



ASME 2021 IMECE[®]

International Mechanical Engineering Congress & Exposition[®]

CONFERENCE

Nov 1–5, 2021

Virtual, Online

Program

<https://event.asme.org/IMECE>

The American Society of Mechanical Engineers[®]
ASME[®]


ASME
SETTING THE STANDARD

Table Of Contents

WELCOME LETTER.....	3
GENERAL INFORMATION	5
IMECE SCHEDULE.....	6
KEYNOTE SPEAKERS.....	8
TRACK PLENARY PRESENTATIONS	16
IMECE ROUNDTABLES	43
SPECIAL PANEL SESSIONS.....	55
EXHIBITOR/SPONSORS	61
COMMITTEE MEETINGS & SPECIAL EVENTS.....	65
SPECIAL MEDALS.....	69
TECHNICAL SESSIONS	77



Welcome From The Chair

Dear Distinguished Attendees:

Welcome to the ASME 2021 International Mechanical Engineering Congress and Exposition (IMECE)! We are excited about this year and continue to celebrate the **breadth, depth,** and **technical connections** that are the heart of a worthwhile conference experience. As you consider your schedule for this week, I personally invite you to benefit from each of these aspects of IMECE.

Breadth: 1350+ Technical papers and presentations over 14 technical tracks. At IMECE, you can meet with experts from across the spectrum of mechanical engineering research and development. So, spend some time attending a few sessions outside of your technical area and see what you can take back to improve your own work.

Depth: Scientific expertise, not a trade show. From Nobel Laureates to one of the world's most cited researchers, the exceptional research depth at IMECE is nowhere so apparent as in the Congress-Wide Keynote Speakers and the Track Plenaries. For example:

- Dr. Shuji Nakamura, 2014 Nobel Laureate in Physics (Congress-Wide Keynote)
- Dr. Shery Welsh, Director of AFOSR with \$500M in Basic Research (Aerospace Track Plenary)
- Dr. Nancy Sottos, Member of the NAE (Materials Track Plenary)
- Dr. Mehrdad Zangeneh, Founding Director of Advanced Design Technology, Ltd. (Fluids Track Plenary)
- Dr. Yi Cui, one of the world's most cited scientists (Materials Track Plenary)

And these are just a few of the amazing speakers that will be available to you! Go to (<https://event.asme.org/IMECE/Keynote-Speakers>) and (<https://event.asme.org/IMECE/Program/Track-Plenary>) for the full list.

Technical Connections: 2,000+ attendees. The primary benefit of a conference is in meeting and interacting with fellow technical experts. As worldwide health conditions have forced us to remain virtual for a second year, we have implemented several new approaches to enable those interactions, and I invite you to fully participate. We have introduced a new series of special technical panels and roundtables designed to be technically focused informal gatherings. Topics for these 30–60 minute sessions range from “Nuclear Power in Space Applications: Promise, Practice, and Challenges” to “New Trends in Lung Therapies” to “Why Thermal Properties Still Matter” to “Advanced Manufacturing Education,” “Beyond GPS: Advancing MEMS/NEMS Sensors for Inertial Navigation Only,” and many more. The full list of Roundtables and Special Panels is on the congress website. Of course, nothing happens until you push the button. So, please join us! Whether in a technical session or special technical event, turn on your camera, make a comment, ask a question, share an opinion, and build those connections!

Finally, on behalf of the IMECE Congress Steering Committee, I express my sincere thanks to and recognition of the hundreds of volunteers and the ASME staff that have dedicated time and effort to strengthening the fields of Mechanical Engineering R&D through organizing and leading sessions, topics, and tracks at this year's IMECE. It is never convenient to serve, and we have all continued to face frustrations of schedule, deadlines, conference websites, and more. Thank you for your service. Your efforts have resulted in a strong congress that will continue to drive research forward both now and in the next generation. Thank you.

Sincerely,



Marriner H. Merrill, Ph.D.

IMECE 2021 Technical Program Chair

Materials Science and Technology Division, U.S. Naval Research Laboratory





GENERAL INFORMATION

PUBLICATIONS: IMECE2021 CONFERENCE PAPERS AND PROCEEDINGS

Technical papers accepted for publication for IMECE2021 will be available through a dedicated Online Papers site available to all fully paid attendees beginning a week before the conference.

- The ISO batch file and two zip files also will be made available on the Online Papers site prior to the conference, so that users may download to their personal computer systems.
- Post-conference, papers presented at the conference will be published as the official Proceedings of the conference on The ASME Digital Collection (asmedigitalcollection.asme.org).

Authors may refer to The Collection for DOI links and citation information for their papers. All ASME conference Proceedings are disseminated worldwide and submitted for indexing to SCOPUS, COMPENDEX, the ISI Conference Proceedings Citation Index, Web of Science (Clarivate), and Google Scholar. For further information about ASME Publications, please contact conferencepubs@asme.org

Membership to ASME

Attendees who pay the Non-Member registration rate will be offered a complimentary four-month ASME trial membership following the conference.

Poster Presentations

Poster presentations will be available throughout the entire conference. Be sure to visit the Undergraduate Research and Design Expo Student Poster Competition, NSF Student Competition, and the Research Posters.

Volunteer Thank You

Thank you to our volunteers who dedicated their time to review submissions, moderate sessions, and provide their technical expertise. Your flexibility during these unpredictable times is appreciated.



IMECE SCHEDULE

Monday, November 1st	
10:00AM - 11:00AM	Keynote
11:00AM - 11:20AM	Break
11:20AM - 12:50PM	Technical Sessions
12:50PM - 1:10PM	Break
1:10PM - 1:55PM	Track Plenary Sessions
1:55PM - 2:15PM	Break
2:15PM - 3:15PM	Special Panels
3:15PM - 3:35PM	Break
3:35PM - 5:05PM	Technical Sessions
5:05PM - 5:25PM	Break
5:25PM - 6:55PM	Technical Sessions

Tuesday, November 2nd	
10:00AM - 11:30AM	Technical Sessions
11:30AM - 11:50AM	Break
11:50AM - 12:35PM	Track Plenary Sessions
12:35PM - 12:55PM	Break
12:55PM - 2:25PM	Technical Sessions
2:25PM - 3:25PM	Marketplace / Poster Hall
3:25PM - 4:55PM	Technical Sessions
4:55PM - 5:15PM	Break
5:15PM - 6:15PM	Special Roundtables
6:15PM - 6:35PM	Break
6:35PM - 8:05PM	Technical Sessions



IMECE SCHEDULE

Wednesday, November 3rd	
10:00AM - 11:30AM	Technical Sessions
11:30AM - 11:50AM	Break
11:50AM - 12:35PM	Track Plenary Sessions
12:35PM - 12:55PM	Break
12:55PM - 2:25PM	Technical Sessions
2:25PM - 3:25PM	Marketplace / Poster Hall
3:25PM - 4:25PM	Special Panels
4:25PM - 4:45PM	Break
4:45PM - 6:15PM	Technical Sessions

Thursday, November 4th	
10:00AM - 11:00AM	Keynote
11:00AM - 11:20AM	Break
11:20AM - 12:05PM	Track Plenary Sessions
12:05PM - 12:25PM	Break
12:25PM - 1:55PM	Technical Sessions
1:55PM - 2:55PM	Marketplace / Poster Hall
2:55PM - 3:55PM	Special Roundtables
3:55PM - 4:15PM	Break
4:15PM - 5:45PM	Technical Sessions
5:45 - 6:00PM	Break
6:00PM - 7:30PM	Technical Sessions

Friday, November 5th	
10:00AM - 11:00AM	Keynote
11:00AM - 11:20AM	Break
11:20AM - 12:50PM	Technical Sessions
12:50PM - 1:10PM	Break
1:10PM - 2:40PM	Technical Sessions
2:40PM - 3:00PM	Break
3:00PM - 4:30PM	Technical Sessions
4:30PM - 5:00PM	Closing Remarks and Feedback Suggestions



KEYNOTE SPEAKERS

**Monday, November 1,
10:00AM–11:00AM ET**



Aprille Joy Ericsson, Ph.D.
*Aerospace Engineer,
Technologist, Project and
Program Manager, Professor,
STEAM Youth Educator NASA
GSFC, Instrument Systems
and Technology Division,
New Business Lead*

Keynote Title: Making Lemonades out of Lemons: Technology Developments During the Age of COVID-19

Abstract: The COVID-19 pandemic derailed the best-laid plans. And yet, the response from the engineering and research community has been remarkable, wrote Tom Costabile. As I say, turning Lemon into Lemonade, 2020–2021 has been a period to remember and there are some innovations worth noticing. Turning the pandemic productivity boom into long-term growth as technology, particularly artificial intelligence and automation fueled by pandemic-induced business changes and prospects of aggressive government funding, has helped the economy take off. Learn about some of the last 18 months' strides in technology, such as Strides in Artificial Intelligence; Autonomous robots that disinfect (UVLight) and deliver necessities; Advanced manufacturing producing 3D-printed concrete,

and Open sourced face shields; as well as, Quantum theory applications of unhackable internet and computing; and lastly, Satellite mega-constellations, asteroid sample retrieval and helicopters on Mars.

Biography: Aerospace engineer Aprille Joy Ericsson's career is distinguished by "firsts." She considers her most prestigious the honor of being the first person of color to receive The Washington Award from the Western Society of Engineers. She is the first African-American female to receive a Ph.D. in Mechanical Engineering from Howard University (HU) and the first African-American female civil servant to earn an Engineering Ph.D. at the NASA Goddard Space Flight Center (GSFC). There she currently serves as New Business lead for the Instrument Systems and Technology Division (ISTD). During her 25+ year tenure with NASA, Dr. Ericsson has worked as an Aerospace Engineer, Technologist, Project and Program Manager, and Executive. She has taught at Howard University, University of Maryland, and Bowie State University. Dr. Ericsson has been named one of the top 50 minority women working in science and engineering fields by the National Technical Association, and she was ranked 8 of 20 on the 2016 list of the Most Powerful Women Engineers by Business Insider.

Ericsson was born in Brooklyn, N.Y. Raised in the projects of Bedford-Stuyvesant, she began her education being bussed to an elementary school



in Brooklyn. “It didn’t take me long to realize I had an aptitude for mathematics and science,” she recalls. In her last year of junior high school, she won second place in the science fair and scored high on all her regent and citywide exams. She passed all entrance exams for New York’s technical high schools, but decided, at age 15, to move to Cambridge, Mass., where she lived with her grandparents and attended on scholarship the Cambridge School of Weston. There, she continued to excel academically and was accepted into the Massachusetts Institute of Technology (MIT) Minority introduction To Engineering, Entrepreneurship and Science program. Ericsson coupled her early academics with extracurricular activities, including playing basketball and other sports. “I believe in living a well-rounded life,” she explains. Throughout her life she has competed in basketball, flag football, and softball. She played on National ranked softball teams which have won two Coed Worlds, numerous State Championships, and a Women’s military World tournaments. She has been voted women’s MVP for coed flag football. Dr. Ericsson’s dedication to youth has also continued as a basketball, softball, baseball, and T-ball Coach. She also enjoys skiing, tennis, and cycling for fun.

After graduating high school, she attended the MIT, where she earned a bachelor’s degree in Aeronautical/Astronautical Engineering. During her time there, she was involved in several Aerospace research projects and lead the research for Manned Mars Mission crew systems for interplanetary vehicles for her senior project. “These projects generated my strong desire to participate in manned space missions,” she explains. She applied to NASA’s astronaut

program, but a history of asthma placed her on medical review.

She earned her master’s and doctoral degree at Howard University (HU), Washington, D.C., where her research focused on developing practical design procedures for future orbiting space structures, like the Space Station. She received several prestigious internships, fellowships, and grants, including the NASA GSFC SIECA Summer Institute for Engineering and Computer Applications, the NASA/HU Center for Studies of Terrestrial and Extraterrestrial Atmospheres, the Wright Patterson Air Force Laboratories, the NASA DC Space Grant Consortium, Dorothy Danford Compton and HU Terminal Dissertation Fellowships.

In addition to receiving funding from the NASA, while there she also held two internships and COOP positions while finishing her degree. During her first summer at GSFC she won the first student presentation competition, and as a result it is mandatory for all GSFC interns to take her seminar on “Giving Outstanding Technical Presentations.” Because of that experience, she was offered a full-time job there after she received her Ph.D. “That’s how you do it,” she says. “Once you get your foot in the door and meet people, you can show them you’re capable of doing the work.”

As an altitude control systems specialist, her satellite missions have included projects X-Ray Timing Explorer, Tropical Rain Forest Measurement Mission, and the Wilkerson Microwave Anisotropy Probe. For these projects, Ericsson developed and used programs for dynamic modeling simulation, which are



invaluable in predetermining the dynamics and structural reactions of spacecraft. Following those assignments, Dr. Ericsson was detailed to NASA HQs as a Program Executive for Earth Science and a Business Executive for Space Science. She returned to GSFC for a long tenure as an Instrument Project Manager, where she led spaceflight instrument teams and proposal developments for instruments ranging from \$15M to \$500M. She also served as the Capture Manager for a proposed \$250M Astrophysics mid-sized Class Explorer, called STAR-X. Prior to that proposal development, Dr. Ericsson served as the GSFC Program Manager for SBIR/STTR. Formerly, she served as the Deputy to the Chief Technologist for the Engineering and Technology Directorate and Acting Associate Chief Technologist of ISTD.

Ericsson's work as an aerospace engineer has presented many opportunities to fulfill her dream of advancing space flight. Additionally, she has traveled extensively throughout the world, presenting papers on her research in the U.S., Canada, Germany, Netherlands, England, South Africa, and most recently Mexico. She has also been a Guest Researcher at Radcliffe Institute/Harvard University, and she has acquired a Leadership & Management Certificate from John Hopkins University.

She speaks to young people across the country—especially minorities and women—to encourage them to follow in her footsteps. She mentors student every year, and 20 years ago she created an email pipeline for groups underrepresented in Science, Technology, Engineering, and Mathematics (STEM) disciplines. This pipeline distributes opportunities for employment, grants, internships, and fellowships. “I feel obligated to spur the interest of youth particularly minorities

and females in STEM,” she says. “Without diversity in these fields, the United States will not remain technically competitive.” She currently serves as an Advisor to the DMV NSBE Jr. Chapter at Howard University. She is lead Coach for the chapter's FIRST Lego League Robotics teams. Dr. Ericsson has served as former Board member, some worth noting are HU Trustee, International Black Aerospace Council, and HU Middle School of Mathematics and Science Chair. Currently, she is a Board member of MIT's Industry Advisory Council for Minority Education; the National Academies of Science, Engineering and Medicine Board of Higher Education and Workforce; Advisory Council of Organization Black Aerospace Professionals; and Chair of the Advisory Council of HU Department of Mechanical Engineering.

Dr. Ericsson's many honors and awards include an Honorary Doctor of Science from Medgar Evers College; The Tau Beta Pi Alumni of Distinction; The Washington Award; The Women's Network “Top 18 Women Who Will Change the World”; National Technical Association's “Top 50 Minority Women in Science and Engineering”; the Women in Science and Engineering Award for Engineering Achievement; the Black Engineers Award Conference Special Recognition Award; and several NASA Goddard Space Flight Center Honor Awards, which include an Excellence in Outreach and Technical awards for several Space mission projects.

Dr. Ericsson has always pursued ambitious undertakings and has never shied away from aiming high. In fact, she lives by these words of Norman Vincent Peale: “Shoot for the moon. Even if you miss, you'll land among the stars.”



Thursday, November 4, 10:00AM–11:00AM ET



Shuji Nakamura, Ph.D.
Professor, University of California-Santa Barbara, 2014 Nobel Laureate in Physics Recipient, ASME 2021 Richard J. Goldstein Energy Lecture Award Recipient

Keynote Title: The Invention of Blue LED and Future Lighting

Abstract: In 1970's and 80's, efficient blue and green light-emitting diodes (LEDs) were the last missing elements for solid-state display and lighting technologies due to the lack of suitable materials. By that time, III-nitride alloys were regarded as the least possible candidate due to various "impossible" difficulties. However, a series of unexpected breakthroughs in the 1990's totally changed people's view angle. Finally, the first highly efficient blue LEDs were invented and commercialized at the same time of 1993. Nowadays, III-nitride-based LEDs have become the most widely used light source in many applications. Laser lighting using blue/violet lasers is also coming as a future lighting with an ultimate point light source.

Biography: Shuji Nakamura was born on May 22, 1954, in Ehime, Japan. He obtained B.E., M.S., and Ph.D. degrees in Electrical Engineering from the University of Tokushima, Japan in 1977, 1979, and 1994, respectively. He joined Nichia Chemical Industries Ltd. in 1979. In 1988, he spent a year at the University of Florida as a visiting research associate.

In 1989, he started the research of blue LEDs using group-III nitride materials. In 1990, he developed a novel MOCVD system for GaN growth, which was named Two-Flow MOCVD. Using this system, he could grow the highest crystal quality of GaN-based materials. As his private opinion, the invention of Two-Flow MOCVD was the biggest breakthrough in his life and his GaN-based research. In 1993 and 1995, he developed the first group-III nitride-based high-brightness blue/green LEDs. He also developed the first group-III nitride-based violet laser diodes (LDs) in 1995. In 1996, his former company, Nichia, started selling white LEDs using his invention of blue LEDs. These white LEDs have been used for all kinds of lighting applications in order to save energy consumptions. The electric consumption of white LEDs is about one-tenth in comparison with that of conventional incandescent bulb lamps nowadays. In 1999, Nichia started selling the violet laser diodes for the application of blue-ray DVDs.

Professor Nakamura has received numerous awards for his work, including the Nishina Memorial Award (1996), the Materials Research Society Medal Award (1997), the Institute of Electrical and Electronics Engineers Jack A. Morton Award, the British Rank Prize (1998), the Benjamin Franklin Medal Award (2002), the Millennium Technology Prize (2006), the Czocharlski Award (2007), the Prince of Asturias Award for Technical Scientific Research (2008), The Harvey Award (2009), and the Technology & Engineering Emmy Award (2012) awarded by The National Academy of Television Arts & Sciences (NATAS). He was elected as a fellow of the U.S.



National Academy of Engineering in 2003. He is the 2014 Nobel Laureate in Physics for the invention of efficient blue light-emitting diodes which has enabled bright and energy-saving white light sources. Prof. Nakamura received the 2014 Order of Culture Award in Japan. He was inducted into the National Inventors Hall of Fame in 2015. He received the 2015 Charles Stark Draper Prize for Engineering and the 2015 Global Energy Prize in Russia. Since 2000, he has been a professor of Materials and Electrical & Computer Engineering at the University of California, Santa Barbara. He holds more than 200 U.S. patents. He has published over 650 papers in his field. Prof. Nakamura is the Research Director of the Solid State Lighting & Energy Electronics Center and The Cree Chair in Solid State Lighting & Displays. He co-founded Sora Laser Diodes (SLD), Inc. in 2013, which operates vertically integrated fabrication facilities in California's Silicon Valley and Santa Barbara.

Friday, November 5, 10:00AM–11:00AM ET

Keynote Panel

Title: Manufacturing the Future: Innovations at Manufacturing USA Institutes

Abstract: This Keynote Panel will describe how collaboration via a public-private partnership is connecting industry and academia to solve the most challenging advanced manufacturing problems. Manufacturing USA institutes create a neutral collaboration space that accelerates manufacturing technology development for use by industry, resulting in breakthrough innovations

that will have transformational impacts on future U.S. supply chains. This panel will highlight diverse and exciting projects and speakers to showcase technology advancement in areas such as Smart, Secure, Clean, and Resilient Manufacturing. Listen to success stories by project stakeholders in critical areas related to the broad themes of IMECE. A live Question and Answer session will be featured so that the audience can engage with these industry leaders.

Moderator:



Mike Molnar is the founding director of the Office of Advanced Manufacturing (OAM) at the National Institute of Standards and Technology (NIST). In this

capacity he is responsible for NIST extramural advanced manufacturing programs and liaison to industry and academia. Mike is also the founding director of the Advanced Manufacturing National Program Office (AMNPO), an interagency team with core staff hosted at NIST. This interagency team works to coordinate federal activities in advanced manufacturing and is the Congressionally designated National Program Office for Manufacturing USA – the National Network for Manufacturing Innovation. Mike joined NIST in 2011. Prior to federal service Mike had a 30-year industry career in advanced manufacturing, with leadership roles in manufacturing technology development, corporate manufacturing engineering, capital planning, metrology, quality systems, automation, computer integrated manufacturing, and industrial controls for manufacturing competitiveness. Mid-career Mike served as the



manufacturing policy Fellow in the White House Office of Science and Technology Policy. Mike is well known in industry and academia, with over thirty years of leadership roles in manufacturing professional societies and associations—most recently as the President of the Society of Manufacturing Engineers. He is a licensed Professional Engineer, Certified Manufacturing Engineer, and was elected Fellow of both the American Society of Mechanical Engineers and the Society of Manufacturing Engineers. Mike earned an Executive MBA from the University of Notre Dame, and a Bachelor's in Mechanical Engineering and Master's in Manufacturing Systems Engineers from the University of Wisconsin.

Panelists and Projects:

Clean Energy, Smart Manufacturing, Innovation Institute, CESMII - CA



Panelist: Dr. Mark McGinley,
*Infrastructure Research,
Civil and Environmental
Engineering, University
of Louisville*

Cement manufacturing is energy-intensive (5GJ/t) and comprises a significant portion of the energy footprint of the composite material. Incorporating modern monitoring, simulation and control systems will allow lower energy use, lower environmental impact and lower costs. Using predictive process models, data analytics, sensors and machine learning, a Smart Manufacturing for cement control system platform will be developed.

Dr. W. Mark McGinley, PE is a professor in Civil Engineering at the University of Louisville and is a structural engineer and building scientist with more than 30 years of research and forensic engineering practice in building systems. He joined the Civil & Environmental Engineering Department faculty at the University of Louisville from North Carolina A & T State University, where he was Chair of the Civil, Architectural, Agricultural & Environmental Engineering Department. He received his PhD, MSc, and BSc in Civil Engineering at the University of Alberta and is a registered professional engineer. Mark is a recognized expert in masonry building systems, in particular, masonry building envelopes. His research has included basic research on the structural performance of masonry walls, energy performance of buildings, and multidisciplinary efforts on the evaluation of the energy systems of existing buildings. He has conducted demonstration projects to evaluate condensing heat exchangers and the thermal mass effects of night time ventilation, materials research, water penetration experiments on envelopes, and the building envelope performance of brick veneer and steel stud wall systems. He is the Principal Investigator on the CESMII/DOE-funded Smart Manufacturing of Cement. Over 135 publications have resulted from his research efforts. Dr. McGinley is also in a number of technical societies, leading many committees in The Masonry Society and ASTM. He was granted the honor of TMS Fellow in 2018. He received the ASTM Gilbert C. Robinson Memorial Award in 2001. In 2008, he received the ASTM Award of Merit and was honored as an ASTM Fellow for his contributions.



America Makes – OH



Panelist: Jesse Boyer,
*Technical Fellow for
Additive Manufacturing,
Pratt & Whitney (Raytheon
Technologies), CT*

“Thermal management in aircraft engines is a challenge with many boundary conditions both in the aircraft environment and in the manufacturing process. Through collaboration with the Manufacturing USA institute America Makes and its members, additive manufacturing technology was applied to the development of thin-walled heat exchangers that enabled breakthrough improvements in material savings, efficiency and design geometry.”

Jesse Boyer is currently the Additive Manufacturing Fellow at Pratt & Whitney (P&W), and previously the Fellow of Advanced Manufacturing Metrology. Jesse holds two BSE degrees from the University of Michigan in Aerospace Engineering and Naval Architecture & Marine Engineering. Jesse has worked a variety of engineering and management positions throughout his ~25+ year career in automotive at General Motors and at P&W, including roles as a Process Engineer, Industrial Engineer, Methods Specialist and Technology Manager for Military Blades, Technology Manager of the Capital Equipment Procurement Group, and the Manager of the Advanced Manufacturing Metrology Group (including Computed Tomography, Process Modeling and Additive Manufacturing). Current work involves the understanding of key process variables to control additive manufacturing processes, in-process monitoring for production,

and the use of the Digital Thread related to inspection and additive manufacturing.

Over the many years working in manufacturing, he has led numerous successful projects implementing advanced and traditional gaging, as well as leading the manufacturing effort to bring metal additive parts into production at Pratt & Whitney.

Jesse has represented P&W on several committees and conferences including the AESQ Standard for MSA, recently the ASTM F42.01 Sub-Committee Chairman, and the role of Chair of the Executive Committee of America Makes. He has over 15 patents in the areas of manufacturing processes, is published in the SME Manufacturing Engineering magazine, and served as guest editor of a well-known manufacturing journal. He is an undergraduate instructor at the University of Connecticut for manufacturing and instrumental in the curriculum development at the University of Hartford to address the gap of manufacturing inspection capable engineers ready for the workforce in the New England Area.

The Institute for Advanced Composites Manufacturing Innovation, IACMI – TN



Panelist: Dana Swan,
*Manager - Technical
Development Manager,
Arkema Inc.*

Thermoplastic composite advancements for wind turbine blades. Developments in thermoplastic materials help enable large-scale production at lower costs, increase end-of-life recyclability, and aid in job creation for American workers.



Thermoset composites reinforced by fiber are the current material of choice for large-scale wind turbine components; however, challenges in manufacturing costs, performance, and recyclability are limiting. IACMI will investigate new developments in thermoplastic materials with industry partners to lower production costs, improve recyclability of wind turbine blades, and expand applicability to components demonstrated at large scale. The long term impact could reduce costs and improve reliability in composite structures, which allow for process improvements on a larger scale, increasing energy efficiency.

Dana Swan, Technical Development Manager, at Arkema Inc. is responsible for development for the Elium® liquid thermoplastic composite resin. Previously, she held the positions Business Development Manager and Lead Scientist for the Elium rein. Dana has 21 years of experience in R&D, Technical Service and Business Development at Arkema Inc.'s King of Prussia, PA headquarters. During that time, she was instrumental in the development of new technologies on projects spanning a variety of markets and Arkema business units including projects in the paint and coatings, solvent, and catalyst fields as well as composites. Originally from the Pittsburgh area, she received her Bachelor of Science in Chemistry from Allegheny College and her Master's in Chemistry from the University of Virginia.

Advanced Robotics for Manufacturing



Panelist: Juan Aparicio,
*VP of Product -
Ready Robotics*

The ARM Institute accelerates the development and adoption of innovative robotics technologies that are the foundation of every advanced manufacturing activity today and in the future. We leverage a unique, robust, and diverse ecosystem of partners across industry, academia, and government.

Juan Aparicio is the VP Product at Ready Robotics, where he is accelerating the adoption of automation with an ease-of-use and open platform approach to robotics. Before that, Juan was the Head of Advanced Manufacturing Automation for Siemens, where he led a team of researchers and engineers in the area of Robotics + AI, in Berkeley, California. In addition to his job at Ready, he is a Technical Advisor for the Advanced Robotics in Manufacturing (ARM), member of A3's AI Tech Board, and Skydeck advisor. Mr. Aparicio has been awarded the MIT Tech Review innovator under35 2019 Europe in the Pioneer category. In 2020, he was awarded Siemens Inventor of the year and the prestigious Thomas Alva Edison Patent Award.

Track Plenary Presentations

Track 1: Acoustics, Vibration, and Phonics

Thursday, November 4, 2021, 11:20AM–12:05PM



Name: John R Willis,
University of Cambridge
Presentation Title:
*Transmission and Reflection
of Energy at the Surface
of a Composite*

Abstract: While the propagation of waves through a composite (or metamaterial) is by now well understood, there has been much less study of the boundary layers that are bound to be present adjacent to any free surface, or interface between a composite and another material. Such boundary layers are unimportant when frequencies are sufficiently low that there is a separation of scales between the wavelengths of the dominant waves and the scale of the microstructure but become increasingly significant as frequency increases. In the case of any composite with random microgeometry, even the dominant mean wave is evanescent, which explains, for instance, why there has to be a trade-off between resolution, frequency and distance of penetration in non-destructive evaluation by ultrasound. There is also the apparent paradox that the mean wave decays while, in the absence of physical dissipation, the energy must be conserved. This presentation will illustrate these considerations by study of

the problem of transmission and reflection at the boundary of a model composite for which an exact explicit solution can be obtained. The composite is a randomly heterogeneous two-component acoustic medium. Each component has the same elastic modulus but they have different densities. The only information that is given comprises the volume fractions and the two-point correlation. The response of this medium is approximated by employment of a closure assumption analogous to the quasi-crystalline approximation. A variational formulation is employed for the entire medium, which consists of the composite occupying $x_2 > 0$ and uniform material occupying $x_2 < 0$. A plane wave is incident from $x_2 < 0$. The particular choice of an exponentially-decaying two-point correlation yields the surprising feature is that this approximation admits a mean wave comprising two plane waves, both attenuating as they propagate. There are correspondingly two transmission coefficients so that determination of these and the reflection coefficient is impossible just from the requirements of continuity of displacement and traction. The mathematical problem posed by this variational approximation can, however, be solved exactly, essentially by the Wiener-Hopf method. The energy that is reflected back into the uniform material has contributions both from the mean reflected wave and from the incoherent reflection. Both depend on frequency but are independent of distance from the interface. The transmitted energy is similarly partitioned but is progressively

transferred from the coherent signal into the incoherent components as the mean waves decay away from the interface. Conservation of energy remains exactly satisfied. Perhaps the most novel aspect is that a reflection coefficient can be defined for the flux of energy carried by the incoherent part of the reflected wave.

Bio: John Raymond Willis is Emeritus Professor of Theoretical Solid Mechanics in the University of Cambridge, having previously held full-time appointments at Imperial College London, the Courant Institute New York, Cambridge, Bath, and then again Cambridge. He was also Professeur de Mécanique (part-time) at Ecole Polytechnique from 1998 to 2004. Professor Willis is a Fellow of the Institute of Mathematics and its Applications (FIMA) and the Royal Society of London (FRS). He is also a Foreign Associate of the U.S. National Academy of Engineering (2004) and the French Académie des Sciences (2009). He is the recipient of the Governors' Prize in Mathematics from Imperial College (1961), the Adams Prize from the University of Cambridge (1971), the Timoshenko Medal from ASME (1997), the Prager Medal from the Society of Engineering Science (1998), and the Euromech Solid Mechanics Prize (2012). He was Editor of the Journal of the Mechanics and Physics of Solids from 1982 to 2006. His research interests are centered around mathematical investigation of problems arising in the mechanics of solids, including the statics and dynamics of composite materials, dislocation theory, nonlinear fracture mechanics, elastodynamics of crack propagation, and ultrasonic nondestructive evaluation. His recent research has concentrated on problems of strain-gradient plasticity and waves in metamaterials.

Track 2: Advanced Manufacturing

Wednesday, November 3, 2021,
11:50AM–12:35PM



Name: Kevin Chou, *National Science Foundation*

Presentation Title: From Hard Turning to Metal Additive Manufacturing: A Journey of Manufacturing Research

Abstract: Over the past few decades, we have all witnessed the sweeping and powerful evolution of manufacturing technologies, manufacturing enterprise and manufacturing ecosystem, and so forth, which impact not only the industry, but also the society and the globe as a whole. The transformation has, no doubt, also had significant influence to manufacturing research activities in the academe. Beginning a career at the National Institute of Standards and Technology, my research then was focused on hard turning, a slight variation of traditional machining. Today, roughly 25 years later, my group is wholly occupied by the ever increasingly studied additive manufacturing, mostly the metal laser powder-bed fusion technology. In this talk, I will share some interesting work with technical details from my research journey, highlight worth-noting results, as well as toss some ideas for future endeavor. Additionally, I will attempt to draw your attention to discuss some factors, e.g., public policy on manufacturing, attributed to the crusade of rising manufacturing research in U.S. universities, using my limited experience from serving in the Advanced Manufacturing



National Program Office a while ago. In the end, I will underline fundamental research in advanced manufacturing areas recently funded by NSF and seek your comments and feedback.

Bio: Currently serving as a Program Director, Kevin Chou joined the NSF (as IPA) in April 2020 from University of Louisville (UofL), where he is the Edward R. Clark Chair of Advanced Manufacturing. Affiliated with Industrial Engineering Department, Dr. Chou also directed UofL's Additive Manufacturing Institute of Science and Technology (AMIST) from Jan. 2019 to Apr. 2020. He received his Ph.D. from Purdue University and post-doc training from the National Institute of Standards and Technology. His research interest includes a broad range of manufacturing processes as well as relevant multidisciplinary fields, with the current focus on metal additive manufacturing, supported by multiple federal agencies (NASA, NSF, NIST, etc.) and the industry. Dr. Chou's group has published over 170 refereed papers and been granted with 3 patents. He is the recipient of 2016 SME RAPID Dick Aubin Distinguished Paper from SME's Rapid Technologies & Additive Manufacturing Community. Dr. Chou is a Fellow of American Society of Mechanical Engineers (ASME), for which he led the Technical Program of its International Manufacturing Science and Engineering Conference in 2011 and served as the Chair of its Manufacturing Engineering Division (MED) (Jan. 2018– un. 2019). He received the Outstanding Service Award from ASME's MED (August 2020). From Aug. 2014 to Aug. 2015, Dr. Chou was the Assistant Director for Technology in the Advanced Manufacturing National Program Office in the U.S. Department of Commerce, supporting the Manufacturing USA initiative.

**Tuesday, November 2, 2021,
11:50AM–12:35PM**



Name: Richard Fonda, *Naval Research Laboratory, Office of Naval Research*

Presentation Title: Towards Validation of Additive Manufacturing of 316 L Stainless Steel

Abstract: Additive manufacturing has the potential to revolutionize fabrication of multifunctional, low volume, and geometrically complex components. In addition, the distinctive processing window employed by additive manufacturing provides an opportunity to achieve material properties beyond the current state of the art. For example, additively manufactured 316L stainless steel has demonstrated strengths 2-3 times the strength of conventionally produced material. To make use of this technology, however, we need to both reduce the variabilities currently present in this process, whether it be between machines, build locations, or positions within the build, as well as ensure a sufficient understanding of the resulting microstructures, mechanical properties, and corrosion behavior to provide the needed confidence in this technology and the parts manufactured with it. The latter topic is the subject of this presentation.

Since the microstructures dictate the properties that will be exhibited, confidence in the additive manufacturing process requires an understanding of the microstructures produced



across the relevant length scales and how those microstructures give rise to the observed properties. Thus, we have characterized the initial microstructure of laser-powder bed fusion additively manufactured 316L, revealed how that microstructure evolves with isothermal or hot isostatic press post processing, and correlated these results to the mechanical and corrosion behavior of the build. Porosity is one of the most important microstructural features in an AM build, with strong dependencies on the size, number, and morphology of pores present. The grain structure and the sub-grain cellular features can also have a substantial effect on the properties of the build, as do the precipitates that develop during high temperature exposures. General trends in mechanical behavior across these microstructural variations are assessed by microhardness testing, while tensile and fatigue testing are used to reveal the details of the mechanical performance metrics. The corrosion performance of additively manufactured structures is of critical importance to the Navy. We have evaluated the corrosion behavior of additively manufactured 316L using potentiodynamic polarization testing, revealing a loss in passivity at the as-built surface due to the high density of pores at that location. Within the interior of the build, the corrosion behavior exhibits significant variations as a function of post-processing condition, and thus microstructure. While temperatures above 800°C cause a loss of passivity relative to that exhibited in the as-built condition and from lower temperature treatments, increasing post-processing temperatures also causes a delay in the onset of crevice corrosion. And while hot isostatic pressing is effective at removing a large fraction of the original pores, it also results in

both an accelerated corrosion of the build and an expedited onset of crevice corrosion, presumably due to the presence of precipitates produced during that process.

Bio: Dr. Richard Fonda has worked at the U.S. Naval Research Laboratory for more than 25 years on a variety of topics including high strength steels, joining technologies, three-dimensional microstructures, and additive manufacturing. He is currently head of the Microstructural Evolution and Joining section. In 2014, he also became a program officer for the Manufacturing Science programs at the Office of Naval Research, where he supports fundamental research on manufacturing technologies of interest to the Navy.

Track 3: Advanced Materials: Design, Processing, Characterization and Applications

Wednesday, November 3, 2021,
11:50AM–12:35PM



Name: Nancy Sottos,
*University of Illinois at
Urbana-Champaign*

Presentation Title: Eco Manufacturing of
High-Performance Thermoset Polymers
and Composites



Abstract: Conventional manufacturing of high-performance thermoset polymers and fiber-reinforced polymer composites requires curing at elevated temperatures for several hours under combined external pressure and internal vacuum. Curing is generally accomplished using large autoclaves or ovens that scale in size with the component. This traditional curing approach is slow and requires a large amount of energy and capital investment. Moreover, the thermoset polymers produced cannot be recycled. Consequently, when these materials reach their end-of-life use, they are downcycled or discarded in landfills.

Our collaborative strategy for sustainable manufacturing and end-of-life management involves incorporating cleavable comonomers into the matrix of composite materials. The cyclic comonomer enables programmed deconstruction into oligomeric products that are upcycled to regenerate a thermoset with excellent mechanical properties. Utilizing frontal ring opening metathesis polymerization (FROMP) as a manufacturing platform, we rapidly manufacture these materials using near zero energy consumption. The cleavable functionality leads to efficient deconstruction, while maintaining the excellent mechanical properties, long term stability and degradability of the comonomer resins.

Bio: Nancy Sottos holds the Maybelle Leland Swanlund Endowed Chair and is Head of the Department of Materials Science and Engineering at the University of Illinois at Urbana-Champaign. She is leader of the Autonomous Materials Systems (AMS) group at the Beckman Institute for Advanced Science and Technology.

Inspired by autonomous function in biological systems, the Sottos group develops polymers and composites capable of self-healing and regeneration, self-reporting, and self-protection to improve reliability and extend material lifetime. Her current research interests focus on new bioinspired methods to manufacture these complex materials. Sottos' research and teaching awards include the ONR Young Investigator Award, Scientific American's SciAm 50 Award, the Hetényi Best Paper Award in Experimental Mechanics, Fylde Best Paper Award in the journal Strain, the M.M. Frocht, the B.J. Lazan and the Charles Taylor Awards from the Society for Experimental Mechanics, the Daniel Drucker Eminent Faculty Award, the IChemE Global Research Award, and the Society of Engineering Science Medal. She is a member of the National Academy of Engineering (NAE), a Fellow of the American Association for the Advancement of Science (AAAS), Society for Experimental Mechanics (SEM), and the Society for Engineering Science (SES).

**Thursday, November 4, 2021,
11:20AM–12:05PM**



Name: Yi Cui,
Stanford University

Presentation Title: Reinventing Batteries Through Materials Design

Abstract: The fast growth of portable power sources for transportation and grid-scale stationary storage presents great opportunities for battery development. The invention of lithium ion batteries has been recognized with Nobel Prize in 2019. How to increase energy density, reduce cost, speed up charging, extend life, enhance safety, and reuse/recycle are critical challenges. Here, Cui will present the 15 year research in his lab to reinvent batteries and address many of the challenges by understanding the materials and interfaces through new tools and providing guiding principles for design. The topics to be discussed include: 1) A breakthrough tool of cryogenic electron microscopy, leading to atomic scale resolution of fragile battery materials and interfaces; 2) Materials design to enable high capacity materials: Si and Li metal anodes and S cathodes; 3) Interfacial design with polymer and inorganic coating to enhance cycling efficiency of battery electrodes; 4) Materials design for safety enhancement; 6) Lithium extraction from sea water and for battery recycling; and 7) New battery chemistry for grid scale storage.

Bio: At Stanford University, Yi Cui is the director of the Precourt Institute for Energy, co-director of the StorageX Initiative, and professor of materials science and engineering and of photon science at SLAC National Accelerator Laboratory. A cleantech pioneer and entrepreneur, Cui earned his bachelor's degree in chemistry in 1998 from the University of Science & Technology of China and his PhD in chemistry from Harvard University in 2002. He was a Miller Postdoctoral Fellow at the University of California, Berkeley from 2002 to 2005 before joining the Stanford faculty. Cui

manages a large Stanford research group, from which alumni have succeeded in academia and businesses. He has founded four companies to commercialize the energy and environment technologies from his lab: Amprius Inc., 4C Air Inc., EEnotech Inc., and EnerVenue Inc.

A preeminent researcher of nanotechnologies for better batteries and other sustainability technologies, Cui has published more than 500 studies and is one of the world's most cited scientists. He is an elected fellow of the American Association for the Advancement of Science, the Materials Research Society, and the Royal Society of Chemistry. He is an executive editor of Nano Letters and co-director of the Battery 500 Consortium. In 2021, U.S. Department of Energy awarded Cui an Ernest Orlando Lawrence Award, which honors mid-career scientists and engineers in eight research fields. Other awards include Materials Research Society Medal (2020), Electro Chemical Society Battery Technology Award (2019), Nano Today Award (2019), Blavatnik National Laureate (2017), and the Sloan Research Fellowship (2010).



Track 4: Advances in Aerospace Technology

Thursday, November 4, 2021,
11:20AM–12:05PM



Name: Dr. Sherry Welsh
Air Force

Presentation Title: Pivot to Space: Achieving Parity in Space-Related Basic Research Investments

Abstract: Basic research is the long game. It is an invitation to discovery and surprising insights into the natural world through rigorous investigation and understanding. This understanding can lead to groundbreaking ideas, theories and principles that drive progress. As part of the Air Force Research Laboratory (AFRL), the mission of the Air Force Office of Scientific Research (AFOSR) is to discover, shape and champion bold, high-risk, high-reward basic research that profoundly impacts the future Air Force and now Space Force. It is to create today's breakthrough science for tomorrow's Force. AFRL is one laboratory supporting two services, and as such charges AFOSR to take purposeful steps towards achieving parity in space-related basic research investments across all scientific disciplines. Through strategic partnerships with government, academia and industry that spread investments across a wide range of disciplines, diverse grantees, and creative partnering arrangements,

AFOSR drives interdisciplinary collaboration for maximum discovery potential. This diversity also spurs opportunities to enhance the human talent pipeline and generates innovative approaches for communicating the value of basic research to every audience. This talk explores the strategic vision, targeted messaging, and tactical processes needed to remove science roadblocks in the pivot to space, energize and diversify the STEM workforce today and of the future, and accelerate change or lose.

Bio: Dr. Shery Welsh is the Director, Air Force Office of Scientific Research (AFOSR), Arlington, Virginia. In this role she leads the management of the Department of the Air Force's global basic research investment. AFOSR has a staff of 200 scientists, engineers and administrators in Arlington and foreign technology offices in London, England; Tokyo, Japan; Santiago, Chile; and Melbourne, Australia. Dr. Welsh ensures the success of a nearly \$500 million/year basic research investment portfolio and the transition of resulting discoveries to other components of the Air Force Research Laboratory, defense industries and other DoD components. AFOSR's annual investment in basic research is distributed among roughly 300 academic institutions worldwide, 100 industry-based contracts, and more than 250 internal AFRL research efforts.



**Monday, November 1, 2021,
1:10PM–1:55PM**



Name: Sergio Pellegrino,
*California Institute
of Technology*

Presentation Title: *Instabilities in Coilable Thin Shell Structures*

Abstract: Coiling is an efficient way of packaging thin, long, slender structures that has been widely used for deployable spacecraft booms. The advent of advanced composites has allowed a range of cross-sections to be designed and built, but some unexpected and rather subtle instabilities have been observed. In this talk, Pellegrino will present and explain the observed instabilities, and present a theory that predicts the formation of propagating buckles in both open- and closed-section thin shell booms. With the help of this theory, we can design booms that minimize the amplitude of the buckles and hence decrease the likelihood of damage during coiling.

Bio: Sergio Pellegrino is the Joyce and Kent Kresa Professor of Aerospace and Civil Engineering at the California Institute of Technology, JPL Senior Research Scientist and Co-Director of the Space Solar Power Project. In 2019, he was the Michael M. Byram Distinguished Visiting Professor, Ann & H.J. Smead Department of Aerospace Engineering Sciences, University of Colorado Boulder. Pellegrino's general area of research is the mechanics of lightweight structures, focusing on packaging, deployment, shape control and stability. He has authored over

300 technical publications on these topics and received 10 patents. He has recently co-authored with Koryo Miura the book, *Forms and Concepts for Lightweight Structures* (Cambridge University Press, 2020). Pellegrino is a Fellow of the Royal Academy of Engineering, a Fellow of AIAA, and a Chartered Structural Engineer. He is current President of the International Association for Shell and Spatial Structures.

Track 5: Biomedical and Biotechnology
**Thursday, November 4, 2021,
11:20AM–12:05PM**



Name: Bruce Rubin
*Virginia Commonwealth
University & Children's
Hospital of Richmond*

Presentation Title: *Effective Aerosol Therapy in Children and Novel Devices*

Abstract: Aerosol therapy is a mainstay for the treatment of airway diseases. Medication delivered by aerosols is generally less expensive, works more rapidly, and produces fewer side effects in the same medications delivered systemically. As well, medications can often be delivered to the airways that would otherwise be rendered ineffective if given systemically.

The requirements for aerosol therapy depend greatly on the target site of action and the underlying disease. Asthma medications should deposit on the conducting airways while peptides intended for systemic absorption would require deposition at the alveolar capillary bed. Examples



of the latter include insulin for the treatment of diabetes and inhaled growth hormone. Effective deposition requires ultrafine particles to allow them to penetrate to the deep lung, a slow inhalation, and relatively normal airways that do not hinder aerosol penetration. Furthermore, the forces needed to generate the aerosol should not degrade these proteins.

Classically, aerosol bronchodilators and inhaled corticosteroids (ICS) are used to treat asthma. Effective deposition requires particle size and inspiratory flow appropriate for airway deposition with sufficient resident time in the airway to allow sedimentation. Generally, this means high efficiency production of particles between 0.5–5 μm mass median aerodynamic diameter (MMAD) inhaled with a slow inspiratory flow and a breath hold. Many devices have been developed to facilitate effective inhalation. Some common reasons for therapeutic failure of these aerosol medications include the use of inactive or depleted medications, inappropriate use of the aerosol device, and poor adherence to prescribed therapy.

There are additional challenges when aerosol medications are used in infants and small children, or during an acute asthma attack. Rapid respiratory rate and patient anxiety lead to depositing more drug in the oral pharynx and less in the airways. Airway obstruction and inhomogeneous ventilation may also limit the targeted deposition of medications. Although all of the commonly used aerosol devices (jet nebulizers, pressurized metered dose inhalers, and dry powder inhalers) have been shown to be equally effective when used correctly, the ability to use these during an acute asthma exacerbation may be compromised.

These challenges are even greater when the patient is in respiratory failure on a mechanical ventilator. Depending on humidification within the ventilator circuit and the ventilator duty cycle, there may not be adequate time for the aerosol cloud to develop in the circuit and the geometry of the circuit may hinder the deposition of the aerosols in the airway.

Other medications that have been used for the treatment of airway disease include mucolytics such as dornase alfa used to treat cystic fibrosis (CF) and aerosolized antibiotics such as tobramycin solution. Pulmonary deposition of these medications can be severely compromised when the airway is filled with pus. Both dornase and aerosol antibiotics are unlikely to penetrate to the deep lung despite good devices. It is possible that the use of surfactants as a carrier or as a therapeutic agent may help to clear the airways and to transport medication such as these into the deeper lung.

This challenge is even greater when delivering gene therapy vectors to the airway. These are very large molecules often unstable to nebulization, requiring precise dosing, and administered to patients with lung disease. Nevertheless, techniques are being developed to improve the deposition of these vectors in the lungs particularly of patients with CF.



The nasal passage is an additional target for drug therapy. Pump inhalers have been used to administer decongestions or corticosteroids to the nose but deposition into the sinuses is poor. Because of the importance of sinus deposition of antibiotics and other medications for the treatment of chronic sinusitis, there is active investigation not only into developing devices for nasal inhalation but also mechanisms (such as humming after inhalation) that may help to deposit medications within the nose and sinuses. Despite the mechanical and engineering challenges in designing devices for aerosol administration, the clinician's greatest challenge is patient education to use their medications and aerosol devices appropriately.

Bio: Bruce Rubin is the Jessie Ball duPont Distinguished Professor of Pediatrics at Virginia Commonwealth University and was Chair of Pediatrics and Physician in Chief of the Children's Hospital of Richmond from 2009 to 2020. He is also Professor of Biomedical Engineering and affiliate Professor of Physiology and Biophysics at VCU. As a Rhodes Scholar, he trained in Biomedical Engineering at Oxford University and then did his fellowship in Paediatric Respiriology at Sick Kids in Toronto. He holds the MD and Master's in Engineering degrees from Tulane, and an MBA degree from Wake Forest University Babcock School of Business. The International Congress of Pediatric Pulmonology (CIPP), and the American Respiratory Care Foundation, and he is Medical Advisor to the Virginia Society of Respiratory Care. He is a fellow of the AAP, elected to the APS, and a Fellow of the Royal College of Physicians and Surgeons of Canada. Dr. Rubin received the Forest Bird Lifetime Scientific Achievement Award and the Jimmy

A. Young Medal from the AARC, the Prix extraordinaire from CIPP, and he is a Prix Galien Laurate. He holds honorary appointments in four medical schools, is on the editorial board of 10 journals, has published more than 300 original research papers (H-index 68) and chapters, and holds 10 patents. His research focus is regulation of mucus clearance in health and disease, airway inflammation and immunomodulation, cough, and aerosol delivery of medications.

Dr. Rubin is also a magician, elected to membership in the International Brotherhood of Magicians (Wizard Award) and over the past 25 years has taught medical magic in 40 countries on 5 continents.

**Wednesday, November 3, 2021,
11:50AM–12:35PM**



Name: Josh Duckworth
*Uniformed Services University
of the Health Sciences
(USUHS)*

Presentation Title: **Monitoring of Subconcussive Blast Overpressure Exposure in Military Personnel - Sensors, Variables, and Physiologic Associations**

Abstract: The long-term effects of repeated sub-concussive blast exposures (RSCBE) are unknown. Evaluation of blast exposures in deployed settings during Operation Enduring Freedom demonstrated that 2/3 of all recorded blast exposure among service members occurred during training. The COmbat and

training QUeryable Exposure/event Repository (CONQUER) operational monitoring program has collected individual-level blast exposure data during 185 combat training cycles/events among service members representing the U.S. Army, Navy, Marine Corps, and Air Force, including both Special Operations and Conventional Forces, as well as National Guard units. CONQUER is designed to capture, quantify, and report blast overpressure events experienced by service members to command leadership at multiple levels. CONQUER currently employs the Black Box Biometrics (B3) Generation 7 Blast Gauge System, which consists of three separate recording devices mounted on the head, shoulder, and chest of service members, collects quantified blast exposure data such as peak overpressure, peak overpressure impulse, number of exposures, and date/time of exposure for a subject during routine combat training operations. When a gauge is triggered above a settable threshold, a 20 ms recording of pressure versus time is created, which can be examined and analyzed. Historically, the analysis of these data has been a labor intensive and time-consuming effort that required a blast expert to review overpressure versus time waveforms to identify recordings that may not have represented actual blast recordings. In these cases, each analyst would manually create graphics to summarize the data. However, this process and the parameters used to define real versus potentially errant recordings have differed across analysts and groups. We have developed and are testing a standardized automated approach to process these data substantially that reduces manpower requirements. CONQUER data processed using the software that automatically identifies errant blast overpressure recordings has significantly reduced the

manpower needed to analyze data. Using these standardized automated methods enables much more rapid creation of reports of blast exposure history for a unit. To date, approximately 6,000 gauge sets have been issued, more than 300,000 blast gauge recordings have been captured, and over 150,000 full waveforms have been processed. Over 185 unit level and personnel level reports have been created and delivered to commanders since 2018.

Service members involved in heavy weapons training (HWT) courses or exercises will be exposed to repetitive sub-concussive blast exposure events (RSCBE). Instructors at heavy weapons training schools may experience high number of HWT-associated blast exposures per year during a 2–3 years of assignments. Over the last decade, the operational, research, and medical communities have become increasingly aware that repetitive sub-concussive blast exposure may cause acute, cumulative, and long-term clinical and physiologic effects. Service members involved in certain routine combat training courses or exercises will be exposed to multiple, primarily sub-concussive, blast overpressure events. RSCBE has historically been associated with clinical signs such as a decrease in neurocognitive function and subjective symptoms that are similar to those of post-concussive syndrome (headache, memory loss, changes in mood, inability to sleep, balance problems), but the long-term effects are largely unknown.



We have hypothesized that RSCBE causes lasting molecular level damages in the brain. Investigating the neurologic effects of Training Associated Blast (I-TAB), monitored service members undergoing HWT with shoulder-fired recoilless weapons using serum based proteomic evaluations. Blood samples were collected from Students (n = 6) and Instructors (n = 10) at baseline, 6 hr, 24 hr, 72 hr, 2 weeks, and 3 months after HWT. Serum samples were isolated on site; aliquots were snap frozen and shipped frozen for proteomics analysis. Serum samples were analyzed by using the reverse phase protein microarray (RPPM), a high sensitivity, high throughput proteomics platform to determine the serum levels of ubiquitin carboxyl-terminal hydrolase L1 (UCH-L1), glial fibrillary acidic protein (GFAP), Claudin 5 (CLDN5), occluding (OCL), membrane metalloprotease 9 (MMP9), interleukin 6 (IL-6), and cholinergic receptor nicotinic alpha 7 subunit (CHRNA7). RPPM analyses were performed according to established procedures. Compared to the serum levels obtained before HWT, serum levels of all biomarkers were elevated following HWT, both in the Instructor Group and in the Student Group; serum biomarker levels of all protein biomarkers tested were significantly higher in Instructors than in Students; serum levels of most of the tested protein biomarkers were the highest at 3 months post-training in the Student Group; autoantibody titers of proteins related to vascular and neuroglia-specific proteins were elevated in Students at 3 months after HWT as compared to the baseline levels. Our preliminary results from our pilot study suggests that HWT may be associated with vascular and neuroglia insult and inflammation lasting for at least 3 months following exposures, based upon or observation

of, and results in elevated titers of autoantibodies against vascular and neuroglia specific proteins over time.

Bio: Professor of Neurology at the F. Edward Hebert School of Medicine at the Uniformed Services University of the Health Sciences (USUHS), where his research efforts are focused towards the understanding and management of traumatic brain injury related pathophysiology. He is currently conducting two clinical trials evaluating the neurologic effects of repetitive blast exposure and participating in a multicenter trial evaluating the effect of repetitive head impact in collegiate sports. He oversees a laboratory and translational TBI program targeting the molecular and cellular responses associated with sub-clinical and concussive forces, to include alterations in the neuronal membrane, such as the scaffolding protein Caveolin-1 and its role in membrane/lipid raft (MLR) formation and localization and Integrin activation and the relationship to cell adhesion and migration, the extracellular matrix (ECM), and mechano-transduction. Dr Duckworth has in vitro and in vivo models of both blast and impact, which allow for translation and investigation of the primary and secondary response to these external forces. His medical training as Staff Neurologist/Neurointensivist and his research experience make him well qualified to perform investigator responsibilities in this study. He has been involved in numerous peer-reviewed publications that addressed traumatic brain injury and neurological disorders.



Track 6: Design, Systems and Complexity**Thursday, November 4, 2021,****11:20AM–12:05PM**

Name: Yoram Halevi,
*Technion, Israel Institute of
 Technology and Shenkar
 College of Engineering,
 Design, Art*

**Presentation Title: Multi-Level Optimization:
 When Optimal Control Meets Evolutionary
 Algorithms**

Abstract: Optimal control of dynamical systems is a well-established problem with well-known solution. Mathematically, it can be formulated as a classical calculus of variations problem and a solution, consisting of a solvable set of differential equations, is derived accordingly. While theoretically fully solved, in practice there are formidable computational problems ahead. The differential equations are notoriously hard to solve because they constitute a two point boundary value problem (TPBVP), and inherently stiff. Furthermore, the problem needs to be solved in one block, i.e., no segmentation is possible. Evolutionary algorithms are in a way the opposite approach. They are iterative procedures that use the model of the system just to calculate the fitness function but otherwise are very generic. Notable properties are that the size of the problem is not directly related to the computational effort and the flexibility in dealing with variables of different types. The complementing properties of the two approaches call for judicious combination of them by creating a bi-level (multi-level in general) optimization

problem. Topics that need to be addressed in that process include the definition of global parameters, the segmentation, and the interplay between higher and lower levels. The general approach will be demonstrated by a detailed solution of a specific problem: minimizing the invested energy in a partially prescribed end-effector motion of a manipulator with redundant degrees of freedom.

Bio: Yoram Halevi is currently the Dean of Engineering at Shenkar – Engineering, Design, Art and a Professor Emeritus at the Technion, Israel Institute of Technology. He has been with the Technion for over 30 years and held the James H. (Jimmy) Belfer chair in Mechanical Engineering until his retirement in 2020. Dr. Halevi received his B.Sc., M.Sc., and D.Sc. degrees in Mechanical Engineering from the Technion. He held visiting positions at Penn State, Ohio State, and Virginia Tech in the U.S. and in CNR-ITIA in Milan, Italy, as well as short term visits to other universities and research institutes. At the Technion, he was Dean of the Faculty of Mechanical Engineering and Dean of the Division of Continuing Education and External Studies. His public activities include serving as President of Israel Association of Automatic Control, Member of ASME Europe Executive Council, and Chair of ASME Europe conference committee. His research interests are in control of flexible structures, optimal control of redundant actuation systems, model order reduction, and model updating. Yoram Halevi is a Fellow of ASME.



Track 7: Dynamics, Vibration, and Control
Monday, November 1, 2021,
1:10PM–1:55PM



Name: Michael P. Paidoussis

Presentation Title: Pipes Conveying Fluid: A Flourishing Model Dynamical Model

Abstract: In a 1993 paper, the dynamics of a pipe conveying fluid was labelled a model dynamical problem, on the same footing as that of a column subjected to an end-load. From 1939 to 1986, with a concentrated effort in the 1950's and 60's, 92 substantial papers on the subject were published, i.e., an overall average of 2 papers/year, but in the 2019–2021 period this exploded to 31 papers/year, an astonishing progression. Many variations on the theme have been studied, mainly on the dynamical behaviour and stability of the pipe, among them:

- Articulated, curved, tapered pipes
- Pipes with added springs, added masses, attached plates, end-nozzles, on elastic foundations Rotating, spinning, loosely supported, flexibly supported, impacting pipes, extruding pipes
- Laminar, turbulent, two-phase, magnetic, pulsating flows
- Aspirating pipes, pipes subjected to both internal and external axial flows

- Very long, multiply supported, micro and nano pipes
- 2D and 3D motions, subcritical and supercritical bifurcations, double degeneracies, and chaos
- Pipes of functionally graded materials, with smart material overlays
- Resolved and unresolved paradoxes

In this lecture, some of the above, selected for their intrinsic interest, will be discussed, mainly in physical rather than mathematical terms. Emphasis is placed on (i) the fundamentals and (ii) recent contributions.

Bio: Michael P. Paidoussis was born in Cyprus in 1935 and was educated in the Greek Schools of Egypt, McGill University, and the University of Cambridge, receiving his B.Eng. in Mechanical Sciences (with honours) in 1958 and his Ph.D. (Cantab) in Engineering in 1963. He has been Overseas Fellow at GEC in Britain (1958–60) and Research Officer at Atomic Energy of Canada Ltd. (Applied Physics Division, 1963–67) in Chalk River, Canada. He joined the Department of Mechanical Engineering of McGill University in 1967. Promoted to Professor in 1976, he served as Chairman of the Department from 1977 to 1986 and is now the Thomas Workman Emeritus Professor.

Since 1960, he has worked on various aspects of fluid-structure interactions and flow-induced vibrations and instabilities. He is the author of *Fluid-Structure Interactions: Slender Structures and Axial Flow*, Vol. 1 (1998, Academic Press, London), Vol. 2 (2004, Elsevier Academic Press, London); 2nd editions in 2014 and 2016. He is also the leading author of *Fluid-Structure Interactions: Cross-Flow-Induced Instabilities* (2011, Cambridge, University Press). He has published over 265 papers in refereed journals and 175 full papers in refereed conference proceedings; h-index: 69.

He has received a British Association Medal for High Distinction in Mechanical Engineering (1958), the George Stephenson Prize from the Institution of Mechanical Engineers (IMEchE), the CANCAM Prize in 1995, and the ASME 1999 and 2016 Fluids Engineering Award and Medal, and the Worcester Reed Warner Award and Medal in 2017.

He is Fellow of IMechE, ASME, CSME, the American Academy of Mechanics, the Royal Society of Canada (Academy of Science), and the Canadian Academy of Engineering. He has served as Chairman of Division III of IAHR (1981–87). He has been active in various committees of the Pressure Vessels and Piping, Fluids Engineering and Applied Mechanics Divisions of ASME; he was the ASME Calvin Rice Lecturer for 1992. From 1986 to 2014, he has been the Editor of the *Journal of Fluids and Structures* (Academic Press, now Elsevier). Now he is a member of the Advisory Board of the *Journal of Fluids and Structures* and *Journal of Sound and Vibration*.

**Tuesday, November 2, 2021,
11:50AM–12:35PM**



Name: Bogdan I. Epureanu
University of Michigan

Presentation Title: Data-Driven Forecasting of Critical Transitions Based on Invariants of Nonlinear Dynamics

Abstract: A variety of large dimensional systems, ranging from systems examined by engineering to others related to climate sciences and ecology, are at risk of critical transitions. These systems shift abruptly from one state to another when parameters that slowly and smoothly drift cross a threshold. It is exceedingly difficult to know if a system comes close to critical transitions, because typically there are no easily noticeable changes in the system dynamics that can be observed until it is too late and the transition has occurred. Furthermore, accurate models of many physical and engineered systems are often not available, and predictions based on incomplete models have limited accuracy. Thus, a significant challenge emerges. How could we forecast such transitions before they occur? The answer lies in a combined use of invariants in nonlinear dynamics and data-driven methods that together can predict such catastrophic events.



In this talk, we introduce a unique set of data-driven approaches developed to forecast critical points and post-critical dynamics using measurements of the system response collected only in the pre-transition regime. The forecasting approach is based on the phenomenon of critical slowing down, namely the slow dynamics systems exhibit near a tipping point. Based on observations of the system response to natural and controlled perturbations, the method discovers the system's stability, resilience, and equilibriums in current and upcoming conditions. The application of this finding in physical experiments and computational methods will be demonstrated for a variety of natural and engineered systems, including microsensors (vibration based mass detectors), aeroelastic systems (flutter of 2D airfoils and 3D wings), traffic flow systems (onset of traffic jams), electrical systems (nonlinear circuits), and population dynamical systems (yeast populations, ecological systems).

Bio: Bogdan I. Epureanu is an Arthur F. Thurnau Professor in the Department of Mechanical Engineering at the University of Michigan and has a courtesy appointment in Electrical Engineering and Computer Science. He received his Ph.D. from Duke University in 1999.

He is the Director of the Automotive Research Center, which leads the way in areas of autonomy of ground systems, including vehicle dynamics, control, and autonomous behavior; human-autonomy teaming; high performance structures and materials; intelligent power systems; and fleet operations and vehicle system of systems integration.

His research focuses on nonlinear dynamics of complex systems, such as teaming of autonomous vehicles, enhanced aircraft safety and performance, early detection of neurodegenerative diseases, and forecasting tipping points in engineered and physical systems such as disease epidemics and ecology. His research brings together interdisciplinary teams and consortia such as Government (NIH, NSF, DOE, DOD), Industry (Ford, Pratt & Whitney, GE, Airbus), and Academia. He has published over 350 articles in journals, conferences, and books.

Track 8: Energy

Wednesday, November 3, 2021,

11:50AM–12:35PM



Name: Petros Sofronis,
*University of Illinois at
Urbana-Champaign*

Presentation Title: Powering the Future Through International Partnerships for Materials and Engineering System Solutions

Abstract: Achieving and even exceeding CO₂ emission reduction targets and developing innovative safe and reliable energy systems are serious challenges. They require a paradigm shift in our approach to research that bridges not only multiple spatial, molecular to miles, and temporal scales, nanoseconds to decades, but it also necessitates bringing together scientists and engineers from disparate disciplines. In this



presentation, Sofronis will showcase a number of engineering approaches from the International Institute for Carbon-Neutral Energy Research to explore (i) the safe, and reliable production, storage, and utilization of hydrogen as a fuel, and (ii) the underlying science of CO₂ capture and storage technology or the conversion of CO₂ to a useful product. Lastly, the reduction of CO₂ emissions associated with the implementation of these technologies in Japan will be discussed. In particular, development and validation of a lifetime prediction methodology for failure of materials used for hydrogen containment components requires thorough understanding of the deformation and fracture mechanisms at the atom- and micro-scale along with a solid mechanics approach to link these mechanisms with the macroscopically observed failure at the macroscale. He will present an approach to establish this link between microscale and macroscale in a number of material systems. Lastly, he will address issues of mitigation strategies, such as the deceleration of hydrogen-induced fatigue crack growth by adding a few molecules of oxygen per million molecules to the hydrogen gas stream.

Bio: Over nearly 35 years, Professor Sofronis has educated hundreds of students in applied mechanics and researched the behavior of materials in adverse chemo-mechanical environments. He has studied hydrogen embrittlement through modeling and simulation at micro- and macro-levels, coupled with experimental observations of deformation processes at micro- and nanoscales. The UIUC theory on the hydrogen-induced shielding of defect interactions is a rational explanation of hydrogen-induced fracture mediated by dislocation plasticity. Professor Sofronis worked

on mitigating embrittlement of materials for hydrogen applications, such as pipelines transporting hydrogen. Since 2010, he has led the International Institute for Carbon-Neutral Energy Research (I2CNER), co-hosted by Kyushu University in Japan and the University of Illinois, and is funded by the World Premier International Research Initiative of Japan. Under his leadership, I2CNER developed into a world-class institute on fundamental research for the advancement of low carbon emission and cost-effective energy systems and improvement of energy efficiency. Currently, he is establishing the Midwestern Hydrogen Partnership, a collaboration between Argonne National Lab and UIUC to advance and promote the development and adoption of hydrogen and fuel cell technologies as important parts of the energy mix for the Midwestern states.

His honors include the 2020 Frank Kreith Energy Award, ASME; 2011 DOE Hydrogen and Fuel Cells Program Research and Development Award; 2009 Campus Award for Excellence in Graduate and Professional Teaching, UIUC; 2009 Fellow, ASME; 2006 Fellow, Japan Society for the Promotion of Science, Kyushu University; and UIUC “List of Instructors Ranked as Excellent by Their Students” for 37 semesters, between Spring 1993 and Fall 2020.



Thursday, November 4, 2021,
11:20AM–12:05PM



Name: Ting Wang,
University of New Orleans

Presentation Title: Production of Cleaner Energy, Power, Fuels, and Chemicals via Gasification Technology

Abstract: Gasification is an endothermic reactive process that converts hydrocarbon feedstock into synthetic gases (or syngas) that can be further utilized to produce power, high-grade fuels (such as hydrogen, diesel, and jet fuels), and various chemicals (such as methanol, ammonia, and fertilizers). The hydrocarbon feedstock is widely available as coal, biomass, refinery bottom residues (such as petroleum coke, asphalt, visbreaker tar, etc.), and municipal wastes. The syngas can be cleaned, and the produced carbon dioxide can be reused or sequestered, making the process cleaner and more environmentally friendly. This presentation will focus on the thermodynamic aspect of the gasification process and its application to power generation, such as the traditional Integrated Gasification Combined Cycle (IGCC), in which the feedstock is fully and completely gasified into light gases, mainly consisting of hydrogen and carbon monoxide. The traditional syngas cleanup methods are performed in a low-temperature environment, which requires the implementation of syngas cooling with an inevitable large loss of thermal efficiency. Recently, a warm gas cleanup process

has been successfully developed, which has inspired the development of a conceptual Integrated Mild/Partial Gasification Combined (IMPGC) cycle, implemented with a post-combustion carbon capture process. The IMPGC cycle employs mild gasification to preserve the high-energy volatile matters within the feedstock, while the partial gasification is implemented to supplement the steam bottom cycle with a purely char-fired PC plant boiler. Therefore, much less energy is used to gasify the solid chars than go through the full and complete gasification. The performance of this newly conceptualized model is compared to those of other types of power plants. Furthermore, this conceptual (IMPGC) cycle is shown to retrofit older pulverized coal plants and achieve significantly increased thermal efficiency than implement conventional retrofitting approaches.

Bio: Professor Ting Wang is currently the Director of Energy Conversion and Conservation Center (ECCC) and Matthey Endowed Chair for Energy Research of University of New Orleans (UNO). He is also a Professor of the Department of Mechanical Engineering. Prior to UNO, he taught 15 years at Clemson University in South Carolina, USA. He has been involved in energy conservation and power generation in full spectrum for the past 40 years. He specializes in gas turbine power generation, turbomachinery, coal gasification, poly-generation, integrated gasification combined cycle (IGCC), Micro Combined Cooling, Heating, and Power (Micro-CCHP), multiphase flow heat transfer, energy efficiency, and general thermal-flow engineering. Professor Wang received a Ph.D. from the University of Minnesota at Twin Cities in 1984 and M.S. degree from the State University of



New York at Buffalo with a major in mechanical engineering in 1981. He has published over 340 research papers and reports. He was the recipient of the American Society of Mechanical Engineers (ASME) George Westinghouse Silver Medal for his contributions to power engineering in general and Edward F. Obert Award for his co-authored paper in the area of Integrated Mild-Partial Gasification Cycle (IMPGC). He was the Past Chair of two ASME committees (Coal, Biomass, and Alternative Fuels Committee and Gas Turbine Heat Transfer Committee). He has also served on the editorial board of three International Journals. He is an ASME Fellow.

Track 9: Engineering Education

Monday, November 1, 2021,
1:10PM–1:55PM



Name: Jill Seubert
NASA

Presentation Title: Featuring Engineering Education: A Personal Trajectory to Becoming an Interplanetary Navigator

Abstract: Dr. Jill Seubert is an interplanetary navigator who has guided spacecraft across the solar system, including the Mars Perseverance rover. In this presentation, she discusses her experiences throughout her engineering education, and the path that led her from rural Pennsylvania to mission control at NASA's Jet Propulsion Laboratory. Jill's childhood and early education was full of people who supported

her interest in STEM subjects, and she chose to study aerospace engineering due in no small part to the romanticism of space exploration. The first time Jill watched a rover land on Mars was when Spirit bounced onto the surface, and Jill remembers one thing most clearly while watching the Mission Operations team at JPL celebrate: "I wish I were smart enough to do that someday."

Fifteen years later, Jill now knows that she is smart enough to do that and has since supported several highly successful Mars landings and demonstrated new technology to push the limits of deep space navigation. This talk explores Jill's engineering education journey, including opportunities and experiences that formulated key engineering traits. Embracing lessons of the importance of adaptability and transparency, accrued through experiences in space mission operations, has forged Jill as a technical leader. Jill will also discuss her experiences as a minority gender in engineering, and how valuing her individuality and authenticity as well as technical integrity has made her a better engineer. The audience will recognize the importance of their individual role in the transformative engineering landscape and future STEM workforce development while learning many pointers for effectiveness from Dr. Seubert's remarkable journey.

Bio: Dr. Jill Seubert is an interplanetary navigator at NASA's Jet Propulsion Laboratory, and is a leading expert on astrodynamics, estimation, deep space navigation, high-fidelity clock stochastic modeling, and mission and science applications of one-way radiometric data. She

has supported the navigation of numerous Mars missions and was the Orbit Determination Lead for the Mars Science Mission 2020, guiding it to a safe landing on Mars on February 18, 2021. In addition to her work in interplanetary navigation, Dr. Seubert was the Deputy Principal Investigator of NASA's Deep Space Atomic Clock Technology Demonstration Mission.

Dr. Seubert is the recipient of the University of Colorado College of Engineering Recent Alumni Award (2017) and Pennsylvania State University "40 Under 40" award (2021). She holds a B.S. degree in Aerospace Engineering from the Pennsylvania State University and M.S. and Ph.D. degrees in Aerospace Engineering Sciences from the University of Colorado at Boulder.

Track 10: Fluids Engineering

Tuesday, November 2, 2021,

11:50AM–12:35PM



Name: Mehrdad Zangeneh,
University College London

Presentation Title: Multi-objective Inverse Design Based Automatic Optimization of Contra-Rotating Low Head Reversible Pump Turbines for Energy Storage Applications

Abstract: Rapid growth in intermittent renewable energy, in order to meet the growing need for rapid decarbonisation, has created challenges in maintaining grid stability. Hydropower energy storage can play a key role in this area. However,

up to now, hydro power energy storage has been relying on high head configurations which restrict applications to limited areas with the right topology. The EU's Horizon 2020 sponsored ALPHEUS project is involved in development of low head contra-rotating reversible pump turbine hydro storage which can enable larger scale application in most coastal areas. In this presentation, the design and optimization of a shaft driven contra-rotating pump-turbine by coupling a 3D inverse design method with surrogate model based optimization strategy will be outlined.

The 3D inverse design method computes the turbomachinery blade geometry for a specified distribution of blade loading and pressure field. The method enables designers to optimize turbomachinery vanes and blades by exploring a large design space without the trial and error of traditional design methodologies. There are also computational advantages in using inverse design as an optimization strategy. In this approach, the blade is parametrized by using the blade loading and not the blade geometry, which can significantly reduce the number of design parameters to cover the same design space. This feature improves the speed and accuracy of automatic optimization. In particular, by using the inverse design approach it is possible to achieve accurate surrogate model based optimization. This approach can then be used to solve difficult multi-point, multi-objective and multi-disciplinary problems under industrial time scales. The presentation starts from the basic initial flow path design of the contra-rotating pump turbine. This initial flow path is then used together with the 3D inverse design method to generate an initial 3D geometry of the contra-rotating pump turbine, which is then analysed in 3D CFD in pump and



turbine modes at various conditions. This initial stage is then parametrized both in terms of 3D blade geometry and flow path by using a total of 21 design parameters for both blade rows. An initial sensitivity analysis is carried out to select the most influential 11 design parameters for detailed optimization using Kriging as surrogate model and 95 different configurations of the contra-rotating stage. The goal of the optimisation was to maximise the average power output of the turbine and minimise the power required for the pump and reduce the risk of cavitation. Cavitation was considered because of its impact on fish mortality. The selected geometry obtained from the surrogate model based optimization process was verified by detailed CFD and significant improvement in stage efficiency were obtained in both pump and turbine modes.

Bio: Mehرداد Zangeneh is Professor of Thermofluids at University College London and Founding Director of Advanced Design Technology, Ltd. For the past 30 years he has been involved in development of advanced turbomachinery design codes based on 3D inverse design approach and automatic optimization to turbomachinery design. His research has resulted in important breakthroughs in radial turbomachinery, such as the suppression of secondary flows in radial and mixed flow impellers and the suppression of corner separation in vaned-diffusers. He has been granted 7 international patents. He is recipient of Japan's Turbomachinery Society's Gold Medal and the Donald Julius Grone Prize by the Institution of Mechanical Engineers in UK. He has published more than 120 papers in journals and refereed conferences.

Track 11: Heat Transfer and Thermal Engineering

Tuesday, November 2, 2021,
11:50AM–12:35PM



Name: Erika Gupta, U.S.
Department of Energy

Presentation Title: Thermal Energy Management for Reduced CO₂ Emissions in Grid-interactive Efficient Buildings.

Abstract: Buildings account for over 70% of U.S. electricity consumption and power sector CO₂ emissions, and in general over 50% of building energy consumption can be attributed to thermal loads. Thermal energy management in buildings is therefore critical for both energy efficiency and grid flexibility where they are managed through electric powered devices such as heat pumps. Most regions of the U.S. experience peak loads on the electrical grid during the summer season. Improvements to HVAC efficiency and load shifting capabilities through thermal energy storage can help reduce peak loads attributed to HVAC in the residential and commercial sectors and enable loads to be shifted to generation periods with lower CO₂ intensity. This plenary will provide an overview of the Department of Energy's Office of Energy Efficiency and Renewable Energy's R&D activities in this space funded by the Building Technologies Office. The two key areas covered will be next generation HVAC and refrigeration technologies and thermal energy storage systems.



Bio: Erika Gupta is the acting program manager for the Emerging Technologies Program in EERE's Building Technologies Office. She is also the technology manager for the Sensors and Controls Subprogram. Her work at BTO leverages her controls background, focusing on building energy management controls and projects supporting controls for grid-integrated efficient buildings.

She first joined EERE as a technology development manager in the Fuel Cell Technologies Office in 2012, managing projects that could lower the cost of delivery of hydrogen. Prior to joining FCTO she worked in the fuel cell industry at Nuvera Fuel Cells. Prior to that, she spent time as a program engineer at Luminus Devices working on their Phlatlight LEDs. Erika also has a background in reliability engineering and predictive failure analysis.

She attained her B.S. in mechanical engineering at Boston University and M.S. in mechanical engineering, with a focus on control systems, at Worcester Polytechnic Institute and has recently completed a graduate certificate in cyber security from Harvard Extension School.

**Thursday, November 4, 2021,
11:20AM–12:05PM**



Name: Summer Locke,
*Boeing Research
& Technology*

Presentation Title: Global Collaboration Strategy for Tackling Integrated Thermal Systems Challenges in Aerospace Applications

Abstract: As new business models evolve around advanced technologies, significant improvements in the performance of aerospace platforms are possible by approaching designs as integrated mechanical systems. Optimizing across systems requires integrated model-based engineering and a multi-industry standards framework for test and validation. Multi-disciplinary systems design is ultimately about value creation: understanding the map of new business requirements and how they are enabled by modular architectures. Collaboration across industries is critical to the transformation of aerospace production systems, and changing the way we design, manufacturing and test parts and tools. The aerospace military and commercial customers are facing an operational transformation enabled by advanced manufacturing business models that are driving new platform and service requirements. This talk will present examples of multi-disciplinary integrated design of heat exchangers, such as a high temperature pre-cooler, that required concurrent development of materials, manufacturing processes, and thermal system optimization. Locke will conclude with a



discussion of how the Boeing Global Research and Development Strategy team is replicating this example with its approach to creating opportunities to accelerate technology infusion.

Bio: Summer Locke is a Boeing Associate Technical Fellow in Multi-Disciplinary Analysis and Optimization, and a Global R&D Portfolio Manager for collaborative projects with partners in Australia, UK, SE Asia, Norway, Saudi Arabia, and the U.S. She leads technology transition and implementation for research with national labs and small to large suppliers. She specializes in complex systems and is leading proposals for integrated thermal systems, satellite networks with optical quantum encrypted communications, remote sensing, 3D printed spare parts, and optimization of factory flow with Industry 4.0. Locke has been with Boeing since 1996. She started her career in optimization of launch vehicle and satellite trajectories, and as a flight operations lead for eight missions on the Russian/Ukrainian Sea Launch and the Inertial Upper Stage programs. From 2007 to 2012, Locke led technology integration for Boeing Technology Ventures, interfacing with large corporate investors, Sandia and Los Alamos National Labs, and venture capital companies to develop supplier capabilities for new business pursuits for Boeing Commercial Airplanes and Boeing Defense, Space & Security. Before joining Boeing, she was a Satellite Design Engineer in the NASA Space Grant Program from 1994 to 1996.

She holds a Bachelor's of Science in Mechanical Engineering from Arizona State University and a Master's of Science in Aerospace Engineering, Plasma Physics, from the University of Washington. Her thesis focused on modeling

the performance of Hall thrusters for in-space propulsion.

Track 12: Mechanics of Solids, Structures, and Fluids

Monday, November 1, 2021, 1:10PM–1:55PM



Name: Zdeněk P. Bažant,
Northwestern University

Presentation Title: Reappraisal of Phase-Field, Peridynamics and Other Fracture Models in Light of Classical Tests and Gap Test

Abstract: The recently conceived gap test^{1,2}, along with its simulations by crack band microplane models for concrete, shale, composites and plastic-hardening metals, sheds new light on the phase-field and peridynamics fracture models, newly popular in computational mechanics. The gap test_{1,2,3}, which revealed that the fracture energy G_f (or K_{Ic} , J_{Ic}) of a quasibrittle material or plastic hardening metal depends strongly on the level and history of crack-parallel stresses σ_{xx} ($=T$), σ_{zz} , σ_{xz} and can change G_f by even $\pm 100\%$, is reviewed first. Then its implications for the newly popular models are discussed, and comparisons with a number of important classical tests of quasibrittle (concrete or rock) structures that have been previously ignored are also made. Optimal fitting of the data by state-of-art phase-field and peridynamics computer programs calibrated by basic material properties reveals severe discrepancies. While the phase-field models have certain advantages (being superior for static and



dynamic propagation of curved and branching line cracks in perfectly brittle materials obeying LEFM) and could be generalized to different constant (non-varying) levels of crack-parallel stress, they are shown incapable of matching the results of classical fracture tests of typical quasibrittle structures (provided that the same set of model parameters is used for all the tests conducted on the same material). In these comparisons, peridynamics is found to be inferior in all cases, which reinforces the previous, strictly theoretical, critique⁴. The conceptual fault of peridynamics, both bond- and state-based, is that it implies a microstructure with exclusively axial force interactions and ignores shear-resisted particle rotations. Such rotations are what lends LDPM, a particle-based discrete model, its superior performance. The continuum-based crack band model with a realistic tensorial damage constitutive law (M7) fits the data from all the classical and gap tests closely. The previously discussed^{1,2,3} severe limitations of XFEM and cohesive crack models are also pointed out. In closing, the ubiquity of varying crack-parallel stresses in practical problems and their effects in concrete, shale, fiber composites, plastic-hardening metals and materials on submicrometer scale is emphasized.

References (freely downloadable as # 612, 613, 620 and 567 from <http://www.civil.northwestern.edu/people/bazant/>)

¹Nguyen, Hoang T., Pathirage, M., Rezaei, M., Issa, M., Cusatis, G., and Bažant, Z.P. (2020). “New perspective of fracture mechanics inspired by gap test with crack-parallel compression.” Proc. National Academy of Sciences 117(25), 14015 - 14020.

²Nguyen, Hoang T., Pathirage, M., Cusatis, G., and Bažant, Z.P. (2020). “Gap test of crack-parallel stress effect on quasibrittle fracture and its consequences.” ASME J. of Applied Mechanics 87

(July), 071012-1 - 11.

³Nguyen, Hoang T., Dönmez, A. Abdullah, Bažant, Z.P. (2021). “Structural Strength Scaling Law for Fracture Plastic-Hardening Metals and Testing of Fracture Properties.” *Extreme Mechanics Letters* 43, 101141, pp. 1 - 12.

⁴Bažant, Z.P., Luo, Wen, Chau, Viet T., and Bessa, M.A. (2016). “Wave dispersion and basic concepts of peridynamics compared to classical nonlocal models.” J. of Applied Mechanics] ASME 83 (Nov.) 111004-1---16

Bio: Born and educated in Prague (Ph.D. 1963), Bažant joined Northwestern in 1969, where he has been W.P. Murphy Professor since 1990 and simultaneously McCormick Institute Professor since 2002, and Director of Center for Concrete and Geomaterials (1981–87). He was inducted to NAS, NAE, Am. Acad. of Arts & Sci., Royal Soc. London; the academies of Austria, Japan, Italy, Spain, Czech Rep., Greece, India, and Lombardy; and Academia Europaea. Honorary Member of ASCE, ASME, ACI, RILEM. Received Austrian Cross of Honor for Science and Art; 7 honorary doctorates (Prague, Karlsruhe, Colorado, Milan, Lyon, Vienna, Ohio State); ASME Medal, ASME Timoshenko, Nadai and Warner Medals; ASCE von Kármán, Freudenthal, Newmark, Biot, Mindlin and Croes Medals, and Lifetime Achievement Award; SES Prager Medal; Outstanding Res. Award, Am. Soc. for Composites; RILEM Gold Medal; Exner Medal (Austria); Torroja Medal (Madrid); etc. He authored nine books: *Scaling of Struct. Strength, Creep in Concrete Str., Inelastic Analysis, Fracture and Size Effect, Stability of Structures, Concrete at High Temp., Creep & Hygrothermal Effects, Probab. Mech. of Quasibrittle Str., QuasibrittleFrac. Mech.* He is one of the original top 100 ISI Highly Cited Scientists in Engrg. H-index: 139, citations: 84,000, i10 index: 658 (Google, incl. self-cit.). In



2019 Stanford U. weighted citation survey (see PLoS), he was ranked no.1 in CE and no.2 in Engrg. worldwide. In 2015, ASCE established ZP Bažant Medal for Failure and Damage Prevention. His 1959 mass-produced patent of safety ski binding is exhibited in the New England Ski Museum, Franconia, NH.

**Tuesday, November 2, 2021,
11:50AM–12:35PM**



Name: Glaucio H. Paulino,
*Georgia Institute
of Technology*

Presentation Title: **Origami Engineering:
Structures, Metamaterials, and Robots**

Abstract:

We study the geometric mechanics of origami assemblages and investigate how geometry affects behavior and properties. Understanding origami from a structural standpoint can allow for conceptualizing and designing feasible applications across scales and disciplines of engineering. We review the basic mathematical rules of origami and use 3D-printed origami legos to illustrate those concepts. We then present a reduced-order-model, which consists of an improved bar-and-hinge model, to simulate origami assemblages. We explore the stiffness of tubular origami and kirigami structures based on the Miura-ori folding pattern. A unique orientation for zipper coupling of rigidly foldable origami tubes substantially increases stiffness in higher order modes and permits only one flexible motion through which the structure can deploy. We couple compatible origami tubes into a variety of

cellular assemblages that enhances mechanical characteristics and geometric versatility, leading to the design of structures and configurational metamaterials that can be deployed, stiffened, and tuned. We have designed, fabricated (using direct laser writing), and tested (SEM) this metamaterial at the micron-scale. This resulted not only in the smallest scale origami assembly, but also in a metamaterial with intriguing mechanical properties, such as anisotropy, reversible auxeticity, and large degree of shape recoverability. The presentation concludes with a vision toward the field of origami engineering, including origami robots with distributed actuation, allowing for on-the-fly programmability, and other interdisciplinary applications.

Bio: Professor Paulino is the Raymond Allen Jones Chair at the Georgia Institute of Technology. His seminal contributions in the area of computational mechanics include the development of methodologies to characterize the deformation and fracture behavior of existing and emerging materials and structural systems, topology optimization for large-scale multiscale/multiphysics problems, variational methods, deployable structures, and origami engineering. Last year (2020), he received the Daniel C. Drucker Medal of ASME, the Raymond D. Mindlin Medal of ASCE, and the Reddy Medal from Mechanics of Advanced Materials and Structures (MAMS 2020). He also received the 2015 Cozzarelli Prize from the National Academy of Sciences, “which recognizes recently published PNAS papers of outstanding scientific excellence and originality.” He is a former President of the Society of Eng. Science (SES). Recently, he was elected to the U.S. National Academy of Engineering (NAE).



Track 13: Micro- and Nano-Systems Engineering and Packaging

Wednesday, November 3, 2021,
11:50AM–12:35PM



Name: James Hone,
Columbia University

Presentation Title: Tunable Electronic and Optical Properties in Rotatable Heterostructures

Abstract: Van der Waals heterostructures, in which different two-dimensional (2D) materials are assembled into layered structures, provide a new opportunity to create tailor-made materials with new properties. Importantly, these properties are a function not only of the constituent materials but also the relative angle between the layers—leading to the new concept of “twistronics.” The ultra-low friction between layers in these heterostructures provides a unique opportunity to create tunable materials whose properties can be changed by modifying the interlayer twist angle. To do this, we rotate the top layer of a heterostructure using a contact-mode atomic force microscope (AFM) to modify the interfacial twist angle and moiré wavelength, modifying a number of emergent properties.

In this talk, Hone will describe three applications of this technique: (1) tuning bandstructure in graphene-hBN interfaces; (2) tuning symmetry in graphene with two hBN layers; and tuning the nonlinear response of hBN-hBN interfaces. He will also describe new efforts to use on-chip electrostatic actuation to control rotation.

Bio: James Hone is currently Wang Fong-Jen Professor of Mechanical Engineering at Columbia University. He received his BS in physics from Yale in 1990, and PhD in experimental condensed matter physics from UC Berkeley in 1998, and did postdoctoral work at the University of Pennsylvania and Caltech, where he was a Millikan Fellow. He joined the Columbia faculty in 2003. He served as director of Columbia’s Materials Research Science and Engineering Center from 2014 to 2021 and currently serves as chair of the Department of Mechanical Engineering.

Track 14: Monday, November 1, 2021, 1:10PM–1:55PM



Name: Antoine B. Rauzy,
Norwegian University of Science and Technology

Title: Towards a New Generation of Probabilistic Safety Assessment Models and Tools

Abstract: This talk aims at presenting the most advanced research results regarding modeling methods, languages, and tools dedicated probabilistic risk and safety assessment of complex technical systems. We shall start by reviewing the conceptual foundations that frame the domain, namely the computational complexity of calculation of probabilistic risk indicators and the different categories of models. Then, we shall present the S2ML+X paradigm and its application to modeling languages dedicated to probabilistic risk and safety assessment. This paradigm is a



new way of designing modeling languages based on the remark that any behavioral modeling language can be decomposed into two parts: a mathematical framework that is used to represent the behavior, the X, and a set of constructs to structure models. S2ML (system structure modeling language) is such set, gathering in a coherent way object-oriented and prototype-oriented constructs. We shall show by means of concrete examples the power of this approach.

Bio: Professor Antoine B. Rauzy is currently with the Norwegian University of Science and Technology (Trondheim, Norway) and the head of the chair Blériot-Fabre, sponsored by the group SAFRAN, at CentraleSupélec (Paris, France). During his career, he moved forth and back from academia to industry, being notably senior researcher at CNRS, associate professor at Universities of Bordeaux and Marseilles, professor at Ecole Polytechnique and CentraleSupélec, CEO of the start-up ARBoost Technologies, and director of the R&D department of Systems Engineering at Dassault Systemes (largest French software editor). Professor Rauzy got his PhD in 1989 and his habilitation à diriger des recherches (tenure) in 1996, both in computer science. He works on the reliability engineering for more than 20 years and on systems engineering for about 10 years. He published over 200 articles in international journals and conferences. He is on the advisory boards of several international conferences and journals and is regularly invited to deliver seminars and keynote talks.

He renewed mathematical foundations and designed state-of-the-art algorithms of probabilistic safety/risk assessment. He is also the main designer of the AltaRica language and proposed state-of-the-art concepts for model-based systems engineering. He developed safety/risk assessment software that are daily used in industry and that are acknowledged as best-in-class tools.

Professor Rauzy teaches advanced programming methods, model-based systems engineering, and reliability engineering. He has been the adviser of numerous master theses, fifteen PhD theses, and several post-doctoral studies. He managed numerous collaborations between academia and industry, in Europe, in the USA, and in Japan.



IMECE ROUNDTABLES

(These sessions will not be available On-Demand)

2021 ASME IMECE will offer several Roundtable Discussions led by a Moderator/Leader. Each Roundtable will be organized into two 30-minute discussions per scheduled hour, which will provide the audience the opportunity to participate in a couple of different discussions. The Roundtable topics include:

**TUESDAY, NOVEMBER 2, 2021,
5:15PM–6:15PM**

Artificial Intelligence/Machine Learning in the Simulations of Process-Structure-Property-Performance Relationships of Advanced Materials

Description: Artificial intelligence/machine learning (AI/ML) has been increasingly applied to the Integrated Computational Materials Engineering (ICME), which aims to construct the process-structure-property-performance (PSPP) relationships through advanced computational simulations. Despite many successful applications in AI/ML, there are still many unsolved issues of applying AI/ML to further develop advanced materials (e.g., composites and metamaterials). This networking/discussion session is aimed at researchers to discuss the current applications, challenges, and new directions of AI/ML in the simulations of manufacturing process, material modeling, and structural analysis.

Roundtable Leaders



Professor Wenbin Wu

Professor, Purdue/AAE

*Director, Composites Design and Manufacturing HUB
CTO, AnalySwift LLC*



Prof. Xin Liu

*Assistant Professor, Industrial, Manufacturing, and Systems Engineering Department
Institute for Predictive Performance Methodologies*

The University of Texas at Arlington



Finding a Job in Industry— For Graduate Students

Description: This roundtable will feature one or two industry-employed recent graduates and six to ten graduate students to discuss getting a job in industry. Topics include interviewing, industry expectations, visa issues, and other topics.

Roundtable Leader



Alireza Mofidi
Westinghouse

Finding a Job in Academia— For Graduate Students

Description: This roundtable will feature assistant professors and graduate students in a discussion of how to get a job in Academia. Topics can include (depending on interest) the application process, interviewing, start-up packages, teaching and research expectations, and others.

Roundtable Leaders



Ryan McGinnis
UVM



Michael Potter
Francis Marion University



Rachel Vitali
University of Iowa

Commercializing New Technology: Going Beyond the “Final Report”

Description: The final deliverable for many research programs is a report. While this is necessary and useful, a better outcome is an implemented solution, tool, process, etc. Join this roundtable to discuss ways to perform implementable research and transition your results to practical use.

Roundtable Leader



Raymond Monroe
Executive Vice President
Steel Founders’ Society of America (SFSA)



Traditional Manufacturing Processes: Transformation & Trends in Industry

Description: Manufacturers utilize many new manufacturing processes to produce parts that are used by millions of people in all sectors of industry. However, the traditional methods of producing goods remain highly relevant today. Industry in parallel with its support for academic research is adapting those traditional processes to address the new challenges of increasing quality, decreasing costs, and implementing new hybrid processes to meet the demands of the marketplace. Daily, improved traditional and hybrid processes are being explored for the automotive, aerospace, construction, and biomedical as well as many other sectors that comprise economies nationally and globally. Authors and presenters from both industry and academia are invited to attend and discuss their takes on how both older and newer technologies are being incorporated into current manufacturing trends.



David Guerra-Zubiaga, Ph.D.
Assistant Professor, Department of
Mechatronics Engineering
Kennesaw State University
Marietta, GA



Ihab Ragai, Ph.D., PE, FASME
Associate Professor, Penn State Erie –
The Behrend College
Erie, PA



Arun Muley, Ph.D.
Technical Fellow – Thermal Management
Global Integrator – Boeing Additive
Manufacturing
Boeing Research & Technology
Huntington Beach, CA

Roundtable Leaders



I.S. Jawahir, Ph.D.
Professor and James F. Hardymon Chair in
Manufacturing Systems
Director of Institute for Sustainable Manufacturing
Department of Mechanical Engineering
University of Kentucky, Lexington, KY



Identifying and Overcoming Additive Manufacturing Challenges for Improved Industry Adoption

Description: Additive manufacturing (AM) continues to disrupt how mechanical engineers design and apply next-generation, mission-enhancing components in the biomedical, energy, aerospace, defense, automotive, and other industries. Over the past few decades significant progress has been made in AM, yet several challenges remain that are hampering its widespread industrial adoption. This roundtable will focus on some of these ongoing challenges, which may include: (i) AM scalability/industrialization for realizing more cost-effective production and larger build envelopes, (ii) part qualification and certification, (iii) characterizing AM-produced part behavior in extreme/atypical environments, (iv) AM simulation for assisting design and manufacturing processes, (v) training AM to workforce, and more. University and government professionals are welcome to attend and contribute to the roundtable discussion. Persons from industry are particularly encouraged to participate and their inputs will be given priority as necessary.

Roundtable Leader



Scott M. Thompson
Kansas State University

Why Thermal Measurements Still Matter: Going Beyond Property Databases (Part 1)

Description: Often thermal property measurements are viewed as off-the-shelf devices providing needed data to estimate temperatures in engineering analysis. Advances in thermal characterization have allowed these techniques to expand beyond simple heat transfer into a host of other engineering domains. This roundtable brings together experts in thermal characterization to discuss and summarize how thermal measurements can explore the fundamental behavior of nanoscale systems, advance the development of metamaterials, or produce non-invasive medical images. Highlights of the 21st Symposium on Thermophysical Properties (June 20–25, 2021 virtual) will also be given. Attendees are invited to this event to share their opinions on the topics and the impact and lessons learned of communicating these advances through a virtual format.

Roundtable Leader



Zhuomin Zhang
J. Erskine Love, Jr. Professor
Georgia Institute of Technology



Kenneth Kroenlein, Ph.D.
*Citrine Informatics
 Redwood City, CA*



Andreas Mandelis, Ph.D.
*Professor and Canada Research Chair
 University of Toronto*

**Humans in Extreme Environments:
 A Discussion of Current Topics and
 Future Trends**

Description: Research on humans in extreme environments has involved sports, transportation (air, space, land, sea), and military domains. In this roundtable, we want to discuss the broad research topics people are currently working on and what they might see on the horizon. Through this discussion we also hope to discover, or reiterate, core fundamental scientific challenges that need to be addressed to achieve our collective research objectives.

Roundtable Leaders



Reuben Kraft, Ph.D.
Associate Professor

*Department of Mechanical and Biomedical
 Engineering
 Institute for Computational and Data Sciences
 The Pennsylvania State University*



Amit Bagchi, Ph.D.
*Fellow of ASME
 U.S. Naval Research Laboratory*

**Trends and Challenges for NDE & SHM in
 the Next Decade**

Description: Nondestructive Evaluation (NDE) and Structural Health Monitoring (SHM) play a significant role in design, manufacturing, and service of engineering systems and structures. This interactive roundtable will provide a venue for communication, discussion, and dissemination of ideas, advancements, and opinions pertaining to emerging areas of research in this field. Topics of discussion would be focused on (i) Future direction of NDE & SHM in diverse industries such as the aerospace, automobile, and energy systems; (ii) Major challenges in offline and online NDE & SHM; and (iii) NDE education



and ASME NDPD Early Career and Students chapter. Authors and presenters from both industry and academia are invited to attend and discuss their thoughts on how current and future technologies will enable solving future NDE challenges. Students and early career individuals are encouraged to attend this roundtable to explore the ASME Nondestructive Evaluation, Diagnostics and Prognostics Division and their new chapter(s).

Roundtable Leaders



Portia Banerjee

[KBR] NASA Ames Research Center, CA



Yanfeng Shen

*Shanghai Jiao Tong University
Shanghai, China*

Future Manufacturing Technologies and Data Repositories that Can Transform the Research and Development of Microsystems

Description: While the microfabrication technologies on large wafers have reduced the cost for mass production of microsystems,

research on those with non-conventional processes/materials is still cost intensive. Certain multi project wafer services allow to reduce this cost for research, however the number of such services is limited. The purpose of this round table is to discuss on the current or future technologies, design methodologies, or data sharing methods that can significantly reduce this cost. Few examples of such technologies are advancement of additive manufacturing at the micro/nanoscale, collaborative robots, industry 4.0, roll-to-roll fabrication techniques, etc. Another solution can be data repositories with standardized microfabrication process data suitable for research, collecting the data available in the published articles, and utilizing it for building data driven models to assist researchers in optimizing their process parameters. The attendees are invited to share their views on the challenges they face in their research in fabrication of microsystems, and the future technologies or data/project sharing methods for meeting those challenges.

Roundtable Leader



Seyedhamidreza Alaie

Assistant Professor

*Department of Mechanical and
Aerospace Engineering*

*New Mexico State University
Las Cruces, New Mexico*



Beyond GPS: Advancing MEMS/NEMS Sensors for Inertial Navigation Only

Description: The Army's Assured Positioning, Navigation and Timing (APNT) Cross Functional Team (CFT) is dedicated to complementing and enhancing the global positioning system (GPS), especially during missions where GPS is degraded or denied. One strategy is to advance MEMS/NEMS based inertial measurement units (IMU) with small size, weight, and power (SWaP) to provide GPS-free navigation. This roundtable is aimed at researchers to discuss the prospects and status of high-performance inertial sensors in IMUs with small SWaP and their current trajectory to supplant GPS.

Roundtable Leader



Grzegorz (Greg) Hader
Mechanical Engineer
U.S. Army DEVCOM Armaments Center

Thursday, November 4, 2021, 2:55PM–3:55PM

Finding a Job in Academia— For Graduate Students

Description: This roundtable will feature assistant professors and graduate students in a discussion of how to get a job in Academia. Topics can include (depending on interest) the application process, interviewing, start-up packages, teaching and research expectations, and others.

Roundtable Leaders



Dr. Yunye Shi
University of Tennessee



Mohsen Ghamari
Wilkes University



Omid Askari
Mississippi State University

Graduate School Advantages and Applications

Description: Undergraduate students are largely unaware of the benefits of graduate school and the corresponding application process. This roundtable will include a general discussion of graduate school, how it can further a student's career, and what schools are looking for in applicants.



Roundtable Leader



Christopher Depcik, Ph.D.
*Professor and Graduate Director
 Department of Mechanical Engineering,
 University of Kansas*



Jean-Pierre Delplanque
*Professor and Vice Provost & Dean of
 Graduate Studies
 Department of Mechanical & Aerospace
 Engineering, University of California, Davis*



Dr. Malisa Sarntinoranont
*Graduate Coordinator and Professor
 Department of Mechanical & Aerospace
 Engineering, University of Florida*



Dr. Donald Siegel
*Professor and Associate Chair for
 Graduate Education
 Department of Mechanical Engineering,
 University of Michigan*

Space—The Next Frontier

Description: We invite you to the Space—The Next Frontier roundtable to discuss technology needs in space-related industrial sectors, such as mobility, shelter, sustainability, and energy, as seen from a mechanical engineering point of view. A brainstorming session will follow scientific advances in space technologies and how their applications promote technology and innovations on terrestrial challenges.

Roundtable Leader



Dr. Assimina Pelegri
*Professor of Mechanical and
 Aerospace Engineering
 Executive Officer and Undergraduate Director
 of the Department, Rutgers University*





Joseph R. Smith

Director

*Mechanical & Aerospace Division
SC Solutions*

Low Emission Aircraft

Description: There is growing interest in reducing CO2 emissions from aircraft. This can be done by increasing efficiencies, using zero carbon or net-zero carbon fuels, or electrifying the propulsion cycle. This roundtable will discuss prospects and status of these approaches.

Roundtable Leader



Professor Tim Lieuwen

*Regents Professor and David S. Lewis Jr. Chair
School of Aerospace Engineering
Georgia Institute of Technology*

Designing with Real Materials

Description: Real materials have heterogeneities, often randomly distributed, that cause local variations in properties. Join this roundtable to discuss how you account for this in practical design of components.

Roundtable Leader



Hayley Brown, Ph.D

*Mill and Forging Technology Manager
Steel Founders' Society of America (SFSA)*

New Trends in Lung Therapies

Description: Lung therapies vary between pharmaceutical and physical treatments depending on the nature of the disease. The latter has gained enormous applications in managing airway constrictions such as during an asthmatic attack. Various noninvasive physical techniques have been developed to treat Asthma, Obstructive Sleep Apnea, and Respiratory Distress Syndrome. These techniques may introduce airway smooth muscle relaxation or improve saliva secretion in the airways which reduce the dependence on pharmaceutical treatments. An example of these methods is the use of pressure oscillation therapy or self-humidification. In this roundtable discussion, we will share ideas and thoughts on available physical therapies and future developments of new technologies for various lung diseases.

Roundtable Leader



Professor Ahmed Al-Jumaily

Editor in Chief, ASME Journal of Engineering and Science in Medical Diagnostics and Therapy
Director, Institute of Biomedical Technologies
Auckland University of Technology

Advanced Manufacturing Education

Description: In addition to new technological advancements and scientific innovations in Advanced Manufacturing, innovative and integrated education plans would be an integral part of workforce development and building the future of the modern manufacturing industry. In fact, strategic education plans are necessary to cope with the increasing industrial requirements of future manufacturing. This interactive roundtable focuses on effective and innovative pedagogical methods that can be potentially used for teaching undergraduate and graduate manufacturing courses, e.g., additive manufacturing, manufacturing processes, manufacturing design, and materials for manufacturing. Effective education methods not only integrate manufacturing education with industrial practice, but also pave the way for establishment of integrated manufacturing education and research plans in academia. Authors and presenters from both industry and academia are invited to attend this event and share their opinions.

Roundtable Leader



Daniel J. Cox, Ph.D.

Professor and Founding Chair of Manufacturing Engineering
Department of Manufacturing Engineering
Georgia Southern University



Esther Akinlabi, Ph.D.

Director
Pan African University for Life and Earth Sciences Institute, Ibadan, Nigeria



Sekhar Rakurty, Ph.D.

Research Team Lead, Cutting Tools and Machining Researcher
The M.K. Morse Company





Roozbeh (Ross) Salary, Ph.D.

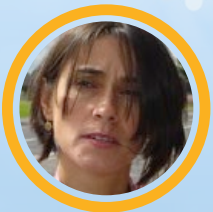
Assistant Professor of Mechanical & BioMedical Engineering

Marshall University (West Virginia State)

Past, Present & Future on Lean Learning Factories

Description: Learning factories have been used for research, education, and training in a close partnership with companies and industrial practices. This roundtable will discuss the innovative experiences in designing, planning, and/or using learning factories. Advantages/disadvantages, difficulties in their design, plan and/or use, technologies and/or methodologies used/studied, competences promoted and/or assessed, among others, will be conversed. In particular, lean learning factories will be addressed.

Roundtable Leader



Anabela C. Alves

ALGORITMI R&D Centre Department of Production and Systems

School of Engineering, University of Minho Guimarães, Portugal

How to Educate Mechanical Engineers in the Light of Increasing Automation and the Spread of Additive Manufacturing

Description: This roundtable will discuss possible and potential modifications needed to current mechanical engineering programs in the light of the increasing shift toward more automation in the industrial workplace and the advent and footprint of additive manufacturing. What new curriculum contents need to be added to current courses in order to bring future mechanical engineers up-to-speed to respond to the needs of the future automation industry and nascent additive manufacturing sector?

Roundtable Leader



Salim Azzouz

*McCoy School of Engineering
Midwestern State University
Wichita Falls, Texas*

Why Thermal Measurements Still Matter: Going Beyond Property Databases (Part 2)

Description: Often thermal property measurements are viewed as off-the-shelf devices providing needed data to estimate temperatures in engineering analysis. Advances in thermal characterization have allowed these techniques to expand beyond simple



heat transfer into a host of other engineering domains. This roundtable brings together experts in thermal characterization to discuss and summarize how thermal measurements can explore the fundamental behavior of nanoscale systems, advance the development of metamaterials, or produce non-invasive medical images. Highlights of the 21st Symposium on Thermophysical Properties (June 20–25, 2021 virtual) will also be given. Attendees are invited to this event to share their opinions on the topics and the impact and lessons learned of communicating these advances through a virtual format.



Liping Wang, Ph.D.
Associate Professor
Arizona State University

Roundtable Leaders



Troy Munro
Assistant Professor
Brigham Young University



Xinwei Wang, Ph.D.
Professor
Iowa State University

SPECIAL PANEL SESSIONS

**MONDAY, NOVEMBER 1, 2021,
2:15PM–3:15PM EDT**

ASME and IMECE Information Panel

This panel will describe how to get involved in ASME, e.g., divisions, and how to be involved with IMECE, including frequently asked questions from ASME staff (e.g., what happens to your papers now.)

Moderator:



Christopher Depcik, Ph.D.
*ASME 2021 IMECE General Conference Chair,
Graduate Director and Professor
Department of Mechanical Engineering,
University of Kansas*

Panelists



Keli Bell-Cole
Manager, Conference & Events, ASME



Stacey Cooper
Manager, Conference Webtool, ASME



Mary Grace Stefanchik
Director, Publishing Development, ASME Press



April Tone
*Senior Manager, Technical &
Engineering Communities (TEC)*



The Educational Landscape of Multidisciplinary Curricula in Mechanical Engineering

Description: More than ever the role of mechanical engineers in addressing complex challenges of our society requires educational programs that systematically and by design introduce students to multidisciplinary content. During this panel, ME Department Chairs/Heads/Deans will share current programs at their institution and provide an overall perspective and views for future plans.

Moderator:



Alberto Cuitino, Ph.D.

ASME 2021 IMECE Steering Committee Vice Chair Department Chair, Professor Mechanical & Aerospace Engineering, Rutgers University

Panelists:



Suvranu De, Ph.D.

Distinguished Professor of Engineering, Department Head, Director, Center for Modeling, Simulation and Imaging in Medicine, Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute



Kevin T. Turner, Ph.D.

Professor and Department Chair, Mechanical Engineering and Applied Mechanics, Materials Science and Engineering, University of Pennsylvania



Alice White, Ph.D.

Professor and Department Chair, College of Engineering, Boston University



Marilyn Minus, Ph.D.

*Professor and Chair of
Mechanical and Industrial Engineering
Northeastern University*

**Nuclear Power in Space Applications:
Promise, Practice, and Challenges**

The challenges of implementing nuclear technology in space is as immense as its promise. Massive power and propulsion potential exists for deep space exploration or human colonization. On all fronts mechanical technology is taken to its furthest extent: materials, manufacturing, simulation, control, safe handling, storage, and transport. In this panel, a wide range of working industry technology specialists will address working current applications alongside handling and storage experts and those involved with realizing the adventurous nuclear thermal propulsion systems of the future. Get an informed read of this subject by attending this panel and the following Q&A session.

Moderator



Joseph R. Smith

*Director, Mechanical & Aerospace Division,
SC Solutions*

Panelists



Dr. Christine Back

*Vice President, Nuclear Technologies and
Materials, General Atomics*



Douglas Burns

*Senior Project Manager, Nuclear Engineer,
Indiana National Lab (INL)*



Dr. Michael Houts

*Nuclear Research Manager, Space Flight Center,
NASA Marshall*



Nicholas Klymyshyn

*Senior Research Engineer, Pacific Northwest
National Lab (PNNL)*



NSF (National Science Foundation) CBET

Representatives from CBET will introduce new funding opportunities and current NSF opportunities from their respective divisions and have a live Q&A with the audience about the opportunities. These presentations will be of greatest benefit to current faculty members (all ranks) at US Institutions.

Panelists



Ying Sun
*National Science
Foundation*



Jeanne VanBriesen,
*National Science
Foundation*

**WEDNESDAY, NOVEMBER 3, 2021,
3:25PM–4:25PM EDT**

Interactive Seminar: Mars Helicopter Ingenuity—An Extraterrestrial Wright Brothers Moment

Ingenuity is the robotic helicopter that hitched a ride to Mars attached to the belly of the Perseverance rover. Ingenuity's main mission is to serve as a technology demonstrator to test the first powered flight on Mars. With the technology demonstration complete, the mission has transitioned to a new operations demo phase, where Ingenuity now complements and expands the capabilities of Perseverance by allowing mapping of the area and identifying

points of interest. Many engineering feats were achieved by NASA, JPL, and their partners to ensure the success of this innovative experiment given the massively compressed program schedule and the unprecedented character of the Ingenuity mission. Josh Ravich, the Ingenuity Mars Helicopter Mechanical Engineering Lead at NASA's Jet Propulsion Laboratory, will discuss the design principles, novel approaches, and challenges that his team faced envisioning and creating Ingenuity.

This interactive seminar aims to engage the community on the most recent technological achievements, discuss the challenges, and explore future engineering avenues related to space exploration and innovation.

Moderator



Dr. Assimina Pelegri
*Professor of Mechanical and Aerospace
Engineering, Executive Officer and
Undergraduate Director of the Department,
Rutgers University*

Panelists:



Joshua Ravich
NASA Mechanical Engineer Lead for Ingenuity Helicopter, JPL NASA

Request for Public Input Information on Manufacturing USA on a National Strategic Plan for Advanced Manufacturing

Description: Under the America COMPETES Act, the federal government develops a strategic plan for advanced manufacturing with stakeholder input from industry and academia. The first of these quadrennial strategic plans was issued in 2018, and federal officials are seeking your input in the development of the 2022–2026 National Strategic Plan for Advanced Manufacturing. This “Interactive Session” is to solicit information from the IMECE audience on where advanced manufacturing should go in the future, and will follow questions issued in a public Request for Information from the White House Office of Science and Technology Policy.

Facilitators:



Mike Molnar
*Founding Director
 Office of Advanced Manufacturing (OAM)
 at the National Institute of Standards and Technology (NIST)
 Founding Director of the Advanced
 Manufacturing National Program Office (AMNPO)*



Bruce Kramer
*Senior Advisor
 National Science Foundation*



Said Jahanmir (Fed)
*Assistant Director for Federal Partnerships
 National Institute of Standards
 and Technology (NIST)
 Advanced Manufacturing National Program
 Office (AMNPO)*



NSF CMMI

Description: NSF (National Science Foundation) CMMI Representatives from CMMI will introduce new funding opportunities and current NSF opportunities from their respective divisions and have a live Q&A with the audience about the opportunities. These presentations will be of greatest benefit to current faculty members (all ranks) at US Institutions.

Panelists:



Siddiq Qidwai

National Science Foundation



Andrew Wells

National Science Foundation



Lucy Zhang

National Science Foundation

Keys to a Successful LinkedIn Profile

LinkedIn Tips and Tricks specifically for students. In this 60 minute session, veteran LinkedIn power user Michael Kaplan will point out the key areas for successful profile development. Items to be covered include:

- How to write a Headline that will get noticed
- The value of the About section
- The hidden power of Recommendations
- Why Skills matter and Endorsements don't
- Much more
- In addition, the session will have 30 minutes specifically devoted to your questions. Michael has more than 18,000 LinkedIn connections and understands the job search challenges facing young engineers.

Speaker:



Michael Kaplan,

FDH Infrastructure Services

EXHIBITOR/SPONSORS

THANK YOU TO ALL SPONSORS FOR THEIR SUPPORT

PLATINUM SPONSOR



BRONZE SPONSORS



WILEY



Exhibitors

ASME Digital Collection

The ASME Digital Collection is ASME's authoritative, online reference for the mechanical engineering and related research communities. It provides unparalleled depth, breadth, and quality of peer-reviewed content with powerful search tools that retrieve content simultaneously from journals (1960 to present), conference proceedings (2000 to present, plus select proceedings back to 1955), and eBooks (1993 to present, plus select titles going back to 1944). A robust and customized taxonomy delivers highly accurate results and related content. Indexed in top A&I services.



Cambridge University Press

Cambridge University Press is a not-for-profit publisher that dates from 1534. We are part of the University of Cambridge and our mission is to unlock people's potential with the best learning and research solutions. Please get in touch if you wish to discuss publishing with us, browse our latest publications and get 30% discount and free shipping.

Higher Education from Cambridge University Press is our new website offering the highest quality content and resources for leading authors to instructors and students, supporting successful teaching and learning journeys in today's rapidly changing educational environment.



MDPI

Machines (ISSN 2075-1702) [IF 2.428, CiteScore 4.5] is an international, peer-reviewed, open access journal on machinery and engineering published monthly online by MDPI. Journal Rank: JCR - Q2 (Engineering, Mechanical) / CiteScore - Q1 (Mechanical Engineering). Manuscripts are peer-reviewed and a first decision provided to authors approximately 13.1 days after submission; acceptance to publication is undertaken in 3 days (median values for papers published in this journal in the first half of 2021).



machines

an open access journal by MDPI



Exhibitors

Morgan Claypool

Morgan & Claypool publishes practical and research-oriented books for engineers in academia, industry, government, and NGOs. Published first as electronic files for the Synthesis Digital Library of Engineering and Computer Science (North America) and IEEE Xplore (worldwide), books are also published in print and eBooks for the retail market. From the most recent advances in automotive technology, to mechanical engineering, to ocean systems' engineering, to sustainable development -- Morgan & Claypool is a leading publisher focused on delivering quality content quickly for engineers around the globe. We started the short-book revolution, and we never stopped.



MORGAN & CLAYPOOL
PUBLISHERS

NYU Tandon School of Engineering

NYU graduate engineering programs exist in the fields of mechanical, civil, urban, industrial, electrical, computer, chemical, biomedical and financial engineering alongside programs in computer science, management of technology, cybersecurity, and integrated digital media. Our goal is to produce highly desirable graduates prepared for industry. This has led us to be one of the top ranked schools in the nation with regards to graduate employability, salary potential and return on investment.



NYU

TANDON SCHOOL
OF ENGINEERING



Exhibitors

Springer

Springer advances discovery by providing the best possible service to the whole research community. We make sure all the research we publish is significant, robust and stands up to objective scrutiny and reaches all relevant audiences in the best possible format so it can be discovered, accessed, used, reused and shared. We support librarians with innovation in technology and data, and provide quality publishing support to societies.



WILEY

Wiley

Wiley a global company, helps people and organizations develop the skills and knowledge they need to succeed. Our online scientific, technical, medical, and scholarly journals, combined with our digital learning, assessment and certification solutions help universities, societies, businesses, governments, and individuals increase the academic and professional impact of their work.

McKelvey School of Engineering at Washington University

The McKelvey School of Engineering at Washington University in St. Louis offers a wide variety of interdisciplinary research opportunities across multiple of the university's top programs. An education at WashU will prepare you for careers in academia, government, and industry while you work to develop solutions for the most urgent challenges facing the world. Students work alongside renowned faculty, collaborate with peers, and graduate prepared to be a leader in their field.



Washington
University in St. Louis
JAMES MCKELVEY
SCHOOL OF ENGINEERING



COMMITTEE MEETINGS & SPECIAL EVENTS (By Day)

This year's meetings will take place online November 8-12, 2021. Registration through the Zoom link is require to access the committee meetings.

**Please visit our website:
<https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events> to access those links.**



COMMITTEE MEETINGS & SPECIAL EVENTS

(By Day)

Please visit our website:

<https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events>

to access those links.

MEETING NAME	MEETING DATE	MEETING TIME
Opening Executive Committee Fluids Engineering Executive Committee Meeting (Closed Meeting)	10/29/21	10:00 AM - 11:30 AM
Fluids Engineering Executive Committee Meeting w/ Technical Committee Chairs (Closed Meeting)	10/29/21	11:30 AM - 12:30 PM
Fluids Engineering Division GSS and Committee Meeting (Closed Meeting)	10/29/21	12:30 PM - 1:30 PM
CV- Assistance: Workshop/Lecture Presented by the Engineering Management Division	10/29/21	4:00 PM - 5:00 PM
Fluids Engineering Town Hall Meeting	10/31/21	1:00 PM - 2:00 PM
Nanoscale Thermal Transport Committee Meeting (Heat Transfer Division, K-9)	11/2/21	6:00 PM - 7:30 PM
Koiter Medalist Lecture	11/3/21	6:30 PM - 7:30 PM
Track 2 Advanced Manufacturing - Award Ceremony	11/3/21	6:30 PM - 7:30 PM
NCAD General Committee Meeting and Awards Ceremony	11/3/21	7:00 PM - 8:00 PM
AMD Awards and Timoshenko Awardee Lecture	11/3/21	7:30 PM - 9:00 PM
Rayleigh Lecture	11/4/21	8:00 PM - 9:00 PM
Fluids Engineering Division Award Ceremony	11/4/21	8:00 PM - 9:00 PM
Materials Division Awards: Nadai Medal, Sia Nemat-Nasser Award, Orr Award, and MD Centennial Award	11/4/21	8:00 PM - 9:00 PM
Oral Competition by the Old Guard	11/7/21	9:00 AM - 1:00 PM
Heat Transfer Division Executive Committee (Closed Meeting)	11/7/21	11:00 AM - 1:30 PM
Heat Transfer Division Executive Committee (Open Meeting)	11/7/21	2:30 PM - 5:00 PM
Thermophysical Properties Committee Meeting (Heat Transfer Division, K-7)	11/8/21	10:00 AM - 11:00 AM
Fluids Engineering Division FMITC Fluid Measurement & Instrumentation Technical Committee	11/8/21	11:00 AM - 12:00 PM
Fluids Engineering Division FMTIC Fluid Mechanics Technical Committee	11/8/21	12:00 PM - 1:00 PM
Technical Committee Meeting - Nanomaterials for Biology and Medicine	11/8/21	1:00 PM - 2:00 PM
Diversity, Equity and Inclusiveness (Heat Transfer Division, K-23)	11/8/21	8:00 PM - 9:00 PM
Member Development and Engagement (MDE)	11/8/21	9:00 AM - 11:00AM
Fluids Engineering Division FMITC Fluid Measurement & Instrumentation Technical Committee	11/8/21	11:00 AM-12:00 PM
Track2 Advanced Manufacturing Meeting (Closed Meeting)	11/8/21	11:00 AM-12:00 PM
The Old Guard Committee Meeting	11/8/21	1:00 PM - 4:00 PM
Material & Energy Recovery Division Executive Committee Meeting (Closed Meeting)	11/8/21	1:00 PM - 2:00 PM



COMMITTEE MEETINGS & SPECIAL EVENTS

(By Day)

Please visit our website:

<https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events>

to access those links.

MEETING NAME	MEETING DATE	MEETING TIME
MEDHEC Executive Committee Meeting (Closed Meeting)	11/8/21	4:00 PM - 5:30 PM
K6 Heat Transfer in Energy Systems Committee Meeting	11/8/21	6:00 PM- 7:00 PM
Theory and Fundamental Research Committee Meeting (Heat Transfer Division, K-8)	11/8/21	8:00 PM – 9:00 PM
Heat Transfer under Extreme Conditions Committee Meeting (Heat Transfer Division, K-18)	11/9/21	9:00 AM - 10:00 AM
Fluids Engineering Division CFDTC Computational Fluid Dynamics Technical Committee	11/9/21	10:00 AM - 11:00 AM
Fluids Engineering Division MNFDTC Micro Nano Fluid Dynamics Technical Committee	11/9/21	11:00 AM - 12:00 PM
Fluids Engineering Division Honors & Awards Committee Meeting (Closed Meeting)	11/9/21	12:00 PM - 1:00 PM
Fluids Engineering Division Multifunctional Materials Technical Committee Meeting	11/9/21	1:00 PM - 2:00 PM
Committee on Government Relations	11/9/21	1:00 PM - 3:30 PM
MD (Materials Division) Composites and Heterogeneous Materials TC Meeting	11/9/21	1:00 PM - 2:00 PM
ASME MD Electronic Materials TC Meeting	11/9/21	2:00 PM - 3:00 PM
Computational Heat Transfer Committee Meeting (Heat Transfer Division, K-20)	11/9/21	4:00 PM – 5:00 PM
K13 Committee on Multiphase Heat Transfer Meeting	11/9/21	4:30 PM - 5:30 PM
Fire and Combustion Committee Meeting (Heat Transfer Division, K-11)	11/9/21	5:00 PM-6:30 PM
Biomedical and Biotechnology Track Organisers Meeting	11/9/21	6:00 PM - 7:00 PM
Women in Engineering Reception	11/9/21	7:00 PM - 8:00 PM
Materials Division General Meeting	11/10/21	10:30 AM - 12:00 PM
Nondestructive Evaluation, Diagnosis, and Prognosis Division (NDPD) Executive Committee Meeting	11/10/21	2:00 PM - 3:00 PM
Fluids Engineering Division FASTC Fluid Applications and Systems Technical Committee	11/10/21	2:00 PM - 3:00 PM
Fluids Engineering Division MFTC Multiphase Flow Technical Committee	11/10/21	3:00 PM - 4:00 PM
MEMS Division Volunteer and Committee Meeting (Open)	11/10/21	4:00 PM - 5:00 PM
Heat Transfer Equipment Committee Meeting (Heat Transfer Division, K-10)	11/10/21	5:00 PM - 6:30 PM
Heat Transfer Division Awards Meeting	11/10/21	6:30 PM - 7:30 PM
Petroleum Division Executive Committee Meeting	11/11/21	9:00 AM - 10:30 AM
Fluids Engineering Division Closing Executive Committee (Closed Meeting)	11/11/21	9:00 AM - 10:30 AM
Fluids Engineering Division Executive Committee Meeting w/ TC Chairs (Closed Meeting)	11/11/21	10:30 AM - 11:30 AM
Public Affairs & Outreach (PAO) Council Meeting	11/11/21	12:00 PM-2:00 PM
Advanced Energy System Division (AESD) System Analysis (SA) Technical Committee Meeting	11/11/21	12:00 PM -1:00 PM
Advanced Energy System Division (AESD) Renewable Energy & Energy Conversion (REEC) Technical Committee Meeting	11/11/21	12:00 PM -1:00 PM



COMMITTEE MEETINGS & SPECIAL EVENTS (By Day)

Please visit our website:

<https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events>

to access those links.

MEETING NAME	MEETING DATE	MEETING TIME
Advanced Energy System Division (AESD) ElectroChemistry Energy Conversion (ECEC) Technical Committee Meeting	11/11/21	12:00 PM - 1:00 PM
Fluids Engineering Division Advisory Committee (Closed Meeting)	11/11/21	1:00 PM - 2:00 PM
Advanced Energy System Division (AESD) Executive Committee (EC) Meetings (Closed Meeting)	11/11/21	1:15 PM - 2:45 PM
SERAD EC Awards Ceremony	11/11/21	5:00 PM - 6:30 PM
Materials Division Executive Committee Meeting (Closed Meeting)	11/11/21	6:20 PM - 7:30 PM
SERAD EC Meeting (November)	11/11/21	6:30 PM - 7:30 PM
TEC Sector Council Meeting	11/12/21	10:00 AM - 12:00 PM
History & Heritage Committee Meeting	11/12/21	10:30 AM - 2:30 PM
MEDHEC Open Mic	11/12/21	2:00 PM - 3:30 PM
Fracture and Failure Mechanics Technical Committee Meeting	11/12/21	3:00 PM - 4:00 PM
Committee on Engineering Education (Closed Meeting)	11/12/21	4:00 PM - 6:00 PM
Technical committee on Publications & Communications (TCPC) (Closed Meeting)	11/13/21	9:00 AM - 12:30 PM
History & Heritage Committee Meeting	11/13/21	10:30 AM - 2:30 PM
Joint Board of Editors (BOE) / Technical Committee on Publications & Communications (TCPC) (Closed Meeting)	11/13/21	1:00 PM - 4:00PM
Business Meeting	11/14/21	11:30 AM - 12:00PM
Board of Governors Meeting (Open)	11/14/21	12:30 PM - 3:00 PM



SPECIAL AWARDS AND MEDALS

There are many awards that are given out to celebrate our engineering community. Below are some of the awards that will be given out this year.

Timoshenko Medal

The Timoshenko Medal is conferred in recognition of distinguished contributions to the field of applied mechanics. Established by the Applied Mechanics Division in 1957, it honors Stephen P. Timoshenko, world-renowned authority.

Recipient: HUAJIAN GAO



Huajian Gao, Ph.D., distinguished university professor at Nanyang Technological University in Singapore, is honored for pioneering contributions to nanomechanics of engineering and biological systems, a new research field at the interface of solid mechanics, materials science and biophysics.

Dr. Gao is also scientific director of the Institute of High Performance Computing in Singapore and editor of the Journal of the Mechanics and Physics of Solids. He previously served on the faculty of Brown University in Providence, R.I.

(2006-19) and Stanford University in California (1988-2002); and as director at the Max Planck Institute for Metals Research in Stuttgart, Germany (2001-06).

Worcester Reed Warner Medal

The Worcester Reed Warner Medal, established in 1930, is awarded for outstanding contributions to the permanent literature of engineering.

Recipient: HANQING JIANG



Hanqing Jiang, Ph.D., a professor of engineering at Westlake University in Hangzhou, China, is honored for seminal contributions through a series of papers on post-buckling behavior of stiff thin films on soft substrates under large deformation, and its new applications in diverse areas. Prior to joining Westlake University in June 2021, Dr. Jiang was a member of the mechanical engineering faculty at Arizona State University in Tempe (2006-21). His current research interests



include origami and kirigami based mechanical metamaterials, mechanics of lithium-metal batteries, food-based edible electronics and soft electronics. He has published more than 130 peer-reviewed journal papers and five book chapters. Many of his papers are among the top cited papers in the mechanics and/or mechanical engineering communities.

Daniel C. Drucker Medal

The Daniel C. Drucker Medal, established in 1997, recognizes distinguished contributions to the field of applied mechanics and mechanical engineering through research, teaching and service to the community.

Recipient: **MARKUS J. BUEHLER**



Markus J. Buehler, Ph.D., the McAfee professor of engineering at the Massachusetts Institute of Technology in Cambridge, is honored for contributions to the use of molecular mechanics and chemical principles to elucidate the mechanics of natural and bio-inspired materials, and the design of mechanically optimized composite materials through hierarchical structuring from nano to macroscales. At MIT, Dr. Buehler is also a member of the Center for Materials Science and Engineering, and the Center for Computational Science and

Engineering at the Schwarzman College of Computing. He has authored more than 450 peer-reviewed publications, and his technical innovations have resulted in several patents.

Warner T. Koiter Medal

The Warner T. Koiter Medal was established in 1996 to recognize distinguished contributions to the field of solid mechanics with special emphasis on the effective blending of theoretical and applied elements, and on a high degree of leadership in the international solid mechanics community. The medal honors the late Dr. Koiter, world-renowned authority in the field.

Recipient: **GERHARD A. HOLZAPFEL**



Gerhard A. Holzapfel, Ph.D., Dr.habil., a professor of biomechanics and head of the Institute of Biomechanics at Graz University of Technology in Austria, is recognized for outstanding contributions to the application of solid mechanics in the development of continuum theory, computational methods, simulations and experiments in the biomechanics of soft biological materials; and for international leadership in the field through editorships, conference organization, mentoring and Ph.D.-level education. In his current positions at Graz since 2007, Dr. Holzapfel is also



an adjunct professor at the Norwegian University of Science and Technology and a visiting professor at the University of Glasgow, U.K. His publications include a graduate textbook and over 230 peer-reviewed journal articles. Dr. Holzapfel is co-founder and co-editor of *Biomechanics and Modeling in Mechanobiology*.

Thomas K. Caughey Dynamics Medal

The Thomas K. Caughey Dynamics Medal recognizes an individual who has made significant contributions to the field of nonlinear dynamics through practice, research, teaching and/or outstanding leadership. Established in 2008 by the Applied Mechanics Division, it was elevated to a Society award in 2020.

Recipient: MICHAEL P. PAIDOUSSIS



Michael P. Paidoussis, ing., Ph.D., Thomas Workman emeritus professor at McGill University in Montreal, is honored for more than half a century of outstanding contributions in nonlinear dynamics of systems with fluid-structure interactions.

Dr. Paidoussis joined the department of mechanical engineering at McGill in 1967, was promoted to professor in 1976 and served as chair of the department from 1977 to 1986. He has authored several books on fluid-structure interactions, and published over 265 papers in refereed journals and 175 papers in refereed conference proceedings (h-index: 79).

Heat Transfer Memorial Awards

The Heat Transfer Memorial Award, established in 1959 by the Heat Transfer Division and elevated to a Society award in 1974, recognizes outstanding contributions to the field through teaching, research, practice and/or design.

Recipient: LAURENT PILON - SCIENCE



Laurent Pilon, Ph.D., a professor in the mechanical and aerospace engineering department at the University of California, Los Angeles, is recognized for seminal and interdisciplinary contributions to the field of heat transfer, combined with interfacial phenomena, materials science and electrochemistry, for the development of sustainable energy technologies.



Dr. Pilon and his collaborators have authored six book chapters and more than 170 archival journal publications, and filed seven patents. Over the last 19 years, he has advised 22 master's students, 30 Ph.D. students and five postdoctoral scholars. Dr. Pilon is an associate editor of ASME's Journal of Electrochemical Energy Conversion and Storage.

Recipient: MICHAEL OHADI - ART



Michael Ohadi, Ph.D., a Minta Martin professor of mechanical engineering at University of Maryland, College Park, is recognized for pioneering contributions in the application of electrohydrodynamics to enhanced heat and mass transfer, liquid-vapor separation and micropumping processes; in novel heat and mass transfer designs for single phase and phase change processes; and in the development of novel, additively manufactured heat exchangers for polymer and polymer composites, and metals and super alloys.

Dr. Ohadi joined UMD in 1990. His research has been cross-disciplinary and team-based, with active collaborations with materials science and engineering, and chemical and electrical engineering disciplines. He served as program director at the U.S. Department of Energy's Advanced Research Project Agency–Energy (2016-20).

Recipient: WEBB MARNER - GENERAL



Webb Marner, Ph.D., an adjunct professor of mechanical and aerospace engineering at the University of California, Los Angeles, is recognized for extensive, exemplary contributions to ASME, the Society's Heat Transfer Division and the thermal science community through technical experience in industry, academia and government.

Dr. Marner's professional career includes a faculty position at the South Dakota School of Mines and Technology in Rapid City and technical staff positions at Heat Transfer Research, Inc. in Alhambra, Calif. In 1980 he joined the California Institute of Technology's Jet Propulsion Laboratory in Pasadena, where he spent most of his career. Dr. Marner began teaching thermal science and system design courses at UCLA in 1991.

James Harry Potter Gold Medal

The James Harry Potter Gold Medal was established in 1980 to recognize eminent achievement or distinguished service in the science of thermodynamics and its applications in mechanical engineering.

Recipient: TATIANA MOROSUK



Tatiana Morosuk, Ph.D., Dr. habil., head of the exergy-based methods for refrigeration systems department at Technische Universität Berlin, is recognized for outstanding and innovative contributions to the science of theoretical and applied thermodynamics, particularly eminent teaching and research in the areas of advanced exergy-based methods, refrigeration and cryogenic processes, and electric power generation plants.

Dr. Morosuk also serves as deputy director of the Institute for Energy Engineering at TU Berlin (2015-17; 2021-). In 2015 she began serving as a study dean for two international master's programs, and that same year two additional programs were established under her leadership. Dr. Morosuk has supervised/co-supervised 16 Ph.D. and more than 100 master's theses. She has published eight books and more than 400 research papers, and she has 10 patents.

George Westinghouse Medals

The **George Westinghouse Medals** were established to recognize eminent achievement or distinguished service in the power field of mechanical engineering to perpetuate the value of the rich contribution to power development made by **George Westinghouse**, honorary member and **29th president of the Society**. The **Gold Medal** was established in **1952** and the **Silver Medal** in **1971**.

Recipient: JOVICA RIZNIC – GOLD



Jovica Riznic, P.Eng., Ph.D., technical specialist at the Canadian Nuclear Safety Commission in Ottawa, Ontario, Canada, is honored for the development of complex numerical models and innovative diagnostics to better measure, calculate and understand the structure of the two-phase flow in nuclear power plants; and for key contributions to steam generator life cycle management.

At the CNSC, Dr. Riznic works on regulatory analysis and assessment of technical issues with operating nuclear power plants, with a focus on fitness-for-service assessment of major components. He is also an adjunct professor/thesis advisor at the University of Waterloo and Purdue University, and a faculty member at Algonquin College.

Recipient: BRIAN WODKA – SILVER

Brian Wodka, P.E., division manager of the York, Pa. office of RMF Engineering, is recognized for demonstrated leadership that has advanced the power industry, particularly achievements in systems design, regulatory changes, standards development, training and ASME service.

Mr. Wodka has spent his entire career involved in steam systems and power plant engineering, inspection, operation, commissioning, reliability and forensic analysis. He has published multiple technical papers and articles as a subject matter expert on power plant performance and reliability. For the past 10 years, he sits on both the Maryland Board of Boiler Rules and the Maryland Board of Stationary Engineers.

Bergles-Rohsenow Young Investigator Award in Heat Transfer

The Bergles-Rohsenow Young Investigator Award in Heat Transfer, established in 2003, recognizes an engineer who is committed to pursuing research in heat transfer and demonstrates the potential to make significant contributions in the field.

Recipient: NENAD MILJKOVIC

Nenad Miljkovic, Ph.D., an associate professor of mechanical science and engineering at the University of Illinois Urbana–Champaign, is recognized for significant contributions to the fundamental understanding of phase change heat transfer, particularly the dropwise condensation of steam, and the development of materials to enable the dropwise condensation of low surface tension fluids.

Dr. Miljkovic also leads the Energy Transport Research Laboratory; and he has courtesy appointments in electrical and computer engineering, and the Materials Research Laboratory. He is associate director of the Air Conditioning and Refrigeration Center, a National Science Foundation industry–university cooperative research center at UIUC.

Nadai Medal

The Nadai Medal was established in 1975 to recognize significant contributions and outstanding achievements that broaden the field of materials engineering.

Recipient: MICHAEL THOULESS



Michael Thouless, CEng, Ph.D., the Janine Johnson Weins professor of engineering, an Arthur F. Thurnau professor, and an associate chair of the mechanical engineering department at the University of Michigan in Ann Arbor, is recognized for seminal studies of fracture and plasticity of thin films, layered materials and adhesive materials, particularly pioneering efforts related to all aspects of cohesive zone modeling.

Dr. Thouless has been with U-M since 1995. With collaborators at the university, he has pioneered fracture-fabrication techniques for nanoscale devices; and developed novel design strategies for protection against blast and impact, and for protection against ice adhesion. Dr. Thouless has published 178 papers, and he has 10 patents.

Sia Nemat-Nasser Early Career Award

The Sia Nemat-Nasser Early Career Award recognizes research excellence in experimental, computational or theoretical aspects of mechanics of materials by an individual within 10 years following receipt of their Ph.D. degree. Established by the Materials Division in 2008, it was elevated to a Society award in 2012.

Recipient: YUHANG HU



Yuhang Hu, Ph.D., an assistant professor in the George W. Woodruff School of Mechanical Engineering, and the School of Chemical and Biomolecular Engineering at the Georgia Institute of Technology in Atlanta, is honored for pioneering contributions to the field of soft active materials through research at the interface of mechanics and materials chemistry that combines theory with simulations and experiments, and spans from fundamental mechanics to novel applications.

At Georgia Tech, Dr. Hu has established an internationally visible and externally funded research program. She has published more than 50 peer-reviewed papers, and has delivered seminars and talks at conferences and peer institutions.

Per Bruel Gold Medal for Noise Control and Acoustics

The Per Bruel Gold Medal for Noise Control and Acoustics was established in 1987 in honor of Dr. Bruel, who pioneered the development of sophisticated noise and vibration measuring and processing equipment. The medal recognizes eminent achievement and extraordinary merit in the field.

Recipient: DAVID R. DOWLING



David R. Dowling, Ph.D., chair of the naval architecture and marine engineering department at the University of Michigan in Ann Arbor, is recognized for the pioneering development of novel and robust techniques for remote focusing of acoustic waves, and remote localization and characterization of sound sources in complicated, noisy and imperfectly known environments. Dr. Dowling assumed his current position in July 2021. With U-M since 1992, he has taught and conducted funded research in acoustics and fluid mechanics. Dr. Dowling has authored/co-authored more than 200 conference presentations and more than 100 journal articles, and has supervised/co-supervised 22 doctoral students.

TECHNICAL SESSIONS

Technical Sessions will run as follows:

- Introduction from Session Chair
- Playback of first 3 video presentations
- Q&A for the first 3 videos
- Playback of remaining videos
- Q&A for the second set of videos
- Closing remarks
- Move to a Post Session Discussion where attendees, authors and the session chair can continue to discuss the topic

**Please note that individual presentation times noted below are approximate. The introductions and presentation lengths will vary and can cause the timing to be skewed.

MONDAY, November 1

04-02-01: ADVANCES IN AERODYNAMICS NOVEMBER 1, 2021

11:20AM–12:50PM

Chair: Erkan Oterkus - *University of Strathclyde*
Chair: Uttam K. Chakravarty - *University of New Orleans*
Chair: Pavana Prabhakar - *University of Wisconsin-Madison*

11:20AM–11:30AM:

PITCH ANGLE & DECALAGE EFFECT IN BIPLANE BLADE DESIGN FOR WIND TURBINES

Technical Paper Publication: **IMECE2021-68989**

Md Saifuddin Ahmed Atique - *University of North Dakota*
Xueling Song - *University of North Dakota*
Cai Xia Yang - *University of North Dakota*

11:30AM–11:40AM:

FLUENCE AS AN INSTRUMENT TOWARDS A UNIFIED REPRESENTATION OF FLUIDDYNAMIC RELATED PHENOMENA

Technical Paper Publication: **IMECE2021-69325**

Michele Trancossi - *Universidade da Beira Interior*
Jose Pascoa - *Universidade da Beira Interior*

11:40AM–11:50AM:

AERODYNAMIC ANALYSIS OF FLAT PLATES AS LIFT GENERATING DEVICES FOR MICRO AERIAL VEHICLES

Technical Paper Publication: **IMECE2021-69419**

Bastav Borah - *Indian Institute of Technology*
Vinayak Kulkarni - *Indian Institute of Technology*
Ujjwal K. Saha - *Indian Institute of Technology*

11:50AM–12:00PM:

DYNAMIC TRANSITION FROM REGULAR TO MACH REFLECTION OVER A MOVING WEDGE



Technical Paper Publication: IMECE2021-69625

Lubna Margha - Rutgers, The State University of New Jersey
Ahmed A. Hamada - Texas A&M University
Doyle D. Knight - Rutgers, The State University of New Jersey
Ahmed Eltaweel - University of Science and Technology

12:00PM–12:10PM:

AN EXPERIMENTAL INVESTIGATION ONTO THE EFFECT OF TWO DESIGN METHODS OF LEADING-EDGE TUBERCLES ON THE AERODYNAMIC PERFORMANCE OF A HIGH LIFT AIRFOIL AT LOW REYNOLDS NUMBER

Technical Paper Publication: IMECE2021-70292

Amr A. Khedr - Egypt-Japan University of Science and Technology
Ihab Adam - Alexandria University
Shinichi Ookawara - Tokyo Institute of Technology
Ahmed El-Wardany - Egypt-Japan University of Science and Technology
Hamdy Hassan - Egypt-Japan University of Science and Technology

12:10PM–12:20PM:

AN IDS INVESTIGATION OF THE INSTABILITY FEATURES WITHIN JET FLOWS

Technical Paper Publication: IMECE2021-70725

Yang Gao - North Carolina A&T State University
Dehua Feng - North Carolina A&T State University
Frederick Ferguson - North Carolina A&T State University
Larry Thompson - North Carolina A&T State University

04-04-01: ADVANCES IN AEROSPACE STRUCTURES AND MATERIALS AND NONLINEAR PROBLEMS IN AEROSPACE STRUCTURES

NOVEMBER 1, 2021

11:20AM–12:50PM

Chair: Erkan Oterkus - University of Strathclyde
Chair: Uttam K. Chakravarty - University of New Orleans
Chair: Pavana Prabhakar - University of Wisconsin-Madison

11:20 AM–11:30AM:

GEOMETRIC NONLINEAR TIME RESPONSE ANALYSIS OF SHELL STRUCTURES BY ADVANCED FINITE ELEMENTS

Technical Presentation: IMECE2021-67477

Alfonso Pagani - Politecnico di Torino
Bin Wu - National University of Ireland, Galway
Fanzhou Zhu - Zhejiang University
Erasmus Carrera - Politecnico di Torino
W.Q. Chen - Zhejiang University

11:30AM–11:40AM:

FAST METHODS FOR NONLINEAR VIBRATION ANALYSIS OF VARIABLE STIFFNESS PANELS

Technical Paper Publication: IMECE2021-68933

Jorge Andrés González - Politecnico di Milano
Riccardo Vescovini - Politecnico di Milano

11:40AM–11:50AM:

NONLINEAR VIBRATION CORRELATION AND BUCKLING ANALYSIS OF FLAT PLATES AND SHELLS

Technical Paper Publication: IMECE2021-69580

Rodolfo Azzara - Politecnico di Torino
Erasmus Carrera - Politecnico di Torino
Alfonso Pagani - Politecnico di Torino



11:50AM–12:00PM:**DEVELOPMENT OF MULTILAYER INSULATION
BLANKET OF AEROGEL WITH ULTRA-LOW
THERMAL CONDUCTIVITY****Technical Paper Publication: IMECE2021-70943***Xiaoyu Li - University of Chinese Academy of Sciences**Kai Chen - Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences**Chengcheng Sheng - University of Chinese Academy of Sciences**Zhao Xu - Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences**Qiang Sheng - Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences**Haifeng Zhao - Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences***12:00PM–12:10PM:****A CASE STUDY ON THE EFFECT OF UNCERTAIN
IMPACTS OF A CIVIL AIRCRAFT FUSELAGE SECTION
WITH AUXILIARY FUEL TANK****Technical Paper Publication: IMECE2021-71009***Saiaf Bin Rayhan - Northwestern Polytechnical University**Xue Pu - Northwestern Polytechnical University***12:10PM–12:20PM:****DAMAGE TOLERANCE ANALYSIS OF WING
FUSELAGE INTERFACE IN BWB AIRCRAFT DESIGN****Technical Paper Publication: IMECE2021-73196***Ashok K. Bakshi - Jain Deemed to be University**B. Dattaguru - Jain Deemed to be University***04-09-01:****MATERIALS AND STRUCTURES FOR
EXTREME ENVIRONMENTS****November 1, 2021****11:20AM–12:50PM****Chair: Erkan Oterkus - University of Strathclyde****Chair: Uttam K. Chakravarty - University of New Orleans****Chair: Pavana Prabhakar - University of Wisconsin-Madison****11:20AM–11:30 AM****CAPTURING EFFECTS OF THERMAL
DECOMPOSITION REACTIONS IN
MICROMECHANICAL MODELING OF POLYMER
MATRIX COMPOSITES AT HIGH TEMPERATURES****Technical Presentation: IMECE2021-71726***Olesya Zhupanska - University of Arizona**Teja Konduri - University of Arizona***11:30AM–11:40AM:****GENERALIZED STUDY ON TIME-DEPENDENT CREEP
ANALYSIS OF FUNCTIONALLY GRADED THICK-
WALLED CYLINDERS UNDER THERMAL AND
MECHANICAL BOUNDARY CONDITIONS****Technical Paper Publication: IMECE2021-71743***Jašem A. Ahmed - Louisiana State University**M.A. Wahab - Louisiana State University***11:40AM–11:50AM:**

PROCESSING AND CHARACTERIZATION OF CONTINUOUS CARBON FIBER REINFORCED SILICON OXYCARBIDE CERAMIC MATRIX COMPOSITES

Technical Paper Publication: **IMECE2021-71934**

Haonan Song - *University of Central Florida*
 Derek Saltzman - *University of Central Florida*
 Jayanta Kapat - *University of Central Florida*
 Jihua Gou - *University of Central Florida*

11:50AM–12:00PM:

DESIGN AND TESTING OF DIMES CARBON ABLATION RODS IN THE DIII-D TOKAMAK

Technical Paper Publication: **IMECE2021-73326**

Dmitri M. Orlov - *University of California*
 Michael O. Hanson - *University of California*
 Jason Escalera - *University of California*
 Hadith Taheri - *University of California*
 Caitlin N. Villareal - *University of California*
 Daniel M. Zubovic - *University of California*
 Igor Bykov - *General Atomics*
 Evdokiya G. Kostadinova - *Auburn University*
 Dmitry L. Rudakov - *University of California*
 Maziar Ghazinejad - *University of California*

12:00PM–12:10PM:

EFFECTS OF FLUID THERMAL STRUCTURAL INTERACTIONS IN HIGH-SPEED FLOWS

Technical Presentation: **IMECE2021-77569**

Phillip Deierling - *University of Iowa*

07-02-01:
GENERAL I
NOVEMBER 1, 2021

11:20AM–12:50PM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

11:20AM–11:30AM:

MULTI-DEGREE-OF-FREEDOM MODELING FOR ELECTRIC POWERTRAINS: INERTIA EFFECT OF ENGINE MOUNTING SYSTEM

Technical Paper Publication: **IMECE2021-66287**

Sudhir Kaul - *Western Carolina University*

11:30AM–11:40AM:

EXPERIMENTAL VERIFICATION OF MODEL-FREE VIBRATION CONTROL TECHNIQUE BASED ON A VIRTUAL CONTROLLED OBJECT CONSIDERING ACTUATOR PARAMETER UNCERTAINTY

Technical Paper Publication: **IMECE2021-69100**

Ansei Yonezawa - *Hokkaido University*
 Heisei Yonezawa - *Hokkaido University*
 Itsuro Kajiwara - *Hokkaido University*

11:40AM–11:50AM:

AUTONOMOUS PV PANEL INSPECTION WITH GEOTAGGING CAPABILITIES USING DRONE

Technical Paper Publication: **IMECE2021-69246**

Mahmoud Rezk - *Dubai Electricity and Water Authority*
 Nawal Aljasmí - *Dubai Electricity and Water Authority*
 Rufaidah Salim - *Dubai Electricity and Water Authority*
 Hesham Ismail - *Dubai Electricity and Water Authority*
 Iraklis Nikolakakos - *Dubai Electricity and Water Authority*



11:50AM–12:00PM:**STRAIN-COUPLED FLUIDLASTIC CIRCUITS INSIDE METAL ADDITIVE MANUFACTURED STRUCTURES****Technical Paper Publication: IMECE2021-69721**

Ankit Saxena - *Pennsylvania State University*
 George Rai - *Pennsylvania State University*
 Valentin Lanari - *Pennsylvania State University*
 Christopher D. Rahn - *Pennsylvania State University*
 Guhaprasanna Manogharan - *Pennsylvania State University*

12:00PM–12:10PM:**A NOVEL FORMULATION TO PREDICT THE ACCURACY OF IMPLICIT TIME INTEGRATION SCHEMES****Technical Paper Publication: IMECE2021-69778**

Sanjay Singh Tomar - *Indian Institute of Technology Kanpur*
 C.S. Upadhyay - *Indian Institute of Technology Kanpur*

12:10PM–12:20PM:**THE CONSISTENCY OF HELICOPTER 'GROUND RESONANCE' AND THE UNSTABLE LATERAL-TORSIONAL VIBRATION IN STANDARD ROTOR SYSTEMS****Technical Paper Publication: IMECE2021-70169**

X. Qian - *Beihang University*
 Y. Fan - *Beihang University*
 L. Li - *Beihang University*
 W.J. Wang - *Beihang University*

07-03-01**NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS I****NOVEMBER 1, 2021****11:20AM–12:50PM**

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

11:20AM–11:40AM:**WAVE PROPAGATION IN NONLINEAR DYNAMICAL SYSTEMS: IMPLICATIONS FOR NON-RECIPROcity, SCATTERING, AND FRICTIONAL MECHANICS****Invited Presentation: IMECE2021-77597**

Michael Leamy - *Georgia Institute of Technology*

11:40AM–11:50AM:**FREQUENCY RESPONSE OF PRIMARY RESONANCE OF ELECTROSTATICALLY ACTUATED MEMS CIRCULAR MEMBRANES****Technical Paper Publication: IMECE2021-73585**

Dumitru I. Caruntu - *University of Texas Rio Grande Valley*
 Marcos Alipi - *University of Texas Rio Grande Valley*
 Miguel Martinez - *University of Texas Rio Grande Valley*
 Pedro Castorena - *University of Texas Rio Grande Valley*

11:50AM–12:00PM:**ON THE DYNAMICS AND OPTIMAL CONTROL OF THE ROTATIONAL INVERTED PENDULUM****Technical Paper Publication: IMECE2021-69171**

Alan Javier González Díaz - *Universidad Industrial de Santander*
 Carlos Borrás Pinilla - *Universidad Industrial De Santander- UIS*



12:00PM–12:10PM:**SOLITARY WAVES IN AN ARRAY OF NONLINEAR OSCILLATORS WITH TIME-PERIODIC DAMPING AND STIFFNESS COEFFICIENTS****Technical Paper Publication: IMECE2021-72545**

M. Reza Talebi Bidhendi - *University of British Columbia*
 Ahmad Mohammadpanah - *University of British Columbia*

12:10PM–12:20PM:**INVESTIGATIONS INTO THE LINEAR COUPLING BETWEEN SYMMETRIC AND ANTI-SYMMETRIC MODES OF V-SHAPED MEMS RESONATORS UNDER ELECTROSTATIC PERTURBATION****Technical Paper Publication: IMECE2021-73535**

Nouha Alcheikh - *King Abdullah University of Science and Technology*
 Hassen M. Ouakad - *Sultan Qaboos University*
 Sofiane Ben Mbarek - *King Abdullah University for Science and Technology*
 Mohammad I. Younis - *King Abdullah University for Science and Technology*

**07-04-01
DESIGN AND CONTROL OF ROBOTS, MECHANISMS AND STRUCTURES I****NOVEMBER 1, 2021****11:20AM–12:50PM**

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

11:20AM–11:30AM:**RAPID DESIGN AND ANALYSIS OF A VERSATILE ROBOTIC PLATFORM****Technical Paper Publication: IMECE2021-67358**

Ariful Islam - *Saint Martin's University*
 Chad Campbell - *Saint Martin's University*
 Christian Merrikin - *Saint Martin's University*
 Shawn Duan - *Saint Martin's University*

11:30AM–11:40AM:**DESIGN OF LITTER COLLECTION ROBOT FOR URBAN ENVIRONMENT****Technical Paper Publication: IMECE2021-69732**

Jian Su - *University of Cincinnati*
 Yu Cao - *University of Cincinnati*
 Anqi Tang - *University of Cincinnati*
 Siyuan Wang - *University of Cincinnati*
 Janet Dong - *University of Cincinnati*

11:40AM–11:50AM:**DESIGN AND DEVELOPMENT OF A NOVEL SOFT GRIPPER MANIPULATED BY A ROBOTIC ARM****Technical Paper Publication: IMECE2021-69880**

Bryce Cianciotto - *Kennesaw State University*
 Derek Price - *Kennesaw State University*
 Logan Spencer - *Kennesaw State University*
 Martin Garcia - *Kennesaw State University*
 Ayse Tekes - *Kennesaw State University*

11:50AM–12:00PM:**HORIZONTAL AXIS WIND ROTORS WITH TWISTED BLADES****Technical Paper Publication: IMECE2021-70046**

Joseph McGuire - *Texas A&M University*
 Hong Zhou - *Texas A&M University*



12:00PM–12:10PM:**SIMULATING DYNAMIC TENSION EFFECTS FROM AN OUT-OF-ROUND UNWIND ROLL****Technical Paper Publication: IMECE2021-70139**Benjamin Reish - *Oklahoma Christian University***12:10PM–12:20PM:****DESIGN AND MODELLING OF SCARA ROBOT VARIANT****Technical Paper Publication: IMECE2021-73288**Manjeet Tummalapalli - *Ryerson University*Puren Ouyang - *Ryerson University*Johnny Bahri - *Ryerson University***09-01-01: CURRICULUM INNOVATIONS, PEDAGOGY AND LEARNING METHODOLOGIES
NOVEMBER 1, 2021****11:20AM–12:50PM**Chair: Subha Kumpaty - *Milwaukee School of Engineering*Chair: Salim Azzouz - *Midwestern State University*Chair: Anabela Alves - *University of Minho***11:20AM–11:30AM:****MEASURING SUSTAINABILITY AND OPERATIONAL PERFORMANCE BY ENGINEERING STUDENTS IN UNIVERSITY-BUSINESS PBL PARTNERSHIPS****Technical Paper Publication: IMECE2021-68673**Anabela C. Alves - *University of Minho*M. Florentina Abreu - *University of Minho***11:30AM–11:40AM:****PROJECT BASED COURSE ENABLED NANOTECHNOLOGY EDUCATION FOR SENIOR LEVEL UNDERGRADUATE AND GRADUATE STUDENTS****Technical Paper Publication: IMECE2021-68827**Hongmei Dang - *University of the District of Columbia*Pawan Tyagi - *University of the District of Columbia*Esther Ososanya - *University of the District of Columbia*Kate Klein - *University of the District of Columbia***11:40AM–11:50AM:****USING WIRELESS PASCO SMART CARTS TO DEMONSTRATE VIBRATION PRINCIPALS****Technical Paper Publication: IMECE2021-69500**Keith Hekman - *California Baptist University***11:50AM–12:00PM:****INTRODUCING ENGINEERING CODES AND STANDARDS THROUGHOUT THE CURRICULUM OF A NEWLY ESTABLISHED MECHANICAL ENGINEERING PROGRAM****Technical Paper Publication: IMECE2021-70013**A.C. Seibi - *Utah Valley University*I. Jaafar - *Utah Valley University*S. Tolman - *Utah Valley University*A. Amin - *Utah Valley University*

12:00PM–12:10PM:**TARGETED CAD/CAM WORKSHOPS FOR FRESHMEN TO IMPROVE OVERALL PERFORMANCE****Technical Paper Publication: IMECE2021-70652**Tikran Kocharian - *Grand Valley State University*Sanjivan Manoharan - *Grand Valley State University***12:10PM–12:20PM:****LEARNING WHILE PLAYING OR PLAYING WHILE LEARNING?****Technical Paper Publication: IMECE2021-68801**Filomena Soares - *University of Minho*ANABELA ALVES - *UNIVERSITY OF MINHO***07-22-01:****CONGRESS-WIDE SYMPOSIUM ON NDE & SHM: DYNAMICS, VIBRATION, AND CONTROL FOR STRUCTURAL HEALTH MONITORING APPLICATIONS I
NOVEMBER 1, 2021****11:20 AM - 12:50 PM**Chair: Yuris Dzenis - *Univ Of Nebraska*Chair: Yanfeng Shen - *Shanghai Jiao Tong University***11:20 AM - 11:30 AM****MEASURING SUSTAINABILITY AND OPERATIONAL PERFORMANCE BY ENGINEERING STUDENTS IN_X000B_UNIVERSITY-BUSINESS PBL PARTNERSHIPS
SUSTAINABILITY AND OPERATIONAL PERFORMANCE BY ENGINEERING STUDENTS IN UNIVERSITY-BUSINESS PBL PARTNERSHIPS****Technical Paper Publication: IMECE2021-68673**Anabela C. Alves - *University of Minho*M. Florentina Abreu - *University of Minho***11:30 AM - 11:40 AM****PROJECT BASED COURSE ENABLED NANOTECHNOLOGY EDUCATION FOR SENIOR LEVEL UNDERGRADUATE AND GRADUATE STUDENTS****Technical Paper Publication: IMECE2021-68827**Hongmei Dang - *University of the District of Columbia*Pawan Tyagi - *University of the District of Columbia*Esther Ososanya - *University of the District of Columbia*Kate Klein - *University of the District of Columbia***11:40 AM - 11:50 AM****USING WIRELESS PASCO SMART CARTS TO DEMONSTRATE VIBRATION PRINCIPALS****Technical Paper Publication: IMECE2021-69500**Keith Hekman - *California Baptist University***11:50 AM - 12:00 PM****INTRODUCING ENGINEERING CODES AND STANDARDS THROUGHOUT THE CURRICULUM OF A NEWLY ESTABLISHED MECHANICAL ENGINEERING PROGRAM****Technical Paper Publication: IMECE2021-70013**A. C. Seibi - *Utah Valley University*I. Jaafar - *Utah Valley University*S. Tolman - *Utah Valley University*A. Amin - *Utah Valley University***12:00 PM - 12:10 PM****TARGETED CAD/CAM WORKSHOPS FOR FRESHMEN TO IMPROVE OVERALL PERFORMANCE****Technical Paper Publication: IMECE2021-70652**Tikran Kocharian - *Grand Valley State University*Sanjivan Manoharan - *Grand Valley State University*

12:10 PM - 12:20 PM**LEARNING WHILE PLAYING OR PLAYING WHILE LEARNING?****Technical Paper Publication: IMECE2021-68801**Filomena Soares - *University of Minho*Anabela Alves - *University of Minho***09-10-01: TEACHING LABORATORIES, HANDS-ON EXPERIENCES, EMBEDDING NOVEL MANUFACTURING CONCEPTS IN ME PROGRAMS, AND TECHNOLOGY-AIDED LECTURING I NOVEMBER 1, 2021****11:20AM–12:50PM**Chair: Subha Kumpaty - *Milwaukee School of Engineering*Chair: Salim Azzouz - *Midwestern State University*Chair: Anabela Alves - *University of Minho***11:20AM–11:30AM:****INTRODUCING MECHANICAL ENGINEERING STUDENTS TO ONLINE ROBOTICS LABORATORIES****Technical Paper Publication: IMECE2021-68276**Juliana Danesi Ruiz - *The University of Iowa*Phillip E. Deierling - *The University of Iowa***11:30AM–11:40AM:****ROBOTIC ARM FOR PROGRAMMING, INSTRUCTION, AND DESIGN (RAPID)****Technical Presentation: IMECE2021-77366**Jen-Li Burnett - *The University of Iowa*Anvay Pradhan - *The University of Iowa*Phillip Deierling - *The University of Iowa***11:40AM–11:50AM:****VISUALIZING FUNDAMENTAL CONCEPTS TAUGHT IN HELICOPTER DYNAMICS COURSE USING MATLAB SIMSCAPE GUI PROGRAM****Technical Paper Publication: IMECE2021-68607**Andrea Contreras Esquen - *Kennesaw State University*Jose Bonilla Martinez - *Kennesaw State University*Paul Pena - *Kennesaw State University*Adeel Khalid - *Kennesaw State University*Ayse Tekes - *Kennesaw State University***11:50AM–12:00PM:****MODIFYING “MANUFACTURING PROCESSES” LABORATORY FOR ONLINE/HYBRID LEARNING DUE TO COVID-19****Technical Paper Publication: IMECE2021-70797**Muhammad Jahan - *Miami University*Yingbin Hu - *Miami University*Kwaku Yeboah - *Miami University*James Stahley - *Miami University***12:00PM–12:10PM:****3D-PRINTED LABORATORY EQUIPMENT FOR VIBRATIONS AND CONTROL THEORY COURSES: PENDULUM, CANTILEVER BEAM, AND RECTILINEAR SYSTEM****Technical Paper Publication: IMECE2021-69866**Martin Garcia - *Kennesaw State University*Benji Estrada - *Kennesaw State University*Elizabeth Lucier - *Kennesaw State University*Tris Utschig - *Kennesaw State University*Coskun Tekes - *Kennesaw State University*Ayse Tekes - *Kennesaw State University*

12:10PM–12:20PM:**A VIRTUAL REALITY LABORATORY IMPLEMENTING LEAN MANUFACTURING: CASE APPLIED AT MECHATRONIC TECHNICAL SCHOOL****Technical Paper Publication: IMECE2021-69645**Neira-Tovar Leticia - *Universidad Autónoma de Nuevo León*Almaguer Rosales Isaías - *Universidad Autónoma de Nuevo León*Cavazos Lucero - *Universidad Autónoma de Nuevo León*Palacka Radoslav - *University of Zilina***10-01-01: ELECTRIC, MAGNETIC AND THERMAL PHENOMENA
NOVEMBER 1, 2021****11:20AM–12:50PM**Chair: Philipp Epple - *Coburg University of Applied Sciences*Chair: Kamran Siddiqui - *University of Western Ontario***11:20AM–11:30AM:****TEMPERATURE GRADIENT EFFECTS IN COLLOIDS OF ELLIPSOIDAL PARTICLES UNDER MICROGRAVITY****Technical Presentation: IMECE2021-67375**Qian Lei - *New Jersey Institute of Technology*Boris Khusid - *New Jersey Institute of Technology*Lou Kondic - *New Jersey Institute of Technology*Andrew D. Hollingsworth - *New York University*Paul M. Chaikin - *New York University*William V. Meyer - *Universities Space Research Association at NASA GRC*Alton J. Reich - *Streamline Automation LLC***11:30AM–11:40AM:****THE BEHAVIOR OF THE MAGNETIC ROD-LIKE PARTICLES IN AN ALTERNATING MAGNETIC FIELD: BROWNIAN DYNAMICS SIMULATIONS****Technical Presentation: IMECE2021-72971**Seiya Suzuki - *Akita Prefectural University*Akira Satoh - *Akita Prefectural University*Muneo Futamura - *Akita Prefectural University***11:40AM–11:50AM:****TRAPPING CHARACTERISTICS OF MAGNETIC ROD-LIKE PARTICLES VIA MULTI-MAGNETIC POLES IN A HAGEN-POISEUILLE FLOW: BROWNIAN DYNAMICS SIMULATIONS****Technical Presentation: IMECE2021-72988**Takeru Yamanouchi - *Akita Prefectural University*Akira Satoh - *Akita Prefectural University***11:50AM–12:00PM:****FEASIBILITY OF THE MULTI-PARTICLE COLLISION DYNAMICS METHOD FOR TAKING INTO ACCOUNT MULTI-BODY HYDRODYNAMIC INTERACTIONS: MAGNETIC DISK-LIKE PARTICLE SUSPENSION****Technical Presentation IMECE2021-73382**Takeru Yamanouchi - *Akita Prefectural University*Akira Satoh - *Akita Prefectural University***12:00PM–12:10PM:****ENHANCED VOLTAGE GENERATION THROUGH ELECTROLYTE FLOW OVER LIQUID-FILLED SURFACES****Technical Presentation: IMECE2021-77070**Bei Fan - *Michigan State University*Prabhakar Bandaru - *University of California, San Diego*

12:10PM–12:20PM:**ELECTROHYDRODYNAMIC SETTLING DROPLET WITH WEAK INERTIA SUBJECTED TO A UNIFORM ELECTRIC FIELD BASED ON THE LATTICE BOLTZMANN METHOD_X000B_****Technical Paper Publication: IMECE2021-70308**

Yimo Zhang - Harbin Institute of Technology

Yu Zhang - Harbin Institute of Technology

Kang Luo - Harbin Institute of Technology

Hongliang Yi - Harbin Institute of Technology

10-03-01:**FUNDAMENTAL ISSUES AND PERSPECTIVES IN FLUID MECHANICS - I
NOVEMBER 1, 2021****11:20AM–12:50PM**

Chair: Philipp Epple - Coburg University of Applied Sciences

Chair: Kamran Siddiqui - University of Western Ontario

11:20AM–11:30AM:**EFFECT OF GEOMETRY ON SMALL SCALE VENTURI NOZZLE PERFORMANCE****Technical Paper Publication: IMECE2021-68560**

Hannah O'Hern - Oregon State University

Xiang Zhang - Oregon State University

Bahman Abbasi - Oregon State University

11:30AM–11:40AM:**THEORETICAL CHARACTERIZATION OF LIQUID SLOSHING IN CONTAINERS****Technical Paper Publication: IMECE2021-70152**

S. Karthick - Amrita School of Engineering

V. Satish - Amrita School of Engineering

11:40AM–11:50AM:**A COMPUTATIONAL STUDY OF THE EVOLUTION OF FABRI-CHOKE IN A TWO-DIMENSIONAL SUPERSONIC EJECTOR****Technical Paper Publication: IMECE2021-70919**

Sumesh Babu C.V. - Government Engineering College Thrissur

V. Lijo - Government Engineering College Thrissur

11:50AM–12:00PM:**MATHEMATICAL MODELLING OF A TWO-WAY HEAD LOSS ANALYSIS BY DESIGNING A 3D PRINTABLE PIPING SYSTEM WITH INTERNAL FEATURES FOR SOLAR THERMAL HEATERS****Technical Presentation: IMECE2021-71603**

Samba Gaye - University of the District of Columbia

Jaime Rios - University of the District of Columbia

Pawan Tyagi - University of the District of Columbia

Heriniaina Rakotomanana - University of the District of Columbia

12:00PM–12:10PM:**EFFECT OF HEMISPHERICAL PROTUBERANCE ON THE LEADING-EDGE TO CONTROL THE LAMINAR SEPARATION BUBBLE****Technical Paper Publication: IMECE2021-73068**

Pradeep Singh - Indian Institute of Technology

S. Sarkar - Indian Institute of Technology

12:10PM–12:20PM:**TURBULENT BOUNDARY LAYER OVER 3D SINUSOIDAL ROUGHNESS****Technical Presentation: IMECE2021-74579**

Misarah Adel Abdelaziz - The University of Adelaide

Lyazid Djenidi - University of New Castle

Mergen H. Ghayesh - The University of Adelaide

Rey Chin - The University of Adelaide



**11-06-01 HEAT TRANSFER IN SOLAR AND RENEWABLE ENERGY SYSTEMS - CONCENTRATED SOLAR POWER AND THERMAL STORAGE
NOVEMBER 1, 2021**

11:20AM–12:50PM

Chair: Subramanyaravi Annapragada -
United Technologies Research

Chair: Kevin Dowding – *Sandia National Laboratories*

Chair: Alexander Rattner - *Penn State University*

11:20AM–11:30AM:

ENTROPY GENERATION MINIMIZATION OPTIMIZE HEAT TRANSFER IN CSP TECHNOLOGIES USING MOLTEN SALT SYSTEM NA₂CO₃/K₂CO₃/MgCl₂ AS HEAT TRANSFER FLUIDS

Technical Paper Publication: **IMECE2021-67195**

Fouad Hadad - *University of Arizona*

Peiwen Li - *University of Arizona*

11:30AM–11:40AM:

THERMAL PERFORMANCE OF A PACKED BED LATENT HEAT THERMAL ENERGY STORAGE WITH PURE SILICON AS PCM

Technical Paper Publication: **IMECE2021-73008**

Sumit Saha - *Bangladesh University of Engineering and Technology*

Abu Raj Md. Ruslan - *Bangladesh University of Engineering and Technology*

A.K.M.M. Morshed - *Bangladesh University of Engineering and Technology*

Titan C. Paul - *University of South Carolina*

11:40AM–11:50AM:

Multiscale Porous High-Temperature Heat Exchanger Design Using Ceramic Co-Extrusion

Technical Presentation: **IMECE2021-77292**

Xiangyu Li - *Massachusetts Institute of Technology*

Chad Wilson - *Massachusetts Institute of Technology*

Lenan Zhang - *Massachusetts Institute of Technology*

Evelyn Wang - *Massachusetts Institute of Technology*

11:50AM–12:00PM:

FLAME SPRAY SYNTHESIS OF MORPHOLOGY CONTROLLABLE AND PERFORMANCE ENHANCED LI(NI_{0.8}CO_{0.1}MN_{0.1})O₂ CATHODE MATERIALS USING UREA AND POLYVINYLPIRROLIDONE AS ADDITIVES

Technical Presentation: **IMECE2021-70309**

Jianan Zhang - *Massachusetts Institute of Technology*

Valerie Muldoon - *Massachusetts Institute of Technology*

Sili Deng - *Massachusetts Institute of Technology*

12:00PM–12:10PM:

THE ENCAPSULATION EFFECT ON THERMAL PERFORMANCE OF MICRO-ENCAPSULATED PHASE CHANGE MATERIALS DURING ENERGY ABSORPTION

Technical Paper Publication: **IMECE2021-73089**

Jingru Z. Benner - *Western New England University*

Rebecca C. Shannon - *Western New England University*

Wentao Wu - *Tennessee State University*

Austen P. Metsack - *Western New England University*

Lu Shen - *Western New England University*

Jingzhou Zhao - *Western New England University*

**11-08-01: FUNDAMENTALS OF PHASE-CHANGE INCLUDING MICRO/NANOSCALE EFFECTS - BOILING AND EVAPORATION
NOVEMBER 1, 2021**

11:20AM–12:50PM

Chair: Subramanyaravi Annapragada -
United Technologies Research

Chair: Kevin Dowding – *Sandia National Laboratories*

Chair: Alexander Rattner - *Penn State University*



11:20AM–11:30AM:**ENHANCED POOL BOILING CRITICAL HEAT FLUX ON TILTED HEATING SURFACES USING COLUMNAR-POST WICKS****Technical Paper Publication: IMECE2021-70054**

Mohammad Borumand - *Wichita State University*
 Gisuk Hwang - *Wichita State University*

11:30AM–11:40AM:**SELF-DRIVEN TRANSPORT OF LIQUID DROPLETS IN V-SHAPED GROOVES DUE TO ASYMMETRIC EVAPORATION****Technical Paper Publication: IMECE2021-73084**

Xukun He - *Virginia Tech*
 Jiangtao Cheng - *Virginia Tech*

11:40AM–11:50AM:**EFFECT OF SUBCOOLING ON POOL BOILING HEAT TRANSFER OVER MINICHANNEL SURFACES****Technical Paper Publication: IMECE2021-73455**

Praveen Dhanalakota - *Indian Institute of Technology Madras*
 Pallab Sinha Mahapatra - *Indian Institute of Technology Madras*
 Arvind Pattamatta - *Indian Institute of Technology Madras*

11:50AM–12:00PM:**THE INFLUENCE OF RAPID TRANSIENT HEATING IN CRITICAL HEAT FLUX OF BOILING HEAT TRANSFER****Technical Paper Publication: IMECE2021-73853**

Yuan Gao - *University of Pittsburgh*
 Zhuorui Song - *University of Pittsburgh*
 Ezekiel Villarreal - *University of Pittsburgh*
 Heng Ban - *University of Pittsburgh*

12:00PM–12:10PM:**ENHANCED FLOW BOILING WITH POROUS METASURFACE: DNS AND THEORETICAL HYDRODYNAMIC, CAPILLARY-VISCOUS, AND THERMAL-CONDUCTANCE LIMITS****Technical Presentation: IMECE2021-77053**

Julio Ferreira - *University of Michigan*
 Massoud Kaviany - *University of Michigan*

12:10PM–12:20PM:**LEIDENFROST SUPPRESSION AND CONTACT TIME REDUCTION ON THE DOUBLE REENTRANT GROOVE ARRAY SURFACE****Technical Presentation: IMECE2021-77233**

Chung-Te Huang - *National Taiwan University*
 Ching-Wen Lo - *National Taiwan University*
 Ming-Chang Lu - *National Taiwan University*

12-03-01: MINISYMPOSIUM ON PERIDYNAMIC MODELING OF MATERIALS' BEHAVIOR NOVEMBER 1, 2021**11:20AM–12:50PM**

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

11:20AM–11:30AM:**PERIDYNAMICS FOR QUASISTATIC FRACTURE MODELING****Technical Paper Publication: IMECE2021-70793**

Debdeep Bhattacharya - *Louisiana State University*
 Patrick Diehl - *Louisiana State University*
 Robert P. Lipton - *Louisiana State University*



11:30AM–11:40AM:**OVERALL EQUILIBRIUM IN THE COUPLING OF PERIDYNAMICS AND CLASSICAL CONTINUUM MECHANICS****Technical Presentation: IMECE2021-77161**

Greta Ongaro - *University of Padova*
 Pablo Seleson - *Oak Ridge National Laboratory*
 Ugo Galvanetto - *University of Padova*
 Tao Ni - *Hohai University*
 Mirco Zaccariotto - *University of Padova*

11:40AM–11:50AM:**A FAST CONVOLUTION-BASED METHOD FOR PERIDYNAMIC MODELLING OF PITTING CORROSION****Technical Presentation: IMECE2021-77326**

Longzhen Wang - *University of Nebraska-Lincoln*
 Siavash Jafarzadeh - *University of Nebraska-Lincoln*
 Florin Bobaru - *University of Nebraska-Lincoln*

11:50AM–12:00PM:**THE FAST CONVOLUTION-BASED METHOD FOR NONLOCAL MODELS****Technical Presentation: IMECE2021-77354**

Siavash Jafarzadeh - *University of Nebraska-Lincoln*
 Farzaneh Mousavi - *University of Nebraska-Lincoln*
 Longzhen Wang - *University of Nebraska-Lincoln*
 Adam Larios - *University of Nebraska-Lincoln*
 Florin Bobaru - *University of Nebraska-Lincoln*

12:00PM–12:10PM:**DATA-DRIVEN LEARNING OF NONLOCAL MODELS: FROM HIGH-FIDELITY SIMULATIONS TO CONSTITUTIVE LAWS****Technical Presentation: IMECE2021-77494**

Marta D'Elia - *Sandia National Laboratories*
 Yue Yu - *Lehigh University*
 Huaiqian You - *Lehigh University*
 Stewart Silling - *Sandia National Laboratories*

12:10PM–12:20PM:**PERIDYNAMIC MODELING OF FLOW-ACCELERATED CORROSION****Technical Presentation: IMECE2021-77516**

Jiangming Zhao - *University of Nebraska-Lincoln*
 Florin Bobaru - *University of Nebraska-Lincoln*

14-01-01: GENERAL TOPICS ON RISK, SAFETY, AND RELIABILITY NOVEMBER 1, 2021**11:20AM–12:50PM**

Chair: **Andrey Morozov** - *University of Stuttgart*
 Chair: **Alba Sofi** - *University Mediterranea of Reggio Calabria*
 Chair: **Bill Munsell** - *Munsell Consulting Services*
 Chair: **Ernie Kee** - *University of Illinois Urbana-Champaign*
 Chair: **Jennifer S. Cooper** - *Boeing*
 Chair: **John Wiechel** - *SEA, Ltd.*
 Chair: **Mihai Diaconeasa** - *North Carolina State University*
 Chair: **Zahra Mohaghegh** - *University of Illinois Urbana-Champaign*

11:20AM–11:30AM:**IMPLEMENTATION OF MECHANICAL RELIABILITY DESIGN THEORY ON A THIN-WALL VESSEL STRUCTURE****Technical Paper Publication: IMECE2021-67665**

Xiaobin Le - *Wentworth Institute of Technology*



11:30AM–11:40AM:**A FRAMEWORK FOR INTEGRATING RELIABILITY, ROBUSTNESS, RESILIENCE, AND VULNERABILITY TO ASSESS SYSTEM ADAPTIVITY****Technical Paper Publication: IMECE2021-73021**Milad Rostami - *Carleton University*Scott Bucking - *Carleton University***11:40AM–11:50AM:****PERFORMANCE OF ITERATIVE NETWORK UNCERTAINTY QUANTIFICATION FOR MULTICOMPONENT SYSTEM QUALIFICATION****Technical Paper Publication: IMECE2021-72345**John Tencer - *Sandia National Laboratories*Edward Rojas - *Sandia National Laboratories***11:50AM–12:00PM:****IMPROVING REAL-TIME METHANE MONITORING IN LONGWALL COAL MINES THROUGH SYSTEM RESPONSE CHARACTERIZATION OF A MULTI-NODAL METHANE DETECTION NETWORK****Technical Paper Publication: IMECE2021-69709**Brian Cappellini - *West Virginia University*Derek Johnson - *West Virginia University*Nigel Clark - *West Virginia University*Amber Barr - *West Virginia University***12:00PM–12:10PM:****A QUANTITATIVE APPROACH TO ASSESS THE LIKELIHOOD OF SUPPLY-CHAIN SHORTAGES****Technical Paper Publication: IMECE2021-73696**Priyanka Pandit - *North Carolina State University*Arjun Earthperson - *North Carolina State University*Alp Tezbasharan - *North Carolina State University*Mihai A. Diaconeasa - *North Carolina State University***04-06-01: LIGHTWEIGHT SANDWICH COMPOSITES AND LAYERED STRUCTURES & ADVANCED MANUFACTURING IN AEROSPACE ENGINEERING NOVEMBER 1, 2021****3:35PM–5:05PM**Chair: Erkan Oterkus - *University of Strathclyde*Chair: Uttam K. Chakravarty - *University of New Orleans*Chair: Pavana Prabhakar - *University of Wisconsin-Madison***3:35PM–3:45PM:****INVESTIGATION OF SELECTIVE LASER SINTERING OF HIGH-DENSITY POLYETHYLENE USING OPTIMIZED 3D PRINTING PARAMETERS****Technical Paper Publication: IMECE2021-70865**Benjamin Hoelzel - *University of Oklahoma*Blake Herren - *University of Oklahoma*Mrinal C. Saha - *University of Oklahoma*Yingtao Liu - *University of Oklahoma***3:45PM–3:55PM:****INVESTIGATION ON SURFACE INTEGRITY IN AXIAL ULTRASONIC VIBRATION-ASSISTED MILLING IN-SITU TiB2/7050AL MMCS****Technical Paper Publication: IMECE2021-72372**Xiao-fen Liu - *Northwestern Polytechnical University*Wen-hu Wang - *Northwestern Polytechnical University*Rui-song Jiang - *Sichuan University*Yi-feng Xiong - *Northwestern Polytechnical University*Chen-wei Shan - *Northwestern Polytechnical University*Jun-chen Li - *Northwestern Polytechnical University*

3:55PM–4:05PM:**CRACK FACE CONTACT MODELING USING TENSIONLESS FOUNDATION FOR FACE/CORE DEBONDS IN SANDWICH BEAMS****Technical Presentation: IMECE2021-76736**Siddarth Niranjana Babu - *Georgia Institute of Technology*
George Kardomateas - *Georgia Institute of Technology***4:05PM–4:15PM:****CLOSED FORM SOLUTION FOR THE ENERGY RELEASE RATE AND MODE PARTITIONING OF DEBONDS IN THE SINGLE CANTILEVER SANDWICH BEAM BY USE OF TIMOSHENKO BEAM THEORY****Technical Presentation: IMECE2021-76738**Siddarth Niranjana Babu - *Georgia Institute of Technology*
George Kardomateas - *Georgia Institute of Technology***4:15PM–4:25PM:****STOCHASTIC ANALYSIS OF LAYERED STRUCTURE'S PULLOUT TEST AND THE SIGNIFICANCE OF MODELING THE ADHESIVE LAYER****Technical Presentation: IMECE2021-76931**Nachman Malkiel - *Technion - Israel Institute of Technology*
Oded Rabinovitch - *Technion - Israel Institute of Technology***4:25PM–4:35PM:****WEAK FORM QUADRATURE ELEMENT FORMULATION OF SANDWICH PANELS BASED ON THE HIGH ORDER THEORY INCLUDING SHEAR EFFECTS****Technical Presentation: IMECE2021-77557**Zhangxian Yuan - *Worcester Polytechnic Institute***04-07-01: DYNAMIC BEHAVIOR OF COMPOSITES & PERIDYNAMICS MODELING
NOVEMBER 1, 2021****3:35PM–5:05PM**Chair: Erkan Oterkus - *University of Strathclyde*Chair: Uttam K. Chakravarty - *University of New Orleans*Chair: Pavana Prabhakar - *University of Wisconsin-Madison***3:35PM–3:45PM:****AXIAL IMPACT BEHAVIOR OF LIQUID NANOFOAM FILLED THIN-WALLED TUBES****Technical Presentation: IMECE2021-77114**Mingzhe Li - *Michigan State University*Saeed Barbat - *Ford Motor Company*Ridha Baccouche - *Ford Motor Company*Jamel Belwafa - *Ford Motor Company*Weiyi Lu - *Michigan State University***3:45PM–3:55PM:****FUNCTIONALIZATION OF WATER MOLECULES CONFINED IN HYDROGELS FOR ENERGY MITIGATION****Technical Presentation: IMECE2021-77164**Chi Zhan - *Michigan State University*Mingzhe Li - *Michigan State University*Weiyi Lu - *Michigan State University***3:55PM–4:05PM:****LIQUID NANOFOAM FILLED-TUBES: A DENT-INERT THIN-WALLED STRUCTURE****Technical Presentation: IMECE2021-77197**Fuming Yang - *Michigan State University*Mingzhe Li - *Michigan State University*Weiyi Lu - *Michigan State University*

4:05PM–4:15PM:**ON INTRODUCTION OF LOCAL STRESS TERM TO PERIDYNAMIC INTEGRAL****Technical Presentation: IMECE2021-77242**Venkata Mutnuri - *Indian Institute of Science*
Srinivasan Gopalakrishnan - *Indian Institute of Science***4:15PM–4:25PM:****EFFECTIVE BEHAVIOR OF RANDOM STRUCTURE COMPOSITES SUBJECTED TO BODY-FORCE LOADING WITH COMPACT SUPPORT****Technical Presentation: IMECE2021-77314**Valeriy Buryachenko - *Micromechanics & Composites LLC***4:25PM–4:35PM:****EFFECTIVE AND EFFICIENT ENERGY MITIGATION BY LIQUID NANOFOAM****Technical Presentation: IMECE2021-77334**Weiyi Lu - *Michigan State University***07-02-02 GENERAL II
NOVEMBER 1, 2021****3:35PM–5:05PM**Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
Chair: Bogdan Epureanu - *University of Michigan*
Chair: Marco Amabili - *McGill University***3:35PM–3:45PM:****HARDWARE-IN-THE-LOOP SIMULATION FOR LARGE-SCALE APPLICATIONS****Technical Paper Publication: IMECE2021-70914**Abdelbasset Krama - *Texas A&M University at Qatar*
Mohamed Gharib - *Texas A&M University at Qatar***3:45PM–3:55PM:****LATERAL-DIRECTIONAL STABILITY AND MANUAL CONTROL OF UNDERSTEERING AND OVERSTEERING VEHICLES IN OFF-ROAD CONDITIONS BASED ON A 2-DOF CORNERING COMPLIANCE VEHICLE DYNAMICS MODEL****Technical Paper Publication: IMECE2021-71854**R.M. Van Auken - *Dynamic Research, Inc.*
S.A. Kebschull - *Dynamic Research, Inc.***3:55PM–4:05PM:****MARS DRONE CONFIGURATIONS AND APPROACHES TO ROTOR DESIGN: A REVIEW****Technical Paper Publication: IMECE2021-71876**Aleandro Saez - *University of North Texas*
Maurizio Manzo - *University of North Texas*
Marco Ciarcia - *South Dakota State University***4:05PM–4:15PM:****A FRAMEWORK FOR SPATIAL 3D COLLISION MODELS: THEORY AND NUMERICAL VALIDATION****Technical Paper Publication: IMECE2021-72981**Terje Sværen - *Western Norway University of Applied Sciences*
Bård Nygard - *Western Norway University of Applied Sciences*
Thomas J. Impelluso - *Western Norway University of Applied Sciences***4:15PM–4:25PM:****DRILLSTRING SIMULATOR: A NOVEL SOFTWARE MODEL FOR STICK-SLIP AND BIT-BOUNCE VIBRATIONS**

Technical Paper Publication: IMECE2021-73717

Baik Jin Kim - *Texas A&M University*
 Alan Palazzolo - *Texas A&M University*
 Mohamed Gharib - *Texas A&M University at Qatar*

4:25PM–4:35PM:**MODEL OF SYSTEMS WITH DISCONTINUITY****Technical Presentation: IMECE2021-77284**

Pezhman Hassanpour - *Gannon University*
 Peter J. Caulfield - *Gannon University*

**07-03-02 NONLINEAR DYNAMICS, CONTROL, AND
 STOCHASTIC MECHANICS II
 NOVEMBER 1, 2021**
3:35PM–5:05PM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

3:35PM–3:45PM:
**ON PERIODIC FIRING ACTIVITIES OF A
 HINDMARSH-ROSE NEURON MODEL WITH
 EXTERNAL PERIODIC STIMULUS**
Technical Paper Publication: IMECE2021-68278

Yeyin Xu - *Xi'an Jiaotong University*
 Peihua Feng - *Xi'an Jiaotong University*

3:45PM–3:55PM:
**PROBABILISTIC RESPONSE OF A VIBRATION
 ENERGY HARVESTER WITH CUSTOMIZED
 NONLINEAR FORCE DRIVEN BY RANDOM
 EXCITATION**
Technical Paper Publication: IMECE2021-68647

Devarajan K - *Amrita School of Engineering*
 Shankaranarayanan V - *Amrita of School of Engineering*
 Nithishrajan K - *Amrita of School of Engineering*
 Gaouthaman M - *Amrita of School of Engineering*
 Chandraditya B - *Amrita of School of Engineering*

3:55PM–4:05PM:
**A NUMERICAL METHOD FOR CALCULATING
 NONLINEAR RESONANCE RESPONSE SURFACE
 BASED ON NONLINEAR MODES**
Technical Paper Publication: IMECE2021-70093

Q. Gao - *Beihang University*
 L. Li - *Beihang University*
 Y. G. Wu - *Beihang University*
 Y. Fan - *Beihang University*

4:05PM–4:15PM:
**EXPERIMENTAL AND ANALYTICAL ANALYSIS OF A
 HINDMARSH-ROSE NEURON MODEL IN A
 NONLINEAR CIRCUIT SYSTEM**
Technical Paper Publication: IMECE2021-70971

Yan Liu - *Northwestern Polytechnical University*
 He Zhang - *Northwestern Polytechnical University*
 Yuchen Li - *Northwestern Polytechnical University*

4:15PM–4:25PM:
**ON THE DYNAMIC AND CONTROL FOR A THREE
 DEGREE-OF-FREEDOM ROBOTIC ARM USED FOR
 REHABILITATION PURPOSES IN MEDICINE**
Technical Paper Publication: IMECE2021-71911

Jean Carlo Grandas Franco - *Universidad Industrial de Santander*
 Carlos Borrás Pinilla - *Universidad Industrial de Santander*



4:25PM–4:35PM:**NONLINEAR VIBRATIONS OF ROTOR-BEARING SYSTEMS SUPPORTED BY SQUEEZE FILM DAMPERS DUE TO UNBALANCE EXCITATION****Technical Paper Publication: IMECE2021-71055**

Furkan Sevencan - *Middle East Technical University*
 Ender Cigeroglu - *Middle East Technical University*
 Özgür Uğraş Baran - *Middle East Technical University*

**07-04-02 DESIGN AND CONTROL OF ROBOTS, MECHANISMS AND STRUCTURES II
NOVEMBER 1, 2021****3:35PM–5:05PM**

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

3:35PM–3:45PM:**A STUDY ON THE EFFECTS OF UNMODELLED ROTATIONAL LOAD SWING DYNAMICS ON THE ANTI-SWING CONTROL OF AN OVERHEAD CRANE****Technical Paper Publication: IMECE2021-68336**

Ho-Hoon Lee - *Southeastern Louisiana University*

3:45PM–3:55PM:**BEHAVIOR CLONING CONTROL USING ADAPTIVE NEURAL FUZZY INFERENCE FOR A ROBOTIC SPORT CAMERA****Technical Presentation: IMECE2021-69555**

He Shen - *California State University*
 Francisco Moxo Galicia - *California State University*

3:55PM–4:05PM:**ELLIPTICAL MACHINES USING ADJUSTABLE LINKAGES****Technical Paper Publication: IMECE2021-70047**

Ali Safdar Naif - *Texas A&M University*
 Hong Zhou - *Texas A&M University*

4:05PM–4:15PM:**TOWARDS DEVELOPMENT OF 3D PRINTED SWIMMING ROBOT USING SOFT ELECTROMAGNETIC ACTUATION****Technical Paper Publication: IMECE2021-70151**

Martin Garcia - *Kennesaw State University*
 Ciaphus Rouse - *Kennesaw State University*
 Benjamin Estrada - *Kennesaw State University*
 Coskun Tekes - *Kennesaw State University*
 Amir Ali Amiri Moghadam - *Kennesaw State University*
 Ayse Tekes - *Kennesaw State University*

4:15PM–4:25PM:**ROBOTIC SYSTEM FOR PLANT TENDING IN REMOTE HABITAT****Technical Paper Publication: IMECE2021-69733**

Blake Hament - *University of Nevada*
 Paul Oh - *University of Nevada*
 Danielle Carr - *Florida A&M University*
 Carl Moore - *Florida A&M University*
 Satyanarayan Dev - *Florida A&M University*
 Ian Ferguson - *Lockheed Martin Space*
 Pedro Pena - *Lockheed Martin Space*
 Josh W. Ehrlich - *Lockheed Martin Space*

4:25PM–4:35PM:**CONSTRUCTION AND TESTING OF SMALL-SCALE TRANSFORMABLE-HULL CONCEPT BOAT**

Technical Paper Publication: IMECE2021-69563Phillip Whitworth - *Washington State University*Cole James - *Washington State University*Konstantin I. Matveev - *Washington State University***09-02-01: GLOBALIZATION OF ENGINEERING AND PROBLEM SOLVING IN ENGINEERING EDUCATION NOVEMBER 1, 2021****3:35PM–5:05PM**Chair: Subha Kumpaty - *Milwaukee School of Engineering*Chair: Salim Azzouz - *Midwestern State University*Chair: Anabela Alves - *University of Minho***3:35PM–3:45PM:****STRATEGIC MANAGEMENT AND OPERATIONAL ENERGETIC EDUCATION, OPPORTUNITY FOR FUTURE SMALL DEVELOPERS AND ENTREPRENEURS****Technical Paper Publication: IMECE2021-71102**Bogdan Alexandru Radulescu - *University Politehnica of Bucharest*Victorita Radulescu - *University Politehnica of Bucharest***3:45PM–3:55PM:****ENHANCING UNIVERSITY PERSISTENCE OF DIVERSE MECHANICAL ENGINEERING STUDENTS****Technical Paper Publication: IMECE2021-70862**Subha Kumpaty - *Milwaukee School of Engineering*Jan Fertig - *Milwaukee School of Engineering***3:55PM–4:05PM:****INTEGRATED SYSTEM ARCHITECTURE DEVELOPMENT FRAMEWORK AND COMPLEXITY ASSESSMENT****Technical Paper Publication: IMECE2021-67515**Akshay S. Dalvi - *Indiana University Purdue University Indianapolis*Hazim El-Mounyari - *Indiana University Purdue University Indianapolis***4:05PM–4:15PM:****EVALUATION OF SYSTEMATIC DESIGN METHODS USED IN SENIOR DESIGN PROJECTS****Technical Paper Publication: IMECE2021-72192**Angran Xiao - *New York City College of Technology*Andy Zhang - *New York City College of Technology*Gaffar Gailani - *New York City College of Technology***4:15PM–4:25PM:****CONTRASTING THE TRADITIONAL ENGINEERING AND BUSINESS APPROACHES TO THE TEACHING OF ENGINEERING ECONOMICS****Technical Paper Publication: IMECE2021-73251**Aaron Armstrong - *Milwaukee School of Engineering***4:25PM–4:35PM:****FOSTERING STUDENT ENGAGEMENT AND LEARNING IN ONLINE AND FLEX DELIVERED THERMODYNAMICS COURSES VIA TWO-STAGE CONCEPT INVENTORY QUIZZES IN TIME OF COVID****Technical Paper Publication: IMECE2021-70778**Zahra Sadeghizadeh - *Florida Polytechnic University***09-10-02: TEACHING LABORATORIES, HANDS-ON EXPERIENCES, EMBEDDING NOVEL MANUFACTURING CONCEPTS IN ME PROGRAMS, AND TECHNOLOGY-AIDED LECTURING II NOVEMBER 1, 2021**

3:35PM–5:05PM

Chair: Subha Kumpaty - Milwaukee School of Engineering
 Chair: Salim Azzouz - Midwestern State University
 Chair: Anabela Alves - University of Minho

3:35PM–3:45PM:

HARVESTING ELECTRICAL ENERGY FROM SOLAR PANELS AND A WIND TURBINE USING CHARGE CONTROLLERS

Technical Presentation: IMECE2021-67548

Salim Azzouz - Midwestern State University
 Ernuel Tonge - Midwestern State University

3:45PM–3:55PM:

EXPERIMENTAL AND COMPUTATIONAL INVESTIGATIONS OF A CYLINDER IN CROSSFLOW

Technical Paper Publication: IMECE2021-70342

Nathan Patterson - Milwaukee School of Engineering
 Prabhakar Venkateswaran - Milwaukee School of Engineering

3:55PM–4:05PM:

INVESTIGATION OF THE POWER GENERATED BY A 3-D PRINTED WIND TURBINE USING A WIND TUNNEL

Technical Presentation: IMECE2021-70421

Pranaya Pokharel - Midwestern State University
 Salim Azzouz - Midwestern State University
 Till Gebel - Midwestern State University

4:05PM–4:15PM:

WIND TUNNEL DATA ACQUISITION SYSTEM

Technical Paper Publication: IMECE2021-70458

Riley Bishop - Western Kentucky University

Wesley Fisher - Western Kentucky University
 Alex Doom - Western Kentucky University
 Elena Hollingsworth - Western Kentucky University
 Brian Mazzoni - Western Kentucky University
 Manohar Chidurala - Western Kentucky University

4:15PM–4:25PM:

INCORPORATION OF BLADE TWIST AND NON-UNIFORM INFLOW EFFECTS IN UNDERGRADUATE HELICOPTER AERONAUTICS WHIRL STAND LABORATORY

Technical Paper Publication: IMECE2021-71169

Jeremy Paquin - United States Military Academy
 Evan Harris - United States Military Academy
 Emma San Martin - United States Military Academy
 Dennis Kirby - United States Military Academy
 Richard Melnyk - United States Military Academy
 Nathan Humbert - United States Military Academy

4:25PM–4:35PM:

DYNAMIC FILTRATION TEST EXPERIMENTAL WORK TO STUDY THE EFFECT OF PREFORMED PARTICLE GELS ON THE FORMATION DAMAGE

Technical Presentation: IMECE2021-70423

Mahmoud Elsharafi - Midwestern State University

10-03-02: FUNDAMENTAL ISSUES AND PERSPECTIVES IN FLUID MECHANICS - II NOVEMBER 1, 2021

3:35PM–5:05PM

Chair: Philipp Epple - Coburg University of Applied Sciences
 Chair: Kamran Siddiqui - University of Western Ontario



3:35PM–3:45PM:**PROFILE LOSS OF A PRINTED TRANSONIC TURBINE CASCADE**

Technical Paper Publication: **IMECE2021-70215**
 Leander Hake - *Muenster University of Applied Sciences*

STEFAN AUS DER WIESCHE - MUENSTER UNIVERSITY OF APPLIED SCIENCES

3:45PM–3:55PM:**INVESTIGATING THE FLOW FIELD PHYSICS WITHIN UNSTEADY COMPRESSIBLE FLOWS**

Technical Paper Publication: **IMECE2021-71788**
 Dehua Feng - *North Carolina A&T State University*
 Yang Gao - *North Carolina A&T State University*
 Frederick Ferguson - *North Carolina A&T State University*
 Larry Thompson - *North Carolina A&T State University*

3:55PM–4:05PM:

Technical Paper Publication: **IMECE2021-69420**
 Alvin Alex - *Government Engineering College Thrissur*
 V. Lijo - *Government Engineering College Thrissur*

4:05PM–4:15PM:**TRANSITIONAL FLOW AND HEAT TRANSFER ON THE PRESSURE SURFACE OF A C-D COMPRESSOR BLADE**

Technical Paper Publication: **IMECE2021-71171**
 S. Sarkar - *Indian Institute of Technology Kanpur*
 S. Katiyar - *Indian Institute of Technology Kanpur*

4:15PM–4:25PM:**VALIDATION STUDY OF REYNOLDS STRESS MODEL COUPLED WITH GAMMA TRANSITION FOR UAV PROPELLERS**

Technical Paper Publication: **IMECE2021-70674**
 Naina Pisharoti - *Virginia Tech*
 Stefano Brizzolara - *Virginia Tech*

4:25PM–4:35PM:**PERFORMANCE OF A TWO STAGE ELECTROHYDRODYNAMIC GAS PUMP WITH DIFFERENT POLARITIES**

Technical Paper Publication: **IMECE2021-71601**
 A.K.M. Monayem H. Mazumder - *Saginaw Valley State University*
 Shariful A. Robin - *Saginaw Valley State University*
 Margaret Wood - *Saginaw Valley State University*

10-10-01: INDUSTRIAL FLOWS - I NOVEMBER 1, 2021**3:35PM–5:05PM**

Chair: Philipp Epple - *Coburg University of Applied Sciences*
 Chair: Kamran Siddiqui - *University of Western Ontario*

3:35PM–3:45PM:**WEAR ANALYSIS OF A NI-RESIST 1 MIXED FLOW, MULTI-STAGE CENTRIFUGAL PUMP: AN EROSION-CORROSION CASE STUDY**

Technical Paper Publication: **IMECE2021-66653**
 Carla Naiana Pires da Silva - *PetroReconcavo*



3:45PM–3:55PM:**FLOW AROUND COMPLEX NATURAL SHAPES
ENCOUNTERED IN FOOD PROCESSING****Technical Paper Publication: IMECE2021-68101**Aklilu T. G. Giorges - *Georgia Tech Research Institute*Saikamal Srinivas - *Georgia Tech Research Institute*Comas Haynes - *Georgia Tech Research Institute*Sean Thomas - *Georgia Tech Research Institute***3:55PM–4:05PM:****DIGITAL FEED-FORWARD GAS FLOW RATE
CONTROL WITH A SWITCHED NOZZLE VALVE****Technical Paper Publication: IMECE2021-70549**Christopher R. Martin - *Pennsylvania State University*Todd D. Batzel - *Pennsylvania State University*Ethan Liebmann - *Pennsylvania State University***4:05PM–4:15PM:****THE EFFECT OF VALVE CLOSURE TIME ON
WATER HAMMER****Technical Paper Publication: IMECE2021-71153**William Davies - *Exponent, Inc.*Malima Wolf - *Exponent, Inc.*Michael Barry - *Exponent, Inc.*Sean O'Hern - *Exponent, Inc.*Timothy Morse - *Exponent, Inc.***4:15PM–4:25PM:****THE INFLUENCE OF PLAIN-ORIFICE GEOMETRY ON
PINTLE INJECTOR FLOW DISCHARGE COEFFICIENT****Technical Paper Publication: IMECE2021-73280**Hamid Fazeli - *Oregon State University*Colton Harms - *Oregon State University*Jordan Vanaken - *Oregon State University***4:25PM–4:35PM:****EFFECTS OF COMBINED ELECTROMAGNETIC
AND BOTTOM-PLUG STIRRING IN A STEEL
REFINING LADLE****Technical Paper Publication: IMECE2021-71767**Joel Godinez - *Purdue University Northwest*Nicholas Walla - *Purdue University Northwest*Xipeng Guo - *Purdue University Northwest*Chenn Zhou - *Purdue University Northwest***11-08-02: FUNDAMENTALS OF PHASE-CHANGE
INCLUDING MICRO/NANOSCALE EFFECTS -
CONDENSATION AND FREEZING
NOVEMBER 1, 2021****3:35PM–5:05PM**Chair: Subramanyaravi Annapragada -
*United Technologies Research*Chair: Kevin Dowding – *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***3:35PM–3:45PM:****NANOSTRUCTURING OF METALLIC ADDITIVELY
MANUFACTURED SURFACES FOR ENHANCED
JUMPING DROPLET CONDENSATION****Technical Paper Publication: IMECE2021-70949**Jin Yao Ho - *Nanyang Technological University Singapore*Kazi Fazle Rabbi - *University of Illinois at Urbana-Champaign*Soumyadip Sett - *University of Illinois at Urbana-Champaign*Teck Neng Wong - *Nanyang Technological University Singapore*Kai Choong Leong - *Nanyang Technological University Singapore*Nenad Miljkovic - *University of Illinois at Urbana-Champaign*

3:45PM–3:55PM:**EFFECT OF LEAF VEIN STRUCTURE ON CONDENSATION BEHAVIOR OF VERTICAL COPPER PLATE: AN EXPERIMENTAL APPROACH****Technical Paper Publication: IMECE2021-72191****Md. Omarsany Bappy** - Bangladesh University of Engineering & Technology**Raihan Aziz** - Bangladesh University of Engineering & Technology**Abdul Aziz Shuvo** - Bangladesh University of Engineering & Technology**A.K.M.M. Monjur Morshed** - Bangladesh University of Engineering & Technology**Titan C. Paul** - University of South Carolina Aiken**3:55PM–4:05PM:****ANALYSIS OF ICE FORMATION AND SALT DIFFUSION IN FREEZING DESALINATION****Technical Paper Publication: IMECE2021-71269****Hongtao Zhang** - Khalifa University of Science and Technology**Isam Janajreh** - Khalifa University of Science and Technology**4:05PM–4:15PM:****CONTROL OF WATER-ICE PHASE CHANGE PROPAGATION WITH GRAPHENE SURFACE INTERACTION****Technical Presentation: IMECE2021-77423****Yu-Kai Weng** - The University of Tennessee, Knoxville**Seungha Shin** - The University of Tennessee, Knoxville**Kenneth D. Kihm** - The University of Tennessee, Knoxville**Doug Aaron** - The University of Tennessee, Knoxville**4:15PM–4:25PM:****EXPERIMENTAL AND NUMERICAL INVESTIGATION OF PHASE CHANGE MATERIAL MELTING AT SUBOPTIMAL INCLINES****Technical Paper Publication: IMECE2021-69233****Casey J. Troxler** - Embry-Riddle Aeronautical University**Thomas B. Freeman** - Embry-Riddle Aeronautical University**Rafael M. Rodriguez** - Embry-Riddle Aeronautical University**Sandra K.S. Boetcher** - Embry-Riddle Aeronautical University**4:25PM–4:35PM:****STUDY OF VAPOR CONDENSATION ON A VERTICAL POROUS MICROGROOVE COPPER PLATE****Technical Paper Publication: IMECE2021-72348****Raihan Aziz** - Bangladesh University of Engineering and Technology**Md. Omarsany Bappy** - Bangladesh University of Engineering and Technology**A.K.M.M. Morshed** - Bangladesh University of Engineering and Technology**Titan C. Paul** - University of South Carolina Aiken**11-06-02 HEAT TRANSFER IN SOLAR AND RENEWABLE ENERGY SYSTEMS - THERMAL APPLICATIONS
NOVEMBER 1, 2021****3:35PM–5:05PM****Chair: Subramanyaravi Annapragada** - United Technologies Research**Chair: Kevin Dowding** - Sandia National Laboratories**Chair: Alexander Rattner** - Penn State University**3:35PM–3:45PM:****IRREVERSIBILITY ANALYSIS, DESIGN, AND OPTIMIZATION OF A COMBINED HYBRID HOT AIR AND BUOYANT GAS BALLOON FOR STRATOSPHERIC PERSISTENCE****Technical Paper Publication: IMECE2021-69681****Michele Trancossi** - Universidade da Beira Interior**Jose Pascoa** - Universidade da Beira Interior

3:45PM–3:55PM:**HEAT SINK OPTIMIZATION FOR COLLECTION OF POTABLE WATER USING RENEWABLE ENERGY****Technical Paper Publication: IMECE2021-71477**Luz A. Amaya - *Central Connecticut State University*David J. Broderick - *Central Connecticut State University***3:55PM–4:05PM:****MANUFACTURING AND PERFORMANCE ASSESSMENT OF SOLAR PHOTO-VOLTAIC MODULES BY ADOPTING VARIOUS HEAT DISSIPATION TECHNIQUES: A REVIEW****Technical Paper Publication: IMECE2021-72889**Abdul Subhan - *United Arab Emirates University*Abdel-Hamid I. Mourad - *United Arab Emirates University***4:05PM–4:15PM:****PERFORMANCE ASSESSMENT OF A CLOSED GREENHOUSE IN A HOT ARID AUSTRALIAN CLIMATE****Technical Paper Publication: IMECE2021-72960**Anwar Hegazy - *University of Auckland*Alison Subiantoro - *University of Auckland*Stuart Norris - *University of Auckland***4:15PM–4:25PM:****EFFECTS OF THE PROPERTIES OF GLYCOL AQUEOUS SOLUTION ON BATTERY COOLING PERFORMANCE BASED ON COLD PLATES****Technical Paper Publication: IMECE2021-69055**Hongya Zhang - *Huazhong University of Science & Technology*Chengshuai Li - *Huazhong University of Science & Technology*Yangsui Xie - *Shenzhen University*Ali Radwan - *Mansoura University*Haisheng Fang - *Huazhong University of Science & Technology***12-02-01: DYNAMIC FAILURE OF MATERIALS & STRUCTURES
NOVEMBER 1, 2021****3:35PM–5:05PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***3:35PM–3:45PM:****GRAPHENE CONFINED POLYMER THIN FILMS SUBJECTED TO SUPERSONIC IMPACT****Technical Paper Publication: IMECE2021-68457**Andrew Bowman - *U.S. Army Engineer Research and Development Center*Michael Roth - *U.S. Army Engineer Research and Development Center*William Lawrimore - *U.S. Army Engineer Research and Development Center*John Newman - *U.S. Army Engineer Research and Development Center***3:45PM–3:55PM:****FRACTURE BEHAVIOR OF ALUMINA/EPOXY RESIN INTERFACE AND EFFECT OF WATER MOLECULES BY USING MOLECULAR DYNAMICS USING REACTION FORCE FIELD (REAXFF)****Technical Paper Publication: IMECE2021-69109**Hiroki Nishino - *Chuo University*Kohei Kanamori - *Chuo University*Yoshikatsu Kimoto - *Chuo University*Kazuma Okada - *Chuo University*Akio Yonezu - *Chuo University*

3:55PM–4:05PM:**HIGH STRAIN RATE IMPACT ON CARBON NANOSTRUCTURES USING MOLECULAR DYNAMICS SIMULATIONS****Technical Paper Publication: IMECE2021-70515**

Matheus Prates - *Kennesaw State University*
 Ian Durr - *Kennesaw State University*
 Jungkyu Park - *Kennesaw State University*
 Giovanni Espitia - *Kennesaw State University*
 Braden Peterson - *Wheeler High School*

4:05PM–4:15PM:**FINITE ELEMENT ANALYSIS ON PLASTIC COLLAPSE BEHAVIOR OF TOPOLOGY-OPTIMIZED CELLULAR STRUCTURE SUBJECT TO COMPRESSIVE LOADING****Technical Paper Publication: IMECE2021-70744**

Yuta Takase - *Chuo University*
 Takahiro Kawano - *Chuo University*
 Tomohisa Kojima - *Chuo University*
 Tomoaki Tsuji - *Chuo University*

4:15PM–4:25PM:**DEVELOPMENT OF BI-AXIAL TENSILE TESTING FOR POROUS POLYMER MEMBRANES AND ITS DEFORMATION CHARACTERISTICS****Technical Paper Publication: IMECE2021-71086**

Yasuhisa Kodaira - *Chuo University*
 Tatsuma Miura - *Chuo University*
 Yoshinori Takano - *Chuo University*
 Akio Yonezu - *Chuo University*

4:25PM–4:35PM:**PLASTIC DEFORMATION BEHAVIOR AT HIGH STRAIN RATE BY USING HIGH VELOCITY MICRO-PARTICLE COLLISIONS****Technical Paper Publication: IMECE2021-71166**

Ryoma Komine - *Chuo University*
 Takumi Furutani - *Chuo University*
 Yugo Sakai - *Chuo University*
 Akio Yonezu - *Chuo University*

**14-01-02: GENERAL TOPICS ON RISK, SAFETY, AND RELIABILITY
NOVEMBER 1, 2021****3:35PM–5:05PM****3:35PM–3:45PM:****COMPRESSION ANALYSIS TESTS FOR PROTOTYPES MADE OF DIFFERENT POLYMERS****Technical Paper Publication: IMECE2021-68096**

Taher Deemyad - *Idaho State University*
 Vincent Akula - *Idaho State University*
 Anish Sebastian - *Idaho State University*

3:45PM–3:55PM:**MATHEMATICAL MODELING FOR CARBON DIOXIDE LEVEL WITHIN CONFINED SPACES****Technical Paper Publication: IMECE2021-68452**

Lincan Yan - *Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health*
 Dave S. Yantek - *Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health*
 Cory R. DeGennaro - *Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health*
 Rohan D. Fernando - *Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health*



3:55PM–4:05PM:**FRESH AIR FLOW REQUIRED TO MAINTAIN SAFE CARBON DIOXIDE LEVELS AND PROVIDE A BREATHABLE AIR ENVIRONMENT IN A REFUGE ALTERNATIVE****Technical Paper Publication: IMECE2021-68680****Cory Degennaro** - Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health**Lincan Yan** - Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health**Dave Yantek** - Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health**4:05PM–4:15PM:****ATTEMPTING TO ESTABLISH DESIGN MARGINS FOR GLASSY POLYMERS IN CRITICAL STRUCTURAL SERVICE****Technical Paper Publication: IMECE2021-71836****Bart Kemper** - Kemper Engineering Services**Kaylie Williams** - Lockheed Martin**4:15PM–4:25PM:****A MULTI-ATTRIBUTE KNOWLEDGE CRITICALITY FRAMEWORK FOR RANKING MAJOR MAINTENANCE ACTIVITIES: A CASE STUDY OF CEMENT RAW MILL PLANT****Technical Paper Publication: IMECE2021-72943****Lillian O. Iheukwumere-Esotu** - University of Manchester**Akilu Yunusa-Kaltungo** - University of Manchester**14-01-03: GENERAL TOPICS ON RISK, SAFETY, AND RELIABILITY
NOVEMBER 1, 2021****3:35PM–5:05PM****3:35PM–3:45PM:****THE ROLE OF PROTECTIVE SYSTEM RELIABILITY ANALYSIS IN THE STUDY OF SYSTEM SAFETY****Technical Paper Publication: IMECE2021-69562****Martin Wortman** - The Organization for Public Awareness of Hazardous Technology Risks**Ernie Kee** - The Organization for Public Awareness of Hazardous Technology Risks**Pranav Kannan** - The Organization for Public Awareness of Hazardous Technology Risks**3:45PM–3:55PM:****ESTABLISHMENT OF THE OFF-CENTER EMBEDDED CRACK STRESS INTENSITY FACTOR DATABASE FOR PROBABILISTIC RISK ASSESSMENT BASED ON UNIVERSAL WEIGHT FUNCTION****Technical Paper Publication: IMECE2021-70198****Tongge Xu** - Beihang University**Shuiting Ding** - Beihang University**Guo Li** - Beihang University**3:55PM–4:05PM:****APPLICATION OF BAYESIAN CALIBRATION TO IMPROVE MULTIPLE BALLISTIC IMPACT MODELING****Technical Paper Publication: IMECE2021-70716****Gregory A. Langone** - United States Military Academy**Brad G. Davis** - United States Military Academy**Nicholas A. Reisweber** - United States Military Academy**4:05PM–4:15PM:****MULTIOBJECTIVE RELIABILITY-BASED DESIGN OF AN AIRCRAFT WING USING A FUZZY-BASED METAHEURISTIC**

Technical Paper Publication: IMECE2021-71001

Suwin Slesongsom - *King Mongkut's Institute of Technology Ladkrabang*

Saksan Winyangkul - *KhonKaen University*

Sujin Bureerat - *KhonKaen University*

4:15PM–4:25PM:

VERIFICATION STUDY OF THE NUCLEAR PRA FOR THE MARS 2020 MISSION FOLLOWING ACCIDENTAL ORBITAL RE-ENTRY

Technical Paper Publication: IMECE2021-71359

Arjun Earthperson - *University of California*

Mihai Diaconeasa - *North Carolina State University*

12-16-04:**GENERAL SESSION****NOVEMBER 1, 2021****3:35PM–5:05PM**

Chair: Marco Amabili - *McGill University*

Chair: Celia Reina - *University of Pennsylvania*

3:35PM–3:45PM:

UNDERWATER AND AIR-BLAST STRUCTURE INTERACTION USING THE IMMERSED APPROACH

Technical Presentation: IMECE2021-76520

Shaunak Shende - *Brown University*

Yuri Bazilevs - *Brown University*

Georgios Moutsandis - *Stony Brook University*

3:45PM–3:55PM:

SYMMETRY-ADAPTED DENSITY FUNCTIONAL THEORY

Technical Presentation: IMECE2021-76652

Abhiraj Sharma - *Georgia Institute of Technology*

Phanish Suryanarayana - *Georgia Institute of Technology*

3:55PM–4:05PM:

MICROBALLISTIC PERFORMANCE OF CARBON NANOTUBE MATS WITH TAILORED INTER-TUBE INTERACTIONS

Technical Presentation: IMECE2021-71843

Jizhe Cai - *University of Wisconsin*

Ramathanan Ramathansan - *University of Wisconsin*

4:05PM–4:15PM:

STRESS ANALYSIS OF BOLTED FLANGE JOINTS WITH DIFFERENT SHELL CONNECTIONS

Technical Paper Publication: IMECE2021-72063

Mohammad Choulaei - *École de Technologie Supérieure*

Abdel-Hakim Bouzid - *École de Technologie Supérieure*

4:15PM–4:25PM:

DISLOCATION DYNAMICS IN CORE-SHELL NANOSTRUCTURES

Technical Presentation: IMECE2021-77519

Robert Fleming - *Arkansas State University*

**04-08-01: DYNAMICS AND CONTROL OF AEROSPACE STRUCTURES
NOVEMBER 1, 2021**

5:25PM–6:59PM

Chair: Erkan Oterkus - *University of Strathclyde*

Chair: Uttam K. Chakravarty - *University of New Orleans*

Chair: Pavana Prabhakar - *University of Wisconsin-Madison*



5:25PM–5:35PM:**ON THE DYNAMIC RESPONSE OF A DIELECTRIC ELASTOMER MEMBRANE****Technical Paper Publication: IMECE2021-70077**Pratik Sarker - *Detroit Engineered Products*Uttam K. Chakravarty - *University of New Orleans***5:35PM–5:45PM:****DRONE POLLINATION OF FLOWERING VEGETATION FOR AGRICULTURAL APPLICATIONS****Technical Paper Publication: IMECE2021-70545**Sonia Diaz Guzman - *Saint Martin's University*Devon Henspeter - *Saint Martin's University*Megan Taylor - *Saint Martin's University*Shawn Duan - *Saint Martin's University***5:45PM–5:55PM:****AN INVESTIGATION OF THE WAKE AND VORTEX FORMATION OF A HELICOPTER ROTOR BLADE****Technical Paper Publication: IMECE2021-70777**Mohammad Khairul Habib Pulok - *University of New Orleans*Uttam K Chakravarty - *University of New Orleans***5:55PM–6:05PM:****A MACHINE LEARNING APPROACH FOR PREDICTING MELT-POOL DYNAMICS OF TI-6AL-4V ALLOY IN THE LASER POWDER-BED FUSION PROCESS****Technical Paper Publication: IMECE2021-71348**M. Shafiqur Rahman - *University of New Orleans*Jonathan Ciaccio - *University of New Orleans*Uttam K. Chakravarty - *University of New Orleans***6:05PM–6:15PM:****TENSILE AND FATIGUE RESPONSE OF THE LASER POWDER-BED FUSED TI-6AL-4V ALLOY AT HIGH TEMPERATURE CONDITIONS****Technical Paper Publication: IMECE2021-72043**M. Shafiqur Rahman - *University of New Orleans*Mohammad Khairul Habib Pulok - *University of New Orleans*Uttam K. Chakravarty - *University of New Orleans***6:15PM–6:25PM:****CRACK PROPAGATION AND FRACTURE TOUGHNESS OF ADDITIVELY MANUFACTURED POLYMERS****Technical Paper Publication: IMECE2021-72061**Mohammad Khairul Habib Pulok - *University of New Orleans*M. Shafiqur Rahman - *University of New Orleans*Uttam K. Chakravarty - *University of New Orleans***04-10-01: IMPACT, DAMAGE AND FRACTURE OF COMPOSITE STRUCTURES
NOVEMBER 1, 2021****5:25PM–6:59PM**Chair: Erkan Oterkus - *University of Strathclyde*Chair: Uttam K. Chakravarty - *University of New Orleans*Chair: Pavana Prabhakar - *University of Wisconsin-Madison***5:25PM–5:35PM:****ANALYZING CORE FAILURE IN COMPOSITE SANDWICH STRUCTURES USING A NON-LOCAL ANISOTROPIC DAMAGE APPROACH****Technical Paper Publication: IMECE2021-70354**Linqi Zhuang - *Ansys, Inc.*Ali Najafi - *Ansys, Inc.*

5:35PM–5:45PM:**REINFORCED MIXED MODE BENDING FIXTURE FOR IMPROVED CHARACTERIZATION****Technical Paper Publication: IMECE2021-70604**Masoud Yekani Fard - *Arizona State University*Christian Bonney - *Arizona State University***5:45PM–5:55PM:****CHARACTERIZING POTENTIAL DAMAGE TO LANDERS AND THEIR PAYLOADS CAUSED BY REGOLITH EJECTA DURING OPERATIONS ON OR NEAR THE SURFACE OF THE MOON, MARS, AND OTHER WORLDS****Technical Paper Publication: IMECE2021-70923**Vincent Roux - *Saint Martin's University*Shawn Duan - *Saint Martin's University***5:55PM–6:05PM:****NUMERICAL SIMULATION OF THE EFFECT OF BONDED PATCH REPAIR ON THE INTERNAL STRESS DISTRIBUTION****Technical Paper Publication: IMECE2021-71302**A.M. Sreenath - *Indian Institute of Technology Madras*Raghu V. Prakash - *Indian Institute of Technology Madras***6:05PM–6:15PM:****IMPACT PERFORMANCE AND BENDING BEHAVIOR ANALYSIS OF FIBER REINFORCED COMPOSITE SANDWICH STRUCTURES IN ARCTIC CONDITION****Technical Presentation: IMECE2021-77490**Arnob Banik - *The University of Akron*Kwek-Tze Tan - *The University of Akron***6:15PM–6:25PM:****EFFECT OF SURFACE PREPARATION ON THE DAMAGE AND FRACTURE BEHAVIOR OF CARBON FIBER-REINFORCED POLYMER AND TITANIUM TUBULAR ADHESIVE LAP-JOINTS AT ELEVATED TEMPERATURES****Technical Presentation: IMECE2021-77528**Isaiah Kaiser - *The University of Akron*Kwek-Tze Tan - *The University of Akron***07-04-03 DESIGN AND CONTROL OF ROBOTS, MECHANISMS AND STRUCTURES III
NOVEMBER 1, 2021****5:25PM–6:59PM**Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*Chair: Bogdan Epureanu - *University of Michigan*Chair: Marco Amabili - *McGill University***5:25PM–5:35PM:****SLIP SUPPRESSION CONTROL TO IMPROVE THE PERFORMANCE OF A MOBILE CLEANING ROBOT UNDER DIFFERENT ROAD SURFACE CONDITIONS****Technical Paper Publication: IMECE2021-69383**Tsubasa Yamatogawa - *Mie University*Tatsuhiko Morimoto - *Mie University*Takaya Tsuno - *Mie University*Tian Shen - *Mie University*Ken'ichi Yano - *Mie University*Toshihiko Arima - *Shinagawa Furnace Co., Ltd.*Shigeru Fukui - *Shinagawa Furnace Co., Ltd.***5:35PM–5:45PM:****NONLINEAR ROBUST CONTROL DESIGN FOR A GRAVITY COMPENSATION MECHANISM UNDER HUMAN WALKING PATTERN SCENARIOS**

Technical Paper Publication: IMECE2021-71712

Zeki Okan Ilhan - *Midwestern State University*
Meng-Sang Chew - *Lehigh University*

5:45PM–5:55PM:**MECHANICAL UPGRADE AND GAIT DEVELOPMENT OF RE-SIZABLE QUADRUPED, HARQ****Technical Paper Publication: IMECE2021-69421**

Salman Hussain - *University of Hartford*
Akin Tatoglu - *University of Hartford*
Kiwon Sohn - *University of Hartford*

5:55PM–6:05PM:**TRACKING CONTROL DESIGN AND IMPLEMENTATION OF MULTIAXIAL CONTROLLER FOR SOCIAL ROBOTIC DEVICES****Technical Paper Publication: IMECE2021-70510**

Marvin Cheng - *National Institute for Occupational Safety and Health*
Ezzat Bakhoun - *University of West Florida*

6:05PM–6:15PM:**DESIGN OF A LIGHTWEIGHT ROBOTIC MULE****Technical Paper Publication: IMECE2021-69715**

Jian Su - *University of Cincinnati*
Xin Zhi - *University of Cincinnati*
Sha Lu - *University of Cincinnati*
Qichun Zhang - *University of Cincinnati*
Janet Dong - *University of Cincinnati*

6:15PM–6:25PM:**DESIGN OF AN APPARATUS TO MEASURE AERODYNAMIC FORCES DURING FLAPPING WING HOVERING****Technical Paper Publication: IMECE2021-73811**

Vernon Fernandez - *Lawrence Technological University*
Hamid Vejdani - *Lawrence Technological University*
Badih Jawad - *Lawrence Technological University*

07-05-01 FLUID-STRUCTURE INTERACTION I NOVEMBER 1, 2021**5:25PM–6:59PM**

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
Chair: Bogdan Epureanu - *University of Michigan*
Chair: Marco Amabili - *McGill University*

5:25PM–5:35PM:**NONLINEAR VIBRATIONS OF BEAMS WITH BILINEAR HYSTERESIS AT SUPPORTS: INTERPRETATION OF EXPERIMENTAL RESULTS****Technical Paper Publication: IMECE2021-70268**

Prabakaran Balasubramanian - *McGill University*
Giulio Franchini - *McGill University*
Giovanni Ferrari - *McGill University*
Brian Painter - *Framatome, Inc.*
Kostas Karazis - *Framatome, Inc.*
Marco Amabili - *McGill University*

5:35PM–5:45PM:**FLOW-INDUCED VIBRATION AND WAKE FLOW DYNAMICS BEHIND HARBOR SEAL WHISKER MODEL IN TANDEM ARRANGEMENT WITH AN UPSTREAM CYLINDER****Technical Paper Publication: IMECE2021-69327**

Sarah Dulac - *University of Massachusetts*
Seyedmohammad Mousavisani - *University of Massachusetts*
Tabitha Ann Breault - *University of Massachusetts*
Banafsheh Seyed-Aghazadeh - *University of Massachusetts*



5:45PM–5:55PM:**NONLINEAR WAKE-INDUCED VIBRATION OF DOWNSTREAM CYLINDER IN STAGGERED ARRANGEMENTS****Technical Paper Publication: IMECE2021-67776**

Bruno Soares - *Newcastle University*
 Narakorn Srinil - *Newcastle University*

5:55PM–6:05PM:**FLOW DISTURBANCE GENERATORS BASED ON OSCILLATING CYLINDERS WITH ATTACHED SPLITTER PLATES****Technical Paper Publication: IMECE2021-69467**

Michael Hughes - *North Carolina State University*
 Mariah Mook - *North Carolina State University*
 Michael Jenkins - *North Carolina State University*
 Ashok Gopalarathnam - *North Carolina State University*
 Matthew Bryant - *North Carolina State University*
 Arun Vishnu Suresh Babu - *North Carolina State University*

6:05PM–6:15PM:**DYNAMICS OF FLOW AND HEAT TRANSFER AROUND TWO CIRCULAR CYLINDERS OF DIFFERENT DIAMETERS IN TANDEM SUBJECTED TO FORCED CONVECTION****Technical Paper Publication: IMECE2021-72944**

Rami Homsy - *Khalifa University of Science and Technology*
 Md Islam - *Khalifa University of Science and Technology*
 Yap Yit Fatt - *Khalifa University of Science and Technology*
 Isam Janajreh - *Khalifa University of Science and Technology*

6:15PM–6:25PM:**SLENDER BODY THEORY FOR EXTENSIBLE AND SHEARABLE FILAMENTS IN FLUID MEDIA****Technical Presentation: IMECE2021-76643**

Mohit Garg - *Indian Institute of Technology Delhi*
 Ajeet Kumar - *Indian Institute of Technology Delhi*

07-07-01 SMART STRUCTURES AND STRUCTRONIC SYSTEMS: SENSING, ENERGY GENERATION AND CONTROL I NOVEMBER 1, 2021**5:25PM–6:59PM**

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

5:25PM–5:35PM:**PROGRAMMABLE NONLINEAR VIBRATION ABSORBER USING SYNTHETIC IMPEDANCE CIRCUITS****Technical Presentation: IMECE2021-77475**

Obaidullah Alfahmi - *Georgia Institute of Technology*
 Christopher Sugino - *Georgia Institute of Technology*
 Alper Erturk - *Georgia Institute of Technology*

5:35PM–5:45PM:**SIZE EFFECT OF A PIEZOELECTRIC PATCH ON A RECTANGULAR PLATE WITH THE NEURAL NETWORK MODEL**

Technical Presentation: IMECE2021-75918

Jie Zhang - Nanjing University of Aeronautics
and Astronautics

Mu Fan - Nanjing University of Aeronautics and Astronautics

5:45PM–5:55PM:

**TUNABLE ENHANCED VIBRATION ENERGY
HARVESTER AS A POWER MODULE FOR
PORTABLE ELECTRONICS AND IOT SENSORS**

Technical Paper Publication: IMECE2021-66697

Hieu Tri Nguyen - Louisiana Tech University

Hamzeh Bardaweel - Louisiana Tech University

5:55PM–6:05PM:

**KINEMATIC AND DYNAMIC MODELLING AND
SIMULATION OF SOFT CONTINUOUS ARM
BASED ON MODAL METHOD**

Technical Paper Publication: IMECE2021-70300

Zhengfeng Bai - Harbin Institute of Technology

Qingfeng Kong - Harbin Institute of Technology

6:05PM–6:15PM:

**WIRE RESISTANCE MODEL FOR TEMPERATURE
AND FORCE ANALYSIS OF TWISTED AND COILED
POLYMER ACTUATORS**

Technical Paper Publication: IMECE2021-70779

Lei Wan - Zhejiang University

Cennan Zhang - Zhejiang University

Yannan Wu - Zhejiang University

Hua Li - Zhejiang University

**09-06-01: FLUID MECHANICS, HEAT TRANSFER,
AND ENERGY SYSTEMS
NOVEMBER 1, 2021**

5:25PM–6:59PM

Chair: Subha Kumpaty - Milwaukee School of Engineering

Chair: Salim Azzouz - Midwestern State University

Chair: Anabela Alves - University of Minho

5:25PM–5:35PM:

**INTRODUCING STUDENTS TO COGENERATION
SYSTEMS USING A DESIGN AND ANALYSIS
SOFTWARE IN ENERGY SYSTEMS**

Technical Paper Publication: IMECE2021-73227

Yasin Naman - Universidad de America

Gregory J. Kowalski - Northeastern University

Mansour Zenouzi - Wentworth Institute of Technology

5:35PM–5:45PM:

**THERMO-MECHANICAL STRESSES IN THE
DESIGN AND ANALYSIS OF THICK-WALLED
PRESSURE VESSELS**

Technical Paper Publication: IMECE2021-66582

AliReza Mohammadzadeh - Grand Valley State University

Salim M. Haidar - Grand Valley State University

5:45PM–5:55PM:

**A FLUIDS EXPERIMENT FOR REMOTE LEARNERS TO
TEST THE UNSTEADY BERNOULLI EQUATION USING
A BURETTE**

Technical Paper Publication: IMECE2021-70018

Matthew J. Traum - University of Florida

Luis Enrique Mendoza Zambrano - University of Florida

5:55PM–6:05PM:

**COMPUTATIONAL FLUID DYNAMICS AND
STUDENTS' CREATIVITY**

Technical Paper Publication: IMECE2021-73009

Wael A. Mokhtar - Grand Valley State University



6:05PM–6:15PM:**EXPERIMENTAL AND COMPUTATIONAL INVESTIGATIONS OF SPARK IGNITION ENGINE PERFORMANCE****Technical Paper Publication: IMECE2021-67623**Prabhakar Venkateswaran - *Milwaukee School of Engineering***6:15PM–6:25 PM:****A PROPOSED NEW MOLECULAR MODEL FOR LIQUIDS AND SOLIDS****Technical Paper Publication: IMECE2021-70484**Larry Howlett - *HTMD Engineering***09-05-01:****APPLIED MECHANICS, DYNAMIC SYSTEMS AND CONTROL ENGINEERING
NOVEMBER 1, 2021****5:25PM–6:59PM**Chair: Subha Kumpaty - *Milwaukee School of Engineering*Chair: Salim Azzouz - *Midwestern State University*Chair: Anabela Alves - *University of Minho***5:25PM–5:35PM:****STOCHASTIC FINITE ELEMENT MODELING OF LAMINATED FIBER-REINFORCED COMPOSITE BEAMS UNDER TRANSVERSE LOADING****Technical Paper Publication: IMECE2021-69851**Boyang Chen - *Rose-Hulman Institute of Technology*Simon Jones - *Rose-Hulman Institute of Technology*Matt Riley - *Rose-Hulman Institute of Technology***5:35PM–5:45PM:****GENERATIVE DESIGN OF A NOVEL ADDITIVELY MANUFACTURED SOLAR ARRAY SYSTEM FOR POWERING SPACE EQUIPMENT ON THE LUNAR SURFACE****Technical Paper Publication: IMECE2021-71221**Jaime Rios - *University of the District of Columbia*Carlos Velazquez - *University of the District of Columbia*Teddy Rakotomanana - *University of the District of Columbia*Mehdi Kabir - *University of the District of Columbia*Jiajun Xu - *University of the District of Columbia***5:45PM–5:55PM:****A NOVEL, LOW-COST THERMAL SYSTEM FOR INTEGRATING LABORATORY EXPERIENCES IN UNDERGRADUATE CONTROLS COURSES****Technical Paper Publication: IMECE2021-71291**Trevor J. Terrill - *Dixie State University***5:55PM–6:05PM:****A PROJECTION-BASED DERIVATION OF THE EQUATIONS OF MOTION FOR THE MOVING FRAME METHOD FOR MULTI-BODY DYNAMICS****Technical Paper Publication: IMECE2021-72324**Dirk M. Luchtenburg - *Cooper Union*Mili Shah - *Cooper Union*Thomas Impelluso - *Western Norway University of Applied Sciences*Thorstein Ravneberg Rykkje - *Western Norway University of Applied Sciences*

6:05PM–6:15PM:**DESIGN OF MODEL-BASED LINEAR AND NONLINEAR CONTROLLERS TO STABILIZE A SIMPLE EXPERIMENTAL SETUP FOR CONTROLS EDUCATION****Technical Paper Publication: IMECE2021-71863***Zeki Okan Ilhan - Midwestern State University***10-06-01:****MICRO- AND NANO SYSTEMS
NOVEMBER 1, 2021****5:25PM–6:59PM****Chair: Philipp Epple - Coburg University of Applied Sciences****Chair: Kamran Siddiqui - University of Western Ontario****5:25PM–5:35 PM:****EXPERIMENTAL STUDY OF GAS-LIQUID MASS TRANSFER IN A RECTANGULAR MICROCHANNEL BY DIGITAL IMAGE ANALYSIS METHOD****Technical Paper Publication: IMECE2021-69095***Shuo Yang - Lund University**Gaopan Kong - Lund University**Zan Wu - Lund University***5:35PM–5:45PM:****STUDY ON THE HYDRODYNAMIC CAVITATION IN STOKES FLOWS OF NEMATIC LIQUID CRYSTALS IN MICROCHANNELS****Technical Presentation: IMECE2021-69890***Jia-Jia Yu - Chongqing University**Li Huang - Chongqing University**Gu-Yuan Li - Chongqing University***5:45PM–5:55PM:****APPLICATIONS OF ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY (EIS) FOR VARIOUS ELECTRODE PATTERN IN A MICROFLUIDIC CHANNEL WITH DIFFERENT ELECTROLYTE SOLUTIONS****Technical Paper Publication: IMECE2021-70623***Shanzida Kabir - University of Texas Rio Grande Valley**Dipannita Ghosh - University of Texas Rio Grande Valley**Nazmul Islam - University of Texas Rio Grande Valley***5:55PM–6:05PM:****SENSITIVE BIOMOLECULAR DETECTION VIA NANOPARTICLE COUNTING****Technical Presentation: IMECE2021-71573***Ruiting Xu - University of Akron**Lidya Abune - Pennsylvania State University**Brandon Davis - Pennsylvania State University**Leixin Ouyang - University of Akron**Ge Zhang - University of Akron**Yong Wang - Pennsylvania State University**Jiang Zhe - University of Akron***6:05PM–6:15PM:****COALESCENCE CHARACTERISTICS OF BULK NANOBUBBLES IN WATER: A MOLECULAR DYNAMICS STUDY COUPLED WITH THEORETICAL ANALYSIS****Technical Presentation: IMECE2021-77008***Zhi Liang - California State University, Fresno**Eric Bird - California State University, Fresno*

6:15PM–6:25PM:**COMPUTATIONAL STUDY ON FLOW PHYSICS AND HEMODYNAMIC PARAMETERS IN SINGLE AND DOUBLE STENOTIC CHANNELS****Technical Presentation: IMECE2021-77229**Siamak Mirfendereski - *University of Nebraska-Lincoln*Jae Sung Park - *University of Nebraska-Lincoln***10-10-02:****INDUSTRIAL FLOWS - II
NOVEMBER 1, 2021****5:25PM–6:59PM**Chair: Philipp Epple - *Coburg University of Applied Sciences*Chair: Kamran Siddiqui - *University of Western Ontario***5:25PM–5:35PM:****SCO₂ OPPOSING PISTON EXPANDER VALVE DESIGN AND ANALYSIS USING SIMSCAPE****Technical Presentation: IMECE2021-74379**Frederick Mitri - *California State Polytechnic University*Kevin Anderson - *California State Polytechnic University*Christopher Mcnamara - *California State Polytechnic University***5:35PM–5:45PM:****EFFECT OF SINGLE AND MULTIPLE PROTUBERANCES ON THE AERODYNAMIC PERFORMANCE OF A WIND TURBINE BLADE****Technical Paper Publication: IMECE2021-69763**Archit Bapat - *Manipal Institute of Technology*Pramod Salunkhe - *Manipal Institute of Technology*Mahesh Varpe - *M. S. Ramaiah University of Applied Sciences***5:45PM–5:55PM:****VERIFICATION STUDY OF CFD PREDICTION ACCURACY OF LIQUID DROPLET IMPINGEMENT EROSION RATE FOR ENGINEERING APPLICATIONS****Technical Paper Publication: IMECE2021-70977**Shaoxiang Qian - *JGC Corporation*Xidong Hu - *JGC Corporation*Shinichiro Kanamaru - *JGC Corporation***5:55PM–6:05PM:****THE EFFECT OF MEMBRANE TOPOLOGY ON SEPARATION PERFORMANCE OF VACUUM MEMBRANE DISTILLATION MODULE****Technical Paper Publication: IMECE2021-69943**Justin Caspar - *Lehigh University*Guanyang Xue - *Lehigh University*Robert Krysko - *Lehigh University*Alparslan Oztekin - *Lehigh University***6:05PM–6:15PM:****EXPERIMENTAL AND COMPUTATIONAL STUDY OF DIRECT CONTACT MEMBRANE DISTILLATION****Technical Paper Publication: IMECE2021-70455**Deliya Kim - *Lehigh University*Justin Caspar - *Lehigh University*Carlos Romero - *Lehigh University*Sudhakar Neti - *Lehigh University*Alparslan Oztekin - *Lehigh University***6:15PM–6:25PM:****COMPUTATIONAL FLUID DYNAMICS TO STUDY THE ORIGIN OF SECONDARY FLOWS IN SQUARE DUCTS WITH STRAIGHTENED ELBOW CONCEPT GOVERNED BY ARTIFICIAL BODY FORCE**

Technical Paper Publication: IMECE2021-71675

Orlando Ayala - *Old Dominion University*
 Thurston Humphries - *Old Dominion University*
 Tyler Youells - *Old Dominion University*
 Jahshawn Thomas - *Old Dominion University*
 Manuel Ayala - *Old Dominion University*

**11-08-03:
 FUNDAMENTALS OF CONVECTION - NATURAL AND
 MIXED CONVECTION
 NOVEMBER 1, 2021**

5:25PM–6:59PM

Chair: Subramanyaravi Annapragada -
United Technologies Research
 Chair: Kevin Dowding – *Sandia National Laboratories*
 Chair: Alexander Rattner - *Penn State University*

5:25PM–5:35PM:

**NUMERICAL SIMULATION OF POISEUILLE-
 RAYLEIGH-BÉNARD FLOW OF AIR IN A HORIZONTAL
 RECTANGULAR CHANNEL HEATED FROM BELOW**

Technical Presentation: IMECE2021-69908

Yue Huang - *Chongqing University*
 You-Rong Li - *Chongqing University*

5:35PM–5:45PM:

**NUMERICAL SIMULATION OF SUPERCRITICAL RP-3
 AVIATION KEROSENE FLOW IN A CIRCULAR TUBE
 UNDER DIFFERENT GRAVITY CONDITIONS**

Technical Presentation: IMECE2021-70129

Ke-Jie Ou - *Chongqing University*
 Ke-Fan Chen - *Chongqing University*
 Jia-Jia Yu - *Chongqing University*
 Jin Yu - *Chongqing Jiaotong University*
 Rui Chen - *Chongqing University*
 Gu-Yuan Li - *Chongqing University*

5:45PM–5:55PM:

**DIRECT NUMERICAL SIMULATION OF POISEUILLE-
 RAYLEIGH-BENARD FLOW OF WATER IN
 THE NEIGHBORHOOD OF ITS DENSITY
 INVERSION POINT**

Technical Presentation: IMECE2021-70696

Ke Li - *Chongqing University*
 Yue Huang - *Chongqing University*
 You-Rong Li - *Chongqing University*

5:55PM–6:15PM:

**PARAMETRIC ANALYSIS AND VALIDATION OF
 MACHINE LEARNING IN CHAOTIC TRANSITIONS OF
 THE LORENZ SYSTEM**

Invited Presentation: IMECE2021-71766

Ben Tribelhorn - *University of Portland*
 H.E. Dillon - *University of Washington*

6:15PM–6:25PM:

**INFLUENCE OF VOLUMETRIC DILATION OF
 MICROSTRUCTURAL PHASES ON RESIDUAL STRESS
 DISTRIBUTION IN LASER WELDED TI-ALLOY**

Technical Paper Publication: IMECE2021-68987

Bikash Kumar - *Indian Institute of Technology*
 Swarup Bag - *Indian Institute of Technology Guwahati*
 M. Ruhul Amin - *Montana State University*

**11-06-03 HEAT AND MASS TRANSFER IN HEATING,
 COOLING, AND POWER SYSTEMS - COOLING
 TECHNOLOGIES
 NOVEMBER 1, 2021**



5:25PM–6:59PM**Chair: Subramanyaravi Annapragada** - *United Technologies Research***Chair: Kevin Dowding** – *Sandia National Laboratories***Chair: Alexander Rattner** - *Penn State University***5:25PM–5:35PM:****THEORETICAL ANALYSIS OF GEOMETRICALLY MODIFIED DEW POINT EVAPORATIVE COOLER****Technical Paper Publication: IMECE2021-67784****Prashant Patunkar** – *Massachusetts Institute of Technology***Sunil V. Dingare** - *Massachusetts Institute of Technology***5:35PM–5:45PM:****THEORETICAL MODELING AND MODULAR APPROACH FOR HIGH-COP THERMOELECTRIC AIR CONDITIONING SYSTEM****Technical Presentation: IMECE2021-68600****Abhishek Saini** - *University of Cincinnati***Arthur Cilley** - *University of Cincinnati***Thiraj Mohankumar** - *University of Cincinnati***Je-Hyeong Bahk** - *University of Cincinnati***Sarah J. Watzman** - *University of Cincinnati***5:45PM–5:55PM:****COMPARATIVE ENERGY AND EXERGY ANALYSIS OF LARGE CAPACITY AMMONIA-WATER AND WATER-LITHIUM BROMIDE VAPOR ABSORPTION REFRIGERATION (VAR) CYCLES****Technical Paper Publication: IMECE2021-71084****Muhammad Saad Khan** - *Texas A&M University at Qatar***Sambhaji T. Kadam** - *Texas A&M University at Qatar***Alexios-Spyridon Kyriakides** - *Centre for Research and Technology Hellas***Ibrahim Hassan** - *Texas A&M University at Qatar***Athanasios I. Papadopoulos** - *Centre for Research and Technology Hellas***Mohammad Azizur Rahman** - *Texas A&M University at Qatar*
Panos Seferlis - *Aristotle University of Thessaloniki***5:55PM–6:05PM:****A MODELING TOOL TO ANALYZE THE PERFORMANCE OF INDUSTRIAL COOLING TOWERS****Technical Paper Publication: IMECE2021-71627****Joshua Hooper** - *Tennessee Tech University***Ethan Languri** - *Tennessee Technological University***Glenn Cunningham** - *Tennessee Tech University***Wei Guo** - *Oak Ridge National Laboratory***6:05PM–6:15PM:****RADIATIVE COOLING PAINTS WITH HIGH FIGURE OF MERIT****Technical Presentation: IMECE2021-77291****Xiangyu Li** - *Massachusetts Institute of Technology***Joseph Peoples** - *Purdue University***Peiyan Yao** - *Purdue University***Xiulin Ruan** - *Purdue University***12-02-02:****DYNAMIC FAILURE OF MATERIALS & STRUCTURES NOVEMBER 1, 2021****5:25PM–6:59PM****Chair: Marco Amabili** - *McGill University***Chair: Celia Reina** - *University of Pennsylvania*

5:25PM–5:35PM:**DEVELOPMENT OF LASER SHOCK-WAVE ADHESION TEST FOR NANO FILMS DEPOSITED ON FUSED SILICA****Technical Presentation: IMECE2021-71167**

Shotaro Yasuda - *Chuo University*
 Yoshikatsu Kimoto - *Chuo University*
 Akio Yonezu - *Chuo University*

5:35PM–5:45PM:**HIGH-THROUGHPUT MATERIALS CHARACTERIZATION USING INDENTATION MAPPING AND COMBINATORIAL SYNTHESIS: MOLECULAR DYNAMICS WITH NEURAL-NETWORK POTENTIALS****Technical Presentation: IMECE2021-71387**

Takeru Miyagawa - *Chuo University*
 Takumi Furutani - *Chuo University*
 Yugo Sakai - *Chuo University*
 Keiji Ishibashi - *COMET*
 Akio Yonezu - *Chuo University*

5:45PM–5:55PM:**DESIGNING AND ANALYZING AN UNDERBODY PLATE FOR AN ARMORED VEHICLE SUBJECTED TO BLAST****Technical Paper Publication: IMECE2021-71832**

Jesus Carrillo - *United States Military Academy*
 Jarrett Justice - *United States Military Academy*
 Tyler Kim - *United States Military Academy*
 Courtney Loomis - *United States Military Academy*
 Kevin McMullen - *United States Military Academy*

5:55PM–6:05PM:**BALLISTIC PERFORMANCE OF SANDWICH COMPOSITE ARMOR SYSTEM****Technical Paper Publication: IMECE2021-71890**

Shah Alam - *Texas A&M University*
 Diem Nguyen - *Texas A&M University-Kingsville*

6:05PM–6:15PM:**EFFECT OF HEAT STABILIZATION AND SOLID LUBRICANTS ON HIGH STRAIN RATE RESPONSE OF POLYAMIDE 6****Technical Paper Publication: IMECE2021-73354**

Luis Rafael Miranda Rodriguez - *Rutgers, The State University of New Jersey*
 Neel Shah - *Rutgers, The State University of New Jersey*
 Aisha S. Haynes - *Picatinny Arsenal*
 Calvin Lim - *Picatinny Arsenal*
 Christopher G. Stout - *Picatinny Arsenal*
 Stephen S. Recchia - *Picatinny Arsenal*
 Assimina A. Pelegri - *Rutgers, The State University of New Jersey*

6:15PM–6:25PM:**ENERGY ABSORPTION PERFORMANCES OF BAMBOO-INSPIRED TUBULAR HONEYCOMB WITH STRUCTURAL HIERARCHY AND FUNCTIONAL GRADIENT****Technical Presentation: IMECE2021-76395**

Wen Zhang – *University of North Carolina at Charlotte*
 Jun Xu - *University of North Carolina at Charlotte*

12-04-01: SYMPOSIUM ON FRACTURE AND FAILURE OF REINFORCED POLYMER MATRIX COMPOSITE MATERIALS
NOVEMBER 1, 2021



5:25PM–6:59PMChair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***5:25PM–5:35PM:****CHARACTERIZATION AND MODELING OF HOW ENVIRONMENTAL AGING AFFECTS FATIGUE DAMAGE EVOLUTION IN FIBER REINFORCED POLYMERIC COMPOSITES****Technical Paper Publication: IMECE2021-70637**Zhiye Li - *Stanford University*Michael Lepech - *Stanford University***5:35PM–5:45PM:****CYLINDRICAL MICROPLANE CONSTITUTIVE MODEL FOR COMBINED DAMAGE/FRICTION IN COMPRESSIVE KINK BAND FAILURES IN FIBER COMPOSITES****Technical Presentation: IMECE2021-76902**Jing Xue - *Stony Brook University*Kedar Kirane - *Stony Brook University***5:45PM–5:55PM:****A PHASE-FIELD FRACTURE MODEL TO PREDICT FAILURE IN POLYMER-MATRIX COMPOSITES UNDER CYCLIC MECHANICAL AND THERMAL LOADING****Technical Presentation: IMECE2021-77123**Shabnam Konica - *Michigan Technological University*Trisha Sain - *Michigan Technological University***5:55PM–6:05PM:****SMART WRINKLED SURFACES FOR TUNABLE ADHESION ENABLED BY COMPOSITES WITH TUNABLE STIFFNESS****Technical Presentation: IMECE2021-77562**Guangchao Wan - *Syracuse University*Ruoyu Sun - *Syracuse University*Jason Mcelhinney - *Syracuse University*Deemo Yu - *Syracuse University*Siavash Sharifi - *Syracuse University*Teng Zhang - *Syracuse University*Wanliang Shan - *Syracuse University***6:05PM–6:15PM:****APPLICATION OF MICROMECHANICS TO STATIC FAILURE ANALYSIS OF GRAPHENE REINFORCED EPOXY NANOCOMPOSITES****Technical Paper Publication: IMECE2021-70710**O. Aluko - *University of Michigan*M. Li - *University of Michigan*N. Zhu - *University of Michigan***6:15PM–6:25PM:****RECONFIGURABLE 3D STRUCTURES OF SPATIALLY PROGRAMMED LIQUID CRYSTAL ELASTOMERS AND THEIR FERROMAGNETIC COMPOSITES****Technical Presentation: IMECE2021-77052**Yi Li - *University of Connecticut*Xueju "Sophie" Wang - *University of Connecticut***14-03-01:****RELIABILITY AND SAFETY IN INDUSTRIAL AUTOMATION SYSTEMS****NOVEMBER 1, 2021**

5:25PM–6:59PM**5:25PM–5:35PM:****AN OVERVIEW OF THE RESEARCH LANDSCAPE IN THE FIELD OF SAFE MACHINE LEARNING****Technical Paper Publication: IMECE2021-69390****Georg Siedel** - German Federal Institute for Occupational Safety and Health**Stefan Voß** - German Federal Institute for Occupational Safety and Health**Silvia Vock** - German Federal Institute for Occupational Safety and Health**5:35PM–5:45PM:****AN APPROACH FOR SAFEGUARDING AUTONOMOUS MOBILE ROBOTS USING MONITORING TOOLS****Technical Paper Publication: IMECE2021-73087****Manuel Müller** - Institute of Industrial Automation and Software Engineering**Natalie Schinzel** - Institute of Industrial Automation and Software Engineering**Nasser Jazdi** - Institute of Industrial Automation and Software Engineering**Michael Weyrich** - Institute of Industrial Automation and Software Engineering**5:45PM–5:55PM:****KRAKENBOX: DEEP LEARNING-BASED ERROR DETECTOR FOR INDUSTRIAL CYBER-PHYSICAL SYSTEMS****Technical Paper Publication: IMECE2021-70258****Sheng Ding** - University of Stuttgart**Andrey Morozov** - University of Stuttgart**Tagir Fabarisov** - University of Stuttgart**Silvia Vock** - Bundesanstalt für Arbeitsschutz und Arbeitsmedizin**5:55PM–6:05PM:****IMPROVING OVERALL EQUIPMENT EFFECTIVENESS BY ENABLING AUTONOMOUS MAINTENANCE PILLAR FOR INTEGRATED WORK SYSTEMS****Technical Paper Publication: IMECE2021-66623****Aneesh A. Chand** - University of the South Pacific**Kushal A. Prasad** - University of the South Pacific**Krishneel R. Sharma** - University of the South Pacific**Sumesh Narayan** - University of the South Pacific**Kabir A. Mamun** - University of the South Pacific**F.R. Islam** - University of Sunshine Coast**Nallapaneni Manoj Kumar** - City University of Hong Kong**Shauhrat S. Chopra** - City University of Hong Kong**6:05PM–6:15PM:****AN INTEGRATIVE AND TRANSDISCIPLINARY APPROACH FOR A HUMAN-CENTERED DESIGN OF AI-BASED WORK SYSTEMS****Technical Paper Publication: IMECE2021-71261****Larissa Schlicht** - German Federal Institute for Occupational Safety and Health**Marlen Melzer** - German Federal Institute for Occupational Safety and Health**Ulrike Rösler** - German Federal Institute for Occupational Safety and Health**Stefan Voß** - German Federal Institute for Occupational Safety and Health**Silvia Vock** - German Federal Institute for Occupational Safety and Health**6:15PM–6:25PM:****DEMONSTRATION OF A LIMITED SCOPE PROBABILISTIC RISK ASSESSMENT FOR AUTONOMOUS WAREHOUSE ROBOTS WITH OPENPRA****Technical Paper Publication: IMECE2021-69998****Philipp Grimmeisen** - University of Stuttgart

Artur Karimov - Ufa State Aviation Technical University
 Mihai A. Diaconeasa - North Carolina State University
 Andrey Morozov - University of Stuttgart

**14-02-01:
 RELIABILITY AND RISK IN ENERGY SYSTEMS
 NOVEMBER 1, 2021**

5:25PM–6:59PM

5:25PM–5:35PM:

**RELIABILITY PREDICTION MODEL FOR
 PHOTOVOLTAIC MODULES AFFECTED BY
 THERMAL AGING**

Technical Presentation: IMECE2021-67428

Alvaro Rodriguez-Prieto - National Distance Education University
 and Société Générale de Surveillance

Juan R. Cabello - Société Générale de Surveillance

Rafael Álvarez - Société Générale de Surveillance

5:35PM–5:45PM:

**EFFECT OF PARTICLE OVERLAPPING IMPACTS IN
 EROSION PROCESS**

Technical Paper Publication: IMECE2021-69881

Xuerui Zang - China University of Petroleum

Xuewen Cao - China University of Petroleum

Zhenqiang Xie - China University of Petroleum

Jun Zhang - University of Tulsa

Yijie Li - University of Tulsa

5:45PM–5:55PM:

**A PROPOSED METHOD FOR ONLINE
 CONDITION MONITORING OF PNEUMATIC
 SYSTEMS UNDER DIFFERENT OPERATING
 CONDITIONS AND PARAMETERS FOR OPTIMAL
 ENERGY CONSUMPTION**

Technical Paper Publication: IMECE2021-69942

Anil U. Peerapur – Massachusetts Institute of Technology

Mangesh N. Dhavalikar - Massachusetts Institute of Technology

Sunil V. Dingare - Massachusetts Institute of Technology

Bhumeshwar K. Patle - Massachusetts Institute of Technology

5:55PM–6:05PM:

**NUCLEAR POWER: ON PRA AND PROTECTIVE
 SYSTEM MAINTENANCE**

Technical Paper Publication: IMECE2021-73035

Ernie Kee - The Organization for Public Awareness of Hazardous
 Technology Risks

Martin Wortman - The Organization for Public Awareness
 of Hazardous Technology Risks

6:05PM–6:15PM:

**ON THE USE OF PROBABILISTIC RISK ASSESSMENT
 FOR THE PROTECTION OF NUCLEAR POWER
 PLANTS AGAINST TERRORIST ATTACKS**

Technical Paper Publication: IMECE2021-71504

Burak Polat - North Carolina State University

Mihai A. Diaconeasa - North Carolina State University

6:15PM–6:25PM:

**ON THE MODELING OF WILDFIRES-INDUCED
 RELEASE AND ATMOSPHERIC DISPERSION IN
 RADIOACTIVELY CONTAMINATED REGIONS**

Technical Paper Publication: IMECE2021-71460

Damla Polat - North Carolina State University

Mihai A. Diaconeasa - North Carolina State University



TUESDAY, November 2

01-02-01:
GENERAL
NOVEMBER 2, 2021

10:00AM–11:30AM

Chair: Mostafa Nough - *University at Buffalo*
 Chair: Yongfeng Xu - *University of Cincinnati*
 Chair: Guoliang Huang - *University of Missouri*

10:00AM–10:10AM:

PERFORMANCE ANALYSIS OF THE DIRECT CONTACT MEMBRANE DISTILLATION USING SONICATION EFFECT

Technical Paper Publication: IMECE2021-73478

Ussama Ali - *Khalifa University of Science and Technology*
 Muhammad Sajjad - *Khalifa University of Science and Technology*
 Isam Janajreh - *Khalifa University of Science and Technology*

10:10AM–10:20AM:

PHYSICAL RENDERING OF SYNTHETIC SPACES FOR TOPOLOGICAL SOUND TRANSPORT

Technical Presentation: IMECE2021-69988

Hui Chen - *University of Missouri-Columbia*
 Hongkuan Zhang - *Beijing Institute of Technology*
 Emil Prodan - *Yeshiva University*
 Xiaoming Zhou - *Beijing Institute of Technology*
 Guoliang Huang - *University of Missouri-Columbia*

10:20AM–10:30AM:

NONRECIPROCAL ELASTIC WAVE PROPAGATION THROUGH A NON-LOCAL PIEZOELECTRIC META-BEAM

Technical Paper Publication: IMECE2021-70609

Qian Wu - *University of Missouri*
 Guoliang Huang - *University of Missouri*

10:30AM–10:40AM:

METASURFACES AS A GENERIC INTERFACE TO COMMUNICATE INFORMATION THROUGH THE SKIN

Technical Presentation: IMECE2021-71548

Majid Kheybari - *University of Connecticut*
 James Stevens - *University of Connecticut*
 Osama Bilal - *University of Connecticut*

10:40AM–10:50AM:

MULTI-FUNCTIONAL METAMATERIALS BASED TRIBOELECTRIC NANOGENERATORS

Technical Presentation: IMECE2021-72153

Xianchen Xu - *University of Missouri*
 Changyong Cao - *Michigan State University*
 Guoliang Huang - *University of Missouri*

10:50AM–11:00AM:

RESEARCH ON TONE QUALITY FOR VEHICLES CONSIDERING THE MASKING EFFECT

Technical Paper Publication: IMECE2021-72907

Jiewei Lin - *Tianjin University*
 Rui Zhang - *Tianjin University*
 Qidi Zhou - *Tianjin University*
 Junhong Zhang - *Tianjin University*
 Gengyi Lin - *Tianjin University*



**02-09-01:
COMPUTATIONAL MODELING AND SIMULATION
FOR ADVANCED MANUFACTURING-I
NOVEMBER 2, 2021**

10:00AM–11:30AM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

10:00AM–10:10AM:

**ANALYSIS OF SURFACE ROUGHNESS IN END-
MILLING OF ALUMINIUM USING AN ADAPTIVE
NETWORK-BASED FUZZY INFERENCE SYSTEM**

Technical Paper Publication: **IMECE2021-68468**

Serge Balonji - *University of Johannesburg*
 I.P. Okokpujie - *University of Johannesburg*
 L.K. Tartibu - *University of Johannesburg*

10:10AM–10:20AM:

**COMPARISON OF FINITE ELEMENT MODELING
WITH MEASURED DEFLECTION OF SPIRAL FLAT
OVAL DUCT**

Technical Paper Publication: **IMECE2021-68684**

Avinash Paruchuri - *Tennessee Technological University*
 Jane Liu - *Tennessee Technological University*
 Stephen Idem - *Tennessee Technological University*

10:20AM–10:30AM:

**MOLECULAR DYNAMICS SIMULATION OF THERMAL
CONDUCTIVITY OF URANIUM MONONITRIDE**

Technical Paper Publication: **IMECE2021-68913**

Ayouba Moussa Hassane - *Harbin Engineering University*
 Wang Qingyu - *Harbin Engineering University*
 Mohammed Ado - *Harbin Engineering University*
 Doctor Enivweru - *Harbin Engineering University*

10:30AM–10:40AM:

**A NUMERICAL HYBRID FINITE ELEMENT
MODEL FOR LATTICE STRUCTURES USING 3D/
BEAM ELEMENTS**

Technical Paper Publication: **IMECE2021-69119**

Ahmadali Tahmasebimoradi - *Technologique SystemX*
 Chetra Mang - *Technologique SystemX*
 Xavier Lorang - *Technologique SystemX*

10:40AM–10:50AM:

**ANALYSIS OF CORRELATION BETWEEN
MANUFACTURING PARAMETERS AND MECHANICAL
STRENGTH FOLLOWED BY UNCERTAINTY
PROPAGATION OF GEOMETRIC DEFECTS IN
LATTICE STRUCTURES**

Technical Paper Publication: **IMECE2021-69121**

Chetra Mang - *Institut de Recherche Technologique SystemX*
 Ahmadali Tahmasebimoradi - *Institut de Recherche Technologique SystemX*
 Xavier Lorang - *Institut de Recherche Technologique SystemX*

10:50AM–11:00AM:

**DIGITAL TWIN ADDITIVE RECONSTRUCTION TOOL
FOR MICROMECHANICAL MODELING OF
3D-PRINTED PARTS**



Technical Paper Publication: IMECE2021-69234

Akshay Gidwani - *Dubai Electricity and Water Authority*
 Hayk Vasilyan - *Dubai Electricity and Water Authority*
 Rahmat Agung Susantyoko - *Dubai Electricity and Water Authority*
 Mozah Alyammahi - *Dubai Electricity and Water Authority*

02-13-01: DIGITAL TWIN ASPECTS
NOVEMBER 2, 2021

10:00AM–11:30AM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

10:00AM–10:20AM:

**DIGITAL TWIN: UNIVERSAL USER INTERFACE FOR
 REAL-TIME MANAGEMENT OF THE
 MANUFACTURING SYSTEM**

Invited Presentation: IMECE2021-69092

Vladimir Kuts - *Tallinn University of Technology*
 Yevhen Bondarenko - *Tallinn University of Technology*
 Marietta Gavriljuk - *Tallinn University of Technology*
 Andriy Partyshev - *Tallinn University of Technology*
 Sergei Jegorov - *Tallinn University of Technology*
 Simone Pizzagalli - *Tallinn University of Technology*
 Tauno Otto - *Tallinn University of Technology*

10:20AM–10:30AM:

**A NEW APPROACH TO DEVELOP AN INTELLIGENT
 MANUFACTURING SYSTEM USING VIRTUAL TOOLS**

Technical Paper Publication: IMECE2021-71546

David Guerra-Zubiaga - *Kennesaw State University*
 Corey Morton - *B&R Industrial Automation Corp.*
 Derrick Stacey - *B&R Industrial Automation Corp.*
 Virginia Peach - *Kennesaw State University*
 Chan Ham - *Kennesaw State University*
 Diego Escobar-Escobar - *Kennesaw State University*
 Noah Hitchcock - *B&R Industrial Automation Corp.*

10:30AM–10:40AM:

**EVALUATION OF VIRTUAL REALITY INTERFACE
 INTERACTION METHODS FOR DIGITAL TWIN
 INDUSTRIAL ROBOT PROGRAMMING AND
 CONTROL, A PILOT STUDY**

Technical Paper Publication: IMECE2021-69408

Simone Pizzagalli - *Tallinn University of Technology*
 Vladimir Kuts - *Tallinn University of Technology*
 Yevhen Bondarenko - *Tallinn University of Technology*
 Tauno Otto - *Tallinn University of Technology*

10:40AM–10:50AM:

**HUMAN MOTION TO COLLABORATIVE TWO-ARM
 ROBOT THROUGH DIGITAL TWIN MODELS**

Technical Presentation: IMECE2021-70721

Seong Dae Kim - *University of Tennessee at Chattanooga*
 Hyunsoo Lee - *Kumoh National Institute of Technology*
 Mohammad Aman Ullah Al Amin - *University of Tennessee at Chattanooga*

10:50AM–11:00AM:

**TACIT KNOWLEDGE CAPTURE USING DIGITAL
 TOOLS IN A HUMAN-ROBOT INTERACTION:
 A CASE STUDY**

Technical Paper Publication: IMECE2021-66084

David A. Guerra-Zubiaga - *Kennesaw State University*
 Navid Nasajpour-Esfahani - *Kennesaw State University*
 Ngan Q. Phan - *Kennesaw State University*
 Shalu Gupta - *Kennesaw State University*
 Logan Block - *Kennesaw State University*



04-02-02:**ADVANCES IN AERODYNAMICS & NOVEL
AEROSPACE PROPULSION SYSTEMS
NOVEMBER 2, 2021****10:00AM–11:30AM**

Chair: Erkan Oterkus - *University of Strathclyde*
 Chair: Uttam K. Chakravarty - *University of New Orleans*
 Chair: Pavana Prabhakar - *University of Wisconsin-Madison*

10:00AM–10:10AM:**COMBINED TIME- AND FREQUENCY-DOMAIN
AIRCRAFT SYSTEM IDENTIFICATION USING
PARETO OPTIMIZATION****Technical Paper Publication: IMECE2021-68541**

Terrin Stachiw - *National Research Council Canada*
 Joseph Ricciardi - *National Research Council Canada*
 Alexander Crain - *National Research Council Canada*

10:10AM–10:20AM:**EFFECT OF SELF-ACTUATING FLAP ON THE
AERODYNAMIC PERFORMANCE OF FLAT PLATE
WING AT LOW REYNOLDS NUMBER****Technical Paper Publication: IMECE2021-70495**

Anand Verma - *Indian Institute of Technology Guwahati*
 Vinayak Kulkarni - *Indian Institute of Technology Guwahati*

10:20AM–10:30AM:**DEVELOPMENT OF A NOVEL 4-STROKE SPARK
IGNITION OPPOSED PISTON ENGINE****Technical Paper Publication: IMECE2021-70504**

Alexandre Nunes - *C-MAST*
 Francisco Brojo - *University of Beira Interior*

10:30AM–10:40AM:**BELL 412 FULL FLIGHT ENVELOPE AIRCRAFT
SIMULATION MODEL DEVELOPMENT
AND EVALUATION WITH NONLINEAR EQUATIONS
OF MOTION****Technical Paper Publication: IMECE2021-71173**

Alexander Crain - *National Research Council Canada*
 Joseph Ricciardi - *National Research Council Canada*
 Terrin Stachiw - *National Research Council Canada*

10:40AM–10:50AM:**DESIGN OF A 3D AEROSPACE BRACKET USING
LATTICE STRUCTURES AND TOPOLOGY
OPTIMIZATION FOR ADDITIVE MANUFACTURING****Technical Paper Publication: IMECE2021-71476**

Gorkem Can Ates - *TOBB University of Economics and Technology*
 Mehmet Demirtunc - *TOBB University of Economics and Technology*
 Ali Cem Göçer - *TOBB University of Economics and Technology*
 Abdulhamid Doğru - *TOBB University of Economics and Technology*
 Recep M. Gorguluarslan - *TOBB University of Economics and Technology*
 Istemihan Gokdag - *Turkish Aerospace Industries, Inc.*
 Hakan Yavas - *Turkish Aerospace Industry, Inc.*



10:50AM–11:00AM:**EFFICIENT ADAPTIVE GEAR VARIATOR FOR THE DRIVE OF AEROSPACE EQUIPMENT****Technical Presentation: IMECE2021-76866****KONSTANTIN IVANOV - ALMATY UNIVERSITY OF POWER ENGINEERING AND TELECOMMUNICATION****04-15-01:****CONGRESS-WIDE SYMPOSIUM ON NDE & SHM – NDE AND PROGNOSTICS IN STRUCTURAL APPLICATIONS
NOVEMBER 2, 2021****10:00AM–11:30AM**

Chair: Erkan Oterkus - *University of Strathclyde*
 Chair: Uttam K. Chakravarty - *University of New Orleans*
 Chair: Pavana Prabhakar - *University of Wisconsin-Madison*

10:00AM–10:10AM:**SPECTRAL CORRELATION METHOD FOR FATIGUE CRACK DETECTION BASED ON NONLINEARLY MIXED ULTRASONIC WAVES****Technical Paper Publication: IMECE2021-68635**

Santhakumar Sampath - *Korea Advanced Institute of Science and Technology*
 Hoon Sohn - *Korea Advanced Institute of Science and Technology*

10:10AM–10:20AM:**A LIGHTWEIGHT AND LOW-POWER CONSUMPTION MECHATRONIC SMART SKIN FOR IMPACT MONITORING OF AIRCRAFT STRUCTURES****Technical Presentation: IMECE2021-70153**

Yu Wang - *Nanjing University of Aeronautics and Astronautics*
 Lei Qiu - *Nanjing University of Aeronautics and Astronautics*
 Xiaodong Lin - *Nanjing University of Aeronautics and Astronautics*
 Shenfang Yuan - *Nanjing University of Aeronautics and Astronautics*
 Wenli Shi - *Nanjing University of Aeronautics and Astronautics*

10:20AM–10:30AM:**AC BASED SENSORY SYSTEM FOR CARBON BASED TRC FOR SHM****Technical Presentation: IMECE2021-71331**

Mahdi Gaben - *Technion - Israel Institute of Technology*
 Yiska Goldfeld - *Technion - Israel Institute of Technology*

10:30AM–10:40AM:**SMART TRC PIPE WITH INTEGRATED MONITORING CAPABILITIES****Technical Presentation: IMECE2021-71384**

Gali Perry - *Technion - Israel Institute of Technology*
 Yiska Goldfeld - *Technion - Israel Institute of Technology*

10:40AM–10:50AM:**BEAM ELEMENT-BASED INVERSE FINITE ELEMENT METHOD FOR SHAPE RECONSTRUCTION OF A WING STRUCTURE****Technical Paper Publication: IMECE2021-73502**

Tianyu Dong - *Nanjing University of Aeronautics and Astronautics*
 Shenfang Yuan - *Nanjing University of Aeronautics and Astronautics*
 Tianxiang Huang - *Nanjing University of Aeronautics and Astronautics*



10:50AM–11:00AM:**CRACK DETECTION AND EVALUATION METHOD FOR SELF-PIERCING RIVETING BUTTON IMAGES BASED ON BP NEURAL NETWORK****Technical Paper Publication: IMECE2021-73530**Ke Hu - *Chongqing University*Ling Jiang - *Chongqing University*Fei Wu - *Chongqing University*Zhenfei Zhan - *Chongqing Jiaotong University and State Key Laboratory of Vehicle NVH and Safety Technology***07-08-01****NOVEL CONTROL OF DYNAMIC SYSTEM AND DESIGN I****NOVEMBER 2, 2021****10:00AM–11:30AM**Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*Chair: Bogdan Epureanu - *University of Michigan*Chair: Marco Amabili - *McGill University***10:00AM–10:10AM:****MECHANISMS DESIGN FOR THE HINGE & BATTERY LIFETIME TESTS FOR A PROTOTYPE****Technical Paper Publication: IMECE2021-68622**Taher Deemyad - *Idaho State University*Vincent Akula - *Idaho State University*Anish Sebastian - *Idaho State University***10:10AM–10:20AM:****DESIGN OF A FRACTIONAL-ORDER CONTROLLER FOR THE LARGE DEEP SPACE OBSERVATORY ANTENNA IN WIND DISTURBANCE****Technical Paper Publication: IMECE2021-69730**Jianyu Jiang - *Beijing Jiaotong University*Bin Wu - *Beijing Jiaotong University*Ting Zhou - *Beijing Jiaotong University***10:20AM–10:30AM:****CONTROLLING THE DYNAMICS OF A QUADRATIC OSCILLATOR USING INFINITE-EQUILIBRIUM****Technical Paper Publication: IMECE2021-71998**Siyuan Xing - *California Polytechnic State University*Albert C.J. Luo - *Southern Illinois University Edwardsville***10:30AM–10:40AM:****A PROPOSITION FOR DESCRIBING REAL-WORLD NETWORK DYNAMICS****Technical Paper Publication: IMECE2021-73360**Chun-Lin Yang - *Texas A&M University*Nandan Shettigar - *Texas A&M University*C. Steve Suh - *Texas A&M University***10:40AM–10:50AM:****ON THE EFFICACY OF INFORMATION TRANSFER IN COMPLEX NETWORKS****Technical Paper Publication: IMECE2021-73710**Nandan Shettigar - *Texas A&M University*Chun-Lin Yang - *Texas A&M University*C. Steve Suh - *Texas A&M University***10:50AM–11:00AM:****MULTI-OBJECTIVE OPTIMAL KINEMATIC DESIGN OF COMPOSITE TRANSVERSE LEAF SPRING MCPHERSON SUSPENSION**

Technical Paper Publication: IMECE2021-72658

Junhong Zhang - *Tianjin University*
 Feiqi Long - *Tianjin University*
 Jiewei Lin - *Tianjin University*
 Yiming Zhang - *Tianjin University*

07-09-01 MULTIBODY DYNAMIC SYSTEMS AND APPLICATIONS I
NOVEMBER 2, 2021

10:00AM–11:30AM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

10:00AM–10:10AM:

BIFURCATION CHARACTERISTIC AND ENERGY TRANSFER OF VEHICLE SHIMMY SYSTEM CONSIDERING THE COUPLING OF VERTICAL AND LATERAL DYNAMICS

Technical Paper Publication: IMECE2021-66827

Heng Wei - *Hefei University of Technology*
 Jian-Wei Lu - *Hefei University of Technology*
 Hang-Yu Lu - *Hefei University of Technology*
 Sheng-Yong Ye - *Hefei University of Technology*

10:10AM–10:20AM:

DESIGN AND PROTOTYPE OF AN ELECTRIC POLLEN EXTRACTOR

Technical Paper Publication: IMECE2021-67404

Ali Alnouser - *Saint Martin's University*
 Turki Andergiri - *Saint Martin's University*
 Shawn Duan - *Saint Martin's University*

10:20AM–10:30AM:

DEVELOPMENT OF SINGLE PIECE DESIGNED COMPLIANT LOCOMOTIVE MECHANISM

Technical Paper Publication: IMECE2021-70121

Ciaphus Rouse - *Kennesaw State University*
 Benjamin Estrada - *Kennesaw State University*
 Caleb Sailors - *Kennesaw State University*
 Christian Schneider - *Kennesaw State University*
 Sean Henderson - *Kennesaw State University*
 Ayse Tekes - *Kennesaw State University*

10:30AM–10:40AM:

VALIDATION OF AN INDIAN RAIL VEHICLE MODEL USING RIDE INDICES FROM OSCILLATION TEST TRIALS

Technical Paper Publication: IMECE2021-70218

Sultan Singh - *Indian Institute of Technology Roorkee*
 Anil Kumar - *Indian Institute of Technology Roorkee*

10:40AM–10:50AM:

MULTIBODY DYNAMIC ADAMS MODEL OF A BALL SCREW MECHANISM WITH RECIRCULATION CHANNEL

Technical Paper Publication: IMECE2021-71121

Antonio C. Bertolino - *Politecnico di Torino*
 Andrea De Martin - *Politecnico di Torino*
 Stefano Mauro - *Politecnico di Torino*
 Massimo Sorli - *Politecnico di Torino*

10:50AM–11:00AM:

EMPIRICAL MODELING OF LAUNCH-TO-LEO ACCELERATIONS FOR MECHANICAL CHARACTERIZATION OF ORGANIDS



Technical Paper Publication: IMECE2021-72095

Peter Violante - *University of California, San Diego*
 Nicholas Blischak - *University of California, San Diego*
 William McLamb - *Space Tango*
 Twyman Clements - *Space Tango*
 Erik Viirre - *University of California, San Diego*
 Maziar Ghazinejad - *University of California, San Diego*

**07-07-02 SMART STRUCTURES AND
 STRUCTRONIC SYSTEMS: SENSING, ENERGY
 GENERATION AND CONTROL II**
NOVEMBER 2, 2021

10:00AM–11:30AM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

10:00AM–10:10AM:

**IDENTIFICATION OF DYNAMIC CHARACTERISTICS
 OF ELECTORRHEOLOGICAL DAMPERS
 USING A COMBINATION OF LEAST SQUARES
 AND RADIAL BASIS FUNCTION NEURAL
 NETWORKS TECHNIQUES**

Technical Paper Publication: IMECE2021-66841

Kamal Jahani - *Carleton University*
 Stefano Sandri - *Carleton University*
 Fred Afagh - *Carleton University*
 Robert Langlois - *Carleton University*

10:10AM–10:20AM:

**RESEARCH ON SOFT ELECTROSTATIC ADSORPTION
 UNIT DRIVEN BY SMA**

Technical Paper Publication: IMECE2021-69872

Jing Jiang - *Harbin Institute of Technology*
 Chenxu Niu - *Harbin Institute of Technology*

10:20AM–10:30AM:

**ACTIVE VIBRATION CONTROL OF PIEZOELECTRIC
 BEAM USING THE PID CONTROLLER**

Technical Paper Publication: IMECE2021-70960

Mohammed Alnuaimi - *Technology Innovation Institute*
 Abdulaziz BuAbdulla - *Technology Innovation Institute*
 Tarcisio Silva - *Technology Innovation Institute*
 Sumaya Altamimi - *Technology Innovation Institute*
 Dong Wook Lee - *Technology Innovation Institute*
 Mohamed Al Teneiji - *Technology Innovation Institute*

10:30AM–10:40AM:

**REINFORCEMENT LEARNING BASED MOTION
 CONTROL FOR A QUADRUPED PNEUMATICALLY
 ACTUATED SOFT ROBOT**

Technical Presentation: IMECE2021-71110

Carina Kaainoa - *California State University*
 Tim Tang - *California State University*
 He Shen - *California State University*

10:40AM–10:50AM:

**ENERGY STORAGE AND STABILIZATION OF
 FLOATING WIND TURBINES**

Technical Paper Publication: IMECE2021-72984

Martinus K. Aarmo - *Western Norway University of Applied Sciences*
 Magnus N. Sivesind - *Western Norway University of Applied Sciences*
 Jan Michael Simon Bartl - *Western Norway University of Applied Sciences*
 David Lande-Sudall - *Western Norway University of Applied Sciences*
 Thomas J. Impelluso - *Western Norway University of Applied Sciences*



09-08-01:**DISTANCE/ONLINE ENGINEERING EDUCATION,
MODELS AND ENABLING TECHNOLOGIES
NOVEMBER 2, 2021****10:00AM–11:30AM**Chair: Subha Kumpaty - *Milwaukee School of Engineering*Chair: Salim Azzouz - *Midwestern State University*Chair: Anabela Alves - *University of Minho***10:00AM–10:10AM:****MOBILE SOLAR POWERED INSTRUCTIONAL
TECHNOLOGY EQUIPMENT FOR ONLINE TEACHING
AND LEARNING DURING COVID-19 PANDEMIC FOR
REMOTE COMMUNITY****Technical Paper Publication: IMECE2021-69089**Ronald M. Galindo - *Cebu Technological University*Jun-Jun A. Obiso - *Cebu Technological University***10:10AM–10:20AM:****INCREASING DEMAND OF ONLINE AUDIO-VISUAL
ENGINEERING KNOWLEDGE IN STUDENTS:
A CASE STUDY****Technical Presentation: IMECE2021-70559**Shank Kulkarni - *Pacific Northwest National Laboratory***10:20AM–10:30AM:****APPLICATION OF ADAPTIVE NEURO-FUZZY
INFERENCE SYSTEM MODEL ON TRAFFIC FLOW OF
VEHICLES AT A SIGNALIZED ROAD INTERSECTIONS****Technical Paper Publication: IMECE2021-70956**O.I. Olayode - *University of Johannesburg*L.K. Tartibu - *University of Johannesburg*M.O. Okwu - *University of Johannesburg***10:30AM–10:40AM:****STUDENT PERCEPTIONS OF A HYBRID AND
FLEXIBLE TEACHING MODEL FOR POST-
COVID19 NORMALITY****Technical Paper Publication: IMECE2021-71742**Miguel X. Rodriguez-Paz - *Tecnologico de Monterrey*Jorge A. Gonzalez-Mendivil - *Tecnologico de Monterrey*Israel Zamora-Hernandez - *Tecnologico de Monterrey*J. Asuncion Zarate-Garcia - *Tecnologico de Monterrey***10:40AM–10:50AM:****GREEN STEM: VIRTUAL REALITY RENEWABLE
ENERGY LABORATORY FOR REMOTE LEARNING****Technical Paper Publication: IMECE2021-73778**Kevin Frank - *Drexel University*Ayanna Gardner - *Drexel University*Irina N. Ciobanescu Husanu - *Drexel University*Richard Y. Chiou - *Drexel University*Regina Ruane - *Temple University***10:50AM–11:00AM:****DISTANCE/ONLINE ENGINEERING EDUCATION
DURING AND AFTER COVID-19: GRADUATE
TEACHING ASSISTANT'S PERSPECTIVE****Technical Paper Publication: IMECE2021-72341**Vishnu Kumar - *Pennsylvania State University*

**10-10-03:
INDUSTRIAL FLOWS - III
NOVEMBER 2, 2021**

10:00AM–11:30 AM

Chair: Philipp Epple - *Coburg University of Applied Sciences*
Chair: Kamran Siddiqui - *University of Western Ontario*

10:00AM–10:10AM:

**EXPERIMENTAL AND COMPUTATIONAL STUDIES ON
SALTATION OF METAL POWDERS USED IN LASER
POWDER BED FUSION SYSTEMS FOR METAL
ADDITIVE MANUFACTURING**

Technical Paper Publication: IMECE2021-69550

Thao Tran-Le - *Penn State University*
Jiaxuan Wang - *Penn State University*
Margaret Byron - *Penn State University*
Stephen Lynch - *Penn State University*
Robert Kunz - *Penn State University*

10:10AM–10:20AM:

**A ONE-DIMENSIONAL MECHANISTIC MODEL FOR
TRACKING UNSTEADY SLUG FLOW**

Technical Paper Publication: IMECE2021-70735

Juan C. Padrino - *Newcastle University*
Narakorn Srinil - *Newcastle University*
Victoria Kurushina - *Newcastle University*
David Swailes - *Newcastle University*
Christopher C. Pain - *Imperial College London*
Omar K. Matar - *Imperial College London*

10:20AM–10:30AM:

**WET GAS HYDROCARBON CENTRIFUGAL
COMPRESSOR – PERFORMANCE TEST RESULTS
AND EVALUATION**

Technical Paper Publication: IMECE2021-71344

Dagfinn Mæland - *Equinor, ASA*
Lars E. Bakken - *Norwegian University of Science and Technology*

10:30AM–10:40AM:

**DROPLET DYNAMICS IN PEM FUEL CELL
FLOW CHANNELS**

Technical Paper Publication: IMECE2021-71972

Mehdi Mortazavi - *Western New England University*
Vedang Chauhan - *Western New England University*
Taylor Pedley - *Western New England University*
Brian M. Whinery - *Western New England University*

10:40AM–10:50AM:

**PERFORMANCE CHARACTERIZATION OF HOLLOW
FIBER DIRECT CONTACT MEMBRANE
DISTILLATION MODULE**

Technical Paper Publication: IMECE2021-70229

Jaber M. Asiri - *Lehigh University*
Abdulaziz M. Alasiri - *Lehigh University*
Justin Caspar - *Lehigh University*
Guanyang Xue - *Lehigh University*
Alparslan Oztekin - *Lehigh University*

10:50AM–11:00AM:

**DEEP LEARNING FOR DRAG COEFFICIENT
PREDICTIONS OF SPHERICAL AND NON-
SPHERICAL PARTICLES**



Technical Paper Publication: IMECE2021-69010

Pratik Mahyawansi - *Florida International University*
 Cheng-Xian Lin - *Florida International University*
 Shu-Ching Chen - *Florida International University*

**11-06-04 HEAT AND MASS TRANSFER IN HEATING,
 COOLING, AND POWER SYSTEMS - FUNDAMENTALS
 AND FRONTIERS**
NOVEMBER 2, 2021
10:00AM–11:30AM

Chair: Subramanyaravi Annapragada -
United Technologies Research

Chair: Kevin Dowding – *Sandia National Laboratories*

Chair: Alexander Rattner - *Penn State University*

10:00AM–10:10AM:
**ENHANCEMENT OF HEAT TRANSFER BY A TWO
 STAGE ELECTROHYDRODYNAMIC GAS PUMP WITH
 DIFFERENT POLARITIES**
Technical Presentation: IMECE2021-71983

A.K.M. Monayem Mazumder - Saginaw Valley State University

10:10AM–10:20AM:
**NUMERICAL SIMULATION OF IMPINGING SLOT AIR
 JET IN THE PRESENCE OF A CROSS FLOW**
Technical Paper Publication: IMECE2021-69088

Abhay Gudi - *Karnatak Law Society's, Vishwanathrao Deshpande
 Institute of Technology, Haliyal*

Vijaykumar Hindasageri - *Karnatak Law Society's, Vishwanathrao
 Deshpande Institute of Technology, Haliyal*

10:20AM–10:30AM:
**STUDY OF FLOW PATTERN CONFIGURATION
 EFFECT IN COOLING SYSTEMS**
Technical Paper Publication: IMECE2021-72170

Gerardo Carbajal - *Florida Polytechnic University*

10:30AM–10:40AM:
**THERMOCAPILLARY FLOW OF A MODERATE-
 PRANDTL NUMBER FLUID IN ANNULAR POOLS
 WITH A HEAT INNER CYLINDER**
Technical Paper Publication: IMECE2021-68924

Dong-Ming Mo - *Chongqing Industry Polytechnic College*

Li Zhang - *Chongqing City Management College*

Deng-Fang Ruan - *Chongqing University*

You-Rong Li - *Chongqing University*

10:40AM–11:00AM:
**NEAR FIELD RESONANT CAPACITIVE HEATING
 OF WATER**
Invited Presentation: IMECE2021-72073

Divya Jaladi - *Tennessee Technological University*

Matthew Pearce - *Tennessee Technological University*

C.W. Van Neste - *Tennessee Technological University*

Ethan Languri - *Tennessee Technological University*

12-06-01:
**CONGRESS-WIDE SYMPOSIUM ON NDE & SHM –
 FATIGUE AND FRACTURE EVALUATION AND
 QUANTIFICATION FOR FAILURE ANALYSIS
 NOVEMBER 2, 2021**
10:00AM–11:30AM

Chair: Marco Amabili - *McGill University*

Chair: Celia Reina - *University of Pennsylvania*



10:00AM–10:10AM:**RECENT ADVANCES IN UNIFIED MECHANICS THEORY****Technical Presentation: IMECE2021-66951**Cemal Basaran - *State University of New York***10:10AM–10:20AM:****ACCELERATION MECHANISM OF INTERGRANULAR CRACKING OF SUS316L UNDER CREEP-FATIGUE LOADING AT ELEVATED TEMPERATURES****Technical Paper Publication: IMECE2021-70108**Yukako Takahashi - *Tohoku University*Ken Suzuki - *Tohoku University*Hideo Miura - *Tohoku University***10:20AM–10:30AM:****FATIGUE ASSESSMENT OF PIPELINES WITH DENT AND CRACK SUBJECTED TO CYCLIC PRESSURE LOADING****Technical Paper Publication: IMECE2021-70916**Shadid A. Al-Nutifat - *Saudi Aramco*Abdulrahman S. Al-Shammari - *Saudi Aramco*Yongchang Pu - *Newcastle University***10:30AM–10:40AM:****STUDY ON CHARACTERIZATION METHOD OF MARTENSITIC TRANSFORMATION MAGNETIC SIGNAL OF AUSTENITIC STAINLESS STEEL****Technical Paper Publication: IMECE2021-71039**Ran Wang - *Nanchang Hangkong University*Bin Hu - *China Special Equipment Inspection and Research Institute*Zhinong Li - *Nanchang Hangkong University*Ting Wang - *China Special Equipment Inspection and Research Institute*Yue Yu - *China Special Equipment Inspection and Research Institute***10:40AM–10:50AM:****RESEARCH ON FATIGUE MONITORING METHOD OF CARBON FIBER FULLY WOUND CYLINDER WITH ALUMINUM LINER BASED ON STRAIN GAUGE****Technical Paper Publication: IMECE2021-71105**Yu Yue - *China Special Equipment Inspection and Research Institute*Xu Yansheng - *Jiangxi University of Science and Technology***10:50AM–11:00AM:****THE PREDICTION OF FATIGUE LIFE BASING RANDOM FOREST ALGORITHM****Technical Paper Publication: IMECE2021-72591**Chenfei Yin - *China Aircraft Strength Research Institute*Yu Yang - *AVIC Aircraft Strength Research Institute***12-09-01:****MECHANICS AND DESIGN OF CELLULAR MATERIALS NOVEMBER 2, 2021****10:00AM–11:30AM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania*

10:00AM–10:10AM:**INVESTIGATION OF THE INTERPLAY BETWEEN NANOPORE MORPHOLOGY AND PRE-EXISTING FRACTURE: A MOLECULAR DYNAMIC STUDY****Technical Presentation: IMECE2021-66113**Pania Newell - *University of Utah*Tao Du - *China University of Mining and Technology*Michael Blum - *University of Utah*Chen Chen - *Penn State University*Murali Gopal Muraleedharan - *Penn State University*Adri C.T. Van Duin - *Penn State University***10:10AM–10:20AM:****DYNAMIC RESPONSE OF CROSS TUBE WITH CRUSHABLE FOAM-FILLED CELLULAR CORE****Technical Paper Publication: IMECE2021-70076**Sean Jenson - *Ohio University*Muhammad Ali - *Ohio University***10:20AM–10:30AM:****CRUSHABLE FOAM-FILLED CELLULAR CORE AND DISCRETE BONDING: A FINITE ELEMENT STUDY OF THIN-WALLED CROSS TUBE****Technical Paper Publication: IMECE2021-70414**Sean Jenson - *Ohio University*Muhammad Ali - *Ohio University***10:30AM–10:40AM:****THERMO-MECHANICS OF HETEROGENEOUS POROUS MATERIAL: A SECOND-ORDER HOMOGENIZATION APPROACH****Technical Presentation: IMECE2021-71265**Bozo Vazic - *University of Utah*Pania Newell - *University of Utah***10:40AM–10:50AM:****TAILORED ENERGY ABSORPTION FOR 3D PRINTED MULTI-MATERIAL CELLULAR STRUCTURES USING ABS AND TPU****Technical Paper Publication: IMECE2021-73699**Nava Raq Khatri - *Texas Tech University*Paul F. Egan - *Texas Tech University***10:50AM–11:00AM:****DERIVATION OF LOADING SURFACES FOR A NITINOL TRIPLY PERIODIC MINIMAL SURFACE UNIT CELL SUBJECTED TO CYCLIC LOADING****Technical Paper Publication: IMECE2021-71534**Adriano Cebrian Carcavilla - *Khalifa University*Wael Zaki - *Khalifa University***13-01-01:****DESIGN AND FABRICATION, ANALYSIS, PROCESSES, AND TECHNOLOGY FOR MICRO AND NANO DEVICES AND SYSTEMS
NOVEMBER 2, 2021****10:00AM–11:30AM**Chair: Namwon Kim - *Texas State University*Chair: Grzegorz (Greg) Hader - *U.S. Army CCDC-
Armaments Center***10:00AM–10:10AM:****DETERMINATION OF MASS FLOW RATE THROUGH PLANE MESH WICK AND NANO-STRUCTURED MESH WICK FOR THERMAL DESIGN APPLICATIONS**

Technical Presentation: IMECE2021-69754*Ifeanyi Uwaoma - Oregon State University**Durga Ghosh - Oregon State University**Bahman Abbasi - Oregon State University***10:10AM–10:20AM:****DETACHABLE FINE BUMP CONNECTION USING MULTI-WALLED CARBON-NANOTUBE BUNDLES FOR 3D SEMICONDUCTOR MODULES****Technical Paper Publication: IMECE2021-70172***Masasuke Kobayashi - Tohoku University**Ken Suzuki - Tohoku University**Hideo Miura - Tohoku University***10:20AM–10:30AM:****A NUMERICAL STUDY ON HEAT TRANSFER CHARACTERISTICS OF MICROCHANNEL COOLING SYSTEM USING MAGNETOHYDRODYNAMIC APPROACH****Technical Presentation: IMECE2021-71974***Kunal Sandip Garud - Dong-A University**Seong Guk Hwang - Dong-A University**Jae-Hyeong Seo - Dong-A University**Moo-Yeon Lee - Dong-A University***10:30AM–10:40AM:****INFLUENCE OF INSTANTANEOUS AND DELAYED OVERLAPS ON SURFACE TOPOGRAPHY AND WETTABILITY OF A FEMTOSECOND LASER TEXTURED SURFACE****Technical Paper Publication: IMECE2021-73636***Reshma Y. Siddiquie - Indian Institute of Technology, Bombay**Ravi Bathe - International Advanced Research Centre for Powder Metallurgy and New Materials**Amit Agrawal - Indian Institute of Technology, Bombay**Suhas S. Joshi - Indian Institute of Technology, Bombay***10:40AM–10:50AM:****LONG-LASTING, PAPER-LIKE DIELECTRIC BARRIER DISCHARGE DEVICES****Technical Presentation: IMECE2021-77320***Stephen Mclaughlin - Rutgers University**Christopher Gorka - Rutgers University**Duncan Trosan - North Carolina State University**Ramendra Pal - Birla Institute of Technology and Science, Pilani**Katharina Stapelmann - North Carolina State University**Deepti Salvi - North Carolina State University**Francois Berthiaume - Rutgers University**Aaron David Mazzeo - Rutgers University***10:50AM–11:00AM:****CRYSTALLINITY-INDUCED ACCELERATION OF INTERGRANULAR CRACKING IN THIN-FILM INTERCONNECTIONS UNDER HIGH CURRENT DENSITY****Technical Paper Publication: IMECE2021-70222***Shota Akasaki - Tohoku University**Hideo Miura - Tohoku University***14-04-01:****RELIABILITY AND SAFETY IN TRANSPORTATION SYSTEMS
NOVEMBER 2, 2021****10:00AM–11:30AM****10:00AM–10:10AM:****A HYBRID METHODOLOGY FOR RISK MITIGATION DURING DEVELOPMENT OF SAFETY-CRITICAL AUTONOMY FEATURES**

Technical Paper Publication: IMECE2021-69313

Pez Zarifian - *Toyota Research Institute*
 Divya Garikapati - *Toyota Research Institute*
 Julia Pralle - *Toyota Research Institute*
 Jennifer Dawson - *Toyota Research Institute*
 Constantin Hubmann - *Toyota Research Institute*
 Brielle Reiff - *Toyota Research Institute*
 Raymond Tam - *Toyota Research Institute*
 Gopi Gaddamadugu - *Toyota Research Institute*

10:10AM–10:20AM:
**SAFETY TECHNOLOGY ADVANCEMENTS FOR
 AUTONOMOUS CARS; PROSPECTIVE OF
 MANUFACTURING, REGULATORY AND SOCIETY**
Technical Paper Publication: IMECE2021-70802

Mohammad Pourgol Mohamad - *University of Maryland*
 Amin Pourgol Mohamad - *University of Massachusetts*

10:20AM–10:30AM:
**A SYSTEMATIC STUDY OF PEDESTRIAN CONTRAST
 AND DETECTION FROM VEHICLE HEADLIGHTS**
Technical Paper Publication: IMECE2021-71215

Fawzi P. Bayan - *SEA, Ltd.*
 Thomas A. Timbario - *SEA, Ltd.*
 Jonathan D. Nelson - *SEA, Ltd.*
 Stuart Sheldon II - *SEA, Ltd.*
 Ronny E. Wahba - *SEA, Ltd.*
 Brandon Keys - *SEA, Ltd.*

10:30AM–10:40AM:
**EFFECT OF WEATHER ON THE PERFORMANCE OF
 AUTONOMOUS VEHICLE LIDAR SENSORS**
Technical Paper Publication: IMECE2021-73770

Jamil Abdo - *Frostburg State University*
 Spencer Hamblin - *Frostburg State University*
 Genshe Chen - *Intelligent Fusion Technology, Inc.*

10:40AM–10:50AM:
**DESIGN OF AN EFFICIENT, LOW-COST, STATIONARY
 LIDAR SYSTEM FOR ROADWAY CONDITION
 MONITORING**
Technical Paper Publication: IMECE2021-69308

Jarod Bennett - *University of Kansas*
 Mather Saladin - *University of Kansas*
 Daniel Sizoo - *University of Kansas*
 Spencer Stewart - *University of Kansas*
 Graham Wood - *University of Kansas*
 Thomas DeAgostino - *University of Kansas*
 Christopher Depcik - *University of Kansas*

02-09-02:
**COMPUTATIONAL MODELING AND SIMULATION
 FOR ADVANCED MANUFACTURING-II
 NOVEMBER 2, 2021**
12:55PM–2:25PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

12:55PM–1:05PM:
**NUMERICAL MODELING OF A HYBRID ASYMMETRIC
 ROLLING AND BENDING PROCESS**
Technical Paper Publication: IMECE2021-69553

Abhay Kumar Dubey - *PDPM Indian Institute of Information Technology*
 Harshal Y. Shahare - *PDPM Indian Institute of Information Technology*
 Alexander Pesin - *Nosov Magnitogorsk State Technical University*
 Denis Pustovoytov - *Nosov Magnitogorsk State Technical University*
 Hailiang Yu - *Central South University*
 Puneet Tandon - *PDPM Indian Institute of Information Technology*



1:05PM–1:15PM:**EFFECT OF DIFFERENT PROCESS PARAMETERS ON THE GRAIN MORPHOLOGY OF ADDITIVELY MANUFACTURED MATERIALS USING KINETIC MONTE CARLO SIMULATIONS****Technical Presentation: IMECE2021-70810**

Saeed Ataollahi - *University of Tennessee at Chattanooga*
 Mohammad Javad Mahtabi - *University of Tennessee at Chattanooga*

1:15PM–1:25PM:**A COMPREHENSIVE 3D FEM MODEL TO STUDY FORCES, CUTTING TEMPERATURE AND RESIDUAL STRESSES DURING VIBRATION ASSISTED HARD TURNING CONSIDERING TOOL COOLING CYCLE****Technical Paper Publication: IMECE2021-70907**

Pranesh Dutta - *Indian Institute of Technology Bhubaneswar*
 Gaurav Bartarya - *Indian Institute of Technology Bhubaneswar*

1:25PM–1:35PM:**OPTIMIZATION OF INJECTION-MOLDING PARAMETERS FOR THE WARPAGE OF GREEN PARTS OF METAL INJECTION MOLDING BY THE TAGUCHI METHOD****Technical Paper Publication: IMECE2021-71362**

Chen-Yuan Chung - *National Central University*
 Yu-Peng Chen - *National Central University*

1:35PM–1:45PM:**COMPRESSION MOLDING OF REINFORCED PLASTICS USING THE ELEMENT FREE GALERKIN (EFG) METHOD****Technical Paper Publication: IMECE2021-71605**

Sandeep Medikonda - *Ansys, Inc.*
 Ashutosh Srivastava - *Ansys, Inc.*
 Amogh Shejwal - *Ansys, Inc.*
 Rajesh Meena - *Ansys, Inc.*

1:45PM–1:55PM:**ANALYSIS OF PROCESS PHYSICS IN ELECTRON BEAM MELTING****Technical Paper Publication: IMECE2021-71782**

Mark Hedreen - *University of Washington*
 Curtis Doyle - *University of Washington*
 Eric Bol - *University of Washington*
 Garrett Kelley - *University of Washington*
 M. Ramulu - *University of Washington*

**02-13-02: INDUSTRY 4.0 ASPECTS
NOVEMBER 2, 2021****12:55PM–2:25PM**

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

12:55PM–1:05PM:**INTELLIGENT PROCESS CONTROL FOLLOWING INDUSTRY 4.0 TRENDS****Technical Paper Publication: IMECE2021-68686**

David Guerra-Zubiaga - *Kennesaw State University*
 Grayson McMichael - *Kennesaw State University*
 Diana Segura-Velandia - *Loughborough University*
 Maria Aslam - *Loughborough University*
 Seung-Woo Yim - *Kennesaw State University*
 Zack Anderson - *Kennesaw State University*
 Yee Mey Goh - *Loughborough University*



1:05PM–1:15PM:**PLANNING AND ACQUISITION OF REAL-TIME PRODUCTION DATA THROUGH THE VIRTUAL FACTORY IN CHEMICAL INDUSTRY****Technical Paper Publication: IMECE2021-73080**

Tõnis Raamets - Tallinn University of Technology
 Kristo Karjust - Tallinn University of Technology
 Aigar Hermaste - Tallinn University of Technology
 Kashif Mahmood - Tallinn University of Technology

1:15PM–1:25PM:**TOOL REMAINING USEFUL LIFE PREDICTION IN ROBOTIC MACHINING OF COMPOSITE MATERIALS BASED ON MECHANICAL VIBRATIONS****Technical Paper Publication: IMECE2021-70682**

José Otávio Savazzi - Federal University of São Carlos
 Sidney Bruce Shiki - Federal University of São Carlos
 Gustavo Franco Barbosa - Federal University of São Carlos
 David Guerra-Zubiaga - Kennesaw State University

1:25PM–1:35PM:**DIGITAL THREAD APPROACH FOR SMART-COLLABORATIVE ROBOTIC CELL****Technical Paper Publication: IMECE2021-69639**

Rubén Febronio García Martínez - Tecnológico de Monterrey
 Pedro Daniel Urbina Coronado - Tecnológico de Monterrey
 José Abraham Valdivia Puga - Tecnológico de Monterrey
 Horacio Ahuett Garza - Tecnológico de Monterrey
 Pedro Orta Castañón - Tecnológico de Monterrey

1:35PM–1:45PM:**A NEW APPROACH TO DEVELOP AN INTELLIGENT ROBOTIC GRIPPER USING VIRTUAL TOOLS IMPLEMENTING IIOT AND ML TECHNOLOGIES****Technical Paper Publication: IMECE2021-69993**

David A. Guerra-Zubiaga - Kennesaw State University
 Logan Block - Kennesaw State University
 Adam Ricketts - Kennesaw State University
 Jacob Faile - Kennesaw State University
 Charlie Dickson - Kennesaw State University

1:45PM–1:55PM:**TOWARDS AN ASSISTANCE AND SIMULATION AUGMENTED REALITY ENVIRONMENT FOR THE MANUFACTURING AREA****Technical Paper Publication: IMECE2021-69816**

José Abraham Valdivia Puga - Tecnológico de Monterrey
 Pedro Daniel Urbina Coronado - Tecnológico de Monterrey
 Rubén Febronio García Martínez - Tecnológico de Monterrey
 Horacio Ahuett Garza - Tecnológico de Monterrey
 Pedro Antonio Orta Castañón - Tecnológico de Monterrey

04-05-01:**BEAM, PLATE, AND SHELL STRUCTURES NOVEMBER 2, 2021****12:55PM–2:25PM**

Chair: Erkan Oterkus - University of Strathclyde
 Chair: Uttam K. Chakravarty - University of New Orleans
 Chair: Pavana Prabhakar - University of Wisconsin-Madison

12:55PM–1:05PM:**NEW ANALYTICAL SOLUTIONS FOR ORTHOTROPIC RECTANGULAR CLAMPED PLATES UNDER PRESSURE LOADING****Technical Paper Publication: IMECE2021-67055**

John Rossi - Boeing Commercial Airplanes
 Olaf Weckner - Boeing Commercial Airplanes



1:05PM–1:15PM:**DRONE ASSISTED TARGETING FOR DIRECT FIRE ENGAGEMENTS****Technical Paper Publication: IMECE2021-69129**

Nathan Batta - *United States Military Academy*
 Grant Williams - *United States Military Academy*
 Shane Murphy - *United States Military Academy*
 Andrew Quantz - *United States Military Academy*
 John Pegues - *United States Military Academy*
 Pratheek Manjunath - *United States Military Academy*
 James Bluman - *United States Military Academy*

1:15PM–1:25PM:**NEW BERNOULLI-EULER BEAM MODEL BASED ON A SIMPLIFIED MICROMORPHIC THEORY****Technical Presentation: IMECE2021-69922**

Gongye Zhang - *Southeast University*
 Xin-Lin Gao - *Southern Methodist University*

1:25PM–1:35PM:**DESIGN OPTIMIZATION OF MONOBLADE AUTOROTATING PODS TO EXHIBIT AN UNCONVENTIONAL DESCENT TECHNIQUE USING GLAUERT'S MODELING****Technical Paper Publication: IMECE2021-69936**

Shashwat Patnaik - *Delhi Technological University*
 Kanishk - *Delhi Technological University*

1:35PM–1:45PM:**MODULAR DESIGN OF SPACE EXPANDABLE CAPSULE BASED ON ORIGAMI-INSPIRED STRUCTURES AND STRETCHABLE MECHANISM****Technical Paper Publication: IMECE2021-70963**

Liping Xiao - *University of Chinese Academy of Sciences*
 Zhao Xu - *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences*

Ke Wang - *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences*

Boqi Kang - *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences*

Anping Wang - *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences*

Haifeng Zhao - *Chinese Academy of Sciences*

1:45PM–1:55PM:**DESIGN AND STRUCTURAL ANALYSIS OF A LIFTING PLATFORM FOR HYDROTHERAPY POOL****Technical Paper Publication: IMECE2021-72754**

N.V. David - *Universiti Teknologi MARA*
 M. Danial Darjat - *Universiti Teknologi MARA*

07-10-01 VIBRATIONS OF CONTINUOUS SYSTEMS I NOVEMBER 2, 2021**12:55PM–2:25PM**

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

12:55PM–1:05PM:**FLUID FLOW IN BETWEEN THE DIFFERENTIALLY ROTATING SPHERICAL SHELLS IN THE PRESENCE OF TOROIDAL MAGNETIC FIELD****Technical Paper Publication: IMECE2021-66692**

Bharti Sharma - *Amrita School of Engineering*
 Neetu Srivastava - *Amrita School of Engineering*

1:05PM–1:15PM:**VIBRATION ISOLATION IN CONTINUOUS BEAM NETWORKS**

Technical Paper Publication: IMECE2021-69720

George Rai - *Pennsylvania State University*
 Christopher D. Rahn - *Pennsylvania State University*
 Edward Smith - *Pennsylvania State University*
 Conor Marr - *Parker Hannifin Corporation*

1:15PM–1:25PM:
**EFFECT OF THE EXTERNAL MULTI-FREQUENCY
 EXCITATIONS ON DYNAMICS OF A RING
 STRUCTURE RESTED ON ELASTIC FOUNDATION**
Technical Paper Publication: IMECE2021-69753

Nan Gao - *Tianjin University*
 Shiyu Wang - *Tianjin University*

1:25PM–1:35PM:
**HEATED CIRCULAR CYLINDER SUBJECTED TO
 FORCED SPANWISE OSCILLATIONS**
Technical Paper Publication: IMECE2021-70713

Ussama Ali - *Khalifa University of Science and Technology*
 Md Islam - *Khalifa University of Science and Technology*
 Isam Janajreh - *Khalifa University of Science and Technology*

1:35PM–1:45PM:
**MODAL INTERACTION IN A LEVITATION FORCE
 MEMS BASED RESONATOR**
Technical Paper Publication (Iran): IMECE2021-72755

Mohammadreza Zamanzadeh - *Urmia University*
 H.G.E. Meijer - *University of Twente*
 H.M. Ouakad - *Sultan Qaboos University*

1:45PM–1:55PM:
**STEADY VIBRATION PROBLEMS IN THE
 COUPLED THEORY OF ELASTICITY FOR TRIPLE
 POROSITY MATERIALS**
Technical Presentation: IMECE2021-75567

Merab Svanadze - *Ilia State University*

**07-12-01 CONTROL THEORY AND APPLICATIONS I
 NOVEMBER 2, 2021**
12:55PM–2:25PM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
 Chair: Bogdan Epureanu - *University of Michigan*
 Chair: Marco Amabili - *McGill University*

12:55PM–1:05PM:
**AN ADAPTIVE CONTROL FRAMEWORK FOR
 UNKNOWN INPUT ESTIMATION**
Technical Paper Publication: IMECE2021-67484

Tristan D. Griffith - *Texas A&M University*
 Mark J. Balas - *Texas A&M University*

1:05PM–1:15PM:
**A NOVEL FRACTIONAL FIXED-TIME SLIDING MODE
 CONTROL METHOD FOR SPHERICAL ROBOT LINEAR
 MOTION SPEED CONTROL**
Technical Paper Publication: IMECE2021-70264

Zhou Ting - *Beijing Jiaotong University*
 Xu Yugong - *Beijing Jiaotong University*
 Wu Bin - *Beijing Jiaotong University*

1:15PM–1:25PM:
**OPTIMAL INTERIOR MOUNTED PERMANENT
 MAGNET SYNCHRONOUS MOTORS MTPA
 AND MPPA CONTROL BASED ON SLIDING
 MODE APPROACHES**


Technical Paper Publication: IMECE2021-70904Hashim Alnami - *Wichita State University*Chengzong Pang - *Wichita State University*Avinash Papineni - *Southern Illinois University Edwardsville*Xin Wang - *Southern Illinois University Edwardsville***1:25PM–1:35PM:****A CONTROL ORIENTED SOOT MINIMIZATION MODEL FOR DIESEL ENGINES USING AN INTEGRATED APPROACH****Technical Paper Publication: IMECE2021-71502**Mahesh S. Shewale - *Indiana University Purdue University Indianapolis*Ali Razban - *Indiana University Purdue University Indianapolis***1:35PM–1:45PM:****BIOREACTOR TEMPERATURE CONTROL SYSTEM USING PID CONTROLLER****Technical Paper Publication: IMECE2021-71715**Richard Alimberti - *Western New England University*Vedang Chauhan - *Western New England University*Devina Jaiswal - *Western New England University***1:45PM–1:55PM:****DEEP NEURAL NETWORK REAL-TIME CONTROL OF A MOTORIZED FUNCTIONAL ELECTRICAL STIMULATION CYCLE WITH AN UNCERTAIN TIME-VARYING ELECTROMECHANICAL DELAY****Technical Paper Publication: IMECE2021-73687**Hannah M. Sweatland - *University of Florida*Brendon C. Allen - *University of Florida*Max L. Greene - *University of Florida*Warren E. Dixon - *University of Florida***07-11-01****MOBILE ROBOTS AND UNMANNED GROUND VEHICLES I****NOVEMBER 2, 2021****12:55PM–2:25PM**Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*Chair: Bogdan Epureanu - *University of Michigan*Chair: Marco Amabili - *McGill University***12:55PM–1:05PM:****DRIVING SYSTEM DESIGN AND CONTROL OF TICK COLLECTION ROBOT****Technical Paper Publication: IMECE2021-67555**Yesiliang Qiu - *University of Cincinnati*Janet Dong - *University of Cincinnati*Caroline “Niki” Harrison Moretto - *University of Cincinnati***1:05PM–1:15PM:****INITIAL DEVELOPMENT OF LOW-COST AUTONOMOUS ROVER FOR PURSUIT OF MOVING TARGETS****Technical Paper Publication: IMECE2021-67678**Cole James - *Washington State University*Konstantin I. Matveev - *Washington State University***1:15PM–1:25PM:****AUTONOMOUSLY CONTROLLED ROBOT WITH TRILATERATION-BASED LOCALIZATION FOR OPTIMIZED EXCAVATION OF LUNAR REGOLITH**

Technical Paper Publication: IMECE2021-68623

Michael Smith - *University of North Carolina at Charlotte*
 David Grabowsky - *University of North Carolina at Charlotte*
 Holden Stanley - *University of North Carolina at Charlotte*
 Jeremy Brake - *University of North Carolina at Charlotte*
 Aidan Browne - *University of North Carolina at Charlotte*

1:25PM–1:35PM:

**MULTI-PURPOSE OPEN SOURCE
 QUADRUPEL PLATFORM FOR ROBOTIC
 RESEARCH AND TRAINING**

Technical Paper Publication: IMECE2021-69167

Stephen Vollaro - *University of Hartford*
 Mason Wein - *University of Hartford*
 Akin Tatoglu - *University of Hartford*
 Kiwon Sohn - *University of Hartford*

1:35PM–1:45 PM:

**A COMPARATIVE ANALYSIS OF OBJECT
 DETECTION ALGORITHMS IN NATURALISTIC
 DRIVING VIDEOS_X000B_**

Technical Paper Publication: IMECE2021-69975

Ce Zhang - *Virginia Tech*
 Azim Eskandarian - *Virginia Tech*

1:45PM–1:55PM:

**A SPECIAL STRATEGY FOR QUADROTORS IN
 AGGRESSIVE AND SINGULARITY-FREE TRACKING**

Technical Paper Publication: IMECE2021-70489

Haowen Liu - *University of Southern California*
 Bingen Yang - *University of Southern California*

08-12-01:

**OUTSTANDING YOUNG INVESTIGATORS IN
 ELECTROCHEMICAL ENERGY CONVERSION
 AND STORAGE**

NOVEMBER 2, 2021**12:55PM–2:25PM**

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

12:55PM–1:15PM:

**MULTI-PHYSICS IMPACT MODELING AND TESTING
 OF LITHIUM-ION BATTERIES**

Invited Presentation: IMECE2021-66685

Jie Deng - *Ford Motor Company*
 Chulheung Bae - *Ford Motor Company*
 Phil Rairigh - *Ford Motor Company*
 Theodore Miller - *Ford Motor Company*

1:15PM–1:35PM:

**FAST-CHARGING LI-ION BATTERIES FOR ELECTRIC
 VEHICLES: UNDERSTANDING AND TACKLING
 THE CHALLENGES**

Invited Presentation: IMECE2021-76803

Donal Finegan - *National Renewable Energy Laboratory*

1:35PM–1:45PM:

**MESOSCALE INTERACTIONS IN COMPOSITE
 CATHODES OF ALL-SOLID-STATE LITHIUM
 BATTERIES**



Technical Presentation: IMECE2021-77347*Kaustubh Girish Naik - Purdue University**Bairav Sabarish Vishnugopi - Purdue University**Partha P. Mukherjee - Purdue University***1:45PM–1:55PM:****DATA-DRIVEN SAFETY RISK CLASSIFICATION OF LITHIUM-ION BATTERIES****Technical Presentation: IMECE2021-76903***Yikai Jia – University of North Carolina at Charlotte**Jun Xu - University of North Carolina at Charlotte***09-09-01:
STEM, LEARNING FACTORIES
NOVEMBER 2, 2021****12:55PM–2:25PM****Chair:** *Subha Kumpaty - Milwaukee School of Engineering***Chair:** *Salim Azzouz - Midwestern State University***Chair:** *Anabela Alves - University of Minho***12:55PM–1:05PM:****PROPCART: STEM FOR AVIATION AND WINDPOWER****Technical Paper Publication: IMECE2021-68729***Julian Earwaker - CnoTes***1:05PM–1:15PM:****A NOVEL TRILOGY OF E-STEM PROGRAMS****Technical Paper Publication: IMECE2021-69012***Mohamed Gharib - Texas A&M University at Qatar**Tala Katbeh - Texas A&M University at Qatar**G. Benjamin Cieslinski - Texas A&M University at Qatar**Brady Creel - Texas A&M University at Qatar***1:15PM–1:25PM:****EDUCATING HISTORICALLY BLACK COLLEGES AND UNIVERSITIES INNOVATORS ABOUT THE COMMERCIALIZATION OF INNOVATION BY THE CUSTOMER DISCOVERY PROCESS****Technical Paper Publication: IMECE2021-69080***Sampson Addo - University of the District of Columbia**Pawan Tyagi - University of the District of Columbia**Devdas Shetty - University of the District of Columbia***1:25PM–1:35PM:****PROBLEM-BASED LEARNING: A CASE STUDY DEMONSTRATING THE BENEFITS OF A POST-FRESHMAN SUMMER INVENTION PROGRAM ON THERMAL FLUID SCIENCES ENGAGEMENT AND PROFESSIONAL DEVELOPMENT****Technical Paper Publication: IMECE2021-71354***Andrew Kim - Cooper Union for the Advancement of Science and Art**David Wootton - Cooper Union for the Advancement of Science and Art***1:35PM–1:45PM:****INNOVATIVE APPROACHES TO ENHANCE AWARENESS ON ADDITIVE MANUFACTURING IN ENGINEERING EDUCATION TOWARDS COMPETENCIES FOR INDUSTRY 4.0****Technical Paper Publication: IMECE2021-71364***Saleh Atatreh - Dubai Electricity & Water Authority**Mozah Alyammahi - Dubai Electricity & Water Authority**Rahmat Agung Susantyoko - Dubai Electricity & Water Authority**Hesham Ismail - Dubai Electricity & Water Authority**Abdalla Mohammed - Dubai Electricity & Water Authority*

1:45PM–1:55PM:

**DESIGN THE FUTURE ACTIVITIES (DFA):
FRAMEWORK TO DEVELOP CASE STUDIES TO
INCORPORATE DEEP UNDERSTANDING OF THE
COUPLING BETWEEN TECHNOLOGY, SOCIETY AND
THE FUTURE**

Technical Paper Publication: IMECE2021-73344Hadi Ali - *Arizona State University*

**10-04-01:
CFD APPLICATIONS - I
NOVEMBER 2, 2021**

12:55PM–2:25PMChair: Philipp Epple - *Coburg University of Applied Sciences*Chair: Kamran Siddiqui - *University of Western Ontario***12:55PM–1:05PM:**

**NUMERICAL SIMULATION OF TURBULENT PIPE
FLOW WITH 90-DEGREE ELBOW USING WALL Y+
APPROACH**

Technical Paper Publication: IMECE2021-69986Ahmed A. Abuhatira - *University of Dundee*Salim M. Salim - *Swansea University*Jan B. Vorstius - *University of Dundee***1:05PM–1:15PM:**

**NUMERICAL INVESTIGATION AND VALIDATION OF
JET TEMPERATURE EFFECTS ON NOZZLE-
AFTERBODY DRAG**

Technical Paper Publication: IMECE2021-69769Berke Haznedaroglu - *Istanbul Technical University*Omer Ciftci - *Istanbul Technical University*Sertac Cadirci - *Istanbul Technical University*Serhad Aytac - *Turkish Aircraft Industries Corporation***1:15PM–1:25PM:**

**NUMERICAL SIMULATION OF MARS AND EARTH
PARTICLE SALTATION**

Technical Presentation: IMECE2021-77078Zhongquan Charlie Zheng - *Utah State University*Meihua Zhang - *Utah State University***1:25PM–1:35PM:**

**A NEW VARIANT OF THE DYNAMIC HYBRID RANS-
LES MODEL FOR COMPLEX TURBULENT FLOWS**

Technical Paper Publication: IMECE2021-72185Tausif Jamal - *Kohler Co. - Kohler Power Systems*Olalekan O. Shobayo - *University of Oklahoma*D. Keith Walters - *University of Oklahoma***1:35PM–1:45PM:**

**DESIGN OF A HYDROKINETIC TURBINE FOR
ENERGY SHIPS APPLICATIONS WITH COMBINED
EXTENDED ANALYTICAL BETZ-SCHMIDT METHOD
AND NUMERICAL SIMULATIONS CFD**

Technical Paper Publication: IMECE2021-70051Philipp Epple - *Coburg University of Applied Sciences*Jonas Holzbrecher - *Coburg University of Applied Sciences*Michael Steppert - *Coburg University of Applied Sciences*Max F. Platzer - *AeroHydro Research & Technology Associates***1:45PM–1:55PM:**

**DEVELOPMENT OF A TOPOLOGY OPTIMIZATION
FRAMEWORK FOR COOLING CHANNEL DESIGN IN
DIE CASTING MOLDS**



Technical Paper Publication: IMECE2021-73363

Farshad Navah - *National Research Council Canada*
 Marc-Étienne Lamarche-Gagnon - *National Research Council Canada*

Florin Ilinca - *National Research Council Canada*

Martin Audet - *National Research Council of Canada*

Marjan Molavi-Zarandi - *National Research Council Canada*

Vincent Raymond - *National Research Council Canada*

11-08-04:
**FUNDAMENTALS OF CONVECTION - COUPLED
 PHASE CHANGE AND COMPRESSIBLE FLOWS
 NOVEMBER 2, 2021**
12:55PM–2:25PM

Chair: Subramanyaravi Annapragada -
United Technologies Research

Chair: Kevin Dowding – *Sandia National Laboratories*

Chair: Alexander Rattner - *Penn State University*

12:55PM–1:05PM:
**RECIPROCATING FLOW FOR ENHANCING THERMAL
 PERFORMANCE OF LATENT THERMAL ENERGY
 STORAGE SYSTEMS**
Technical Paper Publication: IMECE2021-69669

Akashdeep Singh Virk - *University of Missouri*

Chanwoo Park - *University of Missouri*

Constantinos Mitsingas – *U.S. Army Research Laboratory*

Chol-Bum Kweon – *U.S. Army Research Laboratory*

1:05PM–1:15PM:
**PREDICTION OF SHOCK WAVE POSITION
 CONSIDERING NON-EQUILIBRIUM PHASE CHANGE
 OF WET NATURAL GAS IN NOZZLE**
Technical Paper Publication: IMECE2021-69858

Yang Liu - *China University of Petroleum (East China)*

Xuwen Cao - *China University of Petroleum (East China)*

Jiang Bian - *China University of Petroleum (East China)*

1:15PM–1:25PM:
**COMPRESSIBLE-GAS COOLANTS IN
 ELECTROMAGNETIC HEAT EXCHANGERS:
 A THIN DOMAIN MODEL**
Technical Paper Publication: IMECE2021-69624

Ajit A. Mohekar - *Worcester Polytechnic Institute*

Burt S. Tilley - *Worcester Polytechnic Institute*

Vadim V. Yakovlev - *Worcester Polytechnic Institute*

1:25PM–1:35PM:
**INFLUENCES OF HOUSING DIMENSION AND DISK
 GAP ON CONVECTIVE HEAT TRANSFER
 PERFORMANCE OF ROTATING DISKS**
Technical Presentation: IMECE2021-70271

Xiao-Fang Zhang - *Chongqing University*

Deng-Fang Ruan - *Chongqing University*

1:35PM–1:45PM:
**HEAT TRANSFER FROM A SHORT CYLINDER
 SITUATED PARALLEL TO AN AIR STREAM**
Technical Paper Publication: IMECE2021-73293

Majid Molki - *Southern Illinois University*

**12-05-01: SYMPOSIUM ON MODELING OF THE
 FRACTURE, FAILURE AND FATIGUE IN SOLIDS
 NOVEMBER 2, 2021**
12:55PM–2:25PM

Chair: Marco Amabili - *McGill University*

Chair: Celia Reina - *University of Pennsylvania*



12:55PM–1:05PM:**PREDICTING HIGH CYCLE FATIGUE LIFE WITH UNIFIED MECHANICS THEORY****Technical Presentation: IMECE2021-66949**Cemal Basaran - *State University of New York*
Hsiao Wei Lee - *University at Buffalo***1:05PM–1:15PM:****CREEP-FATIGUE DAMAGE OF HEAT-RESISTANT ALLOYS CAUSED BY THE LOCAL LATTICE MISMATCH-INDUCED ACCELERATION OF THE GENERATION AND ACCUMULATION OF DISLOCATIONS AND VACANCIES****Technical Paper Publication: IMECE2021-68489**Yifan Luo - *Tohoku University*
Shogo Tezuka - *Tohoku University*
Koki Nakayama - *Tohoku University*
Ayumi Nakayama - *Tohoku University*
Hideo Miura - *Tohoku University*
Ken Suzuki - *Tohoku University***1:15PM–1:25PM:****MICRO-SCALE FRETTING FATIGUE SIMULATION METHOD BASED ON SUBMODELLING TECHNIQUE****Technical Paper Publication: IMECE2021-68754**Jian Wang - *Southwest University of Science and Technology*
Caizhi Zhou - *University of South Carolina***1:25PM–1:35PM:****MOLECULAR DYNAMICS ANALYSIS OF THE ACCELERATION OF THE DEGRADATION OF THE STRENGTH OF A GRAIN BOUNDARY UNDER CREEP-FATIGUE LOADS****Technical Paper Publication: IMECE2021-70628**Shujiroh Suzuki - *Tohoku University*
Shogo Tezuka - *Tohoku University*
Ken Suzuki - *Tohoku University*
Hideo Miura - *Tohoku University***1:35PM–1:45PM:****APPLICATIVE ELASTO-PLASTIC SELF CONSISTENCY MODEL OF ESHELBY'S INCLUSION THEORY TO ANALYZE THE DEFORMATION IN SINGLE CRYSTALS AND POLY-CRYSTALS OF PURE MAGNESIUM CONSISTING OF MULTIPLE DEFORMATION MODES****Technical Presentation: IMECE2021-71369**Daniel Raja - *Southern Illinois University Edwardsville*
Soondo Kweon - *Southern Illinois University Edwardsville***1:45PM–1:55PM:****RELIABILITY ANALYSIS OF FLEXIBLE PCBs****Technical Paper Publication: IMECE2021-71540**Amogh Shejwal - *Ansys, Inc.*
Ashutosh Srivastava - *Ansys, Inc.*
Sandeep Medikonda - *Ansys, Inc.*
S. Babu Aminjekarai - *Ansys, Inc.***12-08-01:****INSTABILITIES IN SOLIDS AND STRUCTURES NOVEMBER 2, 2021****12:55PM–2:25PM**Chair: Marco Amabili - *McGill University*
Chair: Celia Reina - *University of Pennsylvania*

12:55PM–1:05PM:**VISCOELASTIC TRUSS METAMATERIALS AS TIME-DEPENDENT GENERALIZED CONTINUA****Technical Presentation: IMECE2021-76800**

Raphael Glaesener - *ETH Zurich*
 Jan-Hendrik Bastek - *ETH Zurich*
 Dennis Kochmann - *ETH Zurich*

1:05PM–1:15PM:**CAPILLARY-INDUCED WRINKLE-TO-FOLD TRANSITIONS****Technical Presentation: IMECE2021-77056**

So Nagashima - *Nagoya University*
 Akihiro Nakatani - *Osaka University*

1:15PM–1:25PM:**A SYSTEMATIC GROUP THEORETIC BASED APPROACH TO GLOBAL BIFURCATION APPLIED TO BUCKLING OF HOMOGENEOUS AND PERIODIC BEAMS ON A NONLINEAR ELASTIC FOUNDATION****Technical Presentation: IMECE2021-77069**

Ariel Ibarra Pino - *University of Minnesota*
 Ryan Elliott - *University of Minnesota*

1:25PM–1:35PM:**DIVERSITY OF BIFURCATIONS AND DEFORMATIONS ON FILMS BONDED TO SOFT SUBSTRATES****Technical Presentation: IMECE2021-77099**

Shotaro Kikuchi - *Nagoya University*
 Seishiro Matsubara - *Nagoya University*
 So Nagashima - *Nagoya University*
 Dai Okumura - *Nagoya University*

1:35PM–1:45PM:**EFFECTS OF INITIAL IMPERFECTION AND MESH RESOLUTION ON FINITE ELEMENT ANALYSIS OF CREASE INITIATION AND PROPAGATION****Technical Presentation: IMECE2021-77101**

Ryogo Hoshi - *Nagoya University*
 Seishiro Matsubara - *Nagoya University*
 So Nagashima - *Nagoya-University*
 Dai Okumura - *Nagoya University*

1:45PM–1:55PM:**EVOLUTION OF PHASE TRANSFORMATION INDUCED STRAIN IN NITI TUBES UNDER ISOBARIC THERMAL CYCLING****Technical Presentation: IMECE2021-77142**

Solon Tsimpoukis - *University of Texas at Austin*
 Stelios Kyriakides - *University of Texas*

13-02-01:**COMPUTATIONAL STUDIES AND ADVANCED MANUFACTURING FOR MEMS AND NANOSTRUCTURES
NOVEMBER 2, 2021****12:55PM–2:25PM**

Chair: Namwon Kim - *Texas State University*
 Chair: Grzegorz (Greg) Hader - *U.S. Army CCDC - Armaments Center*

12:55PM–1:05PM:**RAPID PROTOTYPING OF SELF-EXPANDING NITINOL FRAMES WITH A SMALL-FORM FACTOR USING SACRIFICIAL HYPOTUBES IN THE SHAPE SETTING PROCESS**

Technical Presentation: IMECE2021-69558Seyedhamidreza Alaie - *New Mexico State University***1:05PM–1:15PM:****THERMAL CYCLE RELIABILITY ANALYSIS OF DIRECT BONDING COPPER POWER MODULE CONSIDERING THE MANUFACTURING PROCESS EFFECT****Technical Presentation: IMECE2021-70164**

Ji-Yuan Syu - *National Tsing Hua University*
 Chi-Wei Wang - *National Tsing Hua University*
 Kuo-Shu Kao - *National Tsing Hua University*
 Sheng-Tsai Wu - *Industrial Technology Research Institute*
 Tai-Kuang Lee - *Industrial Technology Research Institute*
 Han-Lin Wu - *Industrial Technology Research Institute*
 Tzu-Hsuan Ni - *Industrial Technology Research Institute*
 Chun-Hua Tseng - *Industrial Technology Research Institute*
 Tai-Jyun Yu - *Industrial Technology Research Institute*
 Chang-Chun Lee - *National Tsing Hua University*

1:15PM–1:25PM:**EFFECT OF TENSILE STRAIN ON ELECTRON TRANSPORT PROPERTIES OF DUMBBELL-SHAPE GRAPHENE NANORIBBONS WITH METALLIC-SEMICONDUCTING INTERFACES****Technical Paper Publication: IMECE2021-70930**

Ken Suzuki - *Tohoku University*
 Qinqiang Zhang - *Tohoku University*
 Xiangyu Qiao - *Tohoku University*

1:25PM–1:35PM:**FABRICATION OF POLYMERIC ARRAYS OF FILM-LIKE MICROCAVITIES WITH A SMALL FORM FACTOR SUITABLE FOR MINIMALLY INVASIVE IMPLANTS****Technical Presentation: IMECE2021-69559**Seyedhamidreza Alaie - *New Mexico State University***1:35PM–1:45PM:****THE NOVEL POWER MODULE WITH INSULATED METAL SUBSTRATE FOR POWER CYCLING FINITE ELEMENT ANALYSIS AND RELIABILITY EVALUATION****Technical Presentation: IMECE2021-70270**

Chi-Wei Wang - *National Tsing Hua University*
 Yuan-Cheng Huang - *National Tsing Hua University*
 Kuo-Shu Kao - *National Tsing Hua University*
 Sheng-Tsai Wu - *National Tsing Hua University*
 Tai-Kuang Lee - *National Tsing Hua University*
 Han-Lin Wu - *National Tsing Hua University*
 Tzu-Hsuan Ni - *National Tsing Hua University*
 Chun-Hua Tseng - *National Tsing Hua University*
 Tai-Jyun Yu - *National Tsing Hua University*
 Chang-Chun Lee - *National Tsing Hua University*

1:45PM–1:55PM:**EFFECT OF MANUFACTURING PROCESS TOLERANCES ON MEMS VIBRATORY SENSOR DYNAMICS****Technical Paper Publication: IMECE2021-72853**

Nabeel Khan - *University of Windsor*
 Anurag Agarwal - *University of Windsor*
 Tyler Harrison - *Teledyne Micralyne, Inc.*
 Dean Spicer - *Teledyne Micralyne, Inc.*
 Mohammed Jalal Ahamed - *University of Windsor*

14-04-02:**RELIABILITY AND SAFETY IN TRANSPORTATION SYSTEMS****NOVEMBER 2, 2021**

12:55PM–2:25PM**12:55PM–1:05PM:****DEVELOPMENT OF ALGORITHMS FOR IMPROVING FIBER-OPTICAL RAIL CIRCUIT ON RAILWAY SPANS****Technical Paper Publication: IMECE2021-67732**Nikoloz Mgebrishvili - *Georgian Technical University*Maksim Iavich - *Georgian Technical University*Tengiz Tabidze - *Georgian Technical University*Amiran Nodia - *Georgian Technical University***1:05PM–1:15PM:****STUDY OF CARBODY STRUCTURE DESIGN UNDER DIFFERENT STANDARDS****Technical Paper Publication: IMECE2021-67822**Jianran Wang - *CRRC MA Corporation*Xiaofang Liu - *CRRC MA Corporation*Haifeng Zhang - *CRRC MA Corporation*Qi Luo - *CRRC Changchun Railway Vehicle Co., Ltd.*Shihong Jiang - *CRRC Changchun Railway Vehicle Co., Ltd.*Haifeng Hong - *CRRC Changchun Railway Vehicle Co., Ltd.***1:15PM–1:25PM:****AN IMPERFECT USAGE-BASED PREVENTIVE MAINTENANCE PLANNING MODEL FOR RAILWAY TRACK SUPERSTRUCTURES****Technical Paper Publication: IMECE2021-72955**Fateme Dinmohammadi - *University College London*Mahmood Shafiee - *University of Kent*Enrico Zio - *Mines ParisTech***1:25PM–1:35PM:****CONNECTEDNESS EFFICIENCY FOR TOPOLOGICAL ANALYSIS OF AGGREGATED RAILROAD NETWORKS: FAILURE IMPACTS AND ROBUSTNESS****Technical Presentation: IMECE2021-76944**Bilal M. Ayyub - *Center for Technology and Systems Management*Majed Hamed - *Center for Technology and Systems Management*Yujie Mao - *Center for Technology and Systems Management*Magdy Elsibaie - *Center for Technology and Systems Management*Tarek Omar - *Office of Research and Development, Federal Railroad Administration***1:35PM–1:45PM:****MULTI-LAYER RAIL NETWORK TOPOLOGY: UNDERSTANDING RESILIENCE THROUGH NETWORK FRACTAL PROPERTIES****Technical Presentation: IMECE2021-76953**Donald Dzedzy - *University of Maryland*Bilal Ayyub - *University of Maryland*Magdy Elsibaie - *University of Maryland*Tarek Omar - *Office of Research and Development, Federal Railroad Administration***11-06-05:****HEAT AND MASS TRANSFER IN HEATING, COOLING, AND POWER SYSTEMS - HEAT EXCHANGERS AND THERMAL MANAGEMENT****NOVEMBER 2, 2021****12:55PM–2:25PM**Chair: Subramanyaravi Annapragada - *United Technologies Research*Chair: Kevin Dowding - *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***12:55PM–1:05PM:****EXPERIMENTAL AND CFD ANALYSIS OF A HELICAL COILED HEAT EXCHANGER USING VARIOUS FLUIDS**

Technical Paper Publication: IMECE2021-70163

Shariqa Saiyara - *Military Institute of Science and Technology*
 Nayeem Hossain - *Military Institute of Science and Technology*
 Farzana Ahsan - *Military Institute of Science and Technology*
 Najmus Saquib Sifat - *Military Institute of Science and Technology*

1:05PM–1:15PM:**HEAT TRANSFER ENHANCEMENT OF COUNTER FLOW HEAT EXCHANGER WITH PIN FINS****Technical Paper Publication: IMECE2021-71615**

Mohammed Molham Ibrahim Daadoua - *United Arab Emirates University*
 Fadi Alnaimat - *United Arab Emirates University*
 Mohammed Ziauddin - *United Arab Emirates University*

1:15PM–1:25PM:**DESIGN AND TEST OF THERMAL INSULATION PERFORMANCE OF RAIL VEHICLES****Technical Paper Publication: IMECE2021-71923**

Jianran Wang - *CRRC MA*
 Yanhua Cao - *CRRC MA Corporation*
 Lei Wang - *CRRC Changchun Railway Vehicles Co., Ltd.*
 Na Jia - *CRRC MA Corporation*

1:25PM–1:35PM:**MULTI-PHYSICAL COUPLED SIMULATION ON FUEL COOLING SHELL OF ELECTRIC FUEL PUMP****Technical Paper Publication: IMECE2021-73190**

Qingtao Yan - *Nanjing University of Aeronautics and Astronautics*
 Bin Wang - *Nanjing University of Aeronautics and Astronautics*
 Zhifeng Ye - *Nanjing University of Aeronautics and Astronautics*

1:35PM–1:45PM:**A PRACTICAL APPROACH FOR DETERMINING MINIMUM DESIGN METAL TEMPERATURE (MDMT) OF TRANSMISSION GAS PIPELINES****Technical Paper Publication: IMECE2021-73117**

Ehsan Ebrahimnia Bajestan - *University of British Columbia*
 Saad Bassam - *FortisBC Energy, Inc.*
 Mohammad Arjmand - *University of British Columbia*

02-09-03:**COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING-III NOVEMBER 2, 2021****3:25PM–4:55PM**

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

3:25PM–3:35PM:**NUMERICAL STUDY OF THE PERCUSSIVE RIVETING PROCESS: ANALYSIS VALIDATION****Technical Paper Publication: IMECE2021-71800**

Sai C. Krowvidi - *University of Washington*
 M. Ramulu - *University of Washington*
 Per G. Reinhall - *University of Washington*

3:35PM–3:45PM:**MOLECULAR DYNAMIC SIMULATION OF DIFFUSION IN THE MELT POOL IN LASER ADDITIVE ALLOYING PROCESS OF CO-NI-CR-MN-FE HIGH ENTROPY ALLOY****Technical Paper Publication: IMECE2021-72075**

Mathew Farias - *University of Texas Rio Grande Valley*
 Han Hu - *University of Arkansas*
 Shanshan Zhang - *University of Texas Rio Grande Valley*



Jianzhi Li - *University of Texas Rio Grande Valley*
Ben Xu - *Mississippi State University*

3:45PM–3:55PM:

PROCESS PREDICTION FOR REPAIR OF HIGH-SPEED TRAIN WHEELSEAT AXLE BY EXTREME HIGH-SPEED LASER MATERIAL DEPOSITION (EHLA)

Technical Paper Publication: IMECE2021-72272

Tianci Li - *Beijing Jiaotong University*
Lele Zhang - *Beijing Jiaotong University*
Geng Chen - *Beijing Jiaotong University*
Thomas Schopphoven - *Fraunhofer Institute for Laser Technology*
Andres Gasser - *Fraunhofer Institute for Laser Technology*
Reinhart Poprawe - *Fraunhofer Institute for Laser Technology*

3:55PM–4:05PM:

NUMERICAL INVESTIGATION INTO THE CUTTING FORCES, CHIP FORMATION MECHANISM, AND BURR FORMATION DURING SLOT MILLING OF LAMINATED CFRP COMPOSITES

Technical Paper Publication: IMECE2021-73310

Md. Mahmudul Hassan - *Miami University*
Jeff Ma - *Saint Louis University*
M.P. Jahan - *Miami University*

4:05PM–4:15PM:

NUMERICAL SIMULATION OF SOLDER PASTE PRINTING ON THROUGH-HOLE COMPONENTS

Technical Paper Publication: IMECE2021-73613

Duarte Mateus - *University of Minho*
Senhorinha Teixeira - *University of Minho*
Nelson Rodrigues - *University of Minho*
Violeta Carvalho - *University of Minho*
Duarte Santos - *Bosch Car Multimédia*
Joao Veloso - *Bosch Car Multimédia*
Delfim Soares - *University of Minho*
Jose Teixeira - *University of Minho*

4:15PM–4:25PM:

ASSESSMENT OF INTERLAMINAR STRESS COMPONENTS IN LAMINATED COMPOSITES MANUFACTURED BY PLY-DROP TECHNIQUE

Technical Paper Publication: IMECE2021-73618

Sandeep Suresh Babu - *Indian Institute of Technology Bombay*
Abdel-Hamid I. Mourad - *United Arab Emirates University*

07-13-01:

OPTIMIZATION, UNCERTAINTY AND PROBABILITY I NOVEMBER 2, 2021

3:25PM–4:55PM

Chair: Dumitru Caruntu - *The University of Texas Rio Grande Valley*

Chair: Bogdan Epureanu - *University of Michigan*

Chair: Marco Amabili - *McGill University*

3:25PM–3:35PM:

A SENSITIVITY-BASED APPROACH FOR INTERVAL RELIABILITY ANALYSIS OF STRUCTURES UNDER RANDOM EXCITATION

Technical Paper Publication: IMECE2021-71092

Filippo Giunta - *University of Messina*
Giuseppe Muscolino - *University of Messina*
Alba Sofi - *University "Mediterranea" of Reggio Calabria*

3:35PM–3:45PM:

MULTIPHYSICS MODELING OF A FAULTY ROD-END AND ITS INTERACTION WITH A FLIGHT CONTROL ACTUATOR TO SUPPORT PHM ACTIVITIES



Technical Paper Publication: IMECE2021-71095

Alberto Bacci - *Politecnico di Torino*
 Antonio C. Bertolino - *Politecnico di Torino*
 Andrea De Martin - *Politecnico di Torino*
 Massimo Sorli - *Politecnico di Torino*

3:45PM–3:55PM:

**BOUNDS OF RELIABILITY FUNCTION FOR
 STRUCTURAL SYSTEMS SUBJECTED TO IMPRECISE
 SEISMIC ACTIONS**

Technical Paper Publication: IMECE2021-73231

Federica Genovese - *University of Messina*
 Giuseppe Muscolino - *University of Messina*
 Alba Sofi - *University "Mediterranea" of Reggio Calabria*

3:55PM–4:05PM:

**Structural Reliability Estimation of Steel Hall
 Exhibiting Random Mechanical Parameters**
Technical Paper Publication: IMECE2021-73306

Rafał Bredow - *Łódź University of Technology*
 Marcin Kamiński - *Łódź University of Technology*

4:05PM–4:15PM:

**STOCHASTIC DYNAMICS OF ROTATING WIND
 TURBINE BLADES INFLUENCED BY
 TURBULENCE AND AEROELASTIC UNCERTAINTIES:
 RECENT DEVELOPMENTS**

Technical Paper Publication: IMECE2021-73362

Luca Caracoglia - *Northeastern University*

4:15PM–4:25PM:

**MULTI-OBJECTIVE DESIGN OPTIMIZATION OF A
 PASSENGER QUARTER CAR WITH GRADIENT-BASED
 AND GRADIENT-FREE ALGORITHMS**

Technical Presentation: IMECE2021-77207

Varsha S. Swamy - *Virginia Tech*
 Yashasvi Achanta - *Virginia Tech*
 Pinar Acar - *Virginia Tech*

07-11-02:

**MOBILE ROBOTS AND UNMANNED GROUND
 VEHICLES II
 NOVEMBER 2, 2021**

3:25PM–4:55PM

Chair: Dumitru Caruntu - *The University of Texas
 Rio Grande Valley*

Chair: Bogdan Epureanu - *University of Michigan*

Chair: Marco Amabili - *McGill University*

3:25PM–3:35PM:

**RADAR MODELING FOR AUTONOMOUS VEHICLE
 SIMULATION ENVIRONMENT WITH OPEN-
 SOURCE UTILITIES**



Technical Paper Publication: IMECE2021-72055

Sohel Anwar - *Indiana University Purdue University Indianapolis*

Tayabali Akhtar Kesury - *Indiana University
Purdue University Indianapolis*

Chris Orlin Cardoza - *Indiana University Purdue
University Indianapolis*

3:35PM–3:45PM:**FUNDAMENTAL SCAN MATCHING APPROACH TO
LIDAR BASED LOCALIZATION****Technical Paper Publication: IMECE2021-72022**

Joel Larson - *Washington State University*

Emily Carter - *Washington State University*

Changki Mo - *Washington State University*

Scott Hudson - *Washington State University*

3:45PM–3:55PM:**RELATIVE POSE ESTIMATION FOR COOPERATIVE
VEHICLES AND TRACKING OF MULTIPLE
DYNAMIC OBJECTS****Technical Paper Publication: IMECE2021-69651**

Prasenjit Ghorai - *Virginia Tech*

Azim Eskandarian - *Virginia Tech*

Anshul Nayak - *Virginia Tech*

Zachary Doerzaph - *Virginia Tech Transportation Institute*

3:55PM–4:05PM:**HUMANOID LOCO-MANIPULATION OF PUSHED
CARTS UTILIZING VIRTUAL REALITY
TELEOPERATION****Technical Paper Publication: IMECE2021-71579**

Jean Chagas Vaz - *University of Nevada*

Dylan Wallace - *University of Michigan*

Paul Y. Oh - *University of Nevada*

4:05PM–4:15PM:**VISION BASED OBSTACLE DETECTION AND
NAVIGATION OF AN AUTONOMOUS VEHICLE****Technical Paper Publication: IMECE2021-69621**

Vidya K. Nandikolla - *California State University*

Keven Ferman - *California State University*

Eddie Barragan - *California State University*

Stefany Fuentes Melgar - *California State University*

Hector Perez - *California State University*

4:15PM–4:25PM:**DEVELOPMENT AND CALIBRATION OF A LOW-COST
MACHINE VISION PIPELINE FOR CONNECTED AND
AUTONOMOUS VEHICLE (CAV) RESEARCH****Technical Paper Publication: IMECE2021-70836**

Goodarz Mehr - *Virginia Tech*

Azim Eskandarian - *Virginia Tech*

07-14-01:**MEASUREMENT AND ANALYSIS TECHNIQUES IN
NONLINEAR DYNAMIC SYSTEMS I
NOVEMBER 2, 2021****3:25PM–4:55PM**

Chair: Dumitru Caruntu - *The University of Texas
Rio Grande Valley*

Chair: Bogdan Epureanu - *University of Michigan*

Chair: Marco Amabili - *McGill University*

3:25PM–3:35PM:**NONLINEAR DYNAMICS INVESTIGATION OF
BENDING DEFLECTION OF STIFFENED COMPOSITE
LAMINATED PLATE USING LYAPUNOV
EXPONENT CONCEPTION**

Technical Paper Publication: IMECE2021-67448*Louay S. Yousuf - San Diego State University***3:35PM–3:45PM:****NONLINEAR DYNAMICS SIMULATION IN CONTACT FORCE IN CAM-FOLLOWER SYSTEM USING LYAPUNOV EXPONENT PARAMETER****Technical Paper Publication: IMECE2021-68778***Louay S. Yousuf - San Diego State University***3:45PM–3:55PM:****APPROACH FOR MODELLING THE DYNAMIC TRANSMISSION BEHAVIOR OF GRINDING DISCS USING TRANSFER FUNCTIONS****Technical Paper Publication: IMECE2021-69393***Matthias Dörr - Karlsruhe Institute of Technology**Alexander Dürkopp - Forschungsgemeinschaft Werkzeuge und Werkstoffe e. V.**Sebastian Zimprich - Karlsruhe Institute of Technology**Thomas Gwosch - Karlsruhe Institute of Technology**Hans-Jürgen Gittel - Forschungsgemeinschaft Werkzeuge und Werkstoffe e. V.**Christian Pelshenke - Forschungsgemeinschaft Werkzeuge und Werkstoffe e. V.**Peter Dültgen - Forschungsgemeinschaft Werkzeuge und Werkstoffe e. V.**Sven Matthiesen - Karlsruhe Institute of Technology***3:55PM–4:05PM:****USE OF LIDAR FOR NEGATIVE OBSTACLE DETECTION: A THOROUGH REVIEW****Technical Paper Publication: IMECE2021-70747***Luis Daniel Guerrero-Bañales - Universidad Nacional Autónoma de México**Ignacio Hernandez-Bautista - Cátedra CONACYT**Marcelo López-Parra - Universidad Nacional Autónoma de México**Osiris Ricardo-Torres - Universidad Nacional Autónoma de México***4:05PM–4:15PM:****NONLINEAR DYNAMICS OF A TWO-CAM SYSTEM****Technical Paper Publication: IMECE2021-70902***Louay S. Yousuf Al Roomi - San Diego State University**Dan B. Marghitu - Auburn University***4:15PM–4:25PM:****DETERMINANT SEARCH METHOD FOR THE LARGE STRUCTURAL SYSTEMS WITH SMALL BANDWIDTH****Technical Paper Publication: IMECE2021-71761***Abu Seena - SST Systems, Inc.***08-08-01:****RENEWABLE ENERGY I
NOVEMBER 2, 2021****3:25PM–4:55PM****3:25PM–3:35PM:****DESIGN, FABRICATION AND TESTING OF A NOVEL WAVE ENERGY CONVERTER****Technical Paper Publication: IMECE2021-66597***Sumesh Narayan - University of the South Pacific**Ashneel Deo - University of the South Pacific**Anilesh Raj - University of the South Pacific**Shaniel Kumar - University of the South Pacific**Ronesh Pratap - University of the South Pacific***3:35PM–3:45PM:****INFLUENCE OF GEOMETRIC PARAMETERS ON THE PERFORMANCE OF SAVONIUS WIND TURBINE USING THE RESPONSE SURFACE METHODOLOGY**

Technical Paper Publication: IMECE2021-67485

Sebastian Torres - *Escuela Colombiana de Ingeniería Julio Garavito*

Agustin Marulanda - *Escuela Colombiana de Ingeniería Julio Garavito*

Miguel Montoya - *Escuela Colombiana de Ingeniería Julio Garavito*

Camilo Hernández - *Escuela Colombiana de Ingeniería Julio Garavito*

3:45PM–3:55PM:**ESTIMATES OF AREA, OUTPUT AND LEVELIZED ENERGY COST OF WIND ENERGY SCHEMES IN SAUDI ARABIA****Technical Paper Publication: IMECE2021-68223**

Mohannad Abdulghani - *King Saud University*
Abdullah Alabdulkarem - *King Saud University*

3:55PM–4:05PM:**AN ATOMIC-SCALE INVESTIGATION OF THE TEMPERATURE INFLUENCE ON THE REACTIVITY OF ALKALINE WATER ELECTROLYSIS ON AN OPTIMIZED NICKEL-IRON CATALYST SURFACE FOR THE HYDROGEN GENERATION****Technical Paper Publication: IMECE2021-68795**

Sunday Temitope Oyinbo - *University of Johannesburg*
Tien-Chien Jen - *University of Johannesburg*
Patrick Ehi Imoisili - *University of Johannesburg*
Peter Ozaveshe Oviroh - *University of Johannesburg*

4:05PM–4:15PM:**A MATHEMATICAL MODEL TO PREDICT ALKALINE ELECTROLYZER PERFORMANCE BASED ON BASIC PHYSICAL PRINCIPLES AND PREVIOUS MODELS REPORTED IN LITERATURE****Technical Paper Publication: IMECE2021-68815**

Antonios Antoniou - *Pontificia Universidad Católica del Perú*
Cesar Celis - *Pontificia Universidad Católica del Perú*
Arturo Berastain - *Pontificia Universidad Católica del Perú*

4:15PM–4:25PM:**SOLAR DISTILLATION SYSTEMS ENRICHED WITH MACHINE LEARNING TECHNIQUES: A REVIEW****Technical Paper Publication: IMECE2021-71174**

Y.S. Prasanna - *Birla Institute of Technology and Science, Pilani*
Sandip S. Deshmukh - *Birla Institute of Technology and Science, Pilani*

09-11-01: ENGINEERING RESEARCH INNOVATION I NOVEMBER 2, 2021**3:25PM–4:55PM**

Chair: Subha Kumpaty - *Milwaukee School of Engineering*

Chair: Salim Azzouz - *Midwestern State University*

Chair: Anabela Alves - *University of Minho*

3:25PM–3:35PM:**ALIGNING RESEARCH OBJECTIVES WITH STUDENT LEARNING OUTCOMES AND SUSTAINABILITY OBJECTIVES IN STUDENT ENGINEERING DEVELOPMENT PROJECT****Technical Paper Publication: IMECE2021-67913**

Mohammad Al-Rawi - *Waikato Institute of Technology*
Praneel Chand - *Waikato Institute of Technology*
Jai Khanna - *Waikato Institute of Technology*

3:35PM–3:45PM:**STRATEGIES FOR THE IMPROVEMENT OF RESEARCH COMPETENCES IN THE PROFESSIONAL TRAINING OF ENGINEERS****Technical Paper Publication: IMECE2021-69400**

Carlos R. Vidal - *Popular University of Cesar*
Yimy Gordon - *Popular University of Cesar*
Deibys Barreto - *Technological University of Bolívar*
Juan Fajardo - *Technological University of Bolívar*
Pedro Fragoso - *Popular University of Cesar*



3:45PM–3:55PM:**UNDERGRADUATE RESEARCH WITH
ENTREPRENEURIAL APPROACH: CREATING NEW
INSULATION MATERIALS USING BIOMASS FIBERS****Technical Paper Publication: IMECE2021-70718**Birce Dikici - *Embry-Riddle Aeronautical University***3:55PM–4:05 PM****VIRUS DETECTION AND MEDICAL DIAGNOSTICS
STUDENT PROJECTS FOR THE INTERNET OF
MEDICAL THINGS****Technical Paper Publication: IMECE2021-73428**Yunshun (Richard) Chiou - *Drexel University*Michael G. Mauk - *Drexel University*Tzu-Liang (Bill) Tseng - *The University of Texas at El Paso***4:05PM–4:15PM:****I9MASKS: FROM A MULTIDISCIPLINARY SUMMER
PROJECT TO A NON-ACCREDITED SHORT COURSE:
FROM A MULTIDISCIPLINARY SUMMER PROJECT TO
A NON-ACCREDITED SHORT COURSE****Technical Paper Publication: IMECE2021-73495**Violeta Carvalho - *University of Minho*Cristina Rodrigues - *University of Minho*Graça Minas - *University of Minho*Rui Lima - *University of Minho*José C. Teixeira - *University of Minho*Senhorinha Teixeira - *University of Minho***4:15PM–4:25PM:****A FRAMEWORK FOR THE RESEARCH-BASED
LEARNING OF DESIGN, SIMULATION, ADDITIVE
MANUFACTURING AND EXPERIMENTATION:****MODELING AND TESTING OF SCALED 3D
PRINTED PARTS****Technical Presentation: IMECE2021-77547**Asheesh Lanba - *University of Southern Maine*Bradley Rushford - *University of Southern Maine***10-04-02: CFD APPLICATIONS - II
NOVEMBER 2, 2021****3:25PM–4:55PM**Chair: Philipp Epple - *Coburg University of Applied Sciences*Chair: Kamran Siddiqui - *University of Western Ontario***3:25PM–3:35PM:****EFFECTS OF GEOMETRICAL CONFIGURATION ON
THE AERODYNAMIC PERFORMANCE OF THE
JOINED WINGS****Technical Paper Publication: IMECE2021-72087**M.D. Alam - *Florida International University*Soheil Soeimanikutanaei - *Florida International University***3:35PM–3:45PM:****AERODYNAMIC PERFORMANCE ANALYSIS OF
WINGLETS OF MODERN SAILPLANES****Technical Paper Publication: IMECE2021-69672**Jens Kaestner - *Coburg University of Applied Sciences*Philipp Epple - *Coburg University of Applied Sciences*Michael Steppert - *Coburg University of Applied Sciences***3:45PM–3:55PM:****COMPUTATIONAL FLUID DYNAMICS MODELING
AND EXPERIMENTAL TESTING OF HYDRAULIC
SPOOL VALVES**

Technical Paper Publication: IMECE2021-72697

Kyle Janosky - *Parker Hannifin*
 Maryam Younessi - *Cleveland State University*
 Bipin Kashid - *Parker Hannifin*

3:55PM–4:05PM:

EFFECTS OF HVAC SETTINGS AND WINDOWS OPEN OR CLOSE ON THE SARS-COV-2 VIRUS TRANSMISSION INSIDE A MASS TRANSIT SYSTEM BUS

Technical Paper Publication: IMECE2021-71701

Muhammad Usman Zafar - *University of North Carolina at Charlotte*
 Vincent Lee - *University of North Carolina at Charlotte*
 Will Timms - *University of North Carolina at Charlotte*
 Patrick Bounds - *University of North Carolina at Charlotte*
 Mesbah Uddin - *University of North Carolina at Charlotte*

4:05PM–4:15PM:

NUMERICAL SIMULATION OF THE FLOW INSIDE A HORIZONTAL CLOSED REFRIGERATED DISPLAY CABINET

Technical Paper Publication: IMECE2021-73589

João Silva - *University of Minho*
 Vitor Guedes - *University of Minho*
 Senhorinha Teixeira - *University of Minho*
 Pedro Lobarinhas - *University of Minho*
 José Teixeira - *University of Minho*
 Nelson Rodrigues - *University of Minho*

4:15PM–4:25PM:

VENTILATION CFD ANALYSIS AT A CLASSROOM AS A TOOL FOR AIR SAFETY VERIFICATION UNDER COVID19 CONTEXT: A CASE STUDY

Technical Paper Publication: IMECE2021-73785

Patrik Kehler - *Universidad Nacional de Asunción*
 Jorge H. Kurita - *Universidad Nacional de Asunción*
 Hugo Enrique Centurión Arias - *Universidad Nacional de Asunción*
 Carlos Chaves - *Universidad Nacional de Asunción*
 Logan Lopes - *Universidad Nacional de Asunción*
 Alejandro Escobar - *Universidad Nacional de Asunción*
 Nicolas Ferreira - *Universidad del Cono Sur de las Americas*
 Abdías García - *Universidad Nacional de Asunción*

11-07-01:

**MEASUREMENTS OF THERMOPHYSICAL PROPERTIES
 NOVEMBER 2, 2021**

3:25PM–4:55PM

Chair: Subramanyaravi Annapragada - *United Technologies Research*
 Chair: Kevin Dowding – *Sandia National Laboratories*
 Chair: Alexander Rattner - *Penn State University*

3:25PM–3:35PM:

HIGH TEMPERATURE LVDT DESIGN AND MODELING

Technical Paper Publication: IMECE2021-72946

Yuan Gao - *University of Pittsburgh*
 Heng Ban - *University of Pittsburgh*
 Austin Fleming - *Idaho National Laboratory*

3:35PM–3:45PM:

DIRECT MEASUREMENT OF THERMAL BOUNDARY RESISTANCE REDUCTION DUE TO ELECTRON CARRIERS BY PHOTOTHERMAL RADIOMETRY

Technical Paper Publication: IMECE2021-73000

Ezekiel Villarreal - *University of Pittsburgh*
 Nicolas Horny - *Université de Reims Champagne-Ardenne*
 Heng Ban - *University of Pittsburgh*



3:45PM–3:55PM:**INFRARED RADIOMETRY BASED STEADY-STATE METHOD FOR THERMAL CONDUCTIVITY MEASUREMENT****Technical Paper Publication: IMECE2021-73381**Dihui Wang - *University of Pittsburgh*Heng Ban - *University of Pittsburgh***3:55PM–4:05PM:****THERMAL CONDUCTIVITY MEASUREMENT OF FLOWING GRANULAR MEDIA USING MODULATED PHOTOTHERMAL RADIOMETRY****Technical Presentation: IMECE2021-76979**Jian Zeng - *University of California, San Diego*Ka Man Chung - *University of California, San Diego*Xintong Zhang - *University of California, San Diego*Sarath Reddy Adapa - *University of California, San Diego*Renkun Chen - *University of California, San Diego***4:05PM–4:15PM:****THERMAL CONDUCTIVITY MEASUREMENT OF STATIONARY AND FLOWING MOLTEN SALT USING MODULATED PHOTOTHERMAL RADIOMETRY****Technical Presentation: IMECE2021-77237**Ka Man Chung - *University of California San Diego*Jian Zeng - *University of California, San Diego*Tianshi Feng - *University of California, San Diego*Renkun Chen - *University of California, San Diego***4:15PM–4:25PM:****USING A MODIFIED FREQUENCY DOMAIN METHOD COUPLED TO A PHYSICS BASED MODEL WITH NON-UNIFORM HEAT GENERATION TO EVALUATE THE ENTROPY OF REACTION IN A LI[NIXCOYMNZ] O₂/GRAPHITE LITHIUM ION BATTERY****Technical Paper Publication: IMECE2021-71488**Jonathan Hammond - *Washington State University*Chase McCreary - *Washington State University*Armin Abbasalinejad - *Washington State University*Sun Ung Kim - *Washington State University***11-08-05: FUNDAMENTALS OF RADIATIVE TRANSPORT AND CONDUCTION INCLUDING MICRO/NANOSCALE EFFECTS
NOVEMBER 2, 2021****3:25PM–4:55PM**Chair: Subramanyaravi Annapragada - *United Technologies Research*Chair: Kevin Dowding – *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***3:25PM–3:35PM:****VIOLATION OF KIRCHHOFF'S LAW FOR THERMAL RADIATION USING TIME-DEPENDENT PERMITTIVITY MODULATION IN A GUIDED-MODE RESONANCE STRUCTURE****Technical Presentation: IMECE2021-76199**Alok Ghanekar - *University of Southern California*Jiahui Wang - *Stanford University*Shanhui Fan - *Stanford University*Michelle Povinelli - *University of Southern California*

3:35PM–3:45PM:**SHOCKLEY-QUEISSER ANALYSIS OF THE TEMPERATURE-EFFICIENCY CORRELATION OF SOLAR CELLS IN THE PRESENCE OF NON-RADIATIVE HEAT TRANSFER****Technical Presentation: IMECE2021-77234**

Zheng Zhang - *Southeast University*
 Kaifeng Chen - *Stanford University*
 Shanhui Fan - *Stanford University*
 Zhen Chen - *Southeast University*

3:45PM–3:55PM:**A NEAR-FIELD PHOTONIC THERMAL DIODE WITH HIGH PERFORMANCE****Technical Presentation: IMECE2021-77337**

Dudong Feng - *Georgia Institute of Technology*
 Shannon Yee - *Georgia Institute of Technology*
 Zhuomin Zhang - *Georgia Institute of Technology*

3:55PM–4:05PM:**DYNAMIC CONTROL OF EMISSIVITY IN GUIDED MODE RESONANCE GRATING THROUGH INDEX PERTURBATION****Technical Presentation: IMECE2021-77530**

Alok Ghanekar - *University of Southern California*
 Michelle Povinelli - *University of Southern California*

4:05PM–4:15PM:**THERMAL CONDUCTIVITY AND LORENZ RATIO OF METALS WITH MODE-LEVEL FIRST-PRINCIPLES ANALYSIS****Technical Presentation: IMECE2021-76594**

Hua Bao - *Shanghai Jiao Tong University*
 Shouhang Li - *Shanghai Jiao Tong University*

4:15PM–4:25PM:**EFFICIENCY IMPROVEMENT IN SOLVING NON-GRAY PHONON BOLTZMANN TRANSPORT EQUATION****Technical Presentation: IMECE2021-76861**

Hua Bao - *Shanghai Jiao Tong University*
 Yue Hu - *Shanghai Jiao Tong University*

12-05-02:**SYMPOSIUM ON MODELING OF THE FRACTURE, FAILURE AND FATIGUE IN SOLIDS NOVEMBER 2, 2021****3:25PM–4:55PM**

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

3:25PM–3:35PM:**A MIXED-MODE ANALYSIS OF TWO PARALLEL NON-ALIGNED CRACKS IN A LARGE FLAT PLATE SUBJECTED TO REMOTE TENSION****Technical Paper Publication: IMECE2021-71978**

Mordechai Perl - *Ben Gurion University of the Negev*
 Cesar Levy - *Florida International University*
 Qin Ma - *Walla Walla University*

3:35PM–3:45PM:**NONLINEAR FINITE ELEMENT MODELING AND EXPERIMENTAL VALIDATION OF ADVANCED HIGH FATIGUE STRENGTH THREADED CONNECTIONS FOR SUCKER ROD PUMPING APPLICATIONS**

Technical Paper Publication: IMECE2021-72196

Fei Song - Schlumberger

Ke Li - Schlumberger

3:45PM–3:55PM:**A NONLINEAR FINITE ELEMENT-BASED SUPERVISED MACHINE LEARNING APPROACH FOR EFFICIENTLY PREDICTING COLLAPSE RESISTANCE OF WIRELINE TOOL HOUSINGS SUBJECTED TO COMBINED LOADS****Technical Paper Publication: IMECE2021-72222**

Fei Song - Schlumberger

Kevin Shi - Schlumberger

Ke Li - Schlumberger

3:55PM–4:05PM:**STRENGTH ASSESSMENT OF LIFTING AND MOUNTING HOLES IN ROLLING ELEMENT BEARINGS UNDER STATIC AND DYNAMIC LOADING CONDITIONS****Technical Presentation: IMECE2021-73065**

Matt Wilmer - The Timken Company

Nikhil Londhe - The Timken Company

Brian Ray - The Timken Company

Doug Lucas - The Timken Company

4:05PM–4:15PM:**NUMERICAL MODELING OF PHASE TRANSFORMATION INDUCED MATERIAL FRACTURE AND CRACK PROPAGATION****Technical Presentation: IMECE2021-77339**

Sindhusuta - University of Illinois at Chicago

Sheng-Wei Chi - University of Illinois at Chicago

Craig Foster - University of Illinois at Chicago

4:15PM–4:25PM:**NECKING ANALYSIS AND UPPER BOUND CALCULATIONS FOR UNIFORM DUCTILITY IN GRADIENT MATERIALS****Technical Presentation: IMECE2021-71652**

Xue Wang - University of Tennessee

Teng Li - University of Maryland

Yanfei Gao - University of Tennessee

12-08-02:**INSTABILITIES IN SOLIDS AND STRUCTURES NOVEMBER 2, 2021****3:25PM–4:55PM**

Chair: Marco Amabili - McGill University

Chair: Celia Reina - University of Pennsylvania

3:25PM–3:35PM:**WRINKLING AND CREASING IN CONCERTINA FOLDS OF AXIALLY CRUSHED ALUMINUM TUBES****Technical Presentation: IMECE2021-77160**

Jake A. Haley - University of Texas at Austin

Stelios Kyriakides - University of Texas

3:35PM–3:45PM:**WRINKLING PATTERNS OF FILM-SUBSTRATE SYSTEMS: DIRECT THREE-DIMENSIONAL NUMERICAL SIMULATIONS USING EMBEDDED IMPERFECTIONS****Technical Presentation: IMECE2021-77169**

Siavash Nikravesh - University of New Mexico

Yu-Lin Shen - University of New Mexico



3:45PM–3:55PM:**SURVEYING THE ENERGY LANDSCAPES AND RECONFIGURATION PATHWAYS OF MULTISTABLE BUCKLED STRUCTURES****Technical Presentation: IMECE2021-77264**Yi Li - *University of Connecticut*Samuel Avis - *Durham University*Teng Zhang - *Syracuse University*Halim Kusumaatmaja - *Durham University*Xueju (Sophie) Wang - *University of Connecticut***3:55PM–4:05PM:****LIMIT LOAD INSTABILITIES IN ANISOTROPIC ALUMINUM ALLOY TUBES UNDER COMBINED TENSION AND TORSION****Technical Presentation: IMECE2021-77305**Kelin Chen - *The Ohio State University*Stelios Kyriakides - *University of Texas***4:05PM–4:15PM:****MODELING OF LOCALIZATION IN PSEUDOELASTIC NITI TUBES UNDER BIAXIAL STRESS STATES****Technical Presentation: IMECE2021-77333**Karlos Kazinakis - *University of Texas at Austin*Stelios Kyriakides - *University of Texas***4:15PM–4:25PM:****ENERGY-BASED FRACTURE MECHANICS OF 2D LATTICES****Technical Presentation: IMECE2021-77470**Shengzhi Luan - *Johns Hopkins University*Enze Chen - *Johns Hopkins University*Stavros Gaitanaros - *Johns Hopkins University***13-03-01:****MICROFLUIDICS AND MICRO/NANO SYSTEMS FOR BIOMEDICAL APPLICATIONS****NOVEMBER 2, 2021****3:25PM–4:55 PM**Chair: Namwon Kim - *Texas State University*Chair: Grzegorz (Greg) Hader - *U.S. Army CCDC - Armaments Center***3:25PM–3:35PM:****NUMERICAL MODELING OF A T-JUNCTION STATIC MICROMIXER WITH A PERIODIC POROUS ARCHITECTURE****Technical Paper Publication: IMECE2021-69136**Oraib Al-Ketan - *New York University*Jayaveera Muthusamy - *Texas A&M University*Agus Sasmito - *McGill University*Sébastien Poncet - *Université de Sherbrooke*Mahmoud Alzoubi - *University of Sherbrooke***3:35PM–3:45PM:****VALVE-ENABLED SAMPLE PREPARATION AND ISOTHERMAL AMPLIFICATION FOR SARS-COV-2 DETECTION AT THE POINT-OF-CARE****Technical Paper Publication: IMECE2021-69303**Carlos Manzanos - *University of Florida*Md. Mahbubul Alam - *University of Florida*Julia C. Loeb - *University of Florida*John A. Lednicky - *University of Florida*Chang-Yu Wu - *University of Florida*Z. Hugh Fan - *University of Florida*

3:45PM–3:55PM:**ASYMMETRIC FLOW OF NEMATIC LIQUID CRYSTAL UNDER HORIZONTAL TEMPERATURE GRADIENT IN RECTANGULAR MICROCHANNEL****Technical Presentation: IMECE2021-69889**Gu-Yuan Li - *Chongqing University*Hang-Wei Li - *Chongqing University*Xin-Yu Liu - *Chongqing University*Jia-Jia Yu - *Chongqing University***3:55PM–4:05PM:****IMPROVEMENT IN PHOTOSENSITIVITY OF DUMBBELL-SHAPED GRAPHENE NANORIBBON STRUCTURES BY USING ASYMMETRIC METALLIZATION TECHNIQUE****Technical Paper Publication: IMECE2021-69917**Jowesh Avisheik Goundar - *Tohoku University*Qiao Xiangyu - *Tohoku University*Ken Suzuki - *Tohoku University*Hideo Miura - *Tohoku University***4:05PM–4:15PM:****MODELING AND EXPERIMENTAL ANALYSIS OF PNEUMATICALLY CONTROLLABLE T-JUNCTION-BASED DROPLET GENERATION****Technical Presentation: IMECE2021-73753**Gnanesh Nagesh - *University of Windsor*David Ting - *University of Windsor*Mohammed Ahamed - *University of Windsor***4:15PM–4:25PM:****LEUKEMIA-ON-A-CHIP FOR MODELING AND DECODING CHEMOTHERAPY RESISTANCE****Technical Presentation: IMECE2021-77338**Chao Ma - *New York University*Weiqiang Chen - *New York University***14-07-01:****MACHINE LEARNING FOR SAFETY, RELIABILITY, AND MAINTENANCE
NOVEMBER 2, 2021****3:25PM–4:55PM****3:25PM–3:35PM:****DYNAMIC PLACEMENT OF RAPIDLY DEPLOYABLE MOBILE SENSOR ROBOTS USING MACHINE LEARNING AND EXPECTED VALUE OF INFORMATION****Technical Paper Publication: IMECE2021-70759**Alice Agogino - *University of California, Berkeley*Vivek Rao - *University of California, Berkeley*Ritik Batra - *University of California, Berkeley*Felicity Liao - *University of California, Berkeley*Rohan Sood - *University of California, Berkeley*Zichuan Fang - *University of California at Berkeley*Lily Hu - *Google Research*Hae Young Jang - *University of California, Berkeley*Emerson Shoichet-Bartus - *University of California, Berkeley*John Matranga - *AVENA***3:35PM–3:45PM:****AUTOMATED HARDENING OF DEEP NEURAL NETWORK ARCHITECTURES**

Technical Paper Publication: IMECE2021-72891

Michael Beyer - *Technische Universität Dresden*
 Christoph Schorn - *Robert Bosch, GmbH*
 Tagir Fabarisov - *University of Stuttgart*
 Andrey Morozov - *University of Stuttgart*
 Klaus Janschek - *Technische Universität Dresden*

3:45PM–3:55PM:

FAULT DIAGNOSIS WITH DEEP LEARNING FOR STANDARD AND ASYMMETRIC INVOLUTE SPUR GEARS

Technical Paper Publication: IMECE2021-73702

Fatih Karpat - *Bursa Uludag University*
 Ahmet Emir Dirik - *Bursa Uludag University*
 Onur Can Kalay - *Bursa Uludag University*
 Celalettin Yüce - *Bursa Technical University*
 Oğuz Doğan - *Kahramanmaraş Sutcu Imam University*
 Burak Korcuklu - *Bursa Uludag University*

3:55PM–4:05PM:

ANOMALY DETECTION FOR CYBER-PHYSICAL SYSTEMS USING TRANSFORMERS

Technical Paper Publication: IMECE2021-69395

Yuliang Ma - *University of Stuttgart*
 Andrey Morozov - *University of Stuttgart*
 Sheng Ding - *University of Stuttgart*

4:05PM–4:15PM:

PROGNOSTIC HEALTH MONITORING METHOD FOR THERMAL FATIGUE FAILURE OF POWER MODULES BASED ON FINITE ELEMENT METHOD-BASED LAGRANGIAN NEURAL NETWORKS

Technical Paper Publication: IMECE2021-70783

Akira Kano - *Toshiba Corporation*
 Tomoko Monda - *Toshiba Corporation*
 Tomoyuki Suzuki - *Toshiba Corporation*
 Hideaki Uehara - *Toshiba Corporation*
 Tomoya Fumikura - *Toshiba Corporation*
 Kenji Hirohata - *Toshiba Corporation*

4:15PM–4:25PM:

DEEP LEARNING-BASED ERROR MITIGATION FOR ASSISTIVE EXOSKELETON WITH COMPUTATIONAL-RESOURCE-LIMITED PLATFORM AND EDGE TENSOR PROCESSING UNIT

Technical Paper Publication: IMECE2021-70387

Tagir Fabarisov - *University of Stuttgart*
 Andrey Morozov - *University of Stuttgart*
 Ilshat Mamaev - *Karlsruhe Institute of Technology*
 Klaus Janschek - *Technische Universität Dresden*

02-13-03: CYBER-MANUFACTURING ASPECTS NOVEMBER 2, 2021

3:25PM–4:55PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

3:25PM–3:35PM:

ADAPTIVE INTRUSION DETECTION SYSTEM FOR CYBER-MANUFACTURING SYSTEM

Technical Paper Publication: IMECE2021-70017

Romesh Prasad - *Syracuse University*
 Young Moon - *Syracuse University*



3:35PM–3:45PM:**VERIFICATION OF ADDITIVE MANUFACTURING PRODUCTS USING MODEL REGISTRATION AND TEMPLATE MATCHING TECHNIQUES****Technical Paper Publication: IMECE2021-69115**

Lenning A. Davis IV - *United States Naval Academy*
 John S. Donnal - *United States Naval Academy*
 Michael M. Kutzer - *United States Naval Academy*

3:45PM–3:55PM:**RESILIENT CYBER-MANUFACTURING SYSTEMS UNDER CYBER ATTACKS****Technical Paper Publication: IMECE2021-70019**

Carlos Espinoza-Zelaya - *Syracuse University*
 Young Moon - *Syracuse University*

3:55PM–4:05PM:**SIMULATION AND ACCURACY GUARANTEE TECHNOLOGY OF FUSELAGE COMPONENT TRIAL ASSEMBLY BASED ON DYNAMIC PROCESS MODEL****Technical Paper Publication: IMECE2021-70296**

Yonggang Kang - *Northwestern Polytechnical University*
 Mingyuan Chen - *Northwestern Polytechnical University*
 Xiduo Chen - *Northwestern Polytechnical University*
 Zhihao Chen - *Northwestern Polytechnical University*
 Huan Xiao - *Northwestern Polytechnical University*

4:05PM–4:15PM:**INSIDER ATTACK SCENARIO ASSESSMENT FRAMEWORK****Technical Paper Publication: IMECE2021-69907**

Jinwoo Song - *Syracuse University*
 Xinyu He - *Syracuse University*
 Young Moon - *Syracuse University*

4:15PM–4:25PM:**BLOCKCHAIN APPLICATIONS OF MANUFACTURING SYSTEMS: A SURVEY****Technical Paper Publication: IMECE2021-73159**

Jinwoo Song - *Syracuse University*
 Jinbo Wang - *Syracuse University*
 Young Moon - *Syracuse University*

04-17-01:**APPLICATIONS OF ARTIFICIAL INTELLIGENCE/ MACHINE LEARNING IN AEROSPACE ENGINEERING NOVEMBER 2, 2021****3:25PM–4:55PM**

Chair: Erkan Oterkus - *University of Strathclyde*
 Chair: Uttam K. Chakravarty - *University of New Orleans*
 Chair: Pavana Prabhakar - *University of Wisconsin-Madison*

3:25PM–3:35PM:**PARSIMONY-ENHANCED SPARSE BAYESIAN LEARNING FOR ROBUST DATA-DRIVEN DISCOVERY OF PARTIAL DIFFERENTIAL EQUATIONS****Technical Presentation: IMECE2021-66806**

Zhiming Zhang - *Arizona State University*
 Yongming Liu - *Arizona State University*

3:35PM–3:45PM:**A PHYSICS-GUIDED MACHINE LEARNING MODEL BASED ON PERIDYNAMICS****Technical Presentation: IMECE2021-68334**

Cong Tien Nguyen - *University of Strathclyde*
 Selda Oterkus - *University of Strathclyde*
 Erkan Oterkus - *University of Strathclyde*



3:45PM–3:55PM:

MULTISCALE ONLINE PERFORMANCE PREDICTION OF ADDITIVELY MANUFACTURED HONEYCOMB MATERIALS BY CONVOLUTIONAL NEURAL NETWORKS AND MECHANICS OF STRUCTURE GENOME

Technical Presentation: IMECE2021-68993Xin Liu - *Purdue University*Bangde Liu - *The University of Texas at Arlington*Chen Kan - *The University of Texas at Arlington***3:55PM–4:05PM:**

DAMAGE QUANTIFICATION OF HIGH-RATE IMPACTS USING HYBRID DEEP LEARNING MODELS

Technical Paper Publication: IMECE2021-71524Mark Todisco - *University of Massachusetts*Zhu Mao - *University of Massachusetts***4:05PM–4:15PM:**

NON-INTRUSIVE PARAMETRIC REDUCED ORDER MODELS FOR THE PREDICTION OF INTERNAL AND EXTERNAL FLOW FIELDS OVER AUTOMOBILE GEOMETRIES

Technical Paper Publication: IMECE2021-71728Elnaz Rezaian - *University of Michigan*Rajarshi Biswas - *University of Michigan*Karthik Duraisamy - *University of Michigan***01-03-01:**

**PASSIVE, SEMI-ACTIVE AND ACTIVE NOISE AND VIBRATION CONTROL
NOVEMBER 2, 2021**

6:35PM–8:05PMChair: Mostafa Nough - *University at Buffalo*Chair: Yongfeng Xu - *University of Cincinnati*Chair: Guoliang Huang - *University of Missouri***6:35PM–6:45PM:**

STRUCTURE-BORNE POWER FLOW SENSITIVITY ANALYSIS FOR GENERAL STRUCTURAL MODIFICATIONS

Technical Paper Publication: IMECE2021-73731Jon Young - *Pennsylvania State University*Kyle Myers - *Applied Research Laboratory***6:45PM–6:55PM:**

STATISTICAL ENERGY ANALYSIS OF VIBRATING STRUCTURES WITH ENERGY AND ENTROPY

Technical Paper Publication: IMECE2021-69640Elise Hough - *California State Polytechnic University*Zahra Sotoudeh - *California State Polytechnic University***6:55PM–7:05PM:**

CONCURRENT PASSIVE BROADBAND VIBRATION SUPPRESSION AND ENERGY HARVESTING USING A DUAL-PURPOSE MAGNETOELASTIC METAMATERIAL STRUCTURE: EXPERIMENTAL VALIDATION AND MODELING



Technical Paper Publication: IMECE2021-67652

Hamzeh Bardaweel - *Louisiana Tech University*
 Winner Anigbogu - *Louisiana Tech University*

7:05PM–7:15PM:
**AN ULTRA-LOW-FREQUENCY ACTIVE VERTICAL
 VIBRATION ISOLATOR WITH HORIZONTAL
 CONSTRAINTS FOR ABSOLUTE GRAVIMETRY**
Technical Paper Publication: IMECE2021-68008

Jiamin Yao - *National Institute of Metrology*
 Wei Zhuang - *National Institute of Metrology*
 Jinyang Feng - *National Institute of Metrology*
 Yang Zhao - *National Institute of Metrology*
 Shaokai Wang - *National Institute of Metrology*
 Shuqing Wu - *National Institute of Metrology*
 Fang Fang - *National Institute of Metrology*
 Tianchu Li - *National Institute of Metrology*

7:15PM–7:25PM:
**A VISCOELASTIC TUNED MASS DAMPER FOR
 VIBRATION TREATMENT OF LARGE STRUCTURES**
Technical Paper Publication: IMECE2021-69485

Wail S. Al-Rumaih - *General Director of Military Works*
 Ahmad Kashani - *University of Dayton*

7:25PM–7:35PM:
**PERFORATED LINER MODELING IN APPLICATION TO
 CONVERGENT-DIVERGENT MUFFLER**
Technical Presentation: IMECE2021-76830

Tzuno Hsu - *Institute of Gas Turbine, Tsinghua University*
 Min Zhu - *Institute of Gas Turbine, Tsinghua University*

02-09-04:
**COMPUTATIONAL MODELING AND SIMULATION
 FOR ADVANCED MANUFACTURING-IV
 NOVEMBER 2, 2021**
6:35PM–8:05PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

6:35PM–6:45PM:
**STRESS ANALYSIS OF ADDITIVE MANUFACTURED
 LIGHTWEIGHT SPUR GEARS**
Technical Paper Publication: IMECE2021-73666

Tufan Gürkan Yılmaz - *Bursa Uludag University*
 Onur Can Kalay - *Bursa Uludag University*
 Fatih Karpaz - *Bursa Uludag University*
 Stephen Ekworo-Osire - *Texas Tech University*

6:45PM–6:55PM:
**STUDY ON STRUCTURE CHARACTERISTIC OF 3D
 PRINTING MACHINE**
Technical Presentation: IMECE2021-69782

Tzu-Chi Chan - *National Formosa University*
 Sai-Vijay Medarametla - *National Formosa University*
 Hsin-Hsien Lin - *National Formosa University*
 Jia-Hong Yu - *National Formosa University*
 Yu-Chuan Wang - *National Formosa University*
 Ukris Saragih - *National Formosa University*



6:55PM–7:05PM:**STATISTICAL DESCRIPTION OF SPATIAL DISTRIBUTION OF POROSITIES IN METAL ADDITIVE MANUFACTURING****Technical Presentation: IMECE2021-73357**Ali Tabei - *Oregon State University*Iman Ghamarian - *University of Michigan*Stefan Ball - *The Oregon State University***7:05PM–7:15PM:****MULTIPHYSICS MODELING OF A CONCURRENT POLYMERIZATION AND VASCULARIZATION PROCESS FOR MANUFACTURING POLYMER AND POLYMER COMPOSITES WITH EMBEDDED MICROVASCULAR SYSTEM****Technical Presentation: IMECE2021-77223**Zhuoting Chen - *University of Wyoming*Mayank Garg - *University of Illinois at Urbana-Champaign Urbana*Nancy Sottos - *University of Illinois at Urbana-Champaign*Jeffrey Moore - *University of Illinois at Urbana-Champaign*Philippe Geubelle - *University of Illinois at Urbana-Champaign*Xiang Zhang - *University of Wyoming***7:15PM–7:25PM:****TOPOLOGY OPTIMIZATION FOR MATERIAL EXTRUSION 3D PRINTING PROCESSES WITH WEAK DEPOSITION BONDS****Technical Presentation: IMECE2021-77563**Jackson Jewett - *Massachusetts Institute of Technology*Josephine Carstensen - *Massachusetts Institute of Technology***7:25PM–7:35PM:****DAMAGE DETECTION AND PATH PLANNING FOR ADDITIVE MANUFACTURING-BASED REPAIR OF SPACE STRUCTURES****Technical Presentation: IMECE2021-77310**Noah Harmatz - *Rutgers University*Calvin Dobrin - *Rutgers University*Declan O'Brien - *Rutgers University*Patrick Hull - *NASA*Aaron David Mazzeo - *Rutgers University***04-12-01:****PERIDYNAMICS MODELING
NOVEMBER 2, 2021****6:35PM–8:05PM**Chair: Erkan Oterkus - *University of Strathclyde*Chair: Uttam K. Chakravarty - *University of New Orleans*Chair: Pavana Prabhakar - *University of Wisconsin-Madison***6:35PM–6:45PM:****AN APPROACH TO IMPOSE BOUNDARY CONDITIONS IN PERIDYNAMICS: REMOVAL OF DISPLACEMENT KINKS WITHOUT A FICTITIOUS LAYER****Technical Presentation: IMECE2021-71883**Erdogan Madenci - *University of Arizona*Deepak Behera - *University of Arizona*Pranesh Roy - *University of Arizona*Benjamin Spencer - *Idaho National Laboratory***6:45PM–6:55PM:****A DAMAGE-CUMULATIVE MODEL FOR FATIGUE IN PERIDYNAMICS**

Technical Presentation: IMECE2021-77259

Binchao Liu - *Beihang University*
Rui Bao - *Beihang University*

6:55PM–7:05PM:

A TRUSS ELEMENT FOR ORDINARY STATE-BASED PERIDYNAMIC ANALYSIS WITH UNIFORM OR NON-UNIFORM DISCRETIZATION

Technical Presentation: IMECE2021-77336

Mehmet Dorduncu - *Erciyes University*
Kadir Kaya - *Erciyes University*
Erdogan Madenci - *University of Arizona*

7:05PM–7:15PM:

AN FEM-BASED PERIDYNAMIC MODEL FOR FAILURE ANALYSIS OF UNIDIRECTIONAL FIBER-REINFORCED LAMINATES

Technical Presentation: IMECE2021-77440

Bo Ren - *Livermore Software Technology, An Ansys Company*
C.T. Wu - *Livermore Software Technology, An Ansys Company*
Pablo Seleson - *Oak Ridge National Laboratory*
Danielle Zeng - *Ford Motor Company*
Masato Nishi - *JSOL Corporation*
Marco Pasetto - *University of California, San Diego*

7:15PM–7:25PM:

ON THE PRESCRIPTION OF BOUNDARY CONDITIONS FOR NONLOCAL POISSON'S AND PERIDYNAMICS MODELS

Technical Presentation: IMECE2021-77489

Marta D'Elia - *Sandia National Laboratories*
Yue Yu - *Lehigh University*

7:25PM–7:35PM:

CALIBRATING A PERIDYNAMIC MATERIAL MODEL WITH MOLECULAR DYNAMICS

Technical Presentation: IMECE2021-77501

Stewart Silling - *Sandia National Laboratories*

07-19-01:

**MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE IN DYNAMICS AND VIBRATIONS I
NOVEMBER 2, 2021**

6:35PM–8:05PM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
Chair: Bogdan Epureanu - *University of Michigan*
Chair: Marco Amabili - *McGill University*

6:35PM–6:45PM:

AN ARTIFICIAL NEURAL NETWORK MODEL FOR FLEXOELECTRIC ACTUATION AND CONTROL OF BEAMS

Technical Paper Publication: IMECE2021-69392

Yu Pengcheng - *Nanjing University of Aeronautics and Astronautics*
Fu Xiaogang - *Shanghai Aerospace Control Technology Institute*
Fan Mu - *Nanjing University of Aeronautics and Astronautics*

6:45PM–6:55PM:

AN EMPIRICAL STUDY OF MACHINE LEARNING AND DEEP LEARNING METHODS ON BEARING FAULT DIAGNOSIS BENCHMARKS



Technical Paper Publication: IMECE2021-69994

Behnoush Rezaeianjouybari - *University of Missouri*
Yi Shang - *University of Missouri*

6:55PM–7:05PM:

INTELLIGENT DEFECT DIAGNOSIS OF SPIRAL BEVEL GEARS UNDER DIFFERENT OPERATING CONDITIONS USING ANN AND KNN CLASSIFIERS

Technical Paper Publication: IMECE2021-70016

Syed Muhammad Tayyab - *Politecnico di Milano*
Paolo Pennacchi - *Politecnico di Milano*
Steven Chatterton - *Politecnico di Milano*
Eram Asghar - *Politecnico di Milano*

7:05PM–7:15PM:

HEAVE MOTION PREDICTION OF RECTANGULAR FLOATING BARGE USING ARTIFICIAL NEURAL NETWORK

Technical Paper Publication: IMECE2021-73311

Zobair Ibn Awal - *Bangladesh University of Engineering and Technology*
Nafisa Mehtaj - *Bangladesh University of Engineering and Technology*
Rakin Ishmam Pranto - *Bangladesh University of Engineering and Technology*

7:15PM–7:25PM:

SURROGATE MODELING OF ACOUSTIC FIELD-ASSISTED PARTICLE PATTERNING WITH APPLICATION TO SMART POLYMER COMPOSITE FABRICATION IN STEREO LITHOGRAPHY: A PHYSICS-INFORMED DEEP-LEARNING APPROACH

Technical Presentation: IMECE2021-76345

Yu Hui Lui - *Iowa State University*
M Shahriar - *Iowa State University*
Yayue Pan - *University of Illinois Chicago*
Chao Hu - *Iowa State University*
Shan Hu - *Iowa State University*

7:25PM–7:35PM:

A PHYSICS-INFORMED RECURRENT NEURAL NETWORK APPROACH FOR LONG-TERM PREDICTIVE MODELING OF NONLINEAR DYNAMICAL SYSTEMS

Technical Presentation: IMECE2021-77246

Yongchao Yang - *Michigan Technological University*
Shanwu Li - *Michigan Technological University*

07-11-03:

MOBILE ROBOTS AND UNMANNED GROUND VEHICLES III
NOVEMBER 2, 2021

6:35PM–8:05PM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
Chair: Bogdan Epureanu - *University of Michigan*
Chair: Marco Amabili - *McGill University*

6:35PM–6:45PM:

STOCHASTIC PREDICTIVE CONTROL FOR CRASH AVOIDANCE IN AUTONOMOUS VEHICLES BASED ON STOCHASTIC REACHABLE SET THREAT ASSESSMENT

Technical Paper Publication: IMECE2021-71179

Vanshaj Khattar - *Virginia Tech*
Azim Eskandarian - *Virginia Tech*

6:45PM–6:55PM:

UGV LOCALIZATION WITH AI-ASSISTED EKF FOR MULTI-TERRAIN ENVIRONMENTS



Technical Paper Publication: IMECE2021-70181

Salman Ali Shaukat - *Dubai Electricity & Water Authority*
 Thani Althani - *Dubai Electricity & Water Authority*
 Mohammed Minhas Anzil - *Dubai Electricity & Water Authority*
 Hesham Ismail - *Dubai Electricity & Water Authority*

6:55PM–7:05PM:**ON THE MAPPING PROBLEM IN SLAM APPROACHES FOR AUTONOMOUS ROBOT NAVIGATION****Technical Paper Publication: IMECE2021-70452**

Vomsheendhur Raju - *North Dakota State University*
 Majura F. Selekwa - *North Dakota State University*

7:05PM–7:15PM:**A COMPARATIVE STUDY ON FEATURE DESCRIPTORS FOR RELATIVE POSE ESTIMATION IN CONNECTED VEHICLES****Technical Paper Publication: IMECE2021-70693**

Anshul Nayak - *Virginia Tech*
 Azim Eskandarian - *Virginia Tech*
 Prasenjit Ghorai - *Virginia Tech*
 Zachary Doerzaph - *Virginia Tech*

7:15PM–7:25PM:**DESIGN AND CONSTRUCTION OF A SPHERICAL MOBILE ROBOT PROTOTYPE FOR MONITORING OIL PALM PLANTATIONS****Technical Paper Publication: IMECE2021-67327**

Sebastián Roa Prada - *Universidad Autónoma de Bucaramanga*

7:25PM–7:35PM:**NAVIGATION METHOD FOR UGV ON AERIAL ELEVATION MAPS FOR AUTONOMOUS MISSIONS IN SANDY DESERTS****Technical Paper Publication: IMECE2021-71088**

Marko Bjelotomic - *Dubai Electricity and Water Authority*
 Prashanth Subramaniam - *Dubai Electricity and Water Authority*
 Hesham Ismail - *Dubai Electricity and Water Authority*
 Abdallah Aljasmi - *Dubai Electricity and Water Authority*

**08-08-02: RENEWABLE ENERGY II
NOVEMBER 2, 2021****6:35PM–8:05PM****6:35PM–6:45PM:****YTTRIUM DECORATED ON THIN BOROPHENE DEFECT FOR HYDROGEN STORAGE: A FIRST PRINCIPLES STUDY****Technical Paper Publication: IMECE2021-69160**

Tien-Chien Jen - *University of Johannesburg*
 Kabelo Ledwaba - *University of Johannesburg*
 Sina Karimzadeh - *University of Johannesburg*
 Andile Mkhohlakali - *University of Johannesburg*

6:45PM–6:55PM:**SOLAR-DRIVEN PHOTOTHERMAL CATALYTIC REACTOR DESIGN FOR SCALABLE ARTIFICIAL PHOTOSYNTHESIS****Technical Presentation: IMECE2021-69298**

Xiangkun (Elvis) Cao - *Cornell University*
 Yuval Kaminer - *Cornell University*
 Tao Hong - *Cornell University*
 Perry Schein - *Cornell University*
 Tingwei Liu - *Cornell University*
 Tobias Hanrath - *Cornell University*
 David Erickson - *Cornell University*



6:55PM–7:05PM:**FEASIBILITY OF PUMPED HYDROELECTRIC STORAGE WITHIN EXISTING USACE FACILITIES: A METHODOLOGICAL APPROACH****Technical Paper Publication: IMECE2021-69416**Kyle J. Kass - *United States Military Academy*F. Todd Davidson - *United States Military Academy***7:05PM–7:15PM:****A COMPREHENSIVE ANALYSIS OF AN ELECTROLYTIC HYDROGEN PRODUCTION SYSTEM BASED ON SOLAR RADIATION FOR THE GENERATION OF CLEAN ENERGY****Technical Paper Publication: IMECE2021-69444**Ronald Mas - *Pontificia Universidad Católica del Perú*Antonios Antoniou - *Pontificia Universidad Católica del Perú*Cesar Celis - *Pontificia Universidad Católica del Perú*Arturo Berastain - *Pontificia Universidad Católica del Perú***7:15PM–7:25PM:****A REACTOR TRAIN SYSTEM FOR EFFICIENT SOLAR THERMOCHEMICAL FUEL PRODUCTION****Technical Paper Publication: IMECE2021-69716**Aniket S. Patankar - *Massachusetts Institute of Technology*Xiao-Yu Wu - *University of Waterloo*Wonjae Choi - *Ewha Womans University*Harry L. Tuller - *Massachusetts Institute of Technology*Ahmed F. Ghoniem - *Massachusetts Institute of Technology***7:25PM–7:35PM:****OVERLAP RATIO AS THE DESIGN VARIABLE FOR MAXIMIZING THE EFFICIENCY OF A SAVONIUS WIND ROTOR: AN OPTIMIZATION APPROACH****Technical Paper Publication: IMECE2021-69930**Man Mohan - *Indian Institute of Technology Guwahati*Ujjwal K. Saha - *Indian Institute of Technology***10-08-01:****FLUID MEASUREMENTS AND INSTRUMENTATION NOVEMBER 2, 2021****6:35PM–8:05PM**Chair: Philipp Epple - *Coburg University of Applied Sciences*Chair: Kamran Siddiqui - *University of Western Ontario***6:35PM–6:45PM:****EXPERIMENTAL INVESTIGATION OF MULTI-COMPONENT EMULSION FUEL STABILITY****Technical Paper Publication: IMECE2021-70105**Nicholas Hentges - *University of Iowa*A.S.M. Sazzad Parveg - *University of Iowa*Albert Ratner - *University of Iowa***6:45PM–6:55PM:****EXPERIMENTAL INVESTIGATION OF HIGH-SPEED FLOWS PAST PILLOW PLATES****Technical Paper Publication: IMECE2021-70223**Stephan Sundermeier - *Fachhochschule Münster*Stefan aus der Wiesche - *Muenster University of Applied Sciences***6:55PM–7:05PM:****THREE-DIMENSIONAL VELOCITY AND CONCENTRATION MEASUREMENTS OF CONTAMINANT RELEASE IN A SCALED URBAN ARRAY****Technical Paper Publication: IMECE2021-73756**Parth Doshi - *United States Military Academy*Gabriel Fuhrman - *United States Military Academy*Dylan Moser - *United States Military Academy*Michael Benson - *United States Military Academy*Bret Van Poppel - *United States Military Academy*Christopher Elkins - *Stanford University*Andrew Banko - *Stanford University*

7:05PM–7:15PM:**DESIGN OF AIR JET FLOW FRAME TO CONTROL BUG'S FLIGHT PATH TO PREVENT COLLISION ON LIDAR COVERS****Technical Paper Publication: IMECE2021-73863**Zahra Sadeghizadeh - *Florida Polytechnic University*Edwar Romero - *Florida Polytechnic University*Gerardo Carbajal - *Florida Polytechnic University***7:15PM–7:25PM:****EXPERIMENTAL INVESTIGATION ON FALLING-FILM DROPLET FLOW BEHAVIOR ON VARIED HORIZONTAL TUBE SPACING****Technical Paper Publication: IMECE2021-70409**K. Prudviraj - *Birla Institute of Technology & Science, Pilani*Sandip Deshmukh - *Birla Institute of Technology & Science, Pilani*Supradeeapan K. - *Birla Institute of Technology & Science, Pilani***11-10-01:****SINGLE/TWO-PHASE HEAT TRANSFER IN ACTIVE AND PASSIVE SYSTEMS
NOVEMBER 2, 2021****6:35PM–8:05PM**Chair: Subramanyaravi Annapragada -
*United Technologies Research*Chair: Kevin Dowding – *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***6:35PM–6:45PM:****DEVELOPMENT OF A TOPOLOGY-OPTIMIZED STRUCTURE FOR THERMAL ENERGY STORAGE UNDER NATURAL CONVECTION CONDITIONS****Technical Paper Publication: IMECE2021-70712**Yao Song See - *Nanyang Technological University Singapore*Jin Yao Ho - *Nanyang Technological University Singapore*Kai Choong Leong - *Nanyang Technological University Singapore*Teck Neng Wong - *Nanyang Technological University Singapore***6:45PM–6:55PM:****ADDITIVELY MANUFACTURED TWO-PHASE HEAT EXCHANGER INTEGRATING PCMS FOR SPACECRAFT THERMAL MANAGEMENT****Technical Paper Publication: IMECE2021-68951**Mehdi Kabir - *University of the District of Columbia*Takele Gemeda - *University of the District of Columbia*Raid Mohammed - *University of the District of Columbia*Evan Preller - *University of the District of Columbia*Jiajun Xu - *University of the District of Columbia***6:55PM–7:05PM:****MICRO FIN ARRAY CONFIGURATION IN HEAT TRANSFER ENHANCEMENT IN MINI-CHANNELS****Technical Paper Publication: IMECE2021-72040**Gerardo Carbajal - *Florida Polytechnic University*Colton Frar - *Florida Polytechnic University*Charisma Clarke - *Florida Polytechnic University*Edwar Romero-Ramirez - *Florida Polytechnic University***7:05PM–7:15PM:****DRYING OF A FULLY SATURATED POROUS MEDIUM WITH EXCESS WATER LAYERS: A NUMERICAL STUDY****Technical Paper Publication: IMECE2021-68157**Munevver E. Asar - *Worcester Polytechnic Institute*Jamal S. Yagoobi - *Worcester Polytechnic Institute*

7:15PM–7:25PM:**THEORETICAL ANALYSIS OF A SINGLE-STAGE GAS-FIRED EJECTOR HEAT PUMP WATER HEATER****Technical Paper Publication: IMECE2021-72389**Jeremy Spitzenberger - *University of Missouri*Pengtao Wang - *University of Missouri*Laith Ismael - *University of Missouri*Hongbin Ma - *University of Missouri*Ahmad Abuheiba - *Oak Ridge National Laboratory*Kashif Nawaz - *Oak Ridge National Laboratory***7:25PM–7:35PM:****SIMULATION-BASED CORRELATION FOR SAVED ENERGY IN GROUND SOURCE HEAT EXCHANGERS FOR MIDDLE EAST REGION****Technical Paper Publication: IMECE2021-66381**Khaled I. Ahmed - *King Abdulaziz University*Abobakr Almashhor - *King Abdulaziz University*Mohamed H. Ahmed - *King Abdulaziz University***11-11-01:****FIRE AND COMBUSTION HEAT TRANSFER NOVEMBER 2, 2021****6:35PM–8:05PM**Chair: Subramanyaravi Annapragada - *United Technologies Research*Chair: Kevin Dowding - *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***6:35PM–6:45PM:****PERFORMANCE OF LOW-NOX AND CONVENTIONAL STORAGE WATER HEATERS OPERATED ON BIOGAS AND NATURAL GAS****Technical Paper Publication: IMECE2021-69702**Shiny Choudhury - *University of California, Irvine*Vincent Mc Donnell - *University of California*Scott Samuelsen - *University of California, Irvine***6:45PM–6:55PM:****ON THE VAPORIZATION RATE AND FLAME SHAPE OF NON-SPHERICAL DROPLETS****Technical Paper Publication: IMECE2021-70403**John Palmore, Jr. - *Virginia Tech***6:55PM–7:05PM:****THERMAL PERFORMANCE OF HEAT RECOVERY FROM GAS TURBINE EXHAUST STACKS USING THE SILENCER SEMI-CIRCULAR SECTIONS****Technical Paper Publication: IMECE2021-70465**Fadi A. Ghaith - *Heriot-Watt University*Bouria Faqih - *Heriot-Watt University***7:05PM–7:15PM:****MODELING DISCHARGE SPARK IGNITION USING ZERO DIMENSION THERMODYNAMIC MODEL AND EXPERIMENTAL POWER MEASUREMENTS AT VARIOUS PRESSURES****Technical Paper Publication: IMECE2021-73235**James Shaffer - *Mississippi State University*Saeid Zare - *Mississippi State University*Omid Askari - *Mississippi State University***7:15PM–7:25PM:****APPLICATION OF OXYGEN-ENRICHED COMBUSTION IN AN INDUSTRIAL REHEATING FURNACE USING CFD**

Technical Paper Publication: IMECE2021-71770

Bethany Worl - *Purdue University Northwest*
 Francisco Martinez - *Purdue University Northwest*
 Armin K. Silaen - *Purdue University Northwest*
 Kurt Johnson - *ArcelorMittal Global R&D*
 Larry Fabina - *Cleveland-Cliffs Burns Harbor*
 Kelly Tian - *Linde Gas*
 Joe Maiolo - *Linde Gas*
 Chenn Zhou - *Purdue University Northwest*
 Xiang Li - *Purdue University Northwest*

7:25PM–7:35PM:
**A COMBINED THEORETICAL AND EXPERIMENTAL
 INVESTIGATION OF THE OVERALL ENERGY
 CONSUMPTION IN A WET DUAL CLUTCH SYSTEM
 DURING A DRIVING PROFILE**
Technical Paper Publication: IMECE2021-71198

Zhihong Liu - *Technical University of Darmstadt*
 Ping He - *Technical University of Darmstadt*
 Stephan Rinderknecht - *Technical University of Darmstadt*

**12-16-01: GENERAL SESSION
 NOVEMBER 2, 2021**
6:35PM–8:05PM

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

RAILGUNS: AN OVERVIEW**Technical Paper Publication: IMECE2021-72949**

Adam Sasek - *United States Military Academy*
 Andrew Bellocchio - *United States Military Academy*

6:45PM–6:55PM:
**DEPENDENCIES OF PARALLEL SPARSE ITERATIVE
 LINEAR SOLVER METHODS ON MATRIX
 CONDITIONING ON UNSTRUCTURED FINITE
 ELEMENT MESHES**
Technical Paper Publication: IMECE2021-69065

Qiyue Lu - *University of Illinois at Urbana-Champaign*
 Seid Koric - *University of Illinois at Urbana-Champaign*

6:55PM–7:05PM:
**EFFICIENT PARALLEL SCALABLE MATRIX-FREE 3D
 HIGH-ORDER FINITE ELEMENT SIMULATION OF
 NEO-HOOKEAN COMPRESSIBLE HYPERELASTICITY
 AT FINITE STRAIN**
Technical Paper Publication: IMECE2021-70768

Arash Mehraban - *University of Colorado*
 Jed Brown - *University of Colorado*
 Henry Tufo - *University of Colorado*
 Jeremy Thompson - *University of Colorado*
 Rezgar Shakeri - *University of Colorado*
 Richard Regueiro - *University of Colorado*

7:05PM–7:15PM:
**DESIGN, MODELING, SIMULATION, AND TESTING
 OF FLEXIBLE JOINT**
Technical Paper Publication: IMECE2021-70558

Maria Munguia - *California State University*
 Gabriella Shibata - *California State University*
 Osvaldo Castro - *California State University, Los Angeles*
 Sufi Asadi - *California State University, Los Angeles*
 Anthony De Leon - *California State University, Los Angeles*
 Allan Hernandez - *California State University, Los Angeles*
 Spencer Miesner - *California State University, Los Angeles*



Christopher Molina - California State University, Los Angeles
 Jered Bell - California Polytechnic State University
 Madison Lytle - California Polytechnic State University
 Kieran Wolk - Jet Propulsion Laboratory
 Scott Roberts - Jet Propulsion Laboratory
 Benjamin Furst - Jet Propulsion Laboratory
 Eric Sunada - Jet Propulsion Laboratory
 John Bellardo - California Polytechnic State University
 Takuro Daimaru - Jet Propulsion Laboratory
 Jim Kuo - California State University

7:15PM–7:25PM:

LOAD PATH ANALYSIS AND DESIGN FOR STIFFNESS OF BOLTED ELECTRO-MAGNETIC MASS DRIVERS

Technical Paper Publication: IMECE2021-71366

Gaurav Goyal - Indian Institute of Technology Delhi
 Nagendra Kumar Mehta - Indian Institute of Technology Delhi
 Jitendra Prasad Khatait - Indian Institute of Technology Delhi
 Sudipto Mukherjee - Indian Institute of Technology Delhi

12-13-01: MECHANICAL METAMATERIALS NOVEMBER 2, 2021

6:35PM–8:05PM

Chair: Marco Amabili - McGill University
 Chair: Celia Reina - University of Pennsylvania

6:35PM–6:45PM:

MECHANICS AND DESIGN OF DISTORTED INTERLOCKED TILINGS

Technical Presentation: IMECE2021-73621

Dong Young Kim - Purdue University
 Thomas Siegmund - Purdue University

6:45PM–6:55PM:

INVERTING THE STRUCTURE-PROPERTY MAP OF TRUSS METAMATERIALS BY DEEP LEARNING

Technical Presentation: IMECE2021-76799

Jan-Hendrik Bastek - ETH Zurich
 Sid Kumar - Technische Universität Delft
 Bastian Telgen - ETH Zurich
 Raphael Glaesener - ETH Zurich
 Dennis Kochmann - ETH Zurich

6:55PM–7:05PM:

PROGRAMMING BUCKLING INSTABILITY UPON INFLATION IN SOFT METAMATERIALS

Technical Presentation: IMECE2021-77400

Anthony Jones - University of Maryland, College Park
 Midhun Varghese - University of Maryland, College Park
 Eleonora Tubaldi - University of Maryland, College Park

7:05PM–7:15PM:

CLASSICAL POSTBUCKLING BEHAVIOR UNDERLIES NOVEL PLATE LATTICE MATERIAL BEHAVIOR

Technical Presentation: IMECE2021-77451

Fani Derveni - École Polytechnique Fédérale de Lausanne
 Andrew Gross - University of South Carolina
 Kara Peterman - University of Massachusetts Amherst
 Simos Gerasimidis - University of Massachusetts Amherst

7:15PM–7:25PM:

3D TRANSFORMABLE MODULAR KIRIGAMI BASED PROGRAMMABLE METAMATERIALS

Technical Presentation: IMECE2021-77453

Yanbin Li - North Carolina State University
 Qiuting Zhang - Yale University
 Yaoye Hong - North Carolina State University
 Jie Yin - North Carolina State University



7:25PM–7:35PM:**METAMORPHOSIS OF TESSELLATED THREE-DIMENSIONAL MODULAR KIRIGAMI-INSPIRED RECONFIGURABLE MATTER****Technical Presentation: IMECE2021-77459**Yanbin Li - *North Carolina State University*Jie Yin - *Department of Mechanical and Aerospace Engineering, North Carolina State University***14-10-01: CRASHWORTHINESS, OCCUPANT PROTECTION, AND BIOMECHANICS
NOVEMBER 2, 2021****6:35PM–8:05PM****6:35PM–6:45PM:****REINFORCED CONCRETE BARRIER MODELING OF MULTIPLE IN-SERIES IMPACTS IN LS-DYNA****Technical Paper Publication: IMECE2021-66627**Roshan Sharma - *Texas A&M Transportation Institute*Chiara Silvestri Dobrovolny - *Texas A&M Transportation Institute*Stefan Hurlebaus - *Zachry Department of Engineering*Maysam Kiani - *Texas A&M Transportation Institute***6:45PM–6:55PM:****DAMAGE ASSESSMENT METHOD OF BATTERY PACK OF ELECTRIC VEHICLE IN UNDERCARRIAGE COLLISION****Technical Paper Publication: IMECE2021-69776**Powen Chen - *Tsinghua University*Yong Xia - *Tsinghua University*Qing Zhou - *Tsinghua University*Yunlong Qu - *Tsinghua University*Xinqi Wei - *Tsinghua University***6:55PM–7:05PM:****EQUIVALENT ENERGY ABSORPTION (EEA): A METHODOLOGY FOR IMPROVED AUTOMOTIVE CRASH AND SAFETY DESIGN****Technical Paper Publication: IMECE2021-70137**Peddi Sai Rama Narayana - *Mahindra Research Valley*Raghu V. Prz - *Indian Institute of Technology Madras*Srinivas Gunti - *Mahindra Research Valley*Kanugula Raghu - *Mahindra Research Valley***7:05PM–7:15PM:****DESIGN OF PHONONIC BANDGAP METAMATERIALS BY GAUSSIAN MIXTURE VARIATIONAL AUTOENCODER WITH ITERATIVE MODEL UPDATING****Technical Presentation: IMECE2021-72917**Zihan Wang - *University of Connecticut*Weikang Xian - *University of Connecticut*M. Ridha Baccouche - *Ford Motor Company*Horst Lanzerath - *Ford Motor Company*Ying Li - *University of Connecticut*Hongyi Xu - *University of Connecticut***7:15PM–7:25PM:****INTEGRATION OF MANUFACTURING PROCESS SIMULATION RESULTS INTO CRASH SIMULATION****Technical Presentation: IMECE2021-73915**Horst Lanzerath - *Ford***7:25PM–7:35PM:****INCREASED VEHICLE INTRUSION AS A RESULT OF VEHICLE WEIGHT**

Technical Paper Publication: IMECE2021-71294Lauren Eichaker - *SEA, Ltd.*Cameron Trepeck - *SEA, Ltd.*Michael Arnett - *SEA, Ltd.*Fred Chen - *SEA, Ltd.*John Wiechel - *SEA, Ltd.*Dennis Guenther – *The Ohio State University***14-11-01:****CONGRESS-WIDE SYMPOSIUM ON PROGNOSTIC AND HEALTH MANAGEMENT: NDE AND PROGNOSTICS OF STRUCTURES AND SYSTEMS NOVEMBER 2, 2021****6:35PM–8:05PM****6:35PM–6:45PM:****PROBABILISTIC OPTIMIZATION APPROACH FOR DAMAGE IDENTIFICATION USING FREQUENCY RESPONSE****Technical Paper Publication: IMECE2021-69162**Hussain Altammar - *University of Jamestown*Sudhir Kaul - *Western Carolina University*Anoop Dhingra - *University of Wisconsin***6:45PM–6:55PM:****APPLICATIONS OF HIGH-DIMENSIONAL DATA ANALYTICS IN STRUCTURAL HEALTH MONITORING AND NON-DESTRUCTIVE EVALUATION: THERMAL VIDEOS PROCESSING USING TENSOR-BASED ANALYSIS****Technical Paper Publication: IMECE2021-71878**Hamed Momeni - *New Mexico Tech*Arvin Ebrahimkhanlou - *New Mexico Tech***6:55PM–7:05PM:****A REVIEW OF SQL VS NOSQL DATABASE FOR NUCLEAR REACTOR DIGITAL TWIN APPLICATIONS: WITH EXAMPLE MONGODB BASED NOSQL DATABASE FOR DIGITAL TWIN MODEL OF A PRESSURIZED-WATER-REACTOR STEAM-GENERATOR****Technical Paper Publication: IMECE2021-73153**Subhasish Mohanty - *Argonne National Laboratory*Thomas W. Elmer - *Argonne National Laboratory*Sasan Bakhtiari - *Argonne National Laboratory*Richard B. Vilim - *Argonne National Laboratory***7:05PM–7:15PM:****SPINDLE BEARINGS FAULT DIAGNOSIS TECHNIQUE BASED ON INTEGRATION OF ZERO RESONATOR FREQUENCY FILTER AND DISCRETE WAVELET PACKET TRANSFORM****Technical Paper Publication: IMECE2021-73194**Avitus Titus Mwelinde - *Harbin Institute of Technology*Hongyu Jin - *Harbin Institute of Technology*Jamal Banzi - *Sokoine University of Agriculture*Hongya Fu - *Harbin Institute of Technology*Zhenyu Han - *Harbin Institute of Technology***7:15PM–7:25PM:****FATIGUE CRACK GROWTH PROGNOSIS WITH THE PARTICLE FILTER AND ON-LINE GUIDED WAVE STRUCTURAL MONITORING DATA****Technical Paper Publication: IMECE2021-73504**Jian Chen - *Nanjing University of Aeronautics and Astronautics*Shenfang Yuan - *Nanjing University of Aeronautics and Astronautics*Lei Qiu - *Nanjing University of Aeronautics and Astronautics*Yuanqiang Ren - *Nanjing University of Aeronautics and Astronautics*

7:25PM–7:35PM:**STRUCTURAL DAMAGE IDENTIFICATION USING BEAMFORMING ACOUSTIC SOURCE LOCALIZATION****Technical Presentation: IMECE2021-77441**Ashwani Thakur - *University of Cincinnati*Yongfeng Xu - *University of Cincinnati***09-11-02: ENGINEERING RESEARCH INNOVATION II
NOVEMBER 2, 2021****6:35PM–8:05PM**Chair: Subha Kumpaty - *Milwaukee School of Engineering*Chair: Salim Azzouz - *Midwestern State University*Chair: Anabela Alves - *University of Minho***6:35PM–6:45PM:****PRODUCT DESIGN JOURNEY: NOVEL TOOL CHANGER****Technical Paper Publication: IMECE2021-72124**Tariq Chagouri - *Texas A&M University at Qatar*Fawziya Al-Darwish - *Texas A&M University at Qatar*Abdulrahman Sharif - *Texas A&M University at Qatar*Yasser Al-Hamidi - *Texas A&M University at Qatar***6:45PM–6:55PM:****SURFACE DEFECT DETECTION IN STEEL PLATES USING MACHINE VISION****Technical Paper Publication: IMECE2021-70791**Aaron Mantoni - *Western New England University*Vedang Chauhan - *Western New England University***6:55PM–7:05PM:****UTILIZING THE NASA HUMAN EXPLORATION ROVER CHALLENGE PROJECT AT THE UNIVERSITY OF THE DISTRICT OF COLUMBIA (UDC) TO ENHANCE THE ENGINEERING EXPERIENCE FOR THE DIVERSE POPULATION OF UNDERREPRESENTED STUDENTS****Technical Paper Publication: IMECE2021-71979**Voss Harrigan - *University of the District of Columbia*Jiajun Xu - *University of the District of Columbia*Sasan Haghani - *University of the District of Columbia***7:05PM–7:15PM:****AN INVESTIGATION OF ELASTIC-PLASTIC TORSION IN STRAIN HARDENING MATERIALS****Technical Paper Publication: IMECE2021-73748**Somnath Chattopadhyay - *Cleveland State University***7:15PM–7:25PM:****DESIGN OF A ROBOTIC VEHICLE FOR ASME STUDENT DESIGN COMPETITION 2021****Technical Paper Publication: IMECE2021-72195**Wojciech Kochanczyk - *Western New England University*Vedang Chauhan - *Western New England University***7:25PM–7:35PM:****JOURNEY MAPPING THE VIRTUAL PROTOTYPING EXPERIENCE****Technical Paper Publication: IMECE2021-71618**George Moore - *University of California*Vivek Rao - *University of California*Alice M. Agogino - *University of California*Kosa Goucher-Lambert - *University of California*

**07-21-01:
MARINE ELECTROMECHANICAL SYSTEMS AND
OCEAN MECHATRONICS
NOVEMBER 2, 2021**

6:35PM–8:05PM

Chair: Dumitru Caruntu - *University of Texas Rio Grande Valley*
Chair: Marco Amabili - *McGill University*

**6:35PM–6:45PM:
MODELING AND STATION-KEEPING CONTROL OF
AN UNDERWATER VEHICLE MANIPULATOR SYSTEM
THROUGH REACTIONS WHEELS**

Technical Paper Publication: IMECE2021-69031

Éverton L. de Oliveira - *Laboratory of Dynamics and Control*
Reginaldo Cardoso - *Laboratory of Dynamics and Control*
Décio C. Donha - *Laboratory of Dynamics and Control*

6:45PM–6:55PM:

**IMPLEMENTATION OF 2-DOF GRABBER ARM AND
COMPUTER VISION ON REMOTELY OPERATED
UNDERWATER VEHICLE**

Technical Paper Publication: IMECE2021-69347

Pascal Spino - *Washington State University*
Konstantin I. Matveev - *Washington State University*

6:55PM–7:05PM:

**ERROR ANALYSIS OF MODELS FOR THE FORCES ON
A CYLINDER UNDERGOING 2-DOF PRESCRIBED
MOTION IN A STREAM**

Technical Paper Publication: IMECE2021-70102

Erdem Aktosun - *University of New Orleans*
Nikolaos I. Xiros - *University of New Orleans*
Jason M. Dahl - *University of Rhode Island*

7:05PM–7:15PM:

**POWER ESTIMATION OF AN EXPERIMENTAL
OCEAN CURRENT TURBINE BASED ON THE
CONFORMAL MAPPING AND BLADE ELEMENT
MOMENTUM THEORY**

Technical Paper Publication: IMECE2021-71751

S. Sadeqi - *University of New Orleans*
E. Aktosun - *University of New Orleans*
N. Xiros - *University of New Orleans*
J. VanZwieten - *Florida Atlantic University*
C. Sultan - *Virginia Polytechnic Institute*
J. Iouf - *University of New Orleans*
S. Rouhi - *University of New Orleans*

7:15PM–7:25PM:

**A SMALL-SCALE EXPERIMENTAL OCEAN CURRENT
TURBINE APPARATUS FOR POWER MEASUREMENT**

Technical Paper Publication: IMECE2021-71754

S. Rouhi - *University of New Orleans*
N. Xiros - *University of New Orleans*
E. Aktosun - *University of New Orleans*
C. Sultan - *Virginia Tech*
J. VanZwieten - *Florida Atlantic University*
J. Iouf - *University of New Orleans*
S. Sadeqi - *University of New Orleans*

WEDNESDAY, November 3

**03-02-01: MATERIAL PROCESSING OF FLEXIBLE/
EMERGING ELECTRONICS, SENSORS, AND DEVICES
NOVEMBER 3, 2021**



10:00AM–11:30AM

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

10:00AM–10:10AM:
**DESIGNING AN OMNIDIRECTIONAL DATA-LINK
 ANTENNA FOR PRINTABILITY AND SURVIVABILITY**
Technical Presentation: IMECE2021-69315

Lucas Becker - *Wright State University*
 Roberto Aga - *KBR, Inc.*
 Fahima Ouchen - *KBR, Inc.*
 Emily Heckman - *Air Force Research Laboratory*
 Ahsan Mian - *Wright State University*

10:10AM–10:20AM:
**MICROWAVE SYNTHESIS OF PLANT-BASED
 SUPERCAPACITOR ELECTRODES FOR
 FLEXIBLE ELECTRONICS**
Technical Paper Publication: IMECE2021-70062

Siddhi Mehta - *Texas A&M University*
 Swarn Jha - *Texas A&M University*
 Weston Stewart - *Texas A&M University*
 Hong Liang - *Texas A&M University*

10:20AM–10:30AM:
**MXENE-GRAPHENE FIELD-EFFECT TRANSISTOR
 SENSING OF INFLUENZA VIRUS AND SARS-COV-2**
Technical Presentation: IMECE2021-71771

Yanxiao Li - *Missouri University of Science and Technology*
 Chenglin Wu - *Missouri University of Science and Technology*

10:30AM–10:40AM:
**RECYCLING OF NANOWIRE PERCOLATION
 NETWORK FOR SUSTAINABLE
 WEARABLE ELECTRONICS**
Technical Presentation: IMECE2021-76519

Yuxuan Liu - *North Carolina State University*
 Hongyu Wang - *North Carolina State University*
 Yong Zhu - *North Carolina State University*

10:40AM–10:50AM:
**STRAIN MEASUREMENT FOR STRUCTURAL
 HEALTH MONITORING OF UNMANNED AIRCRAFT
 SYSTEM (UAS)**
Technical Presentation: IMECE2021-77173

Aditi Nandy - *University of North Texas*
 Ifana Mahbub - *University of North Texas*
 Omar Madera - *University of North Texas*
 Kamesh Namuduri - *University of North Texas*
 Haifeng Zhang - *University of North Texas*
 Nandika D'souza - *University of North Texas*

10:50AM–11:00AM:
**3D MODELING THE STOCHASTIC CONDUCTIVE
 FIBROUS NETWORK WITH AN OPEN-
 SOURCE WORKFLOW**
Technical Presentation: IMECE2021-77560

Tongfen Liang - *Rutgers University*
 Meriem Akin - *Braunschweig University of Technology*
 Xiyue Zou - *Rutgers University*
 George Weng - *Rutgers University*
 Assimina Pelegri - *Rutgers University*
 Anna Root - *Rutgers University*
 Aaron David Mazzeo - *Rutgers University*



03-01-01:**NANO MODIFIED AND NANO MATERIALS
IN ENGINEERING
NOVEMBER 3, 2021****10:00AM–11:30AM**Chair: Hareesh Tippur - *Auburn University*Chair: Caglar Oskay - *Vanderbilt University***10:00AM–10:10AM:****FABRICATION, PROCESSING AND
CHARACTERIZATION OF CARBON FIBRE
REINFORCED LAMINATED COMPOSITE EMBEDDED
WITH GRAPHENE LATTICE SHEETS****Technical Paper Publication: IMECE2021-71191**Ajit D. Kelkar - *North Carolina A&T State University*Vishwas S. Jadhav - *North Carolina A&T State University***10:10AM–10:20AM:****THERMO-PHYSICAL PROPERTIES OF CARBON-
BASED SMART POLYMER NANOCOMPOSITES:
A MULTISCALE MODELING APPROACH****Technical Presentation: IMECE2021-77311**Atta Muhammad - *Politecnico di Torino*Rajat Srivastava - *Politecnico di Torino*Matteo Fasano - *Politecnico di Torino*Pietro Asinari - *Politecnico di Torino*Eliodoro Chiavazzo - *Politecnico di Torino***10:20AM–10:30AM:****GRAPHENE OXIDE / NANODIAMOND
NANOCOMPOSITES CHARACTERIZED VIA PARTICLE
DISPERSION AND MICRO- AND NANOSCALE
MECHANICAL PROPERTIES****Technical Paper Publication: IMECE2021-72137**Mustafa Abdelrahman - *Bradley University*Slade C. Jewell - *Bradley University*Abdalla Elbella - *Bradley University*Shannon J. Timpe - *Bradley University***10:30AM–10:40AM:****POTENTIALS FOR PDAGCU METAL HYDRIDES
ENERGY SIMULATIONS****Technical Paper Publication: IMECE2021-71494**Iyad Hijazi - *Marshall University*Zhang Chaonan - *Marshall University*Robert Fuller - *Marshall University***10:40AM–10:50AM:****ADDRESSING CRYOGENIC DIELECTRIC MATERIAL
CHALLENGES IN HIGH-TEMPERATURE
SUPERCONDUCTING CABLES WITH POLYAMIDE/
SILICA NANOCOMPOSITE THIN FILMS****Technical Presentation: IMECE2021-77199**Jacob Mahon - *Rowan University*Jordan Cook - *Rowan University*Nicholas Pagliocca - *Rowan University*Virginia Harnack - *Rowan University*Behrad Koohbor - *Rowan University*Robert Krchnavek - *Rowan University*Wei Xue - *Rowan University***10:50AM–11:00AM:****ENERGY SENSITIVITY OF SCATTERING FOR
CHARGE, ENERGY AND ENTROPY CARRIERS IN
CARBON NANOMATERIALS****Technical Presentation: IMECE2021-77364**Shuang Tang - *SUNY Polytechnic Institute*

**01-04-01:
ANALYTICAL AND COMPUTATIONAL ACOUSTICS
AND VIBRATIONS
NOVEMBER 3, 2021**

10:00AM–11:30AM

Chair: Mostafa Nough - *University at Buffalo*
Chair: Yongfeng Xu - *University of Cincinnati*
Chair: Guoliang Huang - *University of Missouri*

10:00AM–10:10AM:

**MODEL REDUCTION FOR MID-FREQUENCY
TRANSIENT VIBRATION ANALYSIS OF BEAM
STRUCTURES BY THE AUGMENTED DTFM**

Technical Paper Publication: IMECE2021-69979

Yichi Zhang - *University of Southern California*
Bingen Yang - *University of Southern California*

10:10AM–10:20AM:

**VIBRO-ACOUSTIC ULTRASONIC RESONANT
BEHAVIOR IN SKULL AND CRANIAL CONTENTS**

Technical Paper Publication: IMECE2021-70038

Christopher M. Dumm - *University of Pittsburgh*
Anna C. Hiers - *University of Pittsburgh*
David B. Maupin - *University of Pittsburgh*
Marianne E. Cites - *University of Pittsburgh*
George E. Klinzing - *University of Pittsburgh*
Carey D. Balaban - *University of Pittsburgh*
Jeffrey S. Viperman - *University of Pittsburgh*

10:20AM–10:30AM:

**RESEARCH ON CONTROL STRATEGY OF
AUTOMOBILE SIMULATE SOUND BASED ON
HARMONIC ALGORITHM**

Technical Paper Publication: IMECE2021-70700

Zhien Liu - *Wuhan University of Technology*
Rongpei Qin - *Wuhan University of Technology*
Liping Xie - *Wuhan University of Technology*
Kai Liu - *Wuhan University of Technology*

10:30AM–10:40AM:

**PREDICTION OF A BLAST-INDUCED PEAK
PARTICLE VELOCITY IN MINING OPERATIONS:
A FUZZY MAMDANI- AND ANFIS-BASED
EVALUATING METHODOLOGY**

Technical Paper Publication: IMECE2021-71256

Mosa Machesa - *University of Johannesburg*
Lagouge K. Tartibu - *University of Johannesburg*
Modestus O. Okwu - *University of Johannesburg*

10:40AM–10:50AM:

**ACOUSTIC EMISSION-BASED STRUCTURAL HEALTH
MONITORING FOR FUTURE LUNAR PIPELINES**

Technical Paper Publication: IMECE2021-71429

Mario Escarcega - *New Mexico Institute of Mining and Technology*
Meghan Cephus - *New Mexico Institute of Mining and Technology*
Skyler Hughes - *New Mexico Institute of Mining and Technology*
Nakii Tsose - *New Mexico Institute of Mining and Technology*
Kimberly Kelso - *New Mexico Institute of Mining and Technology*
Raechelle Sandoval - *New Mexico Institute of Mining and Technology*
Arvin Ebrahimkhanlou - *New Mexico Institute of Mining and Technology*

10:50AM–11:00AM:

**SIMULATION OF WAVE PROPAGATION IN
BIOMIMETIC POROUS SCAFFOLD USING ARTIFICIAL
NEURAL NETWORK**

Technical Paper Publication: IMECE2021-74492

Mohammad Hodaei - *University of Manitoba*
Pooneh Maghoul - *University of Manitoba*



02-03-01: METROLOGY
NOVEMBER 3, 2021

10:00AM–11:30AM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

10:00AM–10:10AM:

**INFLUENCE OF CUTTING CONDITIONS ON
 DIMENSIONAL INTEGRITY**

Technical Paper Publication: IMECE2021-66625

Sumesh Narayan - *University of the South Pacific*
 Abhishek Kumar - *University of the South Pacific*
 Aruf Ali - *University of the South Pacific*
 Kabir Mamun - *University of the South Pacific*

10:10AM–10:20AM:

**EFFECTS OF THICKNESS VARIATION DUE TO
 PRESENCE OF ROLLER WAKE ON THE
 THICKNESS MEASUREMENT USING LASER
 ULTRASONIC TECHNIQUE**

Technical Paper Publication: IMECE2021-69052

Md. Abdur Rahim - *Saitama University*
 Yoshio Arai - *Saitama University*
 Wakako Araki - *Saitama University*
 Noriyasu Yamada - *Saitama University*

10:20AM–10:30AM:

**GEOMETRIC MODELING AND CHARACTERIZATION
 OF WALL THICKNESS FOR COMPLEX CYLINDRICAL
 THIN-WALLED PARTS WITH UNCERTAIN
 MANUFACTURING DEVIATIONS**

Technical Paper Publication: IMECE2021-73185

Pengyuan Chen - *Shanghai Jiao Tong University*
 Shun Liu - *Shanghai Jiao Tong University*
 Sun Jin - *Shanghai Jiao Tong University*
 Qunfei Gu - *Shanghai Jiao Tong University*

10:30AM–10:40AM:

**DEVELOPMENT OF AN AUTOMATIC
 DETECTION AND REGULATION MODEL OF
 BRUSH WIRE PRESSURE FOR A MICRO
 AEROSPACE COMPONENTS**

Technical Paper Publication: IMECE2021-70259

Yonggang Kang - *Northwestern Polytechnical University*
 Haodi Ren - *Northwestern Polytechnical University*

10:40AM–10:50AM:

Inline Topology Measurement of Material Jetted Metal Parts

Technical Paper Publication: IMECE2021-70279

Christoph Rehekampff - *Technical University of Munich*
 Benedikt Kirchebner - *Technical University of Munich*
 Florian Krebs - *Technical University of Munich*
 Franz Irlinger - *Technical University of Munich*
 Tim C. Lueth - *Technical University of Munich*

10:50AM–11:00AM:

**DEVELOPMENT OF A ROBUST AND REAL-TIME
 THERMAL DEFORMATION PREDICTION SYSTEM
 FOR MACHINE TOOL BY MULTI-POINT
 TEMPERATURE MEASUREMENT**

Technical Paper Publication: IMECE2021-71091

Shun Tanaka - *University of Tokyo*
 Yuya Marukawa - *University of Tokyo*
 Toru Kizaki - *University of Tokyo*
 Kenichi Tomita - *Komatsu, Ltd.*
 Shinji Tsujimura - *Komatsu, Ltd.*
 Daisuke Noda - *Komatsu NTC, Ltd.*
 Hisashi Kobayashi - *Komatsu NTC, Ltd.*
 Naohiko Sugita - *University of Tokyo*



02-02-01:**ADDITIVE MANUFACTURING OF HEAT TRANSFER EQUIPMENT
NOVEMBER 3, 2021****10:00AM–11:30AM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***10:00AM–10:10AM:****RECENT ADVANCES IN THIN-WALL ADDITIVELY MANUFACTURED HEAT EXCHANGERS****Technical Paper Publication: IMECE2021-73212**Arun Muley - *Boeing Research and Technology*Michael Stoia - *Boeing Research and Technology*Doug Van Affelen - *Boeing Research and Technology*Venkateswara Reddy - *Boeing Research and Technology*Vyas Duggirala - *Boeing Research and Technology*Summer Locke - *Boeing Research and Technology***10:10AM–10:20AM:****PARAMETRIC EVALUATION OF AM ENABLED SINUSOIDAL HEAT TRANSFER SURFACES THROUGH NUMERICAL SIMULATIONS****Technical Paper Publication: IMECE2021-69552**Vyas Duggirala - *Boeing Research & Technology*Venkateswara Reddy - *Boeing Research & Technology*Arun Muley - *Boeing Research & Technology*Michael Stoia - *Boeing Research & Technology*Garrett Ek - *Boeing Research & Technology***10:20AM–10:30AM:****PROCESS MAPPING OF ADDITIVELY-MANUFACTURED METALLIC WICKS THROUGH SURROGATE MODELING****Technical Paper Publication: IMECE2021-71241**Mohammad Borumand - *Wichita State University*Sima Esfandiarpour Borujeni - *Wichita State University*Saideep Nannapaneni - *Wichita State University*Moriah Ausherman - *Wichita State University*Guru Madiraddy - *University of Nebraska-Lincoln*Michael Sealy - *University of Nebraska-Lincoln*Gisuk Hwang - *Wichita State University***10:30AM–10:40AM:****MODELING THE EFFECTS OF SURFACE ROUGHNESS VARIATIONS ON PRESSURE DROP IN FLOW MINICHANNELS****Technical Paper Publication: IMECE2021-72042**Abdulaziz Alghamdi - *Western New England University*Suliman Alfaiz - *Western New England University*Marwan Alsulami - *Western New England University*Mehdi Mortazavi - *Western New England University*Seyed A. Niknam - *Western New England University***10:40AM–10:50AM:****NUCLEAR AND ION IRRADIATION OF ADDITIVELY MANUFACTURED NICKEL-BASED SUPERALLOYS****Technical Presentation: IMECE2021-77500**Mohanish Andurkar - *Kansas State University*Valentina O'Donnell - *University of Missouri*Tahmina Keya - *Auburn University*John Gahl - *University of Missouri*Bart Prorok - *Auburn University*Scott Thompson - *Kansas State University*

10:50AM–11:00AM:**SOLID PARTICLE EROSION BEHAVIOR OF ELECTRON BEAM MELTED (EBM) Ti6Al4V AT DIFFERENT BUILT ORIENTATION****Technical Paper Publication: IMECE2021-71776**

Mohammad Sayem Bin Abdullah - *University of Washington*
 Abdullah F. Alajmi - *University of Washington*
 M. Ramulu - *University of Washington*

02-05-01:**ADVANCED MACHINING AND FINISHING PROCESSES-I NOVEMBER 3, 2021****10:00AM–11:30AM**

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

10:00AM–10:10AM:**OPTIMIZATION OF CNC MILLING OF GENERAL-PURPOSE POLY (METHYL METHACRYLATE)****Technical Paper Publication: IMECE2021-68756**

F. M. Mwema - *Dedan Kimathi University of Technology*
 J. M. Wambua - *Dedan Kimathi University of Technology*
 E. T. Akinlabi - *Pan African University for Life and Earth Sciences Institute*
 Buddi Tanya - *Gokaraju Rakaraju Institute of Engineering & Technology*

10:10AM–10:20AM:**STABILITY PERFORMANCE OF A STOCHASTIC TOOLPATH IN MACHINING****Technical Paper Publication: IMECE2021-69264**

Tyler J. Grimm - *Clemson University*
 Niles Ashok Kharat - *Clemson University*
 Nils Potthoff - *Technische Universität Dortmund*
 Laine Mears - *Clemson University*
 Petra Wiederkehr - *Technische Universität Dortmund*

10:20AM–10:30AM:**PROCESS PARAMETER OPTIMIZATION IN MACHINING OF T-TIAL WITH HEXAGONAL INSERTS****Technical Paper Publication: IMECE2021-69934**

Ching-Tun Peng - *Jiangsu University*
 Iqbal Shareef - *Bradley University*

10:30AM–10:40AM:**CONTROLLING GLOBAL SURFACE VARIATIONS IN FACE MILLING OF VARIABLE STIFFNESS STRUCTURE BASED ON ITERATIVE PREDICTION VIA FEMU AND GA****Technical Paper Publication: IMECE2021-71201**

Shun Liu - *Shanghai Jiao Tong University*
 Sun Jin - *Shanghai Jiao Tong University*
 Ang Tian - *Shanghai Jiao Tong University*
 Qunfei Gu - *Shanghai Jiao Tong University*
 Kun Chen - *Shanghai Jiao Tong University*
 Wei Mo - *Shanghai Jiao Tong University*

10:40AM–10:50AM:**EXPERIMENTAL INVESTIGATION ON SURFACE INTEGRITY IN MICRO-END MILLING OF NETWORK-STRUCTURED TiBw/Ta15 COMPOSITES****Technical Paper Publication: IMECE2021-72447**

Minghui Yang - *Huazhong University of Science and Technology*
 Yu Huang - *Huazhong University of Science and Technology*
 Fangyu Peng - *Huazhong University of Science and Technology*
 Yan Rong - *Huazhong University of Science and Technology*
 Ben Deng - *Huazhong University of Science and Technology*
 Fuqiang Han - *Huazhong University of Science and Technology*



10:50AM–11:00AM:**A NUMERICAL STUDY TO INVESTIGATE MACHINING ASPECTS OF CONVEX SURFACE DRILLING****Technical Paper Publication: IMECE2021-73672**

Jonathan Lewis - Rochester Institute of Technology - Dubai
 Salman Pervaiz - Rochester Institute of Technology - Dubai
 Sathish Kannan - American University of Sharjah

**03-05-01: MATERIALS PROCESSING AND CHARACTERIZATION
NOVEMBER 3, 2021****10:00AM–11:30AM**

Chair: Hareesh Tippur - Auburn University
 Chair: Caglar Oskay - Vanderbilt University

10:00AM–10:20AM:**EFFECT OF MOISTURE ABSORPTION ON THE TENSILE AND FLEXURAL PROPERTIES OF GLASS FIBER REINFORCED COMPOSITE MATERIALS****Invited Presentation: IMECE2021-69865**

Raghu Prakash - Indian Institute of Technology Madras
 Vishnu Viswanath - Indian Institute of Technology Madras

10:20AM–10:30AM:**MULTI RESPONSE OPTIMIZATION OF FRICTION STIR PROCESS PARAMETERS FOR AA2024 / SIC COMPOSITE FABRICATED USING FRICTION STIR PROCESSING****Technical Paper Publication: IMECE2021-68010**

Akash Manickam - Anna University
 Raman Kuppusamy - Anna University
 Sudha Jayaprakasham - Anna University
 Senthil Kumar Santhanam - Anna University

10:30AM–10:40AM:**COMPRESSIVE STRESS RELAXATION (CSR) TESTING OF ELASTOMERS****Technical Paper Publication: IMECE2021-68181**

Dilip Menon - Gannon University
 Robert J. Michael - Gannon University
 David Gee - Gannon University

10:40AM–10:50AM:**MECHANICAL AND THERMAL CHARACTERIZATION OF SILICA PARTICLE-REINFORCED POLYMER COMPOSITES****Technical Paper Publication: IMECE2021-68595**

Hassan K. Langat - Dedan Kimathi University of Technology
 J.K. Keraita - Dedan Kimathi University of Technology
 F.M. Mwema - Dedan Kimathi University of Technology
 E.T. Akinlabi - Pan African University of Life and Earth Sciences, University of Ibadan

10:50AM–11:00AM:**X-RAY COMPUTED TOMOGRAPHY (XCT) SCANNING PARAMETERS EFFECTS ON THE HOUNSFIELD UNIT (HU) MEASUREMENTS FOR AA2011****Technical Paper Publication: IMECE2021-67415**

Ahmad M.R. Baydoun - American University of Beirut
 Ramsey F. Hamade - American University of Beirut

**05-02-01:
INJURY AND DAMAGE BIOMECHANICS I
NOVEMBER 3, 2021**

10:00AM–11:30AM

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*

10:00AM–10:20AM:
REGIONAL STRAIN RESPONSE OF AN ANATOMICALLY ACCURATE FINITE ELEMENT HEAD MODEL}
Invited Presentation: IMECE2021-67500

John Humm - *Medical College of Wisconsin*
 Jamie L. Baisden - *Medical College of Wisconsin*
 Valeta Carol Chancey - *U.S. Army Aeromedical Research Laboratory*
 Narayan Yoganandan - *Medical College of Wisconsin*
 Tyler Rooks - *U.S. Army Aeromedical Research Laboratory*

10:20AM–10:30AM:
LOWER LIMB JOINT REACTION FORCES AND MOMENTS CALCULATIONS FOR A 'DABKE JUMP': APPLICATION OF 3D INVERSE DYNAMICS TECHNIQUE
Technical Paper Publication: IMECE2021-68282

Perla C. Sammour - *Notre Dame University – Louaize*
 Ilige S. Hage - *Notre Dame University – Louaize*
 Chady Ghnatios - *Notre Dame University – Louaize*
 Najib Metni - *Notre Dame University-Louaize*
 Re-Mi S. Hage - *Notre Dame University – Louaize*
 Ramsey F. Hamade - *American University of Beirut*

10:30AM–10:40AM:
A TWO-DIMENSIONAL SUBJECT-SPECIFIC HUMAN HEAD MODEL BASED ON THE VISCOUS DISSIPATION-BASED VISCO-HYPERELASTIC CONSTITUTIVE FRAMEWORK
Technical Presentation: IMECE2021-70005

Kshitiz Upadhyay - *Johns Hopkins University*
 Ahmed Alshareef - *Johns Hopkins University*
 Andrew K. Knutsen - *The Henry M. Jackson Foundation for the Advancement of Military Medicine*
 Curtis Johnson - *University of Delaware*
 K.T. Ramesh - *Johns Hopkins University*

10:40AM–10:50AM:
SUBJECT-SPECIFIC 3D BRAIN SIMULATIONS USING HETEROGENOUS, LINEAR VISCOELASTIC MATERIAL PROPERTIES DERIVED FROM MAGNETIC RESONANCE ELASTOGRAPHY
Technical Presentation: IMECE2021-70082

Ahmed Alshareef - *The Johns Hopkins University*
 Andrew K. Knutsen - *The Henry M. Jackson Foundation*
 Curtis L. Johnson - *University of Delaware*
 Aaron Carass - *The Johns Hopkins University*
 Kshitiz Upadhyay - *The Johns Hopkins University*
 Jerry L. Prince - *The Johns Hopkins University*
 K.T. Ramesh - *The Johns Hopkins University*

10:50AM–11:00AM:
IN SILICO MECHANOBIOLOGY OF REPEATED NEURO-AXONAL INJURY
Technical Presentation: IMECE2021-71268

Harsha Teja Garimella - *CFD Research Corp.*
 Andrzej Przekwas - *CFD Research Corp.*
 Zhijian Chen - *CFD Research Corp.*
 Gurdip Uppal - *CFD Research Corp.*
 Raj Gupta - *DoD Blast Injury Research Coordinating Office*



08-02-01: FUNDAMENTALS AND APPLICATIONS OF THERMODYNAMICS
NOVEMBER 3, 2021

10:00AM–11:30AM

Chair: Hohyun Lee - *Santa Clara University*
Chair: Soumik Banerjee - *Washington State University*
Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
Chair: Michail Nitsas - *National Technical University of Athens*

10:00AM–10:10AM:

ADVANCED EXERGETIC ANALYSIS OF PREHEAT TRAIN OF A CRUDE OIL DISTILLATION UNIT

Technical Paper Publication: IMECE2021-69268

Juan Fajardo - *Universidad Tecnológica de Bolívar*
Camilo Negrete - *Universidad Tecnológica de Bolívar*
Daniel Yabrudy - *Universidad Tecnológica de Bolívar*
Camilo Cardona - *Ecopetrol*

10:10AM–10:20AM:

STUDYING THE SUPERFLUID TRANSFORMATION IN HELIUM 4 THROUGH THE PARTITION FUNCTION AND ENTROPIC BEHAVIOR

Technical Paper Publication: IMECE2021-70225

G-R. Domenikos - *National Technical University of Athens*
E. Rogdakis - *National Technical University of Athens*
I. Koronaki - *National Technical University of Athens*

10:20AM–10:30AM:

CONTINUOUS EQUATION OF STATE AND THERMODYNAMIC MAPS FOR CRYOGENIC HELIUM 4

Technical Paper Publication: IMECE2021-70257

G-R. Domenikos - *National Technical University of Athens*
E. Rogdakis - *National Technical University of Athens*
I. Koronaki - *National Technical University of Athens*

10:30AM–10:40AM:

THERMODYNAMIC BEHAVIOR AND EQUATION OF STATE FOR CRYOGENIC HELIUM 3-4 MIXTURES

Technical Paper Publication: IMECE2021-70314

G-R. Domenikos - *National Technical University of Athens*
E. Rogdakis - *National Technical University of Athens*
I. Koronaki - *National Technical University of Athens*

10:40AM–10:50 AM

CONVENTIONAL AND ADVANCED EXERGETIC ANALYSIS FOR THE COMBINED CYCLE OF POWER PLANT WITH GAS TURBINE OF A REFINERY

Technical Paper Publication: IMECE2021-70521

Juan Fajardo - *Universidad Tecnológica de Bolívar*
Dawing Guette - *Universidad Tecnológica de Bolívar*
Deibys Barreto - *Universidad Tecnológica de Bolívar*
Camilo Cardona - *ECOPETROL*
Ildefonso Baldiris - *SENA-Centro Internacional Náutico, Fluvial y Portuario*

10:50AM–11:00AM:

ANALYSIS AND MODELING OF VAPOR-LIQUID INTERACTIONS IN CONDENSING EJECTORS

Technical Paper Publication: IMECE2021-70524

Nanqiao Wang - *Mississippi State University*
Nirmal Bhatt - *Mississippi State University*
Shanti Bhushan - *Mississippi State University*
Heejin Cho - *Mississippi State University*
Like Li - *Mississippi State University*



**08-01-01:
ENERGY-RELATED MULTIDISCIPLINARY I
NOVEMBER 3, 2021**

10:00AM–11:30AM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

10:00AM–10:10AM:

**INVESTIGATION OF A COANDA-EFFECT ENHANCED
HVAC DIFFUSER USING CFD ANALYSIS**

Technical Paper Publication: IMECE2021-69036

Hussein Kokash - *Wayne State University*
 Mihai G. Burzo - *University of Michigan*
 Khalil Khanafer - *University of Michigan*
 Bharat Gokeda - *University of Michigan*

10:10AM–10:20AM:

**ELECTROSTATIC DUST REMOVAL FROM SOLAR
PANELS FOR WATERLESS POWER RECOVERY**

Technical Presentation: IMECE2021-69683

Sreedath Panat - *Massachusetts Institute of Technology*
 Kripa Varanasi - *Massachusetts Institute of Technology*

10:20AM–10:30AM:

**CLIMATE CHANGE AND GLOBAL WARMING:
THE FORGOTTEN FACTORS**

Technical Paper Publication: IMECE2021-70096

Gary K. Conkol - *Conkol Computing Services*

10:30AM–10:40AM:

**RESIDENTIAL APPLIANCE USAGE PATTERNS FROM
OVERALL ENERGY CONSUMPTION DATA: A
STATISTICAL MACHINE LEARNING APPROACH**

Technical Paper Publication: IMECE2021-70122

Arkasama Bandyopadhyay - *Texas A&M University*
 Anirban Bhattacharya - *Texas A&M University*

10:40AM–10:50AM:

**3D PRINTED AND NICKEL-COATED ELECTRODES
FOR PHOTOCATALYTIC ELECTROLYSIS FOR
HYDROGEN GENERATION**

Technical Paper Publication: IMECE2021-70318

Babacar Ndoye - *University of the District of Columbia*
 Noufou Ouedraogo - *University of the District of Columbia*
 Wondwosen Demisse - *University of the District of Columbia*
 Andrew Grizzle - *University of the District of Columbia*
 Eva Mutunga - *University of the District of Columbia*
 Pawan Tyagi - *University of the District of Columbia*

10:50AM–11:00AM:

**A METHODOLOGY FOR RISK ASSESSMENT TO
IMPROVE THE RESILIENCE AND SUSTAINABILITY OF
CRITICAL INFRASTRUCTURE WITH CASE STUDIES
FROM THE UNITED STATES ARMY**

Technical Paper Publication: IMECE2021-70839

Neil Blackwell - *United States Military Academy*
 Aubrey Evans - *United States Military Academy*
 Phoebe Lee - *United States Military Academy*
 Christine Panlasigui - *United States Military Academy*
 Duncan Russell - *United States Military Academy*
 Ke'shaun Wells - *United States Military Academy*
 Stephen McCarthy - *United States Military Academy*
 Brad McCoy - *United States Military Academy*
 F. Todd Davidson - *United States Military Academy*



10-07-01: MULTIPHASE FLOWS
NOVEMBER 3, 2021

10:00AM–11:30AM

Chair: Philipp Epple - Coburg University of Applied Sciences
Chair: Kamran Siddiqui - University of Western Ontario

10:00AM–10:10AM:

CRITICAL SHEAR STRESS FOR EROSION UNDER LAMINAR JET FLOW

Technical Paper Publication: **IMECE2021-67639**

Judith Bamberger - Pacific Northwest National Laboratory
Leonard Pease - Pacific Northwest National Laboratory
Michael Minette - Pacific Northwest National Laboratory

10:10AM–10:20AM:

EXPERIMENTAL STUDY OF GAS-LIQUID DISPLACEMENT IN A POROUS MEDIA MICROCHIP BY DIGITAL IMAGE ANALYSIS METHOD

Technical Paper Publication: **IMECE2021-69902**

Shuo Yang - Lund University
Gaopan Kong - Lund University
Zan Wu - Lund University

10:20AM–10:30AM:

TRANSIENT TWO-PHASE FLOW PRESSURE DROP DURING DROPLET EMERGENCE AND GROWTH IN GAS FLOW CHANNELS

Technical Paper Publication: **IMECE2021-71869**

Mehdi Mortazavi - Western New England University
Cade Watkins - Western New England University
Colin Murchie - Western New England University

10:30AM–10:40AM:

HELIUM DEGASSING FILTER FOR MERCURY PROCESS GAS LIQUID SEPARATOR

Technical Paper Publication: **IMECE2021-72699**

Justin Weinmeister - Oak Ridge National Laboratory
Dustin Ottinger - Oak Ridge National Laboratory
Charlotte Barbier - Oak Ridge National Laboratory

10:40AM–10:50AM:

DYNAMICS OF DROPLETS IN CORE GAS FLOW SUPERIMPOSED WITH ACOUSTIC PRESSURE WAVES

Technical Paper Publication: **IMECE2021-72011**

Mehdi Mortazavi - Western New England University
Taylor Pedley - Western New England University

11-13-01:
FUNDAMENTALS AND APPLICATIONS OF EVAPORATION, BOILING, AND CONDENSATION
NOVEMBER 3, 2021

10:00AM–11:30AM

Chair: Subramanyaravi Annapragada - United Technologies Research
Chair: Kevin Dowding – Sandia National Laboratories
Chair: Alexander Rattner - Penn State University

10:00AM–10:10AM:

EXPERIMENTAL STUDY OF HEAT TRANSFER CHARACTERISTICS OF DRYING PROCESS WITH DIELECTROPHORESIS MECHANISM



Technical Paper Publication: IMECE2021-69545

Mengqiao Yang - Worcester Polytechnic Institute
 Munevver Elif Asar - Worcester Polytechnic Institute
 Jamal Yagoobi - Worcester Polytechnic Institute

10:10AM–10:20AM:**SURFACE EVAPORATION OF SESSILE WATER DROPLET ON A HYDROPHOBIC SURFACE****Technical Paper Publication: IMECE2021-72622**

Minwoo Lee - University of Missouri
 Chanwoo Park - University of Missouri

10:20AM–10:30AM:**EXPERIMENTAL INVESTIGATION ON THE EFFECT OF CONDENSER LENGTH ON THE HEAT TRANSFER PERFORMANCE OF AN Ω -SHAPED CRYOGENIC AXIALLY GROOVED HEAT PIPE****Technical Paper Publication: IMECE2021-73182**

Yongyan Li - Shanghai Institute of Technical Physics Chinese Academy of Sciences
 Nanxi Li - Shanghai Institute of Technical Physics Chinese Academy of Sciences
 Deping Dong - Shanghai Institute of Technical Physics Chinese Academy of Sciences

10:30AM–10:40AM:**THREE-DIMENSIONAL NUMERICAL STUDY ON THE FLOW AND HEAT TRANSFER IN WICK OF LOOP HEAT PIPE****Technical Paper Publication: IMECE2021-73527**

Bo Shao - Shanghai Institute of Technical Physics of the Chinese Academy of Sciences
 Nanxi Li - Shanghai Institute of Technical Physics of the Chinese Academy of Sciences
 Yu Chen - Shanghai Institute of Technical Physics of the Chinese Academy of Sciences
 Deping Dong - Shanghai Institute of Technical Physics of the Chinese Academy of Sciences

10:40AM–10:50AM:**A DYNAMIC FLASH EVAPORATION AND VAPOR SEPARATION SYSTEM FOR SEAWATER DESALINATION****Technical Presentation: IMECE2021-76775**

Vasudevan Chandramouli - University of California, Los Angeles
 Jin Jen - University of California, Los Angeles
 Vijay Dhir - University of California, Los Angeles

10:50AM–11:00AM:**TEMPERATURE JUMP ACROSS THE LIQUID-GAS INTERFACE OF AN EVAPORATING NANODROPLET: A MOLECULAR DYNAMICS STUDY****Technical Presentation: IMECE2021-77005**

Zhi Liang - California State University, Fresno
 Jesus Gutierrez Plascencia - California State University, Fresno
 Eric Bird - California State University, Fresno

11-09-01:**THERMAL TRANSPORT ACROSS INTERFACES I NOVEMBER 3, 2021****10:00AM–11:30AM**

Chair: Subramanyaravi Annapragada - United Technologies Research
 Chair: Kevin Dowding - Sandia National Laboratories
 Chair: Alexander Rattner - Penn State University

10:00AM–10:10AM:**INVESTIGATIONS TO CONSIDER THERMAL INTERACTIONS BETWEEN SPATIALLY SEPARATED SUBSYSTEMS: CONCEPT OF A THERMAL COUPLING SYSTEM FOR X-IN-THE-LOOP TEST BENCHES**

Technical Paper Publication: IMECE2021-69159

Felix Leitenberger - Karlsruhe Institute of Technology
 Michael Steck - Karlsruhe Institute of Technology
 Thomas Gwosch - Karlsruhe Institute of Technology
 Sven Matthiesen - Karlsruhe Institute of Technology

10:10AM–10:20AM:

PHONON SCATTERING FROM CARBON NANOTUBE AND GRAPHENE JUNCTION UNDER MECHANICAL DEFORMATION

Technical Paper Publication: IMECE2021-70349

Ian Durr - Kennesaw State University
 Matheus Prates - Kennesaw State University
 Jungkyu Park - Kennesaw State University

10:20AM–10:30AM:

THERMAL TRANSPORT IN CARBON NANOCOMPOSITES UNDER MECHANICAL STRAIN

Technical Paper Publication: IMECE2021-70556

Jungkyu Park - Kennesaw State University
 Nick Kinports - Kennesaw State University
 Jihad Kudsy - Kennesaw State University

10:30AM–10:40AM:

A SCATTERING MATRIX SCHEME TO MODEL THE PERIODIC HEATING PROBLEM IN LAYERED STRUCTURES

Technical Presentation: IMECE2021-77267

Tao Li - Southeast University
 Zhen Chen - Southeast University

10:40AM–10:50AM:

MODULATING THE THERMAL TRANSPORT ACROSS SI/4H-SIC INTERFACE VIA NANOPATTERNS

Technical Presentation: IMECE2021-76073

Yixin Xu - Hongkong University of Science and Technology
 Yanguang Zhou - Hongkong University of Science and Technology

10:50AM–11:00AM:

MODELING ANISOTROPIC THERMAL TRANSPORT IN BLACK-PHOSPHORUS-LIKE MATERIALS

Technical Presentation: IMECE2021-77262

Hengrui Chen - Southeast University
 Zhen Chen - Southeast University

**12-16-02: GENERAL SESSION
 NOVEMBER 3, 2021**

10:00AM–11:30AM

Chair: Marco Amabili - McGill University
 Chair: Celia Reina - University of Pennsylvania

10:00AM–10:10AM:

APPLICATION OF TOPOLOGY OPTIMIZATION TO DESIGN A STRUCTURAL PANEL SUBJECTED TO BLAST LOADING

Technical Paper Publication: IMECE2021-66667

Gillian Schiffer - United States Military Academy
 Kevin McMullen - United States Military Academy
 Jakob Bruhl - United States Military Academy

10:10AM–10:20AM:

EXPERIMENTAL CHARACTERIZATION OF HYGROTHERMAL AGING: COMPETITION BETWEEN THERMO-OXIDATION AND HYDROLYSIS PHENOMENA



Technical Paper Publication: IMECE2021-69891

Mamoon Shaafaey - *Michigan State University*
 Amir Bahrololoumi - *Michigan State University*
 Hamid Mohammadi - *Michigan State University*
 Sharif Alazhary - *Michigan State University*
 Roozbeh Dargazany - *Michigan State University*

10:20AM–10:30AM:
**A GRAPH BASED DESIGN METHODOLOGY FOR
 COMPLIANT MECHANISMS (NONLINEAR SPRINGS)
 TO MORE FULLY EXPLORE AND EXPLOIT THE
 DESIGN DOMAIN**
Technical Paper Publication: IMECE2021-71271

Tanzeel Ur Rehman - *University of Michigan and Shanghai Jiao
 Tong University Joint Institute*
 Zeeshan Qaiser - *University of Michigan and Shanghai Jiao Tong
 University Joint Institute*
 Haihua Ou - *University of Michigan and Shanghai Jiao Tong Uni-
 versity Joint Institute*
 Haiping Yi - *University of Michigan and Shanghai Jiao Tong Uni-
 versity Joint Institute*
 Shane Johnson - *University of Michigan and Shanghai Jiao Tong
 University Joint Institute*

10:30AM–10:40AM:
**PROGRAMMABLE SOFT METASTRUCTURES VIA
 MULTI-MATERIAL
 TOPOLOGY OPTIMIZATION: PART I**
Technical Presentation: IMECE2021-74203

Xiaoja Shelly Zhang - *University of Illinois at
 Urbana Champaign*

10:40AM–10:50AM:
**PROGRAMMABLE SOFT METASTRUCTURES
 VIA MULTI-MATERIAL TOPOLOGY OPTIMIZATION:
 PART II**
Technical Presentation: IMECE2021-74206

Xiaoja Shelly Zhang - *University of Illinois at
 Urbana Champaign*

12-15-01:
**RECENT ADVANCES AND APPLICATIONS IN
 MESHFREE AND PARTICLE METHODS
 NOVEMBER 3, 2021**
10:00AM–11:30AM

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

10:00AM–10:10AM:
**AN IMPROVED RESPONSE FUNCTION BASED
 STOCHASTIC MESHLESS METHOD FOR BENDING
 ANALYSIS OF THIN PLATES**
Technical Paper Publication: IMECE2021-73429

Aswathy M. - *Indian Institute of Space Science and Technology*
 Arun C.O. - *Indian Institute of Space Science and Technology*

10:10AM–10:20AM:
**MODELING AND SIMULATION OF GRANULAR MEDIA
 USING PERIDYNAMICS**
Technical Presentation: IMECE2021-75443

Robert Lipton - *Louisiana State University*
 Debdeep Bhattacharya - *Louisiana State University*

10:20AM–10:30AM:
**THIN FILM FLOW MODELLING AND
 AUTOMOTIVE APPLICATIONS**
Technical Presentation: IMECE2021-76591

Pratik Suchde - *University of Luxembourg*



10:30AM–10:40AM:**AIR-BLAST-STRUCTURE INTERACTION SIMULATION USING AN IMMERSSED ISOGEOMETRIC-PERIDYNAMIC MODEL****Technical Presentation: IMECE2021-76598**

Masoud Behzadinasab - *Brown University*
 Georgios Moutsanidis - *Stony Brook University*
 Nathaniel Trask - *Sandia National Laboratories*
 Yuri Bazilevs - *Brown University*

10:40AM–10:50AM:**SHOTGUN INTERIOR BALLISTICS ANALYSIS BY DISCRETE ELEMENT METHOD: AN EXAMPLE OF BUCKSHOT****Technical Presentation: IMECE2021-77091**

Shigan Deng - *Chung Cheng Institute of Technology, National Defense University*
 Tung_chi Ken - *Chung Cheng Institute of Technology, National Defense University*
 Jason Wang - *Livermore Software Technology*

10:50AM–11:00AM:**ANALYSIS OF VARIOUS INDUSTRIAL THREAD FORMING PROCESSES USING A GALERKIN MESHFREE METHOD****Technical Presentation: IMECE2021-77238**

Youcai Wu - *Livermore Software Technology, an ANSYS Company*
 Xiaofei Pan - *Livermore Software Technology, an ANSYS Company*
 Wei Hu - *Livermore Software Technology, an ANSYS Company*
 C.T. Wu - *Livermore Software Technology, an ANSYS Company*

03-03-01:**PROCESSING AND DESIGN OF MATERIALS AND COMPONENTS FOR ADDITIVE MANUFACTURING NOVEMBER 3, 2021****12:55PM–2:25PM**

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

12:55PM–1:05PM:**THERMOPLASTICS 3D PRINTING USING FUSED DEPOSITION MODELING ON FABRICS****Technical Paper Publication: IMECE2021-69695**

Maxwell Blais - *University of Maine*
 Scott Tomlinson - *University of Maine*
 Bashir Khoda - *University of Maine*

1:05PM–1:15PM:**MECHANICAL PROPERTIES OF SNAP-FITS FABRICATED BY SELECTIVE LASER SINTERING FROM POLYAMIDE****Technical Paper Publication: IMECE2021-70328**

Samuel Detzel - *Technical University of Munich*
 Annette C. Sigling - *Technical University of Munich*
 Tim C. Lueth - *Technical University of Munich*

1:15PM–1:25PM:**STRENGTH AND QUALITIES OF MIXED ADDITIVE MANUFACTURING MATERIALS****Technical Paper Publication: IMECE2021-70564**

Seth Addeo - *United States Military Academy*
 Margaret Nowicki - *United States Military Academy*
 Kenneth McDonald - *United States Military Academy*
 Nicole Zander - *Army Research Laboratory*



1:25PM–1:35PM:**STRENGTH AND QUALITY OF RECYCLED ACRYLONITRILE BUTADIENE STYRENE (ABS)****Technical Paper Publication: IMECE2021-70583**Micah Bibb - *United States Military Academy*Margaret Nowicki - *United States Military Academy*Kenneth McDonald - *United States Military Academy*Nicole Zander - *Army Research Laboratory***1:35PM–1:45PM:****STUDY OF FLEXURAL STRENGTH AND FRACTURE OF ADDITIVE MANUFACTURED PARTS WITH STIFFENERS****Technical Paper Publication: IMECE2021-71519**P.V. Shyam - *Birla Institute of Technology and Science-Pilani*Srinivasa Prakash Regalla - *Birla Institute of Technology and Science-Pilani*Sampath Mylavaram - *Birla Institute of Technology and Science-Pilani*Sai Harshini Irigineni - *Birla Institute of Technology and Science-Pilani*Prakash Narayan Shrivastava - *University of Southern California***1:45PM–1:55PM:****IMAGING-BASED FATIGUE MECHANISM INVESTIGATION OF ADDITIVELY MANUFACTURED TI-6AL-4V****Technical Paper Publication: IMECE2021-72865**Jie Chen - *Arizona State University*Changyu Meng - *Arizona State University*Yongming Liu - *Arizona State University***05-10-01:****COMPUTATIONAL MODELING IN BIOMEDICAL APPLICATIONS I
NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***12:55PM–1:15PM:****COMPUTATIONAL MODELING AND ANALYSIS OF TURBULENT FLOWS IN THE HUMIDIFICATION UNIT OF THE CONTINUOUS POSITIVE AIRWAYS PRESSURE DEVICE****Invited Presentation: IMECE2021-68573**Ahmed Al-Jumaily - *Auckland University of Technology*Tung Xuan Vuong - *Manukau Institute of Technology***1:15PM–1:25PM:****FINITE ELEMENT MODEL OF A CULTURED VASCULAR SMOOTH MUSCLE CELL SUBJECTED TO UNIAXIAL STRETCH: EFFECT OF ORIENTATION ANGLE OF STRESS FIBERS ON BIOMECHANICAL RESPONSES****Technical Paper Publication: IMECE2021-68844**Atsutaka Tamura - *Tottori University*Kei Makabe - *Tottori University*Hatsune Yamashita - *Tottori University*Jun-ichi Hongu - *Tottori University***1:25PM–1:35PM:****PROBABILISTIC ESTIMATION OF POSTURE METRICS USING NOVEL LOADSOLS**

Technical Paper Publication: IMECE2021-69409

Dan Huynh - *Yale University*
 J. Josiah Steckenrider - *United States Military Academy*
 Gregory Freisinger - *United States Military Academy*

1:35PM–1:45PM:

A COMPARISON OF VISCO-HYPOELASTIC AND VISCO-HYPERELASTIC MODEL TO PREDICT THE ELASTIC STRAIN ENERGY FOR ARTICULAR CARTILAGE OF KNEE JOINT

Technical Paper Publication: IMECE2021-69494

Roberto González-Navarrete - *Universidad de Guanajuato*
 Agustin Vidal-Lesso - *Universidad de Guanajuato*
 Héctor Plascencia-Mora - *Universidad de Guanajuato*
 Xavier Ulises Huerta-Jacobo - *Universidad de Guanajuato*

1:45PM–1:55PM:

PREDICTION OF THROMBUS FORMATION AROUND A PERIPHERAL INTRAVENOUS CATHETER FOR INFANTS

Technical Presentation: IMECE2021-69710

Yuko Miyamura - *Kagoshima Immaculate Heart University/ Kyushu Institute of Technology*
 Kairi Komatani - *Kyushu Institute of Technology*
 Masaaki Tamagawa - *Kyushu Institute of Technology*

**01-08-01:
 VIBRATION AND ACOUSTIC MEASUREMENTS,
 SIGNAL PROCESSING, AND TEST FACILITIES
 NOVEMBER 3, 2021**

12:55PM–2:25PM

Chair: Mostafa Nough - *University at Buffalo*
 Chair: Yongfeng Xu - *University of Cincinnati*
 Chair: Guoliang Huang - *University of Missouri*

12:55PM–1:05PM:

SPATIAL LOCALIZATION OF AIR INCLUSIONS IN CARBON FIBER T-BEAM, BY USE OF WAVELET ENTROPY TIME SERIES FROM HAMMER TAP TEST

Technical Paper Publication: IMECE2021-67591

Spyridon Brouzas - *National Technical University of Athens*
 Ioannis Georgiou - *National Technical University of Athens*

1:05PM–1:15PM:

A COMPARATIVE STUDY OF ADAPTIVE MODE DECOMPOSITION METHODS FOR MODAL RESPONSE EXTRACTION

Technical Paper Publication: IMECE2021-68378

Yabin Liao - *Embry–Riddle Aeronautical University*
 Mark Sensmeier - *Embry–Riddle Aeronautical University*

1:15PM–1:25PM:

ANALYSIS AND OPTIMIZATION OF THE RECOIL-COMPENSATED ABSOLUTE GRAVIMETER

Technical Paper Publication: IMECE2021-68659

Yicong Chen - *Tsinghua University*
 Kang Wu - *Tsinghua University*
 Yi Wen - *Tsinghua University*
 Lijun Wang - *Tsinghua University*

1:25PM–1:35PM:

OPERATIONAL MODAL ANALYSIS OF A ROTATING STRUCTURE SUBJECT TO RANDOM EXCITATION USING A TRACKING CONTINUOUSLY SCANNING LASER DOPPLER VIBROMETER VIA A TWO-DIMENSIONAL SCAN SCHEME

Technical Paper Publication: IMECE2021-71521

Linfeng Lyu - *University of Maryland*
 Weidong Zhu - *University of Maryland*



1:35PM–1:45PM:**OUTPUT-ONLY STRUCTURAL SYSTEM IDENTIFICATION BASED ON SYMPLECTIC GEOMETRY MODE DECOMPOSITION****Technical Paper Publication: IMECE2021-68740**Zhan Pengming - *Tongji University*Qin Xianrong - *Tongji University*Zhang Qing - *Tongji University*Sun Yuantao - *Tongji University***1:45PM–1:55PM:****REAL-TIME SOUND SOURCE LOCALIZATION USING A PARABOLIC REFLECTOR****Technical Paper Publication: IMECE2021-70385**Chang Liu - *Northeastern University*Xu Mao - *Northeastern University*Chang Wang - *Northeastern University*Juan Heredia Juesas - *Northeastern University*Jose Angel Martinez-Lorenzo - *Northeastern University***02-03-02:****NONDESTRUCTIVE EVALUATION
NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***12:55PM–1:05PM:****EXTENDING THE MEASUREMENT CAPABILITIES OF HIGH-RESOLUTION X-RAY COMPUTED TOMOGRAPHY MICROSCOPES TO DIMENSIONAL METROLOGY****Technical Presentation: IMECE2021-76375**Herminso Villarraga-Gomez - *ZEISS Industrial Quality Solutions***1:05PM–1:15PM:****APPLICATION OF DATA PROCESSING AND MACHINE LEARNING TECHNIQUES FOR IN SITU MONITORING OF METAL ADDITIVE MANUFACTURING USING ACOUSTIC EMISSION DATA****Technical Paper Publication: IMECE2021-68835**Md Shahjahan Hossain - *Georgia Southern University*Hossein Taheri - *Georgia Southern University***1:15PM–1:25PM:****IMAGE-GUIDED MULTI-RESPONSE MODELING AND CHARACTERIZATION OF DESIGN DEFECTS IN METAL ADDITIVE MANUFACTURING****Technical Paper Publication: IMECE2021-71966**Farhad Imani - *University of Connecticut*Mojtaba Khanzadeh - *Amazon.com***1:25PM–1:35PM:****PRELIMINARY INVESTIGATION ON THE ACOUSTIC CHARACTERISTICS OF TURNING PROCESSES****Technical Paper Publication: IMECE2021-72923**Scott Kerner - *Clemson University*Zachery Deabenderfer - *Penn State University*Katherine Korn - *Penn State University, Erie*Ihab Ragai - *Penn State University, Erie*Yabin Liao - *Embry-Riddle Aeronautical University*David Loker - *Penn State University*

1:35PM–1:45PM:**NONDESTRUCTIVE EDDY CURRENT ARRAY (ECA) TECHNIQUE FOR STRESS CORROSION CRACKING (SCC) DETECTION AND ASSESSMENT****Technical Paper Publication: IMECE2021-73232**

Hossein Taheri - *Georgia Southern University*
 Md Shahjahan Hossain - *Georgia Southern University*
 Cameron Alexis Jones - *Georgia Southern University*

1:45PM–1:55PM:**DISTRIBUTION AND MORPHOLOGY OF PORES IN ADDITIVE MANUFACTURED Ti-6Al-4V AND THEIR EFFECTS ON FATIGUE PROPERTIES: AN ANALYSIS BASED ON X-RAY COMPUTED TOMOGRAPHY****Technical Presentation: IMECE2021-73106**

Changyu Meng - *Arizona State University*
 Jie Chen - *Arizona State University*
 Yongming Liu - *Arizona State University*

**02-05-02:
ADVANCED MACHINING AND FINISHING PROCESSES-II
NOVEMBER 3, 2021****12:55PM–2:25PM**

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

12:55PM–1:05PM:**MODELING OF THRUST FORCE IN ULTRASONIC ASSISTED DRILLING OF DD6 SUPERALLOY****Technical Paper Publication: IMECE2021-72966**

Xiaoxiang Zhu - *Northwestern Polytechnical University*
 Wenhui Wang - *Northwestern Polytechnical University*
 Ruison Jiang - *Sichuan University*
 Yifeng Xiong - *Northwestern Polytechnical University*
 Xiaofen Liu - *Northwestern Polytechnical University*

1:05PM–1:15PM:**IN-SITU MONITORING IN ABRASIVE WATER JET MACHINING OF STACKED TITANIUM (Ti6Al4V)-CFRP THROUGH TIME AND FREQUENCY ANALYSIS OF ACOUSTIC EMISSION SIGNALS****Technical Paper Publication: IMECE2021-73396**

Rishi Pahuja - *University of Washington*
 M. Ramulu - *University of Washington*

1:15PM–1:25PM:**SURFACE FINISHING AND ELECTROLESS NICKEL PLATING OF ADDITIVELY MANUFACTURED (AM) METAL COMPONENTS****Technical Paper Publication: IMECE2021-71882**

Wondwosen Demisse - *University of the District of Columbia*
 Eva Mutunga - *University of the District of Columbia*
 Kate Klein - *University of the District of Columbia*
 Lucas Rice - *Honeywell Federal Manufacturing & Technologies, LLC*
 Pawan Tyagi - *University of the District of Columbia*

1:25PM–1:35PM:**CURRENT RESEARCH TRENDS IN VARIANTS OF MINIMUM QUANTITY LUBRICATION (MQL): A REVIEW**

Technical Paper Publication: IMECE2021-73656

Shafahat Ali - Rochester Institute of Technology - Dubai
 Salman Pervaiz - Rochester Institute of Technology - Dubai
 Sathish Kannan - Rochester Institute of Technology - Dubai

1:35PM–1:45PM:

SUSTAINABLE SOLUTION OF THICKENING THE SLUDGE FROM WASTEWATER TREATMENT BY A ROTOR WITH BARS

Technical Paper Publication: IMECE2021-71114

Victorita C. Radulescu - University Politehnica of Bucharest

1:45PM–1:55PM:

MULTI-PASS MANDREL-FREE TUBE SPINNING AT ELEVATED TEMPERATURE FOR PRODUCING SPACE ROCKET FUEL TANK

Technical Presentation: IMECE2021-70161
BIPLOV KUMAR ROY - SAITAMA UNIVERSITY, AND DHAKA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Yannis P. Korkolis - The Ohio State University
 Yoshio Arai - Saitama University
 Wakako Araki - Saitama University
 Takafumi Iijima - Asahi Seisakusho Co., Ltd.
 Jin Kouyama - Asahi Seisakusho Co., Ltd.

02-02-02:
**CHARACTERIZATION OF ADDITIVELY MANUFACTURED METAL PARTS
 NOVEMBER 3, 2021**

12:55PM–2:25PM

Chair: Chetan Nikhare - The Pennsylvania State University
 Chair: Scott Thompson - Kansas State University
 Chair: M.P. Jahan - Miami University

12:55PM–1:05PM:

THE HIGH CYCLE FATIGUE BEHAVIOR OF SURFACE TREATED ELECTRON BEAM MELTED TITANIUM Ti6Al4V

Technical Paper Publication: IMECE2021-71975

Melody Mojib - University of Washington
 Hitoshi Soyama - Tohoku University
 Daniel Sanders - University of Washington
 Dwayne Arola - University of Washington
 M. Ramulu - University of Washington

1:05PM–1:15PM:

CORRELATION BETWEEN PROCESS PARAMETERS AND FRACTURE PROPERTY OF 316L STAINLESS STEEL PARTS FABRICATED BY SELECTIVE LASER MELTING

Technical Paper Publication: IMECE2021-70091

Jianhang Jin - Dalian University of Technology
 Zhuowen Xie - Dalian University of Technology
 Guanghui Yang - Dalian University of Technology
 Wei Jiang - Dalian University of Technology

1:15PM–1:25PM:

INVESTIGATION OF MICROSTRUCTURE AND MECHANICAL PROPERTIES OF ADDITIVE MANUFACTURED AISI - 420 MARTENSITIC STEEL DEVELOPED BY DIRECTED ENERGY DEPOSITION METHOD

Technical Paper Publication: IMECE2021-71777

Md Mehadi Hassan - University of New Mexico
 Madhavan Radhakrishnan - University of New Mexico
 David Otazu - University of New Mexico
 Tom Lienert - Optomec
 Osman Anderoglu - University of New Mexico



1:25PM–1:35PM:**MEASUREMENT OF RESIDUAL STRESSES IN LASER 3D PRINTED TRAIN RAIL USING X-RAY DIFFRACTION TECHNIQUE****Technical Paper Publication: IMECE2021-69822**Ershad Mortazavian - *University of Nevada*Zhiyong Wang - *University of Nevada*Hualiang Teng - *University of Nevada***1:35PM–1:45PM:****REVIEWING POST-PROCESSING TECHNIQUES TO ENHANCE MECHANICAL PROPERTIES OF PARTS FABRICATED USING WAAM****Technical Paper Publication: IMECE2021-73573**Said Abdallah - *Rochester Institute of Technology*Salman Pervaiz - *Rochester Institute of Technology***1:45PM–1:55PM:****EFFECTS OF LASER PARAMETERS ON PRINTING QUALITY OF INJECTION MOLD CORES****Technical Paper Publication: IMECE2021-69263**Can Yang - *Shenzhen Technology University*Bao-Hua Yang - *Shenzhen Technology University*Chunbo Li - *Shenzhen Technology University*Liang Deng - *Shenzhen Technology University*Ren-Xiu Yang - *Shenzhen Technology University***03-05-02: MATERIALS PROCESSING AND CHARACTERIZATION
NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Hareesh Tippur - *Auburn Univ*Chair: Caglar Oskay - *Vanderbilt University***12:55PM–1:05PM:****CRYSTALLINE PHASE CHANGES DUE TO HIGH-SPEED PROJECTILES IMPACT ON HY100 STEEL****Technical Paper Publication: IMECE2021-69956**Muna Slewa - *Embry-Riddle Aeronautical University***1:05PM–1:15PM:****A NOVEL MEAN STRESS-INDEPENDENT FATIGUE MODEL FOR BONDED JOINTS WITH DUCTILE ADHESIVES****Technical Paper Publication: IMECE2021-70176**Marco Gerini-Romagnoli - *Oakland University*Sayed A. Nassar - *Oakland University***1:15PM–1:25PM:****IMPROVED TENSILE STRENGTH AND ELECTRICAL CONDUCTIVITY OF THE ELECTRICAL CONDUCTOR ALUMINUM ALLOY 6201****Technical Paper Publication: IMECE2021-70245**Alyaqadhan Allamki - *Sultan Qaboos University*Majid Al-Maharbi - *Sultan Qaboos University*Sayyad Zahid Qamar - *Sultan Qaboos University*Rmanathan Arunachalam - *Sultan Qaboos University***1:25PM–1:35PM:****EBSD INVESTIGATION OF T16AL4V PROCESSED BY CONSTRAINED GROOVE PRESSING AND HEAT TREATMENT****Technical Paper Publication: IMECE2021-70393**A. Bhardwaj - *BITS Pilani Hyderabad Campus*N. Gohil - *BITS Pilani Hyderabad Campus*A. Sharma - *BITS Pilani Hyderabad Campus*K. Lakshman Rao - *BITS Pilani Hyderabad Campus*A.K. Gupta - *BITS Pilani Hyderabad Campus*S.S. Satheesh Kumar - *Metallurgical Research Laboratory, Kanchanbagh*

1:35PM–1:45PM:**EXPERIMENTAL APPROACH AND CONVENTIONAL ANALYTICAL TECHNIQUES TO THE CARBON NANOTUBE NETWORK INTERPHASE IN 3-PHASE POLYMER MATRIX NANO-COMPOSITES****Technical Paper Publication: IMECE2021-70589**Masoud Yekani Fard - *Arizona State University*Joel Swantrom - *Arizona State University***05-02-02:****INJURY AND DAMAGE BIOMECHANICS II
NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***12:55PM–1:05PM:****NECK MOTIONS AND LOADS WITH HEAD SUPPORTED MASS UNDER SAGITTAL ACCELERATIVE LOADING****Technical Paper Publication: IMECE2021-72109**Yuvaraj Purushothaman - *Medical College of Wisconsin*Narayan Yoganandan - *Medical College of Wisconsin***1:05PM–1:15PM:****OLIGODENDROCYTE TETHERING EFFECT ON HYPERELASTIC 3D RESPONSE OF INJURED AXONS IN BRAIN WHITE MATTER****Technical Paper Publication: IMECE2021-73376**Mohit Agarwal - *Rutgers, The State University of New Jersey*
Parameshwaran Pasupathy – *The Rutgers, State University of New Jersey*Robert Desimone - *Marotta Controls*Assimina A. Pelegri - *Rutgers, The State University of New Jersey***1:15PM–1:25PM:****INVESTIGATION OF SKIN MATERIAL MODELS FOR BALLISTIC RESPONSE OF SUITABILITY OF SKIN MATERIAL MODELS FOR BALLISTIC IMPACT****Technical Paper Publication: IMECE2021-73466**Punit Kumar Pandey - *Indian Institute of Technology*Shailesh Ganpule - *Indian Institute of Technology***1:25PM–1:35PM:****ON A FRAMEWORK TO INTEGRATE PERFORMANCE OF HELMET SYSTEMS FOR BLAST, BLUNT IMPACT AND THERMAL LOADING****Technical Paper Publication: IMECE2021-73556**Amit Bagchi – *U.S. Naval Research Laboratory*Yu Yu Khine – *U.S. Naval Research Laboratory*David Mott – *U.S. Naval Research Laboratory*X. Gary Tan – *U.S. Naval Research Laboratory***1:35PM–1:45PM:****EFFECTS OF PERSONAL PROTECTIVE EQUIPMENT ON SPINAL COLUMN LOADS FROM UNDERBODY BLAST LOADING**

Technical Paper Publication: IMECE2021-73664

Sagar Umale - *Medical College of Wisconsin*
 John R. Humm - *Medical College of Wisconsin*
 Narayan Yoganandan - *Medical College of Wisconsin*

**08-01-02:
 ENERGY-RELATED MULTIDISCIPLINARY II
 NOVEMBER 3, 2021**

12:55PM–2:25PM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

12:55PM–1:05PM:

**ENERGETIC MANAGEMENT OF POWER PLANT
 PROTECTION AND CONTROL ACTIVITIES BY
 APPLYING MAINTENANCE PRINCIPLES BASED
 ON RELIABILITY**

Technical Paper Publication: IMECE2021-70959

Victorita Radulescu - *University Politehnica of Bucharest*

1:05PM–1:15PM:

**CURRENT STATUS OF ELECTRICITY GENERATION IN
 THE WORLD AND FUTURE TRENDS**

Technical Presentation: IMECE2021-76422

Igor Pioro - *University of Ontario Institute of Technology*

1:15PM–1:25PM:

**WATER FUEL DEVELOPMENT: PART 1 – CLEAN
 ENERGY PRODUCTION FROM WATER SPLITTING
 HIGH TEMPERATURE ELECTROLYSIS PROCESS IN
 HYDROGEN INTERNAL COMBUSTION ENGINES**

Technical Paper Publication: IMECE2021-72382

Kingsley E. Abhulimen - *University of Lagos*

1:25PM–1:35PM:

**DEMAND RESPONSE ANALYSIS FOR DIFFERENT
 RESIDENTIAL PERSONAS IN A COMFORT-DRIVEN
 BEHAVIORAL CONTEXT**

Technical Paper Publication: IMECE2021-73143

Opeoluwa Wonuola Olawale - *Colorado School of Mines*
 Benjamin Gilbert - *Colorado School of Mines*
 Janet Reyna - *National Renewable Energy Laboratory*

1:35PM–1:45PM:

**A LONG-TERM ASSESSMENT OF THE IMPACT OF
 NATURAL GAS PRODUCTION IN NORTH TEXAS
 INFLUENCING URBAN AND REGIONAL AIR QUALITY**

Technical Paper Publication: IMECE2021-72215

Kuruville John - *University of North Texas*
 Guo Quan Lim - *University of North Texas*
 Jithin Kanayankottupoyil - *University of North Texas*

1:45PM–1:55PM:

**TRANSPORTATION SECTOR GHG EMISSIONS:
 MOTORIST BEHAVIOR, VEHICLE PURCHASE
 CHOICES AND IMPLICATIONS IN REDUCING
 SECTOR EMISSIONS**

Technical Presentation: IMECE2021-73325

McKinley Addy - *AdTra Inc.*
 Gerry Bemis - *California Energy Commission*
 Franklin J Wiens - *AdTra, Inc.*



**08-05-01:
ENERGY SYSTEMS COMPONENTS**

NOVEMBER 3, 2021

12:55PM–2:25PM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

12:55PM–1:05PM:

**TURBOCHARGED DECOUPLING AND
TURBINE ELECTRIFICATION DESIGN FOR MILD-
HYBRID VEHICLE**

Technical Paper Publication: IMECE2021-68935

Roberto Capata - *University of Roma "Sapienza"*

1:05PM–1:15PM:

**OPTIMIZATION OF POWERTRAIN ENERGY
MANAGEMENT FOR RANGE EXTENDED
ELECTRIC VEHICLE USING MODIFIED PARTICLE
SWARM ALGORITHM**

Technical Paper Publication: IMECE2021-69605

Omkar Parkar - *Indiana University Purdue
University Indianapolis*

Benjamin Snyder - *Indiana University Purdue
University Indianapolis*

Sohel Anwar - *Indiana University Purdue University Indianapolis*

1:15PM–1:25PM:

**DEVELOPING HVAC SYSTEM TERMINAL
UNITS CONTROL SEQUENCE UTILIZING GAME
THEORY RULES**

Technical Paper Publication: IMECE2021-69948

Javad Khazaii - *Kennesaw State University*

Ali Khazaei - *Kennesaw State University*

1:25PM–1:35PM:

**NUMERICAL STUDY OF THE EFFECT OF BURNER
POSITION AND REFORMER TUBES ON THE DESIGN
OF AN ANNULAR STEAM METHANE-REFORMING
REACTOR FOR HYDROGEN PRODUCTION**

Technical Paper Publication: IMECE2021-70740

Ajith Krishnan Rohini - *Kookmin University*

Hee Joon Lee - *Kookmin University*

1:35PM–1:45PM:

**ANALYZING THE EFFECTS OF HVAC EQUIPMENT
UNCERTAINTY IN BUILDING ENERGY MODELING
FOR PROFESSIONAL ENVIRONMENT**

Technical Paper Publication: IMECE2021-72295

Miseker Birega - *Kennesaw State University*

Javad Khazaii - *Kennesaw State University*



1:45PM–1:55PM:**MODELLING ECONOMIC LIFE CYCLE INVESTMENT IN NATURAL GAS PIPELINES AND POWER PLANT AVAILABILITY FOR A NIGERIAN NATIONAL GAS COMPANY****Technical Paper Publication: IMECE2021-72388**Kingsley Abhulimen - *University Technology System Limited***08-04-01:****DESIGN AND ANALYSIS OF ENERGY CONVERSION SYSTEMS I****NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Hohyun Lee - *Santa Clara University*Chair: Soumik Banerjee - *Washington State University*Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*Chair: Michail Nitsas - *National Technical University of Athens***12:55PM–1:05PM:****SUPERCRITICAL CARBON DIOXIDE POWER CYCLE INTEGRATED WITH SOLAR POWER TOWER AND OXY-COMBUSTOR****Technical Paper Publication: IMECE2021-66983**Ahmad K. Sleiti - *Qatar University*Wahib A. Al-Ammari - *Qatar University*Ahmed I. Gamil - *Qatar University*Mohd J. Al-Khawaja - *Qatar University***1:05PM–1:15PM:****THREE-DIMENSIONAL COMPUTATIONAL FLUID DYNAMICS MODELING OF A 6V150 DIESEL ENGINE****Technical Paper Publication: IMECE2021-67711**Zhentao Liu - *Zhejiang University*Jiahong Fu - *Zhejiang University City College*Yu Zhang - *Zhejiang University City College*Jinlong Liu - *Zhejiang University***1:15PM–1:25PM:****BIOGAS UPGRADING SYSTEM FOR THE GENERATION OF ELECTRICITY FROM METHANE COMBUSTION****Technical Paper Publication: IMECE2021-67973**Lee Duan - *Saint Martin's University*Lawrence Newcomer - *Saint Martin's University*Alice Thompson - *Saint Martin's University*Shawn Duan - *Saint Martin's University***1:25PM–1:35PM:****EXPERIMENTAL INVESTIGATION ON THE EFFECTS OF DIRECT FUEL INJECTION INTO LOW-O₂ RECOMPRESSION INTERVAL OF AN HCCI ENGINE****Technical Paper Publication: IMECE2021-69240**Ratnak Sok - *Waseda University*Jin Kusaka - *Waseda University***1:35PM–1:45PM:****THEORETICAL INVESTIGATION ON THE PRINTED CIRCUIT HEAT EXCHANGER (PCHE) BASED S-CO₂ BRAYTON CYCLE**

Technical Paper Publication: IMECE2021-69358

Huaitao Zhu - *Northwestern Polytechnical University*
 Han Yuan - *Ocean University of China*
 Gongnan Xie - *Northwestern Polytechnical University*

1:45PM–1:55PM:**SHOCK WAVE HEATING: A NOVEL METHOD FOR LOW-COST HYDROGEN PRODUCTION****Technical Paper Publication: IMECE2021-69775**

Pejman Akbari - *California State Polytechnic University*
 Colin Copeland - *Simon Fraser University*
 Stefan Tüchler - *University of Bath*
 Mark Davidson - *New Wave Hydrogen, Inc.*
 Seyyed V. Mahmoodi-Jezeh - *Simon Fraser University*

**10-04-03: CFD APPLICATIONS - III
NOVEMBER 3, 2021****12:55PM–2:25PM**

Chair: Philipp Epple - *Coburg University of Applied Sciences*
 Chair: Kamran Siddiqui - *University of Western Ontario*

12:55PM–1:05PM:**NUMERICAL SIMULATION OF ELECTRIFIED LIQUID JETS USING A GEOMETRICAL VOF METHOD****Technical Paper Publication: IMECE2021-69817**

Sílvio Cândido - *University of Beira Interior*
 José C. Páscoa - *University of Beira Interior*

1:05PM–1:15PM:**HYDROKINETIC TURBINE PERFORMANCE AND WAKE ANALYSIS USING A DATA-DRIVEN ACTUATOR LINE MODEL****Technical Paper Publication: IMECE2021-71957**

J. Bowman - *Mississippi State University*
 S. Bhushan - *Mississippi State University*
 G. Burgreen - *Mississippi State University*
 I. Dettwiller - *Mississippi State University*

1:15PM–1:25PM:**A RISK ASSESSMENT OF PATHOGEN TRANSPORT DURING AN INDOOR ORCHESTRA PERFORMANCE****Technical Paper Publication: IMECE2021-73290**

Vedant Joshi - *University at Buffalo*
 Francine Battaglia - *University at Buffalo*

1:25PM–1:35PM:**THE METHOD OF ROTATED SOLUTIONS AS A FAST AND EFFICIENT METHOD OF 3-D CFD CODE VERIFICATION****Technical Presentation: IMECE2021-76309**

Marc Horner - *Ansys, Inc.*

1:35PM–1:45PM:**NUMERICAL STUDY OF DEFORMATION OF VISCOELASTIC DROP MIGRATING THROUGH MICROCHANNEL WITH SUDDEN CONSTRICTION****Technical Paper Publication: IMECE2021-71401**

Niraj Kr Prasad - *Indian Institute of Technology Guwahati*
 Siddhartha Sankar Ghosh - *Indian Institute of Technology Guwahati*
 Amaresh Dalal - *Indian Institute of Technology Guwahati*



1:45PM–1:55PM:**CONFINEMENT EFFECTS ON MOLECULAR MECHANICS AND STRUCTURE OF THE LIQUID LAYERS AT SOLID-LIQUID INTERFACE****Technical Paper Publication: IMECE2021-70811**An Zou - *Syracuse University*Sajag Poudel - *Syracuse University*Shalabh C. Maroo - *Syracuse University***11-14-01:****HEAT TRANSFER IN GAS TURBINES
NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Subramanyaravi Annapragada -
*United Technologies Research*Chair: Kevin Dowding - *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***12:55PM–1:05PM:****PERFORMANCE ANALYSIS OF A GAS TURBINE DISK
CONTAINING ROTATING HEAT PIPES****Technical Paper Publication: IMECE2021-69405**Wanqiu Lu - *Beihang University*Shuiting Ding - *Beihang University*Guo Li - *Beihang University***1:05PM–1:15PM:****EFFECTS OF TURBULENCE MODELING AND
TURBULENT SCHMIDT NUMBER ON SUPERSONIC
MIXING SIMULATIONS****Technical Paper Publication: IMECE2021-69458**Md. Navid Chowdhury - *Bangladesh University of
Engineering and Technology*Sarfraz Aziz - *Bangladesh University of Engineering
and Technology*Shanto Kumar Shingh - *Bangladesh University of Engineering
and Technology*Mohammad Ali - *Bangladesh University of Engineering
and Technology*M. Ruhul Amin - *Montana State University***1:15PM–1:25PM:****CONJUGATE HEAT TRANSFER ANALYSIS OF
FILM COOLING WITH A RIB-ROUGHENED
DELIVERY PASSAGE****Technical Paper Publication: IMECE2021-70168**Rui Zhu - *Northwestern Polytechnical University*Gongnan Xie - *Northwestern Polytechnical University*Shulei Li - *Northwestern Polytechnical University*Terrence W. Simon - *University of Minnesota***1:25PM–1:35PM:****VELOCITY AND HEAT TRANSFER STUDIES OF AN
IMPINGING JET USING MAGNETIC RESONANCE
VELOCIMETRY AND INFRARED THERMOMETRY****Technical Paper Publication: IMECE2021-71713**Nathan Humbert - *United States Military Academy*Jack Galante - *United States Military Academy*F. Todd Davidson - *United States Military Academy*David B. Helmer - *United States Military Academy*Christopher J. Elkins - *Stanford University*Gunnar O. Tamm - *United States Military Academy*Michael J. Benson - *United States Military Academy*

1:35PM–1:45PM:**EFFECT OF INLET GEOMETRY ON FLAT PLATE, FILM COOLING EFFECTIVENESS FROM SHAPED HOLES****Technical Paper Publication: IMECE2021-73135**Hanlin Wang - *Texas A&M University*Lesley M. Wright - *Texas A&M University***1:45PM–1:55PM:****ANALYSIS OF FILM COOLING EFFECTIVENESS ON A GAS TURBINE BLADE WITH AN UNSTEADY WAKE USING FAST RESPONSE PRESSURE SENSITIVE PAINT****Technical Paper Publication: IMECE2021-73536**Jeremy L. Sounik - *Texas A&M University*Lesley M. Wright - *Texas A&M University***11-09-02:****HERMAL TRANSPORT ACROSS INTERFACES II
NOVEMBER 3, 2021****12:55PM–2:25PM**Chair: Subramanyaravi Annapragada -
*United Technologies Research*Chair: Kevin Dowding – *Sandia National Laboratories*Chair: Alexander Rattner - *Penn State University***12:55PM–1:05PM:****THERMAL CIRCUIT ANALYSIS OF DROPLET EVAPORATION ON HOT MICROSTRUCTURED SUPERHYDROPHOBIC SURFACES****Technical Paper Publication: IMECE2021-73012**Wenge Huang - *Virginia Tech*Xukun He - *Virginia Tech*Jiangtao Cheng - *Virginia Tech***1:05PM–1:15PM:****REDUCED GRAPHENE OXIDE MEMBRANE AS A THERMAL SPREADER FOR THERMAL MANAGEMENT OF ELECTRONIC DEVICES****Technical Presentation: IMECE2021-77345**Ding-Jun Huang - *National Taiwan University*Yen-Ta Lee - *National Yang Ming Chiao Tung University*Ming-Chang Lu - *National Taiwan University***1:15PM–1:25PM:****Effect of Pore Size of Copper Foam on Thermal Performance of Bio-Based Pcm/copper Foam Composite****Technical Paper Publication: IMECE2021-72299**Mohamed Gadalla - *American University of Sharjah*Yahya A. Sheikh - *American University of Sharjah*Ahmed Azmeer - *American University of Sharjah***1:25PM–1:35PM:****MODELING OF PACKING STRUCTURE AND THERMAL CONDUCTIVITY OF PARTICLE BEDS USING DISCRETE ELEMENT METHOD****Technical Presentation: IMECE2021-77485**Xintong Zhang - *University of California, San Diego*Jian Zeng - *University of California, San Diego*Ka Man Chung - *University of California, San Diego*Sarath Reddy Adapa - *University of California, San Diego*Renkun Chen - *University of California, San Diego*

1:35PM–1:55PM:**MACHINE LEARNING-DRIVEN DISCOVERY OF NEW THERMAL TRANSPORT MECHANISMS IN POROUS MATERIALS****Invited Presentation: IMECE2021-76430***Hua Bao - Shanghai Jiao Tong University**Han Wei - Shanghai Jiao Tong University**Xiulin Ruan - Purdue University***12-12-01: MECHANICS OF SOFT MATERIALS
NOVEMBER 3, 2021****12:55PM–2:25PM****Chair: Marco Amabili - McGill University****Chair: Celia Reina - University of Pennsylvania****12:55PM–1:05PM:****STABILIZED FINITE ELEMENT FORMULATION FOR PHASE-FIELD FRACTURE IN SOFT MATERIALS****Technical Presentation: IMECE2021-68495***Ida Ang - Cornell University**Bin Li - Guangdong Technion Israel Institute of Technology**Nikolaos Bouklas - Cornell University***1:05PM–1:15PM:****PHOTOMECHANICAL COUPLING IN PHOTOACTIVE NEMATIC ELASTOMERS****Technical Presentation: IMECE2021-69007***Ruobing Bai - Northeastern University**Kaushik Bhattacharya - California Institute of Technology***1:15PM–1:25PM:****CONSTITUTIVE MODELING OF VISCOELASTIC PHOTO-ADAPTABLE THERMALLY ACTIVATED SHAPE MEMORY POLYMERS****Technical Paper Publication: IMECE2021-70514***Aayush Prasad - New Jersey Institute of Technology**Swapnil Moon - New Jersey Institute of Technology**Fangda Cui - New Jersey Institute of Technology**I.J. Rao - New Jersey Institute of Technology***1:25PM–1:35PM:****SOFT PIEZOELECTRIC COMPOSITES: SYNTHESIS, ELECTRO-ELASTIC PROPERTY CHARACTERIZATION, AND NON-LINEAR CONSTITUTIVE MODELING****Technical Paper Publication: IMECE2021-71197***Robert L. Lowe - University of Dayton**Joseph G. Beckett - University of Dayton**Christopher G. Cooley - Oakland University**Zongwu Bai - University of Dayton Research Institute**Paul E. Kladitis - University of Dayton Research Institute***1:35PM–1:45PM:****A MICRO-MECHANICAL CONSTITUTIVE MODEL TO PREDICT HYGROTHERMAL AGING OF CROSS-LINKED POLYMERS****Technical Paper Publication: IMECE2021-71928***Amir Bahrololoumi - Michigan State University**Aref Ghaderi - Michigan State University**Mamoon Shaafaey - Michigan State University**Roosbeh Dargazany - Michigan State University*

1:45PM–1:55PM:**INTEGRATION-FREE FRAMEWORKS FOR EXPLORING STRAIN ENERGY DENSITY IN RUBBER-LIKE ELASTICITY_X000B_****Technical Paper Publication: IMECE2021-72168**Ramin Akbari - *Michigan State University*Roosbeh Dargazany - *Michigan State University***01-10-01:****FLOW-INDUCED NOISE AND VIBRATION NOVEMBER 3, 2021****4:45PM–6:15PM**Chair: Mostafa Nough - *University at Buffalo*Chair: Yongfeng Xu - *University of Cincinnati*Chair: Guoliang Huang - *University of Missouri***4:45PM–4:55PM:****CHARACTERIZATION OF ELECTRIC FAN NOISE GENERATION DUE TO BLADE GEOMETRY****Technical Paper Publication: IMECE2021-68201**Liliosa Eyang Cole - *San Jose State University*Fred Barez - *San Jose State University***4:55PM–5:05PM:****EXAMINATION OF RESONANT FREQUENCIES GENERATED BY COMBUSTION OSCILLATION IN A COMBUSTOR FUELED BY A HYDROGEN-NATURAL GAS MIXTURE AND THE UPSTREAM PIPE****Technical Paper Publication: IMECE2021-68521**Akane Uemichi - *Waseda University*Yifan Lyu - *Waseda University*Jin Kusaka - *Waseda University*Shigehiko Kaneko - *Waseda University***5:05PM–5:15PM:****EVALUATING PIPING SUPPORTS MODIFICATION TO MITIGATE SLUG FLOW INDUCED VIBRATION UTILIZING TIME-HISTORY/RESPONSE-SPECTRUM APPROACH IN A RICH AMINE COLUMN NPS 30 INLET PIPING SYSTEM****Technical Paper Publication: IMECE2021-68915**Carlos Herrera Sierralta - *Saudi Aramco*Husain Al-Muslim - *Saudi Aramco***5:15PM–5:25PM:****MEASUREMENTS OF PULSATION GENERATED DUE TO TURNING FLOW INTO SIDE BRANCHES OF DIFFERENT DIAMETER RATIOS****Technical Paper Publication: IMECE2021-69111**Kamal Botros - *NOVA Chemicals*Hemanth Satish - *TC Energy***5:25PM–5:35PM:****A PARAMETRIC STUDY OF PIEZOELECTRIC ENERGY HARVESTING BY VORTEX INDUCED VIBRATION OF A PAIR OF CYLINDERS****Technical Paper Publication: IMECE2021-71636**Thomas Cornett - *Marshall University*Arka P. Chattopadhyay - *Marshall University*Mehdi Esmaeilpour - *Marshall University*

5:35PM–5:45PM:**COMPUTATIONAL AEROACOUSTICS ANALYSIS TO PREDICT FARFIELD NOISE FROM A SHARP TRAILING-EDGE****Technical Presentation: IMECE2021-77277**Rohith Giridhar - *The University of Kansas*Saeed Farokhi - *The University of Kansas*Ray Taghavi - *The University of Kansas***02-02-03:****PROCESS AND QUALITY CONTROL IN ADDITIVE MANUFACTURING
NOVEMBER 3, 2021****4:45PM–6:15PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***4:45PM–5:05 PM****LACK OF FUSION IN ADDITIVE MANUFACTURING:
DEFECT OR ASSET?****Invited Presentation: IMECE2021-73419**Atieh Moridi - *Cornell University*Jenniffer Bustillos - *Cornell University***5:05PM–5:15 PM****A CONVOLUTIONAL NEURAL NETWORK (CNN) FOR DEFECT DETECTION OF ADDITIVELY MANUFACTURED PARTS****Technical Paper Publication: IMECE2021-70500**Mohammad Masud Parvez - *Missouri University of Science and Technology*Musarrat Farzana Rahman - *Missouri University of Science and Technology*Shaikat Galib - *H2O.AI*Frank Liou - *Missouri University of Science and Technology***5:15PM–5:25PM:****PROCESS PARAMETER EFFECTS ON MELT TOPOLOGY AND DIMENSIONAL DEVIATION IN ELECTRON BEAM MELTED TI-6AL-4V****Technical Paper Publication: IMECE2021-70698**Eric Bol - *University of Washington*Curtis Doyle - *University of Washington*Ramulu Mamidala - *University of Washington***5:25PM–5:35PM:****GEOMETRIC PERFORMANCE TESTING OF DIRECTED ENERGY DEPOSITION ADDITIVE MANUFACTURING MACHINE USING STANDARD TESTS FOR MACHINE TOOLS****Technical Paper Publication: IMECE2021-71737**Shawn Moylan - *National Institute of Standards and Technology*Michael McGlaufflin - *National Institute of Standards and Technology*Jared Tarr - *National Institute of Standards and Technology*M. Alkan Donmez - *National Institute of Standards and Technology***5:35PM–5:45PM:****VIRTUAL SURFACE ROUGHNESS MEASUREMENTS FROM AN 'AS-BUILT' VIRTUAL CAD MODEL FOR BEAD BASED DEPOSITION ADDITIVE MANUFACTURED COMPONENTS**

Technical Paper Publication: IMECE2021-72044Hamed Kalami - *University of Windsor*Jill Urbanic - *University of Windsor***02-04-01:****NANOMANUFACTURING AND FRICTION WELDING
NOVEMBER 3, 2021****4:45PM–6:15PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***4:45PM–4:55PM:****SCALABLE FIBER DIP DRAWING METHOD USING
AUTOMATED TRACKS****Technical Paper Publication: IMECE2021-69153**Abigail Heinz - *Rowan University*Dave Jao - *Rowan University*Vincent Beachley - *Rowan University***4:55PM–5:05PM:****IN-SITU SCANNING ELECTRON MICROSCOPE
CHEMICAL VAPOR DEPOSITION AS A PLATFORM
FOR NANOMANUFACTURING INSIGHTS****Technical Paper Publication: IMECE2021-73554**Gordon Koerner - *University of Missouri*Ramakrishna Surya - *University of Missouri*Kannappan Palaniappan - *University of Missouri*Prasad Calyam - *University of Missouri*Filiz Bunyak - *University of Missouri*Matthew R. Maschmann - *University of Missouri***5:05PM–5:15PM:****MULTIPLE REPLICATION OF QUASI-THREE-
DIMENSIONAL PLASMONIC NANOANTENNAS WITH
TAILORED OPTICAL PROPERTIES****Technical Presentation: IMECE2021-72906**Bongjoong Kim - *Purdue University*Jehwan Hwang - *Purdue University*Jonghun Yi - *Hanyang University*Dong Rip Kim - *Hanyang University*Augustine Urbas - *Air Force Research Laboratory*Zahyun Ku - *Air Force Research Laboratory*Chi Hwan Lee - *Purdue University***5:15PM–5:25PM:****MODELING OF RESIDUAL STRESS INDUCED IN
MICRO-GRINDING CONSIDERING TEXTURE EFFECT****Technical Paper Publication: IMECE2021-69724**Man Zhao - *Shanghai University of Engineering Technology*Steven Y. Liang - *Georgia Institute of Technology***5:25PM–5:35PM:****RESISTANCE HEAT ASSISTED FRICTION
ELEMENT WELDING****Technical Paper Publication: IMECE2021-68747**Tyler J. Grimm - *Clemson University*Gowtham V. Parvathy - *Clemson University*Laine Mears - *Clemson University***5:35PM–5:45PM:****LASER-ASSISTED FRICTION ELEMENT WELDING****Technical Paper Publication: IMECE2021-69029**Tyler J. Grimm - *Clemson University*Gowtham V. Parvathy - *Clemson University*Laine Mears - *Clemson University*

**03-03-02:
PROCESSING AND DESIGN OF MATERIALS AND
COMPONENTS FOR ADDITIVE MANUFACTURING
NOVEMBER 3, 2021**

4:45PM–6:15PM

Chair: Hareesh Tippur - Auburn University
Chair: Caglar Oskay - Vanderbilt University

4:45PM–4:55PM:

ADDITIVE MANUFACTURING WITH CERAMICS

Technical Paper Publication: IMECE2021-70601

Jesse Campanella - United States Military Academy
Ivan Figueroa-Cecco - United States Military Academy
Ian Fujinaka - United States Military Academy
Adam Sasek - United States Military Academy
Margaret Nowicki - United States Military Academy
Kenneth McDonald - United States Military Academy
Lionel Vargas-Gonzalez - Army Research Laboratory
Nicholas Ku - Army Research Laboratory

4:55PM–5:05PM:

**INVESTIGATION ON TOOL PERFORMANCE IN
ULTRASONIC VIBRATION ASSISTED CUTTING SICF/
SIC CERAMIC MATRIX COMPOSITES**

Technical Paper Publication: IMECE2021-72527

Yi-feng Xiong - Northwestern Polytechnical University
Wen-Hu Wang - Northwestern Polytechnical University
Yao-yao Shi - Northwestern Polytechnical University
Rui-song Jiang - Sichuan University
Bo Huang - Northwestern Polytechnical University
Cong Liu - Northwestern Polytechnical University
Xiao-fen Liu - Northwestern Polytechnical University
Xiao-xiang Zhu - Northwestern Polytechnical University

5:05PM–5:15PM:

**EFFECTS OF SURFACE TREATMENT ON
TENSILE AND FATIGUE BEHAVIOR OF 3D
PRINTED ABS COMPONENTS WITH DIFFERENT
LAYUP ORIENTATIONS**

Technical Presentation: IMECE2021-69008

Heechang (Alex) Bae - Eastern Washington University
Nicholas Blair - Eastern Washington University
Matthew Michaelis - Eastern Washington University
Awlad Hossain - Eastern Washington University

5:15PM–5:25PM:

**ON ADDITIVE MANUFACTURING OF RIB FRACTURE
FIXATION IMPLANTS: THE ROLE OF LATTICE DESIGN**

Technical Paper Publication: IMECE2021-73086

Lauren Judkins - Pennsylvania State University
Richa Gupta - Pennsylvania State University
Christine Gabriele - Pennsylvania State University
Charles Tomonto - Johnson & Johnson 3D Printing
Michael W. Hast - Pennsylvania State University
Guha Manogharan - Pennsylvania State University

5:25PM–5:35PM:

**LIGHT WEIGHT HIGH ENERGY ABSORPTION
COMPOSITE BY ADDITIVE MANUFACTURING**

Technical Presentation: IMECE2021-77317

Mahan Ghosh - University of North Texas
Nandika D'souza - University of North Texas

5:35PM–5:45PM:

**STRENGTH OF ADDITIVELY MANUFACTURED
FOAMS WITH UNIFORM AND GRADIENT DENSITIES**



Technical Presentation: IMECE2021-77509

Enze Chen - *Johns Hopkins University*
 Shengzhi Luan - *Johns Hopkins University*
 Stavros Gaitanaros - *Johns Hopkins University*

03-04-01:

**PLASTICITY, FRACTURE AND DAMAGE
 IN MATERIALS
 NOVEMBER 3, 2021**

4:45PM–6:15PM

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

4:45PM–4:55PM:

**PROBABILISTIC STUDY OF CORROSION PIT-
 INDUCED FATIGUE**

Technical Paper Publication: IMECE2021-69336

Suhash Ghosh - *University of Hartford*
 Chittaranjan Sahay - *University of Hartford*
 Benjamin Starr - *University of Hartford*
 Sergey Shishkin - *Raytheon Technologies Research Center*

4:55PM–5:05PM:

**IDENTIFICATION OF THE MATERIAL HARDENING
 AND FAILURE OF AN ALUMINUM ALLOY SHEET VIA
 A SIMPLE SHEAR TEST**

Technical Paper Publication: IMECE2021-69574

Qiusha Luo - *Tianjin University*
 Lin Yuan - *Tianjin University*
 Kelin Chen - *The Ohio State University*

5:05PM–5:15PM:

**DUCTILE-TO-BRITTLE FRACTURE SIZE EFFECT
 OF TITANIUM SHEETS IN MICRO/MESO-SCALE
 PLASTIC DEFORMATION**

Technical Paper Publication: IMECE2021-70083

Lei Sun - *Shanghai Jiao Tong University*
 Zhutian Xu - *Shanghai Jiao Tong University*
 Linfa Peng - *Shanghai Jiao Tong University*
 Xinmin Lai - *Shanghai Jiao Tong University*

5:15PM–5:25PM:

**A STUDY OF STRESS INTENSITY FACTORS IN
 LOZENGE PATTERN OF JOINTS**

Technical Paper Publication: IMECE2021-70138

K. Hithendra - *Indian Institute of Technology Madras*
 Raghu V. Prakash - *Indian Institute of Technology Madras*

5:25PM–5:35PM:

**FRACTOGRAPHIC ANALYSIS OF THE EFFECT OF
 SIDE GROOVES IN C(T) SPECIMEN**

Technical Presentation: IMECE2021-71260

Soupramanien C - *National Metallurgical Laboratory*
 Sivaprasad S - *National Metallurgical Laboratory*
 Raghu Prakash - *Indian Institute of Technology Madras*

5:35PM–5:45PM:

**RESOLVING THE CONFLICT OF DUCTILITY AND
 FORMABILITY IN SINGLE-PHASE AND DUPLEX
 TRIP STEELS**

Technical Presentation: IMECE2021-71580

Yanfei Gao - *University of Tennessee*



**03-05-03:
MATERIALS PROCESSING AND CHARACTERIZATION
NOVEMBER 3, 2021**

4:45PM–6:15PM

Chair: Hareesh Tippur - *Auburn University*
Chair: Caglar Oskay - *Vanderbilt University*

4:45PM–4:55PM:

**EFFECT OF HEAT TREATMENT ON
MICROSTRUCTURE AND HARDNESS OF GRAPHENE
NANOPLATELETS REINFORCED AL-ZN-MG-CU
ALLOY COMPOSITE**

Technical Paper Publication: IMECE2021-71258

Ankit Sharma - *BITS Pilani*
Akula Sai Pratyush - *BITS Pilani*
Srinitesh M. - *BITS Pilani*
Amit Kumar Gupta - *BITS Pilani*
Sujith Ravindran - *BITS Pilani*

4:55PM–5:05PM:

**CONSTITUTIVE MODELING AND VALIDATION OF
SINTERED METAL POWDERS SUBJECTED TO LARGE
STRAINS AND HIGH STRAIN RATES**

Technical Paper Publication: IMECE2021-71461

Ashby West - *United States Military Academy*
Garrett Venable - *United States Military Academy*
Michael Flanagan - *United States Military Academy*
Evan Harris - *United States Military Academy*
Brad G. Davis - *United States Military Academy*
F. Todd Davidson - *United States Military Academy*
Joseph Hanus - *United States Military Academy*

5:05PM–5:15PM:

**CHEMICAL STRUCTURE ANALYSIS OF CARBON-
DOPED SILICON OXIDE THIN FILMS BY
PLASMA-ENHANCED CHEMICAL VAPOR
DEPOSITION OF TETRAKIS(TRIMETHYLSILYLOXY)
SILANE PRECURSOR**

Technical Paper Publication: IMECE2021-72026

Jacob Comeaux - *University of Louisiana at Lafayette*
William B. Wirth - *University of Louisiana at Lafayette*
Justin Courville - *University of Louisiana at Lafayette*
Lingyiqian Luo - *University of Louisiana at Lafayette*
Hui Yan - *University of Louisiana at Lafayette*
Seonhee Jang - *University of Louisiana at Lafayette*

5:15PM–5:25PM:

**EFFECT OF THE MORPHOLOGICAL CHANGES IN
REUSED ALS10MG POWDER ON THE
FORMATION OF DEFECTS IN COMPONENTS
MANUFACTURED BY SLM**

Technical Paper Publication: IMECE2021-72226

María Guadalupe Orozco Sandoval - *Universidad Autónoma de Nuevo León*
Moisés Hinojosa Rivera - *Universidad Autónoma de Nuevo León*

5:25PM–5:35PM:

**WEAR BEHAVIOR OF GRINDING WHEELS WITH
SUPERFICIAL COOLING CHANNELS**

Technical Paper Publication: IMECE2021-72319

P. Capela - *University of Minho*
S.F. Carvalho - *University of Minho*
S. Costa - *University of Minho*
S. Souza - *University of Minho*
M. Pereira - *University of Minho*
L. Carvalho - *Dragão - Abrasivos, Lda.*
J.R. Gomes - *University of Minho*
D. Soares - *University of Minho*



05-10-02:**COMPUTATIONAL MODELING IN BIOMEDICAL APPLICATIONS II****NOVEMBER 3, 2021****4:45PM–6:15PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***4:45PM–4:55PM:****A PARAMETRIC STUDY: INFLUENCE OF GEOMETRY AND MATERIAL PROPERTIES ON THE RESPONSE OF THE FEMORAL HEAD THROUGH BIOFLUID****Technical Paper Publication: IMECE2021-70061**Manish Paliwal - *The College of New Jersey***4:55PM–5:05PM:****ASME V&V 40: A RISK-BASED FRAMEWORK FOR ESTABLISHING THE CREDIBILITY OF COMPUTATIONAL MODELS OF MEDICAL DEVICES****Technical Presentation: IMECE2021-70426**Marc Horner - *ANSYS, Inc.*Jeff Bischoff - *Zimmer Biomet*Payman Afshari - *DePuy Synthes Spine***5:05PM–5:15PM:****DO LONG AORTA BRANCHES IMPACT ON THE RHEOLOGICAL PROPERTIES?****Technical Paper Publication: IMECE2021-70565**Mohammad Al-Rawi - *Waikato Institute of Technology*Ahmed Al-Jumaily - *Auckland University of Technology*Djelloul Belkacemi - *Hassiba Ben Boulali University***5:15PM–5:25PM:****MORPHOLOGICAL MARKERS AND DETERMINANTS OF LEFT VENTRICULAR SYSTOLIC DYSFUNCTION IN REPAIRED TETRALOGY OF FALLOT****Technical Paper Publication: IMECE2021-70591**Sachin Govil - *University of California, San Diego*Nickolas Forsch - *University of California, San Diego*Sara Salehyar - *University of California, San Diego*Kathleen Gilbert - *University of Auckland*Avan Suinesiaputra - *University of Auckland*Sanjeet Hegde - *University of California, San Diego*James C. Perry - *University of California, San Diego*Alistair A. Young - *King's College London*Jeffrey H. Omens - *University of California, San Diego*Andrew D. McCulloch - *University of California, San Diego***5:25PM–5:35PM:****EVALUATION OF NORMALIZATION METHODS IN A CEREBRAL ARTERY ATLAS FOR AUTOMATIC LABELING****Technical Paper Publication: IMECE2021-71097**Kazuyoshi Jin - *Tohoku University*Ko Kitamura - *Tohoku University*Shunji Mugikura - *Tohoku University*Naoko Mori - *Tohoku University*Makoto Ohta - *Tohoku University*Hitomi Anzai - *Tohoku University***5:35PM–5:45PM:****ALGORITHM TO AVOID NORMAL TISSUE SACRIFICE AND THERMAL INJURY OF NEIGHBOURING ORGANS DURING RADIOFREQUENCY ABLATION OF HCC TUMOURS TREATED USING A MULTI-TINE ELECTRODE WITH SEPARATELY CONTROLLED TINES**

Technical Paper Publication: IMECE2021-69744

Manoj Dhiman - *Indian Institute of Technology Ropar*
 Ramjee Repaka - *Indian Institute of Technology Ropar*

05-02-03:
**INJURY AND DAMAGE BIOMECHANICS III
 NOVEMBER 3, 2021**
4:45PM–6:15PM

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*

4:45PM–4:55PM:
**EFFECT OF PHOSPHOLIPID TYPE ON FAILURE
 AND DAMAGE OF BIOLOGICAL MEMBRANE
 UNDER TENSION**
Technical Presentation: IMECE2021-76840

Anh Vo - *Mississippi State University*
 Michael Murphy - *Mississippi State University*
 Tonya Stone - *Mississippi State University*

4:55PM–5:05PM:
**A METHODOLOGY TO COMPARE BIOMECHANICAL
 SIMULATIONS WITH CLINICAL BRAIN IMAGING
 ANALYSIS UTILIZING TWO BLUNT IMPACT CASES**
Technical Presentation: IMECE2021-77000

X. Gary Tan - *U.S. Naval Research Laboratory*
 Amit Bagchi - *U.S. Naval Research Laboratory*
 Venkatasivasai Sajja - *Walter Reed Army Institute of Research*
 Maria D'Souza - *Institute of Nuclear Medicine and Allied Sciences*
 Raj Gupta - *U.S. Army Medical Research and
 Development Command*

5:05PM–5:15PM:
**COST AND SCALABILITY ANALYSIS OF A CLOUD-
 BASED BRAIN COMPUTING SERVICE**
Technical Presentation: IMECE2021-77298

Ritika Menghani - *The Pennsylvania State University*
 Anil Das - *The Pennsylvania State University*
 Adam Bartsch - *Prevent Biometrics Inc.*
 Reuben Kraft - *The Pennsylvania State University*

5:15PM–5:25PM:
**RAPIDLY ESTIMATE BRAIN STRAIN AND STRAIN
 RATE ON VARIOUS TYPES OF HEAD IMPACTS WITH
 TRANSFER LEARNING AND DATA FUSION ON DEEP
 NEURAL NETWORK**
Technical Presentation: IMECE2021-77308

Xianghao Zhan - *Stanford University*
 Yuzhe Liu - *Stanford University*
 David Camarillo - *Stanford University*

5:25PM–5:35PM:
**MICROMECHANICAL STUDY OF DIFFUSE AXONAL
 INJURY (DAI)**
Technical Presentation: IMECE2021-77581

Fuad Hasan - *University of Texas at Arlington*
 Ashfaq Adnan - *University of Texas at Arlington*

08-03-01:
**4E ANALYSIS AND OPTIMIZATION OF
 THERMODYNAMIC SYSTEMS
 NOVEMBER 3, 2021**


4:45PM–6:15PM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

4:45PM–4:55PM:

CONTROL TEMPERATURE OF THE AIR CONDITIONING SYSTEM OF A VESSEL FROM EXERGOCHEMICAL ANALYSIS

Technical Paper Publication: IMECE2021-68569

Deibys Barreto - *Universidad Tecnológica de Bolívar*
 Juan Fajardo - *COTECMAR*
 Julian Berrio - *COTECMAR*
 Rosa Torres - *Universidad Tecnológica de Bolívar*
 Yimy Gordon - *Universidad Popular del Cesar*
 Carlos Vidal - *Universidad Popular del Cesar*

4:55PM–5:05PM:

MIXED-INTEGER NONLINEAR PROGRAMMING (MINLP) BASED OPTIMIZATION OF REFRIGERATION SYSTEMS

Technical Paper Publication: IMECE2021-71428

Sergio F. Mussati - *INGAR (CONICET-UTN)*
 Tatiana Morosuk - *Technische Universität Berlin*
 Miguel C. Mussati - *INGAR (CONICET-UTN)*

5:05PM–5:15PM:

METHODS OF DEALING WITH CO-PRODUCTS IN A LIFE-CYCLE ASSESSMENT OF BIODIESEL FUEL PRODUCED FROM WASTE COOKING OIL

Technical Paper Publication: IMECE2021-69292

Hannah Torres - *Swarthmore College*
 Nelson Macken - *Swarthmore College*

5:15PM–5:25PM:

A STUDY ON THE PERFORMANCE OF SOLAR DRIVEN ABSORPTION CHILLER IN TERMS OF COEFFICIENT OF PERFORMANCE AND EXERGY EFFICIENCY

Technical Paper Publication: IMECE2021-69900

M.T. Nitsas - *National Technical University of Athens*
 I.P. Koronaki - *National Technical University of Athens*

5:25PM–5:35PM:

SIZING OPTIMIZATION OF DISTRICT ENERGY SYSTEMS CONSIDERING METEOROLOGICAL, DEMAND, AND ELECTRICITY EMISSIONS UNCERTAINTIES

Technical Paper Publication: IMECE2021-68722

Zahra Ghaemi - *University of Utah*
 Thomas T.D. Tran - *Indiana Tech*
 Amanda D. Smith - *University of Utah / Pacific Northwest
 National Laboratory*

5:35PM–5:45PM:

THERMODYNAMIC, ENVIRONMENTAL AND COST EVALUATION OF COMPRESSION-ABSORPTION PARALLEL AND CASCADE REFRIGERATION CHILLER

Technical Paper Publication: IMECE2021-70886

Sambhaji T. Kadam - *Texas A&M University at Qatar*
 Muhammad Saad Khan - *Texas A&M University at Qatar*
 Alexios-Spyridon Kyriakides - *Centre for Research
 and Technology Hellas*
 Athanasios I. Papadopoulos - *Centre for Research
 and Technology Hellas*
 Ibrahim Hassan - *Texas A&M University at Qatar*
 Mohammad Azizur Rahman - *Texas A&M University at Qatar*
 Panos Seferlis - *Centre for Research and Technology Hellas*



**08-04-02:
DESIGN AND ANALYSIS OF ENERGY CONVERSION
SYSTEMS II
NOVEMBER 3, 2021**

4:45PM–6:15PM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

4:45PM–4:55PM:

**STUDY ON THE OPERATION STRATEGY BASED
ON MULTI-OBJECTIVE OPTIMIZATION
CONSIDERING POWER AND EMISSION
PERFORMANCE FOR A GAS TURBINE**

Technical Paper Publication: IMECE2021-69878

Bei Li - *Shanghai Jiao Tong University*
 Jinwei Chen - *Shanghai Jiao Tong University*
 Huisheng Zhang - *Shanghai Jiao Tong Univ*

4:55PM–5:05PM:

**ON THE MAXIMIZATION OF THE WASTE HEAT
RECOVERY FROM EXHAUST GASES OF INTERNAL
COMBUSTION ENGINES**

Technical Paper Publication: IMECE2021-69941

Roberto Carapellucci - *University of LAquila*
 Davide Di Battista - *University of LAquila*

5:05PM–5:15PM:

**INVESTIGATION OF DATA-DRIVEN MODELING IN
DISTRICT HEATING SUBSTATIONS**

Technical Paper Publication: IMECE2021-70253

Encheng Feng - *Zhejiang University*
 Xiaojie Lin - *Zhejiang University*
 Zaihua Wang - *Electric Power Research Institute of State Grid
Zhejiang Electric Power Co., Ltd.*
 Guangyao Ying - *Electric Power Research Institute of State Grid
Zhejiang Electric Power Co., Ltd.*

5:15PM–5:25PM:

**ANALYSIS OF TRACTION ELECTRIC MOTORS USED
IN COMMERCIAL HEV AND BEV**

Technical Paper Publication: IMECE2021-70852

Alfonso Arriaga-Vigil - *Universidad Nacional Autónoma de México*
 Eleftherios Karamanis - *National Technical University of Athens*
 Marcelo Lopez-Parra - *Universidad Nacional Autónoma de México*
 Osiris Ricardo-Torres - *Universidad Nacional Autónoma
de México*

5:25PM–5:35PM:

**A NUMERICAL STUDY INTO THE IMPORTANCE OF
EQUIVALENCE RATIO MEASUREMENT ACCURACY
FOR SPARK IGNITION ENGINES**

Technical Paper Publication: IMECE2021-70992

Ruomiao Yang - *Zhejiang University*
 Xiaoxia Sun - *Beijing Power Machinery Research Institute*
 Zhentao Liu - *Zhejiang University*
 Yu Zhang - *Zhejiang University*
 Jiahong Fu - *Zhejiang University*

5:35PM–5:45PM:

**EVALUATION OF “NATURAL GAS / HYDROGEN”
MIXTURES FOR POWER-TO-GAS APPLICATION**

Technical Paper Publication: IMECE2021-71418

Jimena Incer Incerincer Valverde - *Technische Universität Berlin*
 Olaniyi Oyeniyi - *Technische Universität Berlin*
 Tatiana Morosuk - *Technische Universität Berlin*
 George Tsatsaronis - *Technische Universität Berlin*



08-01-03:**ENERGY-RELATED MULTIDISCIPLINARY III
NOVEMBER 3, 2021****4:45PM–6:15PM**

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

4:45PM–4:55PM:**COMPARATIVE EVALUATION OF SOME
ENERGY POLICIES IN ABU DHABI USING
ENERGYPLAN PROGRAM****Technical Paper Publication: IMECE2021-72694**

Moza Salim Al Naimi - *Khalifa University*
 Mohamed I. Hassan Ali - *Khalifa University*

4:55PM–5:05PM:**STUDY OF DEFECT MORPHOLOGY AND DENSITY
ON MECHANO-ELECTROCHEMICAL EFFECT OF
PIPELINE CORROSION****Technical Paper Publication: IMECE2021-73358**

Sedigheh Rashidi - *University of Akron*
 Ardavan Zandiatashbar - *Western Digital Corp. (currently
 at Tesla Inc.)*
 Siamak Farhad - *University of Akron*

5:05PM–5:15PM:**PREDICTION OF POTENTIAL FUEL ECONOMY
IMPROVEMENTS OF AN ELECTRIFIED NATURAL GAS
TRUCK EQUIPPED WITH A VVT/VCR ENGINE****Technical Presentation: IMECE2021-76588**

Ratnak Sok - *Waseda University*
 Jin Kusaka - *Waseda University*
 Hisaharu Nakashima - *HKS Co., Ltd.*
 Makoto Akaike - *Tokyo Gas Co., Ltd.*
 Hidetaka Minagata - *Tokyo Gas Co., Ltd.*

5:15PM–5:25PM:**ECONOMIC OPTIMIZATION OF AN INTEGRATED
REGENERATIVE TRANSCRITICAL CYCLE WITH A
SMALL MODULAR REACTOR****Technical Presentation: IMECE2021-77154**

Jacob Bryan - *Utah State University*
 Yili Zhang - *Utah State University*
 Hailei Wang - *Utah State University*
 Geordie Richards - *Utah State University*

5:25PM–5:35PM:**WATER MANAGEMENT FOR AN ELECTROCHEMICAL
GAS SEPARATION AND INERTING SYSTEM****Technical Paper Publication: IMECE2021-69786**

Utsav Raj Aryal - *University of Delaware*
 Ajay K. Prasad - *University of Delaware*

5:35PM–5:45PM:**COMPUTATIONAL MODEL FOR AN
ELECTROCHEMICAL HYDROGEN COMPRESSOR****Technical Paper Publication: IMECE2021-70418**

Majid Aziz - *University of Delaware*
 Utsav Raj Aryal - *University of Delaware*
 Ajay K. Prasad - *University of Delaware*



**10-09-01:
FLUID FLOWS WITH BIO-APPLICATIONS
NOVEMBER 3, 2021**

4:45PM–6:15PM

Chair: Philipp Epple - *Coburg University of Applied Sciences*
Chair: Kamran Siddiqui - *University of Western Ontario*

**4:45PM–4:55PM:
A NUMERICAL STUDY OF THE EFFECT OF SURFACE
COVERAGE ON THE FILTRATION PERFORMANCE OF
HAIR ARRAYS**

Technical Paper Publication: IMECE2021-69668

Sri Savya Tanikella - *University of California*
Nathan D. Jones - *University of California*
Emilie Dressaire - *University of California*

4:55PM–5:05PM:

**FABRICATION OF HETEROGENEOUS HYDROGEL
MODELS FOR CONVECTION-ENHANCED DRUG
DELIVERY STUDIES**

Technical Paper Publication: IMECE2021-67615

Haipeng Zhang - *University of Nebraska*
Aidan Johnson - *University of Nebraska*
Sangjin Ryu - *University of Nebraska*
Seunghee Kim - *University of Nebraska*
Chi (Kevin) Zhang - *University of Nebraska Medical Center*

5:05PM–5:15PM:

**FLUID-STRUCTURE INTERACTION OF SLENDER
BIOFILAMENTS AT LOW REYNOLDS NUMBERS**

Technical Paper Publication: IMECE2021-70702

Mehrad Mortazavi - *University of California*
Venkattraman Ayyaswamy - *University of California*
Arvind Gopinath - *University of California*
Sachin Goyal - *University of California*

5:15PM–5:25PM:

**A COMPUTATIONAL STUDY ILLUSTRATING
SECONDARY FLOW AND AEROSOL TRANSPORT IN
HUMAN AIRWAYS**

Technical Presentation: IMECE2021-71338

Subrata Sarkar - *Indian Institute of Technology Kanpur*
Ishita Jain - *Indian Institute of Technology Kanpur*

5:25PM–5:35PM:

**MODELING AND VALIDATION OF EXTRUSION-
BASED BIOMATERIAL PRINTING IN ADDITIVE
MANUFACTURING**

Technical Presentation: IMECE2021-77348

Siamak Mirfendereski - *University of Nebraska-Lincoln*
Samuel Gerdes - *University of Nebraska-Lincoln*
Pralhada Rao - *University of Nebraska-Lincoln*
Jae Sung Park - *University of Nebraska-Lincoln*

**11-09-03:
MODELING AND SIMULATION METHODS
NOVEMBER 3, 2021**

4:45PM–6:15PM

Chair: Subramanyaravi Annapragada - *United Technologies Research*
Chair: Kevin Dowding - *Sandia*
Chair: Alexander Rattner - *Penn State University*

4:45PM–4:55PM:

**A HIGH-ORDER SPECTRAL DIFFERENCE SOLVER
FOR 2D IDEAL MHD EQUATIONS WITH
CONSTRAINED TRANSPORT**



Technical Paper Publication: IMECE2021-73359

Kuangxu Chen - *Clarkson University*
 Chunlei Liang - *Clarkson University*

4:55PM–5:05PM:
**CLOSED GREENHOUSE HEATING IN AN ARID
 EGYPTIAN WINTER USING EARTH-AIR HEAT
 EXCHANGERS**
Technical Paper Publication: IMECE2021-69509

Anwar Hegazy - *University of Auckland*
 Alison Subiantoro - *University of Auckland*
 Stuart Norris - *University of Auckland*

5:05PM–5:15PM:
**NEURAL DIFFERENTIAL EQUATIONS FOR INVERSE
 MODELING IN MODEL COMBUSTORS**
Technical Paper Publication: IMECE2021-69657

Xingyu Su - *Tsinghua University*
 Weiqi Ji - *Massachusetts Institute of Technology*
 Long Zhang - *Tsinghua University*
 Wantong Wu - *Tsinghua University*
 Zhuyin Ren - *Tsinghua University*
 Sili Deng - *Massachusetts Institute of Technology*

5:15PM–5:25PM:
**PERFORMANCE ANALYSIS OF A TRAVELLING-WAVE
 THERMO-ACOUSTIC ENGINE USING ARTIFICIAL
 NEURAL NETWORK**
Technical Paper Publication: IMECE2021-70529

M. Ngcukayitobi - *University of Johannesburg*
 L.K. Tartibu - *University of Johannesburg*
 F.C. Bannwart - *University of Campinas*

5:25PM–5:35PM:
**MODELING AND SIMULATION OF CONVECTIVE
 HEAT TRANSFER CAUSED BY A ROTATING DISK**
Technical Paper Publication: IMECE2021-70373

David Ruiz - *Purdue University Fort Wayne*
 Donald Mueller - *Purdue University Fort Wayne*
 Hosni Abu-Mulaweh - *Purdue University Fort Wayne*

12-15-02:
**RECENT ADVANCES AND APPLICATIONS IN
 MESHFREE AND PARTICLE METHODS
 NOVEMBER 3, 2021**
4:45PM–6:15PM

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

4:45PM–4:55PM:
**A NATURALLY STABILIZED CONFORMING
 NODAL INTEGRATION FOR NONLINEAR
 EXPLICIT DYNAMICS**
Technical Presentation: IMECE2021-77297

Jiarui Wang - *The Pennsylvania State University*
 Michael Hillman - *The Pennsylvania State University*

4:55PM–5:05PM:
**A VARIATIONAL MULTISCALE IMMersed METHOD
 WITH INTERFACE ENHANCEMENT FOR MODELING
 HETEROGENEOUS MATERIALS**
Technical Presentation: IMECE2021-77303

Ryan Schlinkman - *University of California, San Diego*
 Jiun-Shyan Chen - *University of California, San Diego*



5:05PM–5:15PM:**A DISCONTINUOUS COHESIVE REPRODUCING KERNEL FINITE VOLUME METHOD FOR BRITTLE FRACTURE SIMULATION****Technical Presentation: IMECE2021-77315**Saili Yang - *The Pennsylvania State University*Michael Hillman - *The Pennsylvania State University***5:15PM–5:25PM:****STABLE MIDPOINT INTEGRATION METHOD FOR GALERKIN MESHFREE METHOD****Technical Presentation: IMECE2021-77428**Mohammed Mujtaba Atif - *University of Illinois at Chicago*Sheng-Wei Chi - *University of Illinois at Chicago***5:25PM–5:35PM:****CONVERGENCE STUDIES IN MESHFREE PERIDYNAMIC WAVE AND CRACK PROPAGATION****Technical Presentation: IMECE2021-77492**Pablo Seleson - *Oak Ridge National Laboratory*Marco Pasetto - *University of California, San Diego*Yohan John - *General Electric Global Research*David Littlewood - *Sandia National Laboratories*Jeremy Trageser - *Sandia National Laboratories***5:35PM–5:45PM:****A MESHFREE METHOD FOR RANDOMLY HETEROGENEOUS PERIDYNAMIC MODEL WITH FRACTURE****Technical Presentation: IMECE2021-77498**Yue Yu - *Lehigh University*Yiming Fan - *Lehigh University*Huaiqian You - *Lehigh University*Xiu Yang - *Lehigh University*Xiaochuan Tian - *University of California, San Diego*Xingjie Li - *University of North Carolina at Charlotte***12-12-02:****MECHANICS OF SOFT MATERIALS
NOVEMBER 3, 2021****4:45PM–6:15PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***4:45PM–4:55PM:****COMPUTATIONAL MODELING OF RED BLOOD CELL DEFORMATION IN THE ULTRASONIC STANDING WAVE****Technical Presentation: IMECE2021-72443**Yifan Liu - *Xi'an Jiaotong University*Fengxian Xin - *Xi'an Jiaotong University***4:55PM–5:05PM:****EXPERIMENTS AND MODELING THE VISCOELASTIC BEHAVIOR OF POLYMERIC GELS****Technical Presentation: IMECE2021-73380**Shawn Chester - *New Jersey Institute of Technology*Nikola Bosnjak - *Cornell University*

5:05PM–5:15PM:**STUDY ON THE VISCOELASTIC PROPERTIES OF POLYACRYLAMIDE HYDROGELS DURING TRANSIENT SWELLING****Technical Presentation: IMECE2021-77235**

Akira Takashima - Nagoya University
 Seishiro Matsubara - Nagoya University
 So Nagashima - Nagoya University
 Makoto Uchida - Osaka City University
 Hiro Tanaka - Osaka University
 Shohei Ida - The University of Shiga Prefecture
 Dai Okumura - Nagoya University

5:15PM–5:25PM:**BUCKLE-DELAMINATION DESIGN GUIDED STRETCHABLE SILVER NANOWIRE CONDUCTORS****Technical Presentation: IMECE2021-77374**

Shuang Wu - North Carolina State University
 Shanshan Yao - Stony Brook University
 Yuxuan Liu - North Carolina State University
 Xiaogang Hu - North Carolina State University
 He Huang - North Carolina State University
 Yong Zhu - North Carolina State University

5:25PM–5:35PM:**MEASUREMENT AND MODELING OF THE MECHANICAL AND ELECTROCHEMICAL RESPONSE OF GE ELECTRODE DURING SODIATION/DESODIATION CYCLING****Technical Presentation: IMECE2021-77555**

Akshay Pakhare - Michigan State University
 Siva Nadimpalli - Michigan State University

THURSDAY, November 4**01-01-01: PHONONICS I
NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Mostafa Nough - University at Buffalo
 Chair: Yongfeng Xu - University of Cincinnati
 Chair: Guoliang Huang - University of Missouri

12:25PM–12:35PM:**TUNABLE TOPOLOGICAL WAVE CONTROL IN A THREE-DIMENSIONAL METASTABLE ELASTIC METAMATERIAL****Technical Paper Publication: IMECE2021-69410**

Patrick Dorin - University of Michigan
 Xiang Liu - Shanghai Jiao Tong University
 K.W. Wang - University of Michigan

12:35PM–12:45PM:**TOPOLOGICAL OPTIMIZATION OF PIEZOELECTRIC MATERIALS FOR THE CONTROL OF WAVE PROPAGATION IN PERIODIC STRUCTURES****Technical Paper Publication: IMECE2021-70964**

Jiahui Shi - Beihang University
 Yu Fan - Beihang University
 Lin Li - Beihang University

12:45PM–12:55PM:**EFFECT OF COUPLED HELMHOLTZ RESONATORS ON SOUND CONTROL**

Technical Paper Publication: IMECE2021-70333

R. Sabat - *University of Lille*
 G. Leveque - *University of Lille*
 Y. Pennec - *University of Lille*
 D. Torrent - *Universitat Jaume I*
 B. Djafari-Rouhani - *University of Lille*

12:55PM–1:05PM:
**MULTI-RESONATOR ELASTIC METAMATERIALS:
 FROM SERIES AND PARALLEL TO HYBRID
 CONFIGURATIONS**
Technical Presentation: IMECE2021-70493

Adrian Stein - *University at Buffalo (SUNY)*
 Mostafa Nouh - *University at Buffalo (SUNY)*
 Tarunraj Singh - *University at Buffalo (SUNY)*

1:05PM–1:15PM:
**BLOCH WAVE DYNAMICS OF A BRANCHED
 LOCALLY RESONANT METAMATERIAL WITH A
 DISCRETE PERIODIC RESONATING BRANCH**
Technical Paper Publication: IMECE2021-70727

Mary V. Bastawrous - *University of Colorado*
 Mahmoud I. Hussein - *University of Colorado*

1:15PM–1:25PM:
**SOUND RADIATION OF LOCALLY RESONANT
 UNIDIRECTIONALLY RIBBED PLATES**
Technical Paper Publication: IMECE2021-70987

Pascal Fossat - *LTDS – CNRS UMR 5513 École Centrale de Lyon*
 Mohamed Ichchou - *LTDS – CNRS UMR 5513 École
 Centrale de Lyon*

02-07-01:
**ADVANCED MATERIAL FORMING, FRICTION STIR
 WELDING, AND DEFORMATION
 NOVEMBER 4, 2021**
12:25PM–1:55PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

12:25PM–12:35PM:
**PREDICTION OF HOT DEFORMATION BEHAVIORS
 UNDER MULTIAXIAL LOADING USING GURSON-
 TVERGAARD-NEEDLEMAN DAMAGE MODEL FOR
 INCONEL 718 ALLOY THIN SHEET**
Technical Paper Publication: IMECE2021-70845

Gauri Mahalle - *BITS Pilani*
 Nitin Kotkunde - *BITS Pilani*
 Amit Kumar Gupta - *BITS Pilani*
 Swadesh Kumar Singh - *Gokaraju Rangaraju Institute
 of Engineering & Technology*
 Chetan Nikhare - *Penn State Erie - Behrend College*

12:35PM–12:45PM:
**RESIDUAL FORMABILITY OF SINGLE POINT
 INCREMENTALLY FORMED PART**
Technical Paper Publication: IMECE2021-69895

Chetan P. Nikhare - *Penn State Erie - Behrend College*

12:45PM–12:55PM:
**THE DEVELOPMENT OF A MACHINE FOR
 MACROSCALE FRICTION STIR PROCESSING:
 A WORK IN PROGRESS**


Technical Paper Publication: IMECE2021-69634

William J. Emblom - *Emblom Engineering*
 Ayotunde Olayinka - *University of Louisiana*
 Jared Marcel - *University of Louisiana*
 Joshua Ferrara - *University of Louisiana*
 Scott DePaula - *University of Louisiana*
 Maria Fernanda Espinosa-Perez - *University of Louisiana*
 Scott W. Wagner - *Michigan Technological University*

12:55PM–1:05PM:
EFFECT OF DIE VELOCITY ON TUBE DEFORMATION MECHANICS DURING LOW PRESSURE TUBE HYDROFORMING PROCESS SEQUENCE VARIATION
Technical Paper Publication: IMECE2021-70179

Chetan P. Nikhare - *Penn State Erie - Behrend College*
 Tanya Buddi - *Gokaraju Rangaraju Institute of Engineering and Technology*
 Nitin Ramesh Kotkunde - *Birla Institute of Technology & Science*
 Swadesh Kumar Singh - *Gokaraju Rangaraju Institute of Engineering and Technology*

1:05PM–1:15PM:
A NUMERICAL STUDY ON SPRINGBACK OF A CHANNEL THROUGH THE OSCILLATION OF PUNCH
Technical Paper Publication: IMECE2021-70171

Chetan P. Nikhare - *Penn State Erie - Behrend College*
 Tanya Buddi - *Gokaraju Rangaraju Insititute of Engineering and Technology*
 Nitin Ramesh Kotkunde - *Birla Institute of Technology & Science*
 Swadesh Kumar Singh - *Gokaraju Rangaraju Institute of Engineering and Technology*

1:15PM–1:25PM:
EFFECTS OF ELECTRIC CURRENT ON THE PLASTIC DEFORMATION BEHAVIOR OF PURE COPPER, IRON, AND TITANIUM
Technical Presentation: IMECE2021-77132

Christopher Rudolf – *U.S. Naval Research Laboratory*

**02-02-04:
 INNOVATIONS IN ADDITIVE MANUFACTURING (POWDER, COMPOSITES, INKS)
 NOVEMBER 4, 2021**
12:25PM–1:55PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

12:25PM–12:35PM:
SIMULATION OF SPATTERS STICKING PHENOMENON IN LASER POWDER BED FUSION PROCESS USING THE SMOOTHED PARTICLE HYDRODYNAMICS METHOD
Technical Paper Publication: IMECE2021-66761

Lingbin Meng - *Indiana University - Purdue University Indianapolis*
 Tao Sun - *University of Virginia*
 Tejesh Dube - *Indiana University - Purdue University Indianapolis*
 Sugrim Sagar - *Indiana University - Purdue University Indianapolis*
 Xuehui Yang - *Indiana University - Purdue University Indianapolis*
 Jian Zhang - *Indiana University - Purdue University Indianapolis*
 Jing Zhang - *Indiana University - Purdue University Indianapolis*

12:35PM–12:45PM:
PRODUCTION OF SPHERICAL MONODISPERSE METAL POWDERS BY MEANS OF THE PLATEAU-RAYLEIGH INSTABILITY OF A LIQUID METAL JET
Technical Paper Publication: IMECE2021-70372

Christoph Rehekampff - *Technical University of Munich*
 Dominik Rumschoettel - *Technical University of Munich*
 Andreas Schroeffer - *Technical University of Munich*
 Franz Irlinger - *Technical University of Munich*
 Tim C. Lueth - *Technical University of Munich*



12:45PM–12:55PM:**DEVELOPMENT OF RECYCLED GLASS FIBER-POLYMER COMPOSITES FOR LARGE-SCALE ADDITIVE MANUFACTURING****Technical Presentation: IMECE2021-70715**

Xianhui Zhao - Oak Ridge National Laboratory
 Sanjita Wasti - University of Tennessee, Knoxville
 Tyler Smith - Oak Ridge National Laboratory
 Kai Li - Oak Ridge National Laboratory
 Halil Tekinalp - Oak Ridge National Laboratory
 Uday Vaidya - University of Tennessee, Knoxville
 Soydan Ozcan - Oak Ridge National Laboratory

12:55PM–1:05PM:**DEPOSITION OF LIQUID DOPANT INTO METAL POWDER FOR SPATIALLY CONTROLLED PROPERTIES IN LASER POWDER BED FUSION****Technical Presentation: IMECE2021-69024**

Taylor Davis - Brigham Young University
 Nathan Crane - Brigham Young University

1:05PM–1:15PM:**INFLUENCING THE MECHANICAL PROPERTIES OF FUSED FILAMENT FABRICATION PARTS BY NON-PLANAR MATERIAL EXTRUSION****Technical Paper Publication: IMECE2021-70144**

Rhys Edwards - University of Technology Sydney
 Lee Clemon - University of Technology Sydney

1:15PM–1:25PM:**INKJET PRINTING AND CONDUCTIVITY MEASUREMENT OF SILVER PATTERNS ON FLEXIBLE SUBSTRATES****Technical Presentation: IMECE2021-76507**

Sahil Premprakash Wankhede - University of Massachusetts
 Xian Du - University of Massachusetts Amherst

02-08-01:**INNOVATIVE PRODUCT AND PROCESS DESIGN I NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Chetan Nikhare - The Pennsylvania State University
 Chair: Scott Thompson - Kansas State University
 Chair: M.P. Jahan - Miami University

12:25PM–12:35PM:**TOOL PATH GENERATION FOR FREE FORM SURFACE SLICING IN ADDITIVE MANUFACTURING/ FUSED FILAMENT FABRICATION****Technical Paper Publication: IMECE2021-69667**

Muhammad Salman Chaudhry - York University
 Aleksander Czekanski - York University

12:35PM–12:45PM:**STANDARDIZING THE PROCESS INFORMATION FOR MACHINING OPERATIONS THROUGH SELF-CONTAINED STRUCTURES****Technical Paper Publication: IMECE2021-70173**

Eram Asghar - Politecnico di Milano
 Tullio Tolo - Politecnico di Milano
 Andrea Ratti - Tech.kno S.r.l

12:45PM–12:55PM:**DEVELOPMENT OF A DIGITAL TWIN FOR ADDITIVE MANUFACTURING TRANSFORMATION DURING THE PRODUCTION CYCLE OF A SLS/SLM MACHINE**

Technical Paper Publication: IMECE2021-68002

Michael Machado - *University of Minho*

João Silva - *University of Minho*

Leopoldo Silva - *University of Minho*

Eduardo Oliveira - *University of Minho*

João Sousa - *University of Minho*

12:55PM–1:05PM:**THE IMPACT OF MANUFACTURING FIXATION IN DESIGN: INSIGHTS FROM INTERVIEWS WITH ENGINEERING PROFESSIONALS****Technical Paper Publication: IMECE2021-72394**

Jennifer Bracken Brennan - *Penn State University*

Timothy W. Simpson - *Penn State University*

William B. Miney - *Penn State University*

Kathryn W. Jablokow - *Penn State University*

1:05PM–1:15PM:**DOUBLE CURVED PANEL FORMING WITH BESPOKE SLITS****Technical Paper Publication: IMECE2021-71533**

Rupert Maleczek - *University of Innsbruck*

Valentine Troi - *Troi Composites*

Jonas Mertens - *University of Innsbruck*

1:15PM–1:25 PM:**MODELING AND ANALYSIS OF GEAR TOOTH REPLACEMENT SYSTEM AGAINST BREAKING OF SINGLE TOOTH****Technical Paper Publication: IMECE2021-73316**

Dhiren Patel - *Indus Institute of Technology & Engineering*

Gurprit Singh Viridi - *Alpha College of Engineering and Technology*

A.D. Dhass - *Indus Institute of Technology and Engineering*

03-05-04:**MATERIALS PROCESSING AND CHARACTERIZATION NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Hareesh Tippur - *Auburn University*

Chair: Caglar Oskay - *Vanderbilt University*

12:25PM–12:45PM:**3D PRINTED MECHANICAL TESTING DEVICE FOR MICRO-SCALE MATERIAL SYSTEMS****Invited Presentation: IMECE2021-77290**

Christopher Rudolf - *U.S. Naval Research Laboratory*

12:45PM–12:55PM:**RECENT DEVELOPMENTS IN PROCESSING AND CHARACTERIZATION OF METAL FOAM: REVIEW DEVELOPMENTS IN PROCESSING AND CHARACTERIZATION OF METAL FOAM: A REVIEW****Technical Paper Publication: IMECE2021-73258**

Asima Zahoor - *United Arab Emirates University*

Abdel-Hamid Ismail Mourad - *United Arab Emirates University*

12:55PM–1:05PM:**INVESTIGATION OF THE EFFECT AND CONTRIBUTION OF PROCESS PARAMETERS BY TAGUCHI AND ANOVA ANALYSIS ON THE MORPHOLOGICAL AND ELECTRICAL PROPERTIES OF RF MAGNETRON SPUTTERED SiO₂ OVER Si SUBSTRATE**

Technical Paper Publication: IMECE2021-73849

Sajid Mahfuz Uchayash - *The University of Texas Rio Grande Valley*

Prosanto Biswas - *The University of Texas Rio Grande Valley*

Meah Imtiaz Zulkarnain - *The University of Texas Rio Grande Valley*

Ahmed Touhami - *The University of Texas Rio Grande Valley*

Nazmul Islam - *The University of Texas Rio Grande Valley*

Hasina F. Huq - *The University of Texas Rio Grande Valley*

1:05PM–1:15PM:**SIMULATION OF DEEP INDENTATION OF METALLIC SPECIMENS WITH NEAR-SURFACE VOIDS****Technical Presentation: IMECE2021-77180**

Debasree Das - *Indian Institute of Science Bangalore*

Narayan K. Sundaram - *Indian Institute of Science Bangalore*

03-15-01:**MULTIFUNCTIONAL MATERIALS, STRUCTURES AND DEVICES: MODELING, DESIGN, MANUFACTURING, AND CHARACTERIZATION
NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Hareesh Tippur - *Auburn Univ.*

Chair: Caglar Oskay - *Vanderbilt University*

12:25PM–12:35PM:**A FINITE ELEMENT BASED METHOD TO PREDICT AND TAILOR THE ENERGY ASSOCIATED WITH SNAP-THROUGH BUCKLING OF A CURVED BEAM****Technical Paper Publication: IMECE2021-67793**

Catherine S. Florio – *U.S. Army DEVCOM AC*

12:35PM–12:45PM:**COMPARISON OF THE MULTILAYER EFFECTS ON WATER DESALINATION USING GRAPHENE AND MOS₂****Technical Paper Publication: IMECE2021-69156**

Tien-Chien Jen - *University of Johannesburg*

Sunday Oyinbo - *University of Johannesburg*

Peter Oviroh - *University of Johannesburg*

Sina Karimzadeh - *University of Johannesburg*

12:45PM–12:55PM:**ATOMISTIC SIMULATION OF INTERFACE EFFECTS IN HYBRID CARBON FIBER REINFORCED POLYMER COMPOSITES INCORPORATING ZNO NANOWIRES****Technical Paper Publication: IMECE2021-70772**

Parisa Marshizadeh - *University of Oklahoma*

Mohammad Abshirini - *University of Oklahoma*

Mrinal C. Saha - *University of Oklahoma*

Liangliang Huang - *University of Oklahoma*

Yingtao Liu - *University of Oklahoma*

12:55PM–1:05PM:**FIRST-PLY FAILURE PRESSURE OF SYMMETRIC LAMINATED HYBRID COMPOSITE CNG TANK****Technical Paper Publication: IMECE2021-70945**

Ganesh Shrigandhi - *MIT World Peace University*

Mihil Shah - *MIT World Peace University*

Basavraj S. Kothavale - *MIT-World Peace University*

1:05PM–1:15PM:**ANALYTICAL AND FINITE ELEMENT MODELING OF FLEXOELECTRIC CURVED BEAMS**

Technical Presentation: IMECE2021-71026

Yadwinder Singh Joshan - *Indian Institute of Technology Delhi*
Sushma Santapuri - *Indian Institute of Technology Delhi*

1:15PM–1:25PM:**AXISYMMETRIC NONLINEAR DEFORMATION OF MAGNETOELASTIC MEMBRANES****Technical Presentation: IMECE2021-71098**

Awantika Mishra - *Indian Institute of Technology Delhi*
Sahil Chawla - *Indian Institute of Technology Delhi*
Sushma Santapuri - *Indian Institute of Technology Delhi*

05-10-03:**COMPUTATIONAL MODELING IN BIOMEDICAL APPLICATIONS I
NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Linxia Gu - *Florida Institute of Technology*
Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
Chair: Reuben Kraft - *The Pennsylvania State University*
Chair: Martin Tanaka - *Western Carolina University*

12:25PM–12:35PM:**MODELING AIR FLOW IN PATHOLOGICAL HUMAN AIRWAY WITH PATIENT SPECIFIC CT-DATA****Technical Paper Publication: IMECE2021-71422**

Adnan Islam - *University of Central Florida*
Amir Rouhollahi - *University of Central Florida*
Michael Lauria - *University of California*
Anand Santhanam - *University of California*
Olusegun Ilegbusi - *University of Central Florida*

12:35PM–12:45PM:**AN ANALYTICAL MODEL FOR PREDICTING THE DEFLECTION OF HOLLOW SURGICAL NEEDLE IN SOFT TISSUE****Technical Paper Publication: IMECE2021-71532**

Samer Al-Safadi - *Temple University*
Parsaoran Hutapea - *Temple University*

12:45PM–12:55PM:**INFLUENCE OF ARTERIAL WALL ELASTICITY ON BLOOD FLOW DYNAMIC FACTORS OF STENOTIC CAROTID ARTERY****Technical Paper Publication: IMECE2021-71625**

Muhamed Albadawi - *Egypt-Japan University of Science and Technology*
Yasser Abuouf - *Egypt-Japan University of Science and Technology*
Mahmoud Ahmed - *Egypt-Japan University of Science and Technology*

12:55PM–1:05PM:**DEVELOPMENT OF A PARAMETERIZED MODEL FOR MAIZE STEM CROSS-SECTIONS****Technical Presentation: IMECE2021-71821**

Michael Ottesen - *Brigham Young University*
Ryan Larson - *Brigham Young University*
Douglas Cook - *Brigham Young University*

1:05PM–1:15PM:**BIPHASIC REPRESENTATIVE ELEMENTAL VOLUMES FOR 3-D WHITE MATTER ELASTOGRAPHY****Technical Paper Publication: IMECE2021-73372**

Xuehai Wu - *Rutgers, The State University of New Jersey*
John G. Georgiadis - *Illinois Institute of Technology*
Assimina A. Pelegri - *Rutgers, The State University of New Jersey*



**05-13-1: ROBOTICS, REHABILITATION I
NOVEMBER 4, 2021**

12:25PM–1:55PM

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*

12:25PM–12:35PM:

**A DEPLOYABLE TENSEGRITY MICROROBOT FOR
MINIMAL INVASIVE INTERVENTIONS**

Technical Paper Publication: IMECE2021-67009

Sichen Yuan - *Lawrence Technological University*
 Wuming Jing - *Lawrence Technological University*
 Hao Jiang - *Lawrence Technological University*

12:35PM–12:45PM:

**DESIGN, PROTOTYPING, AND TESTING OF A
ROBOTIC PROSTHETIC LEG PRELIMINARY RESULTS**

Technical Paper Publication: IMECE2021-68786

Michael Davidson - *Loma Linda University*
 Noha Daher - *Loma Linda University*
 Thomas Fryer - *University of California, Riverside*
 Johannes Schaepper - *Loma Linda University*
 Duc Tran - *Loma Linda University*

12:45PM–12:55PM:

**NAVIGATION AND PATH PLANNING OF AN
AUTONOMOUS MOBILE ROBOT**

Technical Paper Publication: IMECE2021-69457

Vidya K. Nandikolla - *California State University*
 Eden Morris - *California State University*
 John Aquino - *California State University*
 Thomas Paris - *California State University*
 Kevin Wheeler - *California State University*

12:55PM–1:05PM:

**DYNAMIC TRAJECTORY PLANNING OF A
7-DOF SURGICAL ROBOT BASED ON HER-
DDPG ALGORITHM**

Technical Paper Publication: IMECE2021-70294

Qitao Hou - *Hefei University of Technology*
 Chenchen Gu - *Hefei University of Technology*
 Xiaoyu Wang - *Hefei University of Technology*
 Yating Zhang - *Hefei University of Technology*
 Ping Zhao - *Hefei University of Technology*

1:05PM–1:15PM:

**DESIGN OF A TRAINING AND EVALUATION SYSTEM
FOR SURGICAL ROBOT OPERATION BASED ON
CHAI3D AND LSTM ALGORITHM**

Technical Paper Publication: IMECE2021-70310

Chenchen Gu - *Hefei University of Technology*
 Qitao Hou - *Hefei University of Technology*
 Zhaojie Ge - *Hefei University of Technology*
 Zhiqiang Teng - *Hefei University of Technology*
 Ping Zhao - *Hefei University of Technology*

1:15PM–1:25PM:

**DESIGN AND DEVELOPMENT OF A
RECONFIGURABLE AND ADJUSTABLE
COMPLIANCE SYSTEM FOR THE
MEASUREMENT OF ORTHOTIC PROPERTIES**



Technical Paper Publication: IMECE2021-70326

Yaru Mo - *University of Michigan and Shanghai Jiao Tong University Joint Institute*

Zeeshan Qaiser - *University of Michigan and Shanghai Jiao Tong University Joint Institute*

Shane Johnson - *University of Michigan and Shanghai Jiao Tong University Joint Institute*

**06-01-01:
PRODUCT AND PROCESS DESIGN I
NOVEMBER 4, 2021**

12:25PM–1:55PM

Chair: Miri Weiss Cohen - *Braude College of Engineering*

Chair: Daniele Regazzoni - *University of Bergamo*

Chair: Marco Rossoni - *Università Degli Studi di Bergamo*

12:25PM–12:35PM:

**E-SYNCH: A TOOL FOR AUTOMATING
REPRODUCTIVE MANAGEMENT OF CATTLE**

Technical Presentation: IMECE2021-68448

Yue Ren - *Cornell University*

12:35PM–12:45PM:

**RESEARCH ON THE APPLICATION OF ELECTRIC
HEATING FLOOR IN RAILWAY VEHICLES**

Technical Paper Publication: IMECE2021-68985

Haifeng Zhang - *CRRCA Corporation*

Na Jia - *CRRCA Corporation*

Jingwen Liang - *CRRCA Corporation*

Yanhua Cao - *CRRCA Corporation*

Xianfeng Liu - *CRRCA Changchun Railway Vehicles Co., Ltd.*

12:45PM–12:55PM:

**ATTRIBUTE-WISE VALUE OF INFORMATION IN
ENGINEERING SYSTEMS: A SIMULATION-
BASED STUDY**

Technical Paper Publication: IMECE2021-69783

Vijitashwa Pandey - *Oakland University*

Jeffrey W. Herrmann - *University of Maryland*

12:55PM–1:05PM:

**A SNAPSHOT OF THE STATE OF BIOLOGICALLY
INSPIRED DESIGN FOR RESEARCHERS,
PRACTITIONERS, AND PUBLIC**

Technical Paper Publication: IMECE2021-70499

Mia Jastrzembski - *Georgia Institute of Technology*

Bryan C. Watson - *Georgia Institute of Technology*

Marc J. Weissburg - *Georgia Institute of Technology*

Bert Bras - *Georgia Institute of Technology*

1:05PM–1:15PM:

**MODULAR ROVER AND PAYLOAD DESIGN FOR
AGRICULTURE FIELD USE**

Technical Presentation: IMECE2021-70868

Manoj Kumar Sharma - *Santa Clara University*

Christopher Kitts - *Santa Clara University*

1:15PM–1:25PM:

**TOLERANCE SPECIFICATION MODEL FOR
SYSTEMATIC APPLICATION OF GD&T IN
PRODUCT DESIGN**

Technical Paper Publication: IMECE2021-70894

Andrea Petruccioli - *University of Modena and Reggio Emilia*

Fabio Pini - *University of Modena and Reggio Emilia*

Francesco Leali - *University of Modena and Reggio Emilia*



**06-01-02:
PRODUCT AND PROCESS DESIGN II
NOVEMBER 4, 2021**

12:25PM–1:55PM

Chair: **Miri Weiss Cohen** - Braude College of Engineering
 Chair: **Daniele Regazzoni** - University of Bergamo
 Chair: **Marco Rossoni** - Università Degli Studi di Bergamo

12:25PM–12:35PM:

**ONTOLOGY FOR PRODUCT LIFECYCLE
MANAGEMENT IN THE OIL AND GAS
TURBOMACHINERY INDUSTRY**

Technical Paper Publication: IMECE2021-71081

Lorenzo Failla - Baker Hughes
Marco Rossoni - Politecnico di Milano
Michele Vallesi - Baker Hughes
Giorgio Colombo - Politecnico di Milano

12:35PM–12:45PM:

**METHODICAL MODELING OF PRODUCT AND
PROCESS DATA OF DESIGN METHODS USING THE
EXAMPLE OF MODULAR LIGHTWEIGHT DESIGN**

Technical Paper Publication: IMECE2021-71259

Michael Hanna - Hamburg University of Technology
Lea-Nadine Schwede - Hamburg University of Technology
Johann Schwenke - Hamburg University of Technology
Fabian Laukotka - Hamburg University of Technology
Dieter Krause - Hamburg University of Technology

12:45PM–12:55PM:

**REINFORCEMENT LEARNING ON MODULAR ROBOTS
USING REAL-TIME DECENTRALIZED
DECONFLICTION IN A WAREHOUSE ENVIRONMENT**

Technical Paper Publication: IMECE2021-72056

Andres Sayed - United States Military Academy
Sara Scales - United States Military Academy
Austin Fox - United States Military Academy
Jafar Stone - United States Military Academy
Steven Crews - United States Military Academy

12:55PM–1:05PM:

**ENHANCING ACCESS TO WATER IN MEXICO CITY
AND ITS PERI-URBAN AREA THROUGH USER
CENTERED DESIGN**

Technical Paper Publication: IMECE2021-72090

David Negrete Rojas - National Autonomous University of Mexico
J. Carlos Rodríguez Tenorio - National Autonomous University of Mexico
Adrielly Nahomeé Ramos Álvarez - National Autonomous University of Mexico
Alejandro C. Ramirez-Reivich - National Autonomous University of Mexico
Ma. Pilar Corona-Lira - National Autonomous University of Mexico
Vicente Borja - National Autonomous University of Mexico
Francisca Irene Soler Anguiano - National Autonomous University of Mexico

1:05PM–1:15PM:

**HUMAN MACHINE INTERACTION: A DESIGN
PROPOSAL OF A TICKET VENDING MACHINE FOR
PUBLIC TRANSPORT**



Technical Paper Publication: IMECE2021-72110

Adrielly Nahomee Ramos Alvarez - *National Autonomous University of Mexico*

J. Carlos Rodriguez Tenorio - *National Autonomous University of Mexico*

Vicente Borja - *National Autonomous University of Mexico*

Yesica Escalera Matamoros - *National Autonomous University of Mexico*

Alejandro C. Ramirez Reivich - *National Autonomous University of Mexico*

1:15PM–1:25PM:**DEVELOPMENT OF AN ORIGAMI-INSPIRED ROBOT USING SELF-FOLDING TECHNIQUE****Technical Paper Publication: IMECE2021-72309**

Minchul Shin - *Northern Kentucky University*

08-06-01:**DESIGN AND ANALYSIS OF ENERGY RECOVERY SYSTEMS
NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Hohyun Lee - *Santa Clara University*

Chair: Soumik Banerjee - *Washington State University*

Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*

Chair: Michail Nitsas - *National Technical University of Athens*

12:25PM–12:35PM:**SIMULATED MODEL FOR A NEW DESIGN OF THERMAL ENERGY STORAGE SYSTEM****Technical Paper Publication: IMECE2021-68202**

Mahmoud Elsharafi - *Midwestern State University*

Ali Elmozughi - *Tranter, Inc.*

Pranaya Pokharel - *Midwestern State University*

Clayton Holmes - *Midwestern State University*

Madison Krahl - *Midwestern State University*

Musaad Aldawsari - *Midwestern State University*

Theo Rolle - *Midwestern State University*

12:35PM–12:45PM:**PERFORMANCE ANALYSIS OF ZEOTROPIC ORGANIC RANKINE CYCLE FOR MARINE DIESEL EXHAUST HEAT RECOVERY****Technical Paper Publication: IMECE2021-69855**

Qizhi Gao - *Ocean University of China*

Han Yuan - *Ocean University of China*

12:45PM–12:55PM:**CASCADE UTILIZATION OF GEOTHERMAL WASTE HEAT FOR ENHANCED OUTDOOR CROP PRODUCTION****Technical Paper Publication: IMECE2021-70001**

Christopher Mignano - *Cooper Union*

Enea Dushaj - *Cooper Union*

Rúnar Unnthorsson - *University of Iceland*

Robert Dell - *Cooper Union*

12:55PM–1:05PM:**DEVELOPMENT AND PERFORMANCE ASSESSMENT OF A HYDRAULIC HYBRID SYSTEM****Technical Paper Publication: IMECE2021-70509**

D.L. Wressell - *University of Johannesburg*

L.K. Tartibu - *University of Johannesburg*

F.K. Tekweme - *University of Johannesburg*

1:05PM–1:15PM:**CONVENTIONAL AND ADVANCED EXERGY ANALYZES OF THE NGL RECOVERY PROCESS**

Technical Paper Publication (Iran): IMECE2021-72479

Fakhrodin Jovijari - *Islamic Azad University*
 Abbas Kosarineia - *Islamic Azad University*
 Mehdi Mehrpooya - *Islamic Azad University*
 Nader Nabhani - *Islamic Azad University*

1:15PM–1:25PM:**POLYMER COMPOSITES FOR THERMAL ENERGY STORAGE****Technical Presentation: IMECE2021-76966**

Souvik Roy - *University of California, Merced*
 James Palko - *University of California, Merced*

08-04-03:**DESIGN AND ANALYSIS OF ENERGY CONVERSION SYSTEMS III
NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

12:25PM–12:35PM:**EMISSIONS REDUCTION OF A DIRECT INJECTION DIESEL MARINE ENGINE BY ADDING HYDROGEN TO THE INLET MANIFOLD****Technical Paper Publication: IMECE2021-71047**

Carlos Tealdo Michelazzo - *Ingenal, S.R.L.*
 Jorge A. Deutsch de Barros - *Ingenal, S.R.L.*

12:35PM–12:45PM:**EFFECT OF LEG TOPOLOGIES ON THERMAL RELIABILITY OF THERMOELECTRIC GENERATORS SYSTEMS RELIABILITY OF DIFFERENT LEG TOPOLOGIES IN THERMOELECTRIC GENERATORS SYSTEMS****Technical Paper Publication: IMECE2021-71237**

Mutabe Aljaghtham - *Prince Sattam bin Abdulaziz University*
 Emrah Celik - *University of Miami*

12:45PM–12:55PM:**EFFECT OF SOURCE TANK CONFIGURATION ON THE PERFORMANCE OF A HYDRAULIC RAM PUMP****Technical Paper Publication: IMECE2021-72033**

Ashokkumar M. Sharma - *University of Arkansas at Little Rock*
 Jacob H. Jackson - *University of Arkansas at Little Rock*
 Pablo J. Centeno - *University of Arkansas at Little Rock*
 Srikanth B. Pidugu - *University of Arkansas at Little Rock*

12:55PM–1:05PM:**ANALYSIS AND DESIGN SOFTWARE FOR INTEGRATION OF RENEWABLE ENERGY AND ENERGY STORAGE WITH CHP DEVICES****Technical Paper Publication: IMECE2021-73229**

Yasin Naman - *Fundacion Universidad de America*
 Gregory J. Kowalski - *Northeastern University*
 Mansour Zenouzi - *Wentworth Institute of Technology*

1:05PM–1:15PM:**EXPERIMENTAL STUDY OF A PIEZOELECTRIC STRAIN-BASED ENERGY HARVESTER FOR INTELLIGENT TIRES OF AUTONOMOUS VEHICLES**

Technical Paper Publication: IMECE2021-73353

Haniph Aliniagerdroudbari - *University of Akron*
 Roja Esmaeeli - *University of Akron*
 Siamak Farhad - *University of Akron*

1:15PM–1:25PM:

GEOTHERMAL HEAT EXCHANGER PERFORMANCE WITH NANOFLUIDS CONTAINING CERAMIC MGO AND AL₂O₃ PARTICLES

Technical Paper Publication: IMECE2021-73370

Himel Barua - *University of Akron*
 Maryam Younessi Sinaki - *Cleveland State University*
 Siamak Farhad - *University of Akron*

10-15-01: YOUNG ENGINEERS PAPER (YEP) CONTEST
NOVEMBER 4, 2021

12:25 PM TO 1:55 PM**12:25 PM - 12:35 PM**

MICROFLUIDICS-BASED FABRICATION OF A HELE-SHAW CELL DEVICE FOR DROP COALESCENCE IMAGING

Technical Paper Publication: IMECE2021-68063

Carson Emeigh - *University of Nebraska*
 Haipeng Zhang - *University of Nebraska*
 Sangjin Ryu - *University of Nebraska*

12:35 PM - 12:45 PM

A COMPARATIVE STUDY OF VARIOUS DEEP LEARNING TECHNIQUES FOR SPATIO-TEMPORAL SUPER-RESOLUTION RECONSTRUCTION OF FORCED ISOTROPIC TURBULENT FLOWS

Technical Paper Publication: IMECE2021-69923

T. S. Sachin Venkatesh - *Delhi Technological University*
 Rajat Srivastava - *Delhi Technological University*

Pratyush Bhatt - *Delhi Technological University*
 Prince Tyagi - *Delhi Technological University*
 Raj Kumar Singh - *Delhi Technological University*

12:45 PM - 12:55 PM

GENERATION AND PARAMETERIZATION OF FORCED ISOTROPIC TURBULENT FLOW USING AUTOENCODERS AND GENERATIVE ADVERSARIAL NETWORKS

Technical Paper Publication: IMECE2021-69933

Kanishk . - *Delhi Technological University*
 Tanishk Nandal - *Delhi Technological University*
 Prince Tyagi - *Delhi Technological University*
 Raj Kumar Singh - *Delhi Technological University*

12:55 PM - 1:05 PM

A MODEL EXPERIMENT OF AORTIC VALVE STENOSIS TO CORRELATE NARROWNESS WITH THE ACOUSTIC SPECTRUM

Technical Paper Publication: IMECE2021-70771

Hannah Zukowski - *Trinity College*
 Marco Rupp - *Trinity College*
 Winrose Mollel - *Trinity College*
 Taikang Ning - *Trinity College*
 Clayton P. Byers - *Trinity College*

1:05 PM - 1:15 PM

COMPUTATION OF THREE-DIMENSIONAL MIXED CONVECTION IN A HORIZONTAL RECTANGULAR DUCT

Technical Paper Publication: IMECE2021-71938

Abimbola Oluwade - *Howard University*
 Emmanuel Glakpe - *Howard University*



1:15 PM - 1:25 PM

COMPUTATIONAL FLUID DYNAMICS MODELING OF THE EFFICACY OF HVAC ADJUSTMENTS ON MITIGATING AIRBORNE TRANSMISSION OF SARS-COV-2

Technical Paper Publication: IMECE2021-73727
Jaywon Woo - Cooper Union
Amal Bukhari - Cooper Union
Louis Lane - Cooper Union
Lutor Mei - Cooper Union
Melody Baglione - Cooper Union
Philip Yecko - Cooper Union
Scott Bondi - Cooper Union

**11-16-01:
HEAT TRANSFER IN ELECTRONIC EQUIPMENT AND MINIATURE DEVICES
NOVEMBER 4, 2021**

12:25PM–1:55PM

**Chair: Subramanyaravi Annapragada -
United Technologies Research**
Chair: Kevin Dowding – Sandia National Laboratories
Chair: Alexander Rattner - Penn State University

12:25PM–12:35PM:

MULTI-OBJECTIVE THERMAL OPTIMIZATION OF A NANOFLUID-COOLED RECTANGULAR MICROCHANNEL HEAT SINK USING GENETIC ALGORITHM: A COMPARATIVE STUDY

Technical Paper Publication: IMECE2021-68217
Hamid Fazeli - Oregon State University

12:35PM–12:45PM:

DYNAMIC RESPONSE EVALUATION OF PLATINUM THIN FILM GAUGE

Technical Paper Publication: IMECE2021-69072
Tanweer Alam - Indian Institute of Technology (Indian School of Mines) Dhanbad
Rakesh Kumar - Indian Institute of Technology (Indian School of Mines) Dhanbad

12:45PM–12:55PM:

HIGH-RESOLUTION CALORIMETRIC TECHNIQUES FOR MEASURING METABOLIC HEAT OUTPUTS OF BIOLOGICAL SYSTEMS

Technical Presentation: IMECE2021-69311
Rohith Mittapally - University of Michigan
Sunghoon Hur - University of Michigan
Swathi Yadlapalli - University of Michigan
Pramod Reddy - University of Michigan
Edgar Meyhofer - University of Michigan

12:55PM–1:05PM:

PARAMETRIC INVESTIGATION ON THERMAL AND HYDRAULIC PERFORMANCE OF MINICHANNEL HEATSINK

Technical Paper Publication: IMECE2021-70472
Ozan Atalay - ASELSAN
Murat Gultekin - ASELSAN
Sertac Cadirci - Istanbul Technical University

1:05PM–1:15PM:

EVALUATION OF HYDRAULIC AND THERMAL CHARACTERISTICS OF INTERCONNECTED PARALLEL FLOW MINI HEAT SINK



Technical Paper Publication: IMECE2021-71372

Md Wasi Uddin - *Military Institute of Science and Technology*

Hassan Shahriar Ayon - *Military Institute of Science and Technology*

Tahmid Mohammad Mehrab - *Military Institute of Science and Technology*

Najmus Saquib Sifat - *Military Institute of Science and Technology*

1:15PM–1:25PM:**SINGLE-SCAN QUANTITATIVE MAPPING OF STEADY TEMPERATURE FIELDS WITH NANOMETER RESOLUTION****Technical Presentation: IMECE2021-76605**

Amin Reihani - *University of Michigan*

Shen Yan - *University of Michigan*

Yuxuan Luan - *University of Michigan*

Edgar Meyhofer - *University of Michigan*

Pramod Reddy - *University of Michigan*

**12-19-01: ADVANCES IN EXPERIMENTAL MECHANICS
NOVEMBER 4, 2021****12:25PM–1:55PM**

Chair: Marco Amabili - *McGill University*

Chair: Celia Reina - *University of Pennsylvania*

12:25PM–12:35PM:**NANOMECHANICS OF PLASTICALLY DEFORMED AMORPHOUS POLYMERS****Technical Presentation: IMECE2021-67016**

Peyman Nikaeen - *University of Louisiana*

Aref Samadi-Dooki - *Louisiana State University*

George Voyiadjis - *Louisiana State University*

Pengfei Zhang - *University of Louisiana*

William M. Chirdon - *University of Louisiana*

Ahmed Khattab - *University of Louisiana*

12:35PM–12:45PM:**CHARACTERIZATION OF A325 STRUCTURAL BOLTS SUBJECTED TO IMPULSIVE LOADS****Technical Paper Publication: IMECE2021-71763**

Maria Warren - *Georgia Institute of Technology*

Lauren Stewart - *Georgia Institute of Technology*

Marc Sanborn - *United States Military Academy*

12:45PM–12:55PM:**REPRESENTATIVE VOLUME ELEMENTS FOR PLASTICITY AND CREEP MEASURED FROM HIGH-RESOLUTION MICROSCALE STRAIN FIELDS****Technical Presentation: IMECE2021-76872**

Renato Vieira - *Pontifícia Universidade Católica do Rio de Janeiro*

Huseyin Sehitoglu - *University of Illinois at Urbana-Champaign*

John Lambros - *University of Illinois at Urbana-Champaign*

12:55PM–1:05PM:**A HIGH-THROUGHPUT ASSEMBLY TO ACCELERATE THERMO-MECHANICAL FATIGUE TESTING****Technical Presentation: IMECE2021-77198**

Weston Craig - *Utah State University*

Adam Smith - *Utah State University*

Ryan Berke - *Utah State University*

1:05PM–1:15PM:**CRACK INITIATION AND SLOW GROWTH FROM A SELF-HEALED CRACK IN SODA-LIME GLASS****Technical Presentation: IMECE2021-77272**

Hareesh Tippur - *Auburn University*

Sivareddy Dondeti - *Auburn University*



1:15PM–1:25PM:**DIC STRAIN-VELOCITY CALIBRATION CURVES TO INFORM VIBRATION-BASED FATIGUE TESTING****Technical Presentation: IMECE2021-77570**

Benjamin Hill - *Utah State University*
 Brandon Furman - *Utah State University*
 Alexandra Loftin - *Utah State University*
 Emily Santana - *Utah State University*
 Lindsey Rowley - *Utah State University*
 Jacob Rigby - *Utah State University*
 Ryan Berke - *Utah State University*

**06-02-01: CAD, CAE, AND CAM
NOVEMBER 4, 2021****4:15PM–5:45PM**

Chair: Miri Weiss Cohen - *Braude College of Engineering*
 Chair: Daniele Regazzoni - *University of Bergamo*
 Chair: Marco Rossoni - *Università Degli Studi di Bergamo*

4:15PM–4:25PM:**A METHOD OF PART PARAMETRIC MODEL DATA EXCHANGE AND RECONSTRUCTION BASED ON FEATURE SCRIPT****Technical Paper Publication: IMECE2021-69067**

Peng Ye - *Beihang University*
 Yonggang Zhang - *Beihang University*
 Yanglan Wang - *Beihang University*
 Geyang Huang - *Beihang University*
 Lianshui Guo - *Beihang University*

4:25PM–4:35PM:**IMPLEMENTING A DISCRETE ELEMENT METHOD FOR FUSED DEPOSITION MODELING ADDITIVE MANUFACTURING THERMAL MODELING****Technical Paper Publication: IMECE2021-71947**

Chelsea Menezes - *Clemson University*
 Cameron J. Turner - *Clemson University*

4:35PM–4:45PM:**DIGITAL SYSTEM INTEGRATION TESTING OF SURFACE WELLHEAD SYSTEMS****Technical Paper Publication: IMECE2021-72202**

Fei Song - *Schlumberger*
 Chris Sanchez - *Schlumberger*
 Ke Li - *Schlumberger*
 Stuart Robinson - *Schlumberger*
 Kirk Guidry - *Schlumberger*

4:45PM–4:55PM:**A MULTIOBJECTIVE OPTIMIZATION BASED APPROACH FOR PRODUCING MANUFACTURABLE STRUCTURES FROM TOPOLOGY OPTIMIZED DESIGNS****Technical Paper Publication: IMECE2021-72224**

Michael Cerda - *Seattle University*
 Josh Hamel - *Seattle University*

4:55PM–5:05PM:**DESIGN INNOVATION OF BICYCLE FRAMES EXPLOITING TOPOLOGY OPTIMIZATION**

Technical Paper Publication: IMECE2021-72265

Filippo Colombo Zefinetti - *Università degli Studi di Bergamo*
 Marco Rossoni - *Politecnico di Milano*
 Carlo Martinelli - *Università degli Studi di Bergamo*
 Daniele Regazzoni - *Università degli Studi di Bergamo*

5:05PM–5:15PM:
**CONCURRENT DESIGN FOR GRAVITY-BALANCING
 AND RIGIDITY ENHANCING OF A NEW
 INTERCONNECTED MANIPULATOR**
Technical Paper Publication: IMECE2021-73333

Ezz El-Din Nehad Mostafa - *Egypt-Japan University of
 Science and Technology*
 Mohamed Fanni - *Egypt-Japan University of Science
 and Technology*
 Abdelfatah M. Mohamed - *Egypt-Japan University of
 Science and Technology*

**01-01-02: PHONONICS II
 NOVEMBER 4, 2021**
4:15PM–5:45PM

Chair: Mostafa Nough - *University at Buffalo*
 Chair: Yongfeng Xu - *University of Cincinnati*
 Chair: Guoliang Huang - *University of Missouri*

4:15PM–4:25PM:
**EVANESCENT COUPLING BETWEEN
 ALUMINUM PILLARS**
Technical Paper Publication: IMECE2021-71096

Rock Akiki - *Université de Lille*
 Yan Pennec - *Université de Lille*
 Bahram Djafari-Rouhani - *Université de Lille*
 Eric Lheurette - *Université de Lille*
 Adnane Noual - *Université Mohamed Premier*
 Bernard Bonello - *Université de Paris*

4:25PM–4:35PM:
**MANIPULATION OF LOCALIZED MODES IN ELASTIC
 MEDIA VIA TWISTING**
Technical Presentation: IMECE2021-71545

Matheus Rosa - *Georgia Institute of Technology*
 Massimo Ruzzene - *University of Colorado*

4:35PM–4:45PM:
**THE ANALYTICAL STRUCTURE OF ACOUSTIC AND
 ELASTIC MATERIAL PROPERTIES**
Technical Presentation: IMECE2021-71577

Hossein Khodavirdi - *Illinois Institute of Technology*
 Ankit Srivastava - *Illinois Institute of Technology*

4:45PM–4:55PM:
**ANALYSIS OF A COILED BEAM-BASED
 PHONONIC CRYSTAL**
Technical Presentation: IMECE2021-71593

Carson Willey - *UES, Inc./Air Force Research Laboratory*
 Vincent Chen - *UES Inc./Air Force Research Laboratory*
 Armin Kianfar - *University of Colorado - Boulder*
 Mahmoud I. Hussein - *University of Colorado - Boulder*
 Abigail Juhl - *Air Force Research Laboratory*

4:55PM–5:05PM:
**MINIMAL SURFACE METAMATERIALS FOR
 TOPOLOGICAL PHENOMENA**
Technical Presentation: IMECE2021-71666

Yuning Guo - *University of Colorado*
 Matheus Rosa - *University of Colorado*
 Massimo Ruzzene - *University of Colorado*



5:05PM–5:15PM:**TUNABLE MANIPULATION OF ULTRA-LOW FREQUENCY WAVES USING NONLINEAR MAGNETIC LATTICES****Technical Presentation: IMECE2021-71842**Audrey Watkins - *University of Connecticut*Osama Bilal - *University of Connecticut***02-07-02: ADVANCED MATERIAL FORMING: ROLL FORMING
NOVEMBER 4, 2021****4:15PM–5:45PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***4:15PM–4:25PM:****FINITE ELEMENT ANALYSIS OF DEFORMATION CHARACTERISTICS IN WARM SKEW ROLLING OF COPPER BALL****Technical Paper Publication: IMECE2021-70789**Jiayao Yuan - *Ningbo University*Baoshou Sun - *Ningbo University*Xing Chen - *Ningbo University*XueDao Shu - *Ningbo University*Houliang Ma - *Ningbo University***4:25PM–4:35PM:****A NUMERICAL STUDY ON EFFECT OF TOOL ROLLER ROTATION ON CHANNEL SPRINGBACK****Technical Paper Publication: IMECE2021-69888**Chetan P. Nikhare - *Penn State Erie - Behrend College***4:35PM–4:45PM:****INFLUENCE STUDY ON END-FACE QUALITY OF SQUARE BILLET IN PLATE CROSS_X000B_WEDGE ROLLING****Technical Paper Publication: IMECE2021-69577**Yingxiang Xia - *Ningbo University*Xuedao Shu - *Ningbo University*Taizhu Chen - *Ningbo University***4:45PM–4:55PM:****EFFECT OF PROCESS PARAMETERS ON THE MICROSTRUCTURE OF CLOSED-OPEN CROSS WEDGE ROLLING****Technical Paper Publication: IMECE2021-69787**Xuedao Shu - *Ningbo University*Jitai Wang - *Ningbo University*Sutao Han - *Ningbo University*Yilun Wei - *Ningbo University***4:55PM–5:05PM:****FRICITION ASSESSMENT IN HOT FORGING OPERATIONS USING LARGE-SCALE RING COMPRESSION TEST****Technical Paper Publication: IMECE2021-71851**Elias Ledesma - *University of Guanajuato*Diego Gomez - *University of Guanajuato*Ryutaro Hino - *Hiroshima University*Hiroshi Hamasaki - *Hiroshima University*Eduardo Aguilera - *Hiroshima University*Ismael Ruiz - *CIE PEMSA*

5:05PM–5:15PM:**FORMATION AND CONTROL OF DEFECTS ON THE SURFACE OF HOLLOW AXLES BY THREE-ROLLER SKEW ROLLING****Technical Paper Publication: IMECE2021-68789**Song Zhang - *Ningbo University*Xuedao Shu - *Ningbo University*Jitai Wang - *Ningbo University*Caoqi Ye - *Ningbo University***02-02-05:****CHARACTERIZATION OF ADDITIVELY MANUFACTURED POLYMER PARTS
NOVEMBER 4, 2021****4:15PM–5:45PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***4:15PM–4:25PM:****EFFECT OF IN SITU FILAMENT COMPRESSION ROLLING ON THE MECHANICAL BEHAVIOR IN FUSED FILAMENT FABRICATION (FFF)****Technical Presentation: IMECE2021-77538**Momen Qasaimeh - *University of Texas at Arlington*Darshan Ravoori - *University of Texas at Arlington*Ankur Jain - *University of Texas at Arlington*Ashfaq Adnan - *University of Texas Arlington***4:25PM–4:35PM:****DEVELOPMENT OF A PELLET AND FILAMENT FORM INTEGRATED MULTI-MATERIAL ADDITIVE MANUFACTURING CO-EXTRUDER****Technical Paper Publication: IMECE2021-71044**Krishnanand - *Maulana Azad National Institute of Technology,*Mohammad Taufik - *Maulana Azad National Institute of Technology***4:35PM–4:45PM:****INVESTIGATING OF THE EFFECT OF TWISTING AND PRINTING ORIENTATION ON THE TOUGHNESS OF 3-D PRINTED PARTS****Technical Paper Publication: IMECE2021-73312**Hari Murali - *Sycamore High School*Abishek Balsamy Kamaraj - *Kettering University***4:45PM–4:55PM:****EVALUATION OF DIFFERENCES BETWEEN FEA PREDICTIONS WITH GEOMETRIC VARIATIONS AND TENSILE TESTS OF STRUT SPECIMENS OF LATTICE STRUCTURES FABRICATED BY MATERIAL EXTRUSION****Technical Paper Publication: IMECE2021-71563**Recep M. Gorguluarslan - *TOBB University of Economics and Technology*O. Utku Gungor - *TOBB University of Economics and Technology*Huseyin Karabiyik - *TOBB University of Economics and Technology***4:55PM–5:05PM:****METHODS TO ESTIMATE THE EFFECTIVE YOUNG'S MODULUS OF SPECIMENS PREPARED BY FUSED FILAMENT FABRICATION****Technical Presentation: IMECE2021-77158**Sung Kang - *Johns Hopkins University*

5:05PM–5:15PM:**SHEAR-LAP STRENGTH OF ADHESIVE BONDED CU PREPARED BY A LASER-INTERFERENCE SURFACE TREATMENT****Technical Presentation: IMECE2021-72304**Adrian Sabau - *Oak Ridge National Laboratory*Ali Passian - *Oak Ridge National Laboratory***02-08-02:****INNOVATIVE PRODUCT AND PROCESS DESIGN II
NOVEMBER 4, 2021****4:15PM–5:45PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***4:15PM–4:25PM:****ENHANCED CRYSTALLINITY DEVELOPMENT OF POLY-LACTIC ACID BY DYNAMIC MELT MANIPULATION****Technical Paper Publication: IMECE2021-73392**Peng Gao - *Lehigh University*Khalid Alqosaibi - *Lehigh University*Animesh Kundu - *Lehigh University*John Coulter - *Lehigh University***4:25PM–4:35PM:****TOWARDS SMART VACCINE MANUFACTURING:
A PRELIMINARY STUDY DURING COVID-19****Technical Paper Publication: IMECE2021-70516**Vishnu Kumar - *Pennsylvania State University*Vijay Srinivasan - *National Institute of Standards and Technology*Soundar Kumara - *Pennsylvania State University***4:35PM–4:45PM:****SPRAY-ON CAPACITIVE PROXIMITY SENSORS IN 3D PRINTED ROBOTIC LINKS****Technical Paper Publication: IMECE2021-68910**Samuel Detzel - *Technical University of Munich*Yannick S. Krieger - *Technical University of Munich*Robert W. Hoefer - *Technical University of Munich*Anton Robe - *Technical University of Munich*Annette C. Sigling - *Technical University of Munich*Tim C. Lueth - *Technical University of Munich***4:45PM–4:55PM:****ADVANCED MELT RHEOLOGY CONTROL:
A FILLING DEFECTS INVESTIGATION FOR HOT
RUNNER BASED INJECTION MOLDING****Technical Paper Publication: IMECE2021-73757**Khalid Alqosaibi - *Lehigh University*Hussam Noor - *Lehigh University*Peng Gao - *Lehigh University*Alaaaldeen Duhduh - *Lehigh University*John Coulter - *Lehigh University***4:55PM–5:05PM:****INVESTIGATING THE EFFECTS OF BRANCHING
ON THE CONSTRAINT-EMBEDDED SWEPT
PROFILE CALCULATIONS****Technical Paper Publication: IMECE2021-70210**Eyyup Aras - *King Saud University***5:05PM–5:15PM:****COMPARISON OF CLUSTERING TECHNIQUES FOR
FEATURE-BASED TOOLPATH GENERATION IN
DIELESS MANUFACTURING****Technical Paper Publication: IMECE2021-70255**Aniket Nagargoje - *deLOGIC Lab IIITDM Jabalpur*

Pavan Kumar Kankar - *System Dynamics Lab, IIT Indore*
 Prashant Kumar Jain - *deLOGIC Lab IIITDM Jabalpur*
 Puneet Tandon - *deLOGIC Lab IIITDM Jabalpur*

03-05-05: MATERIALS PROCESSING AND CHARACTERIZATION
NOVEMBER 4, 2021

4:15PM–5:45PM

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

4:15PM–4:25PM:

CORROSION PERFORMANCE OF DIFFERENT ALUMINUM ALLOY DEPOSITS FABRICATED BY LATERAL FRICTION SURFACING

Technical Paper Publication: IMECE2021-70717

William Relue - *University of Hawaii*
 Ebrahim Seidi - *University of Hawaii*
 L.H. Hihara - *University of Hawaii*
 Scott Miller - *University of Hawaii*

4:25PM–4:35PM:

SOLDER PASTE ADDITIVES FOR THERMAL EXPANSION CONTROL

Technical Paper Publication: IMECE2021-72478

P. Capela - *University of Minho*
 M.S. Souza - *University of Minho*
 S. Costa - *University of Minho*
 M. Fernandes - *Bosch Car Multimédia*
 H. Figueiredo - *Bosch Car Multimédia*
 R. Alves - *Bosch Car Multimédia Portugal, S.A.*
 I. Delgado - *Bosch Car Multimédia*
 J. Teixeira - *University of Minho*
 D. Soares - *University of Minho*

4:35PM–4:45PM:

ON THE FATIGUE PROPERTIES OF 3D STEEL STRUCTURES WELDED ONTO CERAMICS

Technical Paper Publication: IMECE2021-72572

Seyed M. Allameh - *Northern Kentucky University*
 Douglas Alexander - *Northern Kentucky University*
 Roger Miller - *Northern Kentucky University*
 Avery Lenihan - *Gatton Academy of Mathematics and Science*
 Hadi Allameh - *Sullair*

4:45PM–4:55PM:

ULTRASOUND ASSISTED PRODUCTION OF METAL FOAM FROM POLYURETHANE PRECURSOR

Technical Paper Publication: IMECE2021-73192

Asima Zahoor - *United Arab Emirates University*
 Abdel-Hamid I. Mourad - *United Arab Emirates University*

4:55PM–5:05PM:

DETECTION OF JAMMING AND FILAMENT BREAKAGE IN FDM USING VIBRATION OF FEEDER STEPPER

Technical Paper Publication: IMECE2021-71283

Sean Rooney - *Stevens Institute of Technology*
 Emil Pitz - *Stevens Institute of Technology*
 Kishore Pochiraju - *Stevens Institute of Technology*

03-15-02:

MULTIFUNCTIONAL MATERIALS, STRUCTURES AND DEVICES: MODELING, DESIGN, MANUFACTURING, AND CHARACTERIZATION
NOVEMBER 4, 2021



4:15PM–5:45PM

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

4:15PM–4:25PM:

INFLUENCE OF WELDING SEQUENCE ON RESIDUAL STRESS EVOLUTION IN SUS304/Q235 BIMETALLIC CLAD PLATE BUTT-WELDED JOINTS

Technical Paper Publication: IMECE2021-69766

Min Zhu - *Shanghai Jiao Tong University*
 Yansong Zhang - *Shanghai Jiao Tong University*
 Qiao Zheng - *Baoshan Iron and Steel Co., Ltd.*
 Wei Wu - *Baoshan Iron and Steel Co., Ltd.*
 Weifang Qian - *Baoshan Iron and Steel Co., Ltd.*
 Baosen Wang - *Baoshan Iron and Steel Co., Ltd.*

4:25PM–4:35PM:

ANALYSIS OF LINER DEFORMATION BEHAVIOUR IN TRANSTIBIAL PROSTHESIS

Technical Paper Publication: IMECE2021-71483

Srinivasa Prakash Regalla - *BITS Pilani*
 Piyush Prashant Kirange - *BITS Pilani*
 Harshal Vinayak Dhake - *BITS Pilani*
 Prakash Narayan Shrivastava - *University of Southern California*

4:35PM–4:45PM:

A STUDY ON THE ONSET OF SECONDARY HYDRIDING IN DEFECTIVE ZR-2 FUEL FOR BOILING WATER REACTORS

Technical Paper Publication: IMECE2021-73284

Doctor Enivweru - *Harbin Engineering University*
 Qingyu Wang - *Harbin Engineering University*
 Abiodun Ayodeji - *Nigeria Atomic Energy Commission*
 Ayouba Moussa Hassane - *Harbin Engineering University*

4:45PM–4:55PM:

COMPUTATIONAL MODELING OF ANISOTROPIC ELASTICITY AND FRACTURE IN 3D PRINTED POLYMERS

Technical Presentation: IMECE2021-76628Jun Li - *University of Massachusetts Dartmouth***4:55PM–5:05PM:**

ELECTRICAL PROPERTY ENHANCEMENT OF DRY-SPUN CARBON NANOTUBE YARNS BY COMBINATION OF POST-SYNTHESIS TREATMENT

Technical Presentation: IMECE2021-76760

Takumi Watanabe - *Waseda University*
 Tomohisa Watanabe - *Fujikura Ltd.*
 Takeshi Kizaki - *Fujikura Ltd.*
 Masayasu Inaguma - *Fujikura Ltd.*
 Atushi Hosoi - *Waseda University*
 Hiroyuki Kawada - *Waseda University*

05-10-04:

COMPUTATIONAL MODELING IN BIOMEDICAL APPLICATIONS II NOVEMBER 4, 2021

4:15PM–5:45PM

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*



4:15PM–4:25PM:**STEADY FLOW STUDIES OF THE GEOMETRY EFFECTS ON THE RECIRCULATION PROPERTIES AT THE ILIAC BIFURCATION****Technical Paper Publication: IMECE2021-73450**Violeta Carvalho - *University of Minho*Filipa Carneiro - *University of Minho*Ana C. Ferreira - *University of Minho*Vasco Gama - *Centro Hospitalar de Vila Nova de Gaia*Senhorinha Teixeira - *University of Minho*José C. Teixeira - *University of Minho***4:25PM–4:35PM:****ADVANCES IN COMPUTATIONAL FLUID DYNAMICS MODELING OF THE BODY SOUNDS AS A NONINVASIVE DIAGNOSIS METHOD****Technical Paper Publication: IMECE2021-73825**Fardin Khalili - *Embry-Riddle Aeronautical University*Amirtahà Taebi - *University of California, Davis***4:35PM–4:45PM:****CLINICAL DATA BASED-COMPUTATIONAL MODELING OF CAR-T IMMUNOTHERAPY TO DISSECT THE MECHANISMS OF LEUKEMIA RESPONSES AT REMISSION, RESISTANCE AND RELAPSE****Technical Presentation: IMECE2021-77331**Lunan Liu - *New York University*Chao Ma - *New York University*Zhuoyu Zhang - *New York University*Weiqiang Chen - *New York University***4:45PM–4:55PM:****SINGLE-CELL COMPUTATIONAL MODELING OF CARDIOMYOCYTE CONTRACTILITY AUTOREGULATION IN A 3-D HYDROGEL****Technical Presentation: IMECE2021-77533**Mohammad Kazemi - *University of California, Davis*John Shaw - *University of Michigan*Alan Wineman - *University of Michigan*Rafael Shimkunas - *University of California, Davis*Zhong Jian - *University of California, Davis*Leighton Izu - *University of California, Davis*Ye Chen-Izu - *University of California, Davis*Mohammad Ali Kazemi Lari - *University of California, Davis***4:55PM–5:05PM:****INVESTIGATING THE DIFFERENCE IN CORTICAL BONE ADAPTATION AT ENDOCORTICAL AND PERIOSTEAL SURFACES BY FLUID FLOW ANALYSIS****Technical Paper Publication: IMECE2021-71220**Sanjay Singh - *Indian Institute of Technology Ropar*Satwinder Jit Singh - *Indian Institute of Technology Ropar*Jitendra Prasad - *Indian Institute of Technology Ropar***05-13-2: ROBOTICS, REHABILITATION II
NOVEMBER 4, 2021****4:15PM–5:45PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University*

4:15PM–4:25PM:**DESIGN OF A MODULAR HAND EXOSKELETON FOR REHABILITATION AND TRAINING SYNTHESIS AND DESIGN OF A MODULAR HAND EXOSKELETON FOR REHABILITATION AND TRAINING****Technical Paper Publication: IMECE2021-70343**Mihai Dragusanu - *University of Siena*Zubair Iqbal - *University of Siena*Domenico Prattichizzo - *University of Siena*Monica Malvezzi - *University of Siena***4:25PM–4:35PM:****EFFICIENT DIGITAL MODELING AND FABRICATION WORKFLOW FOR INDIVIDUALIZED ANKLE EXOSKELETONS****Technical Paper Publication: IMECE2021-70603**Biruk A. Gebre - *Stevens Institute of Technology*Rodrigo Nogueira - *Stevens Institute of Technology*Shubham Patidar - *Stevens Institute of Technology*Robert Belle-Isle - *Stevens Institute of Technology*Karen Nolan - *Kessler Foundation*Kishore Pochiraju - *Stevens Institute of Technology*Damiano Zanotto - *Stevens Institute of Technology***4:35PM–4:45PM:****IMPROVING THE PERFORMANCE OF AMBULATORY GAIT TRAINING SYSTEM FOR REHABILITATION BY MECHATRONICS AND DESIGN SIMULATION****Technical Paper Publication: IMECE2021-71487**Devdas Shetty - *University of District of Columbia*Lara Thompson - *University of the District of Columbia*Pablo Sanchez - *University of the District of Columbia*Claudio Campana - *University of Hartford***4:45PM–4:55PM:****CHARACTERIZATION AND OPTIMIZATION OF A LOWER EXTREMITY EXOSKELETON DEVICE FOR LEG MUSCLE REHABILITATION****Technical Paper Publication: IMECE2021-72130**Haadi Elahi - *San Jose State University*Marvin Perez - *San Jose State University*Vimal Viswanathan - *San Jose State University*Aayush Vemuri - *IntelliScience Training Institute*Indeever Madireddy - *IntelliScience Training Institute*Sohail Zaidi - *IntelliScience Institute***4:55PM–5:05PM:****DESIGN OF A PERSONALIZED BIO-MECHANICAL KNEE ORTHOSIS****Technical Paper Publication: IMECE2021-73209**Alex Tacescu - *Worcester Polytechnic Institute*Nathaniel Goldfarb - *Worcester Polytechnic Institute*Gregory S. Fischer - *Worcester Polytechnic Institute*Benjamin Secino - *Worcester Polytechnic Institute***5:05PM–5:15PM:****PRELIMINARY DESIGN AND EXPERIMENTAL STUDIES OF A COMPLIANT KNEE JOINT FOR PEDIATRIC ABOVE KNEE AMPUTEES****Technical Paper Publication: IMECE2021-73655**Sahil Pitre - *Kennesaw State University*Bryan Curtin - *Kennesaw State University*Paul Pena - *Kennesaw State University*Ciaphus Rouse - *Kennesaw State University*Emma Joseph - *Kennesaw State University*Joshua Hooper - *Kennesaw State University*Ayse Tekes - *Kennesaw State University*

08-10-01: LI-ION BATTERIES
NOVEMBER 4, 2021

4:15PM–5:45PM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

4:15PM–4:25PM:

**EXPERIMENTAL MEASUREMENT OF CID-
 AND VENT-ACTIVATION IN CYLINDRICAL LITHIUM-
 ION BATTERIES**

Technical Paper Publication: IMECE2021-68046

Weisi Li - *Purdue University*
 Kyle Crompton - *Naval Surface Warfare Center Crane Division*
 Jason Ostanek - *Purdue University*

4:25PM–4:35PM:

**EFFECT OF ELECTRODE CROSSTALK ON HEAT
 RELEASE IN LI-ION BATTERIES UNDER THERMAL
 ABUSE SCENARIOS**

Technical Presentation: IMECE2021-68748

Hanwei Zhou - *Purdue University*
 Mukul Parmananda - *Purdue University*
 Kyle Crompton - *Naval Surface Warfare Center Crane Division*
 Michael Hladky - *Naval Surface Warfare Center Crane Division*
 Martin Dann - *Naval Surface Warfare Center Crane Division*
 Partha Mukherjee - *Purdue University*

4:35PM–4:45PM:

**PROBING THE ROLE OF VENTING AND
 EVAPORATIVE COOLING IN THERMAL RUNAWAY
 FOR SMALL FORMAT LI-ION CELLS**

Technical Paper Publication: IMECE2021-69959

Mohammad Parhizi - *Purdue University*
 K.R. Crompton - *Naval Surface Warfare Center Crane Division*
 Jason Ostanek - *Purdue University*

4:45PM–4:55PM:

LI-ION BATTERY PACK MODEL

Technical Presentation: IMECE2021-77579

Venkatesh Kabra - *Purdue University*
 Partha Mukherjee - *Purdue University*

4:55PM–5:05PM:

**INVESTIGATING EFFECTS OF PULSE CHARGING ON
 PERFORMANCE OF LITHIUM-ION BATTERIES AT
 LOW TEMPERATURE**

Technical Presentation: IMECE2021-73383

Jiahao Liu - *Oakland University*
 Xia Wang - *Oakland University*

5:05PM–5:15PM:

**ALTERING THE DEGRADATION MODE IN LI-ION
 BATTERIES THROUGH DIRECTIONAL APPLICATION
 OF AN INTERELECTRODE THERMAL GRADIENT**

Technical Presentation: IMECE2021-76888

Todd Kingston - *Iowa State University*
 Rachel Carter - *U.S. Naval Research Laboratory*
 Robert Atkinson - *EXCET, Inc.*
 Mukul Parmananda - *Purdue University*
 Matthieu Dubarry - *Hawaii Natural Energy Institute / University of Hawaii at Manoa*
 Conner Fear - *Purdue University*
 Partha Mukherjee - *Purdue University*
 Corey Love - *U.S. Naval Research Laboratory*



08-11-01: FUEL CELL SYSTEMS DESIGN AND APPLICATIONS
NOVEMBER 4, 2021

4:15PM–5:45PM

Chair: Hohyun Lee - *Santa Clara University*
 Chair: Soumik Banerjee - *Washington State University*
 Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*
 Chair: Michail Nitsas - *National Technical University of Athens*

4:15PM–4:25PM:

COMPLEX MATERIAL BEHAVIOR SEEN WITH NOVEL INTERNAL CATHODE TUBULAR SOLID OXIDE FUEL CELLS

Technical Paper Publication: IMECE2021-66565

Alexander R. Hartwell - *Syracuse University*
 Jeongmin Ahn - *Syracuse University*

4:25PM–4:35PM:

EXPERIMENTAL INVESTIGATION OF THE MANUFACTURING OF POROUS SOLID OXIDE FUEL CELLS

Technical Paper Publication: IMECE2021-69235

Cole Wilhelm - *Syracuse University*
 Evan Schaffer - *Syracuse University*
 Thomas Welles - *Syracuse University*
 Jeongmin Ahn - *Syracuse University*

4:35PM–4:45PM:

A TWO-PHASE FLOW STUDY ON CARBON DIOXIDE BUBBLES EVOLUTION IN DIRECT-METHANOL FUEL CELLS WITH DEGASSING CHANNELS

Technical Paper Publication: IMECE2021-72603

Sameer Abdullah - *Egypt-Japan University of Science and Technology*
 Mahmoud Ahmed - *Egypt-Japan University of Science and Technology*

4:45PM–4:55PM:

MASS TRANSPORT AND THERMAL STRESSES EVALUATION OF MICRO SOLID-OXIDE FUEL CELLS: A NUMERICAL STUDY

Technical Paper Publication: IMECE2021-72922

Sameer Osman - *Egypt-Japan University of Science and Technology*
 Mahmoud Ahmed - *Egypt-Japan University of Science and Technology*

4:55PM–5:05PM:

MATURATION OF A SUBSEA POWER SYSTEM USING AN EJECTOR DRIVEN REACTANT PEM FUEL CELL

Technical Presentation: IMECE2021-76699

Robert Utz - *Teledyne Energy Systems*
 Thomas Valdez - *Teledyne Energy Systems*
 Bob Wynne - *Teledyne Energy Systems*
 John Borger - *Teledyne Energy Systems*
 Andrew Leanna - *Teledyne Energy Systems*

5:05PM–5:15PM:

THERMODYNAMIC PERFORMANCE STUDY OF DIESEL-FUELED SOFC POWER GENERATION SYSTEM



Technical Paper Publication: IMECE2021-70074

Heng Wang - *China University of Petroleum*
 Hongbin Zhao - *China University of Petroleum*

11-20-01:

**APPLICATIONS OF COMPUTATIONAL
 HEAT TRANSFER
 NOVEMBER 4, 2021**

4:15PM–5:45PM

Chair: Subramanyaravi Annapragada -
United Technologies Research

Chair: Kevin Dowding – *Sandia National Laboratories*

Chair: Alexander Rattner - *Penn State University*

4:15PM–4:25PM:

**EFFECTS OF CONVECTION ON EXPERIMENTAL
 INVESTIGATION OF HEAT GENERATION DURING
 PLASTIC DEFORMATION**

Technical Paper Publication: IMECE2021-68479

Wyatt Hodges - *Sandia National Laboratories*
 Leslie Phinney - *Sandia National Laboratories*
 Brian Lester - *Sandia National Laboratories*
 Brandon Talamini - *Sandia National Laboratories*
 Amanda Jones - *Sandia National Laboratories*

4:25PM–4:35 PM:

**INNOVATION IN HYDROTESTING ABOVE GROUND
 PIPES: ANALYTICAL SOLUTION VIA INTEGRAL
 TRANSFORMS FOR DISCERNING TEST FLUID
 TEMPERATURES SUBJECT TO AMBIENT
 TEMPERATURE VARIATIONS**

Technical Paper Publication: IMECE2021-69330

Pedro A. Isaza - *NOVA Chemicals Corporation*
 Kamal K. Botros - *NOVA Chemicals Corporation*

4:35PM–4:45PM:

**INFLUENCE OF FILM COOLING HOLES PARTIAL
 BLOCKAGE ON COOLING EFFECTIVENESS**

Technical Paper Publication: IMECE2021-72390

Junhong Zhang - *Tianjin University*
 Wenxin Dong - *Tianjin University*
 Jiewei Lin - *Tianjin University*
 Huwei Dai - *Tianjin University*
 Xibo Wang - *Tianjin University*

4:45PM–4:55PM:

**CONJUGATE MIXED CONVECTIVE FLOW OF
 GALLIUM IN A PARTIALLY VENTED SQUARE CAVITY
 IN THE PRESENCE OF A ROTATING CYLINDER**

Technical Paper Publication: IMECE2021-73254

Abbar Nur-E Faiaz - *Bangladesh University of Engineering
 and Technology*
 Shadman Sakib Priam - *Bangladesh University of Engineering
 and Technology*
 Asif Shahriar - *Bangladesh University of Engineering
 and Technology*
 Mohammad Arif Hasan Mamun - *Bangladesh University
 of Engineering & Technology*

4:55PM–5:05PM:

**NUMERICAL ANALYSIS OF MULTIPLE JETS
 IMPINGING ON A MOVING SURFACE**

Technical Paper Publication: IMECE2021-73603

Flavia Barbosa - *University of Minho*
 Jose Teixeira - *University of Minho*
 Joao Silva - *University of Minho*
 Senhorinha Teixeira - *University of Minho*



5:05PM–5:15PM:**THREE-DIMENSIONAL NUMERICAL SIMULATION OF RAYLEIGH-BÉNARD CONVECTION OF CYCLOHEXANE-OXYGEN MIXTURE NEAR ITS MAXIMUM DENSITY IN A CUBIC CAVITY****Technical Presentation: IMECE2021-69914**Jia-Wei Fang - *Chongqing University*You-Rong Li - *Chongqing University***12-19-02:****ADVANCES IN EXPERIMENTAL MECHANICS
NOVEMBER 4, 2021****4:15PM–5:45PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***4:15PM–4:25PM:****AIRY DISKS VS SUBSET SIZE IN DIGITAL IMAGE CORRELATION AT LONG WORKING DISTANCES AND HIGH MAGNIFICATIONS****Technical Presentation: IMECE2021-77573**Robert Hansen - *Utah State University*Katharine Burn - *Utah State University*Cynthia Rigby - *Utah State University*Ethan Nickerson - *Pacific Northwest National Laboratory*Emma Ashby - *Utah State University*Ryan Berke - *Utah State University***4:25PM–4:35PM:****PAIRING HYDRIDE MAPS WITH DISPLACEMENT FIELDS IN HOOP TENSION TESTS OF AGED NUCLEAR FUEL CLADDING****Technical Presentation: IMECE2021-77580**Robert Hansen - *Utah State University*Micah Estrada - *Utah State University*Ryan Berke - *Utah State University***4:35PM–4:45PM:****A NEW PHASE LOCKED CAMERA TRIGGERING METHOD AND ITS APPLICATION TO A HIGH FREQUENCY VIBRATION-BASED FATIGUE TEST****Technical Presentation: IMECE2021-77582**Brandon Furman - *Utah State University*Benjamin Hill - *Utah State University*Alexandra Loftin - *Utah State University*Ryan Berke - *Utah State University***4:45PM–4:55PM:****TOPOLOGY OPTIMIZATION OF CRACKED STRUCTURES WITH MANUFACTURING CONSTRAINTS****Technical Paper Publication: IMECE2021-73439**Anahita Habibian - *University of Victoria*Abdolrasoul Sohoulou - *University of Victoria*Afzal Suleman - *University of Victoria***4:55PM–5:05PM:****RECENT PROGRESS IN MODELING PLASTICITY AND DUCTILE FRACTURE WITH PERIDYNAMICS****Technical Presentation: IMECE2021-77444**Farzaneh Mousavi - *University of Nebraska-Lincoln*Siavash Jafarzadeh - *University of Nebraska-Lincoln*Florin Bobaru - *University of Nebraska-Lincoln*

5:05PM–5:15PM:**FRACTURE AND DAMAGE IN HETEROGENEOUS MATERIALS: INTERMEDIATELY HOMOGENIZED PERIDYNAMIC MODELS****Technical Presentation: IMECE2021-77495**Florin Bobaru - *University of Nebraska-Lincoln*Jiangming Zhao - *University of Nebraska-Lincoln*Ziguang Chen - *Huazhong University of Science and Technology***12-21-01:****DATA-ENABLED PREDICTIVE MODELING, MACHINE LEARNING, AND UNCERTAINTY QUANTIFICATION IN COMPUTATIONAL MECHANICS****NOVEMBER 4, 2021****4:15PM–5:45PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***4:15PM–4:25PM:****A BAYESIAN MACHINE LEARNING FRAMEWORK FOR SELECTION OF THE STRAIN GRADIENT PLASTICITY MULTISCALE MODEL****Technical Paper Publication: IMECE2021-69693**Jingye Tan - *University at Buffalo*Kathryn Maupin - *Sandia National Laboratories*Shuai Shao - *Auburn University*Danial Faghihi - *University at Buffalo***4:25PM–4:35PM:****DEFORMATION MANIFOLD LEARNING MODEL FOR DEFORMATION OF MULTI-WALLED CARBON NANOTUBES: EXPLORING THE LATENT SPACE****Technical Paper Publication: IMECE2021-70463**Upendra Yadav - *Michigan Technological University*Shashank Pathrudkar - *Michigan Technological University*Susanta Ghosh - *Michigan Technological University***4:35PM–4:45PM:****APPLIED MACHINE LEARNING METHOD TO PREDICT CRACK PROPAGATION PATH IN POLYCRYSTALLINE GRAPHENE SHEET****Technical Paper Publication: IMECE2021-70543**Mohan S.R. Elapolu - *University of North Carolina*Md. Imrul Reza Shishir - *University of North Carolina*Alireza Tabarraei - *University of North Carolina***4:45PM–4:55PM:****A DEEP CONVOLUTIONAL NEURAL NETWORK-BASED METHOD TO PREDICT ACCURATE FRACTURE STRENGTH OF POLY-CRYSTALLINE GRAPHENE****Technical Paper Publication: IMECE2021-70580**Md. Imrul Reza Shishir - *University of North Carolina*Mohan Surya Raja Elapolu - *University of North Carolina*Alireza Tabarraei - *University of North Carolina***4:55PM–5:05PM:****A COMBINED MACHINE LEARNING AND MULTIVARIATE NEWTON METHOD APPROACH TO EXTRACT STRUCTURAL DYNAMICS PARAMETERS DURING MILLING OPERATION****Technical Presentation: IMECE2021-71281**Maryam Hashemitaheri - *University of North Carolina at Charlotte*Mohammadrafi Marandi - *University of North Carolina at Charlotte*Harish Cherukuri - *University of North Carolina at Charlotte*

01-01-03: PHONONICS III
NOVEMBER 4, 2021

6:00PM–7:30PM

Chair: Mostafa Nouh - *University at Buffalo*
 Chair: Yongfeng Xu - *University of Cincinnati*
 Chair: Guoliang Huang - *University of Missouri*

6:00PM–6:10PM:

IMPLEMENTATION OF TRIPLY POLY MINIMAL SURFACES IN DESIGN OF PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS

Technical Paper Publication: IMECE2021-72624
 Daniel Saatchi - *Korea Advanced Institute of Science and Technology*
 Ilkwon Oh - *Korea Advanced Institute of Science and Technology*

6:10PM–6:20PM:

THE VALLEY STATES IN FLUID WITH WILLIS CONSTITUTIVE PROPERTIES

Technical Presentation: IMECE2021-72654
 Hongfei Qu - *Beijing Institute of Technology*
 Xiaoning Liu - *Beijing Institute of Technology*

6:20PM–6:30PM:

PIEZOELECTRIC-BASED ACTIVE ELASTIC METASURFACE FOR LOW-FREQUENCY FLEXURAL WAVEFRONT CONTROL

Technical Presentation: IMECE2021-75942
 Zhenkun Lin - *University of Michigan*
 Serife Tol - *University of Michigan*

6:30PM–6:40PM:

TUNABILITY OF TRANSVERSE WAVE BAND GAPS IN SOFT MAGNETO-ACTIVE PERIODIC LAMINATED COMPOSITE

Technical Presentation: IMECE2021-76535
 Neda Karamimohammadi - *University of Wisconsin-Madison*
 Stephan Rudykh - *University of Wisconsin-Madison*

6:40PM–6:50PM:

CORNER MODES IN ELASTIC TWISTED KAGOME LATTICES

Technical Presentation: IMECE2021-77063
 Hrishikesh Danawe - *University of Michigan*
 Heqiu Li - *University of Michigan*
 Hasan Al Ba'ba'a - *University of Michigan*
 Serife Tol - *University of Michigan*

6:50PM–7:00PM:

TOPOLOGICAL PROTECTION IN A STRONGLY NONLINEAR MECHANICAL INTERFACE LATTICE

Technical Presentation: IMECE2021-77219
 Josh Tempelman - *University of Illinois at Urbana-Champaign*
 Kathryn Matlack - *University of Illinois at Urbana-Champaign*
 Alexander Vakakis - *University of Illinois at Urbana-Champaign*

**02-02-06:
 UNIQUE APPROACHES AND APPLICATIONS IN ADDITIVE MANUFACTURING
 NOVEMBER 4, 2021**



6:00PM–7:30PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

6:00PM–6:10PM:

EXTENDING THE LIFE OF CLASSIC CARS, THE ADDITIVE MANUFACTURING WAY

Technical Paper Publication: IMECE2021-70355

Tanmay A. Luniya - *Clemson University*
 Geetha P. Chimata - *Clemson University*

6:10PM–6:20PM:

INCREASED STRENGTH OF 3D PRINTED PARTS WITH Z-PIN APPROACH

Technical Paper Publication: IMECE2021-67743

Lee Clemon - *University of Technology Sydney*
 Karan Christopher - *University of Technology Sydney*

6:20PM–6:30PM:

A CONCEPTUAL DESIGN FRAMEWORK FOR PHARMACEUTICAL ADDITIVE MANUFACTURING TECHNOLOGIES: FIXED DOSE COMBINATIONS CASE STUDY

Technical Presentation: IMECE2021-77188

Ivan Romero Yopez - *Universidad del Norte*
 Humberto Gomez Vega - *Universidad del Norte*

6:30PM–6:40PM:

VALIDATION OF A FINITE ELEMENT MODEL FOR FUSED FILAMENT FABRICATION ADDITIVE MANUFACTURING

Technical Paper Publication: IMECE2021-73803

Sarah Clark - *University of Texas*
 Timothy Yap - *University of Texas*
 Mehran Tehrani - *University of Texas*

6:40PM–6:50PM:

CURRENT STATUS AND PROSPECTS OF MULTI-JET FUSION (MJF) BASED 3D PRINTING TECHNOLOGY

Technical Paper Publication: IMECE2021-73547

Aman Preet Singh - *Rochester Institute of Technology – Dubai*
 Salman Pervaiz - *Rochester Institute of Technology – Dubai*

6:50PM–7:00PM:

CHARACTERIZATION OF WIRE-ARC ADDITIVELY MANUFACTURED (WAAM) OF TITANIUM ALLOY (TI-6AL-4V) FOR NANOMECHANICAL PROPERTIES

Technical Paper Publication: IMECE2021-69673

Md Shahjahan Hossain - *Georgia Southern University*
 Ashley Pliego - *Georgia Southern University*
 Jinsun Lee - *Georgia Southern University*
 Hossein Taheri - *Georgia Southern University*

02-06-01: FASTENING AND JOINING NOVEMBER 4, 2021

6:00PM–7:30PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

6:00PM–6:10PM:

MICROSTRUCTURAL ANALYSIS AND TENSILE PROPERTY STUDIES ON SPRAY COOLED FRICTION STIR WELDED ALUMINIUM ALLOY 2014



Technical Paper Publication: IMECE2021-68012

Afrith Noor Mohamed Rafi - *Anna University*
 Mystica Augustine Michael Duke - *Anna University*
 Senthil Kumar Velukkudi Santhanam - *Anna University*

6:10PM–6:20PM:

INFLUENCE OF IN-PROCESS CRYOGENIC COOLING ON MECHANICAL PERFORMANCE OF FRICTION STIR T6 - AA 2900 ALLOY WELDMENTS

Technical Paper Publication: IMECE2021-68033

P. Ashwath - *Vellore Institute of Technology*
 M. Anthony Xavier - *Vellore Institute of Technology*
 P. Jeyapandiarajan - *Vellore Institute of Technology*
 J. Joel - *Vellore Institute of Technology*

6:20PM–6:30PM:

ABRASIVE AND CUTTING ELEMENT USE IN FRICTION ELEMENT WELDING

Technical Paper Publication: IMECE2021-68733

Tyler J. Grimm - *Clemson University*
 Amit B. Deshpande - *Clemson University*
 Laine Mears - *Clemson University*

6:30PM–6:40PM:

FRICTION ELEMENT RIVETING: EFFECTS OF LOWER ELEMENT GEOMETRY

Technical Paper Publication: IMECE2021-68751

Tyler J. Grimm - *Clemson University*
 Amit B. Deshpande - *Clemson University*
 Gowtham V. Parvathy - *Clemson University*
 Laine Mears - *Clemson University*

6:40PM–6:50PM:

INJECTION MOLDED METAL-PLASTIC HYBRIDS BASED ON FEMTOSECOND LASER STRUCTURING

Technical Paper Publication: IMECE2021-69249

Can Yang - *Shenzhen Technology University*
 Fei Peng - *Shenzhen Technology University*
 Xiao-Hong Yin - *Shenzhen Technology University*
 Tiefeng He - *Shenzhen Technology University*
 Xiuhong Zheng - *Shenzhen Technology University*

6:50PM–7:00PM:

STUDY ON UNDERWATER FRICTION STIR WELDED AA 2024-T3 PIPES USING MACHINE LEARNING ALGORITHMS

Technical Paper Publication: IMECE2021-71378

Ibrahim Sabry - *Benha University*
 Abdel Hamid I. Mourad - *United Arab Emirates University*
 Dinu Thomas Thekkuden - *United Arab Emirates University*

**02-11-01: ROBOTICS AND AUTOMATION IN ADVANCED MANUFACTURING
 NOVEMBER 4, 2021**

6:00PM–7:30PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

6:00PM–6:10PM:

HIGH FIDELITY HUMAN MODELING VIA INTEGRATED SKELETON TRACKING FOR PREDICTIVE HRC COLLISION DETECTION



Technical Paper Publication: IMECE2021-68054

Gabriel Streitmatter - *University of Florida*
 Jared Flowers - *University of Florida*
 Gloria Wiens - *University of Florida*

6:10PM–6:20PM:

EFFICIENT FEEDRATE OPTIMIZATION METHOD FOR SPLINE TOOLPATH BASED ON TYPICAL CHARACTERISTICS OF INTEGRAL IMPELLER

Technical Paper Publication: IMECE2021-68728

Jianxin Xiao - *Tsinghua University*
 Bingran Li - *Tsinghua University*
 Jun Fang - *Tsinghua University*
 Hui Zhang - *Tsinghua University*

6:20PM–6:30PM:

GRAVITY BALANCING DESIGN OF A 3-DOF HYBRID ROBOTIC MANIPULATOR WITH VARIABLE PAYLOADS

Technical Paper Publication: IMECE2021-69857

Vu Linh Nguyen - *National Chin-Yi University of Technology*

6:30PM–6:40PM:

FRAMEWORK FOR AUTOMATED ROBOTIC ARM MANIPULATION IN VARIABLE INDUSTRIAL ENVIRONMENTS

Technical Paper Publication: IMECE2021-71479

Anvay A. Pradhan - *University of Iowa*
 Will C. Martin - *University of Iowa*
 Juliana Danesi Ruiz - *University of Iowa*
 Phillip E. Deierling - *University of Iowa*

6:40PM–6:50PM:

AGILE TASKING OF ROBOTIC KITTING

Technical Paper Publication: IMECE2021-73683

John Michaloski - *National Institute of Standards*
 Murat Aksu - *National Institute of Standards*
 Craig Schlenoff - *National Institute of Standards*
 Rafael C. Cardoso - *University of Manchester*
 Michael Fisher - *University of Manchester*

6:50PM–7:00PM:

FLEXIBLE TRAJECTORY PLANNING FRAMEWORK FOR LARGE SCALE ADDITIVE MANUFACTURING OF METALS

Technical Presentation: IMECE2021-68128

James McNeil - *University of Tennessee - Knoxville*
 Matthew Lamsey - *University of Tennessee - Knoxville*
 William Hamel - *University of Tennessee*

03-06-01:

**RECENT DEVELOPMENTS IN TRIBOLOGY
 NOVEMBER 4, 2021**

6:00PM–7:30PM

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

6:00PM–6:10PM:

STUDY ON TRIBOLOGICAL BEHAVIOUR OF ZNO NANO ADDITIVES SUSPENDED IN SAE 20W-50 ENGINE OIL ON TRIBOLOGICAL BEHAVIOUR OF ZNO NANO ADDITIVES SUSPENDED IN SAE 20W-50 ENGINE LUBRICANT



Technical Paper Publication: IMECE2021-66843Sayed AKI - *British University in Egypt*Sherif Elsoudy - *British University in Egypt*Ahmed A. Abdel-Rehim - *British University in Egypt*Serag Salem - *British University in Egypt***6:10PM–6:20PM:****THE EVALUATION OF TRIBOLOGICAL PERFORMANCE OF LASER MICRO-TEXTURING Ti6AL4V UNDER LUBRICATION WITH PROTIC IONIC LIQUID****Technical Paper Publication: IMECE2021-69155**Junru Pang - *Rochester Institute of Technology*Hong Guo - *Rochester Institute of Technology*Juan Manuel Vázquez Martínez - *University of Cadiz*Jorge Salguero - *University of Cadiz*Patricia Iglesias Victoria - *Rochester Institute of Technology***6:20PM–6:30PM:****IN SITU STUDY OF THE LUBRICATION MECHANISM OF PHOSPHONIUM PHOSPHATE IONIC LIQUID IN NANOSCALE SINGLE-ASPERITY SLIDING CONTACTS****Technical Presentation: IMECE2021-69735**Filippo Mangolini - *University of Texas*Zixuan Li - *University of Texas*Oscar Morales-Collazo - *University of Texas*Jerzy T. Sadowski - *Brookhaven National Laboratory*Hugo Celio - *University of Texas*Andrei Dolocan - *University of Texas*Joan F. Brennecke - *University of Texas***6:30PM–6:40PM:****PROTIC IONIC LIQUIDS AS LUBRICANT ADDITIVES****Technical Paper Publication: IMECE2021-69792**Brandon Stoyanovich - *Rochester Institute of Technology*Om Saran - *Rochester Institute of Technology*Hong Guo - *Rochester Institute of Technology*Patricia Iglesias - *Rochester Institute of Technology***6:40PM–6:50PM:****THERMAL EXPANSION SIMULATION OF BI-DIRECTIONAL TAPER FORMATION IN COMPOSITE HYDRODYNAMIC THRUST BEARINGS****Technical Paper Publication: IMECE2021-70430**Isaiah Yasko - *Ohio University*Anbara Lutfullaeva - *Ohio University*Collier Fais - *Ohio University*Muhammad Ali - *Ohio University*Khairul Alam - *Ohio University***6:50PM–7:00PM****EXPERIMENTAL PERFORMANCE EVALUATION OF FIXED-GEOMETRY HYDRODYNAMIC THRUST BEARINGS WITH VARIABLE TAPER DEPTHS****Technical Paper Publication: IMECE2021-70459**Collier Fais - *Ohio University*Muhammad Ali - *Ohio University*Isaiah Yasko - *Ohio University*Rick Walker - *Miba Bearings*Anbara Lutfullaeva - *Ohio University***03-15-03:****MULTIFUNCTIONAL MATERIALS, STRUCTURES AND DEVICES: MODELING, DESIGN, MANUFACTURING, AND CHARACTERIZATION
NOVEMBER 4, 2021****6:00PM–7:30PM**Chair: Hareesh Tippur - *Auburn University*Chair: Caglar Oskay - *Vanderbilt University*

6:00PM–6:10PM:**3D PRINTING LIVING PLATFORMS FOR BIOMEDICAL APPLICATION****Technical Presentation: IMECE2021-76845**Daeha Joung - *Virginia Commonwealth University***6:10PM–6:20PM:****MANUFACTURING OF FUNCTIONAL TEXTILES FOR CLEAN WATER, CLEAN ENERGY, AND WEARABLE ELECTRONICS****Technical Presentation: IMECE2021-77195**Wan Shou - *University of Arkansas***6:20PM–6:30PM:****MULTIFUNCTIONAL ORIGAMI OPTOELECTRONICS FOR MULTIMODAL ENVIRONMENTAL SENSING****Technical Presentation: IMECE2021-77443**Xin Ning - *The Pennsylvania State University***6:30PM–6:40 PM:****CAPILLARY TRANSFER OF THIN FILM BASED FUNCTIONAL STRUCTURES****Technical Presentation: IMECE2021-77531**Yue Zhang - *University of Virginia*Baoxing Xu - *University of Virginia***6:40PM–6:50PM:****MICROMECHANICAL MODELING FOR EFFECTIVE THERMAL CONDUCTIVITY OF METALLIC FOAMS****Technical Presentation: IMECE2021-77571**Chloe Li - *Elkins High School***05-09-01:****BIOTRANSPORT AND GENERAL APPLICATIONS NOVEMBER 4, 2021****6:00PM–7:30PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***6:00PM–6:10PM:****ELECTROPHYSIOLOGY OF PHOSPHATIDYL SERINE BILAYER MEMBRANES USING ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY****Technical Paper Publication: IMECE2021-70808**Khalid Tantawi - *University of Tennessee*Hope Hunnicutt - *University of Tennessee***6:10PM–6:20PM:****A STUDY OF FLOW IN ATHEROSCLEROTIC ARTERIES USING VIRTUAL AND IN-VITRO MODELS AND ITS IMPLICATIONS REGARDING VESSEL EROSION****Technical Paper Publication: IMECE2021-70553**Evan Weber - *Nova Southeastern University*Paula Veras De La Rocha - *Nova Southeastern University*Caylee Cox - *Nova Southeastern University*Jonathon Yanello - *Nova Southeastern University*Manuel Salinas - *Nova Southeastern University*

6:20PM–6:30PM:**EFFECT OF STENOSIS LOCATION ON THE FLOW DISTRIBUTION IN CORONARY BRANCHES: EXPERIMENTAL AND NUMERICAL STUDY****Technical Paper Publication: IMECE2021-71590****Mahmoud Ahmed** - *Egypt-Japan University of Science and Technology***Yasser Abuouf** - *Egypt-Japan University of Science and Technology***Muhamed Albadawi** - *Egypt-Japan University of Science and Technology***6:30PM–6:40PM:****HEAD EVAPORATIVE COOLING FROM FORCED AND NATURAL CONVECTION FOR TWO HELMET-PAD CONFIGURATIONS****Technical Paper Publication: IMECE2021-73398****David R. Mott** - *Naval Research Laboratory***Yu Yu Khine** - *Naval Research Laboratory***X. Gary Tan** - *Naval Research Laboratory***Amit Bagchi** - *Naval Research Laboratory***6:40PM–6:50PM:****LASER MICROGROOVING AND NANOFIBER MEMBRANE APPLICATION FOR TOTAL KNEE REPLACEMENT IMPLANTS USING A CAPRINE MODEL****Technical Paper Publication: IMECE2021-73597****Morshed Khandaker** - *University of Central Oklahoma***Sadegh Nikfarjam** - *University of Central Oklahoma***Karim Kari** - *University of Central Oklahoma***Onur Can Kalay** - *Bursa Uludag University***Fatih Karpaz** - *Bursa Uludag University***Helga Progri** - *University of Central Oklahoma***Ariful Bhuiyan** - *University of Houston at Clear Lake***Erik Clary** - *Oklahoma State University***Amgad Haleem** - *University of Oklahoma Health Science Center***05-04-01: SENSORS AND AI
NOVEMBER 4, 2021****6:00PM–7:30PM****Chair: Linxia Gu** - *Florida Institute of Technology***Chair: Ahmed Al-Jumaily** - *Auckland University of Technology***Chair: Reuben Kraft** - *The Pennsylvania State University***Chair: Martin Tanaka** - *Western Carolina University***6:00PM–6:10PM:****DEVELOPMENT OF AN ORGANISATIONAL FRAMEWORK FOR THE OPTIMAL AND EFFICIENT SELECTION OF ACTUATORS****Technical Paper Publication: IMECE2021-67744****Pavlos Hanna** - *University of Technology***Marc Carmichael** - *University of Technology***Lee Clemon** - *University of Technology***6:10PM–6:20PM:****PARAMETRIC EVALUATION OF HEAD CENTER OF GRAVITY ACCELERATION ERROR FROM RIGID BODY KINEMATICS ASSUMPTIONS USED IN ENVIRONMENTAL SENSORS****Technical Paper Publication: IMECE2021-69334****Brandon A. Brown** - *United States Army Aeromedical Research Laboratory***Ray W. Daniel** - *United States Army Aeromedical Research Laboratory***Valeta Carol Chancey** - *United States Army Aeromedical Research Laboratory***Tyler F. Rooks** - *United States Army Aeromedical Research Laboratory*

6:20PM–6:30PM:**DESIGN OF A WEARABLE AND MODULAR HAPTIC DEVICE FOR HAND PALM CUTANEOUS FEEDBACK****Technical Presentation: IMECE2021-71244**Mihai Dragusanu - *University of Siena*Alberto Villani - *Università di Siena***6:30PM–6:40PM:****A NEW MICROFLUIDIC DEVICE INTEGRATED WITH QUARTZ CRYSTAL MICROBALANCE TO MEASURE COLLOIDAL PARTICLE ADHESION****Technical Paper Publication: IMECE2021-73099**Siqi Ji - *Northeastern University*Ran Ran - *Northeastern University*Ilia Chiniforooshan Esfahani - *Northeastern University*Kai-tak Wan - *Northeastern University*Hongwei Sun - *Northeastern University***6:40PM–6:50PM:****QUANTIFICATION OF VASCULAR FEATURES IN SOYBEAN STEMS VIA LASER ABLATION TOMOGRAPHY (LATSCAN)****Technical Presentation: IMECE2021-75287**Berkeley Elias - *University of Southern Maine*Asheesh Lanba - *University of Southern Maine*Abraham Smith - *University of Copenhagen*Jose Costa Netto - *University of Missouri*Felix Fritschi - *University of Missouri*Benjamin Hall - *Lasers for Innovative Solutions***08-10-02:****BATTERY: MATERIALS AND SAFETY
NOVEMBER 4, 2021****6:00PM–7:30 PM**Chair: Hohyun Lee - *Santa Clara University*Chair: Soumik Banerjee - *Washington State University*Chair: Reza Baghaei Lakeh - *University of California, Los Angeles*Chair: Michail Nitsas - *National Technical University of Athens***6:00PM–6:10PM:****PARAMETER OPTIMIZATION OF A NEW BATTERY MODEL****Technical Paper Publication: IMECE2021-68768**Cameron Rose - *General Motors*Ben Pence - *Brigham Young University Idaho***6:10PM–6:20PM:****A STUDY ON DEGRADATION OF LITHIUM-ION BATTERIES FOR IN AIRCRAFT APPLICATIONS****Technical Paper Publication: IMECE2021-73606**Muapper Alhadri - *University of Ha'il*Waleed Zakri - *Jazan University*Roja Esmaeeli - *Friends University*Siamak Farhad - *University of Akron***6:20PM–6:30PM:****EFFECT OF LINBO3 COATING ON CAPACITY AND CYCLING OF NICKLE-RICH NMC CATHODE ACTIVE MATERIAL**

Technical Paper Publication: IMECE2021-73728

Dominic Frisone - *University of Akron*
 Mahdi Amiriyani - *Schaeffler Group USA*
 Eman Hassan - *University of Akron*
 Joshua Dunham - *Schaeffler Group USA*
 Rashid Farahati - *Schaeffler Group USA*
 Siamak Farhad - *University of Akron*

6:30PM–6:40PM:

**ELECTROCHEMICAL-MECHANICAL COUPLED
 CRACK PROPAGATION AND DENDRITE GROWTH IN
 ALL-SOLID-STATE BATTERY**

Technical Presentation: IMECE2021-76320

Chunhao Yuan - *University of North Carolina at Charlotte*
 Jun Xu - *University of North Carolina at Charlotte*

6:40PM–6:50PM:

**EFFECT OF PRESSURE AND TEMPERATURE ON THE
 PERFORMANCE OF ARGYROIDITE LI(6)PS(5)CL(0.5)
 BR(0.5) ELECTROLYTE FOR ALL-SOLID-STATE
 LITHIUM BATTERY**

Technical Paper Publication: IMECE2021-73735

Joshua Dunham - *Scheffler Group*
 Dominic Frisone - *University of Akron*
 Mahdi Amiriyani - *Scheffler Group*
 Eman Hassan - *University of Akron*
 Jung Feng Hu - *Scheffler Group*
 Rashid Farahati - *Scheffler Group*
 Siamak Farhad - *University of Akron*

6:50PM–7:00PM:

**MATHEMATICAL MODELLING OF
 SEMI-SOLID ELECTRODES FOR FLEXIBLE
 LITHIUM-ION BATTERIES**

Technical Paper Publication: IMECE2021-73345

Waleed Zakri - *Jazan University*
 Hassan Fagehi - *Jazan University*
 Muapper Alhadri - *University of Ha'il*
 Ahmed Abutaleb - *Jazan University*
 Siamak Farhad - *University of Akron*

**08-08-03: RENEWABLE ENERGY III
 NOVEMBER 4, 2021**

6:00PM–7:30 PM**6:00PM–6:10PM:**

**COMPUTATIONAL FLUID DYNAMICS TURBULENCE
 AND WAKE STUDY OF A UTILITY-SCALE ROTATING
 THREE-BLADE HORIZONTAL AXIS WIND TURBINE**

Technical Paper Publication: IMECE2021-70095

Hussein Al-Qarishey - *Lawrence Technological University*
 Robert W. Fletcher - *Lawrence Technological University*
 Elaf Abd Alkareem - *Lawrence Technological University*

6:10PM–6:20PM:

**DESIGN AND ENERGY FLOW MANAGEMENT OF
 HYBRID RENEWABLE ENERGY SYSTEM**

Technical Paper Publication: IMECE2021-70763

Reza Amini - *MR CFD, LLC.*
 Abbasali A. Davani - *University of Southern California*
 Mohammad Pourgol Mohamad - *University of Maryland*

6:20PM–6:30PM:

**INTERCONNECTION OF RENEWABLE RESOURCES,
 NEW OPPORTUNITY IN THE REHABILITATION OF
 OLD SMALL HYDROPOWER PLANT**



Technical Paper Publication: IMECE2021-70973

Bogdan Alexandru Radulescu - *University Politehnica of Bucharest*

Victorita Radulescu - *University Politehnica of Bucharest*

6:30PM–6:40PM:

OPTIMIZING POWER OUTPUT OF A WAVE ENERGY CONVERTER BY EMPLOYING SUPERPOSED HYDRODYNAMIC MODEL

Technical Paper Publication: IMECE2021-70980

Kathyayani Nandakumar - *Indian Institute of Technology*

Abdus Samad - *Indian Institute of Technology*

6:40PM–6:50PM:

REINFORCEMENT LEARNING CONTROL OF VERTICAL AXIS WIND TURBINES IN URBAN ENVIRONMENT

Technical Presentation: IMECE2021-71079

He Shen - *California State University, Los Angeles*

Vladimir Pena - *California State University, Los Angeles*

6:50PM–7:00PM:

WIND HARVESTING ON MARS: STUDY AND APPROACH (II)

Technical Paper Publication: IMECE2021-71157

Mohanad Qomsiya - *Lawrence Technological University*

Robert W. Fletcher - *Lawrence Technological University*

11-20-02:

METHODS IN COMPUTATIONAL HEAT TRANSFER AND APPLICATION OF MACHINE LEARNING IN HEAT TRANSFER

NOVEMBER 4, 2021

6:00PM–7:30PM

Chair: Subramanyaravi Annapragada - *United Technologies Research*

Chair: Kevin Dowding – *Sandia National Laboratories*

Chair: Alexander Rattner - *Penn State University*

6:00PM–6:10PM:

TOWARDS A MODEL FOR THE MELT AND FLOW OF ALUMINUM ALLOYS IN FIRES

Technical Paper Publication: IMECE2021-71748

Alexander L. Brown - *Sandia National Laboratories*

John Tencer - *Sandia National Laboratories*

Alex Kucala - *Sandia National Laboratories*

Flint Pierce - *Sandia National Laboratories*

David R. Noble - *Sandia National Laboratories*

6:10PM–6:20PM:

ASSESSMENT OF LOW AND HIGH-FIDELITY TURBULENCE MODELS FOR LIQUID METAL FLOW PREDICTIONS

Technical Paper Publication: IMECE2021-72676

Shanti Bhushan - *Mississippi State University*

Mohammed Elmellouki - *Mississippi State University*

D.K. Walters - *University of Oklahoma*

M. Norman - *Texas A&M University*

Y.A. Hassan - *Texas A&M University*

E. Mezrari - *Pennsylvania State University*

A. Obabko - *Argonne National Lab*

6:20PM–6:30PM:

DERIVING THERMAL MODEL FROM DATA BY SPARSE IDENTIFICATION BASED ON PHYSICAL LAWS

Technical Paper Publication: IMECE2021-70639

Tomoyuki Suzuki - *Toshiba Research & Development Center*

Akira Kano - *Toshiba Research & Development Center*

Kenji Hirohata - *Toshiba Research & Development Center*



6:30PM–6:40PM:**A COMPARATIVE STUDY BETWEEN A SHARP AND A DIFFUSE TOPOLOGY OPTIMIZATION METHOD FOR THERMAL PROBLEMS****Technical Paper Publication: IMECE2021-72861**Marc-Étienne Lamarche-Gagnon -
*National Research Council Canada*Farshad Navah - *National Research Council Canada*Florin Ilinca - *National Research Council Canada*Marjan Molavi-Zarandi - *National Research Council Canada*Vincent Raymond - *National Research Council Canada***6:40PM–6:50PM:****A TWO DIMENSIONAL PARAMETRIC COMPUTATIONAL FRAMEWORK FOR FINITE ELEMENT HEAT TRANSFER ANALYSIS OF SELF-FIELD MAGNETOPLASMA DYNAMIC THRUSTERS}****Technical Paper Publication: IMECE2021-72916**K. Joel Berry - *Kettering University***12-20-01:
SYMPOSIUM ON MULTIPHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS
NOVEMBER 4, 2021****6:00PM–7:30PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***6:00PM–6:10PM:****A COMPUTATIONAL STUDY OF NANOSCALE INTERFACIAL MECHANICS IN BONE****Technical Presentation: IMECE2021-66661**Dong Qian - *University of Texas*Yang Wang - *University of Texas at Dallas*Majid Minary - *University of Texas***6:10PM–6:20PM:****COLLECTIVE BEHAVIOR IN THE KINETICS AND EQUILIBRIUM OF SOLID-STATE PHOTOREACTION****Technical Presentation: IMECE2021-69016**Ruobing Bai - *Northeastern University*Ying Shi Teh - *California Institute of Technology*Kaushik Bhattacharya - *California Institute of Technology***6:20PM–6:30PM:****A FULLY COUPLED DIFFUSION-DEFORMATION MODEL WITH DAMAGE FOR POLYMERS****Technical Presentation: IMECE2021-70391**Shank Kulkarni - *Pacific Northwest National Laboratory*Kyo Sil Choi - *Pacific Northwest National Laboratory*Ayoub Soulami - *Pacific Northwest National Laboratory*Kevin Simmons - *Pacific Northwest National Laboratory***6:30PM–6:40PM:****INTRINSIC DISLOCATION DENSITIES IN WEDGE INDENTATION****Technical Presentation: IMECE2021-71656**George Z. Voyiadjis - *Louisiana State University*Juyoung Jeong - *Louisiana State University***6:40PM–6:50PM:****MULTIPHYSICS MODELING OF IONICALLY CONDUCTIVE HYDROGELS**

Technical Presentation: IMECE2021-76153

Nikola Bosnjak - Cornell University
 Max Tepermeister - Cornell University
 Hongyi Cai - Cornell University
 Meredith Silberstein - Cornell University

6:50PM–7:00PM:

A REACTION-DRIVEN NETWORK THEORY COUPLED WITH PHASE-FIELD FRACTURE TO MODEL THERMO-OXIDATIVE DEGRADATION IN ELASTOMERS

Technical Presentation: IMECE2021-77201

Trisha Sain - Michigan Technological University
 Shabnam Konica - Michigan Technological University

12-21-02:
DATA-ENABLED PREDICTIVE MODELING, MACHINE LEARNING, AND UNCERTAINTY QUANTIFICATION IN COMPUTATIONAL MECHANICS
NOVEMBER 4, 2021
6:00PM–7:30PM

Chair: Marco Amabili - McGill University
 Chair: Celia Reina - University of Pennsylvania

6:00PM–6:10PM:

MACHINE LEARNING IN MULTISCALE MECHANICS OF MATERIALS

Technical Presentation: IMECE2021-71391

Yue Cui - University of Illinois at Urbana-Champaign
 William Noh - University of Illinois at Urbana-Champaign
 Michael Worthington - UIUC
 Huck Beng Chew - University of Illinois at Urbana-Champaign

6:10PM–6:20PM:

A NEURAL NETWORK-BASED VISCO-HYPERELASTIC CONSTITUTIVE MODEL FOR ELASTOMERS

Technical Paper Publication: IMECE2021-71937

Aref Ghaderi - Michigan State University
 Amir Bahrololoumi - Michigan State University
 Roozbeh Dargazany - Michigan State University

6:20PM–6:30PM:

DEEP LEARNING APPROACH TO EVALUATE FRACTURE PARAMETERS FROM PHOTOELASTIC IMAGES

Technical Paper Publication: IMECE2021-73114

Sachin Sasikumar - Indian Institute of Technology Madras
 K. Ramesh - Indian Institute of Technology Madras

6:30PM–6:40PM:

A POPULATION, BEHAVIOR, AND VACCINATION-BASED MODEL FOR THE COVID-19 PANDEMIC

Technical Presentation: IMECE2021-75864

Thomas Usherwood - Brown University
 Zachary Lajoie - Brown University
 Vikas Srivastava - Brown University

6:40PM–6:50PM:

PHYSICS-INFORMED MACHINE LEARNING FOR THE DEVELOPMENT OF MICROSTRUCTURE-SENSITIVE DEFORMATION AND DAMAGE MODELS IN ENGINEERING APPLICATIONS



Technical Presentation: IMECE2021-77619

Jacob Zamora - *University of Utah*
 Donovan Birky - *University of Utah*
 John Emery - *Sandia National Laboratories*
 Coleman Alleman - *Sandia National Laboratories*
 Brian Lester - *Sandia National Laboratories*
 Jacob Hochhalter - *University of Utah*

6:50PM–7:00PM:**DATA-DRIVEN METHODS TO PREDICT FULL-FIELD RESPONSES IN HETEROGENEOUS MATERIALS****Technical Presentation: IMECE2021-76232**

Jun Li - *University of Massachusetts Dartmouth*

**06-03-01: OPTIMIZATION I
NOVEMBER 4, 2021****6:00PM–7:30PM**

Chair: Miri Weiss Cohen - *Braude College of Engineering*
 Chair: Daniele Regazzoni - *University of Bergamo*
 Chair: Marco Rossoni - *Università Degli Studi di Bergamo*

6:00PM–6:10PM:**MULTI-PHYSICS TOPOLOGY OPTIMIZATION FOR EFFICIENT SPACECRAFT DESIGN****Technical Paper Publication: IMECE2021-68953**

Casey R. Corrado - *MITRE Corporation*
 Francisco F. Ramos-Carrizosa - *MITRE Corporation*
 Samuel C. Neu - *MITRE Corporation*

6:10PM–6:20PM:**ULTIMATE LIGHTWEIGHT DESIGN BASED ON SHAKEDOWN STRENGTH AND ITS APPLICATION ON DESIGNING A MANNED AIRTIGHT MODULE****Technical Paper Publication: IMECE2021-69225**

Songhua Huang - *Beijing Jiaotong University*
 Yugong Xu - *Beijing Jiaotong University*
 Lele Zhang - *Beijing Jiaotong University*
 Geng Chen - *Beijing Jiaotong University*
 Fuming Zeng - *Beijing Institute of Spacecraft System Engineering, China Academy of Space Technology*
 Feng Liu - *Beijing Institute of Spacecraft System Engineering, China Academy of Space Technology*

6:20PM–6:30PM:**MULTI-OBJECTIVE MODEL-BASED OPTIMIZATION OF PILOT DECISION MAKING FOR URBAN AIR MOBILITY****Technical Paper Publication: IMECE2021-69819**

Nicholas Holowsko - *Pennsylvania State University*
 Christopher McComb - *Pennsylvania State University*

6:30PM–6:40PM:**MEETING ELECTRICITY DEMAND WITH DISTRIBUTED WIND AND SOLAR GENERATION: SYSTEM FLEXIBILITY DRIVES OPTIMAL SITING****Technical Paper Publication: IMECE2021-70678**

Enrico G.A. Antonini - *Carnegie Institution for Science*
 Tyler H. Ruggles - *Carnegie Institution for Science*
 David J. Farnham - *Carnegie Institution for Science*
 Ken Caldeira - *Carnegie Institution for Science*

6:40PM–6:50PM:**MULTI-WORKING CONDITIONS TOPOLOGY OPTIMIZATION OF THE KEY STRUCTURE OF THE CLIMBABLE AGV BASED ON LEVEL-SET METHOD****Technical Paper Publication: IMECE2021-71020**

Jiacheng Fei - *Southeast University*
 Yijun Zhou - *Southeast University*
 Chen Luo - *Southeast University*



FRIDAY, November 5**01-01-04: PHONONICS IV****NOVEMBER 5, 2021****11:20AM–12:50PM**

Chair: Mostafa Nough - *University at Buffalo*
 Chair: Yongfeng Xu - *University of Cincinnati*
 Chair: Guoliang Huang - *University of Missouri*

11:20AM–11:30AM:**RE-PROGRAMMABLE NON-RECIPROCAL WAVE TRANSMISSION IN NONLINEAR MAGNETIC LATTICES****Technical Presentation: IMECE2021-72179**

Austin Eichelberg - *University of Connecticut*
 Audrey Watkins - *University of Connecticut*
 Osama Bilal - *University of Connecticut*

11:30AM–11:40AM:**NEGATIVE EFFECTIVE MASS IN NONLINEAR METAMATERIAL FOR VIBRATION MITIGATION****Technical Presentation: IMECE2021-75318**

Myung Hwan Bae - *Korea Research Institute of Standards and Science*
 Joo Hwan Oh - *Ulsan National Institute of Science and Technology*

11:40AM–11:50AM:**CONTROLLING SUBWAVELENGTH NEAR FIELD TORSIONAL WAVES USING LOCALLY RESONANT EFFECTIVE PHONONIC CRYSTALS****Technical Presentation: IMECE2021-77327**

Ignacio Arretche - *University of Illinois Urbana-Champaign*
 Kathryn H. Matlack - *University of Illinois Urbana-Champaign*

11:50AM–12:00PM:**VIBRATION INDUCED SPATIAL ORDERING OF PERIODIC PATTERNS IN MULTISTABLE METAMATERIALS****Technical Presentation: IMECE2021-77521**

Vinod Ramakrishnan - *University of California San Diego*
 Michael Frazier - *University of California San Diego*

12:00PM–12:10PM:**ENABLING ASYMMETRIC SUPRATRANSMISSION IN MECHANICAL LATTICES THROUGH ACTIVE NON-LOCAL FEEDBACK CONTROL****Technical Presentation: IMECE2021-77552**

Jack Pechac - *University of California, San Diego*
 Michael Frazier - *University of California, San Diego*

02-10-01: VARIATION SIMULATION AND TOLERANCING NOVEMBER 5, 2021**11:20AM–12:50PM**

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

11:20AM–11:30AM:**A SAFETY-SPACE-BASED APPROACH TO INSPECTION PATH PLANNING FOR THE SHEET METAL ASSEMBLIES**

Technical Paper Publication: IMECE2021-68437

Yinhua Liu - *University of Shanghai for Science and Technology*
 Chao An - *University of Shanghai for Science and Technology*
 Zhenxia Duan - *University of Shanghai for Science and Technology*

11:30AM–11:40AM:
**EFFECT OF HOLE DIAMETER DEVIATION ON
 TEMPORARY FASTENING DAMAGE OF
 COMPOSITE MATERIALS**
Technical Paper Publication: IMECE2021-68860

Chen Yan - *Shanghai Jiao Tong University*
 Yujing Lin - *Shanghai Jiao Tong University*
 Hua Wang - *Shanghai Jiao Tong University*

11:40AM–11:50AM:
**PROBABILISTIC PERFORMANCE EVALUATION
 AND OPTIMIZATION OF MEDICAL PLASTIC
 MOULDED COMPONENTS SUBJECT TO LARGE
 SCALE PRODUCTION**
Technical Paper Publication: IMECE2021-68918

Tim Brix Nerenst - *Technical University of Denmark*
 Martin Ebro - *Novo Nordisk, A/S*
 Morten Nielsen - *Novo Nordisk, A/S*
 Kanishk Bhadani - *Chalmers University of Technology*
 Gauti Asbjörnsson - *Chalmers University of Technology*
 Tobias Eifler - *Technical University of Denmark*
 Kim Lau - *Technical University of Denmark*

11:50AM–12:00PM:
**TOWARDS A DIGITAL TWIN SETUP FOR
 INDIVIDUALIZED PRODUCTION OF
 FABRICATED COMPONENTS**
Technical Paper Publication: IMECE2021-70212

Hugo Hultman - *GKN Aerospace Engine Systems*
 Stefan Cedergren - *GKN Aerospace Engine Systems*
 Rikard Söderberg - *Chalmers University of Technology*
 Kristina Wärmefjord - *Chalmers University of Technology*

12:00PM–12:10PM:
**THREE-DIMENSIONAL DEVIATION ANALYSIS OF
 HIGH-SPEED SPINDLE ASSEMBLY BASED ON SKIN
 MODEL SHAPES**
Technical Paper Publication: IMECE2021-70284

Ang Tian - *Shanghai Jiao Tong University*
 Sun Jin - *Shanghai Jiao Tong University*
 Kun Chen - *Shanghai Jiao Tong University*
 Shun Liu - *Shanghai Jiao Tong University*
 Hangyu Li - *Shanghai Jiao Tong University*
 Zhihua Niu - *Shanghai Jiao Tong University*

12:10PM–12:20PM:
**TOLERANCE ANALYSIS ON ASSEMBLY
 PARTS IN CONTACT BASED UPON PARAMETRIC
 SPACE ENVELOPE**
Technical Paper Publication: IMECE2021-70749

Jiaqi Nie - *Southeast University*
 Chen Luo - *Southeast University*
 Yijun Zhou - *Southeast University*

02-16-01:
**SYMPOSIUM ON SUSTAINABLE MACHINING
 PROCESSES: TURNING, AND GRINDING
 NOVEMBER 5, 2021**
11:20AM–12:50PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*



11:20AM–11:40AM:

OPTIMIZATION OF SUSTAINABLE MACHINING OF Ti6Al4V ALLOY USING GENETIC ALGORITHM FOR MINIMIZED CARBON EMISSIONS AND MACHINING COSTS, AND MAXIMIZED ENERGY EFFICIENCY AND HUMAN HEALTH BENEFITS

Invited Presentation: IMECE2021-72995Alper Uysal - *Yildiz Technical University*Ibrahim S. Jawahir - *University of Kentucky***11:40AM–11:50AM:**

EFFECTS OF CUTTING FLUID APPLICATIONS ON SURFACE INTEGRITY IN GRINDING OF WELD FLASH IN RESISTANCE WELDED ALLOY STEEL

Technical Paper Publication: IMECE2021-69807Nithin Rangasamy - *M.K. Morse Company*C.S. Rakurty - *M.K. Morse Company***11:50AM–12:00PM:**

ON LUBRICATION AND THE GRINDING PROCESS

Technical Presentation: IMECE2021-73740K. Philip Varghese - *Norton/Saint-Gobain Abrasives***12:00PM–12:10PM:**

COMPARATIVE LIFE CYCLE ASSESSMENT OF VARIOUS GRINDING STRATEGIES FOR NICKEL BASE SUPERALLOYS

Technical Paper Publication: IMECE2021-73073Aswani Kumar Singh - *Indian Institute of Technology, Roorkee*Varun Sharma - *Indian Institute of Technology, Roorkee***12:10PM–12:20PM:**

THE INFLUENCE OF SUSTAINABLE COOLING STRATEGIES AND UNCUT CHIP THICKNESS ON SURFACE INTEGRITY IN FINISH MACHINING OF Ti-6Al-4V ALLOY

Technical Paper Publication: IMECE2021-73236Guang Chen - *Tianjin University*Shi Chen - *Kennametal, Inc.*Julius Schoop - *University of Kentucky*James Caudill - *University of Kentucky*I.S. Jawahir - *University of Kentucky***03-19-01:**

**DESIGN OF METAMATERIALS, METASURFACES, AND METADEVICES
NOVEMBER 5, 2021**

11:20AM–12:50PMChair: Hareesh Tippur - *Auburn Univ*Chair: Caglar Oskay - *Vanderbilt University***11:20AM–11:30AM:**

NOVEL NANOCOMPOSITE REFRACTIVE INDEX TUNING MECHANISM BASED ON CONTROLLING EMBEDDED PARTICLE MORPHOLOGY

Technical Paper Publication: IMECE2021-70064Sipan Liu - *North Carolina University*Md Didarul Islam - *North Carolina State University*Jong Eun-Ryu - *North Carolina State University*Zahyun Ku - *Air Force Research Laboratory*Augustine Urbas - *Air Force Research Laboratory*John Derov - *Air Force Research Laboratory*Darryl Boyd - *Naval Research Laboratory*Woohong Kim - *Naval Research Laboratory*Jasbinder Sanghera - *Naval Research Laboratory*

11:30AM–11:40AM:**HIGHLY EFFICIENT MID-WAVELENGTH INFRARED (MWIR) POLARIZER BY ORMOCHALC COMPOSITE WITH IMPROVED THERMOMECHANICAL STABILITY AND SPECTRAL SELECTIVITY****Technical Paper Publication: IMECE2021-70843**

Md Didarul Islam - North Carolina State University
Sipan Liu - North Carolina State University
John Derov - Air Force Research Laboratory
Augustine Urbas - Air Force Research Laboratory
Zahyun Ku - Air Force Research Laboratory
Amy Sihh - Air Force Research Laboratory
Evan Smith - Air Force Research Laboratory
Darryl Boyd - U.S. Naval Research Laboratory
WooHong Kim - U.S. Naval Research Laboratory
Jasbinder Sanghera - U.S. Naval Research Laboratory
Vinh Nguyen - Naval Research Laboratory
Jason Myers - Naval Research Laboratory
Colin Baker - Naval Research Laboratory
Jong Eun Ryu - North Carolina State University

11:40AM–11:50AM:**FABRICATION OF BIO-INSPIRED MICRO/NANO TEXTURED ROUGH SURFACES THROUGH THE SCALABLE ROLL COATING PROCESS****Technical Paper Publication: IMECE2021-71880**

Sekkappan Chockalingam - North Carolina State University
Jong Eun Ryu - North Carolina State University
Md Didarul Islam - North Carolina State University
Myers Harbinson - North Carolina State University

11:50AM–12:00PM:**A BIOINSPIRED ADHESIVE TO ENHANCE CRACK-RESISTANCE OF THE SCREEN GLASS OF SMARTPHONE****Technical Presentation: IMECE2021-73079**

Bo Xu - City University of Hong Kong
Xinrui Niu - City University of Hong Kong

12:00PM–12:10PM:**PENTAMODE METAMATERIAL DESIGN USING DEEP LEARNING AND GENERATIVE MODELING****Technical Presentation: IMECE2021-76373**

Anam Abbas - San José State University
Feruza Amirkulova - San José State University

03-13-01:**MULTIFUNCTIONAL MATERIALS FOR SAFETY AND ENERGY STORAGE APPLICATIONS NOVEMBER 5, 2021****11:20AM–12:50PM**

Chair: Hareesh Tippur - Auburn University
Chair: Caglar Oskay - Vanderbilt University

11:20AM–11:30AM:**CORROSION MITIGATION FOR MECHANICALLY-FASTENED FIBER-REINFORCED-POLYMER COMPOSITES****Technical Paper Publication: IMECE2021-67967**

Moira Callahan - United States Military Academy
Ruby Romsland - United States Military Academy
Kenneth J. McDonald - United States Military Academy
Brad C. McCoy - United States Military Academy

11:30AM–11:40AM:**3D-PRINTED HIERARCHICAL RE-ENTRANT HONEYCOMB WITH IMPROVED STRUCTURAL STABILITY UNDER QUASI-STATIC COMPRESSIVE LOADING**

Technical Paper Publication: IMECE2021-68961

Chi Zhan - *Michigan State University*
 Mingzhe Li - *Michigan State University*
 Robert McCoy - *Ford Motor Company*
 Linda Zhao - *Ford Motor Company*
 Weiyi Lu - *Michigan State University*

11:40AM–11:50AM:

**MECHANICAL-ELECTRICAL BEHAVIOR
 OF MULTIFUNCTIONAL ENERGY
 STORAGE COMPOSITES**

Technical Paper Publication: IMECE2021-71456

Anthony Bombik - *Stanford University*
 Sung Yeon Sara Ha - *Stanford University*
 Amir Nasrollahi - *Stanford University*
 Mohammad Faisal Haider - *Stanford University*
 Fu-Kuo Chang - *Stanford University*

11:50AM–12:00PM:

**MULTIPHYSICS BEHAVIOR OF SI/C COMPOSITE
 ANODES: A MULTISCALE MODELING STUDY**

Technical Presentation: IMECE2021-72782

Xiang Gao - *University of North Carolina at Charlotte*
 Jun Xu - *University of North Carolina at Charlotte*

12:00PM–12:10PM:

**MULTISCALE MODELLING OF MULTIFUNCTIONAL
 COMPOSITES: A REVIEW**

Technical Paper Publication: IMECE2021-73276

Sandeep Suresh Babu - *Indian Institute of Technology Bombay*
 Abdel-Hamid I. Mourad - *United Arab Emirates University*

12:10PM–12:20PM:

**DYNAMIC NANOFLUIDIC ENERGY ABSORPTION IN
 METAL-ORGANIC FRAMEWORKS**

Technical Presentation: IMECE2021-77392

Yueting Sun - *University of Birmingham*

03-25-01:

**MECHANICS AND MATERIALS FOR ELECTRONIC
 DEVICES IN BIOLOGY, MEDICINE AND HEALTHCARE
 NOVEMBER 5, 2021**

11:20AM–12:50PM

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

11:20AM–11:30AM:

**PULL OUT FORCE OF BEAN PLANTS GROWN IN
 AGAR WITH FLUIDIC MICROCHANNELS**

Technical Paper Publication: IMECE2021-72998

Azlan Abdul Aziz - *Universiti Teknologi Brunei*
 Kai Boon Lim - *Universiti Teknologi Brunei*
 Zuruzi Abu Samah - *Alfaisal University*

11:30AM–11:40AM:

**VERTICALLY ORDERED ARRAY OF BIORESORBABLE
 SI NANONEEDLES FOR VERSATILE DRUG DELIVERY
 PLATFORM**

Technical Presentation: IMECE2021-76805

Chi Hwan Lee - *Purdue University*
 Woohyun Park - *Purdue University*



11:40AM–11:50AM:**STRETCHABILITY OF HORSESHOE-SHAPED SILVER NANOWIRE COMPOSITE: EXPERIMENTS AND MODELING****Technical Presentation: IMECE2021-77375**Yuxuan Liu - *North Carolina State University*Shuang Wu - *North Carolina State University*Yong Zhu - *North Carolina State University***11:50AM–12:00PM:****MAGNETIC SOFT COMPOSITES WITH INTEGRATED MULTIPHYSICS RESPONSES FOR MEDICAL DEVICES****Technical Presentation: IMECE2021-77382**Renee Zhao - *Stanford University***12:00PM–12:10PM:****ULTRA-FLEXIBLE VISIBLE-BLIND OPTOELECTRONICS FOR WIRED AND WIRELESS ULTRAVIOLET SENSING IN HARSH ENVIRONMENTS****Technical Presentation: IMECE2021-77448**Xin Ning - *The Pennsylvania State University***12:10PM–12:20PM:****3D PRINTED MICROHEATER SENSOR-INTEGRATED, DRUG-ENCAPSULATED MICRONEEDLE PATCH SYSTEM FOR PAIN MANAGEMENT****Technical Presentation: IMECE2021-77488**Mengtian Yin - *University of Virginia***05-03-01:****VIBRATION AND ACOUSTICS IN BIOMEDICAL APPLICATIONS****NOVEMBER 5, 2021****11:20AM–12:50PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***11:20AM–11:30AM:****VIBRATION AND ACOUSTIC CREPITUS SENSING USING PIEZOELECTRIC ACCELEROMETERS AND AUTOMATED SIGNAL ANALYSIS****Technical Paper Publication: IMECE2021-67348**Gregory Roytman - *Yale Center for Medical Informatics*Matthew Budavich - *National University of Health Sciences*Judith D. Pocius - *National University of Health Sciences*Jocelyn Faydenko - *National University of Health Sciences*Dana Muligano - *National University of Health Sciences*Gregory Cramer - *National University of Health Sciences***11:30AM–11:40AM:****PULSE WAVE VELOCITY AND TRANSMISSION AT THE CAROTID ARTERY AND THE ASCENDING AORTA****Technical Paper Publication: IMECE2021-69412**Sara M. Smith - *Old Dominion University*Justine Marin - *Old Dominion University*Amari Adams - *Old Dominion University*Keith West - *Old Dominion University*Zhili Hao - *Old Dominion University*

11:40AM–11:50AM:**LEVERAGING VIBRATIONS AND GUIDED WAVES IN A HUMAN SKULL****Technical Paper Publication: IMECE2021-71315**

Eetu Kohtanen - *Georgia Institute of Technology*
 Matteo Mazzotti - *University of Colorado Boulder*
 Massimo Ruzzene - *University of Colorado Boulder*
 Alper Erturk - *Georgia Institute of Technology*

11:50AM–12:00PM:**ADVANCES IN NONINVASIVE DIAGNOSIS BASED ON BODY SOUNDS AND VIBRATION: A REVIEW****Technical Paper Publication: IMECE2021-73815**

Amirtahà Taebe - *University of California*
 Fardin Khalili - *Embry-Riddle Aeronautical University*

12:00PM–12:10PM:**DESIGN OF A COST-EFFECTIVE OPTICAL BIOSENSOR POWERED BY ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING****Technical Presentation: IMECE2021-77274**

Pezhman Hassanpour - *Gannon University*
 Ethan M. Regal - *Gannon University*

05-05-01:
BIOMATERIALS AND TISSUE:
MODELLING, SYNTHESIS, FABRICATION
AND CHARACTERIZATION
NOVEMBER 5, 2021

11:20AM–12:50PM**11:20AM–11:30AM:****ACTIVITY OF CELL ON MICRO STRIPE RIDGES AFTER FORCE FIELD STIMULATION WITH CENTRIFUGE****Technical Paper Publication: IMECE2021-66412**

Shigehiro Hashimoto - *Kogakuin University*
 Hiroki Yonezawa - *Kogakuin University*

11:30AM–11:40AM**CELL ACTIVITY CHANGE AFTER DIVISION UNDER WALL SHEAR STRESS FIELD****Technical Paper Publication: IMECE2021-69689**

Shigehiro Hashimoto - *Kogakuin University*
 Hiroki Yonezawa - *Kogakuin University*
 Ryuya Ono - *Kogakuin University*

11:40AM–11:50AM**ADDITIVE MANUFACTURING PROCESS PARAMETER OPTIMIZATION FOR TITANIUM-ALLOY ORTHOPEDIC IMPLANTS****Technical Paper Publication: IMECE2021-70436**

Bhanupratap Gaur - *Indian Institute of Technology Bombay*
 Rupesh Ghyar - *Indian Institute of Technology Bombay*
 Bhallamudi Ravi - *Indian Institute of Technology Bombay*

11:50AM–12:00PM**EFFICIENT DIGITAL MODELING AND FABRICATION WORKFLOW FOR INDIVIDUALIZED ANKLE EXOSKELETONS**

Technical Paper Publication: IMECE2021-70603

Biruk A. Gebre - *Stevens Institute of Technology*
 Rodrigo Nogueira - *Stevens Institute of Technology*
 Shubham Patidar - *Stevens Institute of Technology*
 Robert Belle-Isle - *Stevens Institute of Technology*
 Karen Nolan - *Kessler Foundation*
 Kishore Pochiraju - *Stevens Institute of Technology*
 Damiano Zanutto - *Stevens Institute of Technology*

12:00PM–12:10PM
**MODELING THE BIOMECHANICS PARAMETERS ON
 ACHILLES TENDON USING OPENSIM SIMULATIONS
 AND VALIDATING THE SENSOR ACCURACY**
Technical Paper Publication: IMECE2021-72108

Muhammad Salman - *Kennesaw State University*
 Zachary Contois - *Kennesaw State University*
 M. Hassan Tanveer - *Kennesaw State University*

**05-06-01 BIOMEDICAL DEVICES I
 NOVEMBER 5, 2021**
11:20AM–12:50PM

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*

11:20AM–11:30AM:
**EFFECTS OF NOZZLE DIAMETER AND INJECTION
 VOLUME OF DRUG ON PERFORMANCE OF A
 NEEDLE-FREE INJECTOR**
Technical Paper Publication: IMECE2021-66422

Yang Zhu - *Jiangsu University*
 Can Kang - *Jiangsu University*
 Chunli Zhang - *Jiangsu Poke Medical Technology Co., Ltd.*
 Haifei Li - *Jiangsu Poke Medical Technology Co., Ltd.*

11:30AM–11:40AM:
**INVESTIGATING THE USE OF MAGNETIC ACTUATION
 TO DEVELOP A FUNCTIONAL TONGUE PROSTHETIC**
Technical Paper Publication: IMECE2021-69641

Sarah Vasquez - *Worcester Polytechnic Institute*
 Thomas Lipkin - *Worcester Polytechnic Institute*
 Dana Landry - *Worcester Polytechnic Institute*
 Jenna Currie - *Worcester Polytechnic Institute*
 Pradeep Radhakrishnan - *Worcester Polytechnic Institute*
 Dirk Albrecht - *Worcester Polytechnic Institute*
 Kaveh Pahlavan - *Worcester Polytechnic Institute*

11:40AM–11:50AM:
AEROMEDICAL EVACUATION SKELETAL TRACTION
Technical Paper Publication: IMECE2021-70540

Ethan Rabb - *United States Military Academy*
 Rebecca Zifchock - *United States Military Academy*
 Margaret Nowicki - *United States Military Academy*
 Jeremy Paquin - *United States Military Academy*
 Matthew Posner - *United States Military Academy*

11:50AM–12:00PM:
**DESIGN AND TESTING OF A LOW-COST VENTILATOR
 TO BATTLE THE GLOBAL PANDEMIC**
Technical Paper Publication: IMECE2021-70897

Eric Near - *San Jose State University*
 Mustafa Ihsan - *San Jose State University*
 Waylon Chan - *San Jose State University*
 Vimal Viswanathan - *San Jose State University*



12:00PM–12:10PM:**ELECTRO-MECHANICAL DESIGN TOWARD AN OPEN-SOURCED ROBOTIC HAND EXOSKELETON FOR MANAGEMENT OF NEUROLOGICAL AND NEURODEGENERATIVE DISORDERS****Technical Paper Publication: IMECE2021-73668**James E. Bednar - *Wentworth Institute of Technology*Matthew L. Schwartz - *Wentworth Institute of Technology*John Woo - *Wentworth Institute of Technology*Douglas E. Dow - *Wentworth Institute of Technology*Gloria Ma - *Wentworth Institute of Technology*Marisha Rawlins - *Wentworth Institute of Technology*Filip Cuckov - *Wentworth Institute of Technology***06-04-01:****DESIGN FOR ADDITIVE MANUFACTURING I NOVEMBER 5, 2021****11:20AM–12:50PM**Chair: Miri Weiss Cohen - *Braude College of Engineering*Chair: Daniele Regazzoni - *University of Bergamo*Chair: Marco Rossoni - *Università Degli Studi di Bergamo***11:20AM–11:30AM:****STRUCTURAL OPTIMIZATION FOR SEGMENT-BASED DESIGN OF PART CANDIDATES FOR INCREMENTAL MANUFACTURING****Technical Paper Publication: IMECE2021-68912**Julian Redeker - *Technische Universität Braunschweig*Thomas Vietor - *Technische Universität Braunschweig***11:30AM–11:40AM:****METHODS FOR THE DESIGN OF INDIVIDUAL MECHANISMS FOR THE FABRICATION BY ADDITIVE MANUFACTURING****Technical Paper Publication: IMECE2021-69602**Andreas Schroeffer - *Technical University of Munich*Franz Irlinger - *Technical University of Munich*Tim Lueth - *Technical University of Munich***11:40AM–11:50AM:****COMPONENTS RESIDUAL STRESS AND DEFORMATION REDUCTION: AN INTEGRATED PROCESS DESIGN FOR ADDITIVE MANUFACTURING****Technical Paper Publication: IMECE2021-70887**Enrico Dalpadulo - *University of Modena and Reggio Emilia*Fabio Pini - *University of Modena and Reggio Emilia*Francesco Leali - *University of Modena and Reggio Emilia***11:50AM–12:00PM:****DEVELOPMENT AND MANUFACTURING OF CERVICAL STENOSIS MODELS FOR THE INTEGRATION INTO A NEUROINTERVENTIONAL SIMULATION MODEL****Technical Paper Publication: IMECE2021-71030**Nadine Wortmann - *Hamburg University of Technology*Helena Guerreiro - *University Medical Center Hamburg-Eppendorf*Anna Kyselyova - *University Medical Center Hamburg-Eppendorf*Andreas M. Frölich - *Röntgenpraxis im Tesdorpfhaus*Jens Fiehler - *University Medical Center Hamburg-Eppendorf*Dieter Krause - *Hamburg University of Technology*

12:00PM–12:10PM:**GAPA: AN APPLICATION TO ASSIST NOVICE USERS WITH 3D PRINTING****Technical Paper Publication: IMECE2021-71068**

James Scherick - Worcester Polytechnic Institute
 Collin Touchette - Worcester Polytechnic Institute
 Matthew Gulbin - Worcester Polytechnic Institute
 Parker Coady - Worcester Polytechnic Institute
 Pradeep Radhakrishnan - Worcester Polytechnic Institute
 David C. Brown - Worcester Polytechnic Institute

12:10PM–12:20PM:**DESIGN AND DEVELOPMENT OF PELLETS/ GRANULES EXTRUSION SYSTEM FOR ADDITIVE MANUFACTURING****Technical Paper Publication: IMECE2021-71083**

Krishnanand - Maulana Azad National Institute of Technology
 Mohammad Taufik - Maulana Azad National Institute of Technology

08-07-01: THERMAL ENERGY STORAGE NOVEMBER 5, 2021**11:20AM–12:50PM**

Chair: Hohyun Lee - Santa Clara University
 Chair: Soumik Banerjee - Washington State University
 Chair: Reza Baghaei Lakeh - University of California, Los Angeles
 Chair: Michail Nitsas - National Technical University of Athens

11:20AM–11:30AM:**CONCURRENT PASSIVE BROADBAND VIBRATION SUPPRESSION AND ENERGY HARVESTING USING A DUAL-PURPOSE MAGNETOELASTIC METAMATERIAL STRUCTURE: EXPERIMENTAL VALIDATION AND MODELING_X000B_****Technical Paper Publication: IMECE2021-67656**

Mahmoud Elsharafi - Midwestern State University
 Ali Elmozughi - Tranter, Inc.
 Pranaya Pokharel - Midwestern State University
 Madison Krahl - Midwestern State University
 Musaad Aldawsari - Midwestern State University
 Clayton Holmes - Midwestern State University
 Theo Rolle - Midwestern State University

11:30AM–11:40AM:**EFFECT OF THERMAL EXPANSION COEFFICIENT, VISCOSITY AND MELTING RANGE IN SIMULATION OF PCM EMBEDDED HEAT EXCHANGERS WITH AND WITHOUT FINS****Technical Paper Publication: IMECE2021-70401**

Tanjebul Alam - University of Maryland
 Daniel Bacellar - University of Maryland
 Jiazhen Ling - University of Maryland
 Vikrant Aute - University of Maryland

11:40AM–11:50AM:**THERMAL PERFORMANCE ANALYSIS OF MULTI-LAYER THERMAL ENERGY STORAGE TANK USING DIFFERENT PHASE CHANGE MATERIAL****Technical Paper Publication: IMECE2021-72672**

Md. Ali Azam - Bangladesh University of Engineering and Technology
 Mohammad Arif Hasan Mamun - Bangladesh University of Engineering and Technology



11:50AM–12:00PM:

THERMODYNAMIC PERFORMANCE OF A COMPRESSED HEAT ENERGY STORAGE (CHEST) SYSTEM USING ALTERNATIVE WORKING FLUIDS TO OPTIMIZE EFFICIENCY

Technical Presentation: IMECE2021-73226

Cadin Wendland - *University of Minnesota Duluth*
 Aggrey Mwesigye - *University of Minnesota Duluth*

12:00PM–12:10PM:

TECHNO-ECONOMICS OF USING CONCENTRATE OF MEMBRANE PROCESSES AS A LOW-COST THERMAL ENERGY STORAGE MEDIUM

Technical Paper Publication: IMECE2021-73734

Reza Baghaei Lakeh - *California State Polytechnic University*
 Brian Camey - *Cal Poly Pomona*
 Joseph Kiriakos - *Cal Poly Pomona*
 Gauri Mhamunkar - *Cal Poly Pomona*
 Saied Delagah - *Bureau of Reclamation*
 Ali Sharbat - *Cal Poly Pomona*
 Aaron Mandell - *Waste Salt Technology*

12:10PM–12:20PM:

NOVEL FUNCTIONAL THERMAL ENERGY STORAGE MATERIALS FOR BUILDINGS APPLICATIONS

Technical Paper Publication: IMECE2021-73862

Shuang Cui - *National Renewable Energy Laboratory*
 Madeline Hicks - *National Renewable Energy Laboratory*
 Pranvera Kolari - *National Renewable Energy Laboratory*
 Sumanjeet Kaur - *Lawrence Berkeley National Laboratory*
 Judith Vidal - *National Renewable Energy Laboratory*
 Roderick Jackson - *National Renewable Energy Laboratory*

**08-08-04: RENEWABLE ENERGY IV
 NOVEMBER 5, 2021**

11:20AM–12:50PM**11:20AM–11:30AM:**

RENEWABLE ENERGY PRODUCTION BY SOLAR CHIMNEY: THE INFLUENCE OF CURVED GUIDE VANES ON THE PERFORMANCE OF A SOLAR CHIMNEY USING CFD SIMULATION

Technical Paper Publication: IMECE2021-71491

Haokun Xue - *Marshall University*
 Mehdi Esmaeilpour - *Marshall University*

11:30AM–11:40AM:

CHARACTERIZATION OF THE LEADING-EDGE EROSION OF WIND TURBINE BLADES BY SAND PARTICLES IMPINGEMENT

Technical Paper Publication: IMECE2021-71685

Abdullah F. Alajmi - *University of Washington*
 M. Ramulu - *University of Washington*

11:40AM–11:50AM:

EVALUATION OF WAVE ENERGY ON THE WILLAMETTE RIVER

Technical Paper Publication: IMECE2021-71796

C.J. Poor - *University of Portland*
 Rachel Anderson - *University of Portland*
 H.E. Dillon - *University of Washington*



11:50AM–12:00PM:**WIND FARM LAYOUT OPTIMIZATION: A MULTI-STAGE APPROACH****Technical Paper Publication: IMECE2021-71892**Puyi Yang - *Florida Institute of Technology*Hamidreza Najafi - *Florida Institute of Technology***12:00PM–12:10PM:****NUMERICAL SIMULATION OF THREE-DIMENSIONAL OCEAN WAVE****Technical Paper Publication: IMECE2021-71995**Xiuling Wang - *Purdue University Northwest*Liting Zhang - *Purdue University Northwest***12:10PM–12:20PM:****SECOND-LIFE ANALYSIS OF LITHIUM-ION BATTERY IN A RESIDENTIAL SOLAR PHOTOVOLTAIC GRID-TIED SYSTEM****Technical Paper Publication: IMECE2021-73403**Muapper Alhadri - *University of Ha'il*Waleed Zakri - *Jazan University*Siamak Farhad - *University of Akron***12-16-03: GENERAL SESSION
NOVEMBER 5, 2021****11:20AM–12:50PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***11:20AM–11:30AM:****MAGNETIC SHAPE MEMORY POLYMERS WITH INTEGRATED MULTIFUNCTIONAL SHAPE MANIPULATION****Technical Presentation: IMECE2021-73335**Qiji Ze - *Ohio State University*Xiao Kuang - *Georgia Institute of Technology*Shuai Wu - *Ohio State University*H. Jerry Qi - *Georgia Institute of Technology*Ruike Zhao - *The Ohio State University***11:30AM–11:40AM:****SYMMETRY-BREAKING ACTUATION MECHANISM FOR SOFT ROBOTICS AND ACTIVE METAMATERIALS****Technical Presentation: IMECE2021-77476**S. Macrae Montgomery - *Georgia Institute of Technology*Shuai Wu - *Stanford University*H. Jerry Qi - *Georgia Institute of Technology*Ruike Zhao - *Stanford University***11:40AM–11:50AM:****BUCKLING AND POST-BUCKLING OF AN ELASTICA UNDER A LATERAL RESTRAINING FORCE: EXPERIMENTAL VALIDATION****Technical Presentation: IMECE2021-77499**Kelin Chen - *The Ohio State University*Colin Bruce - *The Ohio State University*Yannis Korkolis - *The Ohio State University***11:50AM–12:00PM:****A COMPUTATIONAL ANALYSIS OF BUBBLE-STRUCTURE INTERACTION IN NEAR-FIELD UNDERWATER EXPLOSION**

Technical Paper Publication: IMECE2021-72854

Wentao Ma - *Virginia Polytechnic Institute and State University*
 Timothy Ozenkoski - *Virginia Polytechnic Institute and State University*
 Kevin Wang - *Virginia Polytechnic Institute and State University*

12:00PM–12:10PM:

MOLECULAR DYNAMICS SIMULATION OF POTENTIAL PHASE TRANSITION OF MOS₂ UNDER EXTERNAL LOADING

Technical Paper Publication: IMECE2021-73407

Mahabubur Rahman - *Clemson University*
 Huijuan Zhao - *Clemson University*

**12-22-01: MULTISCALE MODELS AND EXPERIMENTAL TECHNIQUES FOR COMPOSITE MATERIALS AND STRUCTURES
 NOVEMBER 5, 2021**

11:20AM–12:50PM

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

11:20AM–11:30AM:

EFFECT OF CYCLIC COMPRESSION ON MECHANICAL BEHAVIOR OF CERAMIC-IN-POLYMER COMPOSITE ELECTROLYTES FOR LITHIUM-ION BATTERIES

Technical Paper Publication: IMECE2021-69196

Nishad Mulay - *San José State University*
 Dahyun Oh - *San José State University*
 Dan-Il Yoon - *San José State University*
 Sang-Joon (John) Lee - *San José State University*

11:30AM–11:40AM:

A METHOD OF THERMO-MECHANICALLY COUPLED TWO-SCALE ANALYSIS REFLECTING THE MICROSCOPIC UNSTEADY THERMO-MECHANICAL CROSS-INTERACTIONS

Technical Presentation: IMECE2021-70246

Seishiro Matsubara - *Nagoya University*
 Dai Okumura - *Nagoya University*
 Kenjiro Terada - *Tohoku University*

11:40AM–11:50AM:

STOCHASTIC ANALYSIS OF THE INTERPHASE THICKNESS AND MODULUS IN CARBON FIBER REINFORCED POLYMER MATRIX COMPOSITES

Technical Paper Publication: IMECE2021-70600

Masoud Yekani Fard - *Arizona State University*
 Brian Raji - *Advanced Structural Engineering*

11:50AM–12:00PM:

NONLINEAR MICROSTRUCTURE MATERIAL DESIGN WITH REDUCED-ORDER MODELING

Technical Presentation: IMECE2021-77415

Xiang Zhang - *University of Wyoming*
 Philippe Geubelle - *University of Illinois*
 David Brandyberry - *University of Illinois*

12:00PM–12:10PM:

OPTIMUM SELECTION OF THIN-WALLED LAMINATED COMPOSITE STRUCTURES IN ROBOT DESIGN



Technical Paper Publication: IMECE2021-73914

M.A. Khozeimeh - *University of Saskatchewan*

R. Moazed - *University of Saskatchewan*

R. Fotouhi - *University of Saskatchewan*

12:10PM–12:20PM:**A COUPLED DUALITY-BASED COSSERAT CRYSTAL PLASTICITY AND PHASE FIELD THEORIES FOR GRAIN REFINEMENT MODELING****Technical Presentation: IMECE2021-77520**

Jonghyuk Baek - *University of California, San Diego*

J.S. Chen - *University of California, San Diego*

Michael Tupek - *Sandia National Laboratories*

Frank Beckwith - *Sandia National Laboratories*

H. Eliot Fang - *Sandia National Laboratories*

01-12-01:**CONGRESS-WIDE SYMPOSIUM ON NDE & SHM: ULTRASONIC WAVES FOR MATERIAL CHARACTERIZATION AND DAMAGE ASSESSMENT NOVEMBER 5, 2021****1:10PM–2:40PM**

Chair: Mostafa Nouh - *University at Buffalo*

Chair: Yongfeng Xu - *University of Cincinnati*

Chair: Guoliang Huang - *University of Missouri*

1:10PM–1:20PM:**USING D15 PIEZOELECTRIC TRANSDUCERS FOR ULTRASONIC INSPECTION OF DELAMINATION IN LAMINATED STRUCTURES****Technical Paper Publication: IMECE2021-69157**

Hussain Altammar - *University of Jamestown*

Nathan Salowitz - *University of Wisconsin*

1:20PM–1:30PM:**RESEARCH ON THE APPLICATION OF ACOUSTIC EMISSION TECHNOLOGY IN THE HEALTH MONITORING OF THE REDUCERS ON AMUSEMENT DEVICES****Technical Paper Publication: IMECE2021-70743**

Junjiao Zhang - *China Special Equipment Inspection and Research Institute*

Gongtian Shen - *China Special Equipment Inspection and Research Institute*

Yongna Shen - *China Special Equipment Inspection and Research Institute*

Wenjun Zhang - *Beijing Institute of Technology*

Juanjuan Li - *Special Equipment Safety Inspection and Research Institute of Henan Province*

Yilin Yuan - *China Special Equipment Inspection and Research Institute*

1:30PM–1:40PM:**HIGH-DAMPING VISCOELASTIC MATERIAL MONITORING USING SUB-RESONATOR ENHANCED ELECTRO-MECHANICAL IMPEDANCE SPECTROSCOPY****Technical Paper Publication: IMECE2021-71172**

Runye Lu - *University of Michigan-Shanghai Jiao Tong University Joint Institute*

Yanfeng Shen - *University of Michigan-Shanghai Jiao Tong University Joint Institute*

1:40PM–1:50PM:**ULTRASONIC CHARACTERIZATION OF BIOMIMETIC POROUS SCAFFOLD USING MACHINE LEARNING: APPLICATION OF BIOT'S THEORY**

Technical Paper Publication: IMECE2021-72746

Mohammad Hodaei - *University of Manitoba*
Pooneh Maghoul - *University of Manitoba*

1:50PM–2:00PM:
**DETECTION OF FATIGUE DAMAGE IN ALUMINUM
ALLOY STRUCTURES USING NONLINEAR
ULTRASONIC MODULATION**
Technical Paper Publication: IMECE2021-73423

Ling Yan - *Zhejiang University of Technology*
Lijia Luo - *Zhejiang University of Technology*
Zuming Zhao - *Zhejiang University of Technology*
Jingjing Fan - *Zhejiang University of Technology*
Shiyi Bao - *Zhejiang University of Technology*
Jianfeng Mao - *Zhejiang University of Technology*
Fengping Zhong - *Zhejiang Academy of Special
Equipment Science*
Liuyi Huang - *Zhejiang Academy of Special Equipment Science*

2:00PM–2:10PM:
**ADAPTIVE DATA-DRIVEN PROGNOSIS TECHNIQUE
FOR FATIGUE DAMAGE ACCUMULATION IN
ADHESIVELY BONDED LAP-JOINT**
Technical Paper Publication: IMECE2021-73587

Rajendra Prasath Palanisamy - *Michigan State University*
Portia Banerjee - *[KBR] NASA Ames Research Center*
Mahmood Haq - *Michigan State University*
Yiming Deng - *Michigan State University*

02-10-02:
**JOINING ASPECTS IN VARIATION MANAGEMENT
NOVEMBER 5, 2021**
1:10PM–2:40PM

Chair: Chetan Nikhare - *The Pennsylvania State University*
Chair: Scott Thompson - *Kansas State University*
Chair: M.P. Jahan - *Miami University*

1:10PM–1:20PM:
**IMPROVEMENT OF TOLERANCE SIMULATION
MODEL IN BODY IN WHITE PRODUCT
REALIZATION LOOP BY INTEGRATING
MANUFACTURING JOINING SIMULATION**
Technical Paper Publication: IMECE2021-66534

Hanchen Zheng - *Mercedes-Benz AG*
Frank Litwa - *Mercedes-Benz AG*
Kristin Paetzold - *University of the German Federal
Armed Forces Munich*

1:20PM–1:30PM:
**OPTIMIZATION OF RIVETING ASSEMBLY PROCESS
PARAMETERS FOR AVIATION LARGE PANELS BASED
ON MESOSCOPIC FEATURES**
Technical Paper Publication: IMECE2021-69352

Yonggang Kang - *Northwestern Polytechnical University*
Haodi Ren - *Northwestern Polytechnical University*

1:30PM–1:40PM:
**OPTIMIZATION OF THE INSTALLATION SEQUENCE
FOR THE TEMPORARY FASTENERS IN THE
AIRCRAFT INDUSTRY**
Technical Paper Publication: IMECE2021-69579

Tatiana Pogarskaia - *Peter the Great St. Petersburg
Polytechnic University*
Sergey Lupuleac - *Peter the Great St. Petersburg
Polytechnic University*
Julia Shinder - *Peter the Great St. Petersburg
Polytechnic University*
Philipp Westphal - *Airbus, GmbH*



1:40PM–1:50PM:**AN APPROACH TO VARIATION SIMULATION OF FINAL AIRCRAFT ASSEMBLY WITH PRESENCE OF SEALANT****Technical Paper Publication: IMECE2021-69588****Artem Eliseev** - Peter the Great St. Petersburg Polytechnic University**Sergey Lupuleac** - Peter the Great St. Petersburg Polytechnic University**Boris Grigor'ev** - Peter the Great St. Petersburg Polytechnic University**Julia Shinder** - Peter the Great St. Petersburg Polytechnic University**1:50PM–2:00PM:****EFFICIENT JOINING SEQUENCE VARIATION ANALYSIS OF STOCHASTIC BATCH ASSEMBLIES****Technical Paper Publication: IMECE2021-70288****Roham Sadeghi Tabar** - Chalmers University of Technology**Lars Lindkvist** - Chalmers University of Technology**Kristina Wärmeffjord** - Chalmers University of Technology**Rikard Söderberg** - Chalmers University of Technology**2:00PM–2:10PM:****AN EXTENDED MULTI-ACTUATED OPTIMIZED RECONFIGURABLE FREEFORM SURFACE (E-MORFS) MOLD WITH TARGETED VARIABILITY CAPACITY****Technical Paper Publication: IMECE2021-71248****Kunlin Yang** - University of Michigan and Shanghai Jiao Tong University Joint Institute**Rui Chen** - University of Michigan and Shanghai Jiao Tong University Joint Institute**Zeeshan Qaiser** - University of Michigan and Shanghai Jiao Tong University Joint Institute**Shane Johnson** - University of Michigan and Shanghai Jiao Tong University Joint Institute**02-16-02:****SYMPOSIUM ON SUSTAINABLE MACHINING PROCESSES: TURNING, MILLING, PARTING, AND SAWING
NOVEMBER 5, 2021****1:10PM–2:40PM****Chair: Chetan Nikhare** - The Pennsylvania State University**Chair: Scott Thompson** - Kansas State University**Chair: M.P. Jahan** - Miami University**1:10PM–1:20PM:****EXPERIMENTAL INVESTIGATIONS INTO IONIC LIQUID-BASED NANOFLUIDS FOR MACHINING DIFFICULT-TO-CUT MATERIALS****Technical Paper Publication: IMECE2021-73071****Ramandeep Singh** - Indian Institute of Technology, Roorkee**Varun Sharma** - Indian Institute of Technology, Roorkee**1:20PM–1:30PM:****DEVELOPMENT OF A CONTRIVED TOOL WEAR METHOD IN MACHINING****Technical Paper Publication: IMECE2021-70454****Tyler J. Grimm** - Clemson University**Nils Potthoff** - Technische Universität Dortmund**Nilesh Ashok Kharat** - Clemson University**Laine Mears** - Clemson University**Petra Wiederkehr** - Technische Universität Dortmund**1:30PM–1:40PM:****EFFECTS OF SUSTAINABLE CUTTING FLUID SOLUTION ON METAL MACHINING WITH GROOVING TOOLS**

Technical Presentation: IMECE2021-77461Matthew Morelli - *The M.K. Morse Company*Joesph Tarr - *The M. K. Morse Company*Nithin Rangasamy - *The M. K. Morse Company***1:40PM–1:50PM:****AN EXPERIMENTAL STUDY ON SUSTAINABLE BANDSAWING SOLUTIONS FOR STRUCTURAL APPLICATIONS****Technical Paper Publication: IMECE2021-73133**C.S. Rakurty - *M. K. Morse Company*Nithin Rangasamy - *M. K. Morse Company***1:50PM–2:00PM:****DATA-DRIVEN MULTI-CRITERIA DECISION-MAKING FOR SMART AND SUSTAINABLE MACHINING****Technical Paper Publication: IMECE2021-73085**Purvee Bhatia - *University of South Florida*Yang Liu - *University of South Florida*Sohan Nagaraj - *University of South Florida*Varshita Achanta - *University of South Florida*Bharat Pulaparathi - *University of South Florida*Nancy Diaz-Elsayed - *University of South Florida***2:00PM–2:10PM:****CUTTING FLUID APPLICATION FOR BANDSAWING: A SUSTAINABLE SOLUTION FOR CUTTING SOLIDS****Technical Paper Publication: IMECE2021-73127**C.S. Rakurty - *M. K. Morse Company*Nithin Rangasamy - *M. K. Morse Company***02-12-01:****LASER-BASED ADVANCED MANUFACTURING AND MATERIALS PROCESSING
NOVEMBER 5, 2021****1:10PM–2:40PM**Chair: Chetan Nikhare - *The Pennsylvania State University*Chair: Scott Thompson - *Kansas State University*Chair: M.P. Jahan - *Miami University***1:10PM–1:20PM:****SIMULTANEOUSLY ELIMINATE DEFECTS AND MODIFY SURFACE FOR 3D PRINTED COMPONENTS USING FEMTOSECOND LASER****Technical Paper Publication: IMECE2021-65947**Shang Li - *Shenzhen Technology University*Can Yang - *Shenzhen Technology University*Huan Yang - *Shenzhen Technology University*Fei Peng - *Shenzhen Technology University*Xiao-Hong Yin - *Shenzhen Technology University***1:20PM–1:30PM:****LASER METAL DEPOSITION OF FUNCTIONALLY GRADED Ti-6Al-4V + MO SAMPLES AND CHARACTERIZATION STUDIES****Technical Paper Publication: IMECE2021-68190**Subha Kumpaty - *Milwaukee School of Engineering*Brietta Coen - *Boylan Catholic High School*Liam Coen - *INNIO Waukesha Gas Engines*Monnamme Tlotleng - *Council of Scientific and Industrial Research*Nana Arthur - *Council of Scientific and Industrial Research*Sisa Pityana - *Council of Scientific and Industrial Research*

1:30PM–1:40PM:**POST-PROCESSING AND MATERIAL PROPERTIES OF NYLON 12 PREPARED BY LASER-POWDER BED FUSION****Technical Paper Publication: IMECE2021-69053**

McKay Sperry - Brigham Young University
 Annie Busath - Brigham Young University
 Michael Ottesen - Brigham Young University
 Jacob Heslington - Brigham Young University
 Nathan Crane - Brigham Young University

1:40PM–1:50PM:**INFLUENCE OF LASER INDUCED PLASMA ON MATERIAL REMOVAL IN MICRO-DRILLING UNDERWATER****Technical Paper Publication: IMECE2021-70182**

Changlong Zheng - Shanghai Jiaotong University
 Hong Shen - Shanghai Jiaotong University

1:50PM–2:00PM:**EXPERIMENTAL INVESTIGATION OF NANOSECOND LASER ABLATION OF CARBON NANOTUBES****Technical Paper Publication: IMECE2021-73390**

Oscar Pachon - Saint Louis University
 J. Ma - Saint Louis University
 Nicholas Schaper - Saint Louis University
 M.P. Jahan - Miami University
 Shuting Lei - Kansas State University
 Irma Kuljanishvili - Saint Louis University

2:00PM–2:10PM:**DEVELOPMENT OF A THERMAL BARRIER COATING VIA DIRECT ENERGY DEPOSITION****Technical Paper Publication: IMECE2021-73730**

Parth Parmar - Indian Institute of Technology Bombay
 Sachin Alya - Indian Institute of Technology Bombay
 Ramesh Singh - Indian Institute of Technology Bombay
 Anil Saigal - Tufts University

03-19-02:**DESIGN OF METAMATERIALS, METASURFACES, AND METADEVICES
NOVEMBER 5, 2021****1:10PM–2:40PM**

Chair: Hareesh Tippur - Auburn University
 Chair: Caglar Oskay - Vanderbilt University

1:10PM–1:20PM:**INVERSE MULTISCALE DESIGN OF CELLULAR MECHANICAL METAMATERIALS****Technical Presentation: IMECE2021-76552**

Sheng Liu - Virginia Polytechnic Institute and State University
 Pinar Acar - Virginia Polytechnic Institute and State University

1:20PM–1:30PM:**TUNABILITY AND ENERGY CONVERSION IN NONLINEAR MULTIPLE SCATTERING SYSTEMS****Technical Presentation: IMECE2021-76886**

Angelis Karlos - AGH University of Science and Technology
 Pawel Packo - AGH University of Science and Technology
 Andrew N. Norris - Rutgers University



1:30PM–1:40PM:**ACOUSTIC METAMATERIAL DESIGN USING
CONDITIONAL WASSERSTEIN GENERATIVE
ADVERSARIAL NETWORKS****Technical Presentation: IMECE2021-77172**Peter Lai - *San Jose State University*Feruza Amirkulova - *San Jose State University***1:40PM–1:50PM:****PHONONIC MEDIA FOR BROADBAND
WAVE ATTENUATION, WAVEGUIDING, AND
NOISE CONTROL****Technical Presentation: IMECE2021-77189**Anastasiia Krushynska - *University of Groningen***1:50PM–2:00PM:****DEEP LEARNING EMPOWERED DESIGN OF
ACOUSTIC CLOAK****Technical Presentation: IMECE2021-77370**Linwei Zhuo - *San Jose State University*Feruza Amirkulova - *San Jose State University***05-05-02: BIOMATERIALS AND TISSUE:
MODELLING, SYNTHESIS, FABRICATION AND
CHARACTERIZATION
NOVEMBER 5, 2021****1:10PM–2:40PM****1:10PM–1:20 PM:****STRAIN-BASED DEGRADATION MODEL WITH
APPLICATION TO POLY-L-LACTIDE ACID (PLLA)
ARTERY STENT****Technical Paper Publication: IMECE2021-72395**Shengmao Lin - *Xiamen University of Technology*Pengfei Dong - *Florida Institute of Technology,*Linxia Gu - *Florida Institute of Technology***1:20PM–1:30 PM****CELL BEHAVIOR IN FLOW PASSING THROUGH
MICRO MACHINED GAP****Technical Paper Publication: IMECE2021-69690**Shigehiro Hashimoto - *Kogakuin University*Shogo Uehara - *Kogakuin University***1:30PM–1:40PM****IRRADIATION AND THERMAL POST-PROCESSING
FOR VAT-POLYMERIZATION ADDITIVE
MANUFACTURING: TENSILE PROPERTIES OF FOUR
FORMLABS RESINS****Technical Paper Publication: IMECE2021-73152**Julia Baumgarner - *Gannon University*Davide Piovesan - *Gannon University*

1:40PM–1:50PM**3D BIOPRINTING BIOLOGICALLY INSPIRED IPS CELL-LADEN FLEXIBLE BLOOD VESSELS****Technical Presentation: IMECE2021-73234**

Sung Yun Hann - *The George Washington University*
 Haitao Cui - *The George Washington University*
 Timothy Esworthy - *The George Washington University*
 Kartik Bulusu - *The George Washington University*
 Michael Plesniak - *The George Washington University*
 Lijie Zhang - *The George Washington University*

1:50PM–2:00PM**IN VITRO EVALUATION OF PEGDA-PCL SCAFFOLD FOR CARTILAGE REGENERATION****Technical Presentation: IMECE2021-73596**

Asma Hosna - *University of Central Oklahoma*
 Morshed Khandaker - *University of Central Oklahoma*
 Helga Proгри - *University of Central Oklahoma*
 Hari Kotturi - *University of Central Oklahoma*
 Wendy Williams - *University of Oklahoma Health Science Center*
 Cynthia Bejar - *University of Oklahoma Health Science Center*
 Amgad Haleem - *University of Oklahoma Health Science Center*

**05-11-01:
MUSCULOSKELETAL AND SPORTS BIOMECHANICS I
NOVEMBER 5, 2021****1:10PM–2:40PM**

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*

1:10PM–1:20PM:**PRELIMINARY STUDY: DEVELOPMENT OF SPORT CLIMBING HOLD MEASUREMENT SYSTEM FOR PERFORMANCE ANALYSIS****Technical Paper Publication: IMECE2021-67624**

Nina Pernus - *University of Canterbury*
 Deborah Munro - *University of Canterbury*

1:20PM–1:30PM:**EFFECT OF SHAKING AT OR NEAR RESONANCE OF A SIMPLE HEAD MODEL ON SKULL/BRAIN CONNECTORS****Technical Paper Publication: IMECE2021-69054**

Jose Daboin - *Manhattan College*
 Parisa Saboori - *Manhattan College*

1:30PM–1:40PM:**EVALUATING BICEP STIFFNESS IN INCREASING AGE GROUPS****Technical Paper Publication: IMECE2021-70289**

Muhammad Salman - *Southern Polytechnic College of Engineering*
 Zachary Contois - *Southern Polytechnic College of Engineering*
 M. Hassan Tanveer - *Southern Polytechnic College of Engineering*

1:40PM–1:50PM:**MODELING AND SIMULATION OF ACHILLES TENDON IN OPENSIM FOR VERIFICATION****Technical Paper Publication: IMECE2021-71984**

Muhammad Salman - *Kennesaw State University*
 M. Hassan Tanveer - *Kennesaw State University*



1:50PM–2:00PM:**DESIGN OF HUMAN HEAD AND NECK REPLICA TO FACILITATE CONCUSSION AND TBI RESEARCH****Technical Paper Publication: IMECE2021-72094**Elias Awikeh - *Manhattan College*Peyman Honarmandi - *Manhattan College***05-06-02: BIOMEDICAL DEVICES II
NOVEMBER 5, 2021****1:10PM–2:40PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***1:10PM–1:20PM:****PARKINSONS DISEASE: TREMOR SUPPRESSION WITH WEARABLE DEVICE****Technical Paper Publication: IMECE2021-70910**Sam E. Winston - *University of Portland*Riley C. Dehmer - *University of Portland*Timothy A. Doughty - *University of Portland***1:20PM–1:30PM:****RELIABILITY CHECK OF AN ASSESSMENT SYSTEM FOR PARKINSON'S DISEASE TREMOR MONITORING WITH PORTABLE DEVICES****Technical Paper Publication: IMECE2021-71144**Na Zhu - *University of Michigan*Nathaniel S. Miller - *University of Michigan*Charlotte Tang - *University of Michigan*Sriram Pendyala - *University of Michigan*Quinn Hanses - *University of Michigan*Lacie Gladding - *University of Michigan***1:30PM–1:40PM:****NUMERICAL MODELING OF AIR CELL CUSHION AND ESTIMATION OF SHEAR FORCE DISTRIBUTION AT SITTING INTERFACE****Technical Paper Publication: IMECE2021-71765**Veysel Erel - *University of Texas*Pavan Nuthi - *University of Texas*Yixin Gu - *University of Texas*Himanshu Purandare - *University of Texas*Nischita Haldipurkar - *University of Texas*Muthu B. J. Wijesundara - *University of Texas***1:40PM–1:50PM:****INVESTIGATION OF 3D PRINTED ANTIBACTERIAL NANOCOMPOSITES FOR IMPROVED PUBLIC HEALTH****Technical Paper Publication: IMECE2021-72092**Christopher Billings - *University of Oklahoma*Changjie Cai - *The University of Oklahoma Health Sciences Center*Yingtao Liu - *University of Oklahoma***1:50PM–2:00PM:****NEURAL NETWORK CONTROLLED STIMULATION OF A NEURAL PROSTHESIS**

Technical Presentation: IMECE2021-76773

Martin Tanaka - *Western Carolina University*
 Pablo Valenzuela - *Western Carolina University*
 Paul Yanik - *Western Carolina University*
 David Hudson - *Western Carolina University*

06-08-01: DESIGN OF HUMAN ROBOT COLLABORATION
 NOVEMBER 5, 2021

1:10PM–2:40PM

Chair: Miri Weiss Cohen - *Braude College of Engineering*
 Chair: Daniele Regazzoni - *University of Bergamo*
 Chair: Marco Rossoni - *Università Degli Studi di Bergamo*

1:10PM–1:20PM:

DESIGN OF AN AFFORDABLE PROSTHETIC ARM EQUIPPED WITH DEEP LEARNING VISION-BASED MANIPULATION

Technical Paper Publication: IMECE2021-68714

Alishba Imran - *San Jose State University*
 William Escobar - *San Jose State University*
 Freidoon Barez - *San Jose State University*

1:20PM–1:30PM:

VARIABLE STIFF REVOLUTE JOINT FOR COMPLIANT ROBOT

Technical Paper Publication: IMECE2021-70804

Manoj Kumar Sharma - *Santa Clara University*
 Christopher Kitts - *Santa Clara University*

1:30PM–1:40PM:

ROBOT LEARNING FROM HUMAN DEMONSTRATION OF ACTIVITIES OF DAILY LIVING (ADL) TASKS

Technical Paper Publication: IMECE2021-71643

Urvish Trivedi - *University of South Florida*
 Redwan Alqasemi - *University of South Florida*
 Rajiv Dubey - *University of South Florida*

1:40PM–1:50PM:

COLLABORATIVE ROBOTICS AND ERGONOMICS: A SCIENTIFIC REVIEW

Technical Paper Publication: IMECE2021-72919

Castrese Di Marino - *Federico II University*
 Andrea Tarallo - *University of Naples Federico II*
 Andrea Vitali - *University of Bergamo*
 Daniele Regazzoni - *University of Bergamo*

1:50PM–2:00PM:

CYBERNETICS 2.0: FROM CONTROL TO COORDINATION

Technical Presentation: IMECE2021-77524

Shuichi Fukuda - *Keio University*

06-03-02: OPTIMIZATION II
 NOVEMBER 5, 2021

1:10PM–2:40PM

Chair: Miri Weiss Cohen - *Braude College of Engineering*
 Chair: Daniele Regazzoni - *University of Bergamo*
 Chair: Marco Rossoni - *Università Degli Studi di Bergamo*

1:10PM–1:20PM:

COMMUNICATIONS AND LEARNING FOR DEVOPS (CALDO): A FRAMEWORK FOR LEVERAGING AUTOMATION FOR HUMAN PERFORMANCE SUPPORT AND TRAINING SYSTEMS



Technical Paper Publication: IMECE2021-69428E.J. LeBlanc - *CALDO Consulting***1:20PM–1:30PM:****A SCALABLE GRADIENT-FREE OPTIMIZATION METHOD FOR CALIBRATION OF HEAT CONDUCTION MODEL IN ADDITIVE MANUFACTURING****Technical Presentation: IMECE2021-72133**

Sirui Bi - *Oak Ridge National Laboratory*
 Benjamin Stump - *Oak Ridge National Laboratory*
 Jiaxin Zhang - *Oak Ridge National Laboratory*
 Yousub Lee - *Oak Ridge National Laboratory*
 Matt Bement - *Oak Ridge National Laboratory*
 Guannan Zhang - *Oak Ridge National Laboratory*

1:30PM–1:40PM:**THE SELF-COMPENSATION APPROACH FOR BACKLASH ON GEAR PAIR****Technical Paper Publication: IMECE2021-73074**

Bahadır Karba - *Uludağ University*
 Nihat Yıldırım - *Gaziantep University*

1:40PM–1:50PM:**DESIGN METHODOLOGY OF GEROTOR HYDRAULIC MACHINES FOR MECHATRONIC APPLICATIONS****Technical Paper Publication: IMECE2021-73205**

Marco Puliti - *Polytechnic of Turin*
 Federico Tessari - *Italian Institute of Technology*
 Renato Galluzzi - *Tecnologico de Monterrey*
 Nicola Amati - *Polytechnic of Turin*
 Andrea Tonoli - *Polytechnic of Turin*

1:50PM–2:00PM:**FOREBODY OPTIMIZATION USING RESPONSE SURFACE METHODOLOGY WITH GENETIC ALGORITHM****Technical Paper Publication: IMECE2021-71443**

Ömer Kandemir - *Middle East Technical University*
 İsmail H. Tuncer - *Middle East Technical University*

2:00PM–2:10PM:**SOLVING A PROFITED 3D BIN PACKING PROBLEM USING A HYBRID GENETIC ALGORITHM****Technical Paper Publication: IMECE2021-73282**Miri Weiss Cohen - *Braude College of Engineering***08-08-05:****RENEWABLE ENERGY V AND SUSTAINABLE AND GRID-INTERACTIVE BUILDINGS
NOVEMBER 5, 2021****1:10PM–2:40PM****1:10PM–1:20PM:****PERFORMANCE STUDY OF AN ELECTRIC VEHICLE “EOLO” WITH A MOUNTED AEOLIAN GENERATOR****Technical Paper Publication: IMECE2021-72201**

Arturo Garcia - *Purdue University Northwest*
 Sergio Reyes J. - *Purdue University Northwest*
 Xiuling Wang - *Purdue University Northwest*
 Javier Roldan - *Eolo Motors SAS*
 Mauricio Olaya - *Corporación Industrial Minuto de Dios*



1:20PM–1:30PM:**WAVE ENERGY CONVERTER DESIGN AS A POINT ABSORBER TO GENERATE 1 KW IN AREQUIPA, PERU****Technical Paper Publication: IMECE2021-73377****Alejandro E. Herrera** - *Universidad Nacional De San Agustín de Arequipa***Pascual H. Adriaola** - *Universidad Nacional De San Agustín de Arequipa***Héctor J. Bravo** - *Universidad Nacional De San Agustín de Arequipa***1:30PM–1:40PM:****WIND ENERGY RESOURCE ASSESSMENT FOR SUVA, FIJI AND DESIGN OF A 30 KW WIND TURBINE****Technical Paper Publication: IMECE2021-73401****Krishneel Singh** - *University of the South Pacific***Saiyad S. Kutty** - *University of the South Pacific***M.G.M. Khan** - *University of the South Pacific***Mohammed Rafiuddin Ahmed** - *University of the South Pacific***1:40PM–1:50PM:****DESIGN OF A HORIZONTAL AXIS WIND TURBINE FOR A VENUSIAN ENVIRONMENT****Technical Paper Publication: IMECE2021-73558****Zacharias Garza** - *California State University, Los Angeles***Kevin Pan** - *California State University, Los Angeles***Anthony Izaguirre** - *California State University, Los Angeles***Saul Loza** - *California State University, Los Angeles***Jonathan Serrano** - *California State University, Los Angeles***Oscar Lopez** - *California State University, Los Angeles***Jim Kuo** - *California State University, Los Angeles***Jonathan Sauder** - *Jet Propulsion Laboratory***1:50PM–2:00PM:****VALIDATION APPROACH FOR ENERGY OPTIMIZATION MODELS OF GRID-INTERACTIVE BUILDINGS USING CO-SIMULATION****Technical Paper Publication: IMECE2021-69679****Patrick J. McCurdy** - *Santa Clara University***Kaleb Pattawi** - *Santa Clara University***Chenli Wang** - *National Institute of Standards and Technology***Thomas Roth** - *National Institute of Standards and Technology***Coung Nguyen** - *National Institute of Standards and Technology***Yuhong Liu** - *Santa Clara University***Hohyun Lee** - *Santa Clara University***2:00PM–2:10PM:****FREQUENCY REGULATION WITH CONNECTED LIGHTING SYSTEMS****Technical Paper Publication: IMECE2021-70474****Peng Wang** - *Pacific Northwest National Laboratory***Michael Brambley** - *Pacific Northwest National Laboratory***Michael Poplawski** - *Pacific Northwest National Laboratory***08-16-01:****NUCLEAR ENERGY: PLANTS, DESIGN, ANALYSIS AND SAFETY
NOVEMBER 5, 2021****1:10PM–2:40PM****Chair: Jovica Riznic** - *Canadian Nuclear Safety Commission*

1:10PM–1:20PM:**THERMOPHYSICAL PROPERTIES OF U-10MO MONOLITHIC FUEL****Technical Paper Publication: IMECE2021-67985**Hakan Ozaltun - *Idaho National Laboratory***1:20PM–1:30PM:****CONCEPTUAL DESIGN OF TEMPERATURE-CONTROLLED FUELED-SALT IRRADIATION EXPERIMENT TO SUPPORT DEMONSTRATION OF ADVANCED NUCLEAR REACTORS****Technical Paper Publication: IMECE2021-69204**Abdalla Abou-Jaoude - *Idaho National Laboratory*James Chandler - *Idaho National Laboratory*Gregory Core - *Idaho National Laboratory*Kim Davies - *Idaho National Laboratory*Calvin Downey - *Idaho National Laboratory*William Phillips - *Idaho National Laboratory*Chuting Tan - *Idaho National Laboratory*Stacey Wilson - *Idaho National Laboratory***1:30PM–1:40PM:****TRITIUM ABSORPTION ON CARBON NANOSTRUCTURES****Technical Paper Publication: IMECE2021-70538**Jungkyu Park - *Kennesaw State University*Bryce Atchley - *Kennesaw State University*Erica Wu - *Wheeler High School*Eduardo Farfan - *Kennesaw State University***1:40PM–1:50PM:****EVALUATING THE IMPLEMENTATION OF DISTRIBUTED LEDGER TECHNOLOGY FOR THE LICENSING AND REGULATION OF NUCLEAR POWER PLANTS****Technical Paper Publication: IMECE2021-71730**Priyanka Pandit - *North Carolina State University*Alp Tezbasharan - *North Carolina State University*Arjun Earthperson - *North Carolina State University*Mihai A. Diaconeasa - *North Carolina State University***1:50PM–2:00PM:****A REVIEW OF GRAPHITE PROPERTIES RELEVANT TO MICRO-REACTOR DESIGN****Technical Paper Publication: IMECE2021-71879**Hakan Ozaltun - *Idaho National Laboratory*Diana Liepinya - *MPR Associates*Valentina Angelici - *MPR Associates***12-23-01:****MULTI-SCALE COMPUTATIONS IN FLUIDS, STRUCTURES, AND MATERIALS
NOVEMBER 5, 2021****1:10PM–2:40PM**Chair: Marco Amabili - *McGill University*Chair: Celia Reina - *University of Pennsylvania***1:10PM–1:20PM:****MODELING DUAL SCALE POROSITY EFFECTS IN ADDITIVELY-MANUFACTURED METALS****Technical Presentation: IMECE2021-70441**Raymundo Muro-Barrios - *University of Illinois at Urbana-Champaign*John Lambros - *University of Illinois at Urbana-Champaign*Huck Beng Chew - *University of Illinois at Urbana-Champaign*

1:20PM–1:30PM:**ACHIEVING HIGH-FIDELITY MULTISCALE COMPUTATIONS OF MECHANICS AND MATERIALS BY UNCERTAINTY QUANTIFICATION****Technical Presentation: IMECE2021-70572**Haoran Wang - *Utah State University***1:30PM–1:40PM:****A NOVEL COMPUTATIONAL FRAMEWORK FOR THE EFFECTIVE TRANSPORT PROPERTIES OF HETEROGENEOUS MATERIALS RECONSTRUCTED FROM DIGITAL IMAGES****Technical Paper Publication: IMECE2021-70817**Kelechi O. Ogbuanu - *University of Delaware*R. Valéry Roy - *University of Delaware***1:40PM–1:50PM:****FULL SCALE 3D COMPUTATIONAL MODEL OF THE INDUSTRIAL-SCALE COAL FIRED BOILER PERFORMANCE FOR TEMPERATURE SENSOR INSTALLATION GUIDANCE****Technical Paper Publication: IMECE2021-73399**Tanuj Gupta - *Clemson University*Mahabubur Rahman - *Clemson University*Chethan K Acharya - *Southern Company*Susan Maley - *Electric Power Research Institute*Junhang Dong - *University of Cincinnati*Dock R Houston - *Clemson University*Hai Xiao - *Clemson University*Huijuan Zhao - *Clemson University***1:50PM–2:00PM:****LINEAR VIBRATION OF FUNCTIONALLY GRADED BEAMS IN CONTACT WITH AN INVISCID INCOMPRESSIBLE FLUID****Technical Paper Publication: IMECE2021-73824**Carlos Valencia Murillo - *University of Guanajuato*Miguel Gutierrez Rivera - *University of Guanajuato*Luis Celaya Garcia - *University of Guanajuato*Elias Ledesma Orozco - *University of Guanajuato***2:00PM–2:10PM:****HARNESSING SIZE EFFECTS TO UNDERSTAND THE CHEMOMECHANICS OF LITHIUM-ION AND SODIUM-ION ELECTRODE MATERIALS****Technical Presentation: IMECE2021-77416**Shuman Xia - *Georgia Institute of Technology***03-14-01: SOFT ROBOTICS AND SOFT MACHINE NOVEMBER 5, 2021****1:10PM–2:40PM**Chair: Hareesh Tippur - *Auburn University*Chair: Caglar Oskay - *Vanderbilt University***1:10PM–1:20PM:****RECONFIGURABLE 3D STRUCTURES OF SPATIALLY PROGRAMMED LIQUID CRYSTAL ELASTOMERS FOR SOFT ROBOTICS****Technical Presentation: IMECE2021-77046**Xueju “Sophie” Wang - *University of Connecticut*Yi Li - *University of Connecticut*

1:20PM–1:30PM:**SNAP-THROUGH INSTABILITY ENABLES FAST SOFT ROBOTS BASED ON THERMAL ACTUATION****Technical Presentation: IMECE2021-77205**

Shuang Wu - North Carolina State University
 Gregory Baker - North Carolina State University
 Jie Yin - North Carolina State University
 Yong Zhu - North Carolina State University

1:30PM–1:40PM:**ADHESION BASED GRIPPING OF THREE DIMENSIONAL OBJECTS VIA A TUNABLE STIFFNESS MEMBRANE****Technical Presentation: IMECE2021-77356**

Aoyi Luo - University of Pennsylvania
 Sumukh Shankar Pande - University of Pennsylvania
 Kevin Turner - University of Pennsylvania

1:40PM–1:50PM:**BOUNDARY CURVATURE GUIDED SHAPE-PROGRAMMING KIRIGAMI SHEETS****Technical Presentation: IMECE2021-77401**

Yaoye Hong - North Carolina State University
 Jie Yin - North Carolina State University

1:50PM–2:00PM:**MULTISCALE CAVITATION MECHANICS IN SOFT MATERIALS****Technical Presentation: IMECE2021-77583**

Kah Al Mahmud - University of Texas at Arlington
 Fuad Hasan - University of Texas at Arlington
 Ashfaq Adnan - University of Texas at Arlington

02-17-01: GENERAL MANUFACTURING NOVEMBER 5, 2021**3:00PM–4:30PM**

Chair: Chetan Nikhare - The Pennsylvania State University
 Chair: M.P. Jahan - Miami University
 Chair: Scott Thompson - Kansas State University

3:00PM–3:10PM:**A NEW APPROACH TO DESIGN GEOMETRIC DIMENSIONING AND TOLERANCING****Technical Paper Publication: IMECE2021-67838**

Wangping Sun - Oregon Institute of Technology
 Yanqing Gao - Oregon Institute of Technology

3:10PM–3:20PM:**ANALYSIS OF DRILLING THRUST FOR STRAIGHT AND INCLINED MICRO-HOLES IN THERMAL BARRIER COATED INCONEL 718 SUPERALLOY****Technical Paper Publication: IMECE2021-69145**

Avinash N. Khadtare - Dr. Babasaheb Ambedkar Technological University
 Raju S. Pawade - Dr. Babasaheb Ambedkar Technological University
 Suhas S. Joshi - Indian Institute of Technology Bombay

3:20PM–3:30PM:**AN INTEGRATED MONITORING AND PROCESS CONTROL SYSTEM FOR CYCLIC MANUFACTURING PROCESS****Technical Presentation: IMECE2021-70206**

Saurabh Kumar - University of Ulsan
 Hong Seok Park - University of Ulsan



3:30PM–3:40PM:**INVESTIGATION OF NEW ALTERNATE AND CONVENTIONAL MATERIALS FOR MANUFACTURING HIGH PRESSURE TURBINE DISK****Technical Paper Publication: IMECE2021-73268**Vyshak Sureshkumar - *United Arab Emirates University*
Abdel-Hamid I. Mourad - *United Arab Emirates University***3:40PM–3:50PM:****THE INFLUENCE OF COOLING RATE AND MOLD TEMPERATURE ON POLYMERS CRYSTALLIZATION KINETICS IN INJECTION MOLDING****Technical Paper Publication: IMECE2021-73665**Faisal Alzahrani - *Lehigh University*
Alaauldeen A. Duhduh - *Lehigh University*
Peng Gao - *Lehigh University*
John P. Coulter - *Lehigh University***3:50PM–4:00PM:****EFFECTS OF PART VARIATION AND SAMPLING SIZE ON THE ACCURACY OF GAGE REPEATABILITY AND REPRODUCIBILITY****Technical Presentation: IMECE2021-77454**Chandra Sekhar Rakurty - *The M. K. Morse Company*
Nithin Rangasamy - *The M. K. Morse Company*
Tejasvini Mavuleti - *The M. K. Morse Company***01-13-01:****CONGRESS-WIDE SYMPOSIUM ON NDE & SHM: COMPUTATIONAL NONDESTRUCTIVE EVALUATION AND STRUCTURAL HEALTH MONITORING NOVEMBER 5, 2021****3:00PM–4:30PM**Chair: Mostafa Nouh - *University at Buffalo*
Chair: Yongfeng Xu - *University of Cincinnati*
Chair: Guoliang Huang - *University of Missouri***3:00PM–3:10PM:****FULL WAVEFORM INVERSION BASED INCLUSION IMAGING IN 2D COMPLEX STRUCTURES****Technical Presentation: IMECE2021-68624**Jiaze He - *University of Alabama*
Jing Rao - *Technical University of Munich*
Jacob Flemming - *University of Alabama*
Hom Nath Gharti - *Queen's University*
Luan Nguyen - *BAUER Spezialtiefbau GmbH*
Gaines Morrison - *University of Alabama***3:10PM–3:20PM:****STUDY ON FATIGUE LIFE OF VEHICLE FUEL TANK UNDER RANDOM VIBRATION ENVIRONMENT****Technical Paper Publication: IMECE2021-71032**Yuanzhang Tang - *Wuhan University of Technology*
Zhirong Yang - *Wuhan University of Technology*
Haibo Gao - *Wuhan University of Technology*
Zaiming Yang - *Wuhan University of Technology*
Zhiguo Lin - *Wuhan University of Technology***3:20PM–3:30PM:****CORROSION MONITORING AND MITIGATION IN REINFORCED CONCRETE STRUCTURES USING NOVEL 3D-PRINTED VALVES AND INTERNET-OF-THINGS APPROACH**

Technical Paper Publication: IMECE2021-72141

Mario Escarcega - *New Mexico Tech*
 Savannah Bradley - *New Mexico Tech*
 Gabriel Campos - *New Mexico Tech*
 Parker Randall - *New Mexico Tech*
 Luke Strebe - *New Mexico Tech*
 Hamed Momeni - *New Mexico Tech*
 Arvin Ebrahimkhanlou - *New Mexico Tech*

3:30PM–3:40PM:**AN EXPLORATION OF X-VECTORS FOR DAMAGE DETECTION AND IDENTIFICATION****Technical Paper Publication: IMECE2021-73324**

Kyle Hom - *Columbia University*
 Homayoon Beigi - *Recognition Technologies, Inc.*
 Raimondo Betti - *Columbia University*

3:40PM–3:50PM:**SUPER-RESOLUTION IMAGING OF SUB-WAVELENGTH CRACK-LIKE DEFECTS WITH A NON-CONTACT GUIDED WAVE ARRAY: A COMPUTATIONAL APPROACH****Technical Presentation: IMECE2021-77244**

Yongchao Yang - *Michigan Technological University*
 Homin Song - *Michigan Technological University*

**02-15-01:
BIOMANUFACTURING AND BIOMATERIALS
NOVEMBER 5, 2021****3:00PM–4:30PM**

Chair: Chetan Nikhare - *The Pennsylvania State University*
 Chair: Scott Thompson - *Kansas State University*
 Chair: M.P. Jahan - *Miami University*

3:00PM–3:10PM:**SYNTHESIS-STRUCTURE-PROPERTY RELATIONSHIP FOR ULTRA-SOFT TISSUE-EQUIVALENT ALGINATE HYDROGEL****Technical Paper Publication: IMECE2021-70392**

Xiangpeng Li - *University of Central Florida*
 Jihua Gou - *University of Central Florida*
 Olusegun J. Ilegbusi - *University of Central Florida*

3:10PM–3:20PM:**CHARACTERIZATION OF THE COMPRESSIVE PROPERTIES OF TRIPLY PERIODIC MINIMAL SURFACE PCL SCAFFOLDS FOR BONE TISSUE ENGINEERING****Technical Paper Publication: IMECE2021-72125**

Cole Klemstine - *Marshall University*
 Yousef Abdelgaber - *Marshall University*
 Logan Lawrence - *Cabell Huntington Hospital*
 James B. Day - *Marshall University*
 Pier Paolo Claudio - *University of Mississippi*
 Roozbeh (Ross) Salary - *Marshall University*

3:20PM–3:30PM:**A NOVEL IMAGE-BASED METHOD FOR IN SITU CHARACTERIZATION OF THE PORE SIZE DISTRIBUTION AND DIMENSIONAL ACCURACY OF BONE TISSUE SCAFFOLDS****Technical Paper Publication: IMECE2021-72132**

Yousef Abdelgaber - *Marshall University*
 Cole Klemstine - *Marshall University*
 Logan Lawrence - *Cabell Huntington Hospital*
 James B. Day - *Marshall University*
 Pier Paolo Claudio - *University of Mississippi*
 Roozbeh (Ross) Salary - *Marshall University*



3:30PM–3:40PM:**SHAPE FIDELITY STUDY IN EXTRUSION-BASED BIO 3D PRINTING WITH HIGHLY VISCOUS BIOINK****Technical Presentation: IMECE2021-66750**Ran Zhou - *Purdue University Northwest*Wei Li - *University of Texas at Dallas*Benquan Li - *University of Texas at Dallas***3:40PM–3:50PM:****ADDITIVE MANUFACTURING IN THE BIOMEDICAL SPACE: A CURRENT REVIEW****Technical Presentation: IMECE2021-71973**Liam Dingle - *Algoma University*Bin Wei - *Algoma University***3:50PM–4:00PM:****PRINTABILITY AND FUNCTIONALITY STUDY OF POLYCAPROLACTONE AND POLYPYRROLE COPOLYMERS FOR NERVE GUIDE CONDUITS USING AEROSOL JET PRINTING****Technical Presentation: IMECE2021-72239**Anika Vandeen - *Washington State University*Roland Chen - *Washington State University***03-27-01:****MECHANICS OF ADHESION AND FRICTION
NOVEMBER 5, 2021****3:00PM–4:30PM**Chair: Hareesh Tippur - *Auburn University*Chair: Caglar Oskay - *Vanderbilt University***3:00PM–3:10PM:****CHARACTERIZATION OF LATERAL FRICTION SURFACED AA6063 COATINGS****Technical Paper Publication: IMECE2021-67839**Ebrahim Seidi - *University of Hawaii at Manoa*Scott F. Miller - *University of Hawaii at Manoa***3:10PM–3:20PM****SUPERLUBRICITY OF MXENE AND THE ROLE OF WATER****Technical Presentation IMECE2021-70033**Yanxiao Li - *Missouri University of Science and Technology*Chenglin Wu - *Missouri University of Science and Technology*Congjie Wei - *Missouri University of Science and Technology***3:20PM–3:30PM:****EFFECT OF CYCLIC CORROSION AND JOINING METHOD ON THE STRENGTH OF MULTIMATERIAL DOUBLE LAP JOINTS****Technical Paper Publication: IMECE2021-71154**Marco Gerini Romagnoli - *Oakland University*Chao Yang - *Oakland University*Sayed A. Nassar - *Oakland University***3:30PM–3:40PM:****TRIBOLOGICAL EVALUATION OF A HIGH-PERFORMANCE COMPOSITE COATING****Technical Paper Publication: IMECE2021-73701**Peter Renner - *Texas A&M University*Mohamed Gharib - *Texas A&M University Qatar*Hong Liang - *Texas A&M University*

3:40PM–3:50 PM:**ADHERENCE OF A HYPERELASTIC SHELL ON A RIGID PLANAR SUBSTRATE****Technical Presentation: IMECE2021-77222**

Chenxu Zhao - *Syracuse University*
 Xuanhan Chen - *Syracuse University*
 Wanliang Shan - *Syracuse University*
 Kai-Tak Wan - *Northeastern University*

03-09-01:**MULTIFUNCTIONAL ENGINEERED MATERIALS AND SYSTEMS
NOVEMBER 5, 2021****3:00PM–4:30PM**

Chair: Hareesh Tippur - *Auburn University*
 Chair: Caglar Oskay - *Vanderbilt University*

3:00PM–3:10PM:**PARAMETRIC OPTIMIZATION OF SMA TORSIONAL ACTUATORS FOR AIRCRAFT MORPHING APPLICATIONS****Technical Paper Publication: IMECE2021-73206**

Christopher Summers - *Texas A&M University*
 Jonathan M. Weaver-Rosen - *Texas A&M University*
 Anargyros A. Karakalas - *Texas A&M University*
 Richard J. Malak, Jr. - *Texas A&M University*
 Dimitris C. Lagoudas - *Texas A&M University*

3:10PM–3:20PM:**INFLUENCE OF COATING ON HIGH PERFORMANCE HEAT RESISTANT TEXTILE CURTAINS****Technical Paper Publication: IMECE2021-73307**

Maria Cândida Vilarinho - *University of Minho*
 Paulo Araújo - *University of Minho*
 José Carlos Teixeira - *University of Minho*
 Elisabete Silva - *Olbo & Mehler Tex Portugal*
 Dionisio Silveira - *Olbo & Mehler Tex Portugal*
 Delfim Soares - *University of Minho*
 Maria C. Paiva - *University of Minho*
 Daniel Ribeiro - *University of Minho*
 Marisa Branco - *University of Minho*

3:20PM–3:30PM:**RECONFIGURATION OF MULTISTABLE 3D FERROMAGNETIC MESOSTRUCTURES GUIDED BY ENERGY LANDSCAPE SURVEYS****Technical Presentation: IMECE2021-77055**

Yi Li - *University of Connecticut*
 Samuel Avis - *Durham University*
 Teng Zhang - *Syracuse University*
 Halim Kusumaatmaja - *Durham University*
 Xueju “Sophie” Wang - *University of Connecticut*

3:30PM–3:40PM:**BONE-INSPIRED ADAPTIVE MULTIFUNCTIONAL MATERIALS****Technical Presentation: IMECE2021-77232**

Sung Kang - *Johns Hopkins University*

3:40PM–3:50PM:**A SHAPE MEMORY MATERIAL ENABLED BY REVERSIBLE LIQUID FLOW IN HYDROPHOBIC NANOPORES**

Technical Presentation: IMECE2021-77350Mingzhe Li - *Michigan State University*Chi Zhan - *Michigan State University*Weiyi Lu - *Michigan State University***03-23-01:****MATERIAL MODELING AND EXPERIMENTATION:
POLYMERS TO GEOMATERIALS
NOVEMBER 5, 2021****3:00PM–4:30PM**Chair: Hareesh Tippur - *Auburn University*Chair: Caglar Oskay - *Vanderbilt University***3:00PM–3:10PM:****INVESTIGATION OF PORE SIZE DISTRIBUTION AND
MECHANICAL PROPERTIES OF POROUS
POLYDIMETHYLSILOXANE (PDMS) STRUCTURES
USING SOLVENT EVAPORATION TECHNIQUE****Technical Paper Publication: IMECE2021-70816**Mohammad Abshirini - *University of Oklahoma*M. Cengiz Altan - *University of Oklahoma*Yingtao Liu - *University of Oklahoma*Mrinal Saha - *University of Oklahoma***3:10PM–3:20PM:****MODELLING THE DYNAMIC BEHAVIOUR OF
ELASTOMERS USING FRACTIONAL VISCOELASTIC
MATERIAL FORMULATIONS****Technical Paper Publication: IMECE2021-71178**Arne Leenders - *Leibniz University Hannover*Hamed Vahdati Zadeh - *Leibniz University Hannover*Matthias Wangenheim - *Leibniz University Hannover***3:20PM–3:30PM:****TEMPERATURE DEPENDENT IMPACT PROPERTIES
OF ABS POLYMER****Technical Paper Publication: IMECE2021-71382**Max Kratzok - *Tufts University*Anil Saigal - *Tufts University*Michael Zimmerman - *Tufts University***3:30PM–3:40PM:****HOLMQUIST-JOHNSON-COOK CONSTITUTIVE
MODEL VALIDATION AND EXPERIMENTAL
STUDY ON THE IMPACT RESPONSE OF
CELLULAR CONCRETE****Technical Paper Publication: IMECE2021-71914**Jack Collard - *United States Military Academy*Jake Lanham - *United States Military Academy*Brad G. Davis - *United States Military Academy***3:40PM–3:50PM:****THEORY-BASED SCREENING OF IONIC LIQUIDS FOR
DIGESTION OF EXTRA-TERRESTRIAL REGOLITH****Technical Presentation: IMECE2021-77505**Azmain Islam - *Washington State University*Fatlum Rexhepi - *Washington State University*Christopher Henry - *NASA*Eric Fox - *NASA*Soumik Banerjee - *Washington State University*

05-05-03:**BIOMATERIALS AND TISSUE: MODELLING,
SYNTHESIS, FABRICATION AND
CHARACTERIZATION
NOVEMBER 5, 2021****3:00PM–4:30PM -****3:00PM–3:10PM****DEVELOPMENT OF A NOVEL 3D BIOPRINTABLE
BLOOD PLASMA-BASED BIOINK FOR COMPLEX
TISSUE REGENERATION****Technical Presentation: IMECE2021-73742**

Timothy Esworthy - *George Washington University*
 John L'insalata - *George Washington University*
 Haitao Cui - *George Washington University*
 Sung Yun Hann - *George Washington University*
 Lijie Zhang - *George Washington University*

3:10PM–3:20PM**DESIGN AND TESTING OF 3D PRINTED
TISSUE SCAFFOLDS WITH DIRECTIONALLY
TUNABLE STIFFNESS****Technical Paper Publication: IMECE2021-73745**

Abdullah Al Masud - *Texas Tech University*
 Amit M.E. Arefin - *Texas Tech University*
 Ming-Chien Chyu - *Texas Tech University*
 Paul F. Egan - *Texas Tech University*

3:20PM–3:30PM**THEORETICAL EVALUATION OF HEAT TRANSFER IN
LIVER TUMOR MICROWAVE ABLATION USING A
10-SLOT ANTENNA AT HIGH FREQUENCIES****Technical Paper Publication: IMECE2021-73846**

Yanbin Qin - *University of Shanghai for Science and Technology*
 Nanxi Li - *Shanghai Institute of Technical Physics*
 Baolin Liu - *University of Shanghai for Science and Technology*

3:30PM–3:40PM**MECHANISMS OF CELL DAMAGE DUE TO
MECHANICAL IMPACT: AN IN VITRO INVESTIGATION****Technical Presentation: IMECE2021-76635**

Wonmo Kang - *Arizona State University*
 Marc Raphael - *Naval Research Laboratory*
 Michael Robitaille - *Naval Research Laboratory*
 Chunghwan Kim - *Arizona State University*

3:40PM–3:50PM**BEHAVIOR OF CELL FLOWING OVER OBLIQUE
MICRO RECTANGULAR GROOVE****Technical Paper Publication: IMECE2021-69696**

Shigehiro Hashimoto - *Kogakuin University*
 Hiroki Yonezawa - *Kogakuin University*
 Shogo Uehara - *Kogakuin University*

05-11-02:**MUSCULOSKELETAL AND SPORTS
BIOMECHANICS II
NOVEMBER 5, 2021****3:00PM–4:30PM**

Chair: Linxia Gu - *Florida Institute of Technology*
 Chair: Ahmed Al-Jumaily - *Auckland University of Technology*
 Chair: Reuben Kraft - *The Pennsylvania State University*
 Chair: Martin Tanaka - *Western Carolina University*



3:00PM–3:10PM:**DESIGN OF KNEE PROSTHESIS TO SUSTAIN ACL/
PCL LIGAMENTS AND ALLEVIATE OSTEOARTHRITIS****Technical Paper Publication: IMECE2021-72166**Peyman Honarmandi - *Manhattan College*Erwan Malki - *Manhattan College***3:10PM–3:20PM:****ANALYTICAL IMPACT ANALYSIS OF THE BRAIN
MOTION IN LOW-VELOCITY HEAD IMPACTS USING
CONCENTRIC VISCOELASTIC BODIES****Technical Paper Publication: IMECE2021-73590**Pradip Thapa - *City College of the City University of New York*Shahab Mansoor Baghaei - *City College of the City
University of New York*Ali M. Sadegh - *City College of the City University of New York***3:20PM–3:30PM:****EVALUATION OF HUMAN GAIT UNDER SLIPPERY
CONDITIONS USING OPENSIM MUSCULOSKELETAL
SIMULATIONS****Technical Presentation: IMECE2021-77033**Phong Phan - *Mississippi State University*Anh Vo - *Mississippi State University*Amirhamed Bakhtiarydavijani - *Mississippi State University*Steve Elder - *Mississippi State University*Reuben Burch - *Mississippi State University*Harish Chander - *Mississippi State University*Adam Knight - *Mississippi State University*David Macias - *Columbus Orthopaedic Clinic*Raj Prabhu - *Universities Space Research Association - NASA
Glenn Research Center***3:30PM–3:40PM:****FATIGUE PROPERTIES OF 3D PRINTED
CARBON FIBER****Technical Paper Publication: IMECE2021-67626**Anne Schmitz - *University of Wisconsin-Stout***3:40PM–3:50PM:****HUMANOID ANIMATRONIC LEARNING
SIMULATOR FOR MEDICAL INTERACTIVE TRAINING
(H.A.L. S.M.I.T.)****Technical Paper Publication: IMECE2021-69620**Ethan A. Lauer - *Worcester Polytechnic Institute*James Maxwell - *Worcester Polytechnic Institute*Gillian Cohen - *Worcester Polytechnic Institute*Christopher Rene - *Worcester Polytechnic Institute*Olivia Kiristsis - *Worcester Polytechnic Institute*Pradeep Radhakrishnan - *Worcester Polytechnic Institute***05-07-01:
DYNAMICS AND CONTROL OF
BIOMECHANICAL SYSTEMS
NOVEMBER 5, 2021****3:00PM–4:30PM**Chair: Linxia Gu - *Florida Institute of Technology*Chair: Ahmed Al-Jumaily - *Auckland University of Technology*Chair: Reuben Kraft - *The Pennsylvania State University*Chair: Martin Tanaka - *Western Carolina University***3:00PM–3:10 PM :****A DATA-DRIVEN APPROACH FOR ESTIMATING
POSTURAL CONTROL USING AN INERTIAL
MEASUREMENT UNIT**

Technical Paper Publication: IMECE2021-70518

Anthony Giachin - *United States Military Academy*
 J. Josiah Steckenrider - *United States Military Academy*
 Gregory Freisinger - *United States Military Academy*

3:10PM–3:20PM:**GAIT STABILITY USING LYAPUNOV EXPONENTS****Technical Paper Publication: IMECE2021-73242**

Jose Galarza - *University of Texas Rio Grande Valley*
 Dumitru I. Caruntu - *University of Texas Rio Grande Valley*
 Simon Vasquez - *University of Texas Rio Grande Valley*
 Robert Freeman - *University of Texas Rio Grande Valley*

3:20PM–3:30PM:**SIT TO STAND GAIT TRAINER: MODULATION OF LIFT FORCE VIA ELASTIC NETWORK****Technical Paper Publication: IMECE2021-73154**

Jordan Smith - *Gannon University*
 Robert Felmlee - *Gannon University*
 Mary Crowe - *Lake Erie College of Osteopathic Medicine*
 Davide Piovesan - *Gannon University*

3:30PM–3:40PM:**SIMULATION OF A TERRAIN VERSATILE WALKER-WHEELCHAIR WITH TORSO SUPPORT**

James Manzer - *Gannon University*
 Gabriel Simon Sosa - *Gannon University*
 Davide Piovesan - *Gannon University*

3:40PM–3:50PM:**DESIGN OF A CARBON FIBER ANKLE FOOT ORTHOTIC WITH OPTIMAL JOINT STIFFNESS****Technical Paper Publication: IMECE2021-73248**

Aaron Koch - *Gannon University*
 Brandon Richardson - *Gannon University*
 Daniel Schell - *Gannon University*
 Davide Piovesan - *Gannon University*

06-04-02:**DESIGN FOR ADDITIVE MANUFACTURING II
NOVEMBER 5, 2021****3:00PM–4:30PM**

Chair: Miri Weiss Cohen - *Braude College of Engineering*
 Chair: Daniele Regazzoni - *University of Bergamo*
 Chair: Marco Rossoni - *Università Degli Studi di Bergamo*

3:00PM–3:10PM:**EVALUATION OF DIMENSIONAL ACCURACY OF ADDITIVELY MANUFACTURED METAL PARTS IN FUSED FILAMENT FABRICATION PROCESS****Technical Paper Publication: IMECE2021-71184**

Mozah Saeed Alyammahi - *Dubai Electricity & Water Authority*
 Saleh Atatreh - *Dubai Electricity & Water Authority*
 Rahmat Agung Susantyoko - *Dubai Electricity & Water Authority*
 Tawaddod Alkindi - *Dubai Electricity & Water Authority*

3:10PM–3:20PM:**DESIGN FOR ADDITIVE MANUFACTURING: A FRAMEWORK TO COLLECT AND REUSE ENGINEERING KNOWLEDGE TOWARDS A CAD-BASED TOOL****Technical Paper Publication: IMECE2021-72789**

Claudio Favi - *Università di Parma*
 Marco Mandolini - *Università Politecnica delle Marche*
 Federico Campi - *Università Politecnica delle Marche*
 Paolo Cicconi - *Università degli Studi Roma Tre*
 Michele Germani - *Università Politecnica delle Marche*



3:20PM–3:30PM:**PINECONE HARVESTING UTILIZING COMBUSTION ENGINE POWERED TREE CLIMBING LIFT****Technical Paper Publication: IMECE2021-73315**Walker Murphy - *Purdue University*Keith Pate - *Purdue University*Mina Asghari Heidarlou - *University of Southern Indiana*Farid Breidi - *Purdue University***3:30PM–3:40PM:****ADDITIVE MANUFACTURING DESIGN OF THE FREQUENCY-SCALED, ULTRA-WIDEBAND, SPECTRUM ELEMENT (FUSE) PHASED ARRAY ANTENNA****Technical Paper Publication: IMECE2021-73920**Francisco F. Ramos-Carrizosa - *MITRE Corporation*M. Wajih Elsallal - *MITRE Corporation*John P. Liston - *MITRE Corporation***3:40PM–3:50PM:****DESIGN OF FIBER-BASED RESILIENT SOFT ROBOTIC GRIPPER****Technical Presentation: IMECE2021-76810**Sam Konerman - *Northern Kentucky University*Minchul Shin - *Northern Kentucky University***08-09-01:****SUSTAINABLE AND GRID-INTERACTIVE BUILDINGS
NOVEMBER 5, 2021****3:00PM–4:30PM****3:00PM–3:10PM:****COMPARATIVE INVESTIGATION ON COMMERCIAL AND RESIDENTIAL BUILDING ENERGY PERFORMANCE OF INTERIOR AND EXTERIOR SLAT BLINDS IN U.S. CLIMATES****Technical Presentation: IMECE2021-70736**Goo Seomun - *Hanbat National University*Hyo-Mun Lee - *Hanbat National University*Dong-Su Kim - *Hanbat National University*Jong-Ho Yoon - *Hanbat National University***3:10PM–3:20PM:****POTENTIAL EFFECTS OF PARTIAL SHADING ON POWER EFFICIENCY OF PHOTOVOLTAIC (PV) INTEGRATED WITH EXTERIOR BLIND****Technical Presentation: IMECE2021-70746**Kim Hwanho - *Hanbat National University*Lee Hyomun - *Hanbat National University*Dongsu Kim - *Hanbat University*Jongho Yoon - *Hanbat University***3:20PM–3:30PM:****THERMAL PERFORMANCE OF A HELICAL STEEL ENERGY PILE INCORPORATING LATENT THERMAL ENERGY STORAGE FOR GROUND SOURCE HEAT PUMP APPLICATIONS****Technical Paper Publication: IMECE2021-71671**Aggrey Mwesigye - *University of Minnesota*Ethan Shingledecker - *University of Minnesota*Andrew Walz - *University of Minnesota*Seth Dworkin - *Ryerson University*

3:30PM–3:40PM:**CLIMATOLOGY AND TRENDS OF HEAT INDEX,
HUMAN DISCOMFORT INDEX AND ENERGY PER
CAPITA FOR CONUS AND MESO-AMERICA****Technical Paper Publication: IMECE2021-72532**Jorge E. Gonzalez - *The City College of New York*Qurat Faiz - *The City College of New York***3:40PM–3:50PM:****REVIEW OF STUDIES ON RESIDENTIAL HVAC
SYSTEMS****Technical Paper Publication: IMECE2021-72745**Kevwe A. Ejenakevwe - *University of Oklahoma*Li Song - *University of Oklahoma***3:50PM–4:00PM:****EVALUATING THE IMPACT OF CYBER-ATTACKS ON
GRID-INTERACTIVE EFFICIENT BUILDINGS****Technical Paper Publication: IMECE2021-73694**Yangyang Fu - *Texas A&M University*Zheng O'Neill - *Texas A&M University*Jin Wen - *Drexel University*Veronica Adetola - *Pacific Northwest National Laboratory***08-13-01:****CMS-GENERAL COMBUSTION, FIRE, BIOMASS,
AND WASTE GASIFICATION
NOVEMBER 5, 2021****3:00PM–4:30PM****3:00PM–3:10PM:****EXPERIMENTAL INVESTIGATION OF THE
COMBUSTION BEHAVIOR OF JET-A/WATER
EMULSIFIED FUEL AND ETHANOL-BLENDED JET-A/
WATER EMULSIFIED FUEL DROPLETS****Technical Paper Publication: IMECE2021-70615**A.S.M. Sazzad Parveg - *University of Iowa*Nicholas J. Hentges - *University of Iowa*Albert Ratner - *University of Iowa***3:10PM–3:20PM:****PREDICTING STEAM-GASIFICATION OUTPUT USING
ARTIFICIAL NEURAL NETWORKS****Technical Paper Publication: IMECE2021-71635**Yunye Shi - *University of Tennessee*Diego Yepes Maya - *Federal University of Itajuba*Albert Ratner - *University of Iowa***3:20PM–3:30PM:****KINETIC STUDY OF NITRIC OXIDE FORMATION AT
ATMOSPHERIC AND HIGH-PRESSURE CONDITIONS
FOR DIFFERENT PRIMARY GASEOUS FUELS****Technical Paper Publication: IMECE2021-72127**Fahd Alam - *Exponent, Inc.***3:30PM–3:40PM:****HYDROGEN: FUEL OF THE FUTURE?****Technical Paper Publication: IMECE2021-73533**Charles Baukal - *John Zink Co. LLC*Matthew Whelan - *John Zink Co. LLC*Steve Londerville - *John Zink Co. LLC*Michel Haag - *John Zink International Luxembourg*Gilles Theis - *John Zink Co. LLC*Bill Johnson - *John Zink Co. LLC*

3:40PM–3:50PM:**SURVEY OF EXISTING LITERATURE DATA ON THE BIOMASS COMBUSTION BEHAVIOR IN INDUSTRIAL GRATE-FIRED BOILERS****Technical Paper Publication: IMECE2021-73567**

João Pedro Silva - *University of Minho*
 Senhorinha Teixeira - *University of Minho*
 Bernhard Peters - *University of Luxembourg*
 José Carlos Teixeira - *University of Minho*

3:50PM–4:00PM:**PHYSICOCHEMICAL CHARACTERIZATION OF THE REJECTED WASTE FROM THE MECHANICAL AND BIOLOGICAL TREATMENT OF MUNICIPAL SOLID WASTE****Technical Paper Publication: IMECE2021-73595**

Victor Oliveira - *University of Minho*
 Fernando Castro - *University of Minho*
 Jose Carlos Teixeira - *University of Minho*
 Jorge Araujo - *CVR – Center for Residue Valorization*
 Andre Ribeiro - *CVR – Center for Residue Valorization*
 Joana Carvalho - *CVR – Center for Residue Valorization*
 Maria Cândida Vilarinho - *University of Minho*

11-18-01:**HEAT TRANSFER UNDER EXTREME CONDITIONS
NOVEMBER 5, 2021****3:00PM–4:30PM**

Chair: Subramanyaravi Annapragada - *United Technologies Research*
 Chair: Kevin Dowling – *Sandia National Laboratories*
 Chair: Alexander Rattner - *Penn State University*

3:00PM–3:10PM:**A HETEROGENOUS NUCLEATION MODEL FOR SUPERCOOLED WATER AND SUCROSE SOLUTION DROPLETS UNDER ULTRA-COLD ENVIRONMENTS****Technical Paper Publication: IMECE2021-68974**

Minghan Xu - *McGill University*
 Saad Akhtar - *McGill University*
 Agus P. Sasmito - *McGill University*

3:10PM–3:20PM:**NUMERICAL ANALYSIS OF FLOW AND HEAT TRANSFER FOR SUPERCRITICAL CO₂ AND LIQUID SODIUM IN SEMICIRCULAR MINI-CHANNELS****Technical Paper Publication: IMECE2021-70203**

Lei Qin - *Northwestern Polytechnical University*
 Gongnan Xie - *Northwestern Polytechnical University*
 Shulei Li - *Research & Development Institute of Northwestern Polytechnical University in Shenzhen*

3:20PM–3:30PM:**EXPERIMENTAL AND NUMERICAL STUDY ON PERFORMANCE OF VAPOR COMPRESSION REFRIGERATION SYSTEM COMBINED WITH THERMOELECTRIC REFRIGERATOR****Technical Presentation: IMECE2021-70765**

Zhiguo Qu - *Xi'an Jiaotong University*
 Ruipeng Fu - *Xi'an Jiaotong University*

3:30PM–3:40PM:**STUDY ON CONVECTIVE HEAT TRANSFER CHARACTERISTICS OF SUPERCRITICAL CO₂ IN PRINTED CIRCUIT HEAT EXCHANGER UNDER OCEAN CONDITION**

Technical Paper Publication: IMECE2021-70869

Shulei Li - *Northwestern Polytechnical University in Shenzhen*
 Dechao Liu - *Northwestern Polytechnical University*
 Lei Qin - *Northwestern Polytechnical University*
 Gongnan Xie - *Northwestern Polytechnical University*

3:40PM–3:50PM:

**STRUCTURE AND MEASUREMENT OF
 ATMOSPHERIC AND HIGH-PRESSURE
 IGNITION PLASMA**

Technical Paper Publication: IMECE2021-73138

James Shaffer - *Mississippi State University*
 Saeid Zare - *Mississippi State University*
 Omid Askari - *Mississippi State University*

3:50PM–4:00PM:

**TEST FLOW-LOOP FOR EXTREME PRESSURE
 AND TEMPERATURE SUPERCRITICAL CO₂
 HEAT EXCHANGER**

Technical Presentation: IMECE2021-77398

Aaron Feinauer - *Michigan State University*
 Joerg Petrasch - *Michigan State University*
 André Benard - *Michigan State University*
 James Klausner - *United Arab Emirates University*

12-26-01:

**DATA-DRIVEN MODELING AND SIMULATION FOR
 COMPUTATIONAL BIOMEDICINE
 NOVEMBER 5, 2021**

3:00PM–4:30PM

Chair: Marco Amabili - *McGill University*
 Chair: Celia Reina - *University of Pennsylvania*

3:00PM–3:10PM:

**MACHINE LEARNING ENHANCED PDE-
 CONSTRAINED OPTIMIZATION FOR MATERIAL
 TRANSPORT CONTROL SIMULATION IN NEURONS**

Technical Presentation: IMECE2021-67849

Yongjie Jessica Zhang - *Carnegie Mellon University*
 Angran Li - *Carnegie Mellon University*

3:10PM–3:20PM:

**DATA-DRIVEN MODELING OF AORTIC DISSECTION
 USING DEEPONET**

Technical Presentation: IMECE2021-68056

Minglang Yin - *Brown University*
 Ehsan Ban - *Yale University*
 Enrui Zhang - *Brown University*
 Bruno Rego - *Yale University*
 Jay Humphrey - *Yale University*
 George Karniadakis - *Brown University*

3:20PM–3:30PM:

**COMPLEMENTING REGULATORY EVIDENCE
 THROUGH NUMERICAL SIMULATION TESTS: AN
 APPLICATION CASE FOR FLUID STAGNATION AFTER
 LVAD IMPLANTATION**

Technical Presentation: IMECE2021-69932

Alfonso Santiago - *Barcelona Supercomputing Center*
 Karen May-Newman - *San Diego State University*
 Richard A. Gray - *Food and Drug Administration*
 Timothy J. Baldwin - *Food and Drug Administration*
 Beatriz Eguzkitza - *Barcelona Supercomputing Center*
 Mariano Vazquez - *Barcelona Supercomputing Center*



3:30PM–3:40PM:

A COMPUTATIONAL PIPELINE FOR GENERATING DYNAMIC, HIGH-ORDER, PATIENT-SPECIFIC MESHES FOR USE IN CARDIAC BIOMECHANICS SIMULATION

Technical Presentation: IMECE2021-71442Fariba Mohammadi - *University of Kansas*Brian Wentz - *University of Kansas*Roshan Upendra - *Rochester Institute of Technology*Suzanne Shontz - *University of Kansas*Cristian Linte - *Rochester Institute of Technology***3:40PM–3:50PM:**

A FRAMEWORK FOR COUPLED LEFT VENTRICULAR AND ATRIAL FSI SIMULATIONS WITH BIOPROSTHETIC VALVES

Technical Presentation: IMECE2021-71908Mehdi Saraeian - *Iowa State University*Arian Jafari - *Iowa State University*Remy Braun - *Iowa State University*Ming-Chen Hsu - *Iowa State University*Adarsh Krishnamurthy - *Iowa State University***3:50PM–4:00 PM:**

THE USE OF THE DISCRETE ELEMENT METHOD TO STUDY THE RESPONSE OF PACKED PARTICLES TO A PRESSURE WAVE

Technical Paper Publication: IMECE2021-69041Catherine S. Florio – *U.S. Army DEVCOM Armaments Center***POSTERS****UNDERGRADUATE POSTERS****15-01-01:**

ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPOSITION

DESIGN AND DEVELOPMENT OF ADDITIVELY MANUFACTURED MICROCHANNEL HEAT EXCHANGERS OF DIFFERENT CROSS SECTIONS AND ASPECT RATIOS

Undergraduate Expo: IMECE2021-69844Evan Preller - *University of the District of Columbia*Mehdi Kabir - *University of the District of Columbia*Jiajun Xu - *University of the District of Columbia*

NUMERICAL INVESTIGATION OF A HELICAL STEEL PILE GROUND HEAT EXCHANGER UNDER DIFFERENT OPERATING CONDITIONS FOR SPACE HEATING AND COOLING APPLICATIONS

Undergraduate Expo: IMECE2021-70634Ethan Shingledecker - *University of Minnesota Duluth*Andrew Walz - *University of Minnesota Duluth*Aggrey Mwesigye - *University of Minnesota Duluth*

BIOMIMETIC POROUS METAMATERIAL FOR SOFT ROBOTICS APPLICATIONS

Undergraduate Expo: IMECE2021-77713Anthony Jones - *University of Maryland*Midhun Varghese - *University of Maryland*Eleonora Tubaldi - *University of Maryland*

EXPERIMENTAL AND NUMERICAL ANALYSIS OF A METHOD FOR DETERMINING THE FLEXURAL RIGIDITY OF INDIVIDUAL SEGMENTS OF MAIZE STALKS

Undergraduate Expo: IMECE2021-71801

Nathanael Nelson - Brigham Young University

Douglas Cook - Brigham Young University

MPAD: A MODULAR PACKAGE FOR AUTONOMOUS DRIVING OF SCALAR CARS FOR USE IN DESIGN COURSES

Undergraduate Expo: IMECE2021-71122

Taylan Sel - Worcester Polytechnic Institute

Christopher Mercer - Worcester Polytechnic Institute

Enzo Giglio De Azevedo - Worcester Polytechnic Institute

Eric Reardon - Worcester Polytechnic Institute

Ngoga Julien Vainqueur Mugabo - Worcester Polytechnic Institute

Antonio Jeanlys - Worcester Polytechnic Institute

Pradeep Radhakrishnan - Worcester Polytechnic Institute

Kaveh Pahlavan - Worcester Polytechnic Institute

DESIGN OF A LOCALIZED AIR EXHAUST SYSTEM FOR DENTAL CHAIR UNDER COVID-19 CONTEXT: A CASE STUDY

Undergraduate Expo: IMECE2021-73856

Jorge Kurita - Universidad Nacional de Asuncion

Elias Espinola - Universidad Nacional de Asuncion

Vivian Gonzalez - Universidad Nacional de Asuncion

Jose Santacruz - Universidad Nacional de Asuncion

Liz Esquivel - Universidad Nacional de Asuncion

Jonathan Amarilla - Universidad Nacional de Asuncion

Jorge Medina - Universidad Nacional de Asuncion

Emanuel Orzusa - Universidad Nacional de Asuncion

Patrick Kehler - Universidad Nacional de Asuncion

Nicolas Ferreira - Universidad del Cono Sur de las Américas

EXPERIMENTAL CHARACTERIZATION OF PHOTO-SENSITIVE POLYMERS TO OPTIMIZE UV USAGE PARAMETERS

Undergraduate Expo: IMECE2021-77211

Ben Jewell - Michigan Technological University

Susanta Ghosh - Michigan Technological University

Trisha Sain - Michigan Technological University

LEARNING SHEAR AND MOMENT DIAGRAMS WITH REAL-TIME FEEDBACK

Undergraduate Expo: IMECE2021-77271

Gina Greco - Quinnipiac University

Lynn Byers - Quinnipiac University

UAV GROUND TARGET TRAJECTORY TRACKING USING REINFORCEMENT LEARNING

Undergraduate Expo: IMECE2021-77361

Jorge Alejandro Diaz - The University of Texas Rio Grande Valley

Lei Xu - The University of Texas Rio Grande Valley

Tohid Sardarmehni - The University of Texas Rio Grande Valley

COST-EFFECTIVE MEASUREMENT OF SURFACE RADIATIVE PROPERTIES FOR SIMULATION UNCERTAINTY QUANTIFICATION (UQ) ANALYSIS

Undergraduate Expo: IMECE2021-77367

Rebekah Travis - Georgia Institute of Technology

Karen Son - Sandia National Laboratories



DESIGN OF VENTILATION AND SEPARATION SYSTEM FOR WOOD DUST SAWDUST IN AN INDUSTRY USING COMPUTATIONAL FLUID DYNAMICS

Undergraduate Expo: IMECE2021-77553

Eduvigis Oporto - *Universidad Nacional de Asuncion*
 Gustavo Martinez - *Universidad Nacional de Asuncion*
 Jorge Kurita - *Universidad Nacional de Asuncion*

THERMAL ENERGY STORAGE USING REVERSE OSMOSIS CONCENTRATE

Undergraduate Expo: IMECE2021-77667

Gauri Mhamunkar - *Cal Poly Pomona*
 Edward Siapno - *Cal Poly Pomona*
 Rozina Nalbandian - *Cal Poly Pomona*
 Brian Camey - *Cal Poly Pomona*
 Christopher Salerno - *Cal Poly Pomona*
 Reza Lakeh - *Cal Poly Pomona*

NATIONAL SCIENCE FOUNDATION POSTERS

16-01-01: NSF-FUNDED RESEARCH (GRAD & UNDERGRAD)

ANALYSIS OF THERMAL STABILITY OF SODIUM-ION BATTERIES

NSF Poster Presentation: IMECE2021-76774

Susmita Sarkar - *Purdue University*
 Navneet Goswami - *Purdue University*
 Partha P. Mukherjee - *Purdue University*

EFFICIENT FEEDRATE OPTIMIZATION METHOD FOR SPLINE TOOLPATH BASED ON TYPICAL CHARACTERISTICS OF INTEGRAL IMPELLER

NSF Poster Presentation: IMECE2021-76777

JianXin Xiao - *Tsinghua University*
 Bingran Li - *Tsinghua University*
 Jun Fang - *Tsinghua University*
 Hui Zhang - *Tsinghua University*

COMPARISON OF PORESCALE AND VOLUME-AVERAGED SIMULATIONS OF THERMAL CONVECTION IN POROUS MEDIA

NSF Poster Presentation: IMECE2021-77208

David Korba - *Mississippi State University*
 Like Li - *Mississippi State University*

ANALYSIS OF TRANSPORT CHARACTERISTICS IN LITHIUM-ION BATTERY POROUS ELECTRODES BASED ON MACHINE LEARNING

NSF Poster Presentation: IMECE2021-77215

Debanjali Chatterjee - *Purdue University*
 Bairav S. Vishnugopi - *Purdue University*
 Partha P. Mukherjee - *Purdue University*

COHESIVE ZONE LAW FOR FATIGUE CRACK GROWTH IN MAGNESIUM ALLOY

NSF Poster Presentation: IMECE2021-77279

Huy Tran - *University of Illinois*
 Xie Di - *The University of Tennessee*
 Gao Yanfei - *The University of Tennessee*
 Huck Beng Chew - *University of Illinois at Urbana-Champaign*



SIZE EFFECT ON STRUCTURAL STRENGTH OF LEGO BEAMS

NSF Poster Presentation: IMECE2021-77287

Alejandro Santamarina - *Purdue University*
Luis Almeida - *Purdue University*

DISORDER-ORDER TRANSITION IN COLLOIDS OF ELLIPSOIDAL PARTICLES IN MICROGRAVITY

NSF Poster Presentation: IMECE2021-77380

Qian Lei - *New Jersey Institute of Technology*
Boris Khusid - *New Jersey Institute of Technology*

EVOLUTIONARY ALGORITHM-GUIDED VOXEL-ENCODING PRINTING OF FUNCTIONAL HARD-MAGNETIC SOFT ACTIVE MATERIALS

NSF Poster Presentation: IMECE2021-77464

Shuai Wu - *Stanford University*
Craig Hamel - *Georgia Institute of Technology*
H. Jerry Qi - *Georgia Institute of Technology*
Ruike Zhao - *Stanford University*

EXTREME TRANSFER PRINTING TECHNOLOGY FOR ASSEMBLING FILM BASED FUNCTIONAL STRUCTURES IN LIQUID ENVIRONMENTS

NSF Poster Presentation: IMECE2021-77543

Yue Zhang - *University of Virginia*
Baoting Xu - *University of Virginia*

THREE-DIMENSIONAL PARAMETERIZED MODEL OF MAIZE STALK MORPHOLOGY

NSF Poster Presentation: IMECE2021-77576

Michael Ottesen - *Brigham Young University*
Nan-Wei Liu - *Brigham Young University*
Douglas Cook - *Brigham Young University*

COLLISION-ANGLE-DEPENDENT EXTREME MECHANICAL AND TRIBOLOGICAL RESPONSES OF BLOCK-COPOLYMER MICROPARTICLES FOR SOLID-STATE ADDITIVE MANUFACTURING

NSF Poster Presentation: IMECE2021-76804

Ara Kim - *UMASS Amherst*
Jae-Hwang Lee - *UMASS Amherst*

WAVE SIMULATORS FOR RAPID WAVE FORMATIONS

NSF Poster Presentation: IMECE2021-76911

Samarpan Chakraborty - *University of Maryland, College Park*
Balakumar Balachandran - *University of Maryland, College Park*

FABRICATION, PROCESSING AND CHARACTERIZATION OF CARBON FIBER REINFORCED LAMINATED COMPOSITE EMBEDDED WITH GRAPHENE LATTICE SHEETS

NSF Poster Presentation: IMECE2021-76955

Vishwas Jadhav - *North Carolina A&T State University*
Ajit Kelkar - *North Carolina Agricultural and Technical State University*



MAGNETO-MECHANICAL METAMATERIALS WITH WIDELY TUNABLE MECHANICAL PROPERTIES

NSF Poster Presentation: IMECE2021-77032

Cole Zemelka - Ohio State University

Shuai Wu - Stanford University

Ruike Zhao - Stanford University

MAGNETOCONVECTION IN A HORIZONTAL DUCT FLOW AT VERY HIGH HARTMANN AND GRASHOF NUMBERS

NSF Poster Presentation: IMECE2021-77071

Ruslan Akhmedagaev - University of Michigan-Dearborn

Oleg Zikanov - University of Michigan-Dearborn

Yaroslav Listratov - Moscow Power Engineering Institute

INTERFACIAL SLIDING OF GRAPHENE VERSUS HEXAGONAL BORON NITRIDE ON SILICA SUBSTRATES

NSF Poster Presentation: IMECE2021-77083

Ning Li - University of Illinois at Urbana-Champaign

Christopher Dmichowski - State University of New York at Binghamton

Yingchun Jiang - State University of New York at Binghamton

Chenglin Yi - State University of New York at Binghamton

Feilin Gou - State University of New York at Binghamton

Changhong Ke - State University of New York at Binghamton

Huck Beng Chew - University of Illinois at Urbana-Champaign

ARTIFICIAL NEURAL NETWORK APPROACHES FOR THE IDENTIFICATION OF DYNAMIC INPUT MOTIONS IN A HETEROGENEOUS SOLID

NSF Poster Presentation: IMECE2021-77141

Shashwat Maharjan - Central Michigan University

Bruno P. Guidio - Central Michigan University

Chanseok Jeong - Central Michigan University

HYPERELASTIC EFFECT OF OLIGODENDROCYTE 3D CONNECTIONS TO AXONS IN BRAIN WHITE MATTER

NSF Poster Presentation: IMECE2021-77203

Mohit Agarwal - Rutgers, The State University of New Jersey

Parameshwaran Pasupathy - Rutgers, The State University of New Jersey

Assimina A. Pelegri - Rutgers, The State University of New Jersey

16-02-01:

POSTER SESSION: NSF RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU)

ELECTROCHEMISTRY-BASED EQUIVALENT CIRCUIT MODEL VIA MODEL APPROXIMATION

NSF Poster Presentation: IMECE2021-76925

Daniel Seals - The Ohio State University

Marcello Canova - The Ohio State University

ELECTRIC REDESIGN OF WASTEWATER EVAPORATORS USING POROUS CARBON MATERIAL TO MINIMIZE HEAT LOSS DURING EVAPORATION

NSF Poster Presentation: IMECE2021-77076

Abdel Zaro - Tennessee Technical University

Divya Jaladi - Tennessee Technical University

Ethan Languri - Tennessee Technical University



HIGH-SPEED PASSIVE AUTOFOCUS CONTROL OF HIGH MAGNIFICATION LENSES USING NANOMETER PRECISION PIEZO ACTUATION

NSF Poster Presentation: IMECE2021-77119

Peter DiMeo - *University of Massachusetts Amherst*

Xian Du - *University of Massachusetts Amherst*

RING ORIGAMI FOR FOLDABLE AND WEARABLE ELECTRONICS

NSF Poster Presentation: IMECE2021-77230

Sophie Leanza - *The Ohio State University*

Shuai Wu - *Stanford University*

Ruike Zhao - *Stanford University*

DESIGN AND TEST OF AN INKING SYSTEM FOR ROLL-TO-ROLL MICROCONTACT PRINTING

NSF Poster Presentation: IMECE2021-77296

Jessica Wu - *University of Massachusetts Amherst*

Jingyang Yan - *University of Massachusetts Amherst*

Xian Du - *University of Massachusetts Amherst*

DESIGNING A DEGRADATION MODEL BASED ON PRIOR HARDWARE KNOWLEDGE FOR BLIND IMAGE SUPER RESOLUTION

NSF Poster Presentation: IMECE2021-77302

Johnathan Czernik - *University of Massachusetts Amherst*

Rui Ma - *University of Massachusetts, Amherst*

Xian Du - *University of Massachusetts Amherst*

DEVELOPMENT OF A METHOD FOR QUANTIFYING THE DEGREE OF MAIZE STALK OVALIZATION PRIOR TO BUCKLING FAILURE

NSF Poster Presentation: IMECE2021-77467

Kirsten Steele - *Brigham Young University*

Brandon Sutherland - *Brigham Young University*

Douglas Cook - *Brigham Young University*

OPTICAL IMAGING OF ULTRASONIC FIELDS SURROUNDING PHONONIC CRYSTALS

NSF Poster Presentation: IMECE2021-77705

Thomas Gerrity - *University of North Texas*

Trace Bivens - *University of North Texas*

Hyeonu Heo - *University of North Texas*

Arup Neogi - *University of North Texas*

Arkadii Krokhnin - *University of North Texas*

NONRECIPROCAL ACOUSTIC WAVE PROPAGATION IN DOPPLER-SHIFTED PHONONIC CRYSTALS WITH ASYMMETRIC SCATTERERS

NSF Poster Presentation: IMECE2021-77717

David Rosenbaum - *University of North Texas*

Jyotsna Dhillon - *University of North Texas*

Hyeonu Heo - *University of North Texas*

Arup Neogi - *University of North Texas*

RESEARCH POSTERS



17-01-01: RESEARCH POSTERS
NOVEMBER 4, 2021

2:25PM–3:25PM

**SCALED CRASH TESTING USING MODELING,
SIMILITUDE, AND EXPERIMENTATION**

Poster Paper Publication: IMECE2021-66606

Richard Melnyk - *USMA*

Olivia Beattie - *United States Military Academy*

Bogue Waller - *United States Military Academy*

**SUSTAINABLE MANUFACTURING DESIGN
PRACTICES IN PALM OIL EXTRACTING MACHINE**

Poster Presentation: IMECE2021-69184

**RUFUS CHIME - INSTITUTE OF MANAGEMENT
AND TECHNOLOGY**

**SENIOR CAPSTONE PROJECT: A CLASSROOM HEAT
EXCHANGER DEMONSTRATION KIT**

Poster Paper Publication: IMECE2021-70833

Matthew Quigley - *Lawrence Technological University*

Jason Klebba - *Lawrence Technological University*

Badih Jawad - *Lawrence Technological University*

Liping Liu - *Lawrence Technological University*

**A PREDICTION SOFTWARE TO EVALUATE
FRISBEE MOVEMENT**

Poster Paper Publication IMECE2021-70925

Haowen Yang - *Portledge School*

**COLD WEATHER IMPACTS ON ELECTRIC
VEHICLE PERFORMANCE**

Poster Presentation: IMECE2021-71465

Christian Ramos - *Inter American University of Puerto Rico*

Matthew Eagon - *University of Minnesota Twin Cities*

William Northrop - *University of Minnesota Twin Cities*

**VERIFICATION AND VALIDATION OF A SMALL WIND
TUNNEL DATA ACQUISITION SYSTEM**

Poster Paper Publication: IMECE2021-71806

Elena Hollingsworth - *Western Kentucky University*

Riley Bishop - *Western Kentucky University*

Wesley Fisher - *Western Kentucky University*

Brian Mazzoni - *Western Kentucky University*

Chidurala Manohar - *Western Kentucky University*

Alex J. Doom - *Western Kentucky University*

**MECHANICAL DESIGN AND DEVELOPMENT
OF A SUBORBITAL PAYLOAD FOR REAL-TIME
DATA ACQUISITION AND STRUCTURAL
HEALTH MONITORING**



Poster Paper Publication: IMECE2021-71881

Dillon Cvetic-Thomas - *New Mexico Institute of Mining & Technology*

Amy Tattershall - *New Mexico Institute of Mining & Technology*

Eli Jackson - *New Mexico Institute of Mining & Technology*

Dane Robergs - *New Mexico Institute of Mining & Technology*

Funmilola Nwokocho - *New Mexico Institute of Mining & Technology*

Andrei Zagrai - *New Mexico Institute of Mining & Technology*

ON THE VIBRATION TRANSFER CHARACTERISTICS FROM THE SEAT OF THE VEHICLE TO THE OCCUPANT

Poster Paper Publication: IMECE2021-72041

Ryoma Morisaki - *Toyama Prefectural University*

Osamu Terashima - *Toyama Prefectural University*

Fumiya Kinoshita - *Toyama Prefectural University*

Hideaki Touyama - *Toyama Prefectural University*

ROBOTIC-BASED REPAIR OF CONCRETE STRUCTURES: A SURFACE CRACK FILLER ROBOT

Poster Paper Publication: IMECE2021-72082

Melinda Stevens - *New Mexico Institute of Mining and Technology*

Samuel Arellano - *New Mexico Institute of Mining and Technology*

Diego Rodriguez - *New Mexico Institute of Mining and Technology*

James Wilson - *New Mexico Institute of Mining and Technology*

Zady Gutierrez - *New Mexico Institute of Mining and Technology*

Noah Trudell - *New Mexico Institute of Mining and Technology*

Hamed Momeni - *New Mexico Institute of Mining and Technology*

Arvin Ebrahimkhanlou - *New Mexico Institute of Mining and Technology*

ACOUSTIC EMISSION DETECTION AND SIGNAL SOURCE ANALYSIS OF BOILER WATER WALL TUBE

Poster Paper Publication: IMECE2021-72083

Yilin Yuan - *China Special Equipment Inspection and Research Institute*

Gongtian Shen - *China Special Equipment Inspection and Research Institute*

Yongna Shen - *China Special Equipment Inspection and Research Institute*

Junjiao Zhang - *China Special Equipment Inspection and Research Institute*

Wenjun Zhang - *Beijing Institute of Technology*

Qiang Wan - *China Special Equipment Inspection and Research Institute*

THE INFLUENCE OF WATER CONTENT ON THE APPARENT YOUNG'S MODULUS OF MAIZE STALK TISSUES

Poster Presentation: IMECE2021-72101

Brandon Sutherland - *Brigham Young University*

Douglas Cook - *Brigham Young University*

PROOF OF CONCEPT BIOREACTOR DESIGN: MECHANICALLY SYNCED ELECTRICAL STIMULATION VIA PIEZOELECTRIC SPINAL FUSION INTERBODY DEVICE ON PORCINE EXPLANTS

Poster Presentation: IMECE2021-72135

Victoria Drapal - *University of Kansas*

Jordan Gamble - *University of Kansas*

Lisa Friis - *University of Kansas*

Jennifer Robinson - *University of Kansas*



INNOVATIVE LEARNING TOOL UTILIZING COMPUTER VISION AND MIXED REALITY TO PROVIDE HANDS-ON LEARNING IN MECHANICS COURSES

Poster Presentation: IMECE2021-69212

Nathan Bennett - *University of Kansas*
Evan Haas - *University of Kansas*

WATER REMOVAL ON LIDAR SENSORS USING VIBRATIONS

Poster Presentation: IMECE2021-72321

Colton Frear - *Florida Polytechnic University*
Kyle Steel - *Florida Polytechnic University*
Edwar Romero - *Florida Polytechnic University*
Gerardo Carbajal - *Florida Polytechnic University*
Zahra Sadeghizadeh - *University of California*

DESIGN, MODELING, AND FABRICATION OF A VENTILATOR PROTOTYPE: A SUCCESSFUL STUDENT PROJECT STORY

Poster Paper Publication: IMECE2021-72492

Francis Iloeje - *Indiana University – Purdue University Indianapolis*
Haoyee Yeong - *Indiana University – Purdue University Indianapolis*
Eli Kindomba - *Indiana University – Purdue University Indianapolis*
Sunday Folorunso - *Indiana University – Purdue University Indianapolis*
Yafeng Li - *Tiangong University*
Jing Zhang - *Indiana University – Purdue University Indianapolis*

EMPLOYING MULTI-MATERIAL ADDITIVE MANUFACTURING FOR COATING OF 3-D PRINTED STRUCTURES

Poster Presentation: IMECE2021-72597

Arash Afshar - *Mercer University*

COST-PERFORMANCE ANALYSIS OF NEW HEATING EQUIPMENT FOR GREEN AND EFFICIENT ASPHALT ROOFING USING INFRARED RADIATION HEATERS AND FUEL BURNERS

Poster Presentation: IMECE2021-72717

Alberto Barragán-García - *Universidad de Alcalá*
Miguel Fernandez-Muñoz - *Universidad de Alcalá*
Alberto Vidal-Sánchez - *Universidad de Alcalá*
Efren Díez-Jimenez - *Universidad de Alcalá*

THE EFFECTS OF WRIST POSITION ON THE MEDIAN NERVE LONGITUDINAL MOBILITY DURING FINGER FLEXION

Poster Presentation: IMECE2021-73072

Yifei Yao - *Shanghai Jiao Tong University*
Kewei Song - *University of Illinois at Urbana-Champaign*

A NOVEL MICROFLUIDIC DEVICE WITH A BUILT-IN QUARTZ CRYSTAL MICROBALANCE (QCM) TO QUANTIFY COLLOIDAL PARTICLE DEPOSITION IN FILTRATION

Poster Presentation: IMECE2021-73239

Ran Ran - *Northeastern University*
Siqi Ji - *Northeastern University*
Kai-Tak Wan - *Northeastern University*
Hongwei Sun - *Northeastern University*



**EXPERIMENTAL INVESTIGATION,
MODELING AND SIMULATION FOR INDUSTRY
4.0 CASE STUDIES IN RAINWATER HARVESTING,
AND PREDICTIVE MAINTENANCE**

Poster Presentation: IMECE2021-73780

Devdas Shetty - *University of District of Columbia*
Nandan Shetty - *CITADEL*

**FINITE ELEMENT ANALYSIS OF SINGLE
VISCOELASTIC MYOBLAST UNDER
CYCLIC COMPRESSION**

Poster Presentation: IMECE2021-73807

Shurui Chong - *Shanghai Jiao Tong University*
Yifei Yao - *Shanghai Jiao Tong University*

**ESTIMATION OF RUBBER WEAR RATE USING THREE
DIFFERENT MACHINE LEARNING ALGORITHMS**

Poster Presentation: IMECE2021-74096

Anahita Emami - *Texas State University*
Houdji Hillary Gnidhoue - *Texas State University*
Seyedmeysam Khaleghian - *Texas State University*

**VIRTUAL LABS AND DOCUMENT CAMERA
PROJECTABLE DEMOS FOR REMOTE
EDUCATION IN MECHATRONICS**

Poster Presentation: IMECE2021-74186

Victoria Webster-Wood - *Carnegie Mellon University*
Jessica Harrell - *Carnegie Mellon University*
Zachary Mineroff - *Carnegie Mellon University*
Laura Pottmeyer - *Carnegie Mellon University*

**MODULAR PRINTED POWERED AIR
PURIFYING RESPIRATOR**

Poster Paper Publication: IMECE2021-69333

J. Brown - *Kennesaw State University*
M. Clifford - *Kennesaw State University*
J. Magana - *Kennesaw State University*
M. Salman - *Kennesaw State University*
D. Tran - *Kennesaw State University*

**ELASTIC WAVE PROPAGATION IN METAMATERIAL
THIN PLATES WITH PERIODIC SHUNTED
PIEZO-PATCHES**

Poster Presentation: IMECE2021-74215

Edson Jansen Pedrosa de Miranda Jr. - *Federal Institute
of Maranhão*
José Maria Campos Dos Santos - *University of Campinas*

**DESIGN OF A MANUFACTURING EXECUTION
SYSTEM BASED ON FACTOR ANALYSIS OF
DISCRETE DATA FOR DIAGNOSTIC AND
CLASSIFICATION DEFECTS IN A SIMULATED
PRODUCTION LINE**

Poster Presentation: IMECE2021-76317

Saul Favela Camacho - *Universidad Autonoma de Ciudad Juarez*
Javier Molina Salazar - *Universidad Autonoma de Ciudad Juarez*

**MACHINE LEARNING APPROACH TOWARDS
HEAT TRANSFER CORRELATIONS IN ROUGH
COOLING CHANNELS**

Poster Presentation: IMECE2021-76510

Faizan Ejaz - *Arizona State University*
Leslie Hwang - *Arizona State University*
Beomjin Kwon - *Arizona State University*



MACHINE LEARNING APPLICATION IN PREDICTING THE BOOSTING PRESSURE OF ELECTRICAL SUBMERSIBLE PUMPS (ESPS) UNDER VARIOUS FLOW CONDITIONS

Poster Presentation: IMECE2021-76541

Jianjun Zhu - *China University of Petroleum - Beijing*

Haiwen Zhu - *University of Tulsa*

Hong-Quan Zhang - *University of Tulsa*

ELECTRO-CHEMICAL HYDROGEN COMPRESSOR MODELING

Poster Presentation: IMECE2021-76631

Rui Yang - *Chungbuk National University*

Kibum Kim - *Chungbuk National University*

THE VEHICLE THAT USES HUMAN INTERFACE ENGINEERING

Poster Presentation: IMECE2021-76657

Mantosh Bhattacharya - *PIUL*

ON THE DEVELOPMENT OF ULTRASONIC CHARACTERISTICS OF BONE USING ACOUSTICS WAVES

Poster Presentation: IMECE2021-76816

Mohammad Hodaie - *University of Manitoba*

Pooneh Maghoul - *University of Manitoba*

FINITE ELEMENT MODELS GUIDE ENERGY DELIVERY FOR NON-CONTACT IRREVERSIBLE ELECTROPORATION IN THE ESOPHAGUS WITH THERMAL DAMAGE

Poster Presentation: IMECE2021-76819

Mary Chase Sheehan - *University of Massachusetts Amherst*

Govindarajan Srimathveeravalli - *University of*

Massachusetts Amherst

ELASTO-PLASTIC SHOCKWAVE PROPAGATION IN JAMMED GRANULAR MEDIA

Poster Presentation: IMECE2021-76860

Rannulu Devanjith Fonseka - *University of Illinois*

Philippe Geubelle - *University of Illinois at Urbana-Champaign*

John Lambros - *University of Illinois at Urbana-Champaign*

Amnaya Awasthi - *University of Florida*

IMPROVED REACTIVITY THROUGH MICRO-TREATMENT ON THE SURFACE OF THE CARBON ELECTRODE

Poster Presentation: IMECE2021-76884

Seung Hyun Lee - *Chungbuk National University*

Kibum Kim - *Chungbuk National University*

Hye One Lee - *Chungbuk National University*

Johnbosco Yesuraj - *Chungbuk National University*

TERRESTRIAL MISSION EXTENDER FOR WEATHER BALLOON RADIOSONDE

Poster Paper Publication: IMECE2021-69459

Carrington Chun - *Kennesaw State University*

Joseph McBride - *Kennesaw State University*

Kaveh Torabzadeh - *Kennesaw State University*

Andrew Smith - *Kennesaw State University*

Santana Roberts - *Kennesaw State University*



MICRO-BIOREACTOR FOR TISSUE SCAFFOLDS**Poster Presentation: IMECE2021-76947**

Sriharsha Srinivas Sundarram - *Fairfield University*
 Nwachukwu Ibekwe - *Fairfield University*
 Stephanie Prado - *Fairfield University*
 Sean Feeney - *Fairfield University*
 Clarissa Rotonto - *Fairfield University*

MANUFACTURING SIMULATION OF IMPULSE TURBINE MACHINE**Poster Presentation: IMECE2021-76975**

Rufus Chime - *Institute of Management and Technology*
 Kingsley Ugwuona - *Institute of Management and Technology*
Computer Simulation in Sugar Cane Cutting and Expelling Machine Design

Poster Presentation: IMECE2021-76977Rufus Chime - *IMT Enugu***AN ALL POLYMER BIOCOMPATIBLE ELECTROSMOTIC MICROPUMP FOR BIOMEDICAL APPLICATIONS****Poster Presentation: IMECE2021-77090**

Sai Siva Kare - *University of Illinois at Chicago*
 Pradeep Kumar Ramkumar - *University of Illinois at Chicago*
 John Finan - *University of Illinois at Chicago*

INTELLIGENT DENTAL IMPLANT DESIGN**Poster Presentation: IMECE2021-77133**

Rana Dabaja - *University of Michigan*
 Robert Buechler - *University of Michigan and Stanford University*
 Sun-Yung Bak - *University of Michigan*
 Gustavo Mendonca - *University of Michigan*
 Bogdan Popa - *University of Michigan*
 Mihaela Banu - *University of Michigan*

A TOOL TO ANALYZE AND SYNTHESIZE PLANAR MECHANISMS**Poster Presentation: IMECE2021-77344**

Alexander Galvan - *Worcester Polytechnic Institute*
 Pradeep Radhakrishnan - *Worcester Polytechnic Institute*

PRELIMINARY INVESTIGATION ON THE ACOUSTIC CHARACTERISTICS OF TURNING PROCESSES**Poster Presentation: IMECE2021-77355**

Zachery Deabenderfer - *Penn State University*
 Katherine Korn - *Penn State University*
 Scott Kerner - *Clemson University*
 Ihab Ragai - *Penn State University, Erie*
 Yabin Liao - *Embry-Riddle Aeronautical University*
 David Loker - *Penn State University*

DESIGN OF A WIND TURBINE BLADE TO MAXIMIZE POWER OUTPUT WITH SIMULATED AND EXPERIMENTAL ANALYSIS**Poster Presentation: IMECE2021-77412**

Silverio Vazquez Ruiz - *Tarleton State University*
 William Flores - *Tarleton State University*
 Hoe-Gil Lee - *Tarleton State University*

PERSONALIZED DRIVING USING INVERSE REINFORCEMENT LEARNING WITH REGION-BASED APPROXIMATION**Poster Presentation: IMECE2021-77429**

Rodrigo Gonzalez - *University of Texas Rio Grande Valley*
 Constantine Tarawneh - *University of Texas Rio Grande Valley*
 Tohid Sardarmehni - *University of Texas Rio Grande Valley*



ANALYZING PDMS STAMPS FOR CONTACT PRINTING

Poster Presentation: **IMECE2021-77437**

Nate James - *Umass Amherst*
Sahil Wankhede - *Umass Amherst*
Xian Du - *Umass Amherst*

EFFECT OF INACTIVE INGREDIENTS IN SURFACE DISINFECTANTS AND USE OF PREDICTIVE MODELING ON MATERIAL COMPATIBILITY

Poster Presentation: **IMECE2021-69524**

Jesiska Tandy - *Metrex Research, LLC/KaVo Kerr*
Alexander Wollenberg - *Metrex Research, LLC/KaVo Kerr*
Daniela Barrera - *Metrex Research, LLC/KaVo Kerr*
James Chia - *Metrex Research, LLC/KaVo Kerr*

EXPERIMENTAL STUDY ON THE RELATION BETWEEN FLOW-INDUCED VIBRATION AND NOISE GENERATION OF A FLUTTERING FLAG

Poster Presentation: **IMECE2021-77447**

Miyu Okuno - *Kanazawa University*
Reon Nishikawa - *Toyama Prefectural University*
Koki Shige - *Toyama Prefectural University*
Osamu Terashima - *Toyama Prefectural University*
Yasufumi Konishi - *Tohoku University*
Toshihiko Komatsuzaki - *Kanazawa University*

DECENTRALIZED MULTI-AGENT DEEP REINFORCEMENT LEARNING FOR SURVEILLANCE USING DRONE SWARM

Poster Presentation: **IMECE2021-77449**

Alberto Velazquez - *University of Texas Rio Grande Valley*
Lei Xu - *University of Texas Rio Grande Valley*

THERMAL CONDUCTIVITY MEASUREMENT OF INFUSED FILAMENTS FOR ADDITIVE MANUFACTURING

Poster Presentation: **IMECE2021-77518**

Kyle Steel - *Florida Polytechnic University*
Ecieno Carmona - *Florida Polytechnic University*
Edwar Romero - -
Gerardo Carbajal - *Florida Polytechnic University*

AERODYNAMIC DESIGN OF LIDAR SENSOR COVERS TO IMPROVE ITS PERFORMANCE UNDER ADVERSE WEATHER CONDITIONS

Poster Presentation: **IMECE2021-77554**

Gerardo Carbajal - *Florida Polytechnic University*
Danil Pegin - *Florida Polytechnic University*
Zahra Sadeghizadeh - *The University of California, Davis*
Edwar Romero Ramirez - *Florida Polytechnic University*
Charisma Clarke - *Florida Polytechnic University*

SOLAR HEAT FLUX EFFECT ON RATE OF WATER DROPLETS DEPOSITION ON LIDAR SENSOR COVERS

Poster Presentation: **IMECE2021-77567**

Colton Frear - *Florida Polytech University*
Danil Pegin - *Florida Polytechnic University*
Gerardo Carbajal - *Florida Polytechnic University*
Edwar Romero - *Florida Polytechnic University*
Zahra Sadeghizadeh - *The University of California, Davis*



STABLE ELECTRODE MATERIALS FOR ALKALI METAL-ION BATTERIES: SILICON OXYCARBIDE FUNCTIONALIZED TRANSITION METAL DICHALCOGENIDES

Poster Presentation: IMECE2021-77594

Sonjoy Dey - *Kansas State University*

Gurpreet Singh - *Kansas State University*

LOW COST MANUFACTURING PROCESS OF MICROFLUIDICS CHANNEL FOR DNA SEPARATION BY THE DIELECTROPHORESIS METHOD

Poster Presentation: IMECE2021-77666

Hector Zepeda - *The University of Texas Rio Grande Valley*

Shanzida Kabir - *The University of Texas Rio Grande Valley*

Nazmul Islam - *The University of Texas Rio Grande Valley*

INTERPRETABLE MACHINE LEARNING MODEL FOR THE DEFORMATION OF MULTIWALLED CARBON NANOTUBES UNDER TORSION AND BENDING

Poster Presentation: IMECE2021-77703

Upendra Yadav - *Michigan Technological University*

Shashank Pathrudkar - *Michigan Technological University*

Susanta Ghosh - *Michigan Technological University*

MECHANICAL PROPERTIES AND DUROMETER TESTING RELATIONSHIP OF THERMOPLASTIC POLYURETHANE

Poster Paper Publication: IMECE2021-69648

Edwar Romero - *Florida Polytechnic University*

Charisma Clarke - *Florida Polytechnic University*

Sanna Siddiqui - *Florida Polytechnic University*

Gerardo Carbajal - *Florida Polytechnic University*

ENHANCED SOLAR-DRIVEN PHOTOELECTROCHEMICAL (PEC) SPLITTING BY HETEROJUNCTIONS AT MULTIPHASE TiO₂ INTERFACES

Poster Presentation: IMECE2021-69712

Xiangkun (Elvis) Cao - *Cornell University*

Xu Liu - *Cornell University*

A TIME-FREQUENCY DOMAIN ADAPTIVE CONTROL APPROACH FOR VIBRATION OF ACTIVE MAGNETIC BEARING SYSTEM

Poster Paper Publication: IMECE2021-69771

Xuan Yao - *Harbin Institute of Technology*

Zhaobo Chen - *School of Mechatronics Engineering,*

Harbin Institute of Technology

ACTIVE VIBRATION CONTROL OF AEROSPACE STRUCTURAL SYSTEMS FOR SPECIFIED DAMPING

Poster Paper Publication: IMECE2021-70469

Sathya Hanagud - *Georgia Institute of Technology*





ASME 2021 IMECE®
International Mechanical Engineering Congress & Exposition®

Virtual Conference

See you in 2022

<https://event.asme.org/IMECE>

The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD