Program

https://event.asme.org/IMECE
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

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00AM-11:00AM</td>
<td>Keynote</td>
</tr>
<tr>
<td>11:00AM-11:20AM</td>
<td>Break</td>
</tr>
<tr>
<td>11:20AM-12:50PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>12:50PM-1:10PM</td>
<td>Break</td>
</tr>
<tr>
<td>1:10PM-1:55PM</td>
<td>Track Plenary Sessions</td>
</tr>
<tr>
<td>1:55PM-2:15PM</td>
<td>Break</td>
</tr>
<tr>
<td>2:15PM-3:15PM</td>
<td>Special Panels</td>
</tr>
<tr>
<td>3:15PM-3:35PM</td>
<td>Break</td>
</tr>
<tr>
<td>3:35PM-5:05PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>5:05PM-5:25PM</td>
<td>Break</td>
</tr>
<tr>
<td>5:25PM-6:55PM</td>
<td>Technical Sessions</td>
</tr>
</tbody>
</table>

### Tuesday, November 2nd

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00AM-11:30AM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>11:30AM-11:50AM</td>
<td>Break</td>
</tr>
<tr>
<td>11:50AM-12:35PM</td>
<td>Track Plenary Sessions</td>
</tr>
<tr>
<td>12:35PM-12:55PM</td>
<td>Break</td>
</tr>
<tr>
<td>12:55PM-2:25PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>2:25PM-3:25PM</td>
<td>Marketplace / Poster Hall</td>
</tr>
<tr>
<td>3:25PM-4:55PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>4:55PM-5:15PM</td>
<td>Break</td>
</tr>
<tr>
<td>5:15PM-6:15PM</td>
<td>Special Roundtables</td>
</tr>
<tr>
<td>6:15PM-6:35PM</td>
<td>Break</td>
</tr>
<tr>
<td>6:35PM-8:05PM</td>
<td>Technical Sessions</td>
</tr>
</tbody>
</table>
**IMECE Schedule**

### Wednesday, November 3rd

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00AM - 11:30AM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>11:30AM - 11:50AM</td>
<td>Break</td>
</tr>
<tr>
<td>11:50AM - 12:35PM</td>
<td>Track Plenary Sessions</td>
</tr>
<tr>
<td>12:35PM - 12:55PM</td>
<td>Break</td>
</tr>
<tr>
<td>12:55PM - 2:25PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>2:25PM - 3:25PM</td>
<td>Marketplace / Poster Hall</td>
</tr>
<tr>
<td>3:25PM - 4:25PM</td>
<td>Special Panels</td>
</tr>
<tr>
<td>4:25PM - 4:45PM</td>
<td>Break</td>
</tr>
<tr>
<td>4:45PM - 6:15PM</td>
<td>Technical Sessions</td>
</tr>
</tbody>
</table>

### Thursday, November 4th

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00AM - 11:00AM</td>
<td>Keynote</td>
</tr>
<tr>
<td>11:00AM - 11:20AM</td>
<td>Break</td>
</tr>
<tr>
<td>11:20AM - 12:05PM</td>
<td>Track Plenary Sessions</td>
</tr>
<tr>
<td>12:05PM - 12:25PM</td>
<td>Break</td>
</tr>
<tr>
<td>12:25PM - 1:55PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>1:55PM - 2:55PM</td>
<td>Marketplace / Poster Hall</td>
</tr>
<tr>
<td>2:55PM - 3:55PM</td>
<td>Special Roundtables</td>
</tr>
<tr>
<td>3:55PM - 4:15PM</td>
<td>Break</td>
</tr>
<tr>
<td>4:15PM - 5:45PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>5:45 - 6:00PM</td>
<td>Break</td>
</tr>
<tr>
<td>6:00PM - 7:30PM</td>
<td>Technical Sessions</td>
</tr>
</tbody>
</table>

### Friday, November 5th

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00AM - 11:00AM</td>
<td>Keynote</td>
</tr>
<tr>
<td>11:00AM - 11:20AM</td>
<td>Break</td>
</tr>
<tr>
<td>11:20AM - 12:50PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>12:50PM - 1:10PM</td>
<td>Break</td>
</tr>
<tr>
<td>1:10PM - 2:40PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>2:40PM - 3:00PM</td>
<td>Break</td>
</tr>
<tr>
<td>3:00PM - 4:30PM</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>4:30PM - 5:00PM</td>
<td>Closing Remarks and Feedback Suggestions</td>
</tr>
</tbody>
</table>
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 Medal Award (2006), the Czochralski 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 Soraa 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.
“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 Subcommittee 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.

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 Phononics
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 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 Mecanique (part-time) at Ecole Polytechnique from 1998 to 2004. Professor Willis is a Fellow 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: 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. Païdoussis 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.

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.
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: Mehrdad 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

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 precooler, 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\textsuperscript{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\textsuperscript{1,2,3} which revealed that the fracture energy $G$ (or $K_c$, $J_c$) of a quasibrittle material or plastic hardening metal depends strongly on the level and history of crack-parallel stresses $\sigma_{xx} (=T)$, $\sigma_{zz}$, $\sigma_{xz}$ and can change $G$ by even ±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, critique. 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 fits the data from all the classical and gap tests closely. The previously discussed 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://HYPERLINK "http://www.civil.northwestern.edu/people/bazant" www.civil.northwestern.edu/people/bazant):


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 K´arm´an, 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.

**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

**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
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.

---

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**

Scott M. Thompson
Kansas State University

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

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

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

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 roundtable 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
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

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 dependance 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**

Joseph R. Smith
Director
Mechanical & Aerospace Division
SC Solutions

Hayley Brown, Ph.D
Mill and Forging Technology Manager
Steel Founders’ Society of America (SFSA)

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.
**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.
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

**Roundtable Leader**

Anabela C. Alves  
ALGORITMI R&D Centre Department of Production and Systems  
School of Engineering, University of Minho  
Guimarães, Portugal

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**

Roozbeh (Ross) Salary, Ph.D.  
Assistant Professor of Mechanical & BioMedical Engineering  
Marshall University (West Virginia State)
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 Leaders

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

Troy Munro
Assistant Professor
Brigham Young University

Xinwei Wang, Ph.D.
Professor
Iowa State University
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.

**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)

**Moderator**

- **Joseph R. Smith**  
  Director, Mechanical & Aerospace Division, SC Solutions
**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

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)

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.
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

machines

an open access journal by MDPI

WILEY
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.

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).
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.

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.
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.

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.

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.
This year’s meetings will take place online November 8-12, 2021. Registration through the Zoom link is required 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](https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events) to access those links.

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

Please visit our website: [https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events](https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events) to access those links.

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

(By Day)

Please visit our website: [https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events](https://event.asme.org/IMECE/Program/Committee-Meetings-Special-Events) to access those links.

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

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.

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. 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.

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.

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.
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 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

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
Erasmo 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 Andérez 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
Erasmo Carrera - Politecnico di Torino
Alfonso Pagani - Politecnico di Torino

04-04-01: ADVANCES IN AEROSPACE STRUCTURES AND MATERIALS AND NONLINEAR PROBLEMS IN AEROSPACE STRUCTURES
NOVEMBER 1, 2021
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

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
Jasem 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
11:50AM–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

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-RECIROCITY, 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
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

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

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
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

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

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
**11:30 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
Sanjivan Manoharan - Grand Valley State University

**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

**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

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

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
Arvay Pradhan - The University of Iowa
Phillip Deierling - The University of Iowa

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 Isaias - Universidad Autónoma de Nuevo León
Cavazos Lucero - Universidad Autónoma de Nuevo León
Palacka Radoslav - University of Zilina

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

11:20AM–12:50PM

**TEMPERATURE GRADIENT EFFECTS IN COLLOIDS OF ELLIPSOIDAL PARTICLES UNDER MICROGRAVITY**

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

12:00PM–12:10PM:

**ENHANCED VOLTAGE GENERATION THOUGH 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**

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

---

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

---

11:00AM–12:00PM:

**10-03-01: FUNDAMENTAL ISSUES AND PERSPECTIVES IN FLUID MECHANICS - I**

NOVEMBER 1, 2021

---

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

---

12:00PM–12:10PM:

**THEORETICAL CHARACTERIZATION OF LIQUID SLOSHING IN CONTAINERS**

Technical Paper Publication: IMECE2021-70152
S. Karthick - Amrita School of Engineering
V. Satish - Amrita School of Engineering

---

11:30AM–11:40AM:

**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:

**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

---

11:50AM–12:00PM:

**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

---

12:00PM–12:10PM:

**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 NACL/KCL/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(Ni0.8Co0.1Mn0.1)O2 CATHODE MATERIALS USING UREA AND POLYVINYLPYRROLIDONE 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 META SURFACE: 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
Deebo 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 Paper Publication: IMECE2021-67665
Xiaobin Le - Wentworth Institute of Technology

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 MULTINODAL 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 Hoezel - 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
Jun-chen Li - Northwestern Polytechnical University
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Technical Presentations</th>
</tr>
</thead>
</table>
| 3:55PM–4:05PM| Crack face contact modeling using tensionless foundation for face/core debonds in sandwich beams | Siddarth Niranjan 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 | Siddarth Niranjan 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 | 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 | Zhangxian Yuan - Worcester Polytechnic Institute |
| 3:35PM–5:05PM| Axial impact behavior of liquid nanofoam filled thin-walled tubes | 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 | 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 | 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

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
Alejandro Saez - University of North Texas
Maurizio Manzo - University of North Texas
Marco Ciarcià - 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 Svaåen - 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
4:25PM–4:35PM:
MODEL OF SYSTEMS WITH DISCONTINUITY

Technical Presentation: IMECE2021-77284
Pezhman Hassanpour - Gannon University
Peter J. Caulfield - Gannon University

3:35PM–5:05PM

07-03-02 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS II
NOVEMBER 1, 2021

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 School of Engineering
Nithishrajan K - Amrita School of Engineering
Gaouthaman M - Amrita School of Engineering
Chandraditya B - Amrita 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

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

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

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
Sathyanarayan 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: IMECE2021-69563
Phillip 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 - MUENSTERS 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:

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

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

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: IMECE2021-69681
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
Yangsu 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
Giovanny 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

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

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:

**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

4:05PM–4:15PM:

**MULTIOBJECTIVE RELIABILITY-BASED DESIGN OF AN AIRCRAFT WING USING A FUZZY-BASED METAHEURISTIC**

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:

**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

4:15PM–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
Lilian O. Iheukwumere-Esotu - University of Manchester
Akilu Yunusa-Kaltungo - University of Manchester

4:25PM–4:35PM:

**MULTIOBJECTIVE RELIABILITY-BASED DESIGN OF AN AIRCRAFT WING USING A FUZZY-BASED METAHEURISTIC**

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

4:35PM–4:45PM:

**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

4:45PM–4:55PM:

**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

4:55PM–5:05PM:

**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

4:05PM–5:05PM:

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

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

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:

**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: IMECE2021-70716
Gregory A. Langone - United States Military Academy
Brad G. Davis - United States Military Academy
Nicholas A. Reisweber - United States Military Academy

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
Lilian 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
Technical Paper Publication: IMECE2021-71001
Suwin Sleesongsom - 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
Ramathasan 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
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

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 Bakhoum - University of West Florida

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

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 Homsi - 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 Ravenberg 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

---

**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

---

**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

---

**5:55PM–6:05PM:**

**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

---

**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

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

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

5:55PM–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-BÉNARD 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 THERMEOLECTRIC 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

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–6:59PM

Chair: 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 Fabariso - 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 Nouh - 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 Nihare - 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 DEFORMATION 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
Ayoub Moussa Hassane - Harbin Engineering University
Wang Qingyu - Harbin Engineering University
Mohammed Ado - Harbin Engineering University
Doctor Eniweru - 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 Loran - 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 Loran - Institut de Recherche Technologique SystemX

10:50AM–11:00AM:
DIGITAL TWIN ADDITIVE RECONSTRUCTION TOOL FOR MICROMECHANICAL MODELING OF 3D-PRINTED PARTS
02-13-01: DIGITAL TWIN ASPECTS
NOVEMBER 2, 2021

10:00AM–11:30AM

Chaired by:
Chetan Nikhare - The Pennsylvania State University
Scott Thompson - Kansas State University
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 Partyshov - 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
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 Göker - TOBB University of Economics and Technology
Abdulhamid Doğru - TOBB University of Economics and Technology
Recep M. Gorguluarslan - TOBB University of Economics and Technology
Istemihan Goddag - 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

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

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

10:30AM–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

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. Bertolin - 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 ORGANOIDS**
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 ELECTRORHEOLOGICAL DAMPERS USING A COMBINATION OF LEAST SQUARES AND RADIAL BASIS FUNCTION NEURAL NETWORKS TECHNIQUES

Technical Paper Publication: IMECE2021-6684
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
DISTANCE/ONLINE ENGINEERING EDUCATION, MODELS AND ENABLING TECHNOLOGIES
NOVEMBER 2, 2021

10:00AM–10:10AM:
MOBILE SOLARPOWERED 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 Hindsageri - 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: IMECE2021-72073
Divya Jaladi - Tennessee Technological University
Matthew Pearce - Tennessee Technological University
C.W. Van Neste - Tennessee Technological University
Ethan Languri - Tennessee Technological University

10:30AM–10:40AM:

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

10:20AM–10:30AM:

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:

STUDY OF FLOW PATTERN CONFIGURATION EFFECT IN COOLING SYSTEMS
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-Yeol 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
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 Atollahi - 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 Hedeen - 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
Boqil 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
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: IMECE2021-71502
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

1:25PM–1:35PM:
A CONTROL ORIENTED SOOT MINIMIZATION MODEL FOR DIESEL ENGINES USING AN INTEGRATED APPROACH

Technical Paper Publication: IMECE2021-70904
Hashim Alnami - Wichita State University
Chengzong Pang - Wichita State University
Avinash Papineni - Southern Illinois University Edwardsville
Xin Wang - Southern Illinois University Edwardsville

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
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

MULTI-PURPOSE OPEN SOURCE QUADRUPED 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

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

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

FAST-CHARGING LI-ION BATTERIES FOR ELECTRIC VEHICLES: UNDERSTANDING AND TACKLING THE CHALLENGES

Invited Presentation: IMECE2021-76803
Donal Finegan - National Renewable Energy Laboratory

MESOSCALE INTERACTIONS IN COMPOSITE CATHODES OF ALL-SOLID-STATE LITHIUM BATTERIES
1:45PM–1:55PM:

**DATA-DRIVEN SAFETY RISK CLASSIFICATION OF LITHIUM-ION BATTERIES**

Technical Presentation: IMECE2021-77347
Kaustabh Girish Naik - Purdue University
Bairav Sabarish Vishnugopi - Purdue University
Partha P. Mukherjee - Purdue University

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: IMECE2021-73344
Hadi Ali - Arizona State University

1:15PM–1:25PM:

**NUMERICAL SIMULATION OF MARS AND EARTH PARTICLE SALTATION**

Technical Presentation: IMECE2021-77078
Zhongquan 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: IMECE2021-72185
Tausif 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: IMECE2021-70051
Philipp 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: IMECE2021-69769
Berke Haznedaroğlu - Istanbul Technical University
Omer Ciftci - Istanbul Technical University
Sertac Cadirci - Istanbul Technical University
Serhad Aytac - Turkish Aircraft Industries Corporation

10-04-01:

**CFD APPLICATIONS - I**

NOVEMBER 2, 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 TURBULENT PIPE FLOW WITH 90-DEGREE ELBOW USING WALL Y+ APPROACH**

Technical Paper Publication: IMECE2021-69986
Ahmed 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: IMECE2021-69769
Berke Haznedaroğlu - 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: IMECE2021-77078
Zhongquan 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: IMECE2021-72185
Tausif 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: IMECE2021-70051
Philipp 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: IMECE2021-69769
Berke Haznedaroğlu - Istanbul Technical University
Omer Ciftci - Istanbul Technical University
Sertac Cadirci - Istanbul Technical University
Serhad Aytac - Turkish Aircraft Industries Corporation
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:
RECIPIROCATING 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
Constandinos 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)
Xuewen 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:
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)
Xuewen Cao - China University of Petroleum (East China)
Jiang Bian - China University of Petroleum (East China)
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 Aminjikarai - 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 CONTINUOUS**

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 PROTOTYPEING OF SELF-EXPANDING NITINOL FRAMES WITH A SMALL-FORM FACTOR USING SACRIFICIAL HYPOTUBES IN THE SHAPE SETTING PROCESS**
1:05PM–1:15PM:

THERMAL CYCLE RELIABILITY ANALYSIS OF DIRECT BONDING COPPER POWER MODULE CONSIDERING THE MANUFACTURING PROCESS EFFECT

Technical Presentation: IMECE2021-69558
Seyedhamidreza Alaie - New Mexico State University

1:15PM–1:25PM:

EFFECT OF TENSILE STRAIN ON ELECTRON TRANSPORT PROPERTIES OF DUMBBELL-SHAPE GRAPHENE NANORIBBONS WITH METALLIC-SEMI-ConDUCTING 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

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
12:55PM–2:25PM

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
NOVEMBER 1 – 5, 2021
EVENT.ASME.ORG/IMECE

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. Krovvidi - 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
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

Jianzhi Li - University of Texas Rio Grande Valley
Ben Xu - Mississippi State University

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**
3:45PM–3:55PM:

BOUND 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
NOVEMBER 1 – 5, 2021

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: IMECE2021-71579
Jean Chagas Vaz - University of Nevada
Dylan Wallace - University of Michigan
Paul Y. Oh - University of Nevada
3:35PM–3:45PM:

**NONLINEAR DYNAMICS SIMULATION IN CONTACT FORCE IN CAM-FOLLOWER SYSTEM USING LYAPUNOV EXPONENT PARAMETER**

Technical Paper Publication: IMECE2021-67448
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: IMECE2021-68778
Louay S. Yousuf - San Diego State University

3:55PM–4:05PM:

**USE OF LIDAR FOR NEGATIVE OBSTACLE DETECTION: A THOROUGH REVIEW**

Technical Paper Publication: IMECE2021-69393
Matthias Dörr - Karlsruhe Institute of Technology
Alexander Dürrkopp - 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

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: IMECE2021-70747
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
4:15PM–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 Bolivar
- Pedro Fragoso - Popular University of Cesar

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
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) Chiu - 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
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: IMECE2021-72697
Kyle Janosky - Parker Hannifin
Maryam Younessi - Cleveland State University
Bipin Kashid - Parker Hannifin

4:05PM–4:15PM:

**NUMERICAL SIMULATION OF THE FLOW INSIDE A HORIZONTAL CLOSED REFRIGERATED DISPLAY CABINET**

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

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:

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/GRAFITE 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
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: IMECE2021-72196

Fei Song - 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: IMECE2021-72222

Fei Song - Schlumberger

Kevin Shi - Schlumberger

Ke Li - Schlumberger

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 Manzanas - 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

4:25PM–5:25PM:

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
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 - Kahramanmaras Sutcu Imam University
Burak Korçuklu - 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: IMECE2021-70017

Romesh Prasad - Syracuse University
Young Moon - Syracuse University

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: IMECE2021-68993
Xin 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: IMECE2021-71524
Mark 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: IMECE2021-71728
Elnaz 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–8:05PM

Chair: Mostafa Nouh - 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: IMECE2021-73731
Jon 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: IMECE2021-69640
Elise 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**
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 Karpat - Bursa Uludag University
Stephen Ekwaro-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

7:05PM–7:15PM:
AN ULTRA-LOW-FREQUENCY ACTIVE VERTICAL VIBRATION ISOLATOR WITH HORIZONTAL CONSTRAINTS FOR ABSOLUTE GRAVIMETRY

Technical Paper Publication: IMECE2021-67652
Hamzeh Bardaweel - Louisiana Tech University
Winner Anigbogu - Louisiana Tech University

7:15PM–7:25PM:
A VISCOELASTIC TUNED MASS DAMPER FOR VIBRATION TREATMENT OF LARGE STRUCTURES

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

7:25PM–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
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 Ishman 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 STEREOLITHOGRAPHY: 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 Ghoral - 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. Fuller - 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

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

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
Supradeepan K. - Birla Institute of Technology & Science, Pilani

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

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

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 Donell - University of California
Scott Samuelsen - University of California, Irvine

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
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

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: IMECE2021-71770
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

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
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
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
Dong Youn Kim - Purdue University
Thomas Siegmund - Purdue University
Yanbin Li - North Carolina State University
Qiuting Zhang - Yale University
Yaoye Hong - North Carolina State University
Jie Yin - North Carolina State University
Jan-Hendrik Bastek - ETH Zurich
Sid Kumar - Technische Universität Delft
Bastian Telgen - ETH Zurich
Raphael Glaesener - ETH Zurich
Dennis Kochmann - ETH Zurich
Anthony Jones - University of Maryland, College Park
Midhun Varghese - University of Maryland, College Park
Eleonora Tubaldi - University of Maryland, College Park
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
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

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:

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

7:15PM–7:25PM:

DESIGN OF PHONONIC BANDGAP METAMATERIALS BY GAUSSIAN MIXTURE VARIATIONAL AUTOENCORDER 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

7:25PM–7:35PM:

INCREASED VEHICLE INTRUSION AS A RESULT OF VEHICLE WEIGHT

Technical Presentation: IMECE2021-73915
Horst Lanzerath - Ford
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

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

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

6:35PM–7:05PM:

**09-11-02: ENGINEERING RESEARCH INNOVATION II**

**NOVEMBER 2, 2021**

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–7:15PM:

**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. Ioup - 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. Ioup - 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 Nouh - 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. Vipperman - University of Pittsburgh

10:20AM–10:30AM:
RESEARCH ON CONTROL STRATEGY OF AUTOMOBILE SIMULATE SOUND BASED ON HARMONIC ALGORITHM

Technical Paper Publication: IMECE2021-74492
Mohammad Hodaei - University of Manitoba
Pooneh Maghoul - University of Manitoba

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 Tsosie - 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 Ebrahimkhahamou - New Mexico Institute of Mining and Technology
Arvin Ebrahimkhahamou - 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
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Chair(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00AM–11:30AM</td>
<td><strong>ADDITIONAL MANUFACTURING OF HEAT TRANSFER EQUIPMENT</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOVEMBER 3, 2021</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Chair:</strong> Chetan Nikhare - The Pennsylvania State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Chair: Scott Thompson - Kansas State University</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Chair: M.P. Jahan - Miami University</strong></td>
<td></td>
</tr>
<tr>
<td>10:00AM–10:10AM</td>
<td><strong>RECENT ADVANCES IN THIN-WALL ADDITIVELY MANUFACTURED HEAT EXCHANGERS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Paper Publication: IMECE2021-73212</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arun Muley - Boeing Research and Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Michael Stoia - Boeing Research and Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doug Van Affelen - Boeing Research and Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Venkateswara Reddy - Boeing Research and Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vyas Duggirala - Boeing Research and Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Summer Locke - Boeing Research and Technology</td>
<td></td>
</tr>
<tr>
<td>10:10AM–10:20AM</td>
<td><strong>PARAMETRIC EVALUATION OF AM ENABLED SINUSOIDAL HEAT TRANSFER SURFACES THROUGH NUMERICAL SIMULATIONS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Paper Publication: IMECE2021-69552</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vyas Duggirala - Boeing Research &amp; Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Venkateswara Reddy - Boeing Research &amp; Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arun Muley - Boeing Research &amp; Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Michael Stoia - Boeing Research &amp; Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Garrett Ek - Boeing Research &amp; Technology</td>
<td></td>
</tr>
<tr>
<td>10:20AM–10:30AM</td>
<td><strong>PROCESS MAPPING OF ADDITIVELY MANUFACTURED METALLIC WICKS THROUGH SURROGATE MODELING</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Paper Publication: IMECE2021-71241</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mohammad Borumand - Wichita State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sima Esfandiarpour Borujeni - Wichita State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Saideep Nannapaneni - Wichita State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moriah Ausherman - Wichita State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guru Madiraddy - University of Nebraska-Lincoln</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Michael Sealy - University of Nebraska-Lincoln</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gisuk Hwang - Wichita State University</td>
<td></td>
</tr>
<tr>
<td>10:30AM–10:40AM</td>
<td><strong>MODELING THE EFFECTS OF SURFACE ROUGHNESS VARIATIONS ON PRESSURE DROP IN FLOW MINICHANNELS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Paper Publication: IMECE2021-72042</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abdulaziz Alghamdi - Western New England University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suliman Alfaiz - Western New England University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marwan Alsulami - Western New England University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mehdi Mortazavi - Western New England University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seyed A. Niknam - Western New England University</td>
<td></td>
</tr>
<tr>
<td>10:40AM–10:50AM</td>
<td><strong>NUCLEAR AND ION IRRADIATION OF ADDITIVELY MANUFACTURED NICKEL-BASED SUPERALLOYS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Presentation: IMECE2021-77500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mohanish Andurkar - Kansas State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valentina O'Donnell - University of Missouri</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tahmina Keya - Auburn University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>John Gahl - University of Missouri</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bart Prorok - Auburn University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scott Thompson - Kansas State University</td>
<td></td>
</tr>
</tbody>
</table>
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

10:20AM–10:30AM:

**PROCESS PARAMETER OPTIMIZATION IN MACHINING OF Γ-TIAL WITH HEXAGONAL INSERTS**

Technical Paper Publication: IMECE2021-69934

Ching-Tun Peng - Jiangsu University
Iqbal Shareef - Bradley University

10:00AM–11:30AM

**ADVANCED MACHINING AND FINISHING PROCESSES-I**

NOVEMBER 3, 2021

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: IMECE2021-72447

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–10:40AM:

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

10:40AM–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

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

10:00AM–10:20AM:

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 VISCOSITY 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 HETEROGENEOUS, 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 Bolivar
Camilo Negrete - Universidad Tecnológica de Bolivar
Daniel Yabrudy - Universidad Tecnológica de Bolivar
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: IMECE2021-70524
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

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 Bolivar
Dawing Guette - Universidad Tecnológica de Bolivar
Deibys Barreto - Universidad Tecnológica de Bolivar
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
Khaliil 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
Ka'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–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

10:00AM–10:10AM:
EXPERIMENTAL STUDY OF HEAT TRANSFER CHARACTERISTICS OF DRYING PROCESS WITH DIELECTROPHORESIS MECHANISM

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

Chair: Subramanyaravi Annapragada - United Technologies Research
Chair: Kevin Dowding – Sandia National Laboratories
Chair: Alexander Rattner - Penn State University
10:10AM–10:20AM:
SURFACE EVAPORATION OF SESSILE WATER DROPLET ON A HYDROPHOBIC SURFACE

Technical Paper Publication: IMECE2021-69545
Mengqiao Yang - Worcester Polytechnic Institute
Munevver Elif Asar - Worcester Polytechnic Institute
Jamal Yagoobi - Worcester Polytechnic Institute

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: IMECE2021-72622
Minwoo Lee - University of Missouri
Chanwoo Park - University of Missouri

10:30AM–10:40AM:
THREE-DIMENSIONAL NUMERICAL STUDY ON THE FLOW AND HEAT TRANSFER IN WICK OF LOOP 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

10:40AM–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
<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:10AM–10:20AM:</td>
<td>PHONON SCATTERING FROM CARBON NANOTUBE AND GRAPHENE JUNCTION UNDER MECHANICAL DEFORMATION</td>
</tr>
<tr>
<td>10:20AM–10:30AM:</td>
<td>THERMAL TRANSPORT IN CARBON NANOCOMPOSITES UNDER MECHANICAL STRAIN</td>
</tr>
<tr>
<td>10:30AM–10:40AM:</td>
<td>A SCATTERING MATRIX SCHEME TO MODEL THE PERIODIC HEATING PROBLEM IN LAYERED STRUCTURES</td>
</tr>
<tr>
<td>10:40AM–10:50AM:</td>
<td>MODULATING THE THERMAL TRANSPORT ACROSS SI/4H-SIC INTERFACE VIA NANOPATTERNS</td>
</tr>
<tr>
<td>10:50AM–11:00AM:</td>
<td>MODELING ANISOTROPIC THERMAL TRANSPORT IN BLACK-PHOSPHORUS-LIKE MATERIALS</td>
</tr>
<tr>
<td>12-16-02: GENERAL SESSION</td>
<td>NOVEMBER 3, 2021</td>
</tr>
<tr>
<td>10:00AM–11:30AM</td>
<td></td>
</tr>
<tr>
<td>10:00AM–10:10AM:</td>
<td>APPLICATION OF TOPOLOGY OPTIMIZATION TO DESIGN A STRUCTURAL PANEL SUBJECTED TO BLAST LOADING</td>
</tr>
</tbody>
</table>
10:20AM–10:30AM:

A GRAPH BASED DESIGN METHODOLOGY FOR COMPLIANT MECHANISMS (NONLINEAR SPRINGS) TO MORE FULLY EXPLORE AND EXPLOIT THE DESIGN DOMAIV

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

10:30AM–10:40AM:

PROGRAMMABLE SOFT METASTRUCTURES VIA MULTI-MATERIAL TOPOLOGY OPTIMIZATION: PART I

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 University Joint Institute
Haiping Yi - University of Michigan and Shanghai Jiao Tong University Joint Institute
Shane Johnson - University of Michigan and Shanghai Jiao Tong University Joint Institute

10:40AM–10:50AM:

PROGRAMMABLE SOFT METASTRUCTURES VIA MULTI-MATERIAL TOPOLOGY OPTIMIZATION: PART II

Technical Presentation: IMECE2021-74206
Xiaojia 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 IMMERSED 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 Mylavarapu - 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**
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
Agustín 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 Nouh - 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: IMECE2021-68675
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 Khazdadeh - 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
Wenhu Wang - Northwestern Polytechnical University
Ruisong 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
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–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-Mahari - Sultan Qaboos University
Sayyad Zahid Qamar - Sultan Qaboos University
Rmanathan Arunachalam - Sultan Qaboos University

1:25PM–1:35PM:

EBSD INVESTIGATION OF Ti6Al4V 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

1:35PM–1:45PM:

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

1:05PM–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

1:05PM–1:15PM:

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

1:05PM–1:15PM:

EFFECTS OF PERSONAL PROTECTIVE EQUIPMENT ON SPINAL COLUMN LOADS FROM UNDERBODY BLAST 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
Sagar Umale - Medical College of Wisconsin
John R. Humm - Medical College of Wisconsin
Narayan Yoganandan - Medical College of Wisconsin

Technical Paper Publication: IMECE2021-73664

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: Michall Nitsas - National Technical University of Athens

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 Wonoula 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
Kuruvilla 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 Khazaei - 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 Khazaei - 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

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

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 Baghaii 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. Gamal - Qatar University
Mohd J. Al-Khawaja - Qatar University

1:05PM–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 CONSTRICION

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

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

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
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. Sound - Texas A&M University
Lesley M. Wright - Texas A&M University

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
Sarah Reddy Adapa - University of California, San Diego
Renkun Chen - University of California, San Diego

11-09-02:

HERMAL TRANSPORT ACROSS INTERFACES II

NOVEMBER 3, 2021

12:55PM–2:25PM

Chair: Subramanyaravi Annapragnada - United Technologies Research
Chair: Kevin Dowd - 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
1:35PM–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:

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
Roozbeh Dargazany - Michigan State University
**1:45PM–1:55PM:**

**INTEGRATION-FREE FRAMEWORKS FOR EXPLORING STRAIN ENERGY DENSITY IN RUBBER-LIKE ELASTICITY**

Technical Paper Publication: IMECE2021-72168
Ramin Akbari - Michigan State University
Roozbeh Dargazany - Michigan State University

**Technical Paper:** IMECE2021-72168

---

**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

**Technical Paper:** IMECE2021-68915

---

**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

**Technical Paper:** IMECE2021-68201

---

**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

**Technical Paper:** IMECE2021-71636
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 Nikhale - 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
Jennifer Bustillos - Cornell University

5:05PM–5:15 PM

**A CONVOLUTIONAL NEURAL NETWORK (CNN) FOR DEFECT DETECTION OF ADDITIVELY MANUFACTURED PARTS**

---

5:15PM–5:25PM:

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

5:25PM–5:35PM:

Technical Paper Publication: IMECE2021-70698
Eric Bol - University of Washington
Curtis Doyle - University of Washington
Ramulu Mamidala - University of Washington

5:35PM–5:45PM:

**VIRTUAL SURFACE ROUGHNESS MEASUREMENTS FROM AN ‘AS-BUILT’ VIRTUAL CAD MODEL FOR BEAD BASED DEPOSITION ADDITIVE MANUFACTURED COMPONENTS**
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

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
NOVEMBER 3, 2021

03-04-01: PLASTICITY, FRACTURE AND DAMAGE IN MATERIALS

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 ALSI10MG 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

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

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

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 Bouali 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

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

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: IMECE2021-70565
Mohammad Al-Rawi - Waikato Institute of Technology
Ahmed Al-Jumaily - Auckland University of Technology
Djelloul Belkacemi - Hassiba Ben Bouali University
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 EXERGOECONOMIC 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 L’Aquila  
Davide Di Battista - University of L’Aquila

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 Incerencer 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
Prahalada 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 Annapragnada - 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: IMECE2021-70702
Mehrad Mortazavi - University of California
Venkattraman Ayyaswamy - University of California
Arvind Gopinath - University of California
Sachin Goyal - University of California
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 VISCORIELASTIC PROPERTIES OF POLYACRYLAMIDE HYDROGELS DURING TRANSIENT SWELLING

Technical Presentation: IMECE2021-77235
Akira Takashima - Nagoya University
Seihiro 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/DESDIATION 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 Nouh - 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
02-07-01:
ADVANCED MATERIAL FORMING, FRICTION STIR WELDING, AND DEFORMATION
NOVEMBER 4, 2021

12:25PM–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

12:35PM–1:15PM:
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

12:45PM–1:25PM:
RESIDUAL FORMABILITY OF SINGLE POINT INCREMENTALLY FORMED PART

Technical Paper Publication: IMECE2021-69895
Chetan P. Nikhare - Penn State Erie - Behrend College

12:25PM–1:55PM:
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

THE DEVELOPMENT OF A MACHINE FOR MACROSCALE FRICTION STIR PROCESSING: A WORK IN PROGRESS

Technical Paper Publication: IMECE2021-69895
Chetan P. Nikhare - Penn State Erie - Behrend College

02-07-01:
ADVANCED MATERIAL FORMING, FRICTION STIR WELDING, AND DEFORMATION
NOVEMBER 4, 2021

12:25PM–1:15PM:
BLOCH WAVE DYNAMICS OF A BRANCHED LOCALLY RESONANT METAMATERIAL WITH A DISCRETE PERIODIC RESONATING BRANCH

Technical Paper Publication: IMECE2021-70493
Adrian Stein - University at Buffalo (SUNY)
Mostafa Nouh - University at Buffalo (SUNY)
Tarunraj Singh - University at Buffalo (SUNY)

12:35PM–1:15PM:
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

12:45PM–1:25PM:
RESIDUAL FORMABILITY OF SINGLE POINT INCREMENTALLY FORMED PART

Technical Paper Publication: IMECE2021-69895
Chetan P. Nikhare - Penn State Erie - Behrend College

12:25PM–1:55PM:
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
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 Institute 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 Schroeffler - Technical University of Munich
Franz Iringer - 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 Trol - Trol 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 Virdi - 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:
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

12:45PM–12:55PM:
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 Marashizadeh - 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 Rouollahi - 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–1:05PM:

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

1:05PM–1:15PM:

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

1:15PM–1:25PM:

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

1:25PM–1:35PM:

DESIGN AND DEVELOPMENT OF A RECONFIGURABLE AND ADJUSTABLE COMPLIANCE SYSTEM FOR THE MEASUREMENT OF ORTHOTIC PROPERTIES
**Potential Topics and Presentations**

**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 - CRRC MA Corporation  
Na Jia - CRRC MA Corporation  
Jingwen Liang - CRRC MA Corporation  
Yanhua Cao - CRRC MA Corporation  
Xianfeng Liu - CRRC 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 Petruccioi - 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:
ONTOMETRY 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 DECONFLITXION 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

1:05PM–1:15PM:
HUMAN MACHINE INTERACTION: A DESIGN PROPOSAL OF A TICKET VENDING MACHINE FOR PUBLIC TRANSPORT
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

1:05PM–1:15PM:
CONVENTIONAL AND ADVANCED EXERGY ANALYZES OF THE NGL RECOVERY PROCESS
Technical Paper Publication: IMECE2021-70509
D.L. Wressell - University of Johannesburg
L.K. Tartibu - University of Johannesburg
F.K. Tekweme - University of Johannesburg

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–1:05PM:
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

12:25PM–1:25PM:
SIMULATED MODEL FOR A NEW DESIGN OF THERMAL ENERGY STORAGE SYSTEM
Technical Paper Publication: IMECE2021-68202
Mahmoud Elsharafi - Midwestern State University
Ali Elmozoughi - 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

08-06-01:
DESIGN AND ANALYSIS OF ENERGY RECOVERY SYSTEMS
NOVEMBER 4, 2021
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

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.
1:15PM–1:25PM:

GEOTHERMAL HEAT EXCHANGER PERFORMANCE WITH NANOFLOWS 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

MICROFLUIDICS-BASED FABRICATION OF A HELE-SHAW CELL DEVICE FOR DROP COALESCEENCE 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

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**
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

12:25PM–1:55PM:

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

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

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
Geying Huang - Beihang University
Lianshui Guo - Beihang University

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 Nouh - 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 Penne - 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**

---

4:35PM–4:45PM:

**INFLUENCE STUDY ON END-FACE QUALITY OF SQUARE BILLET IN PLATE CROSS_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
Sutaon Han - Ningbo University
Yilun Wei - Ningbo University

4:55PM–5:05PM:

**FRICTION 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
Ryutarou 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

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 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

---

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

---

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

---

4:45PM–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
Alaauldeen 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

**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
Ayoub Moussa Hassane - Harbin Engineering University

4:45PM–4:55PM:

**COMPUTATIONAL MODELING OF ANISOTROPIC ELASTICITY AND FRACTURE IN 3D PRINTED POLYMERS**

Technical Presentation: IMECE2021-76628
Jun 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
Amirtahâ 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
Claphus Rouse - Kennesaw State University
Emma Joseph - Kennesaw State University
Joshua Hooper - Kennesaw State University
Ayse Tekes - Kennesaw State University
NOVEMBER 1 – 5, 2021
EVENT.ASME.ORG/IMECE

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 BUBBLESEvolution in Direct-Methanol Fuel Cells with Degassing Channels

Technical Paper Publication: IMECE2021-72603
Sameer Abdullah - Egypt-Japan University of Science and Technology
Mahnoud 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
Mahnoud 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
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 Hodgges - 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
Abrar 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

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

4:15PM–5:45PM

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

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 Paper Publication: IMECE2021-73439
Anahita Habibian - University of Victoria
Abdolrasoul Sohouli - 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:

APPLIED MACHINE LEARNING METHOD TO PREDICT CRACK PROPAGATION PATH IN POLYCRYSTALLINE 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 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 Danaw - 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 Yepez - 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
INFLUENCE OF IN-PROCESS CRYOGENIC COOLING ON MECHANICAL PERFORMANCE OF FRICTION STIR T6 - AA 2900 ALLOY WELDMENTS

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:

ABRASIVE AND CUTTING ELEMENT USE IN FRICTION ELEMENT WELDING

Technical Paper Publication: IMECE2021-68033
P. Ashwath - Vellore Institute of Technology
M. Anthony Xavior - Vellore Institute of Technology
P. Jeyapandiarajan - Vellore Institute of Technology
J. Joel - Vellore Institute of Technology

6:20PM–6:30PM:

FRICITON ELEMENT RIVETING: EFFECTS OF LOWER ELEMENT GEOMETRY

Technical Paper Publication: IMECE2021-68751
Tyler J. Grimm - Clemson University
Amit B. Deshpande - Clemson University
Laine Mears - Clemson University

6:30PM–6:40PM:

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
Xiu Hong 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
6:10PM–6:20PM:

**THE EVALUATION OF TRIBOLOGICAL PERFORMANCE OF LASER MICRO-TEXTURING Ti6Al4V UNDER LUBRICATION WITH PROTIC IONIC LIQUID**

Technical Paper Publication: IMECE2021-66843
Sayed Akl - British University in Egypt
Sherif Elsoudy - British University in Egypt
Ahmed A. Abdel-Rehim - British University in Egypt
Serag Salem - British University in Egypt

6:20PM–6:30PM:

**IN SITU STUDY OF THE LUBRICATION MECHANISM OF PHOSPHONIUM PHOSPHATE IONIC LIQUID IN NANOSCALE SINGLE-ASPERITY SLIDING CONTACTS**

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

6:30PM–6:40PM:

**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

6:40PM–6:50PM:

**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

6:50PM–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 Paper Publication: 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 PHOSPHATIDYLEROSINE 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 Karpat - 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**
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 ARGYRODITE Li(6)PS(5)Cl(0.5) Br(0.5) ELECTROLYTE FOR ALL-SOLID-STATE LITHIUM BATTERY**

Technical Paper Publication: IMECE2021-73735
Joshua Dunham - Schaeffler Group
Dominic Frisone - University of Akron
Mahdi Amiriyan - Schaeffler Group
Eman Hassan - University of Akron
Jung Feng Hu - Schaeffler Group
Rashid Farahati - Schaeffler Group
Siamak Farhad - University of Akron

6:50PM–7:00PM:

**MATHEMATICAL MODELLING OF SEMI-SOLID ELECTRODES FOR FLEXIBLE LITHIUM-ION BATTERIES**

Technical Paper Publication: IMECE2021-70763
Reza Amini - MR CFD, LLC.
Abbasali A. Davani - University of Southern California
Mohammad Pourgol Mohamad - University of Maryland

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**
6:30PM–6:40PM:
OPTIMIZING POWER OUTPUT OF A WAVE ENERGY CONVERTER BY EMPLOYING SUPERPOSED HYDRODYNAMIC MODEL

Technical Paper Publication: IMECE2021-70973
Bogdan Alexandru Radulescu - University Politehnica of Bucharest
Victorita Radulescu - University Politehnica of Bucharest

6:40PM–6:50PM:
REINFORCEMENT LEARNING CONTROL OF VERTICAL AXIS WIND TURBINES IN URBAN ENVIRONMENT

Technical Paper Publication: IMECE2021-70980
Kathyayani Nandakumar - Indian Institute of Technology
Abdus Samad - Indian Institute of Technology

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 MAGNETOPLASMADYNAMIC 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**

---

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
Kyoo Sil Choi - Pacific Northwest National Laboratory
Ayoub Souami - 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**
A REACTION-DRIVEN NETWORK THEORY COUPLED WITH PHASE-FIELD FRACTURE TO MODEL THERMO-OXIDATIVE DEGRADATION IN ELASTOMERS

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 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

6:10PM–6:20PM:

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

6:20PM–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
DATA-DRIVEN METHODS TO PREDICT FULL-FIELD RESPONSES IN HETEROGENEOUS MATERIALS

Technical Presentation: IMECE2021-76232
Jun Li - University of Massachusetts Dartmouth

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

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

ULTIMATE LIGHTWEIGHT DESIGN BASED ON SHAKEDOWN STRENGTH AND ITS APPLICATION ON DESIGNING A MANNED AIRTIGHT MODULE

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 Nouh - 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
11:30AM–11:40AM:

**EFFECT OF HOLE DIAMETER DEVIATION ON TEMPORARY FASTENING DAMAGE OF COMPOSITE MATERIALS**

- 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

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

11:40AM–11:50AM:

**PROBABILISTIC PERFORMANCE EVALUATION AND OPTIMIZATION OF MEDICAL PLASTIC MOULDED COMPONENTS SUBJECT TO LARGE SCALE PRODUCTION**

- Technical Paper Publication: IMECE2021-68860
- Chen Yan - Shanghai Jiao Tong University
- Yujing Lin - Shanghai Jiao Tong University
- Hua Wang - 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

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 Wärmejord - Chalmers University of Technology

11:20AM–12:50PM

**SYMPOSIUM ON SUSTAINABLE MACHINING PROCESSES: TURNING, AND GRINDING**

- NOVEMBER 5, 2021

- 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: IMECE2021-72995
Alper 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: IMECE2021-69807
Nithin Rangasamy - M.K. Morse Company
C.S. Rakurty - M.K. Morse Company

11:50AM–12:00PM:

ON LUBRICATION AND THE GRINDING PROCESS

Technical Presentation: IMECE2021-73740
K. 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: IMECE2021-73073
Aswani 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: IMECE2021-73236
Guang 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–12:50PM

Chair: 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: IMECE2021-70064
Sipan 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 ORMOCALC 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 Sihn - 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

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

12:00PM–12:10PM:
MULTISCALE MODELLING OF MULTIFUNCTIONAL COMPOSITES: A REVIEW

Technical Paper Publication: IMECE2021-73276
Sanjeev Suresh Babu - Indian Institute of Technology Bombay
Abdel-Hamid I. Mourad - United Arab Emirates 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
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 Taebi - 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:
BIOATERIALS AND TISSUE: MODELLING, SYNTHESIS, FABRICATION AND CHARACTERIZATION
NOVEMBER 5, 2021
12:00PM–12:10PM

MODELING THE BIOMECHANICS PARAMETERS ON ACHILLES TENDON USING OPENSIM SIMULATIONS AND VALIDATING THE SENSOR ACCURACY

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

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

11:30AM–11:40AM:

**METHODS FOR THE DESIGN OF INDIVIDUAL MECHANISMS FOR THE FABRICATION BY ADDITIVE MANUFACTURING**

Technical Paper Publication: IMECE2021-69602
Andreas Schroeffler - 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

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

11:50AM–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—11:30AM:

**CONCURRENT PASSIVE BROADBAND VIBRATION SUPPRESSION AND ENERGY HARVESTING USING A DUAL-PURPOSE MAGNETOELASTIC METAMATERIAL STRUCTURE: EXPERIMENTAL VALIDATION AND MODELING**

Technical Paper Publication: IMECE2021-67656
Mahmoud Esharafi - Midwestern State University
Ali Elmozeghi - 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

11:20AM—11:30AM:

**CONCURRENT PASSIVE BROADBAND VIBRATION SUPPRESSION AND ENERGY HARVESTING USING A DUAL-PURPOSE MAGNETOELASTIC METAMATERIAL STRUCTURE: EXPERIMENTAL VALIDATION AND MODELING**

Technical Paper Publication: IMECE2021-67656
Mahmoud Esharafi - Midwestern State University
Ali Elmozeghi - 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

11:20AM–12:50PM

08-08-04: RENEWABLE ENERGY IV
NOVEMBER 5, 2021

11:20AM–12:50PM

**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

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

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–12:00PM:
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

11:20AM–12:50PM
Chair: Marco Amabili - McGill University
Chair: Celia Reina - University of Pennsylvania

A COMPUTATIONAL ANALYSIS OF BUBBLE-STRUCTURE INTERACTION IN NEAR-FIELD UNDERWATER EXPLOSION
MOLECULAR DYNAMICS SIMULATION OF POTENTIAL PHASE TRANSITION OF MOS2 UNDER EXTERNAL LOADING

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:

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

11:30AM–11:40AM:

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

11:40AM–11:50AM:

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: IMECE2021-69196
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
A COUPLED DUALITY-BASED COSSEMAT CRYSTAL PLASTICITY AND PHASE FIELD THEORIES FOR GRAIN REFINEMENT MODELING

Technical Paper Publication: IMECE2021-73914
M.A. Khozeimeh - University of Saskatchewan
R. Moazed - University of Saskatchewan
R. Fotouhi - University of Saskatchewan

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

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

1:30PM–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
NOVEMBER 1 – 5, 2021
EVENT.ASME.ORG/IMECE

1:50PM–2:00PM:
DETECTION OF FATIGUE DAMAGE IN ALUMINUM ALLOY STRUCTURES USING NONLINEAR ULTRASONIC MODULATION

Mohammad Hodaei - University of Manitoba
Pooneh Magnoul - University of Manitoba

Technical Paper Publication: IMECE2021-72746

1:10PM–1:20PM:
IMPROVEMENT OF TOLERANCE SIMULATION MODEL IN BODY IN WHITE PRODUCT REALIZATION LOOP BY INTEGRATING MANUFACTURING JOINING SIMULATION

Mokey Hodaie - University of Manitoba
Ponkha Mahgoul - University of Manitoba

Technical Paper Publication: IMECE2021-73423

1:20PM–1:30PM:
ADAPTIVE DATA-DRIVEN PROGNOSIS TECHNIQUE FOR FATIGUE DAMAGE ACCUMULATION IN ADHESIVELY BONDED LAP-JOINT

Ling Yan - Zhejiang University of Technology
Lijia Luo - Zhejiang University of Technology
Zuming Zhao - Zhejiang University of Technology
Jingjing Fang - Zhejiang University of Technology
Shi Li - 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

Technical Paper Publication: IMECE2021-73587

2:00PM–2:10PM:
OPTIMIZATION OF RIVETING ASSEMBLY PROCESS PARAMETERS FOR AVIATION LARGE PANELS BASED ON MESOSCOPIC FEATURES

Rajendra Prasath Palanisamy - Michigan State University
Portia Banerjee - [KBR] NASA Ames Research Center
Mahmood Haq - Michigan State University
Yiming Deng - Michigan State University

Technical Paper Publication: IMECE2021-66534

1:30PM–1:40PM:
OPTIMIZATION OF THE INSTALLATION SEQUENCE FOR THE TEMPORARY FASTENERS IN THE AIRCRAFT INDUSTRY

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

Technical Paper Publication: IMECE2021-69579

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

Technical Paper Publication: IMECE2021-69352

Yonggang Kang - Northwestern Polytechnical University
Haodi Ren - Northwestern Polytechnical University

1:30PM–1:40PM

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
1:40 PM–1:50 PM:

**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

1:50 PM–2:00 PM:

**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 Wärmefjord - Chalmers University of Technology
Rikard Söderberg - Chalmers University of Technology

2:00 PM–2:10 PM:

**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

1:10 PM–2:40 PM

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

1:10 PM–1:20 PM:

**EXPERIMENTAL INVESTIGATIONS INTO IONIC LIQUID-BASED NANOFLOIDS 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

1:20 PM–1:30 PM:

**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

1:30 PM–1:40 PM:

**EFFECTS OF SUSTAINABLE CUTTING FLUID SOLUTION ON METAL MACHINING WITH GROOVING TOOLS**
Technical Presentation: IMECE2021-77461
Matthew 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 Pulaparthi - 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 - Baylan 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 Eseworthy - 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 Progri - 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

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

1:50PM–2:00PM:

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

1:30PM–1:40PM:

INVESTIGATION OF 3D PRINTED ANTI-BACTERIAL 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

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

1:30PM–1:40PM:

INVESTIGATION OF 3D PRINTED ANTI-BACTERIAL 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

1:10PM–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

1:40PM–1:50PM:

INVESTIGATION OF 3D PRINTED ANTI-BACTERIAL 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

1:10PM–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

1:50PM–2:00PM:

NEURAL NETWORK CONTROLLED STIMULATION OF A NEURAL PROSTHESIS
**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**

**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**
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. Adriazola - 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
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Details</th>
</tr>
</thead>
</table>
| 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 |
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 | Chair: Hareesh Tippur - Auburn University  
Chair: Caglar Oskay - Vanderbilt University |
| 1:10PM–2:40PM       | 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

**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 Spezialtiefabau 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**
3:30PM–3:40PM:

AN EXPLORATION OF X-VECTORS FOR DAMAGE DETECTION AND IDENTIFICATION

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

3:40PM–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

3:00PM–3:10PM:

CHARACTERIZATION OF LATERAL FRICITION 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**
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

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

MUSCULOSKELETAL AND SPORTS BIOMECHANICS II
NOVEMBER 5, 2021

3:00PM–4:30PM

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 Bakhtiyariavjani - 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

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

08-09-01:

SUSTAINABLE AND GRID-INTERACTIVE BUILDINGS
NOVEMBER 5, 2021
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 Dowding – Sandia National Laboratories
Chair: Alexander Rattner - Penn State University

3:00PM–3:10PM:

**A HETEROGENEOUS 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**
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 DEEانونET

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: IMECE2021-71442
Fariba 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: IMECE2021-71908
Mehdi 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: IMECE2021-69041
Catherine 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: IMECE2021-69844
Evan 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: IMECE2021-70634
Ethan 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: IMECE2021-77713
Anthony 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 Jealys - Worcester Polytechnic Institute
Pradeep Radhakrishnan - Worcester Polytechnic Institute
Kaveh Pahlavan - Worcester Polytechnic Institute

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

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

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 Cameny - Cal Poly Pomona
Christopher Salerno - Cal Poly Pomona
Reza Lakeh - Cal Poly Pomona

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

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
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
Baoxing 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 Dmuchowski - 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 Krokhin - 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
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 Gnidehoue - 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

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

ELECTRO-CHEMICAL HYDROGEN COMPRESSOR MODELING

Poster Presentation: IMECE2021-76631
Rui Yang - Chungbuk National University
Kibum Kim - Chungbuk National University

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

THE VEHICLE THAT USES HUMAN INTERFACE ENGINEERING

Poster Presentation: IMECE2021-76657
Mantosh Bhattacharya - PIUL

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

ON THE DEVELOPMENT OF ULTRASONIC CHARACTERISTICS OF BONE USING ACOUSTICS WAVES

Poster Presentation: IMECE2021-76816
Mohammad Hodaei - University of Manitoba
Pooneh Maghoul - University of Manitoba

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 Ibeke - Fairfield University
Stephanie Prado - Fairfield University
Sean Feeney - Fairfield University
Clarissa Rotonto - Fairfield University

A TOOL TO ANALYZE AND SYNTHESIZE PLANAR MECHANISMS
Poster Presentation: IMECE2021-77344
Alexander Galvan - Worcester Polytechnic Institute
Pradeep Radhakrishnan - Worcester Polytechnic Institute

MANUFACTURING SIMULATION OF IMPUSE 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: IMECE2021-76977
Rufus Chime - IMT Enugu

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

AN ALL POLYMER BIOCOMPATIBLE ELECTROOSMOTIC 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

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

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

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
See you in 2022

https://event.asme.org/IMECE