IDETC-CIE 2023

**International Design Engineering Technical Conferences
& Computers and Information in Engineering Conference**

CONFERENCE
August 20–23, 2023

**Boston Park Plaza
Boston, MA**

Program

https://event.asme.org/IDETC-CIE

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ASME
SETTING THE STANDARD

Welcome to **IDETC-CIE 2023!**

On behalf of the ASME IDETC-CIE 2023 Conference Organizing Committee, it is our great pleasure to welcome you to Boston Park Plaza to participate in this year's conference! The International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE) stands proudly as one of the premier ASME conferences. The 2023 ASME-IDETC-CIE marks a significant milestone as the second in-person conference after the challenges of the COVID-19 pandemic.

This year, the response to our call for presentations was beyond our expectations! We appreciate the excitement and commitment shown by our community, and we can't wait to experience the breadth of innovative ideas in the presentations. A special thanks goes to all the sub-conference organizing committees and the technical committees. Without your dedication and hard work, the success of this conference would not have been possible.

This year, we have dedicated efforts to enhance industry participation as we recognize the importance of collaboration between industry and academia. Recognizing the significance of diversity and inclusivity, we have curated activities that support our underserved and underrepresented community members.

Located in the vibrant city of Boston, a central hub for global engagement, this conference is very accessible to participants around the world. We invite you to take full advantage of this opportunity to share knowledge, collaborate, and forge new connections within our community at ASME IDETC-CIE 2023!!

Sincerely,

Sachin Goyal
Associate Professor, Department of Mechanical Engineering
University of California, Merced
Chair, ASME IDETC-CIE 2023 Conference Organizing Committee

Andreas Müller
Professor, Institute of Robotics
Johannes Kepler University Linz
Chair, ASME IDETC-CIE 2023 Conference Organizing Committee

Faez Ahmed
Assistant Professor, Department of Mechanical Engineering
Massachusetts Institute of Technology
Local Chair, ASME IDETC-CIE 2023 Conference Organizing Committee

Beshoy Morkos
Associate Professor, College of Engineering
University of Georgia
Student Activities Chair, ASME IDETC-CIE 2023 Conference Organizing Committee

Contents

General Information

REGISTRATION INFORMATION

Exeter Foyer

Registration Hours:

Saturday, August 19
1:00PM–5:00PM

Sunday, August 20
7:00AM–5:00PM

Monday, August 21
7:00AM–5:00PM

Tuesday, August 22
7:00AM–5:00PM

Wednesday, August 23
7:00AM–12:00PM

AUDIOVISUAL EQUIPMENT IN SESSION ROOMS

All technical sessions are equipped with one LCD projector and one screen. Laptops will NOT be provided in the sessions. Presenters MUST bring their own or make arrangements in advance with the session chairs to share theirs. Please bring your presentation on a thumb drive 15 minutes prior to the session's start time.

BADGE REQUIRED FOR ADMISSION

All conference attendees must wear the official ASME 2023 IDETC.CIE badge at all times in order to gain admission to special sessions, technical sessions, exhibits, meals, and other conference events. Without a badge, you will NOT be allowed to attend any conference activities.

TICKETED FUNCTIONS

Access to workshops, tutorials, receptions, and awards luncheons will be confirmed by your badge code. If you wish to bring a guest to an awards luncheon or reception, you must purchase an additional ticket accordingly. Guests are NOT permitted to attend technical sessions, workshops, tutorials, or committee meetings. For questions regarding any possible ticketed items, you can ask a conference representative located in the registration area.

SWAPCARD CONFERENCE APP

IDETC.CIE will utilize a mobile event app in place of a printed program to enhance the conference experience for attendees, speakers, exhibitors, and sponsors, whether you are attending in person or virtually.

You will be able to:

• Connect with Attendees
• View Speaker Profiles
• Access Session Information
• Watch On-Demand Content
• Download Final Papers
• And More!

*All features may not be available at all events.

Keep an eye on your email for more information on how to access and navigate the ASME Conferences App!

INTERNET ACCESS IN THE HOTEL

Wi-Fi is included in your guest room and in the meeting space:

• Please go to the registration desk for details

CONFERENCE PROCEEDINGS

Each attendee will receive an email with a unique code to access digital copies of all the papers accepted for presentation at the conference. The official conference archival proceedings will be published after the conference and will not include accepted papers that were not presented at the conference. The official conference proceedings are registered with the Library of Congress and are submitted for abstracting and indexing. The proceedings are published on the ASME Digital Library. You will be provided with an individual link to the online papers via email. In the event you do not receive the email, send a request to conferencepubs@asme.org.

AUTHOR PRACTICE ROOM

Boylston on the Mezzanine Floor of the hotel will serve as the Author Practice/Speaker Ready Room from 7:00AM to 5:00PM on Monday and Tuesday. An LCD projector and screen will be available for authors to practice their presentations. All necessary connecting cables will be provided. Please bring your own laptop.

PRESENTER ATTENDANCE POLICY

According to ASME's Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper also will not be published in the ASME Digital Collection and may not be cited as a published paper.

MOTHERS ROOM

This room is located on the 4th floor across from Newbury just off the elevators.

QUIET ROOM

Longfellow on the 4th floor will be designated as a quiet room.

FOOD FUNCTIONS & NETWORKING

Breakfasts

Please join our sponsors, exhibitors, conference organizers, and division leadership each morning at 7:00AM in the Ballroom area. Network with your fellow attendees and discuss new ideas, programs, and activities.

Badges Required. Guests not permitted.

Awards Luncheons

One Division Awards Luncheon is included in each Full Conference Registration. Attendees have pre-selected a specific luncheon during the registration process. For those who would like to attend both luncheons, additional tickets may be purchased at the registration desk as well as guest tickets.

Design Engineering Division (DED) Awards Luncheon

• Monday August 21, 12:10PM–2:10PM
• Location: Grand Ballroom A
• Tickets Required. Additional or Guest Tickets may be purchased for $65.

Computers & Information in Engineering (CIE) Awards Luncheon

• Tuesday August 22, 12:20PM–2:20PM
• Location: Grand Ballroom A
• Tickets Required. Additional or Guest Tickets may be purchased for $65.

Opening Reception

IDETC/CIE Conference Opening Reception

• Monday August 21, 7:00PM–9:00PM
• Location: Ballroom Foyer
• Tickets Required. Included in each Full Conference Registration. Additional or Guest Tickets may be purchased for $85.

Sponsorships

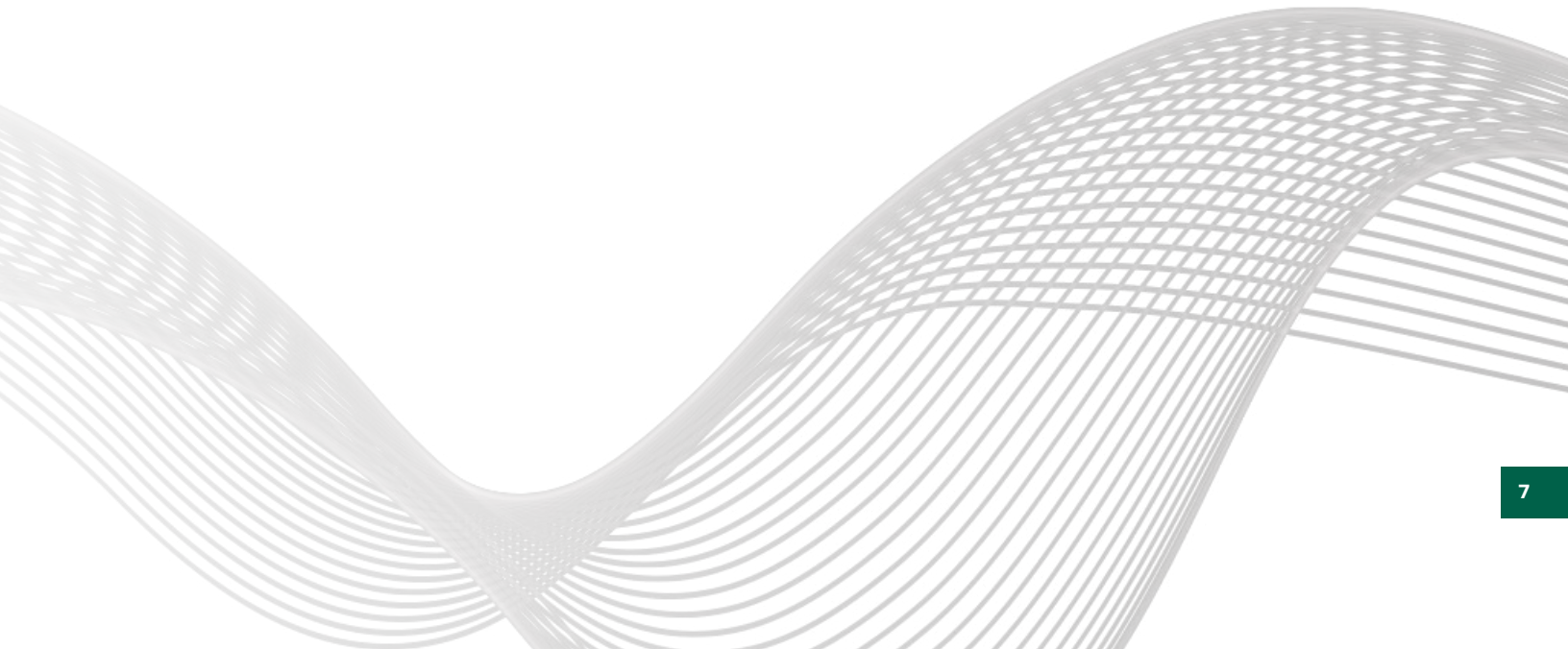## THANK YOU TO OUR SPONSORS

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AUTODESK

ROOMS	SUNDAY, AUGUST 20		
	9:00AM–6:00PM		
Berkeley (Mezz)	Student Hackathon		
Arlington (Mezz)			
ROOMS	9:00AM–1:00PM	1:00PM–5:00PM	5:30PM–6:30PM
Clarendon (Mezz)		DED Executive Committee Meeting (Closed)	
Hancock (Mezz)		CIE Executive Committee Meeting (Closed) - TENTATIVE	
Georgian (Mezz)	Workhop 2: From Data to Design: Challenges and Opportunities Across Industry and Academia		
White Hill (4th FL)	Workshop 5: 2nd Workshop on Trends in Human-AI Teaming for Engineering and Design	Workshop 6: Emerging Technologies and Methods for Early Stage Product Design and Development	
Whittier (4th FL)		Workshop 9: Machine Learning Driven Robot Motion Design	
Newbury (4th FL)	Workshop 3: Bringing Design Justice Content into Engineering Courses – Non-Registrered Speakers and a Virtual Panelist		
Tremont (4th FL)	Workshop 1: Multidomain Physical Modeling and Simulation with Simscape	Workshop 4: Exact Computational Approaches to the Analysis of Mechanism Singularities	
St. James (4th FL)	Workshop 7: Design for a Circular Economy: Addressing the Nexus of Research, Standards and Education		
Terrace Room (LL)			Student Activities

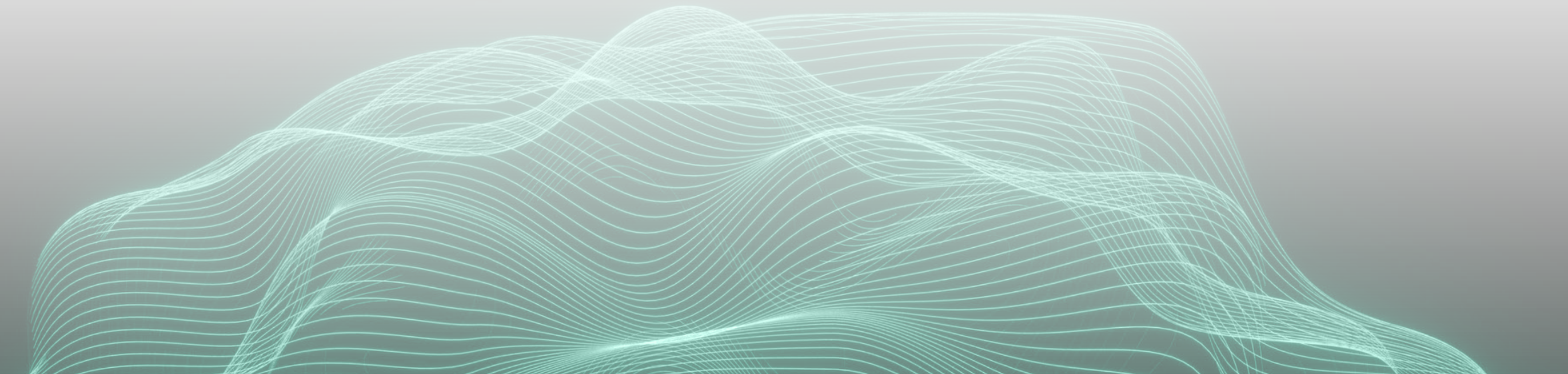| Rooms	7:00AM–7:50AM	8:00AM–9:00AM	9:10AM–10:30AM	10:30AM–10:50AM	10:50AM–12:10PM	12:10PM–2:10PM	2:10PM–3:50PM	3:50PM–4:10PM	4:10PM–5:50PM	6:00PM–7:00PM	7:00PM–9:00PM
						MONDAY, AUGUST 21					
Ballroom Foyer (Mezz)	Attendee Breakfast			Refreshment Break				Refreshment Break			Opening Reception
Ballroom A/B (Mezz)						DED Award Lunch					
Georgian (Mezz)		CIE-17	CIE-15/16		CIE Keynote		CIE 12/14		CIE Industrial Panel	CIE Student Poster Session & Reception	
Clarendon (Mezz)		CIE-01-1	CIE-01-2				CIE-02/04		DED general meeting (5PM start)		
Berkeley (Mezz)		CIE-10	CIE-11				CIE 08/09				
Arlington (Mezz)		DAC-03-01	DAC-15-01		DAC-03-02		DAC-04-01		DAC-04-02		
Statler (Mezz)		DAC-20-01	DAC-07-01		DAC-18-01		DAC-17-01		DAC-17-02		
Hancock (Mezz)		DAC-13-01	DAC-06-01		DAC-13-02		DAC-08-01		DAC-01-01		
Cambridge (4th FL)		PTG-03-01	PTG-02-01		PTG-06-01		PTG-03-02		PTG-02-02		
Back Bay (4th FL)		MESA Keynote	MESA-01-01		MESA-01-02/MESA-08/MESA-09		MESA-03		MESA-06/MESA-11/MESA-15		
Beacon Hill (4th FL)			AVT-01-01		AVT-05-01		AVT-05-02		Workshop on Autonomous and Connected Vehicles	AVT TC Meeting	
Franklin (4th FL)			DEC-01/DEC-02		DEC-03-				DEC Graduate Student Mentorship Program	DEC TC Meeting	
White Hill (4th FL)			MSNDC-01-01		MSNDC-01-02		MSNDC-02-01		MSNDC-03/VIB-06-01		
Whittier (4th FL)		MSNDC Keynote	MSNDC-11/VIB-12-01				MSNDC-07/VIB-11-01		MSNDC-04/VIB-09-01		
Newbury (4th FL)							MNS-01/VIB-05/MSNDC-13-01		MNS-01/VIB-05/MSNDC-13-02		
Tremont (4th FL)		VIB-01-01	VIB-13-01		Myklestad Award Keynote		VIB-01-02				
Stuart (4th FL)			VIB-02-01				VIB-08/MSNDC-12-01		VIB-02-02		
Studio 1 (Lobby)		MR-1-1	MR Keynote		MR-6-1		JMR Spotlight		MR-8-1		
Studio 2 Lobby)		MR-2-1			MR-4-2				MR-4-3		
Loft Lobby)		MR-7-1			MR-7-2				MR-5-1		
Copley/Kenmore Lobby)							NSF-NASA Extreme Design Workshop		NSF Proposal Writing	NSF Office Hours	
Park Lobby)			DFMLC-2		DFMLC-1		DFMLC-5-1		DFMLC-3	DFMLC TC Meeting	
Scollay Lobby)		DTM-01-01	DTM-02-01		DTM-03-01		DTM-04-01		DTM-05-01		

Schedule at a Glance

TUESDAY, AUGUST 22

Rooms	7:00AM–8:00AM	8:10AM–9:10AM	9:20AM–10:40AM	10:40AM–11:00AM	11:00AM–12:20pm	12:20PM–2:20PM	2:20PM–4:00PM	4:00PM–4:20PM	4:20PM–6:00PM	6:10PM–7:10PM	7:10PM–8:10PM
Ballroom Foyer (Mezz)	Attendee Breakfast			Refreshment Break				Refreshment Break	DED/CIE Design Tool and Commercialization Showcase		
Ballroom A (Mezz)						CIE Award Lunch					
Georgian (Mezz)		CIE-13	CIE-21				Design and Innovation Panel		CIE-19	VES TC Meeting	CIE General Meeting
Clarendon (Mezz)		CIE-01-03	CIE-22		CIE VES Panel		CIE AMS-SEIKM-CAPPD		CIE-05/06	AMS TC Meeting	
Berkeley (Mezz)		CIE-07-03	CIE-07-1						CIE-07-2	CAPPD TC Meeting	
Arlington (Mezz)		DAC-15-02	DAC-02-01		JMD Journal Spotlight				DAC-15-03	SEIKM TC Meeting	
Statler (Mezz)		DAC-07-02	DAC-12-01				DAC Signature Event		DAC-12-02		
Hancock (Mezz)		DAC-06-02	DAC-11-01						DAC-11-02		
Cambridge (4th FL)		PTG-05-01	PTG-01-01		PTG-07-01		PTG-03-03		PTG-04-01		
Back Bay (4th FL)		MESA Keynote	MESA-13 / MESA-14		MESA-02 / MESA-04 / MESA-16		MESA-10				
Beacon Hill (4th FL)			AVT-08-01		Milliken Lecture		AVT-(02,3,7)-01		AVT-06-01		
Franklin (4th FL)			DEC-04		DEC-05						
White Hill (4th FL)			MSNDC-03/VIB-06-02		MSNDC-10-01		MSNDC-05-01				
Whittier (4th FL)		Lyapunov Award Keynote	MSNDC-11/VIB-12-02				MSNDC-04/VIB-9-02		MSNDC Student Paper Competition	MSNDC TC Meeting	
Newbury (4th FL)		MNS Keynote			MNS-2		MNS-3			MNS TC Meeting	
Tremont (4th FL)			VIB-05/MNS-01/ MSNDC-13-03		Den Hartog Award Keynote		VIB-07/MSNDC-14-01		DED Undergraduate Research Symposium on Dynamics, Vibration & Acoustics	TCVS TC Meeting	
Stuart (4th FL)			VIB-10/MSNDC-06-01				VIB-04/MR-04-01				
Studio 1 (Lobby)		MR-8-2	MR-4-1 Keynote		MR-6-2		Student Mechanism & Robot Design Competition (SMRDC)		MR-3-1	MR TC Meeting	
Studio 2 Lobby)		MR-2-2			MR-1-2				MR-4-4		
Loft Lobby)		MR-7-3			MR-5-3				MR-1-3		
Copley/Kenmore Lobby)											
Park Lobby)			DFMLC-6		DFMLC-4		DFMLC Keynote				
Scollay Lobby)		DTM-06-01	DTM-07-01		DTM-08-01		DTM-09-01			DTM TC Meeting	
Ballroom B									Poster Session (DTM, MR, BPART, NSF)		
Terrace Room (LL)											DAC TC Meeting

Schedule at a Glance

Rooms	7:00AM–7:50AM	8:00AM–9:40AM	9:40AM–10:00AM	10:00AM–11:40AM	11:40AM–1:15PM	1:15PM–2:55PM	2:55PM–3:15PM	3:15PM–4:55PM
				WEDNESDAY, AUGUST 23				
Ballroom Foyer (Mezz)	Attendee Breakfast		Refreshment Break		Lunch on Own		Refreshment Break	
Ballroom A/B (Mezz)								
Georgian (Mezz)	CIE-18					CIE-23/24		CIE-18
Clarendon (Mezz)		CIE JCISE Panel		CIE VES JCISE Panel		CIE-27-1		CIE-27-2
Berkeley (Mezz)						CIE-25-1		CIE-25-2
Arlington (Mezz)		DAC-02-02		DAC-04-03		DAC-19-01		DAC-25-02
Statler (Mezz)		DAC-12-03		DAC-09-01		DAC-10-01		
Hancock (Mezz)		DAC-11-03		DAC-25-01		DAC-14-01		
Boylston	IDETC.CIE 2023 Committee Meeting (Closed)							
White Hill (4th FL)				MSNDC-09-01		MSNDC-08/MR-05-01		
Whittier (4th FL)		MSNDC Keynote		MSNDC-04/VIB-09-03		MSNDC-04/VIB-09-04		MSNDC-04/VIB-09-05
Tremont (4th FL)		VIB-03-01		Mote Award Keynote		VIB-07/MSNDC-14-02		VIB-07/MSNDC-14-03
Stuart (4th FL)		VIB-15-01				VIB-10/MSNDC-06-02		
Studio 1 (Lobby)		MR-3-2		Special Early Career Session (SEC-sess)		MR-3-3		MR-3-4
Studio 2 Lobby)		MR-4-5				MR-7-4		MR-7-5
Loft Lobby)		MR-1-4				MR-1-5		MR-5-2
Copley/Kenmore Lobby)		NSF Design Funding Opportunities		NSF Office Hours				
Park Lobby)				DFMLC-5-2				
Scollay Lobby)		DTM-09-02		DTM-10-01		DTM-11-01		

25th International Conference on Advanced Vehicle Technologies (AVT)

The Vehicle Design Committee (VDC) promotes innovative analytical, computational, and experimental investigations in the dynamics, control, and design of full vehicle systems, subsystems, and components. With the increasing demands on driving safety and autonomy, the human–vehicle interaction, advanced driver assistance systems, and connected vehicles as well as sustainable propulsion systems and their coupling with the driver/vehicle system are included in the spectrum of topics addressed by VDC. Our members perform fundamental and applied research, and they implement technology for light/heavy vehicle design, modeling, and validation.

The VDC is pleased to welcome you to the 24th International Conference on Advanced Vehicle Technologies, held as a part of the 2022 ASME IDETC-CIE. This year the AVT conference will consist of eight symposia for a total of eight sessions in the areas of: Ground Vehicles Dynamics and Controls; Modeling and Testing Tire-Terrain Interaction; Methods for Ground Vehicle Systems Design; Vehicle Electrification and Powertrain Design; Light Vehicles Design; Military and Commercial Ground Vehicle Design; and Intelligent Vehicles. We sincerely appreciate the time and services of these symposium organizers.

This Year the VDC is especially honored to host Dr. Bo Persson from the Peter Grünberg Institute, Jülich, Germany, for the William Milliken Lecture, which is entitled, "Rubber Friction, Tire Dynamics and ABS Braking Simulations." In addition, VDC with support from ASME-DED organizes a Workshop on Autonomous and Connected Vehicles that is open to any ASME member or IDETC attendee.

A Best Paper and a Student Best Paper (for papers authored and submitted by a student as the primary author) are awarded for conference papers that best exemplify the research advances in ground vehicle engineering based on peer reviews and the award committee's ranking.

We truly hope that this year's AVT Conference will provide you with an exciting, enriching, and rewarding experience!

Ole Balling
Conference Chair

Angelo Bonfitto
Program Chair

Conference Chair Welcomes

43rd Computers and Information in Engineering Division Conference (CIE)

Greetings All Attendees!

The Computers and Information in Engineering Division of ASME welcomes all IDETC-CIE 2023 Conference participants to the 43rd Annual Computers and Information in Engineering Conference (CIE) in Boston, MA (USA).

The CIE conference is a premier venue for the international exchange of technical, scientific, and application knowledge related to the theory and practice of computing to support engineering activities. It provides a forum for researchers, practitioners, educators, and students from academia, industry, and government research labs to share their latest findings and challenges with the broader research community, foster collaborations, and build a sustainable research and education community.

This year we are pleased to report that there will be over 140 technical presentations in the following technical and special topic sessions, organized around the four Technical Committees of the CIE Division, namely: Advanced Modeling and Simulation, Computer-Aided Product and Process Design, Systems Engineering and Information Knowledge Management, and Virtual Environments and Systems.

Advanced Modeling and Simulation (AMS):

- Inverse Problems in Science and Engineering
- Computational Multiphysics Applications
- Uncertainty Quantification in Simulation and Model Verification & Validation
- Simulation in Advanced Manufacturing
- Material Characterization Methods and Applications

Computer-Aided Product and Process Development (CAPPD):

- Human-In-the Loop for Product Design and Automation
- Digital Human Modeling for Design and Manufacturing
- Product and Process Design Automation for Industry 4.0
- Data-Driven Product Design and Fabrication

Systems Engineering Information Knowledge Management (SEIKM):

- Design Informatics
- Systems Engineering and Complex Systems
- Knowledge Capture, Reuse, and Management
- Smart Manufacturing Informatics
- Advanced Manufacturing for Bioeconomy and Circular Economy

Virtual Environments and Systems (VES):

- Designing User Experiences for Virtual Environments
- Virtual Systems for Engineering Applications
- VES Show-and-Tell

AI + ML Approaches for Engineering (General)

Joint Sessions:

- Digital Twin: Advanced Human Modeling and Simulation in Engineering
- Digital Twin Modeling and Analytics for Advanced Manufacturing
- Physics-Informed Machine Learning for Design and Advanced Manufacturing
- Artificial Intelligence and Machine Learning in Design and Manufacturing
- Design, Simulation and Optimization for Additive Manufacturing

In addition to the technical presentations, we will host several specialized events. Accompanying a CIE Keynote Talk, four panels of leading experts from industry, government, and academia will convene to discuss topics related to the future of Computers and Information in Engineering. The Journal of Computing and Information Science in Engineering (JCISE) Spotlight panel session will highlight top articles published over the past year. At the graduate student poster session, select graduate students, each the recipient of an award stipend, will showcase their excellent works.

In addition, we will use the CIE Luncheon to recognize conference best paper awards and the CIE Division awards. We invite you all to join us at the CIE Awards Ceremony Luncheon on Tuesday August 22 to recognize some of the outstanding research being conducted by peers, colleagues, and students alike.

As always, this year's conference would not be possible without the outstanding efforts and contributions from ASME volunteers. This year's CIE Technical Committee meetings and Division meeting will be held on the evening of Tuesday, August 22. It is at these meetings where we acknowledge contributors from the past year while setting the stage for the upcoming year's activities. Please plan to attend and/or join one of these meetings to become further involved in CIE activities.

We would like to thank and recognize the Technical Committee leadership this year for their hard work and contributions:

Advanced Modeling and Simulation (AMS)

- Piyush Pandita, Chair
- Ahn Tran, Vice Chair
- Computer Aided Product and Process Design (CAPPD)
- Anand Balu Nellippallil, Chair
- Jida Huang, Vice Chair

Conference Chair Welcomes

Systems Engineering and Information Knowledge Management (SEIKM)

- Douglas Van Bossuyt, Chair
- Dazhong Wu, Vice Chair
- Virtual Environments and Systems (VES)
- Vinayak Krishnamurthy, Chair
- Yunbo "Will" Zhang, Vice Chair

We would like to use this opportunity to thank our symposium organizers, including Seung-Kyum Choi, Piyush Pandita, Ahn Tran, James Yang, Ashish M. Chaudhari, John Michopoulos, John Steuben, Brian Dennis, Athanasios Iliopoulos, Guanglu Zhang, Zhimin Xi, Chao Hu, Yan Wang, Gaurav Ameta, Bjorn Johansson, Chiradeep Sen, Ehsan Esfahani, Anand Balu Nellippallil, Jida Huang, Tsz Ho Kwok, Giorgio Colombo, Daniele Regazzoni, Satchit Ramnath, Marco Rossoni, Anand Balu Nellippallil, Giovanni Berselli, Weiss Cohen, Jida Huang, Jun Wang, Luis Segura, Yan Lu, Zhuo Yang, Dazgong Wu, Douglas Van Bossuyt,

Yaoyao Fiona Zhao, Ying Liu, Zhenghui Sha, Farhad Ameri, Chris Hoyle, Mutahar Safdar, Hyunwoong Ko, Boonserm Kulvatunyou, Evan Wallace, Vincenzo Ferrero, Senthil Chandrasegaran, Rebecca Friesen, Ronak Mohanty, Vinayak Krishnamurthy, Junfeng Ma, Jinjuan She, Yunbo "Will" Zhang, Yujiang Xiang, Xianlian Alex Zhou, Dehao Liu, Sheng Yang, Yanglong Lu, Jiarui Xie, Yaoyao Fiona Zhao, Jaehyuk Kim, Fahad Milaat, Jun Wang, Chih-Hsing Chu, Dehao Liu for their efforts and hard work in paper review coordination and recommendation.

We would like to thank all reviewers for their time to provide valuable feedback and help maintain high standards and improve the quality of the conference. Last but not the least, we thank all authors for submitting and sharing their latest work to shape the research directions in this community.

Moreover, we thank you for your participation in the various activities of our CIE community. We look forward to seeing you all again next year!

Caterina Rizzi
Conference Chair

Robert Wendrich
Conference Program Chair

49th ASME Design Automation Conference (DAC)

Dear Colleagues,

On behalf of the DAC Executive Committee, welcome to the 49th ASME Design Automation Conference (DAC)!

Following a rigorous review process, this year's DAC technical program consists of 124 accepted papers in 25 active research areas (corresponding approximately to an acceptance rate of 92%). For the first time this year, we also solicited and accepted 23 presentation-only submissions. The technical program will be presented from Monday, August 21 to Wednesday, August 23.

Complementing our technical sessions, we will host a signature event on "Design for Safe and Reliable Autonomous Systems", consisting of a panel of top experts from AI modeling, autonomous vehicles, and additive manufacturing, including:

- Dr. Qi Hommes, Senior Director, ZooX
- Mr. Chris Robinson, Senior Product Manager, Ansys
- Dr. Heng Huang, Professor, University of Maryland – College Park
- Dr. Rajiv Malhotra, Associate Professor, Rutgers University – New Brunswick

Please join us for the DAC committee meeting on the evening of Tuesday, August 22. During that meeting, we will also present the DAC Young Investigator Award winner and the DAC Best Paper Award winner. We look forward to having our community come together, meet old friends, and make new ones.

From the accepted papers, ten were identified as "Papers of Distinction". These papers are listed below (ordered by paper number and including the assigned session):

- DETC2023-109380: Model Consistency for Mechanical Design: Bridging Lumped and Distributed Parameter Models With a Priori Guarantees, by Randi Wang and Morad Behandish
- DETC2023-110756: Mixed-Variable Global Sensitiviy Analysis With Applications to Data-Driven Combinatorial Materials Design, by Yigitcan Comlek, Liwei Wang, and Wei Chen
- DETC2023-114999: Machine Learning-Based Model Bias Correction by Fusing Cae Data With Test Data for Vehicle Crashworthiness, by Yang Li, Saeed Barbat, Zhenyan Gao, Guosong Li, Ying Zhao, Jice Zeng, and Zhen Hu.
- DETC2023-116586: A Reliability-Based Optimization Framework for Planning Operational Profiles for Unmanned Systems, by Indranil Hazra, Joseph Southgate, Arko Chatterjee, Shapour Azarm, Katrina M. Groth, and Matthew Weiner.
- DETC2023-116622: Accounting for Model and Data Uncertainty in Machine Learning Assisted Mechanical Design, by Xiaoping Du
- DETC2023-116743: Characterizing Designs via Isometric Embeddings: Applications to Airfoil Inverse Design, by Qiuyi Chen and Mark Fuge
- DETC2023-116896: Concurrent Probabilistic Control Co-Design and Layout Optimization of Wave Energy Converter Farms Using Surrogate Modeling, by Saeed Azad and Daniel R. Herber
- DETC2023-116962: Advise: AI-Accelerated Design of Evidence Synthesis for Global Development, by Kristen Edwards, Binyang Song, Jaron Porciello, Carolyn Huang, Faez Ahmed, and Mark Engelbert.

- DETC2023-117013: Integrated Sustainable Product Design With Warranty and End-of-Use Considerations, by Xinyang Liu and Pingfeng Wang
- DETC2023-117400: Car Drag Coefficient Prediction With Depth and Normal Renderings, by Binyang Song, Chenyang Yuan, Faez Ahmed, Nikos Arechiga, and Frank Permenter

Authors from our community will present these and many other excellent papers throughout the conference. We encourage you to support your colleagues by attending their presentations and participating in the discussions.

Finally, organizing the conference requires the generous effort of many individuals. We are particularly grateful to all session organizers and paper review coordinators:

Faez Ahmed, Janet K. Allen, Jesse Austin-Breneman, A. Emrah Bayrak, Morad Behandish,

Bill Bernstein, Ramin Bostanabad, Amy Bilton, Wei (Wayne) Chen, Souma Chowdhury, Daniel Cooper, Xiaoping Du, Bryony DuPont, Paul Egan, Ehsan Esfahani, Cong Feng, Yan Fu, Payam Ghassemi, Joshua Hamel, Daniel Herber, Zhen Hu, Horea Ilies, Namwoo Kang, Leifur Leifsson, Mian Li, Xingchen Liu, Yuanzhi Liu, Nordica MacCarty, Ali Mehmani, Nicholas Meisel, Zhenjun Ming, Farrokh Mistree, Seung Ki Moon, Beshoy Morkos, Venkat Nemani, Saigopal Nelaturi, Julián Norato, Philip Odonkor, Herschel Pangborn, Rahul Renu, Daniel Selva, Ada-Rhodes Short, Binyang Song, Eun Suk Suh, Ahn Tran, Zequn Wang, Kate Whitefoot, Natasha Wright, Hongyi Xu, Nita Yodo, Jie Zhang, Zhibo Zhang, Fiona Zhao, and Yuqing Zhou

On behalf of the entire DAC community, we welcome you to another enjoyable and thought-provoking Design Automation Conference.

We look forward to seeing you in Boston!

Christopher McComb
Conference Chair

Chao Hu
Program Chair

20th International Conference on Design Education (DEC)

On behalf of the Design Education Committee, we welcome you to the 20th annual International Conference on Design Education. The focus of this conference is on design education among educators, practitioners, and researchers.

This year's DEC Program consists of four technical symposia – (DEC-1) Implementation, Assessment and Research Methods Across the Curriculum (DEC-1), Diversity and Inclusion in Design Education (DEC-2), Innovative Practices in Design Education (DEC-3), and Demos and Presentation Only (DEC-4). The Demos and Presentation Only session will include presentations and provide ample opportunity for discussion with the presenters to give feedback on emerging design education research. Refer to the conference Technical Program for the times and locations of the technical sessions. In addition to our technical symposia, we will be continuing our mentorship program for graduate students.

The DEC Best Paper for the 2023 Conference is:

IDETC2023-116688, Nature Versus Nurture: The Influence of Classroom Creative Climate on Risk-Taking Preferences of Engineering Students, by Aoran Peng, Jessica Menold, and Scarlett Miller

We extend special appreciation to our technical session Review Coordinators: Mohammad Fazelpour, Elizabeth Starkey, and Charlotte de Vries. We also give our sincerest thanks to all the reviewers of technical papers; they have ensured the quality of this year's conference.

The DEC technical committee meeting will be posted in the Technical Program. At the meeting we present many of the DEC Awards and plan for next year's conference, which includes the election of new committee leadership members. Everyone is welcome to attend, including new attendees and graduate students. Our meeting is streamlined to respect members' participation in other committees.

Nicholas Meisel
Conference Chair

Rahul Renu
Conference Program Chair

Conference Chair Welcomes

28th Design for Manufacturing and the Life Cycle Conference (DFMLC)

The ASME Design for Manufacturing and the Life Cycle Committee welcomes participants to the 28th Annual Design for Manufacturing and the Life Cycle Conference. The ASME Design for Manufacturing and the Life Cycle Conference is the main international forum for the exchange of technical and scientific information on the theory and practice of Integrated Product and Process Development, Sustainable Design and Manufacturing, Product Lifecycle Management (PLM), and Design for X (DFX) Methods. This conference provides a forum for researchers, practitioners, and educators from academia, government organizations, and industry to share their latest results and challenges with the research community.

We are happy to report that this year's conference continues to feature many new and exciting results and methods to be presented as part of the conference's technical sessions. This year's DFMLC conference includes 21 technical papers and 22 technical presentations across 8 sessions, as follows:

- Session 1: Life Cycle & Human Factors Decision Making
- Session 2: Modeling and Optimization for Sustainable Design and Manufacturing
- Session 3: Design for Supply Chain, End of Life Recovery, and Large Systems
- Session 4: Design for Manufacturing and Assembly
- Session 5: Design for Additive Manufacturing 1
- Session 6: Design for Additive Manufacturing 2
- Session 7: Design of Product-Service and Energy Systems
- Session 8: Special Session: Design Tool & Commercialization Showcase

We would like to thank all the authors for submitting papers, the paper reviewers for sharing their time and expertise, and the session chairs/co-chairs for their participation. Special thanks go to the DFMLC Special Session Chair, Albert Patterson, and the paper review coordinators/co-coordinators for managing the papers through the review process: Hao Zhang, Vincenzo Ferrero, William Bernstein, Bryony Dupont, Yong Hoon Lee, Sara Behdad, Yongxian Zhu, Soonjo Kwon, Satya Peddada, Yaoyao Zhao, Xinyi (Serena) Xiao, Albert Patterson, Amin Mirkouei, Abigail Clarke-Sather, Paul Egan. Your participation and hard work have been vital for the success of the DFMLC conference!

This year, Dr. Gul Kremer, Dean for the University of Dayton School of Engineering, will present the DFMLC keynote lecture. Professor Kremer's research accomplishments focus on applied decision sciences and operations research for product and design systems, and other research interests include sustainability, system complexity, design creativity, and engineering education.

There will be a presentation of the 2023 DFMLC Conference Kos Ishii-Toshiba Award for sustained and meritorious contributions to design for manufacturing and the life cycle at the DED luncheon on Monday, August 21st.

The 2023 DFMLC Conference also features a special presentation session. The "Design Tool & Commercialization Showcase" highlights new design tools developed by the members of the ASME Design community in both digital and physical forms.

The DFMLC technical committee meeting will include a review of DFMLC activities during the 2022-2023 cycle. The DFMLC Awards, including the Best Paper Award for the 2023 DFMLC conference, will also be presented in this meeting, and the technical committee will plan for next year's conference. Everyone is welcome to attend.

On behalf of the entire DFMLC community, we welcome you to the 28th Design for Manufacturing and the Life Cycle virtual conference!

Daniel Cooper
Conference Chair

Paul Egan
Conference Program Chair

Conference Chair Welcomes

35th International Conference on Design Theory and Methodology (DTM)

On behalf of the ASME Design Theory and Methodology Committee, we would like to welcome you to the 35th International Conference on Design Theory and Methodology (DTM). Our conference focuses on fundamental design theory and methodologies, and their application in engineering contexts, with contributions provided by both researchers and practitioners.

This 2023 DTM conference includes 54 technical paper presentations and 10 lightning talks. Thematically, the conference includes contributions associated with our four broad foci: Design Theory, Design Methods, Design People, and Design Practice. In addition, this year's conference features a joint session between the Design Education Committee, the Design for Manufacture and Lifecycle Committee, and DTM titled DfAM Principles and their Education. This year's conference also features a student poster session where selected Ph.D. students showcase their dissertation proposals.

There were 72 papers submitted and reviewed by an incredible cohort of review coordinators and reviewers. A total of 239 reviews were completed by 155 reviewers. The review coordinators for this year's conference include: Ambrosio Valencia Romero, Astrid Layton, Christine Toh, Hyeonik Song, James Righter, Jinjuan She, Joshua Summers, Kelley Dugan, Kosa Goucher-Lambert, Maha Haji, Mansur M. Arief, Paul Grogan, Rohan Prabhu, Srinivasan Venkataraman, Vivek Rao, Vrushank Phadnis, Youyi Bi, and Zhenghui Sha. It is through the service of these individuals that we are able to maintain the high-quality expectations of the DTM conference.

We are excited to welcome you to this year's conference and hope that you find it engaging, informative, and beneficial.

Dr. Vimal K. Viswanathan
Conference Chair
San Jose State University

Dr. Rahul S. Renu
Program Chair
Francis Marion University

19th IEEE/ASME International Conference on Mechatronics and Embedded Systems and Applications (MESA 2023)

We are pleased to welcome everyone to the 19th IEEE/ASME International Conference on Mechatronics and Embedded Systems and Applications (MESA 2023). The goal of the MESA 2023 is to bring together experts from the fields of mechatronic and embedded systems, disseminate the recent advances in the area, discuss future research directions, and exchange application experience. MESA 2023 will especially bring out and highlight the latest research results and developments in Industry 4.0 and Artificial Intelligence (AI) in the fields of mechatronics and embedded systems. The success of MESA 2023 would be impossible without the tireless effort and dedicated work of the Members of the Organizing Committees. We would like to express our sincere thanks to Symposium Chairs for their wisdom and hard work in coordinating the review of all submitted papers. We are grateful for Members of the International Program Committee and reviewers for their thorough review of the papers. This year the program committee selected about 30 technical presentations following a review process by two or more expert reviewers for each proposed paper. We sincerely hope that MESA 2023 will be a place for excellent discussions that will put forward new ideas advance educational endeavors and promote active research collaborations.

Prof. Adriano Mancini
Conference Chair
Università Politecnica delle Marche, Ancona, IT

Prof. Matteo Claudio Palpacelli
Program Chair
Università Politecnica delle Marche, Ancona, IT

Conference Chair Welcomes

47th Mechanisms and Robotics Conference (MR)

The Mechanisms and Robotics Technical Committee of the ASME Design Engineering Division would like to warmly welcome you to the 47th Mechanisms and Robotics Conference, the premier international forum for the exchange of technical and scientific information on the theory and application of mechanical systems, mechanisms, and robotics.

The first conference, as The Conference on Mechanisms, was held at Purdue University, West Lafayette, Indiana, in 1953. ASME took over the conference and formed the ASME Biennial Mechanisms Conference in 1964. The conference was renamed the ASME Biennial Mechanisms and Robotics Conference in 2000. Starting in 2005, the conference became an annual conference, the ASME Mechanisms and Robotics Conference. Nowadays, the Mechanisms and Robotics Conference is held annually as a part of the ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference.

This year we have assembled an exciting conference program and a slate of activities for the attendees, with 100 peer-reviewed technical papers and six technical presentations/posters organized into 9 technical symposia, a keynote speech, an early career invited talk session, a symposium keynote speech, and the Student Mechanisms and Robot Design Competition. Paper topics range throughout areas central to the design of mechanical, mechatronic, and robotic systems, including kinematics, dynamics, design, analysis and validation, compliant mechanisms, origami-based design, metamaterials for mechanisms, novel mechanisms and robots, mobile robots, and various applications. Our Keynote Speech will be given by Prof. Jian Dai, Director of Institute of Robotics at Southern University of Science and Technology and Honorary Chair Professor of King's College London, with his speech entitled: "Reconfiguration that Evolves into Robotics in Arts, Healthcare, and Production".

Submitted papers were eligible for several awards, including the Mechanisms and Robotics Best Paper award, A.T. Yang Memorial award, and Compliant Mechanisms award. The authors of selected papers of the Mechanisms and Robotics Conference are invited to submit enhanced archival versions of their papers to an IDETC Special Issue of the ASME Journal of Mechanisms and Robotics. We would like to thank Jian Dai, Chair of the Awards Committee, for coordinating the selection of the awards. Please attend our award session preceding the MR Keynote speech for the presentation of these awards.

The conference and program chairs would like to extend special thanks to all the volunteers who participated in the peer-review process to produce this high-quality program, especially the symposium organizers who coordinated the process:

- MR-1: Mechanisms Synthesis & Analysis: Latifah Nurahmi, Kuan-Lun Hsu, Jieyu Wang
- MR-2: Theoretical & Computational Kinematics (A.T. Yang Symposium): Nina Robson, Hongliang Shi, Haohan Zhang
- MR-3: Compliant Mechanisms: Hongzhe Zhao, Jovana Jovanova, Giovanni Berselli
- MR-4: Origami-Based Engineering Design: Shikui Chen, Suyi Li, Jared Butler
- MR-5: Motion Planning, Dynamics, and Control of Robots: Damien Chablat, Joo Kim, Andreas Mueller, Jeffrey W. Herrmann

- MR-6: Medical and Rehabilitation Robotics: Carl Nelson, Abbas Fattah
- MR-7: Novel Mechanisms, Robots, and Applications: Guowu Wei, Reza Fotouhi, Salih Abdelaziz
- MR-8: Soft and Continuum Mechanisms: Girish Krishnan, Sree Kalyan Patiballa, Vishesh Vikas
- MR-9: Design, Analysis and Fabrication of Architected Materials and Structures: Nilesh D. Mankame, Pablo D. Zavattieri, David Restrepo, Tian "Tim" Chen
- MR-10: Student Mechanism and Robot Design Competition: Long Wang, Gaurav Singh, Haiyang Li, Huijuan Feng, Colette Abah
- MR-11: Special Early Career Session of Invited Presentations: Mark Plecnik

We extend special thanks to all authors, reviewers, presenters, symposium organizers, session chairs, and other volunteers who have contributed to the overall success of the conference. We trust that you will enjoy the conference and look forward to your continued support to our future Mechanisms and Robotics Conferences.

Dongming Gan
Purdue University
Conference Chair and Co-Chair

Ketao Zhang
Queens Mary University of London
Program Chair and Co-Chairs

Guangbo Hao
University College Cork

Yu She
Purdue University

Mark Plecnik
University of Notre Dame

Conference Chair Welcomes

17th International Conference on Micro- and Nanosystems (MNS)

Welcome to the17th International Conference on Micro- and Nano-systems (MNS) with the topic of "The Next Advances in MEMS", we would like to welcome you and thank you for participating. This conference, sponsored by the Technical Committee of Micro and Nano-systems, an integral part of the ASME Design Engineering Division, will provide researchers in industry, academia, and government a forum to exchange scientific and technical information related to recent developments and emerging issues in the design, mechanics, dynamics, control, and fabrication of micro- (MEMS) and nano-scale (NEMS) systems.

This conference is organized around five technical sessions, one of which is jointly offered with the 19th International Conference on Multibody Systems, Nonlinear Dynamics, and Control and the 35th Conference on Mechanical Vibration and Noise:

Keynote Lecture: Professor Ashwin A. Seshia

MNS-1: Nonlinear Dynamics and Vibrations of MEMS and NEMS (joint session with MSNDC and VIB)

- Organizers: Najib Kacem (najib.kacem@femto-st.fr), Hanna Cho (cho.867@osu.edu), Jian Zhao (jzhao@dlut.edu.cn)

MNS-2: Micro/Nano Bioengineering

- Organizers: Dumitru Caruntu (Dumitru.Caruntu@utrgv.edu), Brian Jensen (bdjensen@byu.edu), Chu-Yu Huang (tomhuang@nchu.edu.tw)

MNS-3: Micro/Nano Robotics and Functional Materials

- Organizers: Irene Fassi (Irene.Fassi@stiima.cnr.it), Yu Liu (yu.liu@vip.163.com), Hoe Joon Kim (joonkim@dgist.ac.kr), Mohammad H. Hasan (hhasan_mohammad@columbusstate.edu), Longquiu Li (longqiuli@hit.edu.cn)

MNS-4: Micro/Nano IoT, Sensors and Computing

- Organizers: Muhammad Raziuddin A. Khan (muhammad.khan@navy.mil), Fadi Alsaleem (falsaleem2@unl.edu), Pourkamali Anaraki Siavash (Siavash.Pourkamali@utdallas.edu)

MNS-5: Micro/Nano Power Sources and Storage

- Organizers: Oliver M. Barham (oliver@olivermbarham.com), Muhammad Raziuddin A. Khan (muhammad.khan@navy.mil), Marc Litz (marc.s.litz.civ@mail.mil)

This conference provides a forum for researchers, practitioners, educators, and students from industry, academia, and government research labs to share their latest findings and challenges with the broader research community, foster collaborations, and build a sustainable research community.

We are pleased to offer Pr Ashwin A. Seshia as the MNS keynote speaker. Ashwin A. Seshia is a Professor of Microsystems Technology in the Department of Engineering at Cambridge University and a Fellow of Queens' College, Cambridge. He has acted in numerous service and leadership roles for the MEMS, sensors, and frequency control technical communities, and is currently an Editor of the IEEE Journal of Microelectromechanical Systems and a member of the executive committee of the European Frequency and Time Forum.

We would like to thank all the authors for submitting papers and talks and sharing their work in our conference. We would also like to thank the reviewers for providing valuable feedback to help improve the reporting and the quality of the conference, and finally the session chairs and co-chairs that worked on coordinating the paper review process.

We welcome conference participants to become involved with our technical committee. If you are interested in becoming involved in helping to organize our conference, please contact a conference organizer to inquire, and feel free to attend the technical committee meeting which will be held on Tuesday evening, Aug 22nd, from 6-7pm. This meeting is open to all. Room locations are announced in the program. Our community will continue to grow and flourish with your active participation as we work to define our vision for future events.

We welcome you to the17th International Conference on Micro- and Nanosystems (MNS)!

Sincerely,

Najib, Jian, and the entire 2023 MNS Conference team.

Prof. Najib Kacem, Ph.D.,
Conference Chair
FEMTO-ST Institute, France
najib.kacem@femto-st.fr

Prof. Jian Zhao, Ph.D.,
Program Chair
Dalian University of Technology, China
 jzhao@dlut.edu.cn

Conference Chair Welcomes

19th MSNDC Conference

On behalf of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics, we extend a wholehearted welcome to the attendees of the 19th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC). Consisting of 14 symposia, the conference features nearly 70 presentations covering traditional and emerging topics in the broad areas of multibody systems and nonlinear dynamics. This event presents a unique opportunity for researchers, practitioners, educators, and students to report their accomplishments, exchange ideas, and become familiar with emerging trends in the field. The conference is organizing the MSNDC Best Paper and Best Student Paper competitions.

This year, we are honored to recognize Professor Gábor Stépán as the recipient of the Lyapunov Award for his seminal contributions in numerical methods and cutting-edge applications such as machine tool vibrations, balancing, wheel shimmy, vehicle traction, breaking, stability of robot control, human balancing and traffic control. Established in 2003, the Lyapunov Award recognizes lifelong contributions to the field of nonlinear dynamics.

We are honored to host two keynote lectures by Professor Arvind Raman and Professor Aki Mikkola.

Professor Arvind Raman is the Robert V. Adams Professor in Mechanical Engineering at Purdue University. His research focuses on exploiting nonlinear dynamics for innovations in diverse interdisciplinary areas such as nanotechnology, biomechanics, and appropriate technologies for sustainable development. He is an ASME fellow, an ASME Gustus Larson Memorial Award recipient, Keeley fellow (Oxford), College of Engineering outstanding young investigator awardee, and NSF CAREER awardee.

Professor Aki Mikkola is a Professor in the Department of Mechanical Engineering at LUT University, Lappeenranta, Finland. Currently, he leads the research team of the Laboratory of Machine Design. He has been awarded five patents, has contributed to more than 150 peer-reviewed journal papers, and has presented more than 100 conference articles. His major research activities are related to flexible multibody dynamics, rotating structures, and biomechanics. He is currently Editor-in-Chief of the Journal of Multibody System Dynamics (Springer).

Last but not least, we would like to acknowledge the all-important effort and contribution made by the symposium organizers as well as manuscript reviewers – thank you very much. Your help has been essential. We would also like to thank all contributors for choosing this conference as the venue for sharing the outcomes of their intellectual pursuits.

Conference Co-Chairs:

Hiroyuki Sugiyama
University of Iowa

Pierpaolo Belardinelli
University of Marche

Program Co-Chairs:

Kiran X. D'Souza
Ohio State University

Grzegorz Orzechowski
LUT University

ASME 2023 Power Transmission and Gearing Conference (PTG)

On behalf of the ASME Technical Committee on Power Transmission and Gearing (PTG), we would like to extend a wholehearted welcome to the attendees of the 2023 International Conference on Power Transmission and Gearing. We thank all of the authors for choosing this forum to share their latest research findings, and all of those who chose to attend this conference. The contributions of the leading researchers and practitioners from around the world make this conference an ideal forum and opportunity for enhancing the technology of power transmission and gearing and exchanging ideas. We hope you will take advantage of this unique opportunity to learn about the latest research work, become familiar with emerging trends in the field and network as well.

PTG 2023 features outstanding full research papers and presentations covering a wide range of topics on power transmission and gearing, which include:

- Gear Geometry
- Gear Analysis
- Materials, Fatigue
- Gear Dynamics and Noise
- Gearbox Design, Reliability, and Diagnostics
- Gear Manufacturing
- Lubrication and Efficiency
- Bearings, Clutches, Couplings, and Splines

We acknowledge and thank all the reviewers for their support and assistance and all the following members of the PTG Committee for their dedicated service and efforts in organizing this conference:

Paris Altidis, Flexco Steel Lacing Company

Christopher Cooley, Oakland University

Richard Dippery, Kettering University

Brian Dykas, U.S. Army Research Laboratory

Qi Fan, The Gleason Works

Alfonso Fuentes, Rochester Institute of Technology

Robert Giachetti, Exponent

Robert Handschuh, NASA Glenn Research Center

Adrian Hood, U.S. Army Research Laboratory

Mohammad Hotait, General Motors

Don Houser, The Ohio State University

Murat Inalpolat, University of Massachusetts Lowell

Ahmet Kahraman, The Ohio State University

Conference Chair Welcomes

Mark Klein, Honda Motor Company

Mohsen Kolivand, Meritor

Timothy Krantz, NASA Glenn Research Center

Sheng Li, Wright State University

Teik C. Lim, New Jersey Institute of Technology

Kenneth Nowaczyk, Ford Motor Company

Robert Parker, The University of Utah

Alfred Pettinger, Engineering Systems Inc.

Steve Siegert, Borg Warner

Avinash Singh, General Motors

Jeremy Wagner, John Deere Product Engineering Center

Yawen Wang, The University of Texas at Arlington

Jon Williams, Hilliard Corporation

Brian Wilson, Advanced Drivetrain Engineering

Carlos Wink, Eaton Vehicle Group

We look forward to a successful conference and hope that you enjoy all the events and your stay in Boston as well.

David Talbot
Ohio State University
Conference Chair

Hai Xu
General Motors
Program Chair

35th Conference on Mechanical Vibration and Noise (VIB)

On behalf of the Technical Committee on Vibration and Sound (TCVS), we cordially welcome you to the 35th Conference on Vibration and Noise (VIB). This conference covers a broad spectrum of topics related to vibratory systems including those at emerging frontiers of science and engineering as well as traditional fields where mechanical vibrations are essential. VIB provides a setting for dissemination and discussion of the state of the art of modeling, analysis, and experimentation in all aspects of vibration and noise research. This year's conference includes close collaborations with other IDETC tracks to bring together researchers with similar interests, enhance the technical program, and improve the attendee experience.

The following symposia make up this year's VIB:

- VIB-1 Dynamics and Waves in Structures and Metamaterials
- VIB-2 Vibration and Stability of Mechanical Systems
- VIB-3 Energy Harvesting
- VIB-4 and MR-4 Origami-Inspired Engineering: Design, Dynamics, and Everything in Between
- VIB-5, MNS-1, and MSNDC-13 Nonlinear Dynamics and Vibrations of MEMS and NEMS
- VIB-6 and MSNDC-3 Contact Dynamics and Jointed Structures
- VIB-7 and MSNDC-14 Industrial Applications of Vibration, Acoustics and Dynamics
- VIB-8 and MSNDC-12 Rotating Systems and Rotor Dynamics
- VIB-9 and MSNDC-4 Nonlinear Systems & Phenomena
- VIB-10 and MSNDC-6 Machine Learning Applications in Vibrations and Dynamics
- VIB-11 and MSNDC-7 Time-Delay, Time-Varying and Discontinuous Dynamical Systems
- VIB-12 and MSNDC-11 Dynamics and Control of Smart Structures and Systems
- VIB-13 Dynamics of Biological, Bio-Inspired and Biomimetic Systems
- VIB-14 and PTG-3 Gear Dynamics and Noise
- VIB-15 Vibration Measurement, Signal Processing, and Structural Damage Detection

VIB is highlighted by keynote lectures celebrating top honors given by TCVS. Professor Steven Shaw from the Florida Institute of Technology is the recipient of the J. P. Den Hartog Award for lifetime contributions to the teaching and practice of vibration engineering. His keynote talk is titled "Centrifugal Pendulum Vibration Absorbers – from Den Hartog to Now." Professor Bogdan Epureanu from the University of Michigan will present a keynote talk titled "Physics-Informed Data-Driven Methods for Reduced Order Modeling in Dynamics." He is the recipient of the N. O. Myklestad Award in recognition of his innovate contributions to vibration engineering in the area

of multi-physical systems. Professor Kathryn Matlack from the University of Illinois Urbana-Champaign is the recipient of the C. D. Mote, Jr. Early Career Award for research excellence in the field of vibration and acoustics. Her keynote talk is titled, "Manipulating Vibrations with Phononic Materials."

As part of VIB, TCVS graciously sponsors a student paper competition and student travel support program. This year's conference includes a new undergraduate research symposium on dynamics, vibration and acoustics.

We gratefully acknowledge the efforts of the VIB symposium organizers, reviewers, and authors. It is your efforts that make this conference vibrant.

Christopher G. Cooley
Oakland University
Conference Chair

Mark Jankauski
Montana State University
Technical Program Chair

SPECIAL KEYNOTE & INDUSTRY PANEL: DESIGN AND INNOVATION IN THE AGE OF ARTIFICIAL INTELLIGENCE

TUESDAY, AUGUST 22
2:20PM–4:00PM   **GEORGIAN**

Keynote
Jon Hirschtick
Chief Evangelist at PTC
Cofounder of SOLIDWORKS and Onshape

A Perspective View of AI in Product Development Tools

ABSTRACT: The world is at a clear disruption point with Artificial Intelligence. The advancements of AI in various domains makes us all naturally curious about its potential impact on product development tools. Surprisingly, the current state of AI integration in these tools is relatively limited. Nevertheless, designers should be excited about what lies ahead.

In this keynote, Jon Hirschtick will delve into key considerations that will enable us to effectively prepare for the future of AI in product development tools. He will explore areas where AI might be used in the design process and discuss what AI means for tool builders.

Biography: A technology pioneer and leading entrepreneur in the computer-aided design (CAD) industry, Jon Hirschtick has spent his career building software products that companies use every day to design their hardware products. Founder and former CEO of several successful companies, including Onshape (acquired by PTC) and SOLIDWORKS (acquired by Dassault Systems), Jon is now chief evangelist for PTC's Onshape, where he helps usher in the next major advancement in product design: the adoption of cloud-based engineering tools. When he is not building businesses, Hirschtick entertains customers and peers with stories from his days in the famed MIT Blackjack team, featured in the movie "21" and the History Channel's "Breaking Vegas." Hirschtick holds a bachelor's and a master's degrees from MIT, where he majored in mechanical engineering.

Panelist
Ram Sriram
Chief, Software and Systems Division Chief, Software and Systems Division
NIST

BIOGRAPHY: Ram D. Sriram is currently the chief of the Software and Systems Division, Information Technology Laboratory, at the National Institute of Standards and Technology. Before joining the Software and Systems Division, Sriram was the leader of the Design and Process group in the Manufacturing Systems Integration Division, Manufacturing Engineering Laboratory, where he conducted research on standards for interoperability of computer-aided design systems. Prior to joining NIST, he was on the engineering faculty (1986–1994) at the Massachusetts Institute of Technology (MIT) and was instrumental in setting up the Intelligent Engineering Systems Laboratory. Sriram has co-authored or authored nearly 300 publications, including several books. Sriram was a founding co-editor of the International Journal for AI in Engineering. Sriram received several awards including: an NSF's Presidential Young Investigator Award (1989); ASME Design Automation Award (2011); ASME CIE Distinguished Service Award (2014); the Washington Academy of Sciences' Distinguished Career in Engineering Sciences Award (2015); ASME CIE division's Lifetime Achievement Award (2016); CMU CEE Lt. Col. Christopher Raible Distinguished Public Service Award (2018); IIT Madras Distinguished Alumnus Award (2021). Sriram is a Fellow of AAIA, AIBME, ASME, AAAS, IEEE, IET, INCOSE, SMA, and Washington Academy of Sciences, a Distinguished Member (life) of ACM , a Senior Member (life) AAAI, and an Honorary Member of IISE. Sriram has a B.Tech. from IIT, Madras, India, and an M.S. and a Ph.D. from Carnegie Mellon University, Pittsburgh, USA.

Panelist
Lucia Mirabella
Head of Design & Simulation Systems
Siemens Corporation, Corporate Technology

BIOGRAPHY: Dr. Lucia Mirabella leads the Design and Simulation Systems group at Siemens Corporation, Corporate Technology, where she worked since 2014, with research responsibilities. She received her Ph.D. in Mathematical Engineering from Politecnico di Milano, Italy, in 2010 and worked as a researcher at Emory University and Georgia Institute of Technology. Dr. Mirabella's background includes numerical methods for partial differential equations, computational fluid dynamics in rigid and compliant domains, algorithms for fluid structure interaction, reduced order modeling, multi-scale and multi-physics modeling and high-performance computing. In Siemens, she has been focusing on modeling and simulation of additive manufacturing process and automatic investigation of design options for optimized performance using a combination of physics-based and data-driven approaches, at the component and system level. She has worked as technical lead and contributor on several Government projects funded by agencies like

Keynotes

DARPA, MxD, AmericaMakes, NIH, ONR, and DOE. She has also served as Principal Investigator on a DARPA funded project on design and evaluation of complex and adaptive system of systems and as Siemens Principal Investigator of a DMDII funded project on rapid virtual certification of manufacturing processes. In 2019 she was awarded as Siemens Inventor of the Year.

Panelist
Mehran Mestchian
Senior Director of Engineering, Design Automation Products
MathWorks

BIOGRAPHY: Mehran Mestchian is a senior director of engineering in Design Automation group at MathWorks. He is responsible for technologies and products covering Modeling Languages, Test and Verification, and Automatic Code Generation. Mehran has been at MathWorks since 1993 and has contributed to the development of many design automation products. He is the original author of Stateflow. Prior to joining MathWorks, Mehran worked as a real-time systems engineer in the industrial, robotics, automotive, pharmaceutical, and battery management systems markets. He received his M.S. in control systems engineering from Imperial College, University of London, and his B.S.E.E. from Queen Mary College, University of London.

AVT

TUESDAY, AUGUST 22
11:00AM–12:20PM   **BEACON HILL**

Dr. Bo N.J. Persson
Peter Grünberg Institute, Forschungszentrum Jülich, and Founder and CEO
MultiscaleConsulting, Jülich, Germany

Rubber Friction, Tire Dynamics and ABS Braking Simulations

ABSTRACT: I discuss the origin of rubber friction on hard rough surfaces and present a simple rubber friction law, which can be used, e.g., in models of tire (and vehicle) dynamics. I present a two-dimensional (2D) tire model which combines the rubber friction model with a simple mass-spring description of the tire body. The tire model is very flexible and can be used to calculate μ-slip curves (and the self-aligning torque) for braking and cornering or combined motion (e.g., braking during cornering). I present numerical results which illustrate the theory. Simulations of Anti-Blocking System (ABS) braking are performed using two simple control algorithms.

Rubber friction is a topic of huge practical importance, e.g., for tires, rubber seals, wiper blades, conveyor belts and syringes. In most theoretical studies rubber friction is described using very simple phenomenological models, e.g., the Coulombs friction law with a friction coefficient which may depend on the local sliding velocity.

However, rubber friction depends on the history of the sliding motion (memory effects), which we have found to be crucial for an accurate description of rubber friction. For rubber sliding on a hard rough substrate, the history dependence of the friction is mainly due to frictional heating in the rubber-substrate contact regions. Many experimental observations, such as an apparent dependence of the rubber friction on the normal stress, can be attributed to the influence of frictional heating on the rubber friction.

A large number of papers have been published related to tire dynamics, in particular in the context of Anti-Blocking System braking models. The "heart" in tire dynamics is the road-rubber tire friction. Thus, unless this friction is accurately described, no tire model, independent of how detailed the description of the tire body may be, will provide an accurate picture of tire dynamics. However, most treatments account for the road-tire friction in a very approximate way. Thus, many "advanced" finite element studies for tire dynamics account for the friction only via a static and a kinetic rubber friction coefficients. In other studies the dynamics of the whole tire is described using interpolation formulas,

e.g., the "Magic Formula", but this approach requires a very large set of measured tire properties (which are expensive and time-consuming to obtain), and cannot describe the influence of history (or memory) effects on tire dynamics.

One advantage of the 2D-model over a full 3D-model is that one can easily impose any foot-print pressure distribution one likes (e.g., measured pressure distributions), while in a 3D-model the pressure distribution is fixed by the model itself. This allows a detailed study on how sensitive the tire dynamics depend on the nature of the footprint pressure distribution. The tire model is illustrated by calculating μ-slip curves and with simulations of ABS braking using two different control algorithms.

BIOGRAPHY: : B.N.J. Persson is a research scientist at the Research Center Jülich, Germany, and the Founder and CEO of MultiscaleConsulting, a company specialized in consulting with (mainly) tire and medical companies about contact mechanics and rubber friction. He received his PhD degree from Chalmers University, Sweden, on the topic of "Dynamical Processes at Surfaces", but since the middle of the 1990s, his focus is mainly on tribology problems. Persson has been a visiting scientist for several years at the IBM Research Laboratories in Yorktown Heights and Zürich. He has published more than 500 articles in refereed journals and is the author of Sliding Friction: Physical Principles and Applications, which appeared in the late 1990s, and co-author with Professor A.I. Volokitin of Electromagnetic Fluctuations at the Nanoscale, published in 2017.

During consulting with the Pirelli Tire company, he developed a fundamental contact mechanics theory for rough surfaces. This is the only physically valid analytical approach today for the contact between solids with random roughness on arbitrary many length scales. The theory has been applied to many important problems, including rubber friction and leakage of rubber seals.

Dr. Persson has been presented by many awards, including the Walter-Schottky- Prize of Deutsche Physikalische Gesellschaft, the Adhesion Society Award of Excellence, the Tire Society Lifetime Achievement Award and the Tribology Gold Medal.

CIE

MONDAY, AUGUST 21
10:50AM–12:10PM GEORGIAN

Dr. Mike Molnar
NIST

Advancing U.S. Manufacturing-Opportunities for Innovation, Collaboration and Competitiveness

ABSTRACT: Abstract: Substantive improvements in the health, robustness and innovative capacity of the U.S. manufacturing sector have an unrivaled ability to boost the nation's global economic competitiveness. The Manufacturing USA® program, in conjunction with the Manufacturing Extension Partnership program, is helping to lead the way. Across a range of sectors – biomanufacturing, microelectronics, digital controls and automation, clean energy manufacturing, and advanced materials – Manufacturing USA institutes are bringing together researchers from industry, universities, and national labs to create and transition innovative technologies into scalable, cost-effective, and high-performing production capabilities while preparing the technology-ready workforce needed to win in the global arena. During this presentation, updates will be shared about significant developments, new program initiatives, including opportunities for innovation, collaboration, and competitiveness.

The Office of Advanced Manufacturing (OAM) serves as the headquarters for the interagency Advanced Manufacturing National Program Office to coordinate Manufacturing USA, a network of manufacturing innovation institutes across the country that brings together industry, academia, and the public sector to advance American manufacturing.

BIOGRAPHY: Mike Molnar is the founding director of the Advanced Manufacturing National Program Office, the interagency team responsible for the Manufacturing USA program. Mike also leads the NIST Office of Advanced Manufacturing and serves as co-chair of the National Science and Technology Council, Subcommittee on Advanced Manufacturing – the team responsible for the National Strategic Plan for Advanced Manufacturing.

Prior to joining federal service in 2011 Mike had a successful industry career, including 25 years leading manufacturing and technology development at Cummins, a U.S. based global company that designs, manufactures, and distributes engines and power generation products. Midcareer he served as the first

Manufacturing Policy Fellow in the White House Office of Science and Technology Policy. He earned a Bachelor's in Mechanical Engineering and Master's in Manufacturing Systems Engineering from the University of Wisconsin, and an Executive MBA from the University of Notre Dame. He is a licensed Professional Engineer, Certified Manufacturing Engineer, and was elected a Fellow of SME and a Fellow and Honorary Member of ASME.

DAC SIGNATURE EVENT

TUESDAY, AUGUST 22
2:20PM–4:00PM STATLER

Design for Safe and Reliable Autonomous Systems

DESCRIPTION: Autonomous systems in engineering, especially in manufacturing systems automation, are becoming increasingly popular. As more and more autonomous systems are expected to enter our daily lives in the future, such as autonomous vehicles and personalized additive manufactured products, safety, quality, and performance reliability are major concerns.

Common properties of autonomous systems, particularly those involving human interactions, include complex operation conditions, endless corner cases, and a high degree of machine learning or AI model employment. Each of these properties makes system design challenging, creating significant uncertainties in addition to the design complexity.

While machine learning or AI models have been extensively used in autonomous vehicles for perception and navigation system design, many research problems remain unsolved. For example, how reliable are these AI models in real operating conditions, and how can the system be designed to ensure reliable operation even when the AI model is incorrect? Similarly, how can accurate machine learning or AI models be built for additive manufacturing machines with unknown process uncertainty, and how can these models be used to design better parts or products with guaranteed quality and lifetime reliability for personalized products? These questions are related not only to the theoretical foundation of various AI models but also to their applications in autonomous vehicles and additive manufacturing.

This panel includes top experts from AI modeling, autonomous vehicles, and additive manufacturing from both industry and academia. We are excited to have you join us for an engaging and thought-provoking discussion.

Keynotes

Moderator
Dr. Zhimin Xi
Rutgers, The State University of New Jersey, US

BIOGRAPHY: Dr. Zhimin Xi is an Associate Professor in the Department of Industrial and Systems Engineering at Rutgers University – New Brunswick. He received his B.S. and M.S. degrees in Mechanical Engineering from the University of Science and Technology Beijing in 2001 and 2004, respectively, and obtained his Ph.D. in Mechanical Engineering (Program of Reliability Engineering) from the University of Maryland – College Park in 2010. Dr. Xi's research interests include design for reliability and the application of reliable autonomous vehicles/robots, lithium-ion batteries, and additive manufacturing. He is the recipient of 2021 ASME – Design Automation Young Investigator Award, 2019 Rutgers A. Walter Tyson Assistant Professorship Award, and 2016 DARPA - Young Faculty Award. He currently serves as an Associate Editor for IEEE Robotics and Automation Letters and for the ASME – Journal of Mechanical Design.

Panelist
Dr. Qi Hommes
Senior Director
ZooX

BIOGRAPHY: Qi Hommes is the Senior Director of System Design and Mission Assurance (SDMA) at Zoox and a member of Zoox's Executive Team. SDMA's mission is to construct the Safety Case and validate that Zoox vehicles are safe enough to be deployed for autonomous driving. Zoox's Safety Case incorporates the principles of Systems Engineering, risk-informed decision making, and relevant industry/government safety standards. Through the definition and execution of the Safety Case strategy, Qi and her team enable engineering and operations to rapidly iterate and safely expand Zoox's performance and capabilities. Qi's career spans across private industry, government, and academia. She worked in various engineering roles at Ford and GM. She was a Principal Investigator for the US Department of Transportation. She was also a Research Scientist at MIT where she taught six years of Systems Engineering. Prior to joining Zoox, Qi was the Head of System Safety with Waymo where she played a key role in Waymo's decision to remove drivers from their autonomous vehicles. Qi received her BS degree in Mechanical Engineering from University of Kentucky, and MS and PhD degrees in Mechanical Engineering from MIT.

Panelist
Chris Robinson
Senior Product Manager
Ansys

BIOGRAPHY: Chris Robinson is an Ansys Additive Manufacturing and Metal Forming Senior Product Manager at Ansys. He started his career of AM research when designing satellite components in 2004. He has been in a manufacturing research environment for 18 years at Sandia National Laboratories, Utah State University, NAVAIR, Boeing, 3DSIM and Ansys. Chris has led many R&D product development projects ranging from fundamental research (TRL 1) to production readiness for commercial application (TRL 9). He has worked on material, process, application, and software development efforts utilizing, metal, polymer, and direct-write processes. He has experience in managing projects ranging from semi-autonomous vehicles, to UAVs, to components for commercial aircraft. His current focus is to help the Additive Manufacturing and Metal Forming industries make a positive difference in the lives of individuals and the environment, by guiding software solutions that help them address their real day to day product development problems through process simulation.

Panelist
Dr. Heng Huang
Professor
Univ. of Maryland, College Park

BIOGRAPHY: Dr. Heng Huang is John A. Jurenko Endowed Professor in Electrical and Computer Engineering at University of Pittsburgh, and also Professor in Biomedical Informatics at University of Pittsburgh Medical Center. Dr. Huang received the PhD degree in Computer Science at Dartmouth College. His research areas include machine learning, artificial intelligence, and biomedical data science. Dr. Huang has published more than 280 papers in top-tier conferences and many papers in premium journals, such as ICML, NeurIPS, KDD, IJCAI, AAAI, ICCV, CVPR, Nature Machine Intelligence, Journal of Machine Learning Research, IEEE TPAMI, etc. As PI, Dr. Huang currently is leading NIH R01s, U01, and multiple NSF funded projects on machine learning, data science, AIoT, smart healthcare, and cyber physical system. He is a Fellow of AIBME and served as the Program Chair of ACM SIGKDD Conference 2020. He will be the inaugural Brendan Iribe Endowed Professor in Computer Science at the University of Maryland College Park.

Panelist
Dr. Rajiv Malhotra
Associate Professor
Rutgers University, New Brunswick

BIOGRAPHY: Dr. Rajiv Malhotra got his PhD in Mechanical Engineering from Northwestern University and joined Rutgers University in 2017. His research interests lie in the science-driven innovation and control of additive manufacturing processes across multiple length scales and application sectors. He is an associate editor for SME Manufacturing Letters and SME Journal of Manufacturing Processes, a guest-editor for ASME and SME journals, chair of the Micro-Nanomanufacturing track chair in the ASME Manufacturing Science and Engineering Conference, and a scientific committee member in the North American Manufacturing Research Conference. His research and service efforts were recognized by the SME Young Manufacturing Engineer Award and the SME Associate Editor of the Year Award.

DFMLC

TUESDAY, AUGUST 22
2:20PM–4:00PM   **PARK**

Speaker
Dr. Gul E. Kremer
Dean: College of Engineering, University of Dayton

Remanufacturing Challenges: Engineering, Attitude and More

ABSTRACT: Remanufacturing supports sustainability goals by restoring used products in terms of quality and functionality. Attitudes towards buying remanufactured products and using remanufactured parts in manufacturing are varied across industries, inherently impacting business models. However, the increasing adoption of ESG principles has renewed the positive energy behind remanufacturing.

With support from the REMADE Institute and in collaboration with industrial companies (Danfoss, John Deere, Volvo, and more) and academic partners, Dr. Kremer led several applied projects in remanufacturing. In this talk, she will present the significant engineering and non-engineering challenges she has experienced and observed across these sponsored projects.

BIOGRAPHY: Gül E. Kremer, a distinguished researcher, teacher and skilled university administrator, has been named the new dean for the University of Dayton School of Engineering, starting Aug. 1, 2022. Kremer, previously the Wilkinson Professor in Interdisciplinary Engineering in the Iowa State University Department of Industrial and Manufacturing Systems Engineering and senior director of presidential projects in the Office of the President, brings an extensive track record in collaborative sponsored research, engineering program development, advancing diversity and inclusion, and fundraising. She earned a doctorate in engineering

management from the Missouri University of Science and Technology (formerly University of Missouri-Rolla); master's and bachelor's degrees in industrial engineering from Yildiz Technical University in Istanbul, Turkey, and a master's in business, specializing in production management, from Istanbul University. Her research accomplishments focus on applied decision sciences and operations research for product and design systems, and other research interests include sustainability, system complexity, design creativity, and engineering education.

MESA

MONDAY, AUGUST 21
8:00AM–9:00AM   **BACK BAY**

Professor Primo Zingaretti
Università Politecnica delle Marche
Italy

VRAI: A Journey on Artificial Intelligence Techniques for Mechatronics and Embedded Systems: From Vision Robotics to Virtual Reality

ABSTRACT: VRAI is the name/acronym of the Vision, Robotics and Artificial Intelligence Laboratory at the Department of Information Engineering (DII) of the Università Politecnica delle Marche. Founded about 20 years ago, its researchers have experienced all the rapid advances made by technology in autonomous, intelligent, mechatronics and embedded systems. This keynote, after briefly delineating the path followed, will present, based on several application cases, the integration of Artificial Intelligence techniques within Cyber Physical Systems, shedding light on its profound implications for autonomous decision-making capabilities. We will analyze how AI, combined with sensors and IoT, enables systems to learn, adapt, and respond, thereby pushing the boundaries of automation and control in mechatronic systems. Lastly, we will introduce and elaborate on the concept of Digital Twins and their transformative role in the field. By providing real-time, dynamic replicas of physical systems, Digital Twins allow us to foresee and optimize system performance, leading to unprecedented levels of efficiency and adaptability, also in terms of Human Interaction on immersive XR environment.

BIOGRAPHY: Primo Zingaretti is a Full Professor of Computer Engineering at the Department of Information Engineering (DII) at the Università Politecnica delle Marche, where he currently teaches "Computer Graphics and Multimedia," "Information Processing Systems," and "Information Technology for Cultural Heritage."

His research activity has involved several aspects, both theoretical and applicative, being Artificial Intelligent Systems (Artificial Intelligence), in particular, systems interacting with the surrounding environment mainly through visual sensors (Computer Vision), the unifying research direction. Regarding the theoretical aspects, the research has been oriented to the study of two main problems: - definition and development of techniques and efficient data structures for the representation and processing of

Keynotes

images (Pattern Recognition, Image Processing and Understanding); - definition and development of frameworks for machine vision, graphics and multimedia systems that incorporate machine learning capabilities (Decision Support Systems, Machine Learning and Deep Learning).

The main application areas involved have been: i) Robotic Vision, for the self-location and autonomous navigation of mobile robots (Mobile Robotics) of land (Unmanned Ground Vehicle - UGV), water (Unmanned Undersea Vehicle - UUV) or air (Unmanned Aerial Vehicle - UAV) and scene monitoring; ii) Mechatronic systems, embedded systems and, in particular, Cyber Physical Systems in industry 4.0, exploiting different technologies/sensors for data acquisition (e.g., RGB-D, beacon BLE, IoT), different Real-Time Locating Systems for the localization of objects/persons (e.g., RFID, UWB) and Human Behaviour Analysis, in particular, for customer profiling in retail and home automation systems for Ambient Assisted Living; iii) Geomatic applications, for the automatic classification of heterogeneous data in the production of themes (GIS-ready automatic cartography) and in the monitoring of environments/products, in particular in Precision Farming, from the automatic interpretation of remote sensing data from satellite and/or UAV equipped with innovative image acquisition systems, both multi-spectral and hyper-spectral, as well as ground acquired; iv) Extended Reality (XR), including Augmented Reality (AR) and Virtual Reality (VR), systems in the fields of cultural heritage, tourism, industry 4.0 and medicine.

Great attention has been directed to the technological transfer of research results. In particular, he was a founding partner of two university spin-offs and a specific interest was devoted to industrial applications and factory automation, being scientific and/or technical responsible for many national and international research projects, funded by private companies or by public bodies.

He has been one of the Promotors (and still a member of the Conference Board) of the European Conference on Mobile Robots – ECMR, the Program Chair of ECMR 2003, Radziejowice/Warsaw, Poland and the General Chair of ECMR 2005, Ancona, Italy, General Chair of IEEE/ASME Mechatronic and Embedded Systems and Applications - MESA'11, Washington DC, USA and IEEE/ASME MESA'14, Senigallia, Italy as well as the Program Chair of IEEE/ASME MESA'10, Qingdao, China. He has been Director of the first (PSFMR'05) and second (PSFMR'06) International School on Perception and Sensor Fusion in Mobile Robotics, held with the support of the EURON - European Robotics Research Network of Excellence, for doctoral or post-doctoral students, Chair of the Technical Committe MESA "Mechatronic and Embedded System Applications" of the ASME Design Engineering Division (DED) 2010–2011, and Founder and Director of the Laboratory of Vision, Robotics and Artificial Intelligence (VRAI) at the Department of Information Engineering (DII) of the Università Politecnica delle Marche, which is currently composed of some 30 researchers (faculty, PhD and PhD students) engaged in numerous European, national and regional collaborations and research projects.

He has been Guest Editor of special issues and author or co-author of more than 200 scientific papers in journals, book chapters or conference proceedings. He is Senior Member of IEEE, member of ASME, promoter of AIxIA, Vice President of CVPL.

Professor Chris Pretty
University of Canterbury
New Zealand

ABSTRACT: Healthcare costs are increasingly unaffordable in New Zealand and internationally, and are only going to get worse over the next 20-50 years with the ageing population. To avoid rationing and increased inequity in healthcare, we need to be more efficient and effective at delivering health services.

Mechatronics engineering can enable efficient and effective healthcare systems through lower cost technology, better use of models and data for improved diagnosis, monitoring, and therapy. Right now, we are at an amazing technological confluence of high performance, low-cost processing, connectivity, and components, all in a small physical size, coupled with rapid, accurate, low-cost digital manufacturing systems. We can now solve problems in a way that could not have even been imagined 20 years ago. But, to achieve these goals, we need to enable interoperability, data sovereignty, and new business models.

This talk explores some of the challenges and potential solutions to improving efficiency, efficacy, and equity of healthcare using mechatronics engineering, with some examples from my own research experience.

BIOGRAPHY: Professor Chris Pretty is currently a co-director of the Mechatronics Engineering program in the Department of Mechanical Engineering at the University of Canterbury, New Zealand.

His primary field of research is the application of engineering to solve problems in medicine, principally in critical care and rehabilitative robotics. Specifically, his research involves the modelling, sensing, control, and actuation of dynamic physiological systems, and this forms the common thread between diverse areas of application.

Prof. Pretty's research has particular emphasis on using physiological models to synthesise and "add value" to new or existing sensor data to enable improved care for patients through improved monitoring, diagnosis, and control, as well as reduced cost and effort for clinicians.

Prof. Pretty completed a PhD in Bioengineering in 2012 at the University of Canterbury, NZ. Following his PhD, he moved to Belgium as a postdoctoral researcher at the University of Liege in the GIGA Cardiovascular Sciences research group. He is a past chair of the ASME/IEEE Mechatronics and Embedded Systems and Applications Technical Committee.

MNS

Ashwin A. Seshia
Professor of Microsystems Technology
Cambridge University

Mode-localized Sensing in MEMS Based on Coupled Resonator Arrays

BIOGRAPHY: Ashwin A. Seshia is Professor of Microsystems Technology in the Department of Engineering at Cambridge University and a Fellow of Queens' College, Cambridge. He received his B.Tech. degree in Engineering Physics from IIT Bombay in 1996, and the MS and PhD degrees in Electrical Engineering and Computer Science from the University of California, Berkeley in 1999 and 2002 respectively. Ashwin's research interests include microelectromechanical systems (MEMS) design, particularly in relation to sensors and sensor systems. Ashwin received the 2018 IEEE Sensors Technical Achievement Award (Advanced Career - Sensor Systems) "for pioneering contributions to resonant microsystems with application to sub-surface density contrast imaging and energy harvesting systems". He is a member of the executive committee of the European Frequency and Time Forum and the IEEE MEMS International Steering Committee. He has served on the editorial boards of the Journal of Micromechanics and Microengineering (2015–2016), the IEEE Transactions on Nanotechnology (2015–2017), the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control (2011–2021) and the IEEE Journal of Microelectromechanical Systems (2009–2023). Ashwin is a Fellow of the Institute of Physics (IOP), a Fellow of the Institution for Engineering and Technology (IET) and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

MR

Professor Jian S. Dai
Fellow of the Royal Academy of Engineering (FREng)
FIEEE, FASME, FIMechE, FRSA
Director of Institute of Robotics, Southern University of Science and Technology
Honorary Chair Professor of King's College London

DESCRIPTION: Picking an artefact as a starting point, equipping it with mechanisms, and associating it with mathematics, this engenders a new and broad spectrum of robotics applications. In all its manifesta-tions, the philosophy of reconfiguration evolves in parallel to biological life and to the inherent meta-morphosis presence in biological organisms, leading to the generation of evolutionary mechanisms.

This talk associates the evolution of human beings over millions of years, and the four industrial revolu¬tions, to the structural evolution of mechanisms and robots through the years, placing a particular emphasis on the structural metamorphosis and polymorphism of a robot.

In virtue of the properties of polymorphism and branch variation, the whole spectrum of resulting mechanical design possibilities leads to the creation of various robotic mechanisms for rough terrain locomotion, healthcare, and production, evolving into public services, thereby generating a wide scope for reconfigurable mechanisms. This structural evolution necessitates the advanced mathematics pertaining to Screw algebra and Lie algebra. This transfers the robot structural design process into six-dimensional space and involves both Euler-Rodrigues and dual Euler-Rodrigues formulations in various mathematical forms, achieving a fine harmony between mathematics, the arts, and structures. With these integrated mathematical tools, all evolutionary structures could be interrelated and interchanged in a beautiful geometry that correlates geometric evolution with the diversification of robotic structures. The talk will in a whole process involve a showcase of the diverse applications that can be realized by enduing robots with evolutionary mechanisms.

BIOGRAPHY: Professor Dai is a Fellow of the Royal Academy of Engineering (FREng). He is an IEEE Fellow, ASME Fellow, IMechE Fellow and RSA Fellow. He is an Editor-in-Chief of the long-standing international journal Robotica and a Subject Editor of Mechanism and Machine Theory. A pioneering figure in reconfigurable mechanisms and robots, origami robots, ankle rehabilitation robots, and metamorphic robots, he was the 27th recipient of the 2015 ASME DED Mechanisms and Robotics Award since its inception in 1974, and the 58th recipient of the 2020 ASME Machine Design Award since its inception in 1958, in addition to receiving other awards including the 2010 King's College London Overall Supervisory Excellence Award.

Published over 650 peer-reviewed papers and eight authored books, Prof Dai has graduated over 50 PhD students who are currently either faculty members of world-leading universities, affiliated with prestigious corporations, or successful entrepreneurs.

Keynotes

MR-4 ORIGAMI SYMPOSIUM KEYNOTE

Damiano Pasini
Tier 1 Canada Research Chair in Mechanical Metamaterials and full professor of Mechanical Engineering at McGill University

Loadbearing Multistable Origami Metamaterials

ABSTRACT: Origami patterns are a source of inspiration for the design of reconfigurable materials that find applications across disciplines from deployable solar panels to reconfigurable robots. Most existing origami concepts are floppy along the direction of deployment hence unable to offer structural resistance along their folding path. In this talk, I will present a foldable class of origami-inspired metamaterials that can lock into several states that are load bearing across multiple directions, including the direction of deployment. The basic concept meshes notions of origami and kirigami to enable reconfiguration into several flat-foldable and spatially-lockable folding paths due to face contact. I will illustrate that locking under compression yields topology and symmetry changes that impart multidirectional stiffness and offer opportunities for in-situ modulation of their mechanical properties. I will finally elaborate on the highly mulistable responses they can deliver during repeated cycles of opening and closure, and demonstrate how their remarkably rich energy landscape can be harnessed to program and boost energy absorption.

BIOGRAPHY: Damiano Pasini is Tier 1 Canada Research Chair in Mechanical Metamaterials and full professor of Mechanical Engineering at McGill University. His research interests lie in the broad areas of mechanics of multiscale materials, multiphysics, and structural optimization, expertise that he systematically integrates to understand, predict and optimize the intriguing properties of kirigami, origami and other architected materials made of stiff and soft solids. While his curiosity is primarily driven by the fundamental principles underpinning their behavior and functionality, he also strives to promote them for the development of advanced technology in a diverse range of sectors, from soft robotics, packaging, to aerospace and orthopaedics.

MSNDC

Arvind Raman
John A. Edwardson, Dean of Engineering and the Robert V. Adams Professor of Mechanical Engineering at Purdue University

Recent advances in nonlinear dynamics in AFM

ABSTRACT: Understanding and exploiting the nonlinear dynamics of resonant microcantilevers in the Atomic Force Microscope (AFM) has been fundamental to the advancement of the AFM. This has enabled the microscope to operate more stably, with better resolution, and has enabled the microscope to sensitively measure contrasts in material properties at the nanoscale. In the first part of this talk, I will review some key past results on nonlinear dynamics in the Atomic Force Microscope (AFM) in both air and liquid environments when the AFM is resonantly driven at one excitation frequency.

Next, I will discuss some recent results on the nonlinear dynamics in Intermodulation Atomic Force Microscopy. Intermodulation Atomic Force Microscopy (ImAFM) is a multi-frequency Atomic Force Microscopy (AFM) technique of increasing interest which can simultaneously map the nanoscale compositional contrast of samples and reconstruct quantitatively the nonlinear interaction force between the AFM probe tip and sample surface through measurement of intermodulation products (IMPs). The interaction nonlinearity and resonant excitation of the AFM microcantilever at two closely spaced frequencies create conditions for little-studied yet rich nonlinear dynamical phenomena that could be used to improve the technique. Through theory and experiments we show that this important multi-frequency AFM method also features the possibility of bi-stability, bifurcations, and co-existence of solutions. By controlling the difference frequency one can in fact control access to two different regimes of operation, one dominated by attractive forces and another by repulsive forces, each with a different spectrum of intermodulation products.

BIOGRAPHY: Arvind Raman's research focuses on exploiting nonlinear dynamics for innovations in diverse interdisciplinary areas such as nanotechnology, biomechanics and appropriate technologies for sustainable development. His work on the Atomic Force Microscope (AFM) has helped the scientific and industrial community recognize and exploit nonlinear effects to better and more rapidly image and measure properties of complex materials at the nanoscale. Via the cyberinfrastructure of nanohub the AFM simulation tools developed by Raman's group have been used by thousands of researchers worldwide. He is the co-founder of the Shah Family Global Innovation Lab in the College of Engineering that supports technology development and translation of technologies for sustainable development and the PI of the $70M USAID funded LASER PULSE center that convenes and catalyzes a global network of universities, government agencies, non- governmental organizations, and the private sector for research-driven practical

solutions to critical development challenges in Low- and Middle- Income Countries.

Raman is an ASME fellow, an ASME Gustus Larson Memorial Award recipient, Keeley fellow (Oxford), College of Engineering outstanding young investigator awardee, and a NSF CAREER awardee. Professor Raman joined Purdue University in 2000 as an Assistant Professor following a PhD in Mechanical Engineering from the University of California at Berkeley advised by Prof. C.D Mote Jr. (1999), MS in Mechanical Engineering from Purdue University (1993), and a B. Tech in Mechanical Engineering from the Indian Institute of Technology, Delhi (1991).

WEDNESDAY, AUGUST 23
8:00AM–9:40AM   **WHITTIER**

Aki Mikkola
Professor of Mechanical Engineering
LUT School of Energy Systems Lappeenranta

Sustainable Product Processes Based on the Multibody Simulation

ABSTRACT: Traditionally, multibody system dynamics has been used as a tool to expedite and enhance the quality product development processes. In this study, the use of multibody system dynamics is extended beyond the product development phase to cover the entire product lifetime. The study highlights how multibody system dynamics can enhance understanding product usage and offer a better understanding of the customers and production as well as boosting service-based businesses.

The introduced extension of multibody system dynamics is significant because traditional material-based business processes, i.e., product manufacturing, are being supplemented by models based on data and knowledge processing. These new business models seem to complement traditional economic theories such as the concept of diminishing returns. Therefore, multibody system dynamics plays a critical role in building businesses related to data and knowledge processing.

The study provides several examples, such as the use of multibody system dynamics in gamification as part of the product development process [1]. Additionally, it demonstrates how multibody system dynamics-based models can be integrated with real machines using a concept called reality-driven simulation [2]. In this concept, the multibody system model is actuated via sensor signals coming from the operating machine. The presentation also covers how artificial intelligence can control multibody system models [3] and how data required for artificial intelligence can be generated by models based on multibody system dynamics [4]. Finally, the study highlights the biomechanical applications of multibody system dynamics and how it can help to better understand human behavior as part of the assembly line. In conclusion, the presentation emphasizes that the use of multibody system dynamics can be extended to various product processes and that it represents an indispensable tool for future product processes.

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BIOGRAPHY: Aki Mikkola received a Ph.D. in the field of machine design in 1997. Since 2002, he has been working as a Professor in the Department of Mechanical Engineering at LUT University, Lappeenranta, Finland. Currently, Mikkola leads the research team of the Laboratory of Machine Design. He has been awarded five patents, has contributed to more than 150 peer-reviewed journal papers and has presented more than 100 conference articles. His major research activities are related to flexible multibody dynamics, rotating structures, and biomechanics. Mikkola is currently Editor-in-Chief of the Journal of Multibody System Dynamics (Springer).

Keynotes

TUESDAY, AUGUST 22
8:10AM–9:10AM WHITTIER

LYAPUNOV AWARD KEYNOTE

Gábor Stépán
Professor of Applied Mechanics,
Member of the Hungarian Academy of Sciences and
the Academy of Europe

From the Delayed Mathieu Equation to the Stability of High-Speed Milling Processes

ABSTRACT: The essential mathematical model of parametric excitation appeared first in a paper of Mathieu in 1868. It took more than 60 years to construct the corresponding stability chart in the parameter plane of the system stiffness and the amplitude of the parametric excitation by Strutt and van der Pol. The governing equations of the delayed oscillator showed up first in the papers of Minorsky and von Schlippe related to ship stabilization and rolling wheel stability problems, respectively, in 1942. The corresponding stability charts in the parameter plane of the system stiffness and feedback gain appeared first correctly in 1966 only by Hsu and Bhatt in the ASME Journal of Applied Mechanics. Since 1960, when the mathematical model of machine tool vibrations appeared in the works of Tobias, it has been clear that the milling processes are governed by delay differential equations subjected to parametric excitation, but another 40 years were needed to construct the exact 3D stability chart in the space of the system stiffness, feedback gain and excitation amplitude in the ASME Journal of Dynamic Systems, Measurement, and Control in 2003.

The need for the stability chart of the delayed Mathieu equation has been induced by the continuous development of the high-performance milling technology in the 1990s, where the parametric excitation in the delayed oscillatory system is not negligible. The lecture will summarize the route to the intricate stability lobe diagrams, their experimental validation, and the actual results and challenges in the hardware-in-the-loop based emulation of high-speed milling processes.

ABSTRACT: Gabor Stepan is a Professor of Applied Mechanics at Budapest University of Technology and Economics, former dean of the Faculty of Mechanical Engineering. He is a member of the Hungarian Academy of Sciences and the Academy of Europe, fellow of CIRP (International Academy for Production Engineering). He is an ERC Advanced Grant holder, the recipient of the Thomas K. Caughey Dynamics Award of ASME and the Delay Systems Lifetime Achievements Award of IFAC (International Federation of Automatic Control). His works deal with nonlinear vibrations and time-delay systems with applications in vibrations of robots, human and robotic balancing, rehabilitation robotics, machine tool vibrations, rolling and traffic dynamics, hardware-in-the-loop experiments. He was elected as a fellow of the Society for Industrial and Applied Mathematics in 2017, "for contributions to the theory and analysis of delayed dynamical systems and their applications".

VIB

MONDAY, AUGUST 21
10:50AM–12:10PM TREMONT

N.O. MYKLESTAD AWARD KEYNOTE

Bogdan I. Epureanu
Arthur F. Thurnau Professor
Professor of Mechanical Engineering, and Professor of
Electrical Engineering and Computer Science
Director, Automotive Research Center
University of Michigan, Ann Arbor

Physics-Informed Data-Driven Methods for Reduced Order Modeling in Dynamics

ABSTRACT: Over the past decades, significant advancements in simulation tools, experimental capabilities, and digitization have led to the creation of digital twins to model the dynamics of complex multi-physical systems. Applications include model development and dynamic prediction for design, testing, monitoring, and forecasting based on real-time measurements, among others. High-fidelity models based on physical first principles have been developed in various areas and can provide excellent prediction accuracy. However, attempts to integrate these detailed models to realize full-scale digital twins of complex systems have been only partially successful because of the large computational cost of such models. An early approach to reduce this cost has been the development of reduced order models, which were initially phenomenologically created and later mathematically derived. Such models provide increased computational speed, but are typically hard to generalize and even harder to calibrate with experimental data. Most recently, data-driven methods based on neural networks are novel techniques to create reduced order models that can be easily adjusted to capture experimental data. These methods provide robust reduced order models while removing assumptions traditionally used for computational physics-based techniques, such as the need for modal analyses or projection schemes. Thus, such data-driven models are increasingly adopted as the backbone of digital twins because they can easily incorporate both computational surrogate data and experimental data directly, improving model applicability and adaptability to as-manufactured systems subject to operational loading conditions. In this talk, data-driven methods for reduced order modeling of structural dynamics will be discussed, and examples of response predictions and forecasting in aerospace applications will be presented. This includes methods based on physics-informed machine learning frameworks directly incorporating known physical laws from a component-level viewpoint, as well as model-free approaches using intrinsic system dynamics to forecast instabilities resulting from bifurcations while only using data prior to reaching unstable regimes.

BIOGRAPHY: 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.

Florida Institute of Technology and Adjunct Professor of Physics and Astronomy and University Distinguished Professor Emeritus of Mechanical Engineering at Michigan State University. He received an AB in Physics (1978) and an MSE in Applied Mechanics (1979) from the University of Michigan and a PhD in Theoretical and Applied Mechanics (1983) from Cornell University. His current research interests include vibration absorbers and micro/nano-scale resonators, with an emphasis on nonlinear and noisy behavior and applications to timekeeping, sensing, and torsional vibrations. He has held visiting appointments at Cornell University, the University of Michigan, Caltech, the University of Minnesota, the University of California-Santa Barbara, and McGill University. Steve is a Fellow of ASME (1995) and recipient of the Henry Ford Customer Satisfaction Award (1986), the ASME Henry Hess Award (1986), the SAE Arch T. Colwell Merit Award (1997), the ASME N. O. Myklestad Award (2013), the ASME T. K. Caughey Dynamics Award (2019), and the ASME J. P. Den Hartog Award (2023).

TUESDAY, AUGUST 22
11:00AM–12:20PM   TREMONT

DEN HARTOG AWARD KEYNOTE

Steven W. Shaw
Department of Mechanical and Civil Engineering
Florida Institute of Technology

Centrifugal Pendulum Vibration Absorbers – From Den Hartog to Now

ABSTRACT: Centrifugal pendulum absorbers consist of movable masses attached to a rotating shaft, designed to reduce engine-order torsional vibrations. They have been in wide use in light aircraft engines since WWII, and the past decade has seen their extensive application in automotive powertrain components, where they are used to improve fuel economy and passenger comfort. The first fundamen¬tal analysis of their linear tuning was developed by Meissner (1930), and Den Hartog (1938) first described the detrimental effects of nonlinearity. Newland (1964) suggested a means of tuning that avoids the worst of these effects when using circular path pendulums, but at the cost of diminished efficacy. Madden (1980) suggested an approach for nonlinear tuning using cycloidal path absorbers, and this was refined by Denman (1992), offering further improvements using tautochronic epicycloidal paths. Since then, theoretical and experimental studies have solidified our understanding of these systems and provided approaches for tuning that optimize their performance. In this presentation I will review this history and discuss three recent developments that have added to our practical understanding of these devices: (i) the dynamics of absorbers immersed in fluid, such as those used in torque converters, (ii) the effects of gravity, which come into play at low engine speeds and disrupt the desired uniform pattern of response, and (iii) the use of absorbers that rotate relative to the host rotor, allowing for increased vibration correction for a given amount of absorber mass. Absorber tuning strategies that account for these effects will be presented. Finally, difficulties associated with implementing these absorbers for other applications, such as the gear systems used in electric vehicles, will also be briefly discussed.

BIOGRAPHY: Steven W. Shaw is Professor of Mechanical Engineering at

WEDNESDAY, AUGUST 23
10:00AM–11:40AM   TREMONT

MOTE AWARD KEYNOTE

Kathryn Matlack
Assistant Professor
Mechanical Science and Engineering
The Grainger College of Engineering

Manipulating Vibrations with Phononic Materials

ABSTRACT: One grand challenge for materials and structures design is to satisfy multiple conflicting requirements. For example, energy infrastructure, especially those in remote and extreme environments such as offshore wind turbines and nuclear reactors, requires components to operate effectively over long time periods and avoid catastrophic failures. Structural materials in aviation must be lightweight but high in strength, stiff while dampening out harmful vibrations, survive damaging impact events, and interact with complex flows in non-detrimental ways. On smaller length scales, acoustic and ultrasonic sensors require specific frequency and dissipative responses, and need to detect wavelengths that are much smaller than their physical size. This talk focuses on a common theme to these critical engineering problems: understanding how mechanical waves interact with engineered materials across different length and time scales. In particular, the field of "phononic materials" studies how engineering micro- and meso-scale features in materials and structures can prescribe the frequency and spatial properties of acoustic waves. Features such as spatial periodicity of the material or geometry, resonant inclusions, and nonlinearities can lead to wave propagation and modal properties not found in natural materials. New wave propagation phenomena have been discovered in these material platforms, which has been a direct result of an interdisciplinary research approach, integrating additive manufacturing, acoustics, mechanics, materials science, and design. This presentation will discuss our group's recent research in phononic materials, focusing on effects of tunable materials and

nonlinearity on wave propagation in phononic materials, using reduced order models, finite element simulations, and experiments. Results demonstrate wave propagation features such as tunable band gaps, energy transfer between modes, non-reciprocal wave propagation, and wave-controlled precision actuation.

BIOGRAPHY: Kathryn (Katie) Matlack is an Associate Professor of Mechanical Science and Engineering at the University of Illinois at Urbana-Champaign, where she leads the Wave Propagation and Metamaterials laboratory. Prior, she received her Bachelor's degree in mechanical engineering from MIT, her PhD from Georgia Tech, and was an ETH Postdoctoral Fellow at ETH Zurich. Her research group studies how mechanical waves propagate in complex materials over several length scales, and then uses this knowledge to realize new and multi-functional materials, structures, and devices. She is a recipient of Young Investigator Awards from both the Air Force Office of Scientific Research and the Army Research Office, the NSF CAREER award, as well as the UIUC Dean's Award for Excellence in Research. She currently serves as Associate Editor for the Journal of Nondestructive Evaluation and Wave Motion.

IDETC.CIE STUDENT NETWORKING EVENT

SUNDAY, AUGUST 20
5:30PM–6:30PM   **TERRACE ROOM**

DESCRIPTION: Attention all ASME IDETC student attendees! Join us for the IDETC.CIE Student Networking Event—an opportunity to kickstart your IDETC.CIE experience and foster valuable relationships with fellow students. Expand your professional network and connect with like-minded peers throughout the conference. Don't miss out on shaping your future through meaningful connections. See you there!

NSF-NASA: EXTREME DESIGN - DRIVERS AND NEEDS

MONDAY, AUGUST 21
2:10PM–3:50PM   **COPLEY/KENMORE**

Participation is limited to the first 50 attendees.

DESCRIPTION: This session will provide an overview of key topics in extreme design, as well as guidance on research drivers and needs of interest to NSF and NASA programs

Speakers:
Kathryn W. Jablokow, Ph.D.,
Program Director, Engineering Design & Systems Engineering, National Science Foundation

Anna-Maria R. McGowan, Ph.D.,
NASA Senior Executive for Complex Systems Design

JOURNAL OF MECHANISMS AND ROBOTICS (JMR) SPOTLIGHT SESSION

MONDAY, AUGUST 21
2:10PM–3:50PM   **STUDIO 1**

Editor-in-Chief Venkat Krovi
Clemson University

Title: Structure Synthesis and Reconfiguration Analysis of Variable-Degree-of-Freedom Single-Loop Mechanisms With Prismatic Joints Using Dual Quaternions (September 21, 2021)

Presenting Author: Xianwen Kong, Heriot-Watt University

- Authors: Liu, K., Yu, J., and Kong, X.

DOI: https://doi.org/10.1115/1.4052338

Title: A Modular Open-Source Continuum Manipulator for Underwater Remotely Operated Vehicles, ASME. J. Mechanisms Robotics (December 2022)

Presenting Author: Long Wang, Stevens Institute of Technology, US

- Authors: Sitler, J.L., and Wang, L.

DOI: https://doi.org/10.1115/1.4054309

Title: Actuation-Coordinated Mobile Parallel Robots With Hybrid Mobile and Manipulation Functions (August 2022)

Presenting Author: Dongming Gan, Purdue University, US

- Authors: Gan, D., Fu, J., Lin, H., Yang, H., Rastgaar, M., Min, B., and Voyles, R.

DOI: https://doi.org/10.1115/1.4053821

Title: Design of a Planar Cable-Driven Parallel Crane Without Parasitic Tilt (August 2022)

Presenting Author: Stéphane Caro, National Center for Scientific Research, France

- Authors: Étienne, L., Cardou, P., Métillon, M., and Caro, S.

DOI: https://doi.org/10.1115/1.4054081

Title: Reliability-Based Analysis and Optimization of the Gravity Balancing Performance of Spring-Articulated Serial Robots With Uncertainties (December 9, 2021)

Presenting Author: Vu Linh Nguyen, National Chin-Yi University of Technology, Taiwan

- Authors: Nguyen, V.L., Kuo, C., and Lin, P.T.

DOI: https://doi.org/10.1115/1.4053048

CIE INDUSTRIAL PANEL

MONDAY, AUGUST 21
4:10PM–5:50PM   **GEORGIAN**

KNOWLEDGE TRANSFER (KT) IN EDUCATION, ACADEMIA AND INDUS-TRY: FORWARD THINKING TO PRESERVE ENGINEERING LEADERSHIP

DESCRIPTION: Engineering in the western world faces a generational crisis of losing knowledgeable and experienced engineers to retirement or career change. Their decades of collective knowledge and experience leave with them. Therefore, knowledge transfer (KT) becomes a critical priority to maintain engineering leadership and continue to advance.

KT is a practical method for transitioning knowledge identifying and harnessing people's adaptable skills, building capacity and honing abilities to apply information. KT is not limited to the science and technology disciplines; it encompasses a much broader range of activities. As such, six types of KT can be identified: people; publication/events; collaborative research; consultancy; licensing; and new businesses1. KT helps to

Special Sessions & Panels

translate knowledge into words, visuals, and processes that can be shared. KT improves innovation, stimulates collaboration, accelerates communication and fosters insight and understanding.

This Industry Panel will address challenges and approaches to KT. A live question-and-answer session will be featured so that the audience can engage with these industry leaders.

Panel Moderator
Prof. Robert Wendrich
Rawshaping Technology

Panelists:

Prof. Giorgio Colombo
Politecnico Milano

Dr. Marc Halpern
Gartner

Prof. Scarlett Rae Miller
Penn State

Dr. Mike Molnar
OAM-NIST

Prof. Janis Terpenny
NSF/George Mason University

WORKSHOP ON AUTONOMOUS AND CONNECTED VEHICLES

MONDAY, AUGUST 21
4:10PM–5:50PM   **BEACON HILL**

DEC GRADUATE STUDENT MENTORSHIP PROGRAM

MONDAY, AUGUST 21
4:10PM–5:50PM   **FRANKLIN**

KNOWLEDGE TRANSFER (KT) IN EDUCATION, ACADEMIA AND INDUSTRY: FORWARD THINKING TO PRESERVE ENGINEERING LEADERSHIP

FACILITATORS: Elizabeth M. Starkey, Rohan Prabhu, and Charlotte Marr de Vries

DESCRIPTION: This year's mentorship program will be structured as a speed-networking session and is intended to provide students and early career researchers with an opportunity to build their network. After the speed-networking, we will continue with group or individual discussions based on topics derived from our survey. Prior sign-up is encouraged. Please fill out the form at https://forms.gle/RRXHR93eWpgZvFV96

NSF PROPOSAL WRITING WORKSHOP

MONDAY, AUGUST 21
4:10PM–5:50PM   **COPLEY/KENMORE**

KNOWLEDGE TRANSFER (KT) IN EDUCATION, ACADEMIA AND INDUSTRY: FORWARD THINKING TO PRESERVE ENGINEERING LEADERSHIP

DESCRIPTION: In this workshop, the fundamentals of grant proposal writing for the National Science Foundation (NSF) will be covered. Participants will learn about key topics, including the components of a successful proposal and finding the right home for the research. Critical aspects of the merit review process will be presented. This workshop is geared towards early career and aspiring investigators at U.S. institutions seeking to understand the NSF merit review process, although the information provided will be valuable to principal investigators in any stage of their career seeking to learn more about proposal writing.

SPEAKERS:

Kathryn W. Jablokow, Ph.D.,
Program Director, Engineering Design & Systems Engineering, National Science Foundation

Pinhas Ben-Tzvi, Ph.D., P.E.
Program Director, Established Program to Stimulate Competitive Research (EPSCoR), Office of the Director (OD) I Office of Integrative Activities (OIA)

Janis Terpenny
Program Director of the Manufacturing Systems Integration (MSI) program at the National Science Foundation (NSF)

NSF OFFICE HOURS

MONDAY, AUGUST 21
6:00PM–7:00PM   **COPLEY/KENMORE**

WEDNESDAY, AUGUST 23,
10:00AM–11:40AM   **COPLEY/KENMORE**

DESCRIPTION: These sessions will provide a forum for in-person, open discussions with NSF Program Directors. Attendees will have the chance to ask questions pertaining to NSF funding opportunities, discuss their proposal ideas in relevant subjects, ask questions about the NSF merit review process, and even ask questions and solicit advice about navigating their career paths in academia.

CIE STUDENT POSTER SESSION & RECEPTION

MONDAY, AUGUST 21
6:00PM–7:00PM **GEORGIAN**

DESCRIPTION: Join the CIE community in celebrating and viewing these student posters in a networking setting to wrap up day 1 of sessions.

CIE VES PANEL

TUESDAY, AUGUST 22
11:00AM–12:20PM **CLARENDON**

"2VESAccess" – Accessibility, Inclusion and Wellbeing in Virtual Environment

DESCRIPTION: As immersive technologies become more pervasive in or daily lives, the design of virtual experiences needs thoughtful considerations regarding accessibility, inclusion, and wellbeing of users in these spaces. The ever-increasing human consumption of virtual experiences is bound to have profound effects on both the mind and the body. How should we design such experiences to include individuals with physical, mental, and emotional disabilities? Are there ways to leverage the unique capabilities of virtual worlds to augment users' capabilities and also promote their well-being? What considerations should be given to social aspects of multi-user virtual environments? These questions have far-reaching implications for applications involving virtual space, be they making visual technologies accessible to the vision-impaired, innovations in haptics to facilitate therapeutic experiences and remote healthcare, or social dynamics in multi-user immersive experiences.

PANELISTS:

Prof. James Yang
Texas Tech University

Prof. Daniele Regazzoni
University of Bergamo

Prof. Tahira Reid
Pennsylvania State University

Chih-Hsing Chu (chair)
National Tsing Hua University

Yunbo Zhang (co-chair)
Rochester Institute of Technology

Vinayak Krishnamurthy (co-chair)
Texas A&M University

JOURNAL OF MECHANICAL DESIGN (JMD) SPOTLIGHT SESSION

TUESDAY, AUGUST 22
11:00AM–12:20PM **ARLINGTON**

Editor-in-Chief Carolyn Conner Seepersad
The University of Texas at Austin

TItle: Toward Reusable Surrogate Models: Graph-Based Transfer Learning on Trusses

- Presenting Author: Whalen, Eamon, and Caitlin Mueller - MIT

Title: Reconfigurable Robotic System Design With Application to Cleaning and Maintenance

- Presenting Author: Hayat, Abdullah Aamir, Lim Yi, Manivannan Kalimuthu, M. R. Elara, and Kristin L. Wood - Singapore University of Technology and Design

Title: Co-Design of the Morphology and Actuation of Soft Robots for Locomotion

- Presenting Author: Van Diepen, Merel, and Kristina Shea - ETH Zurich

CIE AMS-SEIKM-CAPPD PANEL

TUESDAY, AUGUST 22
2:20PM–3:40PM **CLARENDON**

Digital Twin for Smart Manufacturing

DESCRIPTION: Smart manufacturing enables the amalgamation of interconnected machines and tools to improve manufacturing performance by optimizing the energy, material and required labor by leveraging technologies such as internet of things (IOT), artificial intelligence, and advanced robotics. In the age of the Industry 4.0, Digital Twin (DT) technology has drawn significant attention as a disruptive digital technology that has the great potential to transform the landscape of smart manufacturing. As a virtual replica of a real-world physical system or process (i.e., a physical twin), DT provides a means of simulating, predicting, controlling, and optimizing physical manufacturing systems and processes. It is envisioned that DT-based smart manufacturing will significantly improve the production process in terms of quality, efficiency, productivity, and flexibility. The power of DT comes from the underlying digital models, which could be physics-based models, machine learning models, or their combinations. However, it is still a main research challenge to create accurate and computationally efficient digital models for real-time or near real-time process monitoring, prediction, and control. On the one hand, physics-based models have good generalization ability, but they are not computationally efficient for real-time prediction. On the other hand, machine learning models are computationally efficient for real-time prediction, but they have poor generalization ability. One possible solution could be physics-based machine learning models, where prior physical knowledge and training data (sensor data, simulation data, etc.) can be integrated together.

Special Sessions & Panels

The panel will discuss challenges and technical approaches in the following topics:

- What is DT?
- Emerging methods for model building, calibration & validation, adaptive learning & updating for DT
- Applications
- Gaps and Challenges
- Future Insights on DT for Smart Manufacturing

PANELISTS:

Dr. Wei Chen
Northwestern University

Dr. Yan Lu
NIST

Dr. Satyandra K. Gupta
University of Southern California

Dr. Conrad Tucker
Carnegie Mellon University

Dr. John G. Michopoulos
Naval Research Laboratory

STUDENT MECHANISM & ROBOT DESIGN COMPETITION (SMRDC)

TUESDAY, AUGUST 22
2:20PM–4:00PM   **STUDIO 1**

DESCRIPTION: The ASME Student Mechanisms and Robotics Design Competition (SMRDC) highlights the innovation of undergraduate and graduate students to design and build a working mechanism and/or robot. Everyone is invited to see the spectacular ideas and realizations devised by students from across the globe.

FINALISTS:

Project: Deployable Vertical-Axis Wind Turbine

- Graduate Student: Henry Vennard
- Faculty Advisor: Jared Butler, Pennsylvania State University

Project: An Origami-inspired Iris Valve

- Graduate Student: Siyuan Ye
- Faculty Advisor: Guangbo Hao
    - School of Engineering and Architecture, University College Cork

Project: 8R-Folding Metamorphic Robot Based on Metamorphic Mechanism

- Graduate Students: Mi Li, Wujie Shi
- Faculty Advisor: Jian S. Dai, Tianjin University, Southern University of Science and Technology

Project: A Multi-stable Elephant Trunk Robot Capable of Abrupt Stiffness Change

- Graduate Students: Zheng Kong, Yi Zhang
- Faculty Advisor: Guimin Chen
    - School of Mechanical Engineering, Xi'an Jiaotong University

Project: A Passively Adaptive Legged Robot with Gear Differentials and Non-Backdrivable Prismatic Legs

- Graduate Student: Seonghoon Noh
- Faculty Advisor: Aaron Dollar, Department of Mechanical Engineering and Materials Science, Yale University

Project: Nigel: A Mechanically Redundant and Reconfigurable Scaled Autonomous Vehicle of AutoDRIVE Ecosystem

- Graduate Students: Tanmay Samak, Chinmay Samak, and Rohit Ravikumar
- Faculty Advisor: Venkat Krovi
    - Department of Automotive Engineering, International Center for Automotive Research (CU-ICAR), Clemson University

Project: COBRA: Crater Observing Bio-inspired Rolling Articulator

- Undergraduate Students: Henry Noyes[1], Nolan Smithwick[2]
- Faculty Advisor: Alireza Ramezani, Mathematics and Physics Department, Mechanical Engineering Department, Electrical and Computer Engineering Department, Northeastern University

Project: Underactuated Parallel Robotic Hand with Linear Trajectory Based on the Watt Linkage Mechanism

- Undergraduate Student: Yinkai Dong
- Faculty Advisors: Zheng Wang, Wenzeng Zhang, Southern University of Science and Technology

Project: Continuum Robot and Intermittent Motion Mechanism for Quadruped Robot Applications

- Undergraduate Students: Chuhan Jin, Qianwen Zhang, Chenkai He, Feiyue Zhang
- Faculty Advisor: Haiyang Li, Dalian University of Technology

Project: The Djembot

- Undergraduate Students: Murray Elinson, Marcel Grygo, Anthony Paolantonio, Kalani Pigao, Kristina Sunada, Joseph Tsui, and Steven Zheng
- Faculty Advisor: Mishah U. Salman, Stevens Institute of Technology

MSNDC STUDENT PAPER COMPETITION

TUESDAY, AUGUST 22
4:20PM–6:00PM   **WHITTIER**

DESCRIPTION: Presentations by Student Paper Competition finalists—Come learn about the latest research in multibody systems, nonlinear dynamics, and control conducted by your student peers.

ASME DED UNDERGRADUATE RESEARCH SYMPOSIUM ON DYNAMICS, VIBRATION & ACOUSTICS

TUESDAY, AUGUST 22
4:20PM–6:00PM   **TREMONT**

Organizer:
Mark Jankauski
Montana State University

DESCRIPTION: TCVS and ASME DED are excited to host the inaugural ASME DED Undergraduate Research Symposium on Dynamics, Vibrations & Acoustics at ASME IDETC 2023. At this symposium, undergraduate researchers will present 6-minute lightning talks on a broad range of topics in dynamics, including vibration absorption, micro air vehicles and human biomechanics. Session participants are eligible for "Judge's Choice" and "Audience Choice" awards. We look forward to seeing you at this special session!

PRESENTERS:

- An Algorithm for Optimization of Flowdown Requirements
  - **Melchizedek Essandoh**
    George Mason University
- Understanding Path-Dependent Processes in Systems Engineering using the Game of Solitaire
  - **Dhiambi Otete**
    George Mason University
- Development of a Test Rig for Investigation of the Dynamic Response Characteristics of Centrifugal Pendulum Vibration Absorbers
  - **Reuben Osborn**
    University of Massachusetts Lowell
- Advancing Structural Health Monitoring: Predicting Concrete Beam Wear through Vibrational Analysis using IMU Sensors

  - **Saif Ullah**
    National University of Sciences and Technology
- Noise Reduction of Quadcopter Drones from Different Frequency Phase Offsets
  - **Phillip Gavino**
    University of Texas at Austin
- Effects of fatigue under different firefighting activities and gear conditions on balance
  - **Hans Elijah Hugo**
    New Jersey Institute of Technology
- Experimental Investigation and Design of Bio-inspired Flapping-Wing Micro-Air-Vehicles (FWMAV)
  - **Michelle Manku**
    University of California at Irvine
- Effect of tandem stance on limb loading, balance, and dominant-leg muscle activity patterns
  - **Josh Failla**
    New Jersey Institute of Technology
- Tendon Shear Wave Tensimetry: Application to Flexor Carpi Radialis
  - **David Phair**
    Brigham Young University
- A Time Dependent Study on the Dynamic Properties of Floral Anthers
  - **Jenna McNally**
    Montana State University

DED/CIE DESIGN TOOL AND COMMERCIALIZATION SHOWCASE

TUESDAY, AUGUST 22
4:20PM–6:00PM   **BALLROOM B FOYER**

DESCRIPTION: Sponsored by the DED Special Initiatives Committee, the DED/CIE Design Tool and Commercialization Showcase provides an alternative pitch-style, demonstration-rich session wherein participants showcase their physical and digital design tools. This year, the Showcase will feature contributions from industry, government, and academia. Supported by DAC, DEC, VES, DTM, and DFMLC, the DED/CIE Design Tool and Commercialization Showcase is a booth-style exposition of interactive tools, including demonstrations of virtual and augmented reality applications, virtual environments, and simulations software to enable design exploration. The session will also feature a live competition to honor the top student-led demonstrations.

ORGANIZERS:

William Bernstein
Air Force Research Laboratory

Deverajan Ramanujan
Aarthus University

Special Sessions & Panels

Paul Egan
Texas Tech University

Albert Patterson
Texas A&M University

Marco Rossoni
Politecnico di Milano

PRESENTERS:

Susan Xu
National Institute for Occupational Safety and Health, National Personal Protective Technology Laboratory

Title: Heat and Moisture Transfer Simulation for a Novel Firefighters' Glove Design With Phase Change Material

- **Susan Xu**
  National Institute for Occupational Safety and Health, National Personal Protective Technology Laboratory

Title: ShapOrator VR: Speech-Based Iterative Digital Design in Virtual Reality

- **Shantanu Vyas**
  Texas A&M University

Title: Augmented Reality Based Diagnostic Tool for a Rotating Machine - Turbo - AR

- **Suryapavan Cheruku**
  Texas A&M University

Title: Creepers3D: Detailed Design Diversification on Product Forms

- **Shantanu Vyas**
  Texas A&M University

Title: General Purpose Software for Immersive AI-Powered Learning

- **Jha, Rajesh**
  SimInsights Inc

Title: Grid Raster: Extended Reality (XR) Cloud Platform

- **Bhaskar Banerjee**
  Grid Raster Inc.

Title: Generative Adversarial Design: Design Intuition, Flexible Problem Definitions, and Initial Guess Generation

- **Nathan Hertlein**
  Air Force Research Laboratory

Title: Stitch - Integrating Digital Engineering Systems

- **Joshua Latimer**
  UES, Inc.

Title: Design Customization for Commercialization of Synthetic Tissue for Surgical Training

- **Paul Egan**
  Texas Tech University

Title: Ontology Model for Design Engineers to Additive Manufacture Smart Wearables for Children

- **Matthew Bonello**
  University of Malta

Title: LCAD: A Framework for Coupling Computer-Aided Design and Life Cycle Analysis Visualizations

- **Teodor Vernica**
  Aarhus University

Title: Dynamic Estimator of Cad Patterning Feature Execution Time

- **John Wagner**
  Clemson University

Title: Researching Human -Robot Interaction With Containerized Virtual Environments

- **Andrew Bowman**
  UES Inc.

Title: A Workflow for Process-Informed Design Using Novel Processes and Materials

- **Roxana Carbonell**
  University of Texas Austin

Title: Spi2py: An Open-Source Python Library for Optimizing System Integration Simultaneously Packing Components and Routing Interconnects for Spatial, Multiphysics, Operational, and Lifecycle Requirements

- **Chad Peterson**
  University of Illinois at Urbana-Champaign

Title: Improving the Flow of Product Life Cycle Information for Product Design

- **Giovanni Formentini**
  Aarhus University

Title: A Grounded Theory Approach for Collecting Interview Data From Industry

- **Beshoy Morkos**
  University of Georgia

NSF/ASME STUDENT DESIGN ESSAY COMPETITION

CHALLENGES IN THE DESIGN OF COMPLEX SYSTEMS

TUESDAY, AUGUST 22
4:20PM–6:00PM   **BALLROOM B**

DESCRIPTION: Students are invited to write essays on their vision for the future of design and manufacturing. These essays are then judged by a panel of faculty from across the United States. This contest has been going on since 1998 and at least ten previous winners have gone on to become faculty members. Essay winners receive funding to attend IDETC and present their work in the form of a poster. We gratefully acknowledge support from NSF Grant Number CMII-1835957.

WINNERS:

Umme Kawsar ALAM

- Title: A Futuristic Approach to Space Exploration and Spacecraft Manufacturing

Naharika BALAJI

- Title: Digital Twin for Next Generation Manufacturing Company: From a Decision-Based Perspective

Mayank BHALERAO

- Title: Shaping the Present, Planning the Future and Thinking the Unforseen

Matthew B. BOWEN & Cody Loren CARROLL

- Title: Enterprise Scale Implementation of Large Language Models: Using LLMs to Propel Companies into Competitive Positions for Future Success

Jinhui CAO

- Title: Unlocking Intelligent Manufacturing: A Design Framework for Self-Organizing Systems in High Tech Enterprise

Runu Proma DAS & Logan SMITH

- Title: Human AI Cognitive Interaction in Manufacturing Industry: Exploring the Implementation of Cognitive Interaction to Increase Industry Metrics

Mohammad Zainullah KHAN

- Title: Stepping Back to Spring Forward: Integrating Human Creativity in an Era of AI Dependency

Yucheng LI

- Title: Innovating Futuristic Design and Manufacturing: A Thriving Company in 2040

Samuel McKINNON

- Title: Increasing the Accessibility of Sustainability Modeling for Manufacturing Enterprises

Fatemeh MOZAFFAR & Mozhdeh RAHMANPOUR

- Title: Lost in Translation? Navigating the Future of Human AI Communications

Zhihan WANG

- Title: Tailor-Made Intelligence: A Design Framework of Cyber-Physical-Social Systems for Personalized Learning

Walt WARD

- Title: The Importance of Implementing Full Autonomy into the Global Manufacturing Industry

Hanbing XIA

- Title: Innovative Development of Supply Chain for High-Tech Global Design and Manufacturing Enterprises in 2040

DTM, MR & B-PART FELLOWSHIP POSTER RECEPTION

TUESDAY, AUGUST 22
4:20PM–6:00PM   **BALLROOM B**

DESCRIPTION: This poster session will feature winners of the DTM Junior Ph.D. student poster competition and the posters from BPart Fellowship Program winners among other IDETC.CIE posters.

MR Poster presenters:

- **Ran Zhuang,** *Stony Brook University*
  "Designing Programmable Ferromagnetic Soft Metastructures for Minimally Invasive Endovascular Therapy"
- **Abbas Fattah,** *Widener University*
  "The Office Trash or Recycle Lift Mechanism"
- **Lingfeng Gao,** *Stony Brook University*
  "Design of Morphable Surfaces Using Deformable Circle Packing Structures and Topology Optimization of Compliant Mechanisms"

Special Sessions & Panels

DTM Junior Ph.D. student posters:

This poster session will highlight up-and-coming students in the Design Theory and Methods community. Junior Ph.D. students who may not have enough research for a full IDETC paper will present their work in a poster format. This competition is organized by Astrid Layton.

DTM Junior Ph.D. student posters

- **Jessica Ezemba**
  Parameter Extraction From Images Using Multilabel Supervised Learning
- **Lauren Wojciechowski**
  Evaluating and Developing Human-Centered Design Workshops for Engagement of Co-Designers Living and Working in sub-Saharan Africa
- **Megan Harris**
  Invoking Suspicion for Improved Accuracy in Phishing Email Identification
- **Nicole Goridkov**
  Enabling Knowledge Transfer from Life Cycle Assessment Documents for Sustainable Design
- **Kathy Cheng**
  Is Cloud the Future of Computer-Aided Design? A Case Study of CAD Collaboration
- **Hossein Basereh Taramsari**
  An Integrated Holistic Approach Toward Sustainable Product Design Using Life Cycle Assessment
- **Erin Johnson**
  Exploring the interactions between individual identities, technology, and decision-making strategies
- **Cynthia Letting**
  Predicting Startup Outcomes in Dynamic Ecosystems through a Novel Computational Model
- **Siyu Chen**
  Unknown Design Space Exploration using Multi-Agent Bayesian Optimization
- **Samantha Kang**
  Gender based social revolutions and their effect on technology evolution: A case study of the sewing machine

BPart Fellowship and Mentorship Winners

The session will also feature winners of the BPart Fellowship and Mentorship Program. This program is designed to uplift early-career graduate students who are members of underrepresented groups within the DED (e.g., women, black and Latinx individuals, transgender individuals, and people with disabilities). The goal of this fellowship program is to create support systems (mentorship and financial) that enable graduate students who are not part of the dominant group in engineering to find in-roads and connections with the design engineering research community. This year's program is organized by Christine Toh and Ada-Rhodes Short.

WINNERS:

- **Tuba Dolar**
  Northwestern University
  "Interpretable neural network analyses for understanding complex physical interactions in engineering design"
- **Olivia Vitale**
  Cornell University
  "Effects of Wave Energy Converter Array Configurations and Geometries on Wave Field and Power Output"
- **Lauren Ervin**
  University of Alabama
  "Design and Dynamic Modeling of the Spherical Tensegrity Exploratory Robot (TExploR)"
- **Zahra Faghihrasoul**
  Oregon State University
  "Methods for Creating Additive Printing Paths on Nonplanar Surfaces"
- **Oredola Adebayo**
  University of Texas at Dallas
  "ANN Crowds: Harnessing Collective Intelligence in Design Prediction"

CIE JCISE PANEL

Presentation Title: **Challenges and Opportunities in Computing Research to Enable Next-Generation Engineering Applications**

DESCRIPTION: Recent advances in computing and information science such as artificial intelligence (AI), machine learning (ML), edge computing, meta-computing, and quantum computing are creating new computing paradigms, which also provide opportunities for new engineering research. For instance, the adoption of Industry 4.0 enabled by AI/ML is fundamentally changing how products are designed, manufactured, maintained, and recycled. It enables considering all aspects of the product life cycle and realizing sustainable designs and helps us in achieving carbon neutrality. Intelligent machines such as robots and autonomous vehicles are revolutionizing human-machine interactions and increasing digitalization in manufacturing and transportation industries. This panel will identify challenges and opportunities in these emerging areas and inspire new researchers to join the field and become a part of the CIE community.

SPEAKERS:

Prof. Janet Allen
University of Oklahoma

Dr. William Bernstein
NIST

Dr. Jitesh Panchal
Purdue University

Dr. Anurag Purwar
Stony Brook University

Dr. Sk Gupta (chair)
University of Southern California

Dr. Yan Wang (co-chair)
Georgia Institute of Technology

NSF DESIGN FUNDING OPPORTUNITIES

WEDNESDAY, AUGUST 23
8:00AM–9:40AM   **COPLEY/KENMORE**

DESCRIPTION: In this session, NSF Program Directors will discuss a range of funding opportunities of interest to the design research community, including the ERI, BRITE, GOALI, and CAREER solicitations, as well as the new BioDesign DCL. Best practices for unsolicited proposals submitted to the EDSE program will also be discussed. The session will also cover Robotics funding opportunities through NSF's Foundational Research in Robotics (FRR) flagship robotics program, and NSF's EPSCoR program major funding investment strategies to achieve its goal of improving the R&D competitiveness of researchers and institutions within EPSCoR jurisdictions. Opportunities from the new TIP Directorate will be covered, and ample time for Q&A will be provided.

Kathryn W. Jablokow, Ph.D.
Program Director, Engineering Design & Systems Engineering, National Science Foundation

Pinhas Ben-Tzvi, Ph.D., P.E.
Program Director, Established Program to Stimulate Competitive Research (EPSCoR), Office of the Director (OD) I Office of Integrative Activities (OIA)

CIE VES JCISE PANEL

WEDNESDAY, AUGUST 23
10:00AM–11:40AM   **CLARENDON**

Title: **JCISE Spotlight Talks on Extended Reality in Design and Manufacturing**

Speakers:

Dr. Hanzhong Xu
Shanghai Jiao Tong University

Prof. Chu,
Chih-Hsing, Nation

Ipsita, Ananya
Purdue University

SPECIAL EARLY CAREER SESSION (SEC-SESS)

WEDNESDAY, AUGUST 23
10:00AM–11:40AM   **STUDIO 1**

Invited Speakers:

Davood Farhadi
Assistant Professor at TU Delft

- **Title: Harnessing Kinematic Singularity to Generate New Modes of Functionality**

Sree Kalyan Patiballa
University of Alabama

- **Title: Design of Intelligent Material and Robotic Systems**

Vu Linh Nguyen
VinUniversity

- **Title: Gravity Compensation for Robots and Mechanisms**

Andrew Sabelhaus
Boston University

- **Title: Controlling Soft Robots: Safety, Robustness, and Scalability**

Workshops & Tutorials

WORKSHOP 1: MULTIDOMAIN PHYSICAL MODELING AND SIMULATION WITH SIMSCAPE

SUNDAY, AUGUST 20
9:00AM–1:00PM **TREMONT**

Organizer:

Mehdi Vahab
Mathworks

DESCRIPTION: This tutorial will provide a practical guide to multidomain physical modeling in Simscape for mechanical engineers, researchers, and academics. It will cover the basic principles of Simscape and how it can be used to model complex systems, with quadcopter drones and vehicle dynamics as working examples. Participants will learn how to create models using blocks in multiple domains and physical units to build, simulate, and analyze complex systems, focusing on practical engineering applications.

In the quadcopter drone example, multiple topics are covered to model different parts of the drone from predefined physical blocks or imported models such as CAD files, implement control algorithms for motor speed and path planning, and import weather data using a Python interface.

For the vehicle dynamics section, participants use Simscape vehicle templates to define a vehicle model and analyze the model behavior based on the variation of suspension damping, steering inputs, and vehicle configurations (e.g., anti-roll bar, sloshing in a tanker, and regenerative braking).

By the end of the workshop, participants will be able to use Simscape to model and simulate physical systems in engineering applications, including control system design and performance analysis. The tutorial suits engineers, scientists, and students interested in applying physical modeling to solve real-world engineering problems.

WORKSHOP 2: FROM DATA TO DESIGN: CHALLENGES AND OPPORTUNITIES ACROSS INDUSTRY AND ACADEMIA

SUNDAY, AUGUST 20
9:00AM–5:00PM **GEORGIAN**

Organizers:

Faez Ahmed
MIT

Daniele Grandi
Autodesk Research

Namwoo Kang
KAIST

Cyril Picard *(MIT)*

Akash Srivastava
IBM

DESCRIPTION: The workshop titled "From Data to Design: Challenges and Opportunities across Industry and Academia" is a full-day event that will bring together professionals and academics to discuss the latest trends, challenges, and opportunities in the field of data-driven engineering design. The workshop will feature invited speakers from both industry and academia who will share their experiences, insights, and best practices in using cutting-edge data-driven machine learning methods to drive engineering design topics. Attendees will also have the opportunity to engage in discussions about the challenges and opportunities associated with data-driven engineering design and to network with other professionals and academics in the field.

Additionally, the workshop will include a half-day hands-on activity, allowing participants to gain practical experience working with real-world data sets and engineering design problems. By the end of the workshop, attendees will have a comprehensive understanding of the latest trends and best practices in data-driven engineering design, as well as practical experience applying these concepts to real-world problems. The workshop promises to be a valuable opportunity for professionals and academics in the field to learn from each other, collaborate, and drive innovation forward.

WORKSHOP 3: BRINGING DESIGN JUSTICE CONTENT INTO ENGINEERING COURSES

SUNDAY, AUGUST 20
9:00AM–5:00PM   **NEWBURY**

Organizers:

Anastasia K. Ostrowski
MIT

Madhurima Das
MIT

Jana Saadi
MIT

Maria Yang
MIT

Aditi Verma
University of Michigan

DESCRIPTION: Over the past three years, the Design Justice Project Team at MIT has investigated the presence of Design Justice in design education courses at MIT and how best to support engineering and design instructors in embedding equity, ethics, and justice in design courses. In August 2022, we hosted the inaugural Design Justice Pedagogy Summit that provided a space for design instructors to come together, learn about Design Justice, and take the first steps for embedding design justice considerations into their courses. The Summit included a workshop and syllabus makeathon activities dedicated to supporting instructors in making the initial step to bring design justice into their courses and policy envisioning activity for imagining the future of design justice in academia. This workshop will be an iteration of the summit specifically bringing these activities (syllabus makeathon and policy envisioning) to the ASME community. Additionally, the workshop will have a panel around design justice in engineering design education. In the workshop, participants will learn strategies for how to engage in design justice considerations in the engineering design classroom and have the opportunity to apply these strategies to their courses.

WORKSHOP 4: EXACT COMPUTATIONAL APPROACHES TO THE ANALYSIS OF MECHANISM SINGULARITIES

SUNDAY, AUGUST 20
1:00PM–5:00PM   **TREMONT**

Organizers:

Xianwen Kong
Heriot Watt University

Andreas Mueller
Johannes Kepler University Linz

DESCRIPTION: The tutorial on singularities of mechanisms is composed of two parts that complement each other.

In Part 1, the basic concepts and definitions of kinematic singularities of mechanisms and the underlying fundamental concepts for their analytical treatment are introduced. The mathematical framework used for kinematics modeling is the screw and Lie group theory, while the analysis uses recently developed methods from differential geometric methods. I particular, it is shown how higher-order analysis can be used to identify singularities, shakiness, and overconstraints, and to determine the finite motion of linkages. The latter is based on the concept of kinematic tangent cone. It allows identification of motion branches, finite mobility, as well as shaky and kinematotropic linkages. Computational methods are introduced as a hands-on tool so that attendees can make immediate use of these methods.

Part 2 covers the singularity analysis of parallel mechanisms. It covers the constraint singularity analysis of conventional and multi-mode parallel mechanisms using tools from computer algebraic geometry and classification of translational parallel mechanisms based on constraint singularities using tools for solving parametric polynomial equations.

Workshops & Tutorials

WORKSHOP 5: 2ND WORKSHOP ON TRENDS IN HUMAN-AI TEAMING FOR ENGINEERING AND DESIGN

SUNDAY, AUGUST 20
9:00AM–1:00PM   **WHITE HILL**

Organizers:

Christopher McComb
Carnegie Mellon University

Susmit Jha
SRI International

DESCRIPTION: The practice of design is rapidly changing. The increasingly digital footprint of design and the growing prevalence of high-powered computing introduces new opportunities for making use of advanced computation. Simultaneously, the rise of complicated cyberphysical systems presents designers with challenges that are unprecedented in terms of scale, multi-disciplinarity, and complexity. In this way, human-AI teaming is not only an exciting opportunity for engineering design, but it is also quickly becoming a necessity. This workshop brings together leading researchers in AI/ML, formal methods, design science, human-computer interaction, and other fields to discuss emerging trends and future opportunities in human-AI teaming for engineering and design.

WORKSHOP 6: EMERGING TECHNOLOGIES AND METHODS FOR EARLY STAGE PRODUCT DESIGN AND DEVELOPMENT

SUNDAY, AUGUST 20
1:00PM–4:00PM, WHITE HILL

Organizers:

Alison Olechowski
University of Toronto

Tucker Marion

Mohsen Moghaddam

Christopher McComb

Katja Holtta-Otto

DESCRIPTION: Building from the momentum of the recent Special Issue in the ASME Journal of Mechanical Design, our workshop aims to bring together researchers and practitioners with interest and expertise related to emerging technologies and methods for early-stage product design and development.

Emerging technologies such as artificial intelligence, machine learning, augmented/virtual/mixed reality, and cloud computing are driving major transformations in the way we design new products. This workshop aims to bring together researchers, practitioners and technology providers to discuss current progress and future opportunities to conduct research at this frontier.

The workshop will progress through "past, present and future" contributions to this topic, with discussions from the authors and organizers of the JMD Special Issue, as well as opportunities for participants to share their progress, build connections, and launch new collaborations.

WORKSHOP 7: DESIGN FOR A CIRCULAR ECONOMY: ADDRESSING THE NEXUS OF RESEARCH, STANDARDS AND EDUCATION

SUNDAY, AUGUST 20
9:00AM–5:00PM, ST. JAMES

Organizer:

Vincenzo Ferrero
NIST

DESCRIPTION: Anticipated resource scarcity, waste management challenges, supply chain disruptions, and economic uncertainty drives the paradigm shift from a traditional economy to increased focus on a Circular Economy. In this two-part workshop, we explore how research, standards, and education play a critical role in establishing the foundations for a transition to a Circular economy.

In the morning session, we invite presenters and workshop participants to share their involvement in circular design research and standards. This session will feature three panels—national lab staff, academic faculty, and industry stakeholders—to establish the current state of progress toward a circular economy and solicit discussion of how these three stakeholders can collaborate to bring the Circular economy to fruition.

The afternoon session further examines the academic and education roles in preparing future engineers and designers for activities that enable a Circular Economy. The discussion explores three topics:

- How to bring CE education to undergraduate courses?
- How to establish CE involvement for graduate students through research, standards activities, and education?
- How can CE education be introduced to existing designers and engineers engaged in industry?

The session will close with an activity presented as a sample lesson plan for teaching concepts of Design and Manufacturing in a Circular Economy.

The outcome of the first session to ascertain the current state and needs of CE industry, academic, and standards research collaboration. The second session explores CE educations to enable current and future design engineers' participation in meeting the needs outlined in session one. The outcomes of the two sessions provide a pilot lesson plan for CE education, demonstrate the growing area of CE research, and offer a clear path for participation in achieving a Circular Economy.

WORKSHOP 9: MACHINE LEARNING DRIVEN ROBOT MOTION DESIGN

SUNDAY, AUGUST 20
1:00PM–4:00PM, WHITTIER

Organizer:

Anurag Purwar
Stony Brook University

DESCRIPTION: This workshop will introduce attendees to a new computational framework for mechanism and robot motion design. The computational framework brings together machine learning with machine design to solve motion generation and path synthesis problems for mechanism design.

Attendees will also get hands-on exposure to a web-based motion design software tool called MotionGen Pro and a robot hardware called SnappyXO Design, both developed at Stony Brook University to support the needs of students in classes, such as Freshman Design Innovation, Kinematics of Machinery, Mechatronics, and Robotics. While the hardware serves as a reference hardware, the software also allows exporting robot part geometry for laser-cutting or 3D printing.

Committee Meetings

ROOM	Sunday, August 20	
Clarendon	DED Executive Committee Meeting (Closed)	1:00PM–5:00PM
Hancock	CIE Executive Committee Meeting (Closed) - Tentative	1:00PM–5:00PM
ROOM	**Monday, August 21**	
Clarendon	Design Engineering Division General Committee Meeting	5:00PM–6:00PM
Beacon Hill	DED - Advanced Vehicle Technologies (AVT)	6:00PM–7:00PM
Franklin	DED - Design Education (DEC)	6:00PM–7:00PM
Park	DED - Design for Manufacturing and the Life Cycle Conference (DFMLC)	6:00PM–7:00PM
ROOM	**Tuesday, August 22**	
Georgian	CIE – Virtual Environments and Systems (VES)	6:10PM–7:10PM
Clarendon	CIE – Advanced Modeling & Simulation (AMS)	6:10PM–7:10PM
Berkeley	CIE – Computer-Aided Product and Process Development (CAPPD)	6:10PM–7:10PM
Arlington	CIE – Systems Engineering, Info. & Knowledge Management (SEIKM)	6:10PM–7:10PM
Whittier	DED - Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)	6:10PM–8:10PM
Newbury	DED - Micro- and Nano Systems (MNS)	6:10PM–7:10PM
Tremont	DED - Mechanical Vibration and Noise (TCVS)	6:10PM–8:10PM
Studio 1	DED – Mechanisms and Robotics (MR)	6:10PM–8:10PM
Scollay	DED - Design Theory and Methodology (DTM)	6:10PM–7:10PM
Terrace Room	DED – Design Automation (DAC)	7:10PM–8:10PM
Georgian	Computers and Information in Engineering General Committee Meeting	7:10PM–8:10PM

MONDAY, AUGUST 21, 2023

VIB-01-01: DYNAMICS & WAVES IN SOLIDS AND METAMATERIALS
8:00AM–9:00AM   **TREMONT (4TH FL)**

Chair: Pai Wang - *University of Utah*
Co-Chair: Serife Tol - *University of Michigan*
Co-Chair: Michael Leamy - *Georgia Institute of Technology*

Numerical Analysis of Phase Nonreciprocity in a Linear Spatiotemporally Modulated System

Technical Paper Publication: IDETC2023-110347

Jiuda Wu - *Concordia University*, **Behrooz Yousefzadeh** - *Concordia University*

Topological Insulator-Based Electroacoustic Transistors

Technical Paper Publication: IDETC2023-116489

Sai Aditya Raman Kuchibhatla - *Georgia Institute of Technology* , **Michael Leamy** - *Georgia Institute of Technology*

The Role of the Dissipative Phononic Crystal Beams for Space Applications

Technical Presentation: IDETC2023-117829

Wei-Chun Lu - *University of Michigan,* **Othman Oudghiri-Idrissi** - *University of Michigan ,* **Hrishikesh Danawe** - *University of Michigan ,* **Avinkrishnan Vijayachandran** - *University of Michigan ,* **Serife Tol** - *University of Michigan*

DTM-01-01: DESIGN AND JUSTICE
8:00AM–9:00AM   **SCOLLAY (LOBBY LEVEL)**

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Mansur Arief - *Carnegie Mellon University*
Co-Chair: Christine Toh - *University of Nebraska at Omaha*

Incorporating Social, Policy, and Ethical Considerations in Engineering and Design Education: An Examination of Barriers and Resources

Technical Paper Publication: IDETC2023-116605

Jana Saadi - *Massachusetts Institute of Technology,* **Madhurima Das** - *Massachusetts Institute of Technology ,* Gillian Roeder - *Massachusetts Institute of Technology ,* **Anastasia Ostrowski** - *Massachusetts Institute of Technology ,* **Stella Lee** - *Johns Hopkins University,* **Marina Santos** - *Wellesley College,* **Cynthia Breazeal** - *Massachusetts Institute of Technology ,* **Catherine D'Ignazio** - *Massachusetts Institute of Technology ,* **Maria Yang** - *Massachusetts Institute of Technology,* **Aditi Verma** - *University of Michigan*

Design and Justice: A Scoping Review in Engineering Design

Technical Paper Publication: IDETC2023-114705

Sita Syal - *University of Michigan,* **Julia Kramer** - *University of Michigan*

Design Justice Strategies for Design Education: Evidence and Recommendations From Syllabus Analysis

Technical Paper Publication: IDETC2023-115270

Anastasia K. Ostrowski - *Massachusetts Institute of Technology ,* **Jennifer Zhang** - *Massachusetts Institute of Technology ,* **Madhurima Das** - *Massachusetts Institute of Technology ,* Cynthia Breazeal - *Massachusetts Institute of Technology ,* **Catherine D'Ignazio** - *Massachusetts Institute of Technology ,* Aditi Verma - *University of Michigan*

Applying Minor Theory to Engineering Design

Technical Presentation: IDETC2023-117936

Caseysimone Ballestas - *Technical University of Delft,* **Kosa Goucher-Lamber** - *University of California, Berkeley ,* **Euiyoung Kim** - *Technical University of Delft,* **Senthil Chandrasegaran** - *Technical University of Delft ,* **Vivek Rao** - *University of California, Berkeley*

PTG-03-01: GEAR DYNAMICS AND NOISE 1
8:00AM–9:00AM   **CAMBRIDGE (4TH FL)**

Chair: David Talbot - *The Ohio State University*
Co-Chair: Hai Xu - *General Motors*

Chair's Welcome

Design of Tooth Flank Modifications in Transmission Systems Considering Dynamic Misalignments

Technical Paper Publication: IDETC2023-112363

Christian Westphal - *RWTH Aachen University,* **Jens Brimmers** - *RWTH Aachen University* , *Christian Brecher - RWTH Aachen University*

An Experimental Investigation of the Effects of Lubrication on Rattling Motions and Noise of a Gear Pair

Technical Paper Publication: IDETC2023-117076

Ata Donmez - *The Ohio State University* , **Ahmet Kahraman** - *The Ohio State University,* **Michael Handschuh** - *The Ohio State University* , **Michael O'toole** - *The Ohio State University*

Investigation of Planetary Gear Elastic Vibrations Using a Finite Element/Contact Mechanics Formulation

Technical Paper Publication: IDETC2023-117164

Christopher Cooley - *Oakland University,* **Adrian Hood** - *U.S. DEVCOM Army Research Laboratory*

MR-2-1: THEORETICAL AND COMPUTATIONAL KINEMATICS (A.T. YANG SYMPOSIUM)
8:00AM–9:00AM   **STUDIO 2 (LOBBY LEVEL)**

Chair: Jeff Ge - *Stony Brook University*
Co-Chair: Anurag Purwar - *Stony Brook University*

Identification of Singularities and Real and Complex Solution Varieties of the Loop Constraints of Linkages Using the Kinematic Tangent Cone

Technical Paper Publication: IDETC2023-114638

Andreas Mueller - *Johannes Kepler University Linz* , **Zijia Li** - *Chinese Academy of Sciences*

Shape Dependent Motion Interpolants for Planar Objects

Technical Paper Publication: IDETC2023-116793

Huan Liu - *Stony Brook University,* **Qiaode Jeffrey Ge** - *Stony Brook University* , **Mark Langer** - *Indiana University*

An Invariant Representation of Coupler Curves Using a Variational Autoencoder: Application to Path Synthesis of Four-Bar Mechanisms

Technical Paper Publication: IDETC2023-116892

Anar Nurizada - *Stony Brook University* , **Anurag Purwar** - *Stony Brook University*

MR-1-1: MECHANISMS SYNTHESIS AND ANALYSIS
8:00AM–9:00AM   **STUDIO 1 (LOBBY LEVEL)**

Chair: Damien Chablat - *CNRS Nantes*
Co-Chair: Vu Linh Nguyen - *Vin University*

Spring Locus Design for Gravity Balanced Mechanisms

Technical Paper Publication: IDETC2023-109820

Colin Rubow - *University of Utah* , **Tristan Archuleta** - *University of Utah* , **Haohan Zhang** - *University of Utah*

Design Considerations for 3rrr Parallel Robots With Lightweight Approximate Static-Balancing

Technical Paper Publication: IDETC2023-110947

Giuseppe Del Giudice - *Vanderbilt University* , **Garrison Johnston** - *Vanderbilt University* , **Nabil Simaan** - *Vanderbilt University*

Multi-Objective Optimal Design of Gravity Compensators Using Pareto Front With Genetic Algorithm

Technical Paper Publication: IDETC2023-112372

Vu Linh Nguyen - *Vin University*

MR-7-1: NOVEL MECHANISMS, ROBOTS, AND APPLICATIONS
8:00AM–9:00AM THE LOFT (LOBBY LEVEL)

Chair: Jaijun Xu - *University of the District of Columbia*
Co-Chair: Wyatt Felt - *VPI Technology*

Design and Development of Solar Array Deployment and Stabilization System for NASA Minds Student Competition

Technical Paper Publication: IDETC2023-109002

Evan Preller - *University of the District of Columbia,* **Joshua Dillard** - *University of the District of Columbia,* **Brandon Bothway** - *University of the District of Columbia,* **Kelechi Iwuchukwu** - *University of the District of Columbia,* **Fisseha Gebre** - *University of the District of Columbia,* **Jiajun Xu** - *University of the District of Columbia*

The Design of a Conjugate Screw Cam Mechanism: Applying Helical Joint in the Design of Cam Mechanisms

Technical Presentation: IDETC2023-117893

Tung-Hsin Pan - *National Taiwan University ,* **Kuan-Lun Hsu** - *National Taiwan University*

Design of Reprogrammable, Rotary, Single-Actuator Mechanical Logic Valves

Technical Paper Publication: IDETC2023-115066

Jonathan Bessette - *Massachusetts Institute of Technology ,* **Steven Burcat** - *Massachusetts Institute of Technology ,* **Alexander Slocum** - *Massachusetts Institute of Technology*

DAC-03-01: NOVEL AI OR ML FRAMEWORKS FOR DESIGN OR SYSTEMS SCIENCE
8:00AM–9:00AM ARLINGTON (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Daniel Selva - *Texas A&M University*
Co-Chair: Souma Chowdhury - *University at Buffalo*

On the Use of Geometric Deep Learning Towards the Evaluation of Graph-Centric Engineering Systems

Technical Paper Publication: IDETC2023-114592

Anthony Sirico - *Colorado State University ,* **Daniel Herber** - *Colorado State University*

Bayesian Mesh Optimization for Graph Neural Networks to Enhance Engineering Performance Prediction

Technical Paper Publication: IDETC2023-113308

Jangseop Park - *Korea Advanced Institute of Science and Technology ,* **Namwoo Kang** - *Korea Advanced Institute of Science and Technology*

Document Understanding Based Design Support: Language Model Based Design Knowledge Extraction

Technical Paper Publication: IDETC2023-116746

Yunjian Qiu - *University of Southern California ,* **Yan Jin** - *University of Southern California*

DAC-13-01: GEOMETRIC MODELING AND ALGORITHMS FOR DESIGN AND MANUFACTURING
8:00AM–9:00AM HANCOCK (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Horea Ilies - *University of Connecticut*
Co-Chair: Saigopal Nelaturi - *Carbon 3D*

Model Consistency for Mechanical Design: Bridging Lumped and Distributed Parameter Models With a Priori Guarantees

Technical Paper Publication: IDETC2023-109380

Randi Wang - Palo Alto Research Center , Morad Behandish - Palo Alto Research Center

An Empirical, Deterministic Design Theory for Compact Drip Emitter Labyrinths

Technical Paper Publication: IDETC2023-116552

Aditya Ghodgaonkar - *Massachusetts Institute of Technology ,* **Emily Welsh** - *Massachusetts Institute of Technology ,* **Benjamin Judge** - *Massachusetts Institute of Technology ,* **Michael Bono** - *Massachusetts Institute of Technology,* **Amos G. Winter, V** - *Massachusetts Institute of Technology*

Methods for Creating Additive Printing Paths on Nonplanar Surfaces

Technical Paper Publication: IDETC2023-110757

Liam Rudd - *Oregon State University,* **Zahra Faghihrasoul** - *Oregon State University ,* **Matthew Campbell** - *Oregon state University*

Technical Sessions - Monday August 21

DAC-20-01: DESIGN OF AUTONOMOUS SYSTEMS
8:00AM–9:00AM STATLER (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Souma Chowdhury** - *University at Buffalo*
Co-Chair: **Ehsan Esfahani** - *University at Buffalo*

Large-Scale Path Planning in Complex Environments Based on Genetic Algorithm

Technical Paper Publication: IDETC2023-116340

Chuanhui Hu - *University of Southern California* , **Yan Jin** - *University of Southern California*

An Enhanced Timed Elastic Band Method for Autonomous Navigation and Its Collision Avoidance Reliability Analysis

Technical Paper Publication: IDETC2023-116695

Zhimin Xi - *Rutgers University*

On How a Self-Organizing System Produces Collective Behavior

Technical Paper Publication: IDETC2023-116875

Jinhui Cao - *Beijing Institute of Technology* , **Zhenjun Ming** - *Beijing Institute of Technology* , **Janet K. Allen** - *The University of Oklahoma* , **Farrokh Mistree** - *The University of Oklahoma*

CIE-01-01: AMS GENERAL
8:00AM–9:00AM CLARENDON (MEZZ)

Chair: **Ahn Tran** - *Sandia National Laboratories*
Co-Chair: **Piyush Pandita** - *GE Research*

Hierarchical Gaussian Process Surrogate Modeling Framework for Heterogeneous Multi-Fidelity Dataset

Technical Paper Publication: IDETC2023-110455

Juyoung Lee - *Korea Advanced Institute of Science and Technology* , **Mingyu Lee** - *Korea Advanced Institute of Science and Technology* , **Bong Jae Lee** - *Korea Advanced Institute of Science and Technology* , **Ikjin Lee** - *Korea Advanced Institute of Science and Technology*

CFD Modelling of an Internal Gear Pump for High Viscosity Fluids

Technical Paper Publication: IDETC2023-111589

Paola Fresia - *Politecnico di Torino* , **Massimo Rundo** - *Politecnico di Torino* , **Gianpaolo Brignolo** - *Varisco Srl* , **Giulio Ferrarese** - *Varisco Srl*

Cross-Domain Health Conditions Identification Based on Joint Distribution Modeling of Fused Prototypes

Technical Paper Publication: IDETC2023-114851

Tingli Xie - *Georgia Institute of Technology, Xufeng Huang - Huazhong University of Science and Technology* , **Seung-Kyum Choi** - *Georgia Institute of Technology*

CIE-10: CAPPD
8:00AM–9:00AM BERKELEY (MEZZ)

Chair: **Marco Rossoni** - *Politecnico di Milano*
Co-Chair: **Anand Balu Nellippallil** - *Florida Institute of Technology*

Early Prediction of Human Intention for Human-Robot Collaboration Using Transformer Network

Technical Paper Publication: IDETC2023-116492

Xinyao Zhang - *University of Florida* , **Sibo Tian** - *University at Buffalo, SUNY* , **Xiao Liang** - *University at Buffalo, SUNY,* **Minghui Zheng** - *University at Buffalo, SUNY* , **Sara Behdad** - *University of Florida*

Efficient Object Manipulation in Confined Space Using Compliant Based Gripper

Technical Paper Publication: IDETC2023-116674

Krushang Gabani - *University at Buffalo* , **Yuhe Oswin Ji** - *University at Buffalo* , **Ehsan Esfahani** - *University at Buffalo*

Augmented Reality for the Positioning of Fasteners and Adhesives in Sheet Metal Joining Processes in the Automotive Industry

Technical Paper Publication: IDETC2023-116849

Rebecca Schwenk - *National Taiwan University* , **Shana Smith** - *National Taiwan University*

Industry's Take on Challenges in the Agricultural Post-Harvesting Industry

Technical Paper Publication: IDETC2023-117157

Logan Smith - *University of Georgia,* **Matthew Bowen** - *University of Georgia ,* **Niloofar Rezaei** - *University of Georgia ,* **Fatmeh Mozaffar** - *University of Georgia ,* **Mozhdeh Rahmanpour** - *University of Georgia ,* **Runu Das** - *University of Georgia,* **Beshoy Morkos** - *University of Georgia*

CIE-17: SEIKM ADVANCED MANUFACTURING FOR BIOECONOMY AND CIRCULAR ECONOMY
8:00AM–9:00AM   GEORGIAN (MEZZ)

Chair: Boonserm Kulvatunyou - *National Institute of Standards and Technology*
Co-Chair: Farhad Ameri - *Texas State University*

Facilitating Cost-Effective Circular Economy With an Example on Plastics

Technical Paper Publication: IDETC2023-111686

Douglas Thomas - *National Institute of Standards and Technology*

Comparative Study of Approaches for an Ontology of Digital Artifacts

Technical Paper Publication: IDETC2023-113755

Dusan Sormaz - *Ohio University,* **Boonserm Kulvatunyou** - *National Institute of Standards and Technology ,* **Miloš Drobnjaković** - *National Institute of Standards and Technology ,* **Saruda Seeharit** - *Ohio University*

Recent Developments in Ontology Standards and Their Applicability to Biomanufacturing

Technical Paper Publication: IDETC2023-116866

Miloš Drobnjaković - *National Institute of Standards and Technology ,* **Boonserm Kulvatunyou** - *National Institute of Standards and Technology ,* **Simon Frechette** - *National Institute of Standards and Technology,* **Vijay Srinivasan** - *National Institute of Standards and Technology*

An Investigation Into an Approach for Automated Supply Chain Onboarding

Technical Paper Publication: IDETC2023-117486

Elena Jelisic - *National Institute of Standards and Technology ,* **Nenad Ivezic** - *National Institute of Standards and Technology,* **Boonserm Kulvatunyou** - *National Institute of Standards and Technology ,* **Perawit Charoenwut** - *National Institute of Standards and Technology ,* **Ana Nikolov** - *National Institute of Standards and Technology*

VIB-02-01: VIBRATION AND STABILITY OF MECHANICAL SYSTEMS
9:10AM–10:30AM   STUART (4TH FL)

Chair: Chengzhi Shi - *Georgia Tech*
Co-Chair: Robert G. Parker - *University of Utah*

Testing and Validation of a Mobile Damping Robot for Power Lines

Technical Paper Publication: IDETC2023-115071

Andrew Choi - *Virginia Tech ,* **Oumar Barry** - *Virginia Tech*

Modeling Semisubmersible Wind Turbine With Inerter-Based Structural Control in the Platform

Technical Paper Publication: IDETC2023-117094

Ryan Okuda - *Virginia Tech,* **Lei Zuo** - *University of Michigan*

Flow-Induced Vibration of Near-Surface Flexibly Mounted Plates: An Experimental Study

Technical Presentation: IDETC2023-117776

Hadi Samsam-Khayani - *University of Massachusetts Dartmouth,* **Banafsheh Seyed-Aghazadeh** - *University of Massachusetts Dartmouth*

Nonlinear Vibration Suppression of Rotating Blades via Metamaterial Concept

Technical Presentation: IDETC2023-117897

Samir Emam - *American University of Sharjah*

VIB-13-01: DYNAMICS OF BIOLOGICAL, BIO-INSPIRED AND BIOMIMETIC SYSTEMS
9:10AM–10:30AM   **TREMONT (4TH FL)**

Chair: Mark Jankauski - *Montana State University*
Co-Chair: Ebru Demir - *Lehigh University*

Tendon Shear Wave Tensiometry: Application to Flexor Carpi Radialis

Technical Presentation: IDETC2023-117940

David Phair - *Brigham Young University* , **Jackson Wilcox** - *Brigham Young University* , **Mitchell Zoolakis** - *Brigham Young University* , **Matt Allen** - *Brigham Young University* , **Cristopher Dillon** - *Brigham Young University*

Dynamics of Buzz Pollination: Modal Analysis and Computational Modeling of Poricidal Anthers

Technical Presentation: IDETC2023-118027

Mark Jankauski - *Montana State University*

Experimental Evaluation of Wing Hinge Mechanics in Bumblebees

Technical Presentation: IDETC2023-118055

Braden Cote - *Montana State University* , **Mark Jankauski** - *Montana State University*

Effect of Waterloss on the Modal Frequencies and Damping Ratios of Clamped Hydrogel Disks

Technical Presentation: IDETC2023-118109

Karthik Yerrapragada - *University of Wisconsin-Madison* , **Haocheng Yang** - *University of Wisconsin-Madison*, **Melih Eriten** - *University of Wisconsin-Madison*

DTM-02-01: ARTIFICIAL INTELLIGENCE IN DESIGN
9:10AM–10:30AM   **SCOLLAY (LOBBY LEVEL)**

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Zhenghui Sha - *The University of Texas at Austin*
Co-Chair: Vivek Rao - *University of California, Berkeley*

A Task-Decomposed AI-Aided Approach for Generative Conceptual Design

Technical Paper Publication: IDETC2023-109087

Boheng Wang - *Imperial College London* , **Haoyu Zuo** - *Imperial College London* , **Zebin Cai** - *Zhejiang University*, **Yuan Yin** - *Imperial College London* , **Peter Childs** - *Imperial College London* , **Lingyun Sun** - *Zhejiang University* , **Liuqing Chen** - *Zhejiang University*

Conceptual Design Generation Using Large Language Models

Technical Paper Publication: IDETC2023-116838

Kevin Ma - *University of California, Berkeley* , **Daniele Grandi** - *Autodesk Research*, **Christopher McComb** - *Carnegie Mellon University*, **Kosa Goucher-Lambert** - *University of California, Berkeley*

Effect of Reflection and Incubation on Artificial-Intelligence-Assisted Design Space Exploration

Technical Paper Publication: IDETC2023-116576

Hyeonik Song - *Texas A&M University*, **Antoni Viros-I-Martin** - *Texas A&M University* , **Daniel Selva** - *Texas A&M University*

Use of Data-Mined Customer Reviews to Inform Design Evaluation and Testing of Bassinets

Technical Paper Publication: IDETC2023-116912

William Singhose - *Georgia Institute of Technology* , **Christopher Adams** - *Georgia Institute of Technology* , **Anjnee Rana** - *Georgia Institute of Technology* , **Dooroo Kim** - *Georgia Institute of Technology* , **Wayne Li** - *Georgia Institute of Technology*

Exploring Human-Centered Design Method Selection Strategies With Large Language Models

Technical Presentation: IDETC2023-118069

Vivek Rao - *University of California, Berkeley* , **Timothy Yang** - *University of California, Berkeley*, **Euiyoung Kim** - *Delft University of Technology* , **Alice Agogino** - *University of California, Berkeley*, **Kosa Goucher-Lambert** - *University of California, Berkeley*

DEC-01/DEC-02: RESEARCH METHODS ACROSS THE CURRICULUM/DIVERSITY AND INCLUSION IN DESIGN EDUCATION
9:10AM–10:30AM   **FRANKLIN (4TH FL)**

Chair: Mohammad Fazelpour - *University of Maryland*
Co-Chair: Nicholas Meisel - *The Pennsylvania State University*

Implementing Application-Driven Data Analytics in Engineering and Engineering Technology Courses With Student Feedback Assessment

Technical Paper Publication: IDETC2023-114696

Zhiyuan Yu - *Miami University*, Chenang Liu - *Oklahoma State University*

Automated Evaluation of Written Assignments in Engineering Using Task-Independent Features and Rubric-Guided Features

Technical Paper Publication: IDETC2023-116913

Wanyu Xu - *Texas A&M University*, Daniel A. McAdams - *Texas A&M University* , Andreas A. Polycarpou - *Texas A&M University*

Unlocking Team Success: The Power of Diversity in Engineering Capstone Teams

Technical Paper Publication: IDETC2023-117175

Divyaa Vivekanandan Gopalakrishnan - *The Pennsylvania State University* , Matthew Parkinson - *The Pennsylvania State University*, Susan Mohammed - *The Pennsylvania State University* , Scarlett Miller - *The Pennsylvania State University*

PTG-02-01: GEAR ANALYSIS, MATERIALS, AND FATIGUE 1
9:10AM–10:30AM   **CAMBRIDGE (4TH FL)**

Chair: Hai Xu - *General Motors*
Co-Chair: David Talbot - *The Ohio State University*
Co-Chair: Thomas Tallerico - *National Aeronautics and Space Administration*

Tooth Bending Strength in the VHCF Area

Technical Paper Publication: IDETC2023-114467

Moritz Zalfen - *RWTH Aachen University* , Dieter Mevissen - *RWTH Aachen University*, Jens Brimmers - *RWTH Aachen University*, Christian Brecher - *Aachen University*

Numerical and Experimental Study on the Correlation Between Wear and Transmission Error of Carbon Fiber- Reinforced Polymer Gears Cured in Autoclave

Technical Paper Publication: IDETC2023-116708

Borut Cerne - *University of Ljubljana* , Nikola Vukašinović - *University of Ljubljana* , Zoran Bergant - *University of Ljubljana* , Damijan Zorko - *University of Ljubljana*

Acoustic Emission Damage Parameter for Cumulative Fatigue Damage Prediction in Gear Single Tooth Bending Fatigue

Technical Paper Publication: IDETC2023-116788

Gabriel Anichowski - *The Ohio State University* , Ahmet Kahraman - *The Ohio State University* , Isaac Hong - *The Ohio State University*

Performance Enhancement of Plastic Gears: The Potential of Woven-Carbon-Fiber Reinforced Plastics

Technical Presentation: IDETC2023-118150

Damijan Zorko - *University of Ljubljana* , Borut Cerne - *University of Ljubljana*

MSNDC-01-01: COMPUTATIONAL METHODS AND SOFTWARE TOOLS IN MULTIBODY SYSTEMS AND NONLINEAR DYNAMICS
9:10AM–10:30AM   **WHITE HILL (4TH FL)**

Chair: Grzegorz Orzechowski - *LUT University*
Co-Chair: Francisco Gonzalez - *University of A Coruña*
Co-Chair: Alessandro Tasora - *University of Parma*

The Finite Element Method in Time for Multibody Dynamics

Technical Paper Publication: IDETC2023-109448

Olivier Bauchau - *University of Maryland*

Effects of Wave Energy Converter Array Configurations and Geometries on Wave Field and Power Output

Technical Paper Publication: IDETC2023-116472

Olivia Vitale - Cornell University

Maha Haji - Cornell University

Using Velocity Partitioning in the Ra Formulation to Solve the Equations of Constrained Multibody Dynamics

Technical Paper Publication: IDETC2023-116950

Alexandra Kissel - *University of Wisconsin-Madison* , **Luning Fang** - *University of Wisconsin-Madison* , **Dan Negrut** - *University of Wisconsin-Madison*

MSNDC-11/VIB-12-01: DYNAMICS AND CONTROL OF SMART STRUCTURES AND SYSTEMS
9:10AM–10:30AM   WHITTIER (4TH FL)

Chair: Kai Zhou - *Michigan Technological University*
Co-Chair: Andrea Arena - *Sapienza University of Rome*
Co-Chair: Francesco Danzi - *University of California, Merced*
Co-Chair: Sichen Yuan - *Lawrence Technological University*

Linear Electrostatic Oscillator With Viscous Damping

Technical Paper Publication: IDETC2023-117102

Kip Coonley - *Duke University* , **Hammond Humber** - *Duke University* , **Brian Mann** - *Duke University*

Dynamic Characterizations of O- and X-Carbon Nanotube Reinforced Rings

Technical Paper Publication: IDETC2023-113317

Hongjie Li - *Nanjing University of Aeronautics and Astronautics* , **Yan Deng** - *Nanjing University of Aeronautics and Astronautics* , **Mu Fan** - *Nanjing University of Aeronautics and Astronautics* , **Dan Wang** - *Nanjing University of Aeronautics and Astronautics*, **Hornsen Tzou** - *Nanjing University of Aeronautics and Astronautics*

Thermally-Induced Modal Interactions in Nanotube Resonators

Technical Presentation: IDETC2023-117801

Pierpaolo Belardinelli - *Polytechnic University of Marche*

Vibration Control of a Cantilever Beam With SPPVDF Patches

Technical Paper Publication: IDETC2023-116321

Han Qiu - *Nanjing University of Aeronautics and Astronautics* , **Mu Fan** - *Nanjing University of Aeronautics and Astronautics* , **Yan Deng** - *Nanjing University of Aeronautics and Astronautics*

DAC-06-01: DESIGN AND OPTIMIZATION OF ENERGY SYSTEMS
9:10AM–10:30AM   HANCOCK (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Jie Zhang - *The University of Texas at Dallas*
Co-Chair: Cong Feng - *National Renewable Energy Laboratory*

A Multi-Fidelity Gaussian Process Regression Method for Probabilistic Wind Farm Power Curve Estimation

Technical Paper Publication: IDETC2023-114762

Honglin Li - *The University of Texas at Dallas*, **Cong Feng** - *National Renewable Energy Laboratory* , **Jie Zhang** - *The University of Texas at Dallas*

Exploration of Building Clustering Potential With Energy Storage in New York City

Technical Paper Publication: IDETC2023-115046

Gregory Kaminski - *Stevens Institute of Technology* , **Philip Odonkor** - *Stevens Institute of Technology*

Multi-Fidelity Modeling for Dynamic Power Control and Optimization of Nuclear-Renewable Hybrid Energy Systems

Technical Paper Publication: IDETC2023-116914

In-Bum Chung - *University of Illinois at Urbana-Champaign* , **Pingfeng Wang** - *University of Illinois at Urbana-Champaign*

Improving Nonuniform Utilization of Li-Ion Pouch Cells Using Tapered Electrodes Through Calendering

Technical Paper Publication: IDETC2023-111360

Changik Cho - *The Pennsylvania State University* , **Seth Kelley** - *The Pennsylvania State University* , **Joseph G. Tylka** - *Siemens Technology*, **Miao He** - *Siemens Technology*, **Naresh N Nandola** - *Siemens Technology*, **Christopher D. Rahn** - *The Pennsylvania State University*

DAC-07-01: DESIGN FOR ADDITIVE MANUFACTURING
9:10AM–10:30AM STATLER (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Nicholas Meisel** - *The Pennsylvania State University*
Co-Chair: **Yaoyao Zhao** - *McGill University*

Empirically Tuned Mechanical Simulation Model of 3D-Printed Biaxial Weaves

Technical Paper Publication: IDETC2023-111278

Marc Wirth - *ETH Zurich* , **Kristina Shea** - *ETH Zurich*

Process-Aware Prediction of Geometric Accuracy for Additive Manufacturing via Transfer Learning

Technical Paper Publication: IDETC2023-111826

Daphne Lin - *The University of Texas at Austin* , **Carolyn Seepersad** - *The University of Texas at Austin*

A Framework Establishing the Bounds of Small Angle Assumptions in Multi-Material Additively Manufactured Compliant Mechanisms

Technical Paper Publication: IDETC2023-116865

Evelyn Thomas - *The Pennsylvania State University,* **Nicholas Meisel** - *The Pennsylvania State University,* **Jared Butler** - *The Pennsylvania State University*

Build Orientation Optimization for Five-Axis 3D Printing

Technical Paper Publication: IDETC2023-111726

Ghazi Alonayni - *Oregon State University* , **Matthew Campbell** - *Oregon State University*

DAC-15-01: MULTIDISCIPLINARY DESIGN OPTIMIZATION, MULTIOBJECTIVE OPTIMIZATION, AND SENSITIVITY ANALYSIS
9:10AM–10:30AM ARLINGTON (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Hongyi Xu** - *University of Connecticut*
Co-Chair: **Mian Li** - *Shanghai JiaoTong University*
Co-Chair: **Shikui Chen** - *Stony Brook University*

Data-Driven Multifidelity Topology Design With a Latent Crossover Operation

Technical Paper Publication: IDETC2023-111079

Taisei Kii - *Osaka University* , **Kentaro Yaji** - *Osaka University* , **Kikuo Fujita** - *Osaka University,* **Zhenghui Sha** - *The University of Texas at Austin* , **Carolyn C. Seepersad** - *The University of Texas at Austin*

A GPU-Based Parallel Bound-and-Classify Method for Continuous Constraint Satisfaction Problems

Technical Paper Publication: IDETC2023-112414

Wangchuan Feng - *Carnegie Mellon University* , **Guanglu Zhang** - *Carnegie Mellon University* , **Jonathan Cagan** - *Carnegie Mellon University*

Efficient Many Objective Robust Design Space Visualization and Exploration Using ISOM

Technical Paper Publication: IDETC2023-117199

Niharika Balaji - *Florida Institute of Technology* , **Mathew Baby** - *Florida Institute of Technology* , **Gehendra Sharma** - *Mississippi State University,* **Rashmi Rama Sushil** - *Indian Institute of Technology Madras,* **Palaniappan Ramu** - *Indian Institute of Technology Madras,* **Anand Balu Nellippallil** - *Florida Institute of Technology*

A Genetic Algorithm for Component Layout Design Using Hierarchical Genotypes

Technical Presentation: IDETC2023-117846

Yosuke Takamori - *Kyoto University* , **Kazuhiro Izui** - *Kyoto University* , **Shinji Nishiwaki** - *Kyoto University,* **Kentaro Toda** - *Aisin Corp.* , **Keisuke Suzuki** - *Aisin Corp.* , **Kento Ogihara** - *Aisin Corp.*

Technical Sessions - Monday August 21

MESA-01-01
9:10AM–10:30AM   BACK BAY (4TH FL)

Chair info

Chair: **Matteo C. Palpacelli** - *Polytechnic University of Marche*
Co-Chair: **Adriano Mancini** - *Polytechnic University of Marche*
Co-Chair: **YangQuan Chen** - *University of California, Merced*

Development of a Pillow Placement Process for Robotic Bed-Making

Technical Paper Publication: IDETC2023-114747

Chi-Hong Cheung - *University of Toronto* , **Aaron Hao Tan** - *University of Toronto* , **Andrew Goldenberg** - *University of Toronto*

Hand Assemble Action Recognition Using Spatial Temporal Graph Convolutional Network

Technical Paper Publication: IDETC2023-114886

Chao-Lung Yang - *National Taiwan University of Science and Technology* , **Yen-Ping Lin** - *National Taiwan University of Science and Technology* , **Shang-Che Hsu** - *National Taiwan University of Science and Technology*

Embedded Vision System for Real-Time Shelves Lines Detection for Planogram Compliance Check

Technical Paper Publication: IDETC2023-114921

Rocco Pietrini - *Università Politecnica delle Marche* , **Alessandro Galdelli** - *Università Politecnica delle Marche* , **Adriano Mancini** - *Università Politecnica delle Marche* , **Primo Zingaretti** - *Università Politecnica delle Marche*

A Digital Twin Development Framework for a Smart Saltwater Greenhouse

Technical Paper Publication: IDETC2023-116343

Shiang Cao - *University of California, Merced* , **Yangquan Chen** - *University of California, Merced*

CIE-01-02 AMS GENERAL
9:10AM–10:30AM   CLARENDON (MEZZ)

Chair: **Ashish M. Chaudari** - *Massachusetts Institute of Technology*
Co-Chair: **James Yang** - *Texas Tech University*

Efficient Mapping Between Void Shapes and Stress Fields Using Deep Convolutional Neural Networks With Sparse Data

Technical Paper Publication: IDETC2023-115077

Anindya Bhaduri - *GE Research*, **Nesar Ramachandra** - *Argonne National Laboratory* , **Sandipp Krishnan Ravi** - *GE Research*, **Lele Luan** - *GE Research* , **Piyush Pandita** - *GE Research*, **Prasanna Balaprakash** - *Oak Ridge National Laboratory* , **Mihai Anitescu** - *Argonne National Laboratory*, **Changjie Sun** - *GE Research* , **Liping Wang** - *GE Research*

A µ-Synthesis Approach for Robust Control of Wind Turbines

Technical Paper Publication: IDETC2023-115133

Edwin Kipchirchir - *University of Duisburg-Essen* , **Fateme Bakhshande** - *University of Duisburg-Essen* , **Dirk Söffker** - *University of Duisburg-Essen*

An Isogeometric Approach for Reaction Diffusion Based Level Set Methods in Topology Optimization

Technical Paper Publication: IDETC2023-116401

Harsh Kumar - *Indian Institute of Technology Madras*, **Sourav Rakshit** - *Indian Institute of Technology Madras*

Design Process for Dimensioning Elastomer Bearings for Winch Based Point Absorbers

Technical Paper Publication: IDETC2023-116790

Kjell Andersson - *KTH Royal Institute of Technology* , **Rimmie Duraisamy** - *KTH Royal Institute of Technology,*

Physics-Informed Multi-Output Surrogate Modeling of Fusion Simulations

Technical Paper Publication: IDETC2023-116989

Kathryn Maupin - *Sandia National Laboratories* , **Anh Tran** - *Sandia National Laboratories* , **William Lewis** - *Sandia National Laboratories* , **Michael Glinsky** - *qiTech Consulting*

CIE-11: CAPPD DATA DRIVEN PRODUCT DESIGN AND FABRICATION
9:10AM–10:30AM **BERKELEY (MEZZ)**

Chair: **Jun Wang** - *Santa Clara University*
Co-Chair: **Jida Huang** - *University of Illinois*

Detection of Singularities in Finite Element Simulations: A 3D Deep Learning Approach

Technical Paper Publication: IDETC2023-109720

Sebastian Bickel - *Friedrich-Alexander-Universität Erlangen-Nürnberg* , **Stefan Goetz** - *Friedrich-Alexander-Universität Erlangen-Nürnberg* , **Sandro Wartzack** - *Friedrich-Alexander-Universität Erlangen-Nürnberg*

Iverse Design of 2D Shape-Morphing Structures

Technical Paper Publication: IDETC2023-111426

Mohammad Abu-Mualla - *University of Illinois at Chicago* , **Victor Jirón** - *University of Illinois at Chicago*, **Jida Huang** - *University of Illinois at Chicago*

Design and Optimization of Quasi-Periodic Volumetric Microstructures by Aperiodic Tiling and Implicit Function

Technical Paper Publication: IDETC2023-116668

Jun Wang - *Santa Clara University* , **Rahul Rai** - *Clemson University*

Generating Large Datasets of Simplified Automotive Body-in-White Structures to Predict Springback Using Machine Learning

Technical Paper Publication: IDETC2023-116842

Abhishek Bolar - *The Ohio State University* , **Ibraheem Alawadhi** - *The Ohio State University* , **Satchit Ramnath** - *The Ohio State University* , **Prakash Kumar** - *Arizona State University* , **Yannis Korkolis** - *The Ohio State University* , **Joseph Davidson** - *Arizona State University* , **Jami Shah** - *The Ohio State University*

CIE-15/16: SEIKM JOINT TOPICS
9:10AM–10:30AM **GEORGIAN (MEZZ)**

Chair: **Farhad Ameri** - *Texas State University*
Co-Chair: **Hyunwoong Ko** - *Arizona State University*

Agri-Food Supply Chain Traceability Supported by a Formal Ontology: A Grain Elevator to Processor Use Case

Technical Paper Publication: IDETC2023-108860

Farhad Ameri - *Texas State University,* **Evan Wallace** - *National Institute of Standards and Technology,* **Reid Yoder** - *Texas State University,* **Frank Riddick** - *Strativia*

A Framework of Real-Time Knowledge Capture and Formalization for Model-Based Design With Spoken Annotation and Design Operations

Technical Paper Publication: IDETC2023-112226

Yutaka Nomaguchi - *Osaka University* , **Hiroyuki Morikawa** - *Osaka University* , **Rempei Nishida** - *Osaka University* , **Kikuo Fujita** - *Osaka University*

Knowledge Management for Data Analytics in Additive Manufacturing

Technical Paper Publication: IDETC2023-116566

Yeun Park - *National Institute of Standards and Technology* , **Paul Witherell** - *National Institute of Standards and Technology* , **Albert Jones** - *National Institute of Standards and Technology* , **Hyunbo Cho** - *Pohang University of Science and Technology*

Explainability of Laser Powder Bed Fusion Melt Pool Classification Using Deep Learning

Technical Paper Publication: IDETC2023-109137

Matthew Sato - *Stanford University* , **Vivian Wong** - *Stanford University* , **Kincho Law** - *Stanford University,* **Ho Yeung** - *National Institute of Standards and Technology* , **Paul Witherell** - *National Institute of Standards and Technology*

Data Fusion Cognitive Computing for Characterization of Mechanical Property in Friction Stir Welding Process

Technical Paper Publication: IDETC2023-117184

Danny Hoang - *University of Connecticut* , **Ruimin Chen** - *University of Connecticut* , **Debasish Mishra** - *University of Connecticut,* **Surjya K. Pal** - *Indian Institute of Technology Kharagpur* , **Farhad Imani** - *University of Connecticut*

Technical Sessions - Monday August 21

DFMLC-02-01 DESIGN FOR SUPPLY CHAIN, END OF LIFE RECOVERY, AND LARGE SYSTEMS
9:10AM–10:30AM   **PARK (LOBBY LEVEL)**

Chair: **Paul Egan** - *Texas Tech University*
Co-Chair: **Sara Behdad** - *University of Florida*
Co-Chair: **Yongxian Zhu** - *University of Michigan*

Predicting the Quantity of Recycled End-of-Life Products Using a Hybrid SVR-Based Model

Technical Paper Publication: IDETC2023-114718

Hanbing Xia - *Cranfield University,* **Ji Han** - *University of Exeter Business School ,* **Jelena Milisavljevic-Syed** - *Cranfield University*

The Impact of Covid-19 on Mass Personalization Supply Chain Network: A Qualitative Inquiry

Technical Paper Publication: IDETC2023-117191

Bryce Schuebert - *University of Georgia ,* **Devanshi Shah** - *University of Georgia ,* **Jesse Mullis** - *University of Georgia ,* **Fatemeh Mozaffar** - *University of Georgia ,* **Beshoy Morkos** - *University of Georgia*

Design Levels and Realizability Constraints for Interconnected Engineering Systems With Coupled Physical Interactions

Technical Presentation: IDETC2023-117724

Zane Givans - *University of Illinois at Urbana-Champaign ,* **Albert Patterson** - *Texas A&M University*

On Holistically Optimizing the Spatial Configuration of Systems

Technical Presentation: IDETC2023-118241

Chad Peterson - *University of Illinois ,* **Satya Peddada** - *University of Illinois ,* **James Allison** - *University of Illinois*

MESA-01-02 / MESA-08 / MESA-09
10:50AM–12:10PM   **BACK BAY (4TH FL)**

Chair: **Matteo C. Palpacelli** - *Polytechnic University of Marche*
Co-Chair: **Adriano Mancini** - *Polytechnic University of Marche*
Co-Chair: **YangQuan Chen** - *University of California, Merced*

Smart Predictive Maintenance and Error Recovery for Transmission Line Effects on RF Impedance Matching Performance

Technical Paper Publication: IDETC2023-116350

Furkan Guc - *University of California, Merced ,* **Yangquan Chen** - *University of California, Merced*

Neural Network-Based Structured MPC: A Model Predictive Control Approach

Technical Paper Publication: IDETC2023-116877

Marcel Zydeck - *University of Duisburg-Essen ,* **Fateme Bakhshande** - *University of Duisburg-Essen ,* **Dirk Söffker** - *University of Duisburg-Essen*

The Objective Way to Detect the Path to Purchase by Clustering Shoppers' Trajectories

Technical Paper Publication: IDETC2023-115157

Marina Paolanti - *University of Macerata,* **Roberto Pierdicca** - *Università Politecnica delle Marche ,* **Valerio Placidi** - *Grottini Lab,* **Adriano Mancini** - *Università Politecnica delle Marche ,* **Primo Zingaretti** - *Università Politecnica delle Marche ,* **Emanuele Frontoni** - *University of Macerata*

Case Study: Rapid Design Process for a High-Velocity and Accurate Linear Stage in an Optomechanical Device

Technical Paper Publication: IDETC2023-110597

Scott W. Kresie - *Gener8*

DTM-03-01: PERCEPTION, PROTOTYPING, AND INSPIRATION IN DESIGN
10:50AM–12:10PM   **SCOLLAY (LOBBY LEVEL)**

Chair: **Rahul Sharan Renu** - *Francis Marion University*
Co-Chair: **Kosa Goucher-Lambert** - *University of California, Berkeley*
Co-Chair: **Jinjuan She** - *Miami Ohio*

Adaptive Optimization of Subjective Design Attributes: Characterizing Individual and Aggregate Perceptions

Technical Paper Publication: IDETC2023-111714

Ananya Nandy - *University of California, Berkeley,* **Kosa Goucher-Lambert** *- University of California, Berkeley*

Form Attributes to Measure and Understand Aesthetic Preferences

Technical Paper Publication: IDETC2023-116601

Jana Saadi - *Massachusetts Institute of Technology, Maria Yang - Massachusetts Institute of Technology ,* **Leah Chong** *- Massachusetts Institute of Technology*

Factors Hindering the Implementation of Prototyping in the Early Stages of New Business Development

Technical Paper Publication: IDETC2023-113239

Keita Mitomi - *Keio University,* **Masashi Honmmi** *- Ricoh Company, Ltd.,* **Masao Yasugi** *- Ricoh Company, Ltd. ,* **Satoshi Tanaka** *- Ricoh Company, Ltd. ,* **Nobuyuki Ohnaga** *- Bridge, Ltd.,* **Seiko Shirasaka** *- Keio University*

Similarities and Differences in Human versus Computational Representations of Non-Semantic Inspirational Design Stimuli

Technical Paper Publication: IDETC2023-115108

Elisa Kwon - *University of California, Berkeley,* **Kosa Goucher-Lambert** *- University of California, Berkeley*

Identifying a Relationship Between Design Concept Representation Style and Consumer Product Preference

Technical Paper Publication: IDETC2023-115059

Jonathan Echerd - *East Carolina University ,* **Brian Sylcott** *- East Carolina University ,* **Russell Lemken** *- East Carolina University ,* **Gerald Weckesser** *- East Carolina University ,* **Jinkun Lee** *- East Carolina University*

DEC-03: INNOVATIVE PRACTICES IN DESIGN EDUCATION (OTHER TOPICS)
10:50AM–12:10PM   **FRANKLIN (4TH FL)**

Chair: **Charlotte De Vries** - *The Pennsylvania State University*
Co-Chair: **Nicholas Meisel** - *The Pennsylvania State University*

The Impact of a Product Teardown Activity on Systems Thinking

Technical Paper Publication: IDETC2023-116528

Alexander R. Murphy - *The University of Texas at Dallas ,* **Abigail S. Whittle** *- The University of Texas at Dallas ,* **Joshua D. Summers** *- The University of Texas at Dallas*

Nature Versus Nurture: The Influence of Classroom Creative Climate on Risk-Taking Preferences of Engineering Students

Technical Paper Publication: IDETC2023-116688

Aoran Peng - *The Pennsylvania State University ,* **Jessica Menold** *- The Pennsylvania State University ,* **Scarlett R. Miller** *- The Pennsylvania State University*

A Categorical Approach to Define Makerspaces

Technical Paper Publication: IDETC2023-117124

Pavan Kumar - *The University of Texas at Dallas ,* **Joshua Summers** *- The University of Texas at Dallas*

PTG-06-01: LUBRICATION AND EFFICIENCY
10:50AM–12:10PM   **CAMBRIDGE (4TH FL)**

Chair: **Karsten Stahl** - *Technical University of Munich*
Co-Chair: **David Talbot** - *The Ohio State University*

Power Loss and Damage Behavior of Gears Operating Under Loss of Lubrication

Technical Paper Publication: IDETC2023-111108

Bernd Morhard - *Technical University of Munich,* **Constantin Paschold** *- Technical University of Munich,* **Thomas Lohner** *- Technical University of Munich,* **Karsten Stahl** *- Technical University of Munich*

Influence of Root Clearance on Helical Gear Pocketing Power Loss

Technical Presentation: IDETC2023-118128

Kyler Mcdonald - *The Ohio State University* , **Isaac Hong** - *The Ohio State University* , **Ahmet Kahraman** - *The Ohio State University*

Investigations on Ways to Improve the Scuffing and Wear Behaviour of Oil Free Water-Based Lubricants for Gear Applications

Technical Paper Publication: IDETC2023-114649

Yves Johannes Barth - *Technical University of Munich* , **Nadine Sagraloff** - *Technical University of Munich* , **Gregor Egger** - *Technical University of Munich* , **Thomas Tobie** - *Technical University of Munich* , **Karsten Stahl** - *Technical University of Munich*

Experimental Study on the Impact of Surface Distress on Spur Gear Scuffing Performance

Technical Presentation: IDETC2023-118190

Michael Handschuh - *The Ohio State University* , **Tiffany Lim** - *The Ohio State University* , **Gunther Beall** - *The Ohio State University* , **Ahmet Kahraman** - *The Ohio State University*

MR-4-2: ORIGAMI METAMATERIALS
10:50AM–12:10PM   STUDIO 2 (LOBBY LEVEL)

Chair: **Shikui Chen** - *Stony Brook University*
Co-Chair: **Hongyi Xu** - *University of Connecticut*

Modelling of Origami Mechanical Metamaterials With Parallel Curved Creases

Technical Paper Publication: IDETC2023-110668

Yucong Sun - *Shanghai Jiao Tong University,* **Kailun Huang** - *Shanghai Jiao Tong University* , **Xiang Zhou** - *Shanghai Jiao Tong University*

Folding-Wall Kirigami, Design and Compressive Performance

Technical Paper Publication: IDETC2023-114915

Tom Corrigan - *3M* , **Abhishek Srivastava** - *3M* , **Di Xie** - *3M,* **Cory Arthur** - *3M* , **Nathan Brownell** - *3M*

Origami-Based Mechanical Metamaterials and Their Robotics Applications

Technical Presentation: IDETC2023-118020

Hanqing Jiang - *Westlake University*

Kirigami Corrugations: Strong, Modular and Programmable Plate Lattices

Technical Paper Publication: IDETC2023-116481

Alfonso Parra Rubio - *Massachusetts Institute of Technology,* **Klara Mundilova** - *Massachusetts Institute of Technology,* **David Preiss** - *Massachusetts Institute of Technology,* **Erik Demaine** - *Massachusetts Institute of Technology,* **Neil Gershenfeld** - *Massachusetts Institute of Technology*

MR-6-1: MEDICAL AND REHABILITATION ROBOTICS
10:50AM–12:10PM   STUDIO 1 (LOBBY LEVEL)

Chair: **T.-J. Yeh** - *National Tsing Hua University*
Co-Chair: **Salvador Echeveste** - *University of Illinois at Chicago*

Development of a Comprehensive Motorless Walking Assistance and Evaluation of Muscle Activity

Technical Paper Publication: IDETC2023-111375

Xiuyuan Wu - *Waseda University* , **Yuntian Wang** - *Waseda University* , **Keisuke Osawa** - *Waseda University* , **Eiichiro Tanaka** - *Waseda University*

Design and Optimization of a Wearable Under-Actuated Mechanism for Spinal Posture Measurement

Technical Paper Publication: IDETC2023-114785

Ming-Chang Hsu - *National Tsing Hua University,* **Hsuan-Yu Chen** - *National Taiwan University College of Medicine and National Taiwan University Hospital,* **Ting-Jen Yeh** - *National Tsing Hua University*

Preliminary Development of a Robotic Hip-Knee Exoskeleton With 3D-Printed Backdrivable Actuators

Technical Paper Publication: IDETC2023-116406

Alyssia Sanchez - *University of Toronto* , **Trent Rossos** - *University of Toronto* , **Alex Mihailidis** - *University of Toronto,* **Brokoslaw Laschowski** - *University of Toronto*

Optimal Swing Assistance Using a Hip Exoskeleton: Comparing Simulations With Hardware Implementation

Technical Paper Publication: IDETC2023-117126

Salvador Echeveste - *University of Illinois at Chicago,* **Ernesto Hernandez Hinojosa** - *University of Illinois at Chicago*

MR-7-2: NOVEL MECHANISMS, ROBOTS, AND APPLICATIONS
10:50AM–12:10PM   **THE LOFT (LOBBY LEVEL)**

Chair: Michael Kutzer – *U.S. Naval Academy*
Co-Chair: Carl Nelson - *University of Nebraska-Lincoln*

Proposed Design for Electromechanical Telescoping Actuator to Replace Hydraulics in Extreme High Force and Long Stroke Applications

Technical Paper Publication: IDETC2023-115098

Carmen Sleight Crawford - *Massachusetts Institute of Technology ,* **Mariia Smyk** - *Massachusetts Institute of Technology,* **Sophia Cheung** - *Massachusetts Institute of Technology ,* **Doug Coughran** - *Massachusetts Institute of Technology ,* **Jeffrey Costello** - *Massachusetts Institute of Technology ,* **Zhiyi Liang** - *Massachusetts Institute of Technology,* **Amos G. Winter, V** - *Massachusetts Institute of Technology*

Sea-Leg: A Wheel-Leg Hybrid Locomotion Platform for Uncontrolled Environments Using Series Elastic Actuators

Technical Paper Publication: IDETC2023-116769

Nick Swerczek - *University of Nebraska-Lincoln ,* **Carl Nelson** - *University of Nebraska-Lincoln ,* **John Cerny** - *University of Nebraska-Lincoln ,* **Amber Tannehill** - *University of Nebraska-Lincoln*

Mechanism Designs of a Robot for Charging Multiple Electric Vehicles

Technical Paper Publication: IDETC2023-116736

Dalong Gao - *GM R&D*

Design of a Robotic Testbed for Spherical Additive Manufacturing

Technical Paper Publication: IDETC2023-114908

Christopher Kim - *Johns Hopkins University ,* **Levi Devries** - *U.S. Naval Academy ,* **Michael Kutzer** - *U.S. Naval Academy*

DAC-03-02: NOVEL AI OR ML FRAMEWORKS FOR DESIGN OR SYSTEMS SCIENCE
10:50AM–12:10PM   **ARLINGTON (MEZZ)**

Chair: Chao Hu - *Iowa State University*
Co-Chair: Daniel Selva - *Texas A&M University*
Co-Chair: Wei Chen - *Northwestern University*

Neural Optimization Machine for Design With Neural Network Based Objectives

Technical Presentation: IDETC2023-114605

Jie Chen - *Northwestern University ,* **Yongming Liu** - *Arizona State University ,* **Wei Chen** - *Northwestern University*

Autosurf: Automated Expert-Guided Meshing With Graph Neural Networks and Conformal Predictions

Technical Paper Publication: IDETC2023-115065

Amin Heyrani Nobari - *Massachusetts Institute of Technology ,* **Justin Rey** - *Massachusetts Institute of Technology,* **Suhas Kodali** - *Massachusetts Institute of Technology ,* **Matthew Jones** - *Massachusetts Institute of Technology,* **Faez Ahmed** - *Massachusetts Institute of Technology*

Diffusing the Optimal Topology: A Generative Optimization Approach

Technical Paper Publication: IDETC2023-116595

Giorgio Giannone - *Massachusetts Institute of Technology ,* **Faez Ahmed** - *Massachusetts Institute of Technology*

Topology Optimization Using Neural Networks With Conditioning Field Initialization for Improved Efficiency

Technical Paper Publication: IDETC2023-116937

Hongrui Chen - *Carnegie Mellon University ,* **Aditya Joglekar** - *Carnegie Mellon University ,* **Levent Burak Kara** - *Carnegie Mellon University*

DAC-13-02: GEOMETRIC MODELING AND ALGORITHMS FOR DESIGN AND MANUFACTURING
10:50AM–12:10PM   HANCOCK (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Horea Ilies - *University of Connecticut*
Co-Chair: Morad Behandish - *Palo Alto Research Center*
Co-Chair: Randi Wang - *Palo Alto Research Center*

Multi-Material Topology Optimization Considering the Bounding Box Dimension Constraint and Assemblability Based on the Extended Level Set Method in Two Dimensions

Technical Paper Publication: IDETC2023-111214

Yukun Feng - *The University of Tokyo* , **Yuki Noguchi** - *The University of Tokyo* , **Takayuki Yamada** - *The University of Tokyo*

Finding Chain Nets of Solids Using Heuristic Hamiltonian Pathfinding Methods

Technical Paper Publication: IDETC2023-114669

Matthew Lawrence - *University of Maine* , **Scott Tomlinson** - *University of Maine* , **Bashir Khoda** - *University of Maine*

How to Encode Microstructure in Machine Learning: A Comparison Study

Technical Paper Publication: IDETC2023-116704

Yulun Wu - *University of Illinois,* **Yumeng Li** - *University of Illinois at Urbana-Champaign*

Automated 3D Pipe and Wire Routing Framework for Rapidly Generating Diversified Design Solutions

Technical Presentation: IDETC2023-118060

Chad Peterson - *University of Illinois* , **Isaac Love** - *University of Illinois* , **Satya Peddada** - *University of Illinois,* **Danny Lohan** - *Toyota Research Institute* , **Yuqing Zhou** - *Toyota Research Institute* , **Ercan Dede** - *Toyota Research Institute* , **Nancy Amato** - *University of Illinois* , **James Allison** - *University of Illinois*

DAC-18-01: COMPUTATIONAL DESIGN FOR BIOMEDICAL APPLICATIONS
10:50AM–12:10PM   STATLER (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Julián Norato - *University of Connecticut*
Co-Chair: Paul Egan - *Texas Tech University*

Pareto Optimization of Tissue and Blood Vessel Growth in 3D Printed Bone Scaffolds

Technical Paper Publication: IDETC2023-115147

Amit Arefin - *Texas Tech University* , **Paul Egan** - *Texas Tech University*

Designing Programmable Ferromagnetic Soft Metastructures for Minimally Invasive Endovascular Therapy

Technical Paper Publication: IDETC2023-116342

Ran Zhuang - *State University of New York at Stony Brook* , **Jiawei Tian** - *State University of New York at Stony Brook,* **Apostolos Tassiopoulos** - *State University of New York at Stony Brook* , **Chandramouli Sadasivan** - *State University of New York at Stony Brook* , **Xianfeng David Gu** - *State University of New York at Stony Brook* , **Shikui Chen** - *State University of New York at Stony Brook*

A Fully Automated Design Process for Shape and Stiffness Customisation of Knee Replacement Implants From CT Data Using Machine Learning Techniques

Technical Presentation: IDETC2023-110463

Thomas A. Burge - *Imperial College* , **Connor Myant** - *Imperial College*

Pareto Front Segment Identification for Efficient Radiotherapy Treatment Plan Navigation With Application to Liver Cancer

Technical Presentation: IDETC2023-117711

Marcus Guozong Lim - *University of Cambridge* , **Timoleon Kipouros** - *University of Cambridge* , **Ibrahim Chamseddine** - *Harvard Medical School* , **Michael Kokkolaras** - *McGill University*

MSNDC-01-02: COMPUTATIONAL METHODS AND SOFTWARE TOOLS IN MULTIBODY SYSTEMS AND NONLINEAR DYNAMICS
10:50AM–12:10PM   **WHITE HILL (4TH FL)**

Chair: Grzegorz Orzechowski - *LUT University*
Co-Chair: Francisco Gonzalez - *University of A Coruña*
Co-Chair: Alessandro Tasora - *University of Parma*

Recursive Least-Squares Based Constraint Enforcement Algorithm for Multibody Systems

Technical Presentation: IDETC2023-116979

Renato Maia Matarazzo Orsino - *University of São Paulo* , **Éverton Lins De Oliveira** - *University of São Paulo*

Physics-Informed Model Order Reduction via Generalized Characteristic Value Decomposition

Technical Presentation: IDETC2023-118149

Dalton Stein - *University of Rhode Island* , **David Chelidze** - *University of Rhode Island*

DEM Simulation of GRC-1 Simulant Using Two GPUs

Technical Presentation: IDETC2023-118192

Ruochun Zhang - *University of Wisconsin-Madison* , **Dan Negrut** - *University of Wisconsin-Madison* , **Radu Serban** - *University of Wisconsin-Madison*, **Colin Vanden Heuvel** - *University of Wisconsin-Madison*

DFMLC-01-01: LIFE CYCLE AND HUMAN FACTORS DECISION MAKING
10:50AM–12:10PM   **PARK (LOBBY LEVEL)**

Chair: Paul Egan - *Texas Tech University*
Co-Chair: Hao Zhang - *James Madison University*
Co-Chair: Vincenzo Ferrero - *National Institute of Standards and Technology*

An Integrated Holistic Approach Toward Sustainable Product Design Using Life Cycle Assessment

Technical Paper Publication: IDETC2023-111608

Hossein Basereh Taramsari - *Stevens Institute of Technology* , **Simerjeet Mudhar** - *Stevens Institute of Technology*, **Steven Hoffenson** - *Stevens Institute of Technology*

Selection Method of Molding Condition for Self-Adhesive Products Using Only Bamboo Fibers and Powder Extracted by a Machining Center

Technical Paper Publication: IDETC2023-115090

Kaito Tanaka - *Doshisha University* , **Reo Kitazaki** - *Doshisha University* , **Toshiki Hirogaki** - *Doshisha University* , **Eiichi Aoyama** - *Doshisha University* , **Hiromichi Nobe** - *Mifuji Kikai Inc.*

A Latent Dirichlet Allocation Based Approach to Reconceptualize Circular Economy

Technical Presentation: IDETC2023-117035

Junfeng Ma - *Mississippi State University*

Cognitive Workload and Design Knowledge Gaps in Hybrid Manufacturing

Technical Presentation: IDETC2023-118121

Kenton Fillingim - *Oak Ridge National Laboratory*, **Thomas Feldhausen** - *Oak Ridge National Laboratory*

AVT-05-01: ADVANCES IN VEHICLE ELECTRIFICATION AND POWERTRAIN DESIGN
10:50AM–12:10PM   **BEACON HILL (4TH FL)**

Chair: Joel Anstrom - *Penn State University*
Co-Chair: Angelo Bonfitto - *Politecnico di Torino*
Co-Chair: Venkat Ramakrishnan - *FCA Group*

Route Based Fuel Savings of Freight Train Hybridization

Technical Paper Publication: IDETC2023-114683

Nitisha Ahuja - *The Pennsylvania State University* , **Jay D. Martin** - *Applied Research Laboratory* , **Michael A. Yukish** - *Applied Research Laboratory* , **Gary M. Stump** - *Applied Research Laboratory* , **Lorri A. Bennett** - *Applied Research Laboratory* , **Bryan W. Schlake** - *Rail Transportation Engineering* , **Joel R. Anstrom** - *Applied Research Laboratory*, **Christopher D. Rahn** - *The Pennsylvania State University*

Effects of Recycled Permanent Magnets on Electric Machine and Hybrid Electric Vehicle Performances

Technical Paper Publication: IDETC2023-114893

Saulius Pakstys - *Politecnico di Torino* , *Angelo Bonfitto - Politecnico di Torino* , **Shailesh Hegde** - *Politecnico di Torino* , **Gaizka Ugalde** - *Mondragon Unibertsitatea*, **Fernando Garramiola** - *Mongragon Unibertsitatea* , **Christian Alejandro Rivera** - *Mondragon Unibertsitatea*

Electric Machine and Battery Sizing for Hybrid Electric Heavy Duty Vehicles

Technical Paper Publication: IDETC2023-114898

Shailesh Hegde - *Politecnico di Torino* , **Angelo Bonfitto** - *Politecnico di Torino,* **Luis M. Castellanos Molina** - *Politecnico di Torino*

VIB-01-02: DYNAMICS & WAVES IN SOLIDS AND METAMATERIALS
2:10PM–3:50PM   TREMONT (4TH FL)

Chair: Pai Wang - *University of Utah*
Co-Chair: Serife Tol - *University of Michigan*
Co-Chair: Michael Leamy - *Georgia Tech Institute of Technology*

Plastic Wave Propagation in Phononic Crystals

Technical Presentation: IDETC2023-117941

Greg Dorgant - *Georgia Institute of Technology,* **Washington Delima** - *Kansas City National Security Campus* , **Michael Leamy** - *Georgia Institute of Technology*

Bianisotropic Elastic Metasurface for Asymmetric Wave Tailoring

Technical Presentation: IDETC2023-117985

Yashasvi Shanker Sharma - *University of Michigan* , **Serife Tol** - *University of Michigan*

Dispersion Tailoring and Non-Reciprocity in Non-Local Acoustic Metamaterials

Technical Presentation: IDETC2023-118155

Muhammad Bilal Khan - *Stevens Institute of Technology* , **Christopher Sugino** - *Stevens Institute of Technology*

DTM-04-01: GLOBAL PERSPECTIVES IN DESIGN
2:10PM–3:50PM   SCOLLAY (LOBBY LEVEL)

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: James Righter - *The Citadel*
Co-Chair: Astrid Layton - *Texas A&M*

Co-Design in the Himalaya: Embracing Local Knowledge and User Innovation to Address Household Energy Challenges

Technical Paper Publication: IDETC2023-115082

Robyn Richmond - *Massachusetts Institute of Technology* , **Daniel Sweeney** - *Massachusetts Institute of Technology* , **Daniel Frey** - *Massachusetts Institute of Technology* , **Sucheta Baliga** - *Massachusetts Institute of Technology*

Evaluating and Developing Human-Centered Design Workshops for Engagement of Co-Designers Living and Working in Sub-Saharan Africa

Technical Paper Publication: IDETC2023-114012

Lauren Wojciechowski - *University of Michigan,* **Emily Himes** - *University of California, San Francisco* , **Nelson Cheruiyot** - *Independent Design Consultant* , **Abigail Hamwada Turinayo** - *Design Without Borders* , *Sheila Niyonsaba - Design Without Borders,* **Julia Kramer** - *University of Michigan*

Towards a Theoretical Framework for Using "Context" in Engineering Design Processes for Global Health Applications

Technical Paper Publication: IDETC2023-117027

Grace Burleson - *University of Michigan* , *Kentaro Toyama - University of Michigan* , **Kathleen Sienko** - *University of Michigan*

Measuring the Health of Makerspaces During Large Disruptions Such as the Covid-19 Pandemic

Technical Paper Publication: IDETC2023-116510

Claire Crose - *Georgia Institute of Technology* , **Samuel Blair** - *Texas A&M University,* **Astrid Layton** - *Texas A&M University,* **Julie Linsey** - *Georgia Institute of Technology*

Understanding the State of Sanitation in India Through Qualitative Methods and a Septic Tank Sensing Device

Technical Paper Publication: IDETC2023-116908

Monisha Naik - *University of Toronto,* **Pablo Cotera Rivera** - *University of Toronto ,* **Meghraj Garad** - *Indian Institute of Techology Bombay,* **Digvijay P. Patil** - *Indian Institute of Techology Bombay ,* **Bakul Rao** - *Indian Institute of Techology Bombay,* **Amy M. Bilton** - *University of Toronto*

PTG-03-02: GEAR DYNAMICS AND NOISE 2
2:10PM–3:50PM   **CAMBRIDGE (4TH FL)**

Chair: Ahmet Kahraman - *The Ohio State University*
Co-Chair: David Talbot - *The Ohio State University*
Co-Chair: Yawen Wang - *The University of Texax at Arlington*

Influence of Fixed Ring Gear Structural Compliance on the Quasi-Static and Dynamic Response of Epicyclic Gear Sets

Technical Paper Publication: IDETC2023-115009

Lokaditya Ryali - *Gear and Power Transmission Research Lab ,* **David Talbot** - *The Ohio State University*

A Study on the Development of Differential Gear Noise in Electric Vehicles While Operating the Disconnect Actuating System

Technical Presentation: IDETC2023-114855

Moo Suk Kim - *Hyundai Motor Company,* **Hyun Ku Lee** - *Hyundai Motor Company,* **Sa Man Hong** - *Hyundai Motor Company,* **Suk Chan Kang** - *Hyundai Motor Company,* **Jung Hwan Moon** - *Hyundai Motor Company,* **Jung Han Lee** - *Hyundai Motor Company*

Sensitivity of Gear Rattle Noise to Backlash

Technical Presentation: IDETC2023-117827

Ata Donmez - *The Ohio State University ,* **Ahmet Kahraman** - *The Ohio State University*

Load Balance Analysis and Improvement Method of Helicopter Split-Torsion Transmission System

Technical Presentation: IDETC2023-118005

Yujie Zhang - *Chongqing University ,* **Jing Wei** - *Chongqing University ,* **Siyu Chen** - *Chongqing University,* **Aiqiang Zhang** - *Chongqing University*

Spectral Influences of Tooth Spacing Errors

Technical Presentation: IDETC2023-118242

David Talbot - *The Ohio State University*

VIB-08/MSNDC-12-01: ROTATING SYSTEMS AND ROTOR DYNAMICS
2:10PM–3:50PM   **STUART (4TH FL)**

Chair: Meng-Hsuan Tien - *National Tsing Hua University*
Co-Chair: Andrea Zanoni - *Politecnico di Milano*

Design and Nonlinear Analysis of Two-Body Centrifugal Pendulum Vibration Absorber for Suppression of Multiple Harmonic Frequencies in Torsional Vibration of Rotor System

Technical Paper Publication: IDETC2023-114618

Xingyu Zhou - *Nagoya University ,* **Tsuyoshi Inoue** - *Nagoya University ,* **Akira Heya** - *Nagoya University*

The Influence of Differential Pressure on Stability of Vertical Rotor-Seal System

Technical Paper Publication: IDETC2023-114617

Shogo Kimura - *Nagoya University ,* **Tsuyoshi Inoue** - *Nagoya University ,* **Hiroo Taura** - *Kindai University ,* **Akira Heya** - *Nagoya University*

Comparing Strain Gauge and Tip Timing Data With Computational Reduced Order Models

Technical Presentation: IDETC2023-117838

Kiran D'souza - *The Ohio State University ,* **Troy Krizak** - *The Ohio State University*

MESA-03
2:10PM–3:50PM   **BACK BAY (4TH FL)**

Chair: Matteo C. Palpacelli - *Polytechnic University of Marche*
Co-Chair: Adriano Mancini - *Polytechnic University of Marche*

A Flexible Framework for Robotic Post-Processing of 3D Printed Components

Technical Paper Publication: IDETC2023-109746

Albin Bajrami - *Polytechnic University of Marche,* **Matteo Claudio Palpacelli** - *Polytechnic University of Marche*

Consideration of Autonomous Decentralized Coordination of Electric Balancer and Robotic Arm With Inertia Compensation for Lager Payload Manipulation

Technical Paper Publication: IDETC2023-115166

Hiroaki Hanai - *Doshisha University* , **Mikio Ozawa** - *Doshisha University* , **Toshiki Hirogaki** - *Doshisha University* , **Eiichi Aoyama** - *Doshisha University*

Localisation of Mobile Robots via Ultra-Wideband Systems

Technical Paper Publication: IDETC2023-115188

Federico Neri - *Polytechnic University of Marche* , **Luca Alfredo Annoni** - *Tekne srl* , **Giacomo Palmieri** - *Polytechnic University of Marche,* **Matteo-Claudio Palpacelli** - *Polytechnic University of Marche* , **Massimo Callegari** - *Polytechnic University of Marche*

Multi-Robot Scalar Field Adaptive Navigation: Exploring and Characterizing the Environment

Technical Presentation: IDETC2023-117984

Christopher Kitts - *Santa Clara University*

An Omnidirectional Autonomous Mobile Robot (OAMR) for Indoor Mobile Manipulation Applications

Technical Presentation: IDETC2023-118000

Brijesh Patel - *National Taiwan University of Science and Technology* , **Chih-Chi Yuan** - *National Taiwan University of Science and Technology* , **Shang-Chen Kuo** - *National Taiwan University of Science and Technology* , **Chin-Hsing Kuo** - *University of Wollongong,* **Ming-Hau Tsai** - *Industrial Technology Research Institute,* **Lung-Chen Liang** - *Career Technology Manufacturing Company, Limited,* **Chung-Hsien Kuo** - *National Taiwan University,* **Chao-Lung Yang** - *National Taiwan University of Science and Technology* , **Po Ting Lin** - *National Taiwan University of Science and Technology*

DAC-04-01: DATA-DRIVEN DESIGN
2:10PM–3:50PM   ARLINGTON (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Faez Ahmed** - *Massachusetts Institute of Technology*
Co-Chair: **Souma Chowdhury** - *University at Buffalo*

Design of Self-Organizing Systems Using Multi-Agent Reinforcement Learning and the Compromise Decision Support Problem Construct

Technical Paper Publication: IDETC2023-116703

Mingfei Jiang - *Beijing Institute of Technology* , **Zhenjun Ming** - *Beijing Institute of Technology* , **Chuanhao Li** - *Beijing Institute of Technology* , **Farrokh Mistree** - *The University of Oklahoma* , **Janet K. Allen** - *The University of Oklahoma*

Car Drag Coefficient Prediction With Depth and Normal Renderings

Technical Paper Publication: IDETC2023-117400

Binyang Song - *Massachusetts Institute of Technology* , **Chenyang Yuan** - *Toyota Research Institute,* **Frank Permenter** - *Toyota Research Institute* , **Nikos Arechiga** - *Toyota Research Institute,* **Faez Ahmed** - *Massachusetts Institute of Technology*

Dated: Guidelines for Creating Synthetic Datasets for Engineering Design Applications

Technical Paper Publication: IDETC2023-111609

Cyril Picard - *Massachusetts Institute of Technology,* **Jürg Schiffman** - *École Polytechnique Fédérale de Lausanne,* **Faez Ahmed** - *Massachusetts Institute of Technology*

Grades: An AI-Driven Graphic Design Support System for Design Style Analysis

Technical Paper Publication: IDETC2023-114660

Jinyu Song - *Zhejiang University,* **Weitao You** - *Zhejiang University,* **Shuhui Shi** - *Zhejiang University* , **Ziwei Tu** - *Sichuan University,* **Juntao Ji** - *Zhejiang University* , **Kaixin Han** - *Zhejiang University* , **Lingyun Sun** - *Zhejiang University*

Investigating the Effect of a Brand Factor in Product Design Based on a Data-Driven Approach Using Online Reviews

Technical Paper Publication: IDETC2023-114966

Seyoung Park - *University of Illinois* , **Harrison Kim** - *University of Illinois*

MSNDC-07/VIB-11-01: TIME-DELAY, TIME-VARYING AND DISCONTINUOUS DYNAMICAL SYSTEMS
2:10PM–3:50PM   **WHITTIER (4TH FL)**

Chair: **Zoltán Dombóvari** - *Budapest University of Technology and Economics*
Co-Chair: **Ashu Sharma** - *Auburn University*
Co-Chair: **David Lehotzky** - *Northeastern University*
Co-Chair: **Nikhil Bajaj** - *University of Pittsburgh*

Decoupled Model-Free Adaptive Control of a Nonlinear MIMO System: An Experimental Comparison of Approaches Applied to a Three-Tank System

Technical Paper Publication: IDETC2023-116423

Soheil Salighe - *University of Duisburg-Essen* , **Nehal Trivedi** - *University of Duisburg-Essen,* **Fateme Bakhshande** - *University of Duisburg-Essen,* **Dirk Söffker** - *University of Duisburg-Essen*

Dc Motor Velocity Control With Integral Retarded Controller Under Unintentional Delay

Technical Paper Publication: IDETC2023-116814

Haonan Fan - *Northeastern University,* **Adrián Ramírez** - *CONACYT – Division of Control and Dynamical Systems, IPICYT* , **Sabine Mondié** - *CINVESTAV-IPN,* **Rifat Sipahi** - *Northeastern University*

New Physical Insights in Optimal Dynamical Stabilization

Technical Presentation: IDETC2023-112571

Arnaud Lazarus - *Sorbonne University,* **Alvaro Anzoleaga Grandi** - *Sorbonne University* , **Suzie Protière** - *Sorbonne University*

String Stability in Mixed Traffic of Human-Driven and Connected Vehicles: Effects of Platoon Order and Time Delays

Technical Presentation: IDETC2023-117491

Duo Wang - *Northeastern University* , **Rifat Sipahi** - *Northeastern University*

When Swarms Collide: Chaos From Using One Swarm to Capture Another

Technical Presentation: IDETC2023-117770

Sayomi Kamimoto - *U.S. Naval Research Laboratory* , **Jason Hindes** - *U.S. Naval Research Laboratory,* **Ira Schwartz** - *U.S. Naval Research Laboratory*

DAC-08-01: DESIGN FOR MARKET SYSTEMS
2:10PM–3:50PM   **HANCOCK (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Yan Fu** - *Ford*
Co-Chair: **Kate Whitefoot** - *Carnegie Mellon University*

Evolutionary Co-Mention Network Analysis via Social Media Mining

Technical Paper Publication: IDETC2023-115114

Phillip Gavino - *The University of Texas at Austin* , **Yinshuang Xiao** - *The University of Texas at Austin* , **Yaxin Cui** - *Northwestern University.* **Wei Chen** - *Northwestern University,* **Zhenghui Sha** - *The University of Texas at Austin*

Modeling the Dynamics of Customer Demand to Determine the Optimal Time to Release Product Updates: A Cognitive Approach

Technical Paper Publication: IDETC2023-115259

Ian Walter - *Purdue University,* **Philip E. Paré** - *Purdue University,* **Jitesh H. Panchal** - *Purdue University*

A Customer Segmentation Approach Based on Sentiment Network of Online Reviewers and Graph Embedding

Technical Paper Publication: IDETC2023-109235

Aoxiang Cheng - *Shanghai Jiao Tong University* , **Mengyuan Shen** - *Shanghai Jiao Tong University* , **Youyi Bi** - *Shanghai Jiao Tong University*

Exploring How the Design Hierarchy of Needs Explains Correlations Between Design Decisions and Online Customer Review Ratings

Technical Paper Publication: IDETC2023-117051

Lisa Retzlaff - *North Carolina State University* , **Scott Ferguson** - *North Carolina State University*

A Review of Automotive Demand Models With Implications for Their Use in Informing Engineering Design and Policy Decisions

Technical Presentation: IDETC2023-118012

Johnathan Vicente - *Carnegie Mellon University* , **Connor Forsythe** - *Carnegie Mellon University* , **Kenneth Gillingham** - *Yale University,* **Jeremy Michalek** - *Carnegie Mellon University* , **Kate Whitefoot** - *Carnegie Mellon University*

DAC-17-01: DESIGN AND DECISION MAKING UNDER UNCERTAINTY
2:10PM–3:50PM STATLER (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Zhen Hu** - *University of Michigan-Dearborn*
Co-Chair: **Ramin Bostanabad** - *University of California, Irvine*

Integrated Sustainable Product Design With Warranty and End-of-Use Considerations

Technical Paper Publication: IDETC2023-117013

Xinyang Liu - *University of Illinois at Urbana-Champaign* , **Pingfeng Wang** - *University of Illinois at Urbana-Champaign*

Satisficing Strategy in Engineering Design

Technical Paper Publication: IDETC2023-109302

Lin Guo - *South Dakota School of Mines and Technology* , **Suhao Chen** - *South Dakota School of Mines and Technology*

Uncertainty Quantification of Corrosion Processes With Statistical Shape Modeling

Technical Paper Publication: IDETC2023-117050

Hao Wu - *University of Illinois at Urbana-Champaign* , **Parth Bansal** - *University of Illinois at Urbana-Champaign* , **Zheng Liu** - *University of Illinois at Urbana-Champaign* , **Yumeng Li** - *University of Illinois at Urbana-Champaign,* **Pingfeng Wang** - *University of Illinois at Urbana-Champaign*

Efficient Airfoil Geometric Uncertainty Quantification Using Neural Network Models and Sequential Sampling

Technical Paper Publication: IDETC2023-114954

Pavankumar Koratikere - *Purdue University* , **Leifur Leifsson** - *Purdue University*

Multi-Agent Bayesian Optimization for Unknown Design Space Exploration

Technical Paper Publication: IDETC2023-115112

Siyu Chen - *The University of Texas at Austin,* **Alparslan Emrah Bayrak** - *Stevens Institute of Technology* , **Zhenghui Sha** - *The University of Texas at Austin*

MSNDC-02-01: FLEXIBLE MULTIBODY DYNAMICS
2:10PM–3:50PM WHITE HILL (4TH FL)

Chair: **Andreas Zwölfer** - *Technical University of Munich*
Co-Chair: **Johannes Gerstmayr** - *University of Innsbruck*

Optimal Predictive Mode Generation for Linear Flex Body Contact in Deterministic Systems

Technical Presentation: IDETC2023-110563

Urs Becker - *Altair Engineering* , **Jin Fan Liu** - *Altair Engineering*

Dimensionless Approach for a Flexible Body With Time-Varying Length

Technical Presentation: IDETC2023-116380

Riko Ogawara - *Sophia University* , **Yoshiaki Terumichi** - *Sophia University,* **Stefan Kaczmarczyk** - *Northampton University*

Structural Optimization of Flexible Components of Multibody Systems in Optimal Control

Technical Presentation: IDETC2023-117909

Daniel Lichtenecker - *Technical University of Munich,* **Karin Nachbagauer** - *University of Applied Sciences Upper Austria*

A Non-Intrusive Corotional Finite-Element Framework for Large Motion and Deformation

Technical Presentation: IDETC2023-118174

Frank Naets - *KU Leuven*

From 3D Solid Finite Elements to Reduced Flexible Multibody Bodies With Constraint Interfaces: A Holistic Approach

Technical Presentation: IDETC2023-118271

Johannes Gerstmayr - *University of Innsbruck* , **Stefan Holzinger** - *University of Innsbruck* , **Andreas Zwölfer** - *Technical University of Munich*

CIE-02/04: AMS JOINT TOPICS
2:10PM–3:50PM   **CLARENDON (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Brian Dennis** - *The University of Texas at Arlington*

Optimization of Masking Parameters for Volumetric Material Manufacturing Using Inverse Methods

Technical Paper Publication: IDETC2023-117030

Benjamin Graber - *U.S. Naval Research Laboratory* , **Athanasos Iliopoulos** - *U.S. Naval Research Laboratory* , **John Michopoulos** - *U.S. Naval Research Laboratory* , **John Steuben** - *U.S. Naval Research Laboratory* , **Andrew Birnbaum** - *U.S. Naval Research Laboratory* , **Nicole Apetre** - *U.S. Naval Research Laboratory* , **Edward Gorzkowski** - *U.S. Naval Research Laboratory* , **Eric Patterson** - *U.S. Naval Research Laboratory* , **Andrew Geltmacher** - *U.S. Naval Research Laboratory*

Inverse Determination of Detailed Internal Flow and Temperature Fields From Wall Measurements

Technical Paper Publication: IDETC2023-117250

Kapil Aryal - *The University of Texas at Arlington* , **Vivek Nair** - *The University of Texas at Arlington* , **Brian Dennis** - *The University of Texas Arlington*

Scalable Probabilistic Modeling and Machine Learning With Dimensionality Reduction for Expensive High- Dimensional Problems

Technical Paper Publication: IDETC2023-110704

Lele Luan - *GE Research,* **Nesar Ramachandra** - *Argonne National Laboratory* , **Sandipp Krishnan Ravi** - *GE Research,* **Anindya Bhaduri** - *GE Research* , **Piyush Pandita** - *GE Research,* **Prasanna Balaprakash** - *Oak Ridge National Laboratory* , **Mihai Anitescu** - *Argonne National Laboratory,* **Changjie Sun** - *GE Research* , **Liping Wang** - *GE Research*

Additive Gaussian Process Regression for Metamodeling in High-Dimensional Problems

Technical Paper Publication: IDETC2023-116555

Anh Tran - *Sandia National Laboratories* , **Kathryn Maupin** - *Sandia National Laboratories* , **Ankush Mishra** - *Iowa State University,* **Zhen Hu** - *University of Michigan - Dearborn* , **Chao Hu** - *University of Connecticut*

Investigation of an Adaptable Batch Multi-Objective Bayesian Optimization Schema for Engineering Design

Technical Presentation: IDETC2023-117828

Adelle Holder - *Valparaiso University* , **Henry Debruin** - *Valparaiso University* , **Jesse Sestito** - *Valparaiso University*

Scalable Uncertainty Quantification and Probabilistic Analysis for Random Heterogeneous Materials

Technical Presentation: IDETC2023-118053

Yongming Liu - *Arizona State University* , **Yi Gao** - *Arizona State University*

CIE-08/09: CAPPD JOINT TOPICS
2:10PM–3:50PM   **BERKELEY (MEZZ)**

Chair: **Daniele Regazzoni** - *University of Bergamo*
Co-Chair: **Tsz Ho Kwok** - *Concordia University*

A Comparison of CNN Models for Automated Femur Segmentation Based on DICOM Images

Technical Paper Publication: IDETC2023-116427

Anna Ghidotti - *University of Bergamo* , **Andrea Vitali** - *University of Bergamo* , **Daniele Regazzoni** - *University of Bergamo,* **Miri Weiss Cohen** - *Braude College of Engineering* , **Caterina Rizzi** - *University of Bergamo*

Assessing Learning of Manual Assembly Processes Using Wrist-Worn Inertial Measurement Unit

Technical Paper Publication: IDETC2023-108975

Rahul Sharan Renu - *Francis Marion University* , **Kirk Johnson** - *Francis Marion University* , **Nathaniel Smith** - *Francis Marion University* , **Jerel Dawkins** - *Francis Marion University* , **James Righter** - *The Citadel*

Real-Time Emotion Recognition in Virtual Reality

Technical Presentation: IDETC2023-117850

Tzu-Ying Li - *National Taiwan University* , **Shana Smith** - *National Taiwan University*

Fatigue Prediction for Repetitive Lifting

Technical Paper Publication: IDETC2023-116839

Shuvrodeb Barman - *Oklahoma State University* , **Yujiang Xiang** - *Oklahoma State University* , **Ritwik Rakshit** - *Texas Tech University,* **James Yang** - *Texas Tech University*

Framework for Analysing Human Cognition in Operationally-Relevant Human Swarm Interaction

Technical Paper Publication: IDETC2023-117162

Joseph Distefano - *University at Buffalo* , **Hanvit Cho** - *University at Buffalo,* **Prajit Krisshnakumar** - *University at Buffalo* , **Souma Chowdhury** - *University at Buffalo,* **Ehsan Esfahani** - *University at Buffalo*

CIE-12/14: SEIKM JOINT TOPICS
2:10PM–3:50PM　　　　　　　　　　GEORGIAN (MEZZ)

Chair: Douglas Van Bossuyt - *Naval Postgraduate School*
Co-Chair: Zhuo Yang - *National Institute of Standards and Technology*

Enhancing Part Quality Management Using an Extended Data Fusion Framework in Metal Powder Bed Fusion Additive Manufacturing

Technical Paper Publication: IDETC2023-116524

Zhuo Yang - *National Institute of Standards and Technology,* **Jaehyuk Kim** - *National Institute of Standards and Technology,* **Yan Lu** - *National Institute of Standards and Technology,* **Albert Jones** - *National Institute of Standards and Technology,* **Paul Witherell** - *National Institute of Standards and Technology,* **Ho Yeung** - *National Institute of Standards and Technology,* **Hyunwoong Ko** - *Arizona State University*

Uncovering Hidden Innovation Quality Through Patent-Citation Network Analysis

Technical Presentation: IDETC2023-116720

Soumyakant Padhee - *Northeastern University* , **Babak Heydari** - *Northeastern University*

Functional Reasoning of System Architecture in the System Modeling Language (SysML) With XML Representation

Technical Paper Publication: IDETC2023-117193

Parth Ganeriwala - *Florida Institute of Technology* , **Candice Chambers** - *Florida Institute of Technology,* **Chiradeep Sen** - *Florida Institute of Technology* , **Siddhartha Bhattacharyya** - *Florida Institute of Technology*

Collaborating Under Complexity: Experimental Study on Agents' Reliance to Team Collaboration Under Design Complexity

Technical Presentation: IDETC2023-112628

Soumyakant Padhee - *Northeastern University* , **Babak Heydari** - *Northeastern University*

Cyberriskdelphi: Towards Objective Cyber Risk Assessment for Complex Systems

Technical Paper Publication: IDETC2023-114783

Nikolaos Papakonstantinou - *VTT Technical Research Centre of Finland* , **Douglas L. Van Bossuyt** - *Naval Postgraduate School,* **Britta Hale** - *Naval Postgraduate School* , **Ryan Arlitt** - *Technical University of Denmark,* **Jarno Salonen** - *VTT Technical Research Centre of Finland* , **Jani Suomalainen** - *VTT Technical Research Centre of Finland*

Modeling Distributed Situation Awareness in Resilience-Based Design of Complex Engineered Systems

Technical Paper Publication: IDETC2023-116689

Lukman Irshad - *NASA Ames Research Center (KBR, Inc.)* , **Daniel Hulse** - *NASA Ames Research Center*

DFMLC-05-01: DESIGN FOR ADDITIVE MANUFACTURING
2:10PM–3:50PM　　　　　　　　　PARK (LOBBY LEVEL)

Chair: Paul Egan - *Texas Tech University*
Co-Chair: Yaoyao Zhao - *McGill University*
Co-Chair: Xinyi Xiao - *Miami University*

Investigating Children's Experiences for Smart Wearables: Implications on Design for Additive Manufacturing

Technical Paper Publication: IDETC2023-110629

Matthew Bonello - *University of Malta* , **Philip Farrugia** - *University of Malta* , **Nathalie Buhagiar** - *University of Malta*

Applicability of Load Separation Method to Additively Manufactured ABS

Technical Paper Publication: IDETC2023-116652

Astrit Imeri - *Tennessee Technological University* , **Christopher D. Wilson** - *Tennessee Technological University*

Predicting the Behavior of Large-Scale, Additively Manufacturable Lattice Structures via the Laws of Similitude

Technical Paper Publication: IDETC2023-116735

Sumant Rokade - *The Pennsylvania State University*, **Mariantonieta Gutierrez Soto** - *The Pennsylvania State University*, **Nicholas Meisel** - *The Pennsylvania State University*

Design for Additive Manufacturing of Pneumatic Soft Robotics via a Large-Scale, High-Viscosity Vat Photopolymerization Process

Technical Paper Publication: IDETC2023-116885

Roxana Carbonell - *The University of Texas at Austin* , **Hongtao Song** - *The University of Texas at Austin* , **Carolyn Seepersad** - *The University of Texas at Austin* , **Richard Crawford** - *The University of Texas at Austin*

The Impact of Additive Manufacturing Constraints and Design Objectives on Structural Topology Optimization

Technical Paper Publication: IDETC2023-117039

Babin Dangal - *Southern Illinois University* , **Sangjin Jung** - *Southern Illinois University*

MNS-01/VIB-05/MSNDC-13: NONLINEAR DYNAMICS AND VIBRATIONS OF MEMS AND NEMS
2:10PM–3:50PM   **NEWBURY (4TH FL)**

Chair: **Najib Kacem** - *FEMTO-ST Institute*
Co-Chair: **Slava Krylov** - *Tel Aviv University*

A Parametrically Excited Mode-Localized Acceleration Threshold Sensor Using Supercritical Hopf Bifurcation

Technical Paper Publication: IDETC2023-109050

Yinghai Tang - *Dalian University of Technology* , **Jian Zhao** - *Dalian University of Technology* , **Najib Kacem** - *University of Franche-Comté* , **Zeyuan Dong** - *Dalian University of Technology* , **Xianze Zheng** - *Dalian University of Technology*

Bow Snap-Through Condition in Electrostatically Actuated Initially Curved and Latched Micro-Beams

Technical Paper Publication: IDETC2023-109332

Lior Medina - *Tel-Aviv University*

Coupled Beam Arrays for Mass Sensing: Unified Model Development and Experimental Verification

Technical Paper Publication: IDETC2023-114900

Fehmi Najar - *Prince Sattam bin Abdulaziz University* , **Mehdi Ghommem** - *American University of Sharjah* , **Toky Rabenimanana** - *FEMTO-ST Institute,* **Vincent Walter** - *FEMTO-ST Institute* , **Najib Kacem** - *FEMTO-ST Institute*

A Novel Mass Sensor Incoporating Multiple Internal Resonances in Coupled Resonators Under Electrostatic Actuation

Technical Paper Publication: IDETC2023-116316

Rongjian Sun - *Dalian University of Technology* , **Jian Zhao** - *Dalian University of Technology* , **Najib Kacem** - *University of Franche-Comté* , **Zeyuan Dong** - *Dalian University of Technology* , **Ming Lyu** - *Inner Mongolia University*

AVT-05-02: ADVANCES IN VEHICLE ELECTRIFICATION AND POWERTRAIN DESIGN
2:10PM–3:50PM   **BEACON HILL (4TH FL)**

Chair: **Joel Anstrom** - *The Pennsylvania State University*
Co-Chair: **Angelo Bonfitto** - *Politecnico di Torino*
Co-Chair: **Venkat Ramakrishnan** - *FCA Group*

A Flex-Fuel Sensor and Control Strategy for Variable Concentrations of Hydrogen-Natural Gas Blend Fuel in and Internal Combustion Engine

Technical Paper Publication: IDETC2023-116486

Michael Dogal - *The Pennsylvania State University* , **Joel Anstrom** - *The Pennsylvania State University* , **Suresh S. Iyer** - *The Pennsylvania State University*

Testing Device for Battery Diagnostics and Market Analysis for Reuse in Static Application

Technical Paper Publication: IDETC2023-116596

Alberto Ponso - *Politecnico di Torino* , **Angelo Bonfitto** - *Politecnico di Torino* , Mario Silvagni - *Politecnico di Torino* , **Sara Luciani** - *Politecnico di Torino*

Ultracapacitors in Light Duty Hybrid Electric Vehicle Energy Storage Systems: Technical Impact and Economic Perspectives

Technical Paper Publication: IDETC2023-116663

Saulius Pakstys - *Politecnico di Torino* , **Angelo Bonfitto** - *Politecnico di Torino* , **Shailesh Hegde** - *Politecnico di Torino*

VIB-02-02: VIBRATION AND STABILITY OF MECHANICAL SYSTEMS
4:10PM–5:50PM   STUART (4TH FL)

Chair: Chengzhi Shi - *Georgia Institute of Technology*
Co-Chair: Robert G. Parker - *The University of Utah*

Nonlinear Dynamics of a Buckled Beam Under Impact Excitation: An Experimental and Numerical Investigation

Technical Presentation: IDETC2023-117999

Michael Rouleau - *Georgia Institute of Technology* , **James Keller** - *Georgia Institute of Technology* , **Jason Lee** - *Georgia Institute of Technology* , **Zachary Booker** - *Georgia Institute of Technology* , **Steven Craig** - *Georgia Institute of Technology* , **Chengzhi Shi** - *Georgia Institute of Technology* , **Julien Meaud** - *Georgia Institute of Technology*

Flow-Induced Vibration Response of a Triangular Prism With Rotational and Crossflow Oscillations

Technical Presentation: IDETC2023-118052

Seyedmohammad Mousavisani - *University of Massachusetts Dartmouth* , **Farnaz Feyli** - *University of Massachusetts Dartmouth*, **Banafsheh Seyed-Aghazadeh** - *University of Massachusetts Dartmouth*

Post-Flutter Behavior Investigation of Highly Flexible Airfoils

Technical Presentation: IDETC2023-118124

Mostafa Khazaee Kuhpar - *University of Massachusetts Dartmouth* , **Banafsheh Seyed-Aghazadeh** - *University of Massachusetts Dartmouth*

Experimental Investigation of Vortex-Induced Vibrations in Curved and Tapered Circular Cylinders

Technical Presentation: IDETC2023-118215

Farnaz Feyli - *University of Massachusetts Dartmouth* , **Seyedmohammad Mousavisani** - *University of Massachusetts Dartmouth* , **Banafsheh Seyed-Aghazadeh** - *University of Massachusetts Dartmouth*

DTM-05-01: DECISION MAKING IN EARLY STAGES OF DESIGN
4:10PM–5:50PM   SCOLLAY (LOBBY LEVEL)

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Joshua Summers - *The University of Texas at Dallas*
Co-Chair: Maha Haji - *Cornell University*

Emerging Methods for 2D and 3D Physics Simulation to Support Early Design Decisions

Technical Paper Publication: IDETC2023-112481

Pongchalat Chaisiriroj - *Oregon State University* , **Robert Stone** - *Oregon State University*

Identification of Designer Search Strategies and Their Effects on Performance Outcomes in Pair Parameter Design Tasks

Technical Paper Publication: IDETC2023-116499

Alkim Avsar - *Stevens Institute of Technology* , **Paul Grogan** - *Stevens Institute of Technology*

The Impact of Facilitation During Idea Generation in Engineering Design

Technical Paper Publication: IDETC2023-113583

Alexander R. Murphy - *The University of Texas at Dallas* , **Emily Moseley** - *Georgia Institute of Technology* , **Morgan Weaver** - *Georgia Institute of Technology* , **Julie S. Linsey** - *Georgia Institute of Technology*

Who Is This Design For? Promoting Consideration of People During Concept Generation

Technical Paper Publication: IDETC2023-114673

Thanina Makhlouf - *University of Michigan* , **Laura Murphy** - *University of Michigan* , **Shanna Daly** - *University of Michigan* , **Colleen Seifert** - *University of Michigan*

Cognitive and Behavioral Patterns of Human Designers When Describing Their Understanding of Problem Domains Through Concept Maps: A Pilot Study

Technical Paper Publication: IDETC2023-116955

John Kochenberger - *Florida Institute of Technology* , **Chiradeep Sen** - *Florida Institute of Technology*

Fewer Triplets Than You Think: Novelty Error Converges Faster Than Triplet Violations in Ordinal Embeddings

Technical Paper Publication: IDETC2023-116696

Matthew Keeler - *University of Maryland, College Park* , **Mark Fuge** - *University of Maryland, College Park*

DAC-01-01: CONTROL CO-DESIGN
4:10PM–5:50PM   HANCOCK (MEZZ)

Chair: **Daniel Herber** - *Colorado State University*
Co-Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Herschel Pangborn** - *The Pennsylvania State University*

Control Co-Design With Approximate Explicit Model Predictive Controllers

Technical Paper Publication: IDETC2023-109551

Ying-Kuan Tsai - *Texas A&M University* , **Richard Malak, Jr**. - *Texas A&M University*

Control Co-Design With Varying Available Information Applied to Vehicle Suspensions

Technical Paper Publication: IDETC2023-114690

Saeid Bayat - *University of Illinois at Urbana-Champaign* , **James T. Allison** - *University of Illinois at Urbana-Champaign*

A Two-Timescale Reinforcement Learning Approach for Control Co-Design Problems

Technical Paper Publication: IDETC2023-116567

Eddieb Sadat - *Stevens Institute of Technology,* **Mostaan Lotfalian Saremi** - *Stevens Institute of Technology* , **Alparslan Emrah Bayrak** - *Stevens Institute of Technology*

Platform Hydrodynamic and Structural Control Co-Optimization for the Floating Offshore Wind Turbines

Technical Paper Publication: IDETC2023-117541

Jinbin Liang - *Sun Yat-Sen University* , **Xianping Du** - *Sun Yat-Sen University* , **Jianbo Yi** - *Sun Yat-Sen University* , **Guowei Qian** - *Sun Yat-Sen University* , **Peng Xie** - *Sun yat-Sen University* , **Hongyi Xu** - *University of Connecticut*

A Framework to Support Multilevel Robust Co-Design of Manufacturing Supply Networks

Technical Paper Publication: IDETC2023-117145

Mathew Baby - *Florida Institute of Technology,* **Akshay Guptan** - *Florida Institute of Technology,* **Jacob Broussard** - *Florida Institute of Technology* , **Janet Allen** - *The University of Oklahoma,* **Farrokh Mistree** - *The University of Oklahoma,* **Anand Balu Nellippallil** - *Florida Institute of Technology*

PTG-02-02: GEAR ANALYSIS, MATERIALS, AND FATIGUE 2
4:10PM–5:50PM   CAMBRIDGE (4TH FL)

Chair: **Hai Xu** - *General Motors*
Co-Chair: **David Talbot** - *The Ohio State University*
Co-Chair: **Michael Hurrell** - *National Aeronautics and Space Administration*

A Novel Ultrasonic Fully Reversible Bending Fatigue Test Specimen for Simulated Gear Tooth Bending Fatigue

Technical Paper Publication: IDETC2023-115149

Zachary Cameron - *NASA Goddard Space Flight Center* , **Thomas Tallerico** - *NASA Glenn Research Center*

The Effect of Geometrical Quality on the Stress-State in the Plastic Gear

Technical Paper Publication: IDETC2023-111881

Damijan Zorko - *University of Ljubljana* , **Nikola Vukašinović** - *University of Ljubljana* , **Borut čErne** - *University of Ljubljana*

An Experimental Study on the Accuracy of Cumulative Damage Models in Gear Tooth Bending Fatigue

Technical Paper Publication: IDETC2023-116926

Gabriel Anichowski - *The Ohio State University* , **Riley Damm** - *The Ohio State University,* **Ahmet Kahraman** - *The Ohio State University* , **Isaac Hong** - *The Ohio State University*

Cylindrical Spur Gear Tooth Root Stress Calculation Through FE-Based Flexible Multibody Simulations

Technical Presentation: IDETC2023-117714

Valentin Mouton - *Université de Lyon,* **Emmanuel Rigaud** - *Université de Lyon,* **Joël Perret-Liaudet** - *Université de Lyon*

A Three-Dimensional Quasi-Static Model of a Helical Gear Pair

Technical Presentation: IDETC2023-118236

David Talbot - *The Ohio State University,* **Michael Benatar** - *The Ohio State University*

MR-4-3: DEPLOYABLE ORIGAMI I
4:10PM–5:50PM   STUDIO 2 (LOBBY LEVEL)

Chair: **Jared Butler** - *The Pennsylvania State University*
Co-Chair: **Brandon Sargent** - *Gonzaga*

Applying Origami-Based Design Approaches to Foldable Furniture for Children

Technical Paper Publication: IDETC2023-114790

Bethany Parkinson - *Brigham Young University ,* **Mitchel Skinner** - *Brigham Young University ,* **Denise Halverson** - *Brigham Young University ,* **Terri Bateman** - *Brigham Young University ,* **Spencer Magleby** - *Brigham Young University ,* **Larry Howell** - *Brigham Young University*

Cutting and Folding Thick-Panel Miura-Ori With One DOF

Technical Paper Publication: IDETC2023-112262

Jingyi Yang - *University of Oxford ,* **Zhong You** - *University of Oxford*

2.5D Signage From Sheet Material With Orthogonal Cuts and Folds

Technical Paper Publication: IDETC2023-116691

Erik D. Demaine - *Massachusetts Institute of Technology ,* **Martin L. Demaine** - *Massachusetts Institute of Technology ,* **Satyan L. Devadoss** - *University of San Diego,* **Perla Myers** - *University of San Diego,* **Alfonso Parra Rubio** - *Massachusetts Institute of Technology*

Modular Thick Origami for Large Deployable Infrastructure

Technical Presentation: IDETC2023-117754

Yi Zhu - *University of Michigan ,* **Evgueni Filipov** - *University of Michigan*

Selectively Stiffened Integrated Composite Hinge

Technical Paper Publication: IDETC2023-116367

Philip Klocke - *Brigham Young University ,* **Mitchel Skinner** - *Brigham Young University ,* **Andy George** - *Brigham Young University ,* **Spencer Magleby** - *Brigham Young University*

MR-8-1: SOFT AND CONTINUUM MECHANISMS
4:10PM–5:50PM   STUDIO 1 (LOBBY LEVEL)

Chair: **Sree Kalyan Patiballa** - *The University of Alabama*
Co-Chair: **Girish Krishnan** - *University of Illinois at Urbana-Champaign*

A Backbone-Driven Approach for the Positioning of Continuum Robots

Technical Paper Publication: IDETC2023-114773

Yucheng Li - *University of Dayton ,* **Andrew Murray** - *University of Dayton ,* **David Myszka** - *University of Dayton*

A Compliant Hinge Joint Driven by the PneuNets Bending Actuator for Enhancing the Performance of Soft Robots

Technical Paper Publication: IDETC2023-114816

Yi Jin - *The Ohio State University ,* **Haijun Su** - *The Ohio State University*

Design Space Enumerations for Pneumatically Actuated Soft Continuum Manipulators

Technical Paper Publication: IDETC2023-116930

Evan Ripperger - *University of Illinois at Urbana-Champaign ,* **Girish Krishnan** - *University of Illinois at Urbana-Champaign*

Design and Modeling Framework for Dexter: Dexterous Continuum Tensegrity Manipulator

Technical Presentation: IDETC2023-117758

Vishesh Vikas - *NA,* **Cole Woods** - *The University of Alabama*

Spira Coils: Soft Self-Sensing Pneumatic Integrated Retractable Actuator Coils

Technical Paper Publication: IDETC2023-109473

Jacob R. Greenwood - *VPI Technology,* **Wyatt Felt** - *VPI Technology*

MR-5-1: MOTION PLANNING, DYNAMICS, AND CONTROL OF ROBOTS
4:10PM–5:50PM   **THE LOFT (LOBBY LEVEL)**

Chair: Gloria Wiens - *University of Florida*
Co-Chair: Jeffrey W. Herrmann - *University of Maryland*

Dynamic Modeling and Roubust Touque Control of a Discrete Variable Stiffness Actuator

Technical Paper Publication: IDETC2023-115235

Ziqing Yu - *Purdue University* , **Jiaming Fu** - *Purdue University* , **Bin Yao** - *Purdue University* , **George Chiu** - *Purdue University* , **Richard Voyles** - *Purdue University* , **Dongming Gan** - *Purdue University*

Prediction of Human Reaching Pose Sequences in Human-Robot Collaboration

Technical Paper Publication: IDETC2023-115309

Jared Flowers - *University of Florida* , **Gloria Wiens** - *University of Florida*

Targeted Sampling DWA: A Path-Aware DWA Sampling Strategy for Omni-Directional Robots

Technical Paper Publication: IDETC2023-116450

Chen Shen - *Singapore University of Technology and Design* , **Gim Song Soh** - *Singapore University of Technology and Design*

Towards High Dynamic Operations With Parallel-Serial Hybrid Robots

Technical Paper Publication: IDETC2023-116954

Keerthi Sagar - *University of Genova,* **Vishal Ramadoss** - *University of Genova,* **Matteo Zoppi** - *University of Genova, Italy*

Comparing Complementary Kalman Filters Against Slam for Collaborative Localization of Heterogeneous Multi-Robot Teams

Technical Presentation: IDETC2023-117789

Benjamin Abruzzo - *Scientific Systems Co., Inc.,* **David Cappelleri** - *Perdue University,* **Philippos Mordohai** - *Stevens Institute of Technology*

MSNDC-03/VIB-06-01: CONTACT DYNAMICS AND JOINTED STRUCTURES
4:10PM–5:50PM   **WHITE HILL (4TH FL)**

Chair: Akira Saito - *Meiji University*
Co-Chair: Marco Morandini - *Politecnico di Milano*

Analyzing the Backbone Curve of Non-Smooth Systems Using a Generalized Bilinear Frequency Approximation Method

Technical Presentation: IDETC2023-110647

Meng-Hsuan Tien - *National Tsing Hua University* , **Keng-Yen Lee** - *National Tsing Hua University* , **Shih-Chun Huang** - *National Tsing Hua University*

Equality-Based Weighted Residual Formulation for Periodic Solutions of Dry Friction Damped Systems

Technical Presentation: IDETC2023- 117683

Christophe Pierre - *Stevens Institute of Technology,* **Mathias Legrand** - *McGill University*

A New Hybrid Continuation Framework for Analyzing Nonlinear Normal Modes of Non-Smooth Systems

Technical Paper Publication: IDETC2023-115105

Shih-Chun Huang - *National Tsing Hua University* , **Meng-Hsuan Tien** - *National Tsing Hua University*

Non-Smooth Reduced Interface Models and Their Use in Co-Simulation of Mechanical Systems

Technical Paper Publication: IDETC2023-117079

Ali Raoofian - *McGill University* , **Xu Dai** - *McGill University,* **Jozsef Kovecses** - *McGill University*

MSNDC-04/VIB-09-01: NONLINEAR DYNAMICS OF SYSTEMS AND STRUCTURES
4:10PM–5:50PM WHITTIER (4TH FL)

Chair: **Ajeet Kumar** - *Indian Institute of Technology Delhi*
Co-Chair: **Gizem Acar** - *Stevens Institute of Technology*
Co-Chair: **Stefano Lenci** - *Polytechnic University of Marche*
Co-Chair: **Richard Wiebe** - *University of Washington*

Modeling and Control of Chaotic Jumping of an Inverted Flexible Pendulum System

Technical Paper Publication: IDETC2023-115264

Fateme Bakhshande - *University of Duisburg-Essen ,* **Hartiny Kahar** - *Politeknik Banting Selangor ,* **Dirk Söffker** - *University of Duisburg-Essen*

Large Amplitudes Near Peak Dynamics of Nonlinear Oscillators by Means of an Asymptotic Approach

Technical Presentation: IDETC2023-117933

Stefano Lenci - *Polytechnic University of Marche*

The Presence of Chaos in a Viscoelastic Harmonically Forced Von Mises Truss

Technical Paper Publication: IDETC2023-116683

Pritam Ghoshal - *Purdue University ,* **James Gibert** - *Purdue University ,* **Anil Bajaj** - *Purdue University*

Bistable Dynamics and Locomotion Performance Enhancement of a Multi-Module Vibration-Driven Robot

Technical Paper Publication: IDETC2023-117186

Yuyang Zhao - *Fudan University ,* **Hongbin Fang** - *Fuan University ,* **Jian Xu** - *Fudan University*

Frequency Response of a Beck's Column With Nonlinear Constitutive Law

Technical Presentation: IDETC2023-118066

Muhammad Hassaan Ahmed - *University of California, Merced,* **Soheil Fatehiboroujeni** - *Colorado State University ,* **Sachin Goyal** - *University of California, Merced*

MESA-06 / MESA-11 / MESA-15
4:10PM–5:50PM BACK BAY (4TH FL)

Chair: **Matteo C. Palpacelli** - *Polytechnic University of Marche*
Co-Chair: **Adriano Mancini** - *Polytechnic University of Marche*
Co-Chair: *Chris Pretty - University of Canterbury*

Fabrication of 3D Conformable Electronics on Arbitrary Curvilinear Surfaces Enabled by Direct Freeform Laser Technique

Technical Presentation: IDETC2023-109683

Bujingda Zheng - *University of Missouri*

"Lever" -- Low-Cost Electric Vehicle Charging Robot: Development and Testing

Technical Paper Publication: IDETC2023-117008

Bryan Cochran - *Georgia Institute of Technology ,* **Zulfiqar Zaidi** - *Georgia Institute of Technology ,* **Bert Bras** - *Georgia Institute of Technology*

A Tale of Two Turrets: Transitioning Hands-On, Project-Based Learning to a Remote Environment

Technical Paper Publication: IDETC2023-112409

Michael Kutzer - *United States Naval Academy ,* **Levi Devries** - *United States Naval Academy ,* **Tracie Severson** - *United States Naval Academy*

An Experimental Study of Drag Coefficients of a Quadrotor Airframe

Technical Paper Publication: IDETC2023-114020

Daniel Morris - *University of Canterbury ,* **Chris Pretty** - *University of Canterbury*

DAC-04-02: DATA-DRIVEN DESIGN
4:10PM–5:50PM ARLINGTON (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Faez Ahmed** - *Massachusetts Institute of Technology*
Co-Chair: **Ali Mehmani** - *Prescriptive Data Inc.*

When Is It Actually Worth Learning Inverse Design?

Technical Paper Publication: IDETC2023-116678

Milad Habibi - *University of Maryland, College Park ,* **Jun Wang** - *Santa Clara University,* **Mark Fuge** - *University of Maryland, College Park*

Interpretable Neural Network Analyses for Understanding Complex Physical Interactions in Engineering Design

Technical Paper Publication: IDETC2023-115103

Tuba Dolar - *Northwestern University* , **Doksoo Lee** - *Northwestern University* , **Wei Chen** - *Northwestern University*

Heat Sink Design Optimization via GAN-CNN Combined Deep-Learning

Technical Paper Publication: IDETC2023-116429

Nathan Flynn - *University of Wisconsin-Madison* , **Xiaoping Qian** - *University of Wisconsin-Madison*

Using Machine Learning to Predict the Adoption of Building Electrification Technologies in U.S. Households

Technical Paper Publication: IDETC2023-116751

Andrew Majowicz - *Stevens Institute of Technology,* **Philip Odonkor** - *Stevens Institute of Technology*

Ship-D: Ship Hull Dataset for Design Optimization Using Machine Learning

Technical Paper Publication: IDETC2023-117003

Noah Bagazinski - *Massachusetts Institute of Technology* , **Faez Ahmed** - *Massachusetts Institute of Technology*

Qunatifying Model Uncertainty of Label-Free Machine Learning for Multidisciplinary Systems Analysis

Technical Paper Publication: IDETC2023-112948

Huiru Li - *Indiana University-Purdue University Indianapolis* , **Jitesh Panchal** - *Purdue University,* **Xiaoping Du** - *Indiana University-Purdue University Indianapolis*

A Comparison of Bayesian Acquisition Functions for Use in Surrogate Multi-Objective Feasibility Robust Optimization With Interval Uncertainty

Technical Paper Publication: IDETC2023-116320

Randall Kania - *University of Maryland* , **Shapour Azarm** - *University of Maryland*

Robust Design for Product Adaptation Considering Changes in Configurations and Parameters

Technical Paper Publication: IDETC2023-116614

Reza Deabae - *University of Calgary* , **Deyi Xue** - *University of Calgary*

Accounting for Model and Data Uncertainty in Machine Learning Assisted Mechanical Design

Technical Paper Publication: IDETC2023-116622

Xiaoping Du - *Indiana University*

DAC-17-02: DESIGN AND DECISION MAKING UNDER UNCERTAINTY
4:10PM–5:50PM   **STATLER (MEZZ)**

Chair: Chao Hu - *Iowa State University*
Co-Chair: Xiaoping Du - *Indiana University-Purdue University Indianapolis*
Co-Chair: Leifur Leifsson - *Purdue University*

An Efficient Surrogate Modeling Method for Reliability-Based Global Path Planning of Off-Road Autonomous Ground Vehicles

Technical Paper Publication: IDETC2023-117348

Jianhua Yin - *University of Michigan-Dearborn* , **Zhen Hu** - *University of Michigan,* **Zissimos Mourelatos** - *Oakland University,* **David Gorsich** - *U.S. Army Combat Capabilities Development Command, Ground Vehicle Systems Center* , **Amandeep Singh** - *U.S. Army Combat Capabilities Development Command, Ground Vehicle Systems Center* , **Seth Tau** - *U.S. Army Combat Capabilities Development Command, Ground Vehicle Systems Center*

DFMLC-03-01: MODELING AND OPTIMIZATION FOR SUSTAINABLE DESIGN AND MANUFACTURING
4:10PM–5:50PM   **PARK (LOBBY LEVEL)**

Chair: Paul Egan - *Texas Tech University*
Co-Chair: Bryony DuPont - *Oregon State University*
Co-Chair: Yong Hoon Lee - *The University of Memphis*

The Economic and Environmental Sustainability of Additive Manufacturing for Tooling: A Case Study on Using Laser Powder Bed Fusion for Making Injection Molding Tool Inserts

Technical Paper Publication: IDETC2023-112462

Jiankan Liao - *University of Michigan* , **Robert De Kleine** - *Ford Motor Company* , **Jason Powell** - *Ford Motor Company* , **Daniel Cooper** - *University of Michigan*

Resilience and Sustainability in Certified Green Buildings: Applying Ecosystem Concepts to Aid in More Dynamic Green Communities

Technical Paper Publication: IDETC2023-114798

Emily Payne - *Texas A&M University* , **Hannah Wagner** - *Texas A&M University* , **Astrid Layton** - *Texas A&M University*

Quantifying the Sustainability and Robustness of Manufacturing Systems Using Energy and Ecological Network Analyses

Technical Paper Publication: IDETC2023-116490

Hadear Hassan - *Texas A&M University* , **Emily Payne** - *Texas A&M University* , **Astrid Layton** - *Texas A&M University*

Supporting Design for Circular Economy Using Lifecycle Co-Simulation

Technical Paper Publication: IDETC2023-116537

Gaurav Aher - *Aarhus University,* **Hugo Daniel Macedo** - *Aarhus University* , **Peter Gorm Larsen** - *Aarhus University* , **Devarajan Ramanujan** - *Aarhus University*

LCAD: A Framework for Coupling Computer-Aided Design and Life Cycle Analysis Visualizations

Technical Paper Publication: IDETC2023-116573

Teodor Vernica - *Aarhus Universitet,* **Gaurav Aher** - *Aarhus University,* **Badrinath Veluri** - *Grundfos A/S* , **Devarajan Ramanujan** - *Aarhus University*

Adapting Digital Twin Frameworks Toward Lean Manufacturing for the Circular Economy

Technical Paper Publication: IDETC2023-116759

Vincenzo Ferrero - *National Institute of Standards and Technology,* **Naser Alqseer** - *National Institute of Standards and Technology,* **Maya Reslan** - *National Institute of Standards and Technology,* **KC Morris** - *National Institute of Standards and Technology*

MNS-01/VIB-05/MSNDC-13-02: NONLINEAR DYNAMICS AND VIBRATIONS OF MEMS AND NEMS
4:10PM–5:50PM   NEWBURY (4TH FL)

Chair: Mohammad Shavezipur - *Southern Illinois University Edwardsville*
Co-Chair: Lior Medina - *Tel Aviv University*

Localized Noninear Waves in Electromechanical Lattices

Technical Presentation: IDETC2023-118049

Slava Krylov - *Tel Aviv University,* **Philip Rosenau** - *Tel Aviv University*

Theoretical Investigation of Frequency Stabilization Mechanisms in Micromechanical Resonators Through Internal Resonance

Technical Presentation: IDETC2023-118151

Ata Donmez - *The Ohio State University* , **Hanna Cho** - *The Ohio State University*

Selective Actuation of Higher Order Modes of a Micromachined Circular Membrane

Technical Presentation: IDETC2023-118171

Lvjun Wang - *King Abdullah University of Science and Technology,* **Wen Zhao** - *King Abdullah University of Science and Technology,* **Aamir Farooq** - *King Abdullah University of Science and Technology,* **Mohammad Younis** - *State University of New York at Binghamton*

CIE-26: POSTER SESSION
6:00PM–7:00PM   GEORGIAN (MEZZ)

Chair: Jun Wang - *Santa Clara University*
Co-Chair: Satchit Ramnath - *The Ohio State University*

Natural Language Processing for Automated System Modeling and Functional Reasoning of System Architecture

Student Poster Presentation: IDETC2023-109846

Parth Ganeriwala - *Florida Institute of Technology* , **Candice Chambers** - *Florida Institute of Technology* , **Siddhartha Bhattacharyya** - *Florida Institute of Technology* , **Chiradeep Sen** - *Florida Institute of Technology*

When Creativity Goes Rogue: Uncovering the Potential Dangers of VR for Engineering Design

Student Poster Presentation: IDETC2023-117668

Jiacheng Cai - *Pennsylvania State University,* **Scarlett R. Miller** - *The Pennsylvania State University*

Additive Manufacturing Methodology for Agricultural Machinery Spare Part Production

Student Poster Presentation: IDETC2023-118161

Matthew Bowen - *University of Georgia*

Laser Cutters for Rapid PneuNet Generation

Student Poster Presentation: IDETC2023-118194

Lauren Bertelsen - *University of Nebraska at Omaha*

Toward Swarm Manufacturing: Developing a Multi-Robot Cooperative Framework for Complex Manufacturing Tasks

Student Poster Presentation: IDETC2023-118195

Ronnie Frank Pires Stone - *The University of Texas at Austin*

Physics-Informed Deep Learning for Chemical Source Localization and Characterization

Student Poster Presentation: IDETC2023-118205

Forouzan Naderi - *University of Wisconsin-Milwaukee*

Development of a Convolutional Neural Networks-Based Transparent Plastic Bottle Defect Diagnosis Algorithm

Student Poster Presentation: IDETC2023-118213

Young Woon Choi - *Sungkyunkwan University,* **Du Ju Lee** - *Sungkyunkwan University,* **Jiho Lee** - *Purdue University,* **Byeong Kwon Kang** - *Sungkyunkwan University,* **Sang Won Lee** - *Sungkyunkwan University*

Development of Anomaly Detection Model for Tip Wear Fault Based on Autoencoder in Robotic Spot-Welding Process

Student Poster Presentation: IDETC2023-118219

Yongjae Jeon - *Sungkyunkwan University,* **Sang Won Lee** - *Sungkyunkwan University ,* **Jiho Lee** - *Purdue University,* **Inwoong Noh** - *Sungkyunkwan University*

Generation of Spatial Constraints for Artificially Generated Subassemblies

Student Poster Presentation: IDETC2023-118220

Cody Carroll - *University of Georgia*

Establishment of a Human-Ai Cognitive Interaction in Manufacturing Industry

Student Poster Presentation: IDETC2023-118228

Runu Das - *University of Georgia*

Surrogate Assisted User-Feedback Architectures for Optimizing Multilevel Coupled Design Problems

Student Poster Presentation: IDETC2023-117686

Cole Jetton - *Oregon State University*

Effects of Geometry on Human Perceived Softness in Extended Reality

Student Poster Presentation: IDETC2023-117691

Yalda Ghasemi - *University of Illinois at Chicago ,* **Jida Huang** - *University of Illinois at Chicago*

Mitigating the Effects of Source-Dependent Bias and Noise on Multi-Source Bayesian Optimization

Student Poster Presentation: IDETC2023-117719

Zahra Zanjani Foumani - *University of California, Irvine ,* **Amin Yousefpour** - *University of California, Irvine ,* **Mehdi Shishehbor** - *University of California, Irvine ,* **Ramin Bostanabad** - *University of California, Irvine*

An Integrated Holistic Approach Toward Sustainable Product Design Using Life Cycle Assessment

Student Poster Presentation: IDETC2023-117745

Hossein Basereh Taramsari - *Stevens Institute of Technology*

LCAD: A Framework for Coupling Computer-Aided Design and Life Cycle Analysis Visualizations

Student Poster Presentation: IDETC2023-117910

Teodor Vernica - *Aarhus Universitet*

Development of a Digital Twin Framework for Real-Time Ded Process Monitoring and Control Based on Kafka

Student Poster Presentation: IDETC2023-117959

Yongho Lee - *Sungkyunkwan University* , **Young Woon Choi** - *Sungkyunkwan University,* **Hyewon Shin** - *Sungkyunkwan University,* **Junsoo Ahn** - *Sungkyunkwan University,* **Sang Won Lee** - *Sungkyunkwan University*

Knowledge Gap Identification for Visual Question Answering Datasets

Student Poster Presentation: IDETC2023-118019

Sarikaa Sridhar - *The Ohio State University*

Modeling the Dynamics of Customer Demand to Determine the Optimal Time to Release Product Updates: A Cognitive Approach

Student Poster Presentation: IDETC2023-118133

Ian Walter - *Purdue University,* **Philip E. Paré** - *Purdue University,* **Jitesh H. Panchal** - *Purdue University*

TUESDAY, AUGUST 22, 2023

DTM-06-01: APPLICATION OF DESIGN IN ROBOTICS
8:10AM–9:10AM   **SCOLLAY (LOBBY LEVEL)**

Chair: **Rahul Sharan Renu** - *Francis Marion University*
Co-Chair: **Rohan Prabhu** - *Lafayette College*
Co-Chair: **Youyi Bi** - *Shanghai Jiao Tong University*

Design Transformation Cards for Reconfigurable Robotics: Case Study of an Expandable Robot for Cleaning Tasks

Technical Paper Publication: IDETC2023-116679

Manivannan Kalimuthu - *Singapore University of Technology and Design* , **Abdullah Aamir Hayat** - *Singapore University of Technology and Design* , **Thejus Pathmakumar** - *Singapore University of Technology and Design,* **Prabakaran Veerajagadheswar** - *Singapore University of Technology and Design* , **Mohan Rajesh Elara** - *Singapore University of Technology and Design,* **Kristin Lee Wood** - *University of Colorado Denver*

The Impact of Robotics Expertise on Iterative Robot Design Decisions and Vulnerability to Anchoring Bias

Technical Paper Publication: IDETC2023-116874

Cristina Wilson - *Oregon State University* , **Kallahan Brown** - *Temple University* , **Cynthia Sung** - *University of Pennsylvania*

Transforming Spherical Robots

Technical Paper Publication: IDETC2023-116589

Jun Hua Ong - *Singapore University of Technology and Design* , **Abdullah Aamir Hayat** - *Singapore University of Technology and Design,* **Manivannan KaliMuthu** , **Rajesh Elara** - *Singapore University of Technology and Design* , **Kristin Lee Wood** - *University of Colorado Denver*

Design of a Biologically Inspired Active Visual Communication Strategy for Robotic Applications

Technical Paper Publication: IDETC2023-117141

Bryan Cochran - *Georgia Institute of Technology* , **Bert Bras** - *Georgia Institute of Technology*

PTG-05-01: GEAR MANUFACTURING
8:10AM–9:10AM   **CAMBRIDGE (4TH FL)**

Chair: **Qi Fan** - *Gleason*
Co-Chair: **David Talbot** - *The Ohio State University*
Co-Chair: **Michael Handschuh** - *The Ohio State University*

Investigation of Isotropic Superfinishing Effects on Ground Hypoid Gears

Technical Paper Publication: IDETC2023-111023

Hai Xu - *General Motors,* **Jeff Heaton** - *General Motors*

Non-Contact Measurement of Spiral Bevel Gears Using the Laser Profiler on the Five-Axis Machine

Technical Paper Publication: IDETC2023-112006

Yi-Pei Shih - *Taiwan University of Science and Technology,* **Bor-Tyng Sheen** - *National Taiwan University of Science and Technology* , **Wun-Kai Wu** - *National Taiwan University of Science and Technology* , **Bo-Lin Wei** - *National Taiwan University of Science and Technology*

Quality and Error Tendencies of Gears Printed by Stereolithography Three-Dimensional Printer

Technical Paper Publication: IDETC2023-116460

Kaiwen Duan - *Waseda University,* **Keisuke Osawa** - *Waseda University* , **Eiichiro Tanaka** - *Waseda University*

MR-2-2: THEORETICAL AND COMPUTATIONAL KINEMATICS (A.T. YANG SYMPOSIUM)
8:10AM–9:10AM   **STUDIO 2 (LOBBY LEVEL)**

Chair: **Anurag Purwar** - *Stony Brook University*
Co-Chair: **Jeff Ge** - *Stony Brook University*

Complete Solutions for the Approximate Synthesis of Spherical Four-Bar Function Generators

Technical Paper Publication: IDETC2023-116895

Sam O'Connor - *University of Notre Dame* , **Mark Plecnik** - *University of Notre Dame* , **Aravind Baskar** - *University of Notre Dame* , **James Joo** - *Wright-Patterson Air Force Base*

On the Construction of Confidence Regions for Uncertain Planar Displacements

Technical Paper Publication: IDETC2023-117185

Zihan Yu - *Stony Brook University,* **Qiaode Jeffrey Ge** - *Stony Brook University ,* **Mark Langer** - *Indiana University,* **Mona Arbab** - *UT Southwestern Medical Center*

A Unified Design Equation to Represent Geometric Constraints of Spatial Ss, Es, and Se Dyads

Technical Paper Publication: IDETC2023-117282

Xueting Deng - *Stony Brook University ,* **Anurag Purwar** - *Suny Stony Brook ,* **Qiaode Ge** - *Stony Brook University*

MR-8-2: SOFT AND CONTINUUM MECHANISMS
8:10AM–9:10A   - STUDIO 1 (LOBBY LEVEL)

Chair: Vishesh Vikas - *University of Alabama*
Co-Chair: Girish Krishnan - *University of Illinois at Urbana-Champaign*

Fully Soft Deployable Structures via Kirigami Cuts and Active Learning

Technical Presentation: IDETC2023-118068

Leixin Ma - *University of California, Los Angeles,* **Mrunmayi Mungekar** - *University of California, Los Angeles ,* Vwani Roychowdhury - *University of California, Los Angeles ,* **Mohammad Khalid Jawed** - *University of California, Los Angeles*

Symmetric Kinetostatic Behavior From Asymmetric Spatially Curved Beams

Technical Presentation: IDETC2023-117845

Ali Amoozandeh Nobaveh - *Delft University of Technology ,* **Giuseppe Radaelli** - *Delft University of Technology,* **Just Herder** - *Delft University of Technology*

Topology Design and Optimization of Modular Soft Robots (MSoRos) Capable of Homogenous and Heterogenous Reconfiguration

Technical Presentation: IDETC2023-117980

Vishesh Vikas - *NA,* **Justin Conzola** - *The University of Alabama,* **Caitlin Freeman** - *The University of Alabama*

MR-7-3: NOVEL MECHANISMS, ROBOTS, AND APPLICATIONS
8:10AM–9:10AM   THE LOFT (LOBBY LEVEL)

Chair: Carl Nelson – *University of Nebraska-Lincoln*
Co-Chair: Matthew Marshall - *Kennesaw State University*

Design of Detachable Winch System for Field-Deployable Cable Driven Parallel Robot

Technical Paper Publication: IDETC2023-110562

Arely Flores Guevara - *Kennesaw State University ,* **Matthew Marshall** - *Kennesaw State University*

A New 3-DOF 2T1R Parallel Mechanism: Topology Design and Kinematics

Technical Paper Publication: IDETC2023-114943

Shen Huipijng - *Changzhou University ,* **Zhongqiu Du** - *Changzhou University ,* **Damien Chablat** - *CNRS Nantes - LS2N ,* **Ju Li** - *Changzhou University,* **Guanglei Wu** - *Dalian University of Technology*

A Variable-Stiffness Link for Safe Robot Interactions

Technical Paper Publication: IDETC2023-114980

Carl Nelson - *University of Nebraska-Lincoln ,* **Nick Swerczek** - *University of Nebraska-Lincoln ,* **Amber Tannehill** - *University of Nebraska-Lincoln*

DAC-06-02: DESIGN AND OPTIMIZATION OF ENERGY SYSTEMS
8:10AM–9:10AM   HANCOCK (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Jie Zhang - *The University of Texas at Dallas*
Co-Chair: Ali Mehmani - *Prescriptive Data Inc.*

System Level Techno-Economic and Environmental Design Optimization for Ocean Wave Energy

Technical Paper Publication: IDETC2023-114607

Rebecca McCabe - *Cornell University ,* **Madison Dietrich** - *Cornell University,* **Alan Liu** - *Cornell University,* **Maha Haji** - *Cornell University*

Multiphysics-Informed Machine Learning for Battery Design and Health Monitoring

Technical Paper Publication: IDETC2023-117113

Parth Bansal - *University of Illinois,* Yumeng Li - *University of Illinois at Urbana-Champaign*

Modeling a Concentrated Solar Thermal Energy: Convection-Enhanced Evaporation System for Small-Scale Brine Management

Technical Paper Publication: IDETC2023-117236

Nallely Guillen Rodriguez - *University of Minnesota ,* Mustafa F. Kaddoura - *University of Minnesota ,* Natasha C. Wright - *University of Minnesota*

DAC-07-02: DESIGN FOR ADDITIVE MANUFACTURING
8:10AM–9:10AM   STATLER (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Nicholas Meisel - *The Pennsylvania State University*
Co-Chair: Joshua Hamel - *Seattle University*

Topology Optimization in Consideration of Overhang Constraint for Additive Manufacturing Based on Coupled Fictitious Physical Model in Thermal Design Problem

Technical Paper Publication: IDETC2023-112499

Mikihiro Tajima - *The University of Tokyo ,* Takayuki Yamada - *The University of Tokyo*

Application of a Continuous Variable Density Infill: Manipulating Center of Gravity

Technical Paper Publication: IDETC2023-116644

Patrick Murphy - *University of Maine ,* Bashir Khoda - *University of Maine*

3D Convolutional Neural Network Based Automatic Feature Detection Process for Design Guidelines of Additive Manufacturing

Technical Presentation: IDETC2023-118107

Kijung Park - *Incheon National University ,* Kyudong Kim - *Incheon National University*

DAC-15-02: MULTIDISCIPLINARY DESIGN OPTIMIZATION, MULTIOBJECTIVE OPTIMIZATION, AND SENSITIVITY ANALYSIS
8:10AM–9:10AM   ARLINGTON (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Hongyi Xu - *University of Connecticut*
Co-Chair: Mian Li - *Shanghai Jiao Tong University*
Co-Chair: Shikui Chen - *Stony Brook University*

Topology Optimization of Rarefied Gas Devices With Discrete Velocity Method

Technical Paper Publication: IDETC2023-111436

Kaiwen Guan - *The University of Tokyo ,* Kei Matsushima - *The University of Tokyo,* Takayuki Yamada - *The University of Tokyo*

Optimization of 3D Printing While Traveling en Route to Extend Range of UAS for Multi-Location Mission Scenarios

Technical Paper Publication: IDETC2023-116618

Tevin Dickerson - *Brigham Young University ,* John Salmon - *Brigham Young University ,* Christopher Mattson - *Brigham Young University*

Inverse Design of Foldable Hinge Structure Using Multi-Fidelity DNN and Generative Models

Technical Presentation: IDETC2023-117889

Donghyeon Lee - *Seoul National University ,* Do-Nyun Kim - *Seoul National University*

CIE-01-03: AMS GENERAL
8:10AM–9:10AM   CLARENDON (MEZZ)

Co-Chair: Seung-Kyum Choi - *Georgia Institute of Technology*
Co-Chair: Massimo Cavacece - *University of Cassino and Southern Lazio*

A Scalable Multi-Objective Bayesian Optimization and Its Application to Biodegradable Scaffold Design

Technical Presentation: IDETC2023-109193

Jesse Sestito - *Valparaiso University ,* Bethany Luke - *Valparaiso University*

Analysis and Structural Optimization of Large Five-Axis Machine Tools

Technical Presentation: IDETC2023-115145

Tzu-Chi Chan - *National Formosa University* , **Xian-You Shao** - *National Formosa University* , **Bedanta Roy** - *National Formosa University,* **Chien-Wen Chen** - *Yong Ju Precision Technology Co., Ltd.* , **Chia-Wei Chen** - *Yong Ju Precision Technology Co., Ltd.*

Using Simulation to Design MPC Policies for GPS-Based Field Navigation

Technical Presentation: IDETC2023-117988

Harry Zhang - *University of Wisconsin-Madison* , **Stefan Caldararu** - *University of Wisconsin-Madison* , **Ishaan Mahajan** - *University of Wisconsin Madison*

Shouvik Chatterjee - University of Wisconsin-Madison

Thomas Hansen - *University of Wisconsin-Madison* , **Abhiraj Dashora** - *University of Wisconsin-Madison* , **Sriram Ashokkumar** - *University of Wisconsin-Madison* , **Luning Fang** - *University of Wisconsin-Madison* , **Xiangru Xu** - *University of Wisconsin-Madison,* **Dan Negrut** - *University of Wisconsin-Madison*

Multi-Input Multi-Output Vibration Model for Vehicle Excited by Ride Test

Technical Paper Publication: IDETC2023-117114

Massimo Cavacece - *University of Cassino and Southern Lazio* , **Giorgio Figliolini** - *University of Cassino and Southern Lazio* , **Chiara Lanni** - *University of Cassino and Southern Lazio*

CIE-07-03: CAPPD GENERAL
8:10AM–9:10AM   BERKELEY (MEZZ)

Chair: Beshoy Morkos - *University of Georgia*
Co-Chair: Satchit Ramnath - *The Ohio State University*

Collecting Product Design Data: Examining the Applicability of Utilizing Gaze Data to Obtain Customer Feedback on Product Designs

Technical Paper Publication: IDETC2023-117130

George Vrampas - *Florida Institute of Technology* , **Corey Kado** - *Florida Polytechnic University* , **Xiaoou Yang** - *University of Georgia,* **Elisabeth Kames** - *Florida Polytechnic University* , **Beshoy Morkos** - *University of Georgia*

Mesh Alignment in a Two-Dimensional Irregular Boundary Using Genetic Algorithm

Technical Presentation: IDETC2023-116673

Taeyong Kim - *Quarra Stone Company*

Image Segmentation With Human-in-the-Loop in Automated De-Caking Process for Powder Bed Additive Manufacturing

Technical Paper Publication: IDETC2023-115282

Vincent Asare-Manu - *The University of Texas Rio Grande Valley* , **Sachithra Karunathilake** - *The University of Texas Rio Grande Valley* , **Zhaohui Geng** - *The University of Texas Rio Grande Valley*

Gaze-Based Augmented Reality Interfaces for Micro- and Macro-Scale Tasks

Technical Paper Publication: IDETC2023-116758

Christina Petlowany - *The University of Texas at Austin* , **Mitch Pryor** - *The University of Texas at Austin*

CIE-13: SEIKM DESIGN INFORMATICS
8:10AM–9:10AM   GEORGIAN (MEZZ)

Chair: Zhenghui Sha - *The University of Texas at Austin*
Co-Chair: Jiarui Xie - *McGill University*

Fairness- and Uncertainty-Aware Data Generation for Data-Driven Design

Technical Paper Publication: IDETC2023-114687

Jiarui Xie - *McGill University* , **Chonghui Zhang** - *McGill University* , **Lijun Sun** - *McGill University* , **Yaoyao Zhao** - *McGill University*

CAD Challenges App: An Informatics Framework for Parametric Modeling Practice and Research Data Collection in Computer-Aided Design

Technical Paper Publication: IDETC2023-114927

Yuanzhe Deng - *University of Toronto* , **Matthew Mueller** - *PTC Inc.,* **Matthew Shields** - *PTC Education*

A Conceptual Design of Natural Gas Downhole Drilling and Production Equipment on RFKD Model

Technical Paper Publication: IDETC2023-116352

Yiwei Jiang - *Sichuan University* , **Wu Zhao** - *Sichuan University* , **Xin Guo** - *Sichuan University* , **Kai Zhang** - *Sichuan University* , **Miao Yu** - *Sichuan University* , **Huicong Hu** - *Shantou University*

Neurocognition of New Ideas During Engineering Design

Technical Paper Publication: IDETC2023-117127

Emma Walker - *Virginia Polytechnic Institute and State University* , **Tripp Shealy** - *Virginia Polytechnic Institute and State University* , **John Gero** - *The University of North Carolina at Charlotte*

DTM-07-01: DESIGN AND SOCIETY
9:20AM—10:40AM   SCOLLAY (LOBBY LEVEL)

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Apurva Patel - *The University of Texas at Dallas*
Co-Chair: Vimal Viswanathan - *San Jose State University*

A Product Life Cycle Approach to Medical Device Development for Low-Resource Settings: A Systematic Literature Review

Technical Paper Publication: IDETC2023-109064

Milena Overhoff - *ETH Zurich* , **Thomas S. Lumpe** - *ETH Zurich* , **Kristina Shea** - *ETH Zurich*

Thinking Beyond the Default User: The Impact of Gender and Stereotypes on Designers' Interpretation of Users and Their Needs

Technical Paper Publication: IDETC2023-110403

Anastasia Schauer - *Georgia Institute of Technology* , **Margaret Nunn** - *University of Wisconsin-Madison* , **Hunter Schaufel** - *Georgia Institute of Technology* , **Katherine Fu** - *University of Wisconsin-Madison*

Gender-Based Social Revolutions and Their Effect on Technology Evolution

Technical Paper Publication: IDETC2023-114613

Samantha Kang - *Oregon State University* , **Andy Dong** - *Oregon State University*

Simulating the Adoption and Social Impact of Improved Cookstoves in Uganda Using Agent-Based Modeling and Neural Networks

Technical Paper Publication: IDETC2023-110911

Christopher Mabey - *Brigham Young University,* **Erin Peiffer** - *American Society of Mechanical Engineers* , **Nordica Maccarty** - *Oregon State University* , **Christopher Mattson** - *Brigham Young University*

A Functional Perspective on the Emergence of Dominant Designs

Technical Paper Publication: IDETC2023-116868

Myles Robinson - *Oregon State University* , **Bailey Taube-Adams** - *Oregon State University* , **Samantha Kang** - *Oregon State University* , **Andy Dong** - *Oregon State University*

DEC-04: DEMOS AND PRESENTATION ONLY
9:20AM—10:40AM   FRANKLIN (4TH FL)

Chair: Elizabeth Starkey - *The Pennsylvania State University*
Co-Chair: Nicholas Meisel - *The Pennsylvania State University*

Using Generative AI Tools to Facilitate Self-Learning of Hands-on Stem Learning for Artists and Designers

Technical Presentation: IDETC2023-117147

Prem Sagar - *Massachusetts Institute of Technology*

Research Based and Design Based Education: Applications of Experiences in India, UK, and USA

Technical Presentation: IDETC2023-118103

Jyoti Prakash Naidu - *JK Lakshmipat University and Smile SleepLabs Inc.,* **Rajlakshmi Nayak** - *JK Lakshmipat University,* **Tim Haats** - *Carleton University,* **Jaya Gupta** - *JK Lakshmipat University* , **Siddhartan Govindasamy** - *Boston College*

The Influence of Design Project Representation on Student Learning: A Neurocognitive Analysis

Student Poster Presentation: IDETC2023-118137

Corey Kado - *Florida Polytechnic University* , **Elisabeth Kames** - *Florida Polytechnic University*

Student's Decision Matrix Method: A Pugh's Method for Novice Engineering Students

Technical Presentation: IDETC2023-116811

Jose Lugo - *University of Puerto Rico*

PTG-01-01: GEAR GEOMETRY
9:20AM–10:40AM   **CAMBRIDGE (4TH FL)**

Chair: Alfonso Fuentes Aznar - *Rochester Institute of Technology*
Co-Chair: David Talbot - *The Ohio State University*
Co-Chair: Isaac Hong - *The Ohio State University*

Finite Element Contact Analysis and Redesign of Rotorcraft Planetary Gear Sets With Asymmetric Profiles

Technical Paper Publication: IDETC2023-116519

Karthikeyan Marambedu - *Advanced Numerical Solutions LLC* , **Michael Hurrell** - *NASA Glenn Research Center,* **Sandeep Vijayakar** - *Advanced Numerical Solutions. LLC* , **Timothy Krantz** - *NASA Glenn Research Center,* **Mark Valco** - *NASA Glenn Research Center*

Flank Modification Based on the Predetermined Contact Characteristics for Spiral Bevel and Hypoid Gears

Technical Paper Publication: IDETC2023-114168

Yi-Hui Lee - *National United University,* **Kuan-Hung Chen** - *National Chung Cheng University* , **Zhang-Hua Fong** - *National Chung Cheng University*

Multi Degree of Freedom Load Distribution Modelling of Cross-Axis Gearing

Technical Paper Publication: IDETC2023-116661

Nishank Amin - *The Ohio State University* , **David` Talbot** - *The Ohio State University*

Using Modified Tilt and Swivel Motions for Higher-Degree Flank Modifications of Spiral Bevel Gears

Technical Presentation: IDETC2023-117905

Eugeniu Grabovic - *University of Pisa* , **Alessio Artoni** - *Università di Pisa,* **Marco Gabiccini** - *Università di Pisa*

MSNDC-11/VIB-12-02: DYNAMICS AND CONTROL OF SMART STRUCTURES AND SYSTEMS
9:20AM–10:40AM   **WHITTIER (4TH FL)**

Chair: Kai Zhou - *Michigan Technological University*
Co-Chair: Andrea Arena - *Sapienza University of Rome*
Co-Chair: Francesco Danzi - *University of California, Merced*
Co-Chair: Sichen Yuan - *Lawrence Technological University*

Initiating Giant Deformations in Dielectric Elastomer Membranes Using Voltage Pulses

Technical Presentation: IDETC2023-117997

Christopher Cooley - *Oakland University* , **Robert Lowe** - *University of Dayton*

Active Vibration Control on a Spoked Structure With Evolving Dynamics Using Sliding Mode Control and Piezoelectric Transducers: Modeling and Experimental Investigations

Technical Presentation: IDETC2023-117915

Antoine Carvalho - *LaMCoS* , **Jonathan Rodriguez** - *LaMCoS,* **François Lohr** - *Manufacture Française des Pneumatiques Michelin* , **Simon Chesne** - *LaMCoS*

Multi-Body Modeling for Conceptual Design of Co-Located Ocean Renewable Energy and Aquaculture Systems

Technical Presentation: IDETC2023-117954

Yong Hoon Lee - *University of Memphis* , **Yue Guan** - *University of Memphis*

VIB-10/MSNDC-06-01: MACHINE LEARNING APPLICATIONS IN VIBRATIONS AND DYNAMICS
9:20AM–10:40AM   **STUART (4TH FL)**

Chair: David Najera-Flores - *Sandia National Laboratories*
Co-Chair: Anthony Garland - *Sandia National Laboratories*
Co-Chair: Jozsef Kovecses - *McGill University*

Semi-Supervised Autoencoder With Joint Loss Learning for Bearing Fault Detection

Technical Paper Publication: IDETC2023-112654

Kai Zhou - *Michigan Technological University* , **Yang Zhang** - *University of Connecticut,* **Jiong Tang** - *University of Connecticut*

Design of a Data Fusion and Deep Transfer Learning Test Rig for Roller Bearings Diagnosis and Prognosis

Technical Paper Publication: IDETC2023-117264

Mert Sehri - *University of Ottawa* , **Patrick Dumond** - *University of Ottawa,* **Michel Bouchard** - *General Bearing Service Inc.*

An Order Reduction Framework for Structural Systems With Isolated Nonlinearities

Technical Presentation: IDETC2023-118130

D. Dane Quinn - *The University of Akron* , **David Najera-Flores** - *Sandia National Laboratories* , **Anthony Garland** - *Sandia National Laboratories* , **Vlachas Konstantinos** - *ETH Zurich,* **Eleni Chatzi** - *ETH Zurich,* **Michael Todd** - *University of California, San Diego*

Overview of Design Considerations for Data-Driven Time Stepping Schemes Applied to Non-Linear Mechanical Systems

Technical Paper Publication: IDETC2023-112087

Tomas Slimak - *Technical University of Munich* , **Andreas Zwoelfer** - *Technical University of Munich* , **Bojidar Todorov** - *Technical University of Munich* , **Daniel Rixen** - *Technical University of Munich*

MESA-13 / MESA-14
9:20AM–10:40AM BACK BAY (4TH FL)

Chair: Matteo C. Palpacelli - *Polytechnic University of Marche*
Co-Chair: Adriano Mancini - *Polytechnic University of Marche*
Co-Chair: Primo Zingaretti - *Polytechnic University of Marche*

Design and Tracking Control of a Large-Range Reluctance-Actuated Compliant Nano-Manipulator

Technical Paper Publication: IDETC2023-116451

Xuexuan Li - *Tsinghua University,* **Yijie Liu** - *Tsinghua University,* **Zhen Zhang** - *Tsinghua University*

Dynamic Modeling of a Piezo-Driven Fast Tool Servo System With Coupling of Cutting Load

Technical Paper Publication: IDETC2023-117288

Yue Zhang - *Qilu University of Technology (Shandong Academy of Sciences)* , **Pengbo Liu** - *Qilu University of Technology (Shandong Academy of Sciences)* , **Jiashuai Guo** - *Qilu University of Technology (Shandong Academy of Sciences)* , **Shuaishuai Lu** - *Qilu University of Technology (Shandong Academy of Sciences)*

An Electrostatically Actuated Mems Microgripper With an Integrated Displacement Sensor

Technical Presentation: IDETC2023-118247

Yousef Algoos - *King Abdullah University of Science and Technology,* **Mohammad Younis** - *State University of New York at Binghamton* , **Wagner B. Lenz** - *King Abdullah University of Science and Technology,* **Fahimullah Khan** - *King Abdullah University of Science and Technology,* **Carlos Grande** - *King Abdullah University of Science and Technology,* **Eric Feron** - *King Abdullah University of Science and Technology*

Performance Assessment of Fractional-Order Control of a Non-Minimum Phase Power Converter Systems

Technical Paper Publication: IDETC2023-116336

Justus Nwoke - *University of California Merced* , **Jairo Viola** - *University of California Merced* , **Yangquan Chen** - *University of California Merced*

DAC-02-01: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FOR CHALLENGING REAL-WORLD PROBLEMS IN DESIGN AUTOMATION
9:20AM–10:40AM ARLINGTON (MEZZ)

Chair: Payam Ghassemi - *Caterpillar Inc.*
Co-Chair: Chao Hu - *Iowa State University*

Automating Style Analysis and Visualization With Explainable AI: Case Studies on Brand Recognition

Technical Paper Publication: IDETC2023-115150

Yu-Hsuan Chen - *Carnegie Mellon University* , **Levant Burak Kara** - *Carnegie Mellon University* , **Jonathan Cagan** - *Carnegie Mellon University*

Characterizing Designs via Isometric Embeddings: Applications to Airfoil Inverse Design

Technical Paper Publication: IDETC2023-116743

Qiuyi Chen - *University of Maryland, College Park* , **Mark Fuge** - *University of Maryland, College Park*

MaterIQ: An Artificial Intelligence Framework for Design Automation of Complex Materials System

Technical Presentation: IDETC2023-118162

Phong Nguyen - *University of Virginia,* **H.S. Udaykumar** - *University of Iowa* , **Stephen Baek** - *University of Virginia*

Data-Driven Inverse Aerodynamic Design of Compressor Blading

Technical Presentation: IDETC2023-117958

Can Unlusoy - *McGill University* , Michael Kokkolaras - *McGill University*

DAC-11-01: DESIGN OF ENGINEERING MATERIALS AND STRUCTURES
9:20AM–10:40AM   HANCOCK (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Yuqing Zhou - *Toyota Research Institute of North America*
Co-Chair: Xingchen Liu - *University of California, Berkeley*

Mixed-Variable Global Sensitivity Analysis With Applications to Data-Driven Combinatorial Materials Design

Technical Paper Publication: IDETC2023-110756

Yigitcan Comlek - *Northwestern University* , Liwei Wang - *Northwestern University*, Wei Chen - *Northwestern University*

Mitigating the Effects of Source-Dependent Bias and Noise on Multi-Source Bayesian Optimization: Application to Materials Design

Technical Paper Publication: IDETC2023-114414

Zahra Zanjani Foumani - *University of California Irvine* , Amin Yousefpour - *University of California Irvine* , Mehdi Shishehbor - *University of California Irvine* , Ramin Bostanabad - *University of California Irvine*

An Improved Shape Annealing Algorithm for the Generation of Coated DNA Origami Nanostructures

Technical Paper Publication: IDETC2023-113633

Bolutito Babatunde - *Carnegie Mellon University* , Jonathan Cagan - *Carnegie Mellon University* , Rebecca Taylor - *Carnegie Mellon University*

Tackling an Exact Maximum Stress Minimization Problem With Gradient-Free Topology Optimization Incorporating a Deep Generative Model

Technical Paper Publication: IDETC2023-111265

Misato Kato - *Osaka University* , Taisei Kii - *Osaka University* , Kentaro Yaji - *Osaka University* , Kikuo Fujita - *Osaka University*

MSNDC-03/VIB-06-02: CONTACT DYNAMICS AND JOINTED STRUCTURES
9:20AM–10:40AM   WHITE HILL (4TH FL)

Chair: Akira Saito - *Meiji University*
Co-Chair: Marco Morandini - *Politecnico di Milano*

Bearing Friction Measurement With a Pendulum

Technical Presentation: IDETC2023-117979

Péter Máté - *Budapest University of Technology and Economics* , András Szekrényes - *Budapest University of Technology and Economics*

A Comprehensive Dynamic Continuous Impact Model With Plastic Deformation

Technical Paper Publication: IDETC2023-116358

Hamed Mozaffari - *Southern Illinois University Edwardsville* , Arman Dabiri - *Southern Illinois University Edwardsville*

High-Fidelity Nonlinear Forced Response Analysis of Aero-Engine Turbine Blades With Root Friction Contact

Technical Paper Publication: IDETC2023-117474

Aykut Tamer - *University of Bath*, Christoph Schwingshackl - *Imperial College London* , Adrian Jones - *Rolls-Royce plc*

Measuring Quasistatic Strain Fields in Loaded Elastomeric Rollers Using Digital Image Correlation

Technical Presentation: IDETC2023- 117774

Nehemiah Mork - *Georgia Institute of Technology* , Antonia Antoniou - *Georgia Institute of Technology* , Michael Leamy - *Georgia Institute of Technology*

VIB-05/MNS-01/MSNDC-13-03: NONLINEAR DYNAMICS AND VIBRATIONS OF MEMS AND NEMS
9:20AM–10:40AM   **TREMONT (4TH FL)**

Chair: **Dumitru Caruntu** - *The University of Texas Rio Grande Valley*
Co-Chair: **Najib Kacem** - *FEMTO-ST Institute*
Co-Chair: **Valentina Zega** - *Politecnico di Milano*
Co-Chair: **Jian Zhao** - *Dalian University of Technology*
Co-Chair: **Lior Medina** - *Tel Aviv University*

Amplitude-Voltage Response of Parametric Resonance of Electrostatically Actuated Circular Membranes

Technical Paper Publication: IDETC2023-114995

Marcos Alipi - *The University of Texas Rio Grande Valley* , **Dumitru Caruntu** - *The University of Texas Rio Grande Valley*

The Dynamics of a System of N Coupled Mems-Colpitts Oscillators

Technical Paper Publication: IDETC2023-116557

Shaghayegh Rahimpour - *University of Pittsburgh* , **Nikhil Bajaj** - *University of Pittsburgh,* **Shreyas Y. Shah** - *Purdue University* , **Conor Pyles** - *Purdue University* , **Dana Weinstein** - *Purdue University* , **Jeffrey F. Rhoads** - *Purdue University,* **D. Dane Quinn** - *University of Akron*

Nonparametric Identification of a Mems Resonator Actuated by Electrostatic Levitation Forces

Technical Presentation: IDETC2023-118077

Mohammed Abdel Razzaq - *State University of New York at Binghamton* , **Rodrigo T. Rocha** - *Silicon Austria Labs,* **Shahrzad Towfighian** - *State University of New York at Binghamton* , **Sami F. Masri** - *University of Southern California,* **Mohammad I. Younis** - *State University of New York at Binghamton*

Liquid Density Measurement Using a Microchannel Stainless Cantilever

Technical Presentation: IDETC2023-118078

Takumi Nakamura - *University of Tsukuba* , **Hiroshi Yabuno** - *University of Tsukuba,* **Yasuyuki Yamamoto** - *National Institute of Advanced Industrial Science and Technology* , **Sohei Matsumoto** - *National Institute of Advanced Industrial Science and Technology*

DAC-12-01: ENGINEERING FOR GLOBAL DEVELOPMENT
9:20AM–10:40AM   **STATLER (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Natasha Wright** - *University of Minnesota Twin Cities*
Co-Chair: **Nordica MacCarty** - *Oregon State University*

Advise: AI-Accelerated Design of Evidence Synthesis for Global Development

Technical Paper Publication: IDETC2023-116962

Kristen Edwards - *Massachusetts Institute of Technology* , **Binyang Song** - *Massachusetts Institute of Technology* , **Jaron Porciello** - *University of Notre Dame,* **Mark Engelbert** - *International Initiative for Impact Evaluation* , **Carolyn Huang** - *International Initiative for Impact Evaluation* , **Faez Ahmed** - *Massachusetts Institute of Technology*

Design and Evaluation of an Automatic Scheduling-Manual Operation Tool to Bring Precision Irrigation to Resource-Constrained Farmers

Technical Paper Publication: IDETC2023-112470

Georgia D. Van de Zande - *Massachusetts Institute of Technology,* **Carolyn Sheline** - *Massachusetts Institute of Technology* , **Susan Amrose** - *Massachusetts Institute of Technology* , **Jeffery Costello** - *Massachusetts Institute of Technology* , **Aditya Ghodgaonkar** - *Massachusetts Institute of Technology* , **Fiona Grant** - *Massachusetts Institute of Technology,* **Amos G. Winter, V** - *Massachusetts Institute of Technology*

Fifty-Five Prompt Questions for Identifying Social Impacts of Engineered Products

Technical Paper Publication: IDETC2023-116725

Christopher Mattson - *Brigham Young University* , **Thomas Geilman** - *Brigham Young University* , **Joshua Cook-Wright** - *Brigham Young University* , **Christopher Mabey** - *Brigham Young University* , **Eric Dahlin** - *Brigham Young University,* **John Salmon** - *Brigham Young University*

Design Interviews Conducted by Intra- and Intercultural Teams: A Case Study on Dialysis in Zimbabwe

Technical Paper Publication: IDETC2023- 116953

Micki Grover - *University of Minnesota* , **Carlye Lauff** - *University of Minnesota* , **Chiratidzo Ndhlovu** - *University of Zimbabwe* , **Natasha Wright** - *University of Minnesota*

Technical Sessions - Tuesday August 22

CIE-07-01: CAPPD GENERAL
9:20AM–10:40AM   **BERKELEY (MEZZ)**

Chair: Anand Balu Nellippallil - *Florida Institute of Technology*
Co-Chair: *Jida Huang - University of Illinois*

Application of Munich Agile Concept for MBSE Based Development of Automated Guided Vehicles Based on Digital Twin-Data

Technical Paper Publication: IDETC2023-110983

Vahid Salehi - *University of Applied Sciences Munich*

Selection of Inverse Kinematics Solution Type for Cooperative Robots and Singularity Avoidance Based on Reinforcement Learning

Technical Paper Publication: IDETC2023-114868

Daiki Kato - *Doshisha University ,* **Naoki Maeda** - *Doshisha University ,* **Ayumu Takeuchi** - *Doshisha University,* **Masataka Sekioka** - *Doshisha University ,* **Toshiki Hirogaki** - *Doshisha University ,* **Eiichi Aoyama** - *Doshisha University*

Projected Barycentric Densities for Multi-Material Topology Optimization Using Shape Function With Penalization Approach

Technical Paper Publication: IDETC2023-115128

Nikhil Singh - *Indian Institute of Technology Kanpur,* **Anupam Saxena** - *Indian Institute of Technology Kanpur*

Optimal Design and Process Planning for Product Adaptation With Initial Evaluation of Solutions Based on Information Entropy

Technical Paper Publication: IDETC2023-116347

Mohammed Saad - *University of Calgary ,* **Deyi Xue** - *University of Calgary*

Parameter Extraction From Images Using Multilabel Supervised Learning

Technical Paper Publication: IDETC2023-116501

Jessica Ezemba - *Carnegie Mellon University ,* **James Cunningham** - *Carnegie Mellon University ,* **Conrad Tucker** - *Carnegie Mellon University*

CIE-21: AMS/CAPPD JOINT TOPICS
9:20AM–10:40AM   **GEORGIAN (MEZZ)**

Chair: James Yang - *Texas Tech University*
Co-Chair: Yujiang Xiang - *Oklahoma State University*

Subject-Specific Musculoskeletal Modeling of Adolescent Scoliosis Patients: A Pilot Study

Technical Paper Publication: IDETC2023-112424

Juan Baus - *Texas Tech University ,* **Zhiqing Cheng** - *Innovision LLC ,* **James Yang** - *Texas Tech University*

State-Space Characterization of Human Balance Through a Reinforcement Learning Based Muscle Controller

Technical Paper Publication: IDETC2023-114841

Kubra Akbas - *New Jersey Institute of Technology ,* **Xianlian Zhou** - *New Jersey Institute of Technology*

Optimal Control of Spine and Shoulder Powered Exoskeletons for Squat Lifting

Technical Paper Publication: IDETC2023-114984

Asif Arefeen - *Oklahoma State University ,* **Yujiang Xiang** - *Oklahoma State University*

Design and Control of a Bio-Inspired Inchworm Robot Using a Novel Helical Artificial Muscle Actuator

Technical Paper Publication: IDETC2023-115207

Joel Quarnstrom - *Oklahoma State University ,* **Yujiang Xiang** - *Oklahoma State University*

Three-Dimensional Symmetric Tossing Motion Prediction: A Pilot Study

Technical Paper Publication: IDETC2023-117336

Seunghun Lee - *Texas Tech University ,* **James Yang** - *Texas Tech University*

CIE-22: AMS/SEIKM JOINT TOPICS
9:20AM–10:40AM　　　　　　　　　　CLARENDON (MEZZ)

Chair: **Ahn Tran** - *Sandia National Laboratories*
Co-Chair: **Sheng Yang** - *University of Guelph*
Chair **Hyunwoong Ko** - *Arizona State University*

Multimodal Sensor Fusion for Real-Time Location-Dependent Defect Detection in Laser-Directed Energy Deposition

Technical Paper Publication: IDETC2023-110284

Lequn Chen - *Advanced Remanufacturing and Technology Centre,* **Xiling Yao** - *Singapore Institute of Manufacturing Technology,* **Wenhe Feng** - *Advanced Remanufacturing and Technology Centre,* **Youxiang Chew** - *Advanced Remanufacturing and Technology Centre,* **Seung Ki Moon** - *Nanyang Technological University*

A Digital Twin Assisted Framework for Quality Assurance in Mould Manufacturing

Technical Paper Publication: IDETC2023-114848

Till Böttjer - *Aarhus University,* **Devarajan Ramanujan** - *Aarhus University*

A Heuristics Derivation Approach for the Digital Twin Designs

Technical Paper Publication: IDETC2023-115242

Maulik C. Kotecha - *Texas A&M University ,* **Daniel A. McAdams** - *Texas A&M University*

Digital Twin of Human-Robot Collaborative Inspection of Resistance Spot Welds in Automotive Body in White

Technical Paper Publication: IDETC2023-116425

Liz Lekarczyk - *Oakland University ,* **Ali Malik** - *Oakland University*

DFMLC-06-01: DESIGN OF PRODUCT-SERVICE AND ENERGY SYSTEMS
9:20AM–10:40AM　　　　　　　　　　PARK (LOBBY LEVEL)

Chair: **Paul Egan** - *Texas Tech University*
Co-Chair: **Amin Mirkouei** - *University of Idaho*
Co-Chair: **Abigail Clearke-Sather** - *University of Minnesota*

State of Health Estimation of Electric Vehicle Batteries Using Transformer-Based Neural Network

Technical Paper Publication: IDETC2023-116426

Yixin Zhao - *University of Florida ,* **Sara Behdad** - *University of Florida*

Theoretical Piezoelectric Energy Generation From Thoracic Expansion During Respiration for Smart Wearables

Technical Paper Publication: IDETC2023-116562

Sam Carlson - *University of Minnesota Duluth ,* **Angela K. Martini** - *University of Minnesota Duluth,* **Abigail R. Clarke-Sather** - *University of Minnesota Duluth ,* **Paulo H. Alves** - *University of Minnesota Duluth*

Evaluation of CAE Design Change Updates - a Case Study on Gas Turbine Airflow Disruptors

Technical Paper Publication: IDETC2023-116761

David Procopio - *Clemson University ,* **John Morris** - *Clemson University ,* **John Wagner** - *Clemson University*

An LSTM Driven Simulation Approach for SOC and SOH Estimation of a Lithium-Ion Cell

Technical Paper Publication: IDETC2023-117057

Tejas Dhanagare - *Indian Institute of Technology (Indian School of Mines),* **Shikha Singh** - *Indian Institute of Technology (Indian School of Mines),* **Vijitashwa Pandey** - *Oakland University*

Rapid Supply Chain Configuration Through Unit Manufacturing Process Modeling

Technical Presentation: IDETC2023-118235

Mahdi Kabiri - *Oregon State University ,* **Karl Haapala** - *Oregon State University ,* **Kyoung-Yun Kim** - *Wayne State University ,* **Gül Kremer** - *University of Dayton*

AVT-08-01: ADVANCES IN INTELLIGENT VEHICLES
9:20AM–10:40AM   **BEACON HILL (4TH FL)**

Chair: Guangqiang Wu - *Tongji University Shanghai*
Co-Chair: Liangyao Yu - *Tsinghua University*

Mobile Manipulation Platform for Autonomous Indoor Inspection in Low-Clearance Areas

Technical Paper Publication: IDETC2023-111245

Erik Pearson - *Stevens Institute of Technology* , **Paul Szenher** - *Stevens Institute of Technology* , **Christine Huang** - *Stevens Institute of Technology* , **Brendan Englot** - *Stevens Institute of Technology*

Roundabout Traffic: Simulation With Automated Vehicles, AI, 5G, Edge Computing and Human in the Loop

Technical Paper Publication: IDETC2023-116402

Giorgio Previati - *Politecnico di Milano* , **Gianpiero Mastinu** - *Politecnico di Milano* , **Elena Campi** - *Politecnico di Milano* , **Massimiliamo Gobbi** - *Politecnico di Milano* , **Lorenzo Uccello** - *Politecnico di Milano* , **Alvaro Varela Daniel** - *Politecnico di Milano* , **Antonino Albanese** - *Italtel S.p.A.,* **Alessandro Roccasalva** - *TECH - CRF* , **Gabriele Santin** - *Fondazione Bruno Kessler* , **Massimiliano Luca** - *Fondazione Bruno Kessler* , **Bruno Lepri** - *Fondazione Bruno Kessler,* **Laura Ferrarotti** - *Fondazione Bruno Kessler* , **Nicola Di Pietro** - *Athonet*

Safe Autonomous Vehicle Cooperative Cruise Control With Deep Reinforcement Learning

Technical Paper Publication: IDETC2023-113683

James Yang - *Texas Tech University* , **Natnael M. Negash** - *Texas Tech University*

DTM-08-01: DESIGN AND MODELING OF SYSTEMS
11:00AM–12:20PM   **SCOLLAY (LOBBY LEVEL)**

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Kosa Goucher-Lambert - *University of California, Berkeley*
Co-Chair: James Righter - *The Citadel*

Designing Complex Systems for Decommissioning in a Circular Economy: A Systematic Literature Review

Technical Paper Publication: IDETC2023-114873

Shenal Dilanjaya Hewa Witharanage - *The University of Melbourne* , **Katja Holtta-Otto** - *The University of Melbourne,* **Kevin Otto** - *The University of Melbourne* , **Wen Li** - *The University of Melbourne*

A Study of Technology Ecosystem Evolution Using Lotka-Volterra Ecosystem Model: A Multi-Component System Perspective

Technical Presentation: IDETC2023-118017

Wanyu Xu - *Texas A&M University,* **Maulik C. Kotecha** - *Texas A&M University* , **Daniel A. McAdams** - *Texas A&M University*

A Life Cycle Approach to Environment-Responsive Structures: Quantitative Comparison of Thermo-Responsive Actuators

Technical Paper Publication: IDETC2023-116554

Rafaela Louis - *ETH Zurich* , **Kristina Shea** - *ETH Zurich*

Exploring the Role of Individual Differences in System Interpretation

Technical Paper Publication: IDETC2023-117222

Apurva Patel - *The University of Texas at Dallas,* **Alexander Murphy** - *The University of Texas at Dallas,* **Joshua Summers** - *The University of Texas at Dallas,* **Chiradeep Sen** - *Florida Institute of Technology*

Model Validation Based on Value-of-Information Theory

Technical Paper Publication: IDETC2023-117043

George Hazelrigg - *George Mason University*

DEC-05/DTM-05: DFAM PRINCIPLES AND THEIR EDUCATION
11:00AM–12:20PM   **FRANKLIN (4TH FL)**

Chair: Mohammad Fazelpour - *University of Maryland*
Co-Chair: Nicholas Meisel - *The Pennsylvania State University*
Co-Chair: Rohan Prabhu - *Lafayette College*

Should I Sketch or Should I CAD? Exploring Design Representation Strategies in Design for Additive Manufacturing Tasks

Technical Paper Publication: IDETC2023-113137

Rohan Prabhu - *Lafayette College* , **Madison Cass** - *Lafayette College*

Exploring the Manifestation of Design for Manufacturing Axioms in Students' Early-Stage Engineering Design Concepts

Technical Paper Publication: IDETC2023-116667

Seth Pearl - *The Pennsylvania State University,* **Nicholas Meisel** - *The Pennsylvania State University*

Designing Immersive Experiences in Virtual Reality for Training and Working With Digital Artifacts in Design for Additive Manufacturing Processes

Technical Paper Publication: IDETC2023-116690

Jayant Mathur - *The Pennsylvania State University,* **Scarlett Miller** - *The Pennsylvania State University,* **Timothy Simpson** - *The Pennsylvania State University,* **Nicholas Meisel** - *The Pennsylvania State University*

PTG-07-01: BEARINGS
11:00AM–12:20PM   **CAMBRIDGE (4TH FL)**

Chair: **David Talbot** - *The Ohio State University*
Co-Chair: **Michael Hurrell** - *National Aeronautics and Space Administration*

In Situ Visualization and Analysis of Oil Starvation in Ball Bearing Cages

Technical Presentation: IDETC2023-117939

Ujjawal Arya - *Purdue University ,* **Farshid Sadeghi** - *Purdue University,* **Andreas Meinel** - *Schaeffler Technologies AG & Co. KG ,* **Hannes Grillenberger** - *Schaeffler Technologies AG & Co. KG*

A Load Distribution Model for Ball Bearings

Technical Paper Publication: IDETC2023-110507

Gaurang Dharap - *The Ohio State University ,* **David Talbot** - *The Ohio State University*

Performance Investigation of Fluid-Lubricated Thrust Bearings With Varying Textured Pad Surfaces Using Computational Fluid Dynamics

Technical Paper Publication: IDETC2023-116894

Saltuk Yildiz - *Virginia Tech ,* **Alexandrina Untaroiu** - *Virginia Tech*

Ceramic Bearing Endurance Within a Transmission

Technical Paper Publication: IDETC2023-110559

Mark Riggs - *U.S. Army Research Laboratory,* **Adrian Hood** - *DEVCOM Army Research Laboratory ,* **William Pomplon** - *DEVCOM Army Research Laboratory ,* **Jason Fetty** - *DEVCOM Aviation & Missile Center,* **Ryan Milligan** - *Bell Textron, Inc. ,* **John Zielinski** - *Eaton Aerospace*

MR-1-2: MECHANISMS SYNTHESIS AND ANALYSIS
11:00AM–12:20PM   **STUDIO 2 (LOBBY LEVEL)**

Chair: **Giorgio Figliolini** - *University of Cassino and Southern Lazio*
Co-Chair: **Chiara Lanni** - *University of Cassino and Southern Lazio*

Higher-Order Centrodes and Bresse's Circles of Slider-Crank Mechanisms

Technical Paper Publication: IDETC2023-116627

Chiara Lanni - *University of Cassino and Southern Lazio ,* **Giorgio Figliolini** - *University of Cassino and Southern Lazio ,* **Luciano Tomassi** - *University of Cassino and Southern Lazio*

Curvature Analysis of Linear and Circular Tractrices for the Planar Motion of Vehicles

Technical Paper Publication: IDETC2023-116658

Chiara Lanni - *University of Cassino and Southern Lazio,* **Giorgio Figliolini** - *University of Cassino and Southern Lazio,* **Jorge Angeles** - *McGill University*

Higher Order Kinematic Analysis of Long-Dwell Mechanisms

Technical Paper Publication: IDETC2023-116699

Chiara Lanni - *University of Cassino and Southern Lazio ,* **Giorgio Figliolini** - *University of Cassino and Southern Lazio ,* **Luciano Tomassi** - *University of Cassino and Southern Lazio*

Roll Center and Centrodes of an Eight-Bar Suspension System

Technical Paper Publication: IDETC2023-116901

Chiara Lanni - *University of Cassino and Southern Lazio ,* **Giorgio Figliolini** - *University of Cassino and Southern Lazio ,* **Luciano Tomassi** - *University of cassino and Southern Lazio*

MR-5-3: MOTION PLANNING, DYNAMICS, AND CONTROL OF ROBOTS
11:00AM–12:20PM   **THE LOFT (LOBBY LEVEL)**

Chair: Stéphane Caro - *Laboratoire des Sciences du Numérique de Nantes*
Co-Chair: Andreas Muller - *Johannes Kepler University*

An Underactuated Cable-Driven Parallel Robot for Marine Automated Launch and Recovery Operations

Technical Paper Publication: IDETC2023-110570

Michele Angelini - *University of Bologna* , **Edoardo Ida'** - *University of Bologna* , **Daniele Bertin** - *L3Harris - Calzoni* , **Marco Carricato** - *University of Bologna* , **Enrico Mantovani** - *L3Harris - Calzoni* , **Davide Bazzi** - *L3Harris - Calzoni* , **Vincenzo Orassi** - *L3Harris - Calzoni*

A Collaborative Robotic Screw Assembly System Using 6-PUS Parallel Mechanism

Technical Paper Publication: IDETC2023-114479

Qiao Sun - *Shanghai Platform for Smart Manufacturing,* **Dalong Gao** - *GM Global Research and Development Center* , **Xianbao Chen** - *Shanghai Jiao Tong University,* **Jing Sun** - *Shanghai Jiao Tong University,* **Ninjian Huang** - *GM Global Research and Development Center* , **Feng Gao** - *Shanghai Jiao Tong University*

On the Effects of Inertia Force on the Actual Motion of a Special-Case Grashof Linkage at Its Singular Points

Technical Paper Publication: IDETC2023-116911

Jin Xie - *Southwest Jiaotong University* , **Zhaohui Liu** - *Southwest Jiaotong University*

Effects of Soft Contact on the Base of Support of Legged Systems

Technical Paper Publication: IDETC2023-117584

Carlotta Mummolo - *Politecnico di Bari* , **Oceane Duvert** - *Politecnico di Bari,* **Adriana Torres-Pardo** - *Cajal Institute, Spanish National Research Council* , **David Rodriguez-Cianca** - *Cajal Institute, Spanish National Research Council* , **Diego Torricelli** - *Cajal Institute, Spanish National Research Council* , **Giuseppe Carbone** - *Politecnico di Bari*

MR-6-2: MEDICAL AND REHABILITATION ROBOTICS
11:00AM–12:20PM   **STUDIO 1 (LOBBY LEVEL)**

Chair: Anupam Saxena - *Indian Institute of Technology Kanpur*
Co-Chair: Milton Aguirre - *Purdue University*

Robotic Exoskeleton Glove System Design and Simulation for Patients With Brachial Plexus Injuries

Technical Paper Publication: IDETC2023-114907

Wenda Xu - *Virginia Tech* , **Yunfei Guo** - *Virginia Tech,* **Pinhas Ben-Tzvi** - *Virginia Tech*

A Novel Slack Tolerant, Sliding Pulley Differential Mechanism for Adaptive Grasping

Technical Paper Publication: IDETC2023-115115

Vitthal Khatik - *Indian Institute of Technology Kanpur* , **Anupam Saxena** - *Indian Institute of Technology Kanpur*

Natural Motion Grasping Design Using Control-Oriented Kinematic Models

Technical Paper Publication: IDETC2023-116654

Nina Robson - *California State University, Fullerton,* **Vanessa Audrey** - *University of California, Irvine,* **Severino Hernandez** - *California State University, Fullerton,* **John Golden** - *University of California, Irvine* , **Vincent Ton** - *University of California, Irvine*

Design Verification of a Multi-Modal Compliant Mechanism Intended to Enhance Safety in Handheld Laparoscopic Tissue Grasping

Technical Paper Publication: IDETC2023-116606

Milton Aguirre - *Purdue University,* **Mauricio Fernandez Montoya** - *Purdue University* , **Juan Andres Gallego Sanchez** - *Universidad EAFIT,* **Krishna Kommuri** - *Eindhoven University of Technology*

MSNDC-10-01: NONLINEAR AND COMPUTATIONAL DYNAMICS ASPECTS IN BIOMECHANICS
11:00AM–12:20PM **WHITE HILL (4TH FL)**

Chair: James Chagdes - *Miami University*
Co-Chair: Adam Kłodowski - *LUT University*

Parametric Musculoskeletal Model for Human-Robot Interaction Simulation in Warfield Rescue: A Pilot Study

Technical Paper Publication: IDETC2023-112425

Seunghun Lee - *Texas Tech University* , **Zhiqing Cheng** - *Innovision LLC* , **James Yang** - *Texas Tech University*

Different Pathological Gaits Emerge From the Same Neuromotor Control Policy

Technical Presentation: IDETC2023-117969

Matilde Tomasi - *University of Pisa* , **Alessio Artoni** - *University of Pisa*

Finite Element Method-Based Comparison Between Healthy Subject and Patient With Lumbar Interbody Fusion Cage Implant

Technical Presentation: IDETC2023-118173

James Yang - *Texas Tech University* , **Paul Egan** - *Texas Tech University* , **Andres Mena** - *Texas Tech University*

A Nonlinear Dynamics Perspective on the Benefits of Predicting Postural Sway for Upright Human Balance

Technical Presentation: IDETC2023-118158

James Chagdes - *Miami University* , **Jinjuan She** - *Miami University* , **Jennifer Kinney** - *Miami University*

MESA-02 / MESA-04 / MESA-16
11:00AM–12:20PM **BACK BAY (4TH FL)**

Chair: Matteo C. Palpacelli - *Polytechnic University of Marche*
Co-Chair: Adriano Mancini - *Polytechnic University of Marche*
Co-Chair: Chris Pretty - *University of Canterbury*
Co-Chair: Abhijit Nagchaudhuri - *University of Maryland Eastern Shore*

Noodle: Design of a Modular, Configurable Serpentine Robot With Series Elastic Actuators and Modular Segment Panels

Technical Paper Publication: IDETC2023-117543

Gordon Lay - *University of Canterbury* , **Chris Pretty** - *University of Canterbury*, **Lui Holder-Pearson** - *University of Canterbury*

Leveraging Smart Farming Technologies for Optimal Ph Adjustments With Variable Rate Lime Application

Technical Paper Publication: IDETC2023-114933

Abhijit Nagchaudhuri - *University of Maryland Eastern Shore* , **Jesuraj Pandya** - *University of Maryland Eastern Shore*, **Bede Nnebedum** - *University of Maryland Eastern Shore* , **Madhumi Mitra** - *University of Maryland Eastern Shore* , **Caleb Nindo** - *University of Maryland Eastern Shore*

Evaluating Heart-Rate Variability Metrics as a Measure of Stress During Unsedated Medical Procedures

Technical Paper Publication: IDETC2023-114621

Chris Cameron - *University of Canterbury* , **Christopher G. Pretty** - *University of Canterbury* , **Phil Bagshaw** - *Canterbury Charity Hospital* , **Jaana Aramowicz** - *Canterbury Charity Hospital* , **Michael P. Hayes** - *University of Canterbury*

Capturing Parkinson's Disease Tremor and Vigor With a Single Disease Parameter

Technical Paper Publication: IDETC2023-117228

Michael Haman - *Florida Polytechnic University* , **Chris Kelley** - *Florida Polytechnic University*

DFMLC-04-01: DESIGN FOR MANUFACTURING AND ASSEMBLY
11:00AM–12:20PM   **PARK (LOBBY LEVEL)**

Chair: **Paul Egan** - *Texas Tech University*
Co-Chair: **Satya R.T. Peddada** - *University of Illinois at Urbana-Champaign*
Co-Chair: **Albert Patterson** - *Texas A&M University*

Design and Validation of a Modular Device to Convert Off-the-Shelf Leaf Blowers to Fish Feed Distribution Systems for Use in Aquaculture Farms in Ghana

Technical Presentation: IDETC2023-114723

Prem Sagar - *Massachusetts Institute of Technology,* **Urvaksh Irani** *- Massachusetts Institute of Technology,* **Jonathan Tagoe** *- Massachusetts Institute of Technology,* **Stephanie Khaguli** *- Massachusetts Institute of Technology*

Enhancing Design Guidelines for Metal Powder Bed Fusion: Analyzing Geometric Features to Improve Part Quality

Technical Paper Publication: IDETC2023-117019

Jannatul Bushra - *The University of Arizona ,* **Hannah D. Budinoff** *- The University of Arizona ,* **Pablo Luna Falcon** *- The University of Arizona* **Marat Latypov** *- The University of Arizona*

Why Commercial Flow Simulation Software and Finite Element Analysis (FEA) Should Be Utilized in Stem Curriculum

Technical Presentation: IDETC2023-117195

Jeremy Agozzino - *Ohio Northern University*

Manufacturability Considerations for Copper/Copper Alloy Aerospace Parts Using Metal Powder Material Extrusion

Technical Presentation: IDETC2023-117684

Brandon Jones - *Texas A&M University,* **Aniket Ranjit Bhalerao** *- Texas A&M University,* **Jyhwen Wang** *- Texas A&M University,* **Albert Patterson** *- Texas A&M University*

Drilling Holes in CFRP for Aircraft Using CBN Electroplated Ball End Mill Using Helical Interpolation Motion

Technical Paper Publication: IDETC2023-117499

Sora Hamamoto - *Doshisha University,* **Toshiki Hirogaki** *- Doshisha University,* **Eiichi Aoyama** *- Doshisha University,* **Kazuna Fujiwara** *- Kamogawa Co.,* **Masashi Taketani** *- Kamogawa Co.*

MNS-02: MICRO/NANO BIOENGINEERING, ROBOTICS AND FUNCTIONAL MATERIALS
11:00AM–12:20PM   **NEWBURY (4TH FL)**

Chair: **Longqiu Li** - *Harbin Institute of Technology*
Co-Chair: **Irene Fassi** - *CNR*

Mems Cantilever Biosensors Driven by Fringe Effect: Voltage-Amplitude Response of Parametric Resonance

Technical Paper Publication: IDETC2023-114993

Miguel Martinez - *University of Texas Rio Grande Valley ,* **Dumitru Caruntu** *- University of Texas Rio Grande Valley*

Shape-Based Force Estimation Method for Guidewire Navigation in Neurointervention Surgery

Technical Paper Publication: IDETC2023-112293

Yang Xu - *Stevens Institute of Technology ,* **Jacob Golden** *- Bergen County Academies ,* **Ronin Mangla** *- Millennium High School,* **Karen Wu** *- Madison High School,* **Sundeep Mangla** *- Neurointerventional Medicine PLLC ,* **Sean Masur** *- Stevens Institute of Technology,* **Yong Shi** *- Stevens Institute of Technology*

Development of Soft Sensors for Measuring Human-Robot Contacts

Technical Presentation: IDETC2023-116466

Marcello Valori - *CNR,* **Buddhika Piyumal Bandara Samarathunga Samarathunga Mudiyanselage** *- University of Brescia ,* **Giovanni Legnani** *- University of Brescia,* **Rocco Vertechy** *- University of Bologna ,* **Irene Fassi** *- CNR*

MSNDC-04/VIB-09-02: NONLINEAR DYNAMICS OF SYSTEMS AND STRUCTURES
2:20PM–3:40PM - WHITTIER (4TH FL)

Chair: **Ajeet Kumar** - *Indian Institute of Technology Delhi*
Co-Chair: **Gizem Acar** - *Stevens Institute of Technology*
Co-Chair: **Richard Wiebe** - *University of Washington*
Co-Chair: **Stefano Lenci** - *Polytechnic University of Marche*
Co-Chair: **Brian Feeny** - *Michigan State University*

Strategy for the Identification of the Dynamic Influence of Non-Structural Elements on Spacecraft

Technical Presentation: IDETC2023-117731

Lisa Fournier - *ISAE-SUPAERO ,* **Leonardo Sanches** *- ISAE-SUPAERO ,* **Simon Foucaud** *- CNES,* **Guilhem Michon** *- ISAE-SUPAERO*

Validating a Nonlinear Model in a Three-Axis Mechanical Shock Environment

Technical Presentation: IDETC2023-117872

Tyler Alvis - *Sandia National Laboratories* , **Mikhail Mesh** - *Sandia National Laboratories* , **Michael Neilsen** - *Sandia National Laboratories*

Machine Learning for Nonlinear Dynamics of Atomic Force Microscopy

Technical Presentation: IDETC2023-108863

Pierpaolo Belardinelli - *Polytechnic University of Marche* , **Richard Wiebe** - *University of Washington,* **Stefano Lenci** - *Polytechnic University of Marche*

Steady-State Amplitude Self-Excited Oscillations in a Two-Degree-of-Freedom Spring-Mass-Damper System by Cubic Nonlinear Control

Technical Presentation: IDETC2023-117966

Mari Nishijima - *University of Tsukuba* , **Hiroshi Yabuno** - *University of Tsukuba*

DTM-09-01: DESIGN COGNITION
2:20PM–3:40PM   **SCOLLAY (LOBBY LEVEL)**

Chair: **Rahul Sharan Renu** - *Francis Marion University*
Co-Chair: **Christine Toh** - *University of Nebraska at Omaha*
Co-Chair: **Hyeonik Song** - *Texas A&M University*

From Obstacles to Opportunities: How Perceptions of Psychological Safety Affect Founders' Abilities to Identify Resources

Technical Paper Publication: IDETC2023-116498

Cynthia Letting - *The Pennsylvania State University,* **Nicole Calpin** - *The Pennsylvania State University,* **Nicolas F. Soria Zurita** - *The Pennsylvania State University* , **Jessica Menold** - *The Pennsylvania State University*

Dealing With Loss: How Do Designers' Resilience and Perceptions of Scarcity Affect Perceptions of Design Performance

Technical Paper Publication: IDETC2023-117158

Grace Sibley - *The Pennsylvania State University* , **Cynthia Letting** - *The Pennsylvania State University* , **Jessica Menold** - *The Pennsylvania State University*

Evaluating the Dynamics of Designers' Moods Throughout the Collaborative Design Process

Technical Paper Publication: IDETC2023-111391

Megan Harris - *University of Nebraska at Omaha* , **Christine Toh** - *University of Nebraska at Omaha*

Paper or Tablet? The Impact of Digital Tools on Sketching During Engineering Design Concept Generation

Technical Paper Publication: IDETC2023-114983

Madhurima Das - *Massachusetts Institute of Technology* , **May Huang** - *Massachusetts Institute of Technology* , **Maria Yang** - *Massachusetts Institute of Technology*

Spatial Elements and Their Influence on Creative Work: A Systematic Literature Review

Technical Paper Publication: IDETC2023-115000

Valentina Mejia Londoño - *Universidad EAFIT* , **Elizabeth Rendón Vélez** - *Universidad EAFIT*

Towards Quantifying Interviews: Comparing Techniques to Evaluate the Quality of Design Interviews

Technical Paper Publication: IDETC2023-116929

Micki Grover - *University of Minnesota* , **Natasha Wright** - *University of Minnesota* , **Carlye Lauff** - *University of Minnesota*

PTG-03-03: GEAR DYNAMICS AND NOISE 3
2:20PM–3:40PM   **CAMBRIDGE (4TH FL)**

Chair: **Ahmet Kahraman** - *The Ohio State University*
Co-Chair: **David Talbot** - *The Ohio State University*
Co-Chair: **Isaac Hong** - *The Ohio State University*

A Three-Dimensional Dynamic Model for Multi-Mesh Geared Systems Operating Under Stick-Slip Motion Generated Excitations

Technical Paper Publication: IDETC2023-116467

Enes Timur Ozdemir - *University of Massachusetts Lowell* , **Murat Inalpolat** - *University of Massachusetts Lowell* , **Hyun Ku Lee** - *Hyundai Motor Company,* **Moo Suk Kim** - *Hyundai Motor Company*

Dynamic Characteristics Analysis of Parallel Axis Gear Transmission System in Non-Inertial System

Technical Presentation: IDETC2023-114888

Jinzong Ye - *Chongqing University* , **Jing Wei** - *Chongqing University* , **Aiqiang Zhang** - *Chongqing University* , **Miaofei Cao** - *Chongqing University* , **Bin Peng** - *Chongqing University* , **Shilin Chen** - *Chongqing University*

Torque Characteristics of a Planetary Gear Train During Gear Shifting Under Two Inputs and One Output Tandem Driving Conditions

Technical Paper Publication: IDETC2023-115087

Daiki Shimura - *Doshisha University* , **Toshiki Hirogaki** - *Doshisha University* , **Eiichi Aoyama** - *Doshisha University,* **Masao Nakagawa** - *National Traffic Safety and Environment Laboratory* , **Shinnosuke Yuba** - *Doshisha University*

Load and Vibration of Spur Gears Due to Thermal Deformation

Technical Presentation: IDETC2023-112775

Chan Il Park - *Gangneung-Wonju National University*

Understanding the Response and Measured Spectra of Elastic Central Components in Cyclically Symmetric Planetary Gears

Technical Presentation: IDETC2023-118051

Chenxin Wang - *Huanyan DriveTech Research Co., Ltd* , **Qi Zhang** - *Huanyan DriveTech Research Co., Ltd* , **Robert Parker** - *The University of Utah*

VIB-04/MR-04: MECHANICS AND DYNAMICS OF ORIGAMI
2:20PM–3:40PM   **STUART (4TH FL)**

Chair: Suyi Li - *Virginia Polytechnic Institute and State University*
Co-Chair: Mark Plecnik - *University of Notre Dame*

Comparisons of Dynamic Models of a Stacked Miura-Origami Structure Based on Different Modeling Techniques

Technical Paper Publication: IDETC2023-115277

Haiping Wu - *Fudan University* , **Zuolin Liu** - *Fudan University* , **Hongbin Fang** - *Fudan University*

Data-Driven Design of Phononic Bandgaps in Kirigami Metasurface

Technical Presentation: IDETC2023-118106

Darshil Patel - *Clemson University,* **Hesameddin Khosravi** - *Virginia Polytechnic Institute and State University* , **Suyi Li** - *Virginia Polytechnic Institute and State University,* **Rahul Rai** - *Clemson University*

Modulation of Origami Phononic Structure for Tunable Beamforming

Technical Presentation: IDETC2023-118176

Megan Hathcock - *University of Michigan* , **Kon-Well Wang** - *University of Michigan* , **Bogdan Popa** - *University of Michigan*

Energy Absorption of a Novel Origami-Inspired Tube With Star-Shaped Auxetic Patterns

Technical Presentation: IDETC2023-117996

Duy-Binh Pham - *National Kaohsiung University of Science and Technology* , **Shyh-Chour Huang** - *National Kaohsiung University of Science and Technology*

Extended Abstract: Principles and Categorization of Compliant Surrogate Folds for Deployable Origami-Inspired Mechanical Systems

Technical Presentation: IDETC2023-118191

Ivyann Running - *Brigham Young University* , **Phebe Ramsdell** - *Brigham Young University* , **Spencer Magleby** - *Brigham Young University*

VIB-07/MSNDC-14-01: INDUSTRIAL APPLICATIONS OF VIBRATION, ACOUSTICS & DYNAMICS
2:20PM–3:40PM   **TREMONT (4TH FL)**

Chair: Ryan Monroe - *Oakland University*
Co-Chair: Brian Olson - *Johns Hopkins University*
Co-Chair: Ron Couch - *Johns Hopkins University*
Co-Chair: Peter Coffin - *Sandia National Laboratories*
Co-Chair: Justin Wilbanks - *Sandia National Laboratories*
Co-Chair: Ata Donmez - *The Ohio State University*

Derivation of Sensor-Actuator Layout for Active Control of Gearbox Housing Vibration

Technical Paper Publication: IDETC2023-110297

Sneha Rupa Nampally - *Technical University of Darmstadt* , **Mauro Fontana** - *Powerflex SRL,* **Rainer Nordmann** - *Technical University of Darmstadt* , **Stephan Rinderknecht** - *Technical University of Darmstadt*

Determination of a Predictive Model for Print Quality of Desktop 3D Printers While at Sea

Technical Paper Publication: IDETC2023-112599

Eliott Radcliffe - The Johns Hopkins University , **Drew Seker** - *The Johns Hopkins University* , **Eric Chen** - *The Johns Hopkins University* , **Nina Horne** - *The Johns Hopkins University* , **John Hill** - *The Johns Hopkins University*

Modeling and Analysis of a Thin Plate With Multiple Harmonic Excitations for Vibrotactile Touch Display Applications

Technical Paper Publication: IDETC2023-117179

Santosh Rajkumar - *Miami University* , **Kumar Singh** - *Miami University* . **Jeong-Hoi Koo** - *Miami University,* **Tae-Heon Yang** - *Korea National University of Transportation*

Identification of a Lumped Element Modeled Ring Shaped Structure via Peak Picking Method

Technical Paper Publication: IDETC2023-114895

Pelin Seyrek - *TOBB University of Economics and Technology* , **Dogan Onur Arisoy** - *Roketsan Inc.,* **Gokhan Karapistik** - *Roketsan Inc.* , **Ahmet Kutay Erozden** - *Roketsan Inc.* , **Hamit Caglar Karatas** - *Roketsan Inc.,* **Hakki Ozgur Unver** - *TOBB University of Economics and Technology*

MESA-10
2:20PM–3:40PM **BACK BAY (4TH FL)**

Chair: Matteo C. Palpacelli - *Polytechnic University of Marche*
Co-Chair: Adriano Mancini - *Polytechnic University of Marche*

Hyperdimensional Cognitive Computing for Lightweight Cyberattack Detection in Industrial Internet of Things

Technical Paper Publication: IDETC2023-110699

Fardin Jalil Piran - *University of Connecticut* , **Hamza Barkam** - *University of California, Irvine* , **Mohsen Imani** - *University of California, Irvine* , **Farhad Imani** - *University of Connecticut*

Robot Arm Path Planning With Obstacle Avoidance Using Lagrangian Minimization With Safety Assessment Machine Learning (SAML) Models

Technical Presentation: IDETC2023-114508

Brijesh Patel - *National Taiwan University of Science and Technology,* **Chao-Yi Lin** - *National Taiwan University of Science and Technology,* **Zhi-Lin Zhang** - *National Taiwan University of Science and Technology* , **Yan-Cen Lin** - *National Taiwan University of Science and Technology,* **Hao Jian Eugene Tong** - *National Taiwan University of Science and Technology* , **Wei-Hao Lu** - *National Taiwan University of Science and Technology,* **Chien-Ching Ma** - *National Taiwan University,* **Chao-Lung Yang** - *National Taiwan University of Science and Technology* , **Ching-Yuan Chang** - *National Taipei University of Technology,* **Po Ting Lin** - *National Taiwan University of Science and Technology*

Can the Attributes of a Waste Bin Improve Recycling? A Literature Review for Sensors and Actuators to Define Product Design Objectives

Technical Paper Publication: IDETC2023-114609

David Rios-Zapata - *Universidad EAFIT,* **Elizabeth Rendón-Vélez** - *Universidad EAFIT* , **Santiago Ruiz-Arenas** - *Universidad EAFIT,* **Juan Carlos Arbeláez-Estrada** - *Universidad EAFIT* , **Paola Vallejo** - *Universidad EAFIT,* **Marta Silvia Tabares** - *Universidad EAFIT*

MSNDC-05-01: MODELING AND SIMULATION OF VEHICLE DYNAMICS AND MOBILITY
2:20PM–3:40PM **WHITE HILL (4TH FL)**

Chair: Hiroyuki Sugiyama - *University of Iowa*
Co-Chair: José Escalona - *University of Seville*
Co-Chair: Robert Seifried - *Technical University Hamburg*
Co-Chair: Paramsothy Jayakumar - *U.S. Army GVSC*

A Combined Simple/Complex Terramechanics Representation. Part 1: Using Machine Learning to Identify DEM Soil Properties From Bevameter Test Data

Technical Paper Publication: IDETC2023-117123

Ben Thornton - *Hexagon* , **Eric Pesheck** - *Hexagon,* **Paramsothy Jayakumar** - *U.S. Army DEVCOM GVSC*

Complex Terramechanics for Mobility Assessment. Part 2: Efficiency Through a Simple Terramechanics Representation

Technical Paper Publication: IDETC2023-117161

Joseph Little - *Hexagon* , **Chris Coker** - *Hexagon* , **Ben Thornton** - *Hexagon* , **Eric Pesheck** - *Hexagon,* **Paramsothy Jayakumar** - *U.S. Army DEVCOM GVSC*

Application of Multi Body Dynamics Simulation for Development of New Design Automated Guided Forklift

Technical Presentation: IDETC2023-117965

Yu Shibata - *Mitsubishi Heavy Industries, Ltd.* , **Yusuke Otaki** - *Mitsubishi Heavy Industries, Ltd.* , **Rohit Arora** - *Mitsubishi Heavy Industries, Ltd.*

Predicting Vehicle Motion in Shallow Water With Data-Driven Hydrodynamics Model

Technical Paper Publication: IDETC2023-115254

Hiroki Yamashita - *The University of Iowa* , **Juan E. Martin** - *The University of Iowa* , **Hiroyuki Sugiyama** - *The University of Iowa* , **Nathan Tison** - *U.S. Army DEVCOM GVSC* , **Arkady Grunin** - *U.S. Army DEVCOM GVSC,* **Paramsothy Jayakumar** - *U.S. Army DEVCOM GVSC*

MNS-03: MICRO/NANO IOT, SENSORS AND DIGITAL COMPUTING
2:20PM–3:40PM NEWBURY (4TH FL)

Chair: **Fadi Alsaleem** - *University of Nebraska-Lincoln*
Co-Chair: **Muhammad Khan** - *Naval Surface Warfare Center*

Tailored Imaging and Sensing Technologies Enabled by 3D Rapid Micro- to Nano-Fabrication

Technical Paper Publication: IDETC2023-116800

Anthony Salerni - *Worcester Polytechnic Institute* , **Daniel Ruiz-Cadalso** - *Worcester Polytechnic Institute* , **Cosme Furlong** - *Worcester Polytechnic Institute*

Characterization of a Mems Multi-Threshold Inertial Switch

Technical Presentation: IDETC2023-118070

Qiu Xu - *King Abdullah University of Science and Technology* , **Eric Feron** - *King Abdullah University of Science and Technology,* **Mohammad I. Younis** - *State University of New York at Binghamton*

A Zero-Power Multi-Directional Mems Inertial Switch With Multiple Thresholds

Technical Presentation: IDETC2023-118243

Yousef Algoos - *King Abdullah University of Science and Technology,* **Mohammad Younis** - *State University of New York at Binghamton* , **Qiu Xu** - *King Abdullah University of Science and Technology,* **Raed Alahmdi** - *King Abdullah University of Science and Technology,* **Eric Feron** - *King Abdullah University of Science and Technology*

AVT-(02,3,7)-01
2:20PM–3:40PM BEACON HILL (4TH FL)

Chair: **Costin Untaroiu** - *Virginia Tech*
Co-Chair: **Ole Balling** - *Aarhus University*

Hydroplaning of Tires: A Review of Numerical Modeling and Novel Sensing Methods

Technical Paper Publication: IDETC2023-116314

Alexandru Vilsan - *Virginia Tech* , **Corina Sandu** - *Virginia Tech*

Study on Driver's Preview Distance Based on Driving Simulator Tests

Technical Paper Publication: IDETC2023-115032

Massimiliano Gobbi - *Politecnico di Milano* , **Giampiero Mastinu** - *Politecnico di Milano,* **Massimiliano Milivinti** - *Politecnico di Milano* , **Giorgio Previati** - *Politecnico di Milano* , **Daniel Rios Hidalgo** - *Politecnico di Milano*

Modeling and Co-Simulation of Hybrid Off-Road Machinery

Technical Paper Publication: IDETC2023-116543

Giota Goswami - *LUT University* , **Charles Nutakor** - *LUT University* , **Jussi Sopanen** - *LUT University*

PTG-04-01: GEARBOX DESIGN, RELIABILITY AND DIAGNOSTICS
4:20PM−6:00PM — CAMBRIDGE (4TH FL)

Chair: **Murat Inalpolat** - *University Massachusetts Lowell*
Co-Chair: **David Talbot** - *The Ohio State University*
Co-Chair: **Yawen Wang** - *The University of Texas at Arlington*

Gearbox Fault Detection via Physics-Informed Parallel Deep Learning Model Architecture

Technical Paper Publication: IDETC2023-116599

Qianyu Zhou - *University of Connecticut* , **Jiong Tang** - *University of Connecticut*

Impact of Shaft Misalignments in Planetary Gearboxes

Technical Paper Publication: IDETC2023-114810

Marius Fuerst - *Technical University of Munich* , **Michael Otto** - *Technical University of Munich* , **Karsten Stahl** - *Technical University of Munich*

Calculation of Partial Transmission Ratios of Two-Stage Gearboxes by Volume Minimization

Technical Paper Publication: IDETC2023-115086

Tom Abraham - *Rochester Institute of Technology*, **Alfonso Fuentes-Aznar** - *Rochester Institute of Technology*

Development of Reduction Gears With Self-Locking Function

Technical Presentation: IDETC2023-118099

Chihiro Kamio - *Gunma University* , **Tatsuhito Aihara** - *Hosei University* , **Toshiaki Shimada** - *Ai-esu Corporation*

Effect of System Flexibilites on the Static Transmission Error of an Epicyclic Gearset

Technical Paper Publication: IDETC2023-113311

Fabio Bruzzone - *Politecnico di Torino* , **Carlo Rosso** - *Politecnico di Torino*

MR-1-3: MECHANISMS SYNTHESIS AND ANALYSIS
4:20PM−6:00PM — THE LOFT (LOBBY LEVEL)

Chair: **Stéphane Caro** - *Laboratoire des Sciences du Numérique de Nantes*
Co-Chair: **Dongming Gan** - *Purdue University*

Design and Analysis of a Series-Parallel Hybrid 3-SPS-U Mechanism

Technical Paper Publication: IDETC2023-115225

Swaminath Venkateswaran - *Leonardo Da Vinci Engineering School*, **Damien Chablat** - *Ecole Centrale de Nantes*, **Denis Creusot** - *Ecole Centrale de Nantes*

Workspace Determination of Kinematic Redundant Manipulators Using a Ray-Based Method

Technical Paper Publication: IDETC2023-115240

Angelica Ginnante - *University of Genova*, **Stéphane Caro** - *Nantes Université, École Centrale Nantes*, **Enrico Simetti** - *University of Genova*, **François Leborne** - *Nimbl'Bot*

Kinetostatic Modeling and Cable Tension Optimization of Cable-Driven Parallel Robots on Cylindrical Surfaces

Technical Paper Publication: IDETC2023-116327

Lei Jin - *Purdue University* , **Boxiang Zhang** - *Purdue University* , **Maitha Alqaydi** - *Purdue University*, **Xiaoming Wang** - *Purdue University* , **Tarek Taha** - *Dubai Future Foundation*, **Dongming Gan** - *Purdue University*

Wrench Capability Analysis of a Planar Dual-Platform Cable-Driven Parallel Robot

Technical Paper Publication: IDETC2023-116412

Tahir Rasheed - *Nantes Université, LS2N* , **Philip Long** - *Atlantic Technological University* , **Taskin Padir** - *Northeastern University* , **Stéphane Caro** - *CNRS - LS2N*

Sensitivity Analysis of Tension Distribution Algorithms for Cable-Driven Parallel Robots

Technical Paper Publication: IDETC2023-116640

Vincenzo Di Paola - *University of Genova* , **Stéphane Caro** - *CNRS*, **Matteo Zoppi** - *University of Genova*

MR-3-1: COMPLIANT MECHANISMS (A. MIDHA SYMPOSIUM)
4:20PM–6:00PM   **STUDIO 1 (LOBBY LEVEL)**

Chair: **Just L. Herder** - *Delft University of Technology*
Co-Chair: **Jonathan Hopkins** - *University of California, Los Angeles*

Zero Parasitic Shift Pivoting Kinematic Structures Based on Coupled N-RRR Planar Parallel Mechanisms for Flexure Pivot Design

Technical Paper Publication: IDETC2023-109120

Loïc Tissot-Daguette - *École Polytechnique Fédérale de Lausanne,* **Etienne Thalmann** - *École Polytechnique Fédérale de Lausanne,* **Florent Cosandier** - *École Polytechnique Fédérale de Lausanne,* **Simon Henein** - *École Polytechnique Fédérale de Lausanne*

Design and Modelling of Compliant Mechanisms With Invertible Poisson's Ratio Effect for Growing Biological Cells

Technical Paper Publication: IDETC2023-110544

Manu Sebastian - *Indian Institute of Technology Hyderabad ,* **Sreenath Balakrishnan** - *Indian Institute of Technology Goa ,* **Safvan Palathingal** - *Indian Institute of Technology Hyderabad*

Mechanical Logic Gates and Processors Using Hinged-Connected Pinned-Pinned Arches

Technical Paper Publication: IDETC2023-113272

Priyabrata Maharana - *Indian Institute of Science ,* **Sudhanshu Shekhar** - *Indian Institute of Science, Bengaluru,* **G.K. Ananthasuresh** - *Indian Institute of Science, Bengaluru*

Analytical Modeling and Validation of New Prismatic Compliant Joints Based on Zero Poisson's Ratio Lattice Structures

Technical Paper Publication: IDETC2023-113580

Mauricio Arredondo-Soto - *Tecnologico de Monterrey ,* **Enrique Cuan-Urquizo** - *Tecnologico de Monterrey ,* **Alfonso Gómez-Espinosa** - *Tecnologico de Monterrey*

Design and Optimization of a Multi-Mode Piezo-Motor Based on a Compliant Mechanism

Technical Paper Publication: IDETC2023-114897

Hong Yao - *Ji Hua Laboratory ,* **Hai Bi** - *Ji Hua Laboratory ,* **Junjie Wei** - *Ji Hua Laboratory,* **Fangxin Chen** - *Ji Hua Laboratory*

MR-4-4: ORIGAMI ROBOTS
4:20PM–6:00PM   **STUDIO 2 (LOBBY LEVEL)**

Chair: **Suyi Li** - *Virginia Polytechnic Institute and State University*
Co-Chair: **Ankur Mehta** - *University of California, Los Angeles*

Origamechs: Fully Folded Autonomous Robots

Technical Presentation: IDETC2023-117759

Wenzhong Yan - *University of California, Los Angeles,* **Shuguang Li** - *Tsinghua University ,* **Mauricio Deguchi** - *University of California, Los Angeles,* **Zhaoliang Zheng** - *University of California, Los Angeles,* **Daniela Rus** - *Massachusetts Institute of Technology,* **Ankur Mehta** - *University of California, Los Angeles*

Kinematics of Spaced Origami Sheets

Technical Presentation: IDETC2023-118239

Guowei Wayne Tu - *University of Michigan-Ann Arbor ,* **Evgueni Filipov** - *University of Michigan-Ann Arbor*

Modular Origami Horn and Claw Chains

Technical Paper Publication: IDETC2023-116784

David Xing - *University of Oxford ,* **Zhong You** - *University of Oxford*

Drag Coefficient Characterization of the Origami Magic Ball

Technical Paper Publication: IDETC2023-117182

Guanyu Chen - *University of Pennsylvania ,* **Dongsheng Chen** - *University of Pennsylvania ,* **Jessica Weakly** - *University of Pennsylvania ,* **Cynthia Sung** - *University of Pennsylvania*

Direct Encoding of Tunable Stiffness Into an Origami-Inspired Jumping Robot Leg

Technical Presentation: IDETC2023-114694

Fuchen Chen - *Arizona State University ,* **Daniel Aukes** - *Arizona State University*

DAC-11-02: DESIGN OF ENGINEERING MATERIALS AND STRUCTURES
4:20PM–6:00PM   **HANCOCK (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Xingchen Liu** - *University of California, Berkeley*
Co-Chair: **Hongyi Xu** - *University of Connecticut*

Reliability-Based Topology Optimization of Structures Made of Geometric Primitives With Dimensional Variability

Technical Presentation: IDETC2023-117973

Mohammad Behtash - *University of Connecticut* , **Hongye Gu** - *University of Connecticut*, **Julian Norato** - *University of Connecticut* , **Chao Hu** - *University of Connecticut*

High-Frequency Band Gap Design of Porous Phononic Crystals by Topology Optimization

Technical Paper Publication: IDETC2023-114619

Naoki Murai - *The University of Tokyo* , **Yuki Noguchi** - *The University of Tokyo*, **Takayuki Yamada** - *The University of Tokyo*

Selective Amplification and Suppression of Strain in a Multi-Axis Force Sensor Using Topology Optimization

Technical Paper Publication: IDETC2023-114920

Myung Kyun Sung - *University of Maryland, Baltimore County* , **Soobum Lee** - *University of Maryland, Baltimore County*, **Devin Burns** - *NASA Langley Research Center*, **Jude Persia** - *University of Maryland, Baltimore County*

Orientation Optimization With Topological Derivative for Anisotropic Materials With Rotational Symmetry

Technical Paper Publication: IDETC2023-110477

Masaki Noda - *The University of Tokyo* , **Kei Matsushima** - *The University of Tokyo*, **Takayuki Yamada** - *The University of Tokyo*

Data-Driven Design of High Electron Mobility Transistor Devices Using Physics-Informed Gaussian Process Modeling

Technical Paper Publication: IDETC2023-117200

Anabel Renteria - *University of Illinois at Urbana-Champaign* , **Yanwen Xu** - *University of Illinois at Urbana-Champaign* , **Bayan Hamdan** - *University of Illinois at Urbana-Champaign* , **Zhou Li** - *Stanford University*, **Sergio Cordero** - *Stanford University* , **Debbie G. Senesky** - *Stanford University*, **Pingfeng Wang** - *University of Illinois at Urbana-Champaign*

DAC-12-02: ENGINEERING FOR GLOBAL DEVELOPMENT
4:20PM–6:00PM   **STATLER (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Nordica MacCarty** - *Oregon State University*
Co-Chair: **Amy Bilton** - *University of Toronto*

Lab-to-Market Design of an Electrodialysis-Based Home Scale Water Desalination System

Technical Paper Publication: IDETC2023-112625

Marie Floryan - *Massachusetts Institute of Technology*, **Quinn Bowers** - *Massachusetts Institute of Technology* , **Zachary Sternberg** - *Massachusetts Institute of Technology* , **Sahas Gembali** - *Massachusetts Institute of Technology* , **Akshita Goyal** - *Massachusetts Institute of Technology* , **Jonathan Bessette** - *Massachusetts Institute of Technology* , **Soraya Honarparvar** - *Massachusetts Institute of Technology* , **Amos Winter** - *Massachusetts Institute of Technology*

Feasibility of Small-Scale, Off-Grid Desalination in the Navajo Nation

Technical Paper Publication: IDETC2023-113479

Melissa Brei - *Massachusetts Institute of Technology*

Feeling the Distance: Exploring Novice Designers' Perceptions of the Psychological Distance Towards and Empathy Induced by Problem Variations

Technical Paper Publication: IDETC2023-114540

Jenna Herzog - *Lafayette College*, **Mohammad Alsager Alzayed** - *Kuwait University* , **Elizabeth Starkey** - *The Pennsylvania State University* , **Rohan Prabhu** - *Lafayette College*

Reducing the Barriers to Designing 3D-Printable Prosthetics in Resource-Constrained Environments

Technical Paper Publication: IDETC2023-116399

Junghun Lee - *Carnegie Mellon University,* **Andrew Chesang** - *Dedan Kimathi University of Technology ,* **Michael Gichane** - *Dedan Kimathi University of Technology ,* **Moise Busogi** - *Carnegie Mellon University Africa,* **Jean Byiringiro** - *Dedan Kimathi University of Technology ,* **Conrad Tucker** - *Carnegie Mellon University*

An Approach for Predicting Social, Environmental, and Economic Product Impacts and Navigating the Associated Impact Trade-Space in Engineering Design

Technical Paper Publication: IDETC2023-116719

Christopher Mabey - *Brigham Young University ,* **Tevin Dickerson** - *Brigham Young University ,* **John Salmon** - *Brigham Young University ,* **Christopher Mattson** - *Brigham Young University*

DAC-15-03: MULTIDISCIPLINARY DESIGN OPTIMIZATION, MULTIOBJECTIVE OPTIMIZATION, AND SENSITIVITY ANALYSIS
4:20PM–6:00PM   ARLINGTON (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Mian Li - *Shanghai JiaoTong University*
Co-Chair: Hongyi Xu - *University of Connecticut*
Co-Chair: Shikui Chen - *Stony Brook University*

Scenario-Based Multi-Objective Robust Optimization With Interval and Distributional Uncertainty

Technical Presentation: IDETC2023-118025

Elizabeth Jordan - *University of Maryland, College Park ,* **Shapour Azarm** - *University of Maryland, College Park*

Multi-Material and Multi-Joint Topology Optimization Considering Multiple Design Spaces

Technical Paper Publication: IDETC2023-113451

Il Yong Kim - *Queen's University ,* **Yuhao Huang** - *Queen's University ,* **Luke Crispo** - *Queen's University*

Robust Topology Optimization of Synchronous Reluctance Motors (SynRMs) Using Cardinal Basis Function (CBF) Based Level Set Method

Technical Paper Publication: IDETC2023-115068

Jiawei Tian - *State University of New York at Stony Brook ,* **David Torrey** - *GE Research,* **Fang Luo** - *State University of New York at Stony Brook ,* **Jon Longtin** - *State University of New York at Stony Brook ,* **Shikui Chen** - *State University of New York at Stony Brook*

A Method to Identify and Leverage Promising Design Heuristics for Multiobjective Combinatorial Design Optimization

Technical Presentation: IDETC2023-118058

Roshan Suresh Kumar - *Texas A&M University ,* **Daniel Selva** - *Texas A&M University*

A Framework for Developing Systematic Testbed for Multi-Fidelity Optimization Methods

Technical Presentation: IDETC2023-118122

Siyu Tao - *Dassault Systemes,* **Srikanth Devanathan** - *Dassault Systemes ,* **Chaitra Sharma** - *Dassault Systemes*

CIE-05/06: AMS JOINT TOPICS
4:20PM–6:00PM   CLARENDON (MEZZ)

Chair: Gaurav Ameta - *Siemens*
Co-Chair: Björn Johansson - *Chalmers University of Technology*

Analytically Determined Frequency Shifts for a Continuous Model 3d Printed Metal Beam With Square Void Defect

Technical Paper Publication: IDETC2023-115074

Quin Howell - *California State University, Chico ,* **Joshua Davis** - *California State University, Chico ,* **Trevor Folden** - *California State University, Chico ,* **Stewart Lamon** - *California State University, Chico ,* **Dennis O'connor** - *California State University, Chico*

Digital Twin Based Development of Mobile Robot Assistant for Wind Turbines Manufacturing

Technical Paper Publication: IDETC2023-115261

Ali Ahmad Malik - *Oakland University*

Analysis of Mechanical Chemical and Thermal Properties of PLA Filaments After Mechanical Recycling

Technical Paper Publication: IDETC2023-116824

Mahsa Shabani - *Clemson University* , **Cameron Turner** - *Clemson University*

Towards Fatigue-Tolerant Design of Additively Manufactured Metamaterials

Technical Paper Publication: IDETC2023-117512

Nicole Apetre - *U.S. Naval Research Laboratory* , **Attilio Arcari** - *U.S. Naval Research Laboratory* , **John Michopoulos** - *U.S. Naval Research Laboratory* , **Steven Rodriguez** - *U.S. Naval Research Laboratory,* **Athanasios Iliopoulos** - *U.S. Naval Research Laboratory,* **John Steuben** - *U.S. Naval Research Laboratory* , **Benjamin Graber** - *U.S. Naval Research Laboratory*

Finite Element Simulation of Gleeble Testing Toward Thermomechanical Analysis of Alloy Materials

Technical Paper Publication: IDETC2023- 115184

Dong Xu - *University of Connecticut* , **Kevin Zhang** - *University of Connecticut* , **Lesley Frame** - *University of Connecticut* , **Jeongho Kim** - *University of Connecticut* , **Jiong Tang** - *University of Connecticut*

CIE-07-02: CAPPD GENERAL
4:20PM–6:00PM   BERKELEY (MEZZ)

Chair: Chiradeep Sen - *Florida Institute of Technology*
Co-Chair: Ehsan Esfahani - *University of Buffalo*

Study the Impact of Cross-Sections on the Energy Absorption of Architected Materials

Technical Paper Publication: IDETC2023-116583

Xinnian Wang - *University of Illinois at Chicago,* **Sina Rastegarzadeh** - *University of Illinois at Chicago* , **Yayue Pan** - *University of Illinois at Chicago,* **Jida Huang** - *University of Illinois at Chicago*

Conceptual Design and Virtual Prototyping of a Constant Force Gripper for Food Harvesting

Technical Paper Publication: IDETC2023-116587

Mario Baggetta - *University of Genoa* , **Guangbo Hao** - *University College Cork* , **Giovanni Berselli** - *University of Genoa*

Vector Field Based Volume Peeling for Multi-Axis Machining

Technical Paper Publication: IDETC2023-116742

Neelotpal Dutta - *The University of Manchester* , **Tianyu Zhang** - *The University of Manchester* , **Guoxin Fang** - *The University of Manchester* , **Ismail E. Yigit** - *The University of Manchester* , **Charlie C.L. Wang** - *The University of Manchester*

Process Control-Based Embedding and Computer Vision-Based Retrieval of 2D Codes in Fused Deposition Modeling

Technical Paper Publication: IDETC2023-116880

Karim Elsayed - *Purdue University* , **Jitesh Panchal** - *Purdue University*

Generative Design of Statistically Self-Similar Mechanical Structures

Technical Paper Publication: IDETC2023-117063

Noah Hill - *Texas A&M University* , **Matthew Ebert** - *Texas A&M University,* **Mena Maurice** - *Texas A&M University,* **Vinayak Krishnamurthy** - *Texas A&M University*

CIE-19: VES VIRTUAL SYSTEMS FOR ENGINEERING APPLICATIONS
4:20PM–6:00PM   GEORGIAN (MEZZ)

Chair: Marco Rossoni - *Politecnico di Milano*
Co-Chair: Rebecca Friesen - *Texas A&M University*

Perceived Complexity of 3D Shapes for Spatial Visualizaton Tasks: Humans versus Generative Models

Technical Paper Publication: IDETC2023- 115081

Lucy Mcshane - *Lafayette College* , **Christian Lopez** - *Lafayette College*

Animated Point Clouds Real-Time Rendering for Extended Reality

Technical Paper Publication: IDETC2023-115124

Pietro Piazzolla - *Politecnico di Milano* , **Marco Rossoni** - *Politecnico di Milano* , **Matteo Pozzi** - *Politecnico di Milano* , **Giorgio Colombo** - *Politecnico di Milano* , **Marco Gribaudo** - *Politecnico di Milano*

Adding a Novel Sensory Dimension to the Use of Virtual Reality in Training

Technical Paper Publication: IDETC2023-116561

Francesco Ferrise - *Politecnico di Milano* , **Nicolò Dozio** - *Politecnico di Milano* , **Elena Spadoni** - *Politecnico di Milano* , **Marco Rossoni** - *Politecnico di Milano* , **Marina Carulli** - *Politecnico di Milano* , **Monica Bordegoni**-- *Politecnico di Milano*

A Global Correction Method for Camera Registration in Video See-Through Augmented Reality Systems

Technical Presentation: IDETC2023-118202

Wenhao Yang - *Rochester Institute of Technology* , **Yunbo Zhang** - *Rochester Institute of Technology*

"I Can See Your Password": A Case Study About Cybersecurity Risks in Mid-Air Interactions of Mixed Reality-Based Smart Manufacturing Applications

Technical Presentation: IDETC2023-118212

Yunbo Zhang - *Rochester Institute of Technology* , **Wenhao Yang** - *Rochester Institute of Technology*

AVT-06-01: ADVANCES IN LIGHT VEHICLES DESIGN
4:20PM–6:00PM   **BEACON HILL (4TH FL)**

Chair: Alberto Doria - *University of Padova*
Co-Chair: Luis Munoz - *Universidad de los Andes*

The Effect of Tyre Models on the Stability and Ride Dynamics of Two-Wheeled Vehicles: MF-Tyre versus MF-Swift

Technical Paper Publication: IDETC2023-116540

Matteo Mottola - *Università degli Studi di Padova* , **Stefano Lovato** - *Università degli Studi di Padova* , **Roberto Lot** - *Univeristà di Padova*, **Matteo Massaro**–- *Università degli Studi di Padova*

Optimal Structural Design of the Composite Chassis of a High Energy Efficient Vehicle

Technical Paper Publication: IDETC2023-116843

Pietro Stabile - *Politecnico di Milano* , **Federico Maria Ballo** - *Politecnico di Milano* , **Massimiliano Gobbi** - *Politecnico di Milano* , **Gianpiero Mastinu** - *Politecnico di Milano*

Development of Light-Weight Vehicles for Highway Transportation

Technical Presentation: IDETC2023-118203

Andrzej Wylezinski - *Wabash National Corp.*

WEDNESDAY, AUGUST 23, 2023

VIB-15-01: VIBRATION MEASUREMENT, SIGNAL PROCESSING, AND STRUCTURAL DAMAGE DETECTION
8:00AM–9:40AM STUART (4TH FL)

Chair: Weidong Zhu - *University of Maryland, Baltimore County*
Co-Chair: Sichen Yuan - *University of Alabama*

High-Speed Schlieren Imaging of Shock Waves for the Study of Tympanic Membrane's Response

Technical Paper Publication: IDETC2023-115148

Jonathan Oliveira Luiz - *Center for Holographic Studies and Laser micro-mechaTronics ,* **Anahita Alipanahi** - *Worcester Polytechnic Institute,* **Jeffrey Cheng** - *Massachusetts Eye and Ear ,* **John Rosowski** - *Massachusetts Eye and Ear,* **Cosme Furlong-Vazquez** - *Worcester Polytechnic Institute*

Back-EMF Sensing of Linear Resonant Actuators for Detection of Tap-Induced Vibration

Technical Paper Publication: IDETC2023-117180

Ryan Schmidt - *Georgia Institute of Technology,* **Melissa Hernandez Guzman** - *Georgia Institute of Technology,* **Franziska Schlagenhauf** - *Georgia Institute of Technology,* **William Singhose** - *Georgia Institute of Technology*

Application of Topology-Optimization Based Damage Identification Method to Three-Dimensional Structures

Technical Presentation: IDETC2023-117674

Akira Saito - *Meiji University ,* **Wang Zhongxu** - *Meiji University,* **Hidetaka Saomoto** - *National Institute of Advanced Industrial Science and Technology*

EEG Analysis of Seated Occupants Subjected to Whole-Body Vibration

Technical Presentation: IDETC2023-118093

Byoung-Gyu Song - *Kyungpook National University ,* **Namcheol Kang** - *Kyungpook National University*

A Novel Robust Edge Detection Method for Full-Field Modal Parameter Estimation Using an Image-Based Tracking Continuously Scanning Laser Doppler Vibrometer System

Technical Presentation: IDETC2023-116826

Linfeng Lyu - *University of Maryland Baltimore County ,* **Garrett Higgins** - *University of Maryland Baltimore County ,* **Weidong Zhu** - *University of Maryland*

DTM-09-02: DESIGN COGNITION
8:00AM–9:40AM SCOLLAY (LOBBY LEVEL)

Chair: Rahul Sharan Ren –- *Francis Marion University*
Co-Chair: Srinivasan V. - *Indian Institute of Technology Delhi*
Co-Chair: Joshua Summers - *The University of Texas at Dallas*

Investigating Cognitive Biases Within Different Forms of Knowledge Actions in Design Cognition

Technical Presentation: IDETC2023-117978

Elizabeth Pollack - *University of Wisconsin-Madison ,* **Jackson Moffitt** - *University of Wisconsin-Madison ,* **Katherine Fu** - *University of Wisconsin-Madison*

The Potential for Incentive Structures to Prevent Significant Engineering Failures

Technical Paper Publication: IDETC2023-116706

Wanru Li - *George Mason University,* **George Hazelrigg** - *George Mason University*

The Two Sides of Design: Applications of Dual-Process Theory

Technical Presentation: IDETC2023-118154

Meagan Flus - *University of Toronto ,* **Alison Olechowski** - *University of Toronto*

Striking the Right Balance: Formulating Effective Problem Statements in Crowdsourcing by Balancing Seeker Knowledge and Solver Capabilities

Technical Presentation: IDETC2023-117811

Ademir-Paolo Vrolijk - *University of Toronto,* **Zoe Szajnfarber** - *The George Washington University*

Steps Toward Development of a Comprehensive Set-Based Design Process Model: A Case Study

Technical Paper Publication: IDETC2023-115315

Jonathan Page - *U.S. Navy,* **Warren Seering** - *Massachusetts Institute of Technology*

Development of a Validation Process, Overcoming the Challenges Associated With the Evaluation of Design Indicators

Technical Paper Publication: IDETC2023-111929

Ana Maria Mesa Lopez- *Universidad EAFIT ,* **Santiago Ruiz-Arenas** - *Universidad EAFIT*

VIB-03-01: ENERGY HARVESTING
8:00AM–9:40AM   TREMONT (4TH FL)

Chair: Wei-Che Tai - *Michigan State University*
Co-Chair: Shengxi Zhou - *Northwestern Polytechnical University*
Co-Chair: Feng Qian - *Penn State Behrend*

Identification of the Piezoelectric Properties of Materials From Impulsive Tests on Cantilever Harvesters

Technical Paper Publication: IDETC2023-114894

Domenico Tommasino - *University of Padova ,* **Michele Tonan** - *University of Padova ,* **Federico Moro** - *University of Padova ,* **Alberto Doria** - *University of Padova*

Numerical Analysis and Wave Tank Test of a Point Absorber Wave Energy Converter Using a Tether Driven Power Take-Off System

Technical Paper Publication: IDETC2023-114939

Hu Zhang - *Wuhan University of Technology ,* **Liang Sun** - *Wuhan University of Technology ,* **Jingxuan Liu** - *The University of Texas at Austin* , **Jia Mi** - *University of Michigan,* **Xiaofan Li** - *University of Michigan,* **Lin Xu** - *Wuhan University of Technology ,* **Lei Zuo** - *University of Michigan*

Ocean Wave Energy Conversion With a Spar-Floater System Using a Nonlinear Inerter Pendulum Vibration Absorber

Technical Paper Publication: IDETC2023-117069

Aakash Gupta - *Michigan State University ,* **Wei-Che Tai** - *Michigan State University*

Experimental Study on Frequency Up Conversion Utilizing a Pendulum Mechanism for Energy Harvesting

Technical Presentation: IDETC2023-112306

Weijie Xian - *University of Maryland, Baltimore County ,* **Soobum Lee** - *University of Maryland, Baltimore County*

Recent Advances in Energy Harvesting From Vibration and Human Motion

Technical Presentation: IDETC2023-117975

Wei-Hsin Liao - *Chinese University of Hong Kong*

MR-1-4: MECHANISMS SYNTHESIS AND ANALYSIS
8:00AM–9:40AM   THE LOFT (LOBBY LEVEL)

Chair: Philip Voglewede - *Marquette University*
Co-Chair: Atul Thakur - *Indian Institute of Technology Patna*

Kinematics of an Adjustable Cam-Linkage Mechanism for a Variable Displacement Hydraulic Motor

Technical Paper Publication: IDETC2023-115013

Jonatan Pozo-Palacios - *University of Minnesota ,* **John Voth** - *University of Minnesota,* **James Donald Van De Ven** - *University of Minnesota*

Profile Synthesis of Inverse Cam Mechanism Using the Instant-Center Method

Technical Paper Publication: IDETC2023-116375

Jing-Yi Shao - *National Taiwan University,* **Wen-Huei Yang** - *National Tsing Hua University ,* **Long-Iong Wu** - *National Tsing Hua University ,* **Kuan-Lun Hsu** - *National Taiwan University*

Bio-Inspired Gait Trajectory Design for Lizard-Inspired Wall Climbing Robot

Technical Paper Publication: IDETC2023-116421

Anugrah Ak - *Indian Institute of Technology Patna ,* **Atul Thakur** - *Indian Institute of Technology Patna*

Experimental Verification of Sobol Sensitivity Indices in a Space Latching Mechanism

Technical Paper Publication: IDETC2023-116738

Nathan Johnson - *Milwaukee School of Engineering* , **Christopher Roberts** - *Marquette University,* **Brian Slaboch** - *Milwaukee School of Engineering* , **Philip Voglewede** - *Marquette University*

Design and Implementation of Eight-Wheeled Semi-Autonomous Delivery Robot

Technical Presentation: IDETC2023-118168

Omer Mutlu Turk Kaya - *Yildiz Technical University,* **Gokhan Erdemir** - *The University of Tennessee at Chattanooga*

MR-3-2: COMPLIANT MECHANISMS (A. MIDHA SYMPOSIUM)
8:00AM–9:40AM   STUDIO 1 (LOBBY LEVEL)

Chair: Jonathan Hopkins - *University of California, Los Angeles*
Co-Chair: Just L. Herder - *Delft University of Technology*

Deltaflex: An Additively Manufactured Monolithic Delta Robot With Compliant Joints

Technical Paper Publication: IDETC2023-114914

Alberto Parmiggiani - *Istituto Italiano di Tecnologia* , **Emilio Ottonello** - *Istituto Italiano di Tecnologia,* **Seyyed Masoud Kargar** - *Università degli Studi di Genova* , **Mario Baggetta** - *Università degli Studi di Genova* , **Guangbo Hao** - *University College Cork,* **Giovanni Berselli** - *Università degli Studi di Genova*

A Force- and Stress-Deflection Model of Serpentine Flexures for Use in a Compliant Bone Plate

Technical Paper Publication: IDETC2023-115051

Connor Huxman - *The Pennsylvania State University* , **Jared Butler** - *The Pennsylvania State University*

Application of the Ellipse of Elasticity to a Hybrid-Chain Compliant Mechanism

Technical Paper Publication: IDETC2023-115219

Orazio Sorgonà - *Niccoló Cusano University of Rome* , **Oliviero Giannini** - *Niccoló Cusano University of Rome* , **Matteo Verotti** - *University of Genoa*

Effect of Cross-Axis Pivots Orientation on Accuracy Performance of Compliant Mechanisms

Technical Paper Publication: IDETC2023-115226

Simone Serafino - *University of Genova* , **Pietro Fanghella** - *University of Genoa* , **Matteo Verotti** - *University of Genoa*

A Rigid-Compliant Hybrid Heat Dissipation Mechanism Driven by Thermal Expansion

Technical Paper Publication: IDETC2023-116359

Tingwei Wang - *Beihang University* , **Jingjun Yu** - *Beihang University* , **Hongzhe Zhao** - *Beihang University*

MR-4-5: DEPLOYABLE ORIGAMI II
8:00AM–9:40AM   STUDIO 2 (LOBBY LEVEL)

Chair: Jared Butler - *The Pennsylvania State University*
Co-Chair: Brandon Sargent - *Gonzaga*

Reaction Force Analysis and Validation of a Rigid Origami-Inspired Modified Wren Parallel Mechanism With Flexure Hinges

Technical Paper Publication: IDETC2023-115262

Zhujin Jiang - *Queen Mary University of London* , **Ketao Zhang** - *Queen Mary University of London*

A Framework for Origami Flasher Pattern Optimization to Mitigate Rigid-Foldability Issues

Technical Paper Publication: IDETC2023-116542

Katie Varela - *Brigham Young University* , **Nathan Coleman** - *Brigham Young University* , **Mitchel Skinner** - *Brigham Young University* , **Larry Howell** - *Brigham Young University* , **Spencer Magleby** - *Brigham Young University*

Preliminary Concepts for Magnetic Actuation and Stabilization of Origami-Based Arrays

Technical Paper Publication: IDETC2023-116615

Hunter Pruett - *Brigham Young University* , **Nathan Coleman** - *Brigham Young University* , **Spencer Magleby** - *Brigham Young University*

Technical Sessions - Wednesday August 23

Preliminary Design of a Deployable Optical Space Array Based on a Thickened Origami Flasher Pattern

Technical Paper Publication: IDETC2023-116803

Jared Hunter - *Brigham Young University* , **Clark Roubicek** - *Brigham Young University,* **Mark Stephen** - *NASA Goddard Space Flight Center ,* **Spencer Magleby** - *Brigham Young University ,* **Larry Howell** - *Brigham Young University*

Multiplanar Origami: A New Approach to Design for Manufacturing and Assembly of Origami

Technical Presentation: IDETC2023-117921

Tyler Stevens - *Brigham Young University ,* **Nathan Crane** - *Brigham Young University*

DAC-02-02: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FOR CHALLENGING REAL-WORLD PROBLEMS IN DESIGN AUTOMATION
8:00AM–9:40AM   ARLINGTON (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Philip Odonkor** - *Stevens Institute of Technology*
Co-Chair: **Zhibo Zhang** - *University at Buffalo*

A Heuristic Approach to Classify Geometrically Defective Bead Segments Based on Range of Sound Power, Range of Curvature and Maximum Height

Technical Paper Publication: IDETC2023-114741

Nowrin Akter Surovi - *Singapore University of Technology and Design,* **Gim Song Soh** - *Singapore University of Technology and Design*

Counterfactuals for Design: A Model-Agnostic Method for Design Recommendations

Technical Paper Publication: IDETC2023-117216

Lyle Regenwetter - *Massachussetts Institute of Technology ,* **Yazan Abu Obaideh** - *ProgressSoft,* **Faez Ahmed** - *Massachusetts Institute of Technology*

Machine Learning-Based Model Bias Correction by Fusing CAE Data With Test Data for Vehicle Crashworthiness

Technical Paper Publication: IDETC2023-114999

Jice Zeng - *University of Michigan-Dearborn ,* **Ying Zhao** - *University of Michigan-Dearborn ,* **Guosong Li** - *Ford Motor Company,* **Zhenyan Gao** - *Ford Motor Company ,* **Yang Li** - *Ford Motor Company,* **Saeed Barbat** - *Ford Motor Company,* **Zhen Hu** - *University of Michigan-Dearborn*

DAC-11-03: DESIGN OF ENGINEERING MATERIALS AND STRUCTURES
8:00AM–9:40AM   HANCOCK (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Hongyi Xu** - *University of Connecticut*
Co-Chair: **Yuqing Zhou** - *Toyota Research Institute of North America*

Optimization of Multi-Material Sandwich Structures Towards Simultaneous Structural-Acoustic Performance

Technical Presentation: IDETC2023-117730

Vanessa Cool - *KU Leuven,* **Niels Aage** - *Danmarks Tekniske Universitet,* **Ole Sigmund** - *Danmarks Tekniske Universitet*

Design of Mixed-Category Stochastic Microstructures: A Comparison of Curvatual Functional-Based and Deep Generative Model-Based Methods

Technical Paper Publication: IDETC2023-114601

Leidong Xu - *University of Connecticut,* **Kiarash Naghavi Khanghah** - *University of Connecticut ,* **Hongyi Xu** - *University of Connecticut*

Comparing Derivatives of Neural Networks for Regression

Technical Paper Publication: IDETC2023-117571

Joel Najmon - *Indiana University - Purdue University, Indianapolis,* **Andres Tovar** - *Indiana University - Purdue University, Indianapolis*

Topology Optimization of Plate Heat Exchangers Employing Geometry Projection Method

Technical Presentation: IDETC2023-118126

Prabin Pradhananga - *University of Connecticut ,* **Navid Changizi** - *University of Connecticut ,* **Andre Benard** - *Michigan State University ,* **Patrick Kwon** - *Michigan State University ,* **Haseung Chung** - *Michigan State University ,* **Julian Norato** - *University of Connecticut*

Operating Mode Design Space Guides the Design of Lightweight Structures From Thin-Walled Cylinders

Technical Presentation: IDETC2023- 118217

Ruoyu Sun - *University of Illinois at Urbana-Champaign* , **Nilesh Mankame** - *General Motors Research and Development* , **Girish Krishnan** - *University of Illinois at Urbana-Champaign*

Designing Sensors for the Study of Rainwater Harvesting Adoption in Mexico City

Technical Presentation: IDETC2023-117595

Eren Rudy - *University of Toronto,* **Adriana Diaz Lozano Patiño** - *University of Toronto* , **Yu Chen** - *University of Toronto,* **Amy Bilton** - *University of Toronto*

DAC-12-03: ENGINEERING FOR GLOBAL DEVELOPMENT
8:00AM–9:40AM   **STATLER (MEZZ)**

Chair: Chao Hu - *Iowa State University*
Co-Chair: Amy Bilton - *University of Toronto*
Co-Chair: Natasha Wright - *University of Minnesota Twin Cities*

Achieving High Performance and Low Cost: Development of a High-Performing Passive Prosthetic Knee for Emerging Markets

Technical Paper Publication: IDETC2023-116478

Madison Reddie - *Massachusetts Institute of Technology* , **Saloni Bedi** - *Massachusetts Institute of Technology* , **Manasi Vaidya** - *Massachusetts Institute of Technology* , **Amari Griffin** - *Harvard University,* **Nina Petelina** - *Massachusetts Institute of Technology* , **Amos G. Winter** - *Massachusetts Institute of Technology*

Quantifying Resilience Trade-Offs for Small-Scale Farms: A System Optimization Study in Uganda

Technical Paper Publication: IDETC2023-116657

Jesse Austin-Breneman - *University of Michigan,* **Praneet Nallan Chakravarthula** - *University of Michigan* , **Alvin Kimbowa** - *Makerere University,* **Peter Ozaveshe Oviroh** - *University of Johannesburg,* **Samuel Boahen** - *Kwame Nkrumah University of Science & Technology* , **Emmanuel Wokulira Miyongo** - *Makerere University,* **Panos Papalambros** - *University of Michigan*

The Giving Garden: Realizing Community and Fostering a Connection to the Land Through Co-Design in Duluth, Minnesota

Technical Paper Publication: IDETC2023-116756

Austin Konrath - *University of Minnesota Duluth,* **Abigail R. Clarke-Sather** - *University of Minnesota Duluth,* **Regina Laroche** - *Planting Connections, Planting Hope Program, Diaspora Gardens* , **Morgan Bliss** - *Giving Garden,* **Rumbidizai Masawi** - *Giving Garden*

DTM-10-01: UNDERSTANDING DESIGN THINKING
10:00AM–11:40AM   **SCOLLAY (LOBBY LEVEL)**

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Astrid Layton - *Texas A&M*
Co-Chair: Jinjuan She - *Miami Ohio*

A Customer Journey Mapping Approach With Mobile Application

Technical Paper Publication: IDETC2023-112637

Yiqing Ding - *Stanford University* , **Erin Macdonald** - *Stanford University* , **James Lattin** - *Stanford University*

Journey Mapping the Virtual Design Thinking Experience: Engaging Students Across Disciplines in Human-Centered Design

Technical Paper Publication: IDETC2023-108817

George Moore - *Massachusetts Institute of Technology* , **Vivek Rao** - *University of California, Berkeley,* **Kosa Goucher-Lambert** - *University of California, Berkeley,* **Alice Agogino** - *University of California, Berkeley*

Open Quantum Models and Magnetoencephalography Derived Neural Correlates for Engineering Decision Dynamics

Technical Paper Publication: IDETC2023-116722

Calahan Mollan - *Oakland University* , **Susan Bowyer** - *Oakland University* , **Vijitashwa Pandey** - *Oakland University*

Triple Process Theory and EEG Frequency Band Power: Metacognitive Brain Activity in Open Design

Technical Paper Publication: IDETC2023- 115050

Sonia Liliana Da Silva Vieira - *University of Porto* , **Udo Kannengiesser** - *Johannes Keppler University,* **John S. Gero** - *University of North Carolina at Charlotte*

Design Neurocognition in the First Stage of Product Development

Technical Presentation: IDETC2023-118101

Jacob Hunter - *Purdue University,* **John Gero** - *University of North Carolina at Charlotte,* **Tahira Reid -** *Pennsylvania State University*

When Creativity Goes Rogue: Uncovering the Potential Dangers of VR for Engineering Design

Student Poster Presentation: IDETC2023-117815

Jiacheng Cai - *The Pennsylvania State University,* **Scarlett R. Miller** - *The Pennsylvania State University ,* **Samuel T. Hunter** - *The Pennsylvania State University*

Determination of a System Level Sensitivity Analysis for the Optimization of Mechatronic Systems Using Multi-Body Co- Simulations

Technical Presentation: IDETC2023-117763

Daan Bortels - *KU Leuven ,* **Jari Peeters** - *KU Leuven,* **Simon Vanpaemel** - *KU Leuven ,* **Frank Naets** - *KU Leuven*

Shape Modes of Dynamic Structures

Technical Presentation: IDETC2023-118270

Seyed Ali Ghasemi - *TU Dortmund University ,* **Jan Liedmann** - *TU Dortmund University,* **Franz-Joseph Barthold** - *TU Dortmund University*

MSNDC-09-01: OPTIMIZATION, SENSITIVITY ANALYSIS, AND UNCERTAINTY QUANTIFICATION IN DYNAMIC SYSTEMS
10:00AM–11:40AM   WHITE HILL (4TH FL)

Chair: Radu Serban - *University of Wisconsin-Madison*
Co-Chair: Antonio Recuero - *Idaho National Laboratory*

Inertia Parameter Identification for Closed-Loop Mechanisms: Adaptation of Linear Regression for Coordinate Partitioning

Technical Paper Publication: IDETC2023-114891

Lauri Pyrhönen - *LUT University,* **Aki Mikkola** - *LUT University ,* **Frank Naets** - *KU Leuven*

A Comparison of Flexible Dynamics Formulations for Coupled Fluid and Deformable Body Simulations: FEM-SPH, LPM-SPH, or SPG-SPH?

Technical Paper Publication: IDETC2023-111406

Bonaventura Tagliafierro - *Universitat Politecnica de Catalunya ,* **Iván Martínez-Estévez** - *Univesity of Vigo,* **Salvatore Capasso** - *University of Salerno ,* **José Domínguez** - *University of Vigo ,* **Joseph O'connor** - *Imperial College London,* **Corrado Altomare** - *Universitat Politècnica de Catalunya ,* **Giacomo Viccione** - *University of Salerno,* **Alejandro Crespo** - *University of Vigo,* **Benedict D. Rogers** - *The University of Manchester ,* **Radu Serban** - *University of Wisconsin-Madison ,* **Dan Negrut** - *University of Wisconsin-Madison*

Efficient and Accurate Real-Time Simulations of Coupled Mechanical Systems Using the Universal Hydraulic Surrogate

Technical Paper Publication: IDETC2023-117402

Qasim Khadim - *University of Oulu ,* **Emil Kurvinen** - *University of Oulu ,* **Aki Mikkola** - *LUT University,* **Grzegorz Orzechowski** - *LUT University*

MSNDC-04/VIB-09-03: NONLINEAR DYNAMICS OF SYSTEMS AND STRUCTURES
10:00AM–11:40AM   WHITTIER (4TH FL)

Chair: Ajeet Kumar - *IIT Delhi*
Co-Chair: Gizem Acar - *Stevens Institute of Technology*
Co-Chair: Richard Wiebe - *University of Washington*
Co-Chair: Stefano Lenci - *Polytechnic University of Marche*
Co-Chair: Brian Feeny - *Michigan State University*

On Selecting and Reconstructing Lyapunov Functions for Stability Analysis of Nonlinear Dynamical Systems

Technical Paper Publication: IDETC2023-116835

Bin Wei - *Texas A&M University-Kingsville*

Exploring the Kuramoto Effect Using Multibody Simulation: Simscape Multibody Model of Metronomes on a Moving Platform

Technical Presentation: IDETC2023-117919

Karanjodh Singh Meen - *MathWorks Inc.,* **Steve Miller** - *MathWorks Inc.,* **Jan Janse Van Rensburg** - *MathWorks Inc.*

Nonlinear Dynamics Simulation of the Contact Force in Planar Mechanism With Clearance

Technical Paper Publication: IDETC2023-114952

Louay Yousuf - *San Diego State University*

DAC-04-03: DATA-DRIVEN DESIGN
10:00AM–11:40AM   **ARLINGTON (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Souma Chowdhury** - *University at Buffalo*
Co-Chair: **Ali Mehmani** - *Prescriptive Data Inc.*

Deep Generative Model-Based Synthesis of Four-Bar Linkage Mechanisms Considering Both Kinematic and Dynamic Conditions

Technical Paper Publication: IDETC2023-114464

Sumin Lee - *Korea Advanced Institute of Science and Technology* , **Jihoon Kim** - *Korea Advanced Institute of Science and Technology* , **Namwoo Kang** - *Korea Advanced Institute of Science and Technology*

On-the-Fly Dual Reduction Method on Transient Fluid Topology Optimization

Technical Paper Publication: IDETC2023-114806

Tianye Wang - *University of Wisconsin, Madison* , **Xiaoping Qian** - *University of Wisconsin, Madison*

A Visual Representation of Engineering Catalogs Using Variational Autoencoders

Technical Paper Publication: IDETC2023-115029

Saketh Sridhara - *University of Wisconsin* , **Krishnan Suresh** - *University of Wisconsin*

Investigating Customer Preferences Using Video Product Reviews

Technical Paper Publication: IDETC2023-115206

Kangcheng Lin - *University of Illinois* , **Harrison Kim** - *University of Illinois*

On the Connectedness of the Topology Optimization Predictors

Technical Paper Publication: IDETC2023-116574

MohammadMahdi Behzadi - *University of Connecticut* , **Horea Ilies** - *University of Connecticut*

DAC-09-01: DESIGN FOR RESILIENCE AND FAILURE RECOVERY
10:00AM–11:40AM   **STATLER (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Nita Yodo** - *North Dakota State University*
Co-Chair: **Zhen Hu** - *University of Michigan-Dearborn*

A Reliability-Based Optimization Framework for Planning Operational Profiles for Unmanned Systems

Technical Paper Publication: IDETC2023- 116586

Indranil Hazra - *University of Maryland, College Park* , **Arko Chatterjee** - *University of Maryland, College Park* , **Joseph Southgate** - *University of Maryland, College Park* , **Matthew Weiner** - *University of Maryland, College Park* , **Katrina M. Groth** - *University of Maryland, College Park* . **Shapour Azarm** - *University of Maryland, College Park*

Physics-Informed Neural Networks for Degradation Diagnostics of Lithium-Ion Batteries

Technical Paper Publication: IDETC2023-116940

Sina Navidi - *University of Connecticut* , **Adam Thelen** - *Iowa State University*, **Tingkai Li** - *University of Connecticut* , **Chao Hu** - *University of Connecticut*

Data-Driven Design for Indirect Liquid Cooling Plate With Microchannel for Battery Thermal Management

Technical Paper Publication: IDETC2023-116921

Zheng Liu - *University of Illinois at Urbana-Champaign*, **Yanwen Xu** - *University of Illinois at Urbana-Champaign* , **Hao Wu** - *University of Illinois at Urbana-Champaign* , **Pingfeng Wang** - *University of Illinois at Urbana-Champaign* , **Yumeng Li** - *University of Illinois at Urbana-Champaign*

Mean Time to Failure Prediction for Complex Systems With Adaptive Surrogate Modeling

Technical Paper Publication: IDETC2023-117177

Hao Wu - *University of Illinois at Urbana-Champaign* , **Yanwen Xu** - *University of Illinois at Urbana-Champaign* , **Zheng Liu** - *University of Illinois at Urbana-Champaign* , **Pingfeng Wang** - *University of Illinois at Urbana-Champaign*

Sensor Network Design for Permanent Magnet Synchronous Motor Fault Diagnosis

Technical Paper Publication: IDETC2023-116972

Sara Kohtz - *University of Illinois at Urbana-Champaign* , **Junhan Zhao** *- University of Illinois at Urbana-Champaign* , **Anabel Renteria** - *University of Illinois at Urbana-Champaign* , **Anand Vikas Lalwani** - *Stanford University,* **Xialong Zhang** - *University of Illinois at Urbana-Champaign,* **Kiruba Sivasubramaniam Haran** - *University of Illinois at Urbana-Champaign* , **Debbie Senesky** - *Stanford University,* **Pingfeng Wang** *- University of Illinois at Urbana-Champaign*

DAC-25-01: AI-DRIVEN DESIGN INNOVATION
10:00AM–11:40AM   HANCOCK (MEZZ)

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Wei Chen** - *Northwestern University*
Co-Chair: **Binyang Song** - *Massachusetts Institute of Technology*

The Generation of Novel Art Using Collaborative MI Models

Technical Paper Publication: IDETC2023-116825

Ada-Rhodes Short - *University of Nebraska at Omaha*

An Integrated Approach to Designing Robust Turbocompressors on Gas Bearings Through Surrogate Modeling and Constrained Multi-Objective Optimization

Technical Paper Publication: IDETC2023-115201

Soheyl Massoudi - *École Polytechnique Fédérale de Lausanne,* **Cyril Picard** - *Massachusetts Institute of Technology,* **Jürg Schiffmann** - *École Polytechnique Fédérale de Lausanne*

Transfer Reinforcement Learning: Feature Transferability in Ship Collision Avoidance

Technical Paper Publication: IDETC2023-116709

Xinrui Wang - *University of Southern California* , **Yan Jin** - *University of Southern California*

Teaching AI to Design From Humans: A Comparison of Behavioral Cloning Architectures

Technical Paper Publication: IDETC2023-115280

Ghazal Boozarjomehry - *University of Calgary* , **Joseph Thekinen** *- University of Calgary,*

A Generic Gan Model for Multi-Criteria Generative Design

Technical Presentation: IDETC2023-117830

Parisa Ghasemi - *Northeastern University ,* **Mohsen Moghaddam** *- Northeastern University*

DFMLC-05-02: DESIGN FOR ADDITIVE MANUFACTURING
10:00AM–11:40AM   PARK (LOBBY LEVEL)

Chair: **Paul Egan** - *Texas Tech University*
Co-Chair: **Yaoyao Zhao** - *McGill University*
Co-Chair: **Xinyi Xiao** - *Miami University*

Designing Manufacturable Meso-Scale Architected Materials for Scanning-Type Additive Manufacturing

Technical Presentation: IDETC2023-117726

Albert Patterson - *Texas A&M University,* **Charul Chadha** - *University of Illinois at Urbana-Champaign Iwona Jasiuk - University of Illinois at Urbana-Champaign*

Assessing the Relationship Between Part Complexity and Energy Consumption in Laser Powder Bed Fusion

Technical Presentation: IDETC2023-117782

Kaitlyn Gee - *Massachusetts Institute of Technology*

Fabrication Consistency and Mechanics of 3D Printed Bone Tissue Scaffolds With Tunable Anisotropic Stiffness

Technical Presentation: IDETC2023-117861

Abullah Masud - *Texas Tech University* , **Amit Arefin** - *Texas Tech University* , **Nava Khatri** - *Texas Tech University* , **Ming Chyu** - *Texas Tech University* , **Paul Egan** - *Texas Tech University*

Medical Device Hybrid Manufacturing: Translating the Coordinate System From Metal Additive Manufacturing to Subtractive Post-Processing

Technical Presentation: IDETC2023-117898

Justin Suriano - *New Jersey Institute of Technology* , **Angelantonio Tafuni** *- New Jersey Institute of Technology* , **Lewis Mullen** - *Stryker Orthopaedics,* **Joseph Racanelli** - *Stryker Orthopaedics,* **Robert Tarantino** *- New Jersey Precision Technologies, Inc.* , **Samuel Lieber** - *New Jersey Institute of Technology*

Variation of Mesostructure in Fused Filament Fabrication and Its Implication on Mechanical Properties

Technical Presentation: IDETC2023-118118

Charul Chadha - *University of Illinois at Urbana-Champaign* , **Mahmoud A. Mahrous** - *University of Illinois at Urbana-Champaign* , **Gabriel Olaivar** - *Unverisity of Illinois at Urbana-Champaign,* **Iwona Jasiuk** - *University of Illinois at Urbana-Champaign* , **Albert E. Patterson** - *Texas A&M University*

DTM-11-01: EMPATHY AND COMMUNICATION IN DESIGN
1:15PM–2:55PM   **SCOLLAY (LOBBY LEVEL)**

Chair: Rahul Sharan Renu - *Francis Marion University*
Co-Chair: Vimal Viswanathan - *San Jose State University*
Co-Chair: Apurva Patel - *The University of Texas at Dallas*

Enterprise Communication: A Naturalistic, Non-Intrusive Method for Studying Design Phenomena

Technical Presentation: IDETC2023- 117825

Sharon Ferguson - *University of Toronto* , **Alison Olechowski** - *University of Toronto*

Empathic Ability versus User Satisfaction: Evaluating the Role of Preference Accuracy in Engineering Design

Technical Paper Publication: IDETC2023-116943

Erin Johnson - *Pennsylvania State University* , **Cynthia Letting** - *Pennsylvania State University* , **Nicolas Soria Zurita** - *Pennsylvania State University* , **Jessica Menold** - *Pennsylvania State University*

Gathering and Communicating Empathic User Understanding in Product Development

Technical Paper Publication: IDETC2023-115253

Teresia Borgman - *Aalto University,* **Katja Holtta-Otto** - *University of Melbourne* , **Jaana Hyvärinen** - *Aalto University*

Understanding the User Perception Gap: Older Adults Consistently Underrate Their Need for Sit-to-Stand Assistance

Technical Paper Publication: IDETC2023-116642

Stephan Stansfield - *Massachusetts Institute of Technology* , *Booker Schelhaas - Massachusetts Institute of Technology* , **Neville Hogan** - *Massachusetts Institute of Technology* , **Maria Yang** - *Massachusetts Institute of Technology*

Design for Implementation: A Medical Device Development Design Process

Technical Paper Publication: IDETC2023-114067

Elisa Bravo - *University of Michigan,* **Jesse Austin-Breneman** - *University of Michigan*

Exploring the Interplay Between Conversational Dynamics and Design Outcomes in Dyadic Interactions

Technical Presentation: IDETC2023- 118200

Debrina Roy - *Thred Group, Penn State University,* **Jessica Menold** - *Pennsylvania State University*

MR-1-5: MECHANISMS SYNTHESIS AND ANALYSIS
1:15PM–2:55PM   **THE LOFT (LOBBY LEVEL)**

Chair: Andrew Murray - *University of Dayton*
Co-Chair: David Myszka - *University of Dayton*

Approximate Motion Synthesis of Four-Bar Linkages Using Poles: A Bi-Invariant Approach

Technical Paper Publication: IDETC2023-114960

Tianze Xu - *University of Dayton* , **David Myszka** - *University of Dayton* , **Andrew Murray** - *University of Dayton*

The Synthesis of P-Drivable Single Degree of Freedom Spatial Mechanisms

Technical Paper Publication: IDETC2023-116938

Jian Liu - *University of Science and Technology Liaoning* , **Mohammad Khan** - *University of Dayton,* **David Myszka** - *University of Dayton* , **Andrew Murray** - *University of Dayton*

A Unified Real-Time Motion Generation Algorithm for Approximate Position Analysis of Planar N-Bar Mechanisms

Technical Paper Publication: IDETC2023-117159

Zhijie Lyu - *Stony Brook University* , **Wei Liao** - *Stony Brook University,* **Anurag Purwar** - *Stony Brook University*

Exact Placement of Ground Pivots Using Watt I Indirect Cognates of a Four-Bar Mechanism

Technical Presentation: IDETC2023-118226

Craig Lusk - *University of South Florida*

Mechanics of a Chevron Shaped Unit Cell With Tape Spring Arms

Technical Presentation: IDETC2023-118199

Nilesh Mankame - *General Motors Global Research & Development* , **Kristiaan Hector** - *Purdue University*, **Pablo Zavattieri** - *Purdue University*

MR-3-3: COMPLIANT MECHANISMS (A. MIDHA SYMPOSIUM)
1:15PM–2:55PM   STUDIO 1 (LOBBY LEVEL)

Chair: Dongming Gan - *Purdue University*
Co-Chair: Giovanni Berselli - *University of Genova*

Design of Unhinged Compliant Mechanism to Enable Bistable Segments in Continuum Robots

Technical Paper Publication: IDETC2023-116374

Muhammad Umer Khan Niazi - *Biomedical Engineering Research Center, Asan Medical Center* , **Usman Mehmood** - *Biomedical Engineering Research Center, Asan Medical Center*, **Jaesoon Choi** - *Asan Medical Center, University of Ulsan College of Medicine* , **Youngjin Moon** - *Asan Medical Center, University of Ulsan College of Medicine*

Revisiting Mechanical Advantage of Compliant Mechanisms: A Case-Study of a Compliant Gripper Using the Spring- Lever Model

Technical Paper Publication: IDETC2023-116440

Shreyas Dixit - *Indian Institute of Science, Bengaluru*, **G.K. Ananthasuresh** - *Indian Institute of Science, Bengaluru*

Dynamic Offloading and Selective Redistribution of Plantar Pressure Using Connected Shallow Arches

Technical Paper Publication: IDETC2023- 116444

Priyabrata Maharana - *Indian Institute of Science* , **Ahmad Shaikh** - *Indian Institute of Science, Bengaluru*, **G.K. Ananthasuresh** - *Indian Institute of Science, Bengaluru*

Topology Optimization of Fluidic Pressure-Driven Multi-Material Compliant Mechanisms

Technical Paper Publication: IDETC2023-116522

Prabhat Kumar - *Indian Institute of Technology Hyderabad* , **Josh Pinskier** - *CSIRO*, **David Howard** - *CSIRO* , **Matthijs Langelaar** - *TU Delft*

Computational Analysis of Buckling-Based Stiffness Programming of Liquid Crystal Elastomer Beams

Technical Paper Publication: IDETC2023-116617

Nathan Hertlein - *Air Force Research Laboratory* , **Beijun Shen** - *Johns Hopkins University*, **Sung Hoon Kang** - *Johns Hopkins University*, **Philip R. Buskohl** - *Air Force Research Laboratory*

MR-7-4: NOVEL MECHANISMS, ROBOTS, AND APPLICATIONS
1:15PM–2:55PM   STUDIO 2 (LOBBY LEVEL)

Chair: Chin-Hsing Kuo - *University of Wollongong*
Co-Chair: Xianwen Kong - *Heriot-Watt University*

The Kinematic Synthesis of a Spherical Mechanism for Assisting in Wrist Pronation and Supination

Technical Paper Publication: IDETC2023-114766

Clément Trotobas - *INRIA*, **Christine Azevedo** - *INRIA*. **Andrew Murray** - *University of Dayton*

Magnetization, Geometry, and Segmentation Analysis of Nested Halbach Cylinders for Optimizing the Interactive Torque

Technical Paper Publication: IDETC2023-115290

Elijah Biggs - *University of Wollongong* , **Chin-Hsing Kuo** - *University of Wollongong* , **Ting Ren** - *University of Wollongong*

A Geometric Method for Static Balancing of Spatial Mechanisms Using Springs

Technical Paper Publication: IDETC2023-116500

Jieyu Wang - *Shanghai University* , **Xianwen Kong** - *Heriot-Watt University* , **Yingzhong Tian** - *Shanghai University*

Air Shield Design for Preventing Inhalation on Turbofan-Engines of Passenger-Jets

Technical Paper Publication: IDETC2023-116881

Yunchen Li - *Santa Clara University* , **Jun Wang** - *Santa Clara University*

Design Factors for the Dimensional Synthesis of Cylindrical Developable Mechanisms

Technical Paper Publication: IDETC2023-116890

Henry Vennard - *The Pennsylvania State,* **Jacob Greenwood** - *VPI Technology* , **Jared Butler** - *The Pennsylvania State University*

VIB-07/MSNDC-14-02: INDUSTRIAL APPLICATIONS OF VIBRATION, ACOUSTICS & DYNAMICS
1:15PM–2:55PM   **TREMONT (4TH FL)**

Chair: Ryan Monroe - *Oakland University*
Co-Chair: Brian Olson - *Johns Hopkins University Applied Physics Laboratory*
Co-Chair: Peter Coffin - *Sandia National Laboratories*
Co-Chair: Ron Couch - *Johns Hopkins University Applied Physics Laboratory*
Co-Chair: Justin Wilbanks - *Sandia National Laboratories*
Co-Chair: Ata Donmez - *The Ohio State University*

Computational Modal Analysis of Half Scale Business Jet Fuselage Tail Section

Technical Paper Publication: IDETC2023-116917

Rochana Gunawardana - *Queen's University,* **Christopher Mechefske** - *Queen's University*

Experimental Modal Analysis of a Half-Scale Business Jet Fuselage Tail Section

Technical Paper Publication: IDETC2023-116820

John M. Sekijoba - *Queen's University* , **Chris K. Mechefske** - *Queen's University*

Frequency Response Based Optimization of an Aircraft Hydraulic Pump Support Structure

Technical Paper Publication: IDETC2023-114957

Simon Kersten - *Queen's University* , **Chris Mechefske** - *Queen's University*

Computational Modal Analysis of an Aircraft Hydraulic Pump Support Structure

Technical Paper Publication: IDETC2023-114951

Simon Kersten - *Queen's University* , **Chris Mechefske** - *Queen's University*

MSNDC-04/VIB-09-04: NONLINEAR DYNAMICS OF SYSTEMS AND STRUCTURES
1:15PM–2:55PM   **WHITTIER (4TH FL)**

Chair: Ajeet Kumar - *Indian Institute of Technology Delhi*
Co-Chair: Gizem Acar - *Stevens Institute of Technology*
Co-Chair: Richard Wiebe - *University of Washington*
Co-Chair: Stefano Lenci - *Polytechnic University of Marche*
Co-Chair: Brian Feeny - *Michigan State University*

Lock-in Control and Mitigation of Vortex-Induced Vibrations in Aircraft Wings Using a Conserved-Mass Nonlinear Vibration Absorber

Technical Paper Publication: IDETC2023-116841

Ehab Basta - *Virginia Tech* , **Sunit Gupta** - *Virginia Tech* , **Oumar Barry** - *Virginia Tech*

Broadband Vibration Absorption Using Novel Nonlinear Energy Sink

Technical Presentation: IDETC2023-118013

Collin Treacy - *University of Rhode Island* , **Dalton Stein** - *University of Rhode Island,* **David Chelidze** - *University of Rhode Island*

Performance and Robustness of Various Dynamical Absorbers to Control a Given Linear Structure

Technical Presentation: IDETC2023- 118092

Floriane Peyrouse - *Insa-Lyon* , **Louis Mesny** - *Insa-Lyon* , **Simon Chesné** - *Insa-Lyon,* **Guilhem Michon** - *ISAE-Supaéro*

Numerical Simulations and Experimental Implementation of a Pneumatic Nonlinear Energy Sink

Technical Presentation: IDETC2023-117767

Clément Raimond - *ISAE Supaero* , **Thomas Roncen** - *Liebherr Aerospace* , **Thierry Jardin** - *ISAE Supaero* , **Leonardo Sanches** - *ISAE Supaero* , **Guilhem Michon** - *ISAE Supaero*

Nonlinear Vibration Absorber for Reducing Hand Vibration From a Vibro-Impact Hammer Model

Technical Paper Publication: IDETC2023-115238

Oreoluwa Alabi - *Virginia Polytechnic Institute and StateUuniversity,* **Sunit Kumar Gupta** - *Virginia Polytechnic Institute and State University,* **Oumar Barry** - *Virginia Polytechnic Institute and State University*

VIB-10/MSNDC-06-02: MACHINE LEARNING IN DYNAMICS AND VIBRATIONS
1:15PM–2:55PM   STUART (4TH FL)

Chair: David Najera-Flores - *Sandia National Laboratories*
Co-Chair: Anthony Garland - *Sandia National Laboratories*
Co-Chair: Jozsef Kovecses - *McGill University*

Reducing Data Requirements for Wiener Series Identification With Gaussian Process Priors

Technical Paper Publication: IDETC2023-113497

Joseph Massingham - *University of Cambridge ,* **Ole Nielsen** - *Bose Corporation,* **Tore Butlin** - *University of Cambridge*

Computationally Efficient Neural Network-Based Model Predictive Control for Real-Time Implementation

Technical Paper Publication: IDETC2023-115271

Fateme Bakhshande - *University of Duisburg-Essen ,* **Mark Spiller** - *German Aerospace Center,* **Justus Hering** - *University of Duisbur-Essen,* **Dirk Söffker** - *University of Duisburg-Essen*

Mutual Information-Based Feature Selection for Real-Time Parameter Updating Using Neural Network Inverse Mapping Models

Technical Presentation: IDETC2023-112091

Bas Kessels - *Eindhoven University of Technology,* **Adarsh Subrahamanian** - *Eindhoven University of Technology ,* **Rob Fey** - *Eindhoven University of Technology,* **Nathan Van De Wouw** - *Eindhoven University of Technology*

Practical Reinforcement Learning for Controls: Design, Test, and Deployment

Technical Presentation: IDETC2023-117826

Naren Srivaths Raman - *The MathWorks, Inc. ,* **Emmanouil Tzorakoleftherakis** - *The MathWorks, Inc. ,* **Mehdi Vahab** - *MathWorks*

MSNDC-08/MR-05-01: MOTION PLANNING, DYNAMICS, AND CONTROL OF ROBOTS
1:15PM–2:55PM   WHITE HILL (4TH FL)

Chair: Damien Chablat - *CNRS Nantes*
Co-Chair: Andreas Mueller - *Johannes Kepler University Linz*
Co-Chair: Joo H. Kim - *New York University*

Physics Guided Machine Learning Approach to Safe Quasi-Static Impact Situations in Human-Robot Collaboration Following the Power and Force Limiting Method of the ISO/TS 15066 Standard

Technical Paper Publication: IDETC2023-109517

Nemanja Kovincic - *Johannes Kepler University ,* **Hubert Gattringer** - *Johannes Kepler University,* **Andreas Mueller** - *Johannes Kepler University Linz,* **Mathias Brandstoetter** - *Carinthia University of Applied Sciences*

A Closed-Form Command Shaping Control of a Rotating Flexible Beam With Nonzero Initial Conditions

Technical Paper Publication: IDETC2023-116434

Khaled Alhazza - *Kuwait University ,* **Mohammed Alfares** - *Kuwait University ,* **Abdulaziz Alawadhi** - *Kuwait University*

Formation-Keeping and Cooperative Control of AUVs Based on the Udwadia-Kalaba Equation

Technical Paper Publication: IDETC2023-116553

Éverton Lins De Oliveira - *University of São Paulo ,* **Renato Maia Matarazzo Orsino** - *University of São Paulo ,* **Décio Crisol Donha** - *University of São Paulo*

Fixed-Time Learning for Optimal Feedback Control

Technical Paper Publication: IDETC2023-117007

Nick-Marios Kokolakis - *Georgia Institute of Technology ,* **Kyriakos Vamvoudakis** - *Georgia Institute of Technology ,* **Wassim Haddad** - *Georgia Institute of Technology*

DAC-10-01: DESIGN OF COMPLEX SYSTEMS
1:15PM–2:55PM   **STATLER (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Beshoy Morkos** - *University of Georgia*
Co-Chair: **Rahul Sharan Renu** - *Francis Marion University*

Heuristics for Solver Aware System Architecting (SASA): A Reinforcement Learning Approach

Technical Paper Publication: IDETC2023-115030

Vikranth Gadi - *Purdue University* , **Taylan Topcu** - *Virginia Tech,* **Zoe Szajnfarber** - *George Washington University* , **Jitesh Panchal** - *Purdue University*

Improving Change Management by Quantifying the Relationships Between Margins and Design Variable Flexibility

Technical Paper Publication: IDETC2023-115312

Lindsey Jacobson - *North Carolina State University* , **Scott Ferguson** - *North Carolina State University*

Knowledge Transfer in Self-Organizing Systems and Impact of Social Ability

Technical Paper Publication: IDETC2023-116392

Bingling Huang - *University of Southern California* , **Yan Jin** - *University of Southern California*

Framing Wicked Problems Through Evidentiary and Interpretive Analysis

Technical Paper Publication: IDETC2023-117285

Mayank Bhalerao - *The University of Oklahoma* , **Wesley Honeycutt** - *The University of Oklahoma* , **Ashok Das** - *Sun Moksha Power Pvt. Ltd.* , **Janet K. Allen -** *The University of Oklahoma* , **Farrokh Mistree** - *The University of Oklahoma*

Electronics Design and Verification for Robots With Actuation and Sensing Requirements

Technical Paper Publication: IDETC2023-115313

Dongsheng Chen - *University of Pennsylvania* , **Zonghao Huang** - *University of Pennsylvania* , **Cynthia Sung** - *University of Pennsylvania*

DAC-14-01: METAMODEL-BASED DESIGN OPTIMIZATION (MBDO)
1:15PM–2:55PM   **HANCOCK (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Payam Ghassemi** - *Caterpillar Inc.*
Co-Chair: **Yuanzhi Liu** - *Apple Inc.*

Concurrent Probabilistic Control Co-Design and Layout Optimization of Wave Energy Converter Farms Using Surrogate Modeling

Technical Paper Publication: IDETC2023-116896

Saeed Azad - *Colorado State University* , **Daniel R. Herber** - *Colorado State University*

Constrained Bayesian Optimization Methods Using Regression and Classification Gaussian Processes as Constraint

Technical Paper Publication: IDETC2023-109993

Cole Jetton - *Oregon State University* , **Chengda Li** - *Oregon State University* , **Christopher Hoyle** - *Oregon State University*

Topology Optimization With Quantum Approximate Bayesian Optimization Algorithm

Technical Paper Publication: IDETC2023-116549

Jungin Kim - *Georgia Institute of Technology* , **Yan Wang** - *Georgia Institute of Technology*

Multi-Task Multi-Fidelity Machine Learning for Reliability-Based Design With Partially Observed Information

Technical Paper Publication: IDETC2023-117032

Yanwen Xu - *University of Illinois at Urbana-Champaign* , **Hao Wu** - *University of Illinois at Urbana-Champaign* , **Zheng Liu** - *University of Illinois at Urbana-Champaign,* **Pingfeng Wang** - *University of Illinois at Urbana-Champaign*

DAC-19-01: HUMAN-ARTIFICIAL INTELLIGENCE COLLABORATION IN ENGINEERING SYSTEM DESIGN
1:15PM–2:55PM **ARLINGTON (MEZZ)**

Chair: **Chao Hu** - *Iowa State University*
Co-Chair: **Alparslan Emrah Bayrak** - *Stevens Institute of Technology*
Co-Chair: **Namwoo Kang** - *Korea Advanced Institute of Science and Technology*

How Does Agency Impact Human-AI Collaborative Design Space Exploration? A Case Study on Ship Design With Deep Generative Models

Technical Paper Publication: IDETC2023-112570

Shahroz Khan - *University of Strathclyde* , **Panagiotis Kaklis** - *University of Strathclyde,* **Kosa Goucher-Lambert** - *University of California, Berkeley*

Adaptation and Challenges in Human-Ai Partnership for the Design of Complex Engineering Systems

Technical Paper Publication: IDETC2023- 115176

Zeda Xu - *Carnegie Mellon University* , **Chloe Hong** - *Carnegie Mellon University,* **Nicolas F. Soria Zurita** - *The Pennsylvania State University,* **Joshua Gyory** - *Carnegie Mellon University,* **Gary Stump** - *The Pennsylvania State University,* **Hannah Nolte** - *The MITRE Corporation* , **Jonathan Cagan** - *Carnegie Mellon University,* **Christopher McComb** - *Carnegie Mellon University*

A Multi-Objective Bayesian Optimized Human Assessed Multi-Target Generated Spectral Recommender System for Rapid Pareto Discoveries of Material Properties

Technical Paper Publication: IDETC2023-116956

Arpan Biswas - *Oak Ridge National Laboratory,* **Yongtao Liu** - *Oak Ridge National Laboratory,* **Maxim Ziatdinov** - *Oak Ridge National Laboratory* , **Yu-Chen Liu** - *National Cheng Kung University,* **Stephen Jesse** - *Oak Ridge National Laboratory,* **Jan-Chi Yang** - *National Cheng Kung University,* **Sergei Kalinin** - *University of Tennessee* , **Rama Vasudevan** - *Oak Ridge National Laboratory*

Let's Chat if You Are Unhappy: The Effect of Emotions on Interaction Experience and Trust Toward Empathetic Chatbots

Technical Paper Publication: IDETC2023-115318

Ting Liao - *Stevens Institute of Technology* , **Bei Yan** - *Stevens Institute of Technology*

Understanding the Relation Between Designer Search Strategies and Designer Learning During Design Space Exploration

Technical Paper Publication: IDETC2023-116984

Hyeonik Song - *Texas A&M University* , **Daniel Selva** - *Texas A&M University*

CIE-23/24: AMS/SEIKM
1:15PM–2:55PM **GEORGIAN (MEZZ)**

Chair: **Dehao Liu** - *Binghamton University*
Co-Chair: **Zhuo Yang** - *University of Massachusetts Amhurst*

Layer-to-Layer Thermal History Prediction for Thin Walls in Metal Additive Manufacturing

Technical Paper Publication: IDETC2023-114997

Yifan Tang - *Simon Fraser University* , **Shahriar Bakrani Balani** - *Tampere University,* **Akshay Dhalpe** - *Tampere University,* **Mostafa Rahmani Dehaghani** - *Simon Fraser University* , **Suraj Panicker** - *Tampere University,* **Eric Coatanea** - *Tampere University* , **Di Wu** - *Tampere University,* **G. Gary Wang** - *Simon Fraser University*

A Physics-Informed Action Selection Framework for Robotic Heating

Technical Paper Publication: IDETC2023-116329

Neel Dhanaraj - *University of Southern California* , **Omey Manyar** - *University of Southern California* , **Vihan Krishnan** - *University of Southern California* , **Satyandra Gupta** - *University of Southern California*

Supporting Condition Based Maintenance for Rotary Systems Under Multiple Fault Scenarios

Technical Paper Publication: IDETC2023-116470

Larry Marshall, Jr. - *University of Arkansas* , **David Jensen** - *University of Arkansas,* **Han Hu** - *University of Arkansas*

Multiphysics-Constrained Neural Networks for Predicting Dendritic Growth in Additive Manufacturing

Technical Presentation: IDETC2023- 109670

Dehao Liu - *State University of New York at Binghamton* , **Yan Wang** - *Georgia Institute of Technology*

Physics Informed Neural Networks for Estimation of Temperature Field and Thermal Conductivity

Technical Presentation: IDETC2023- 117766

Yanglong Lu - *Hong Kong University of Science and Technology* , **Tong Zhu** - *Hong Kong University of Science and Technology* , **Qiye Zheng** - *Hong Kong University of Science and Technology*

Transferability Analysis of Data-Driven Additive Manufacturing Knowledge: A Case Study Between Powder Bed Fusion and Directed Energy Deposition

Technical Paper Publication: IDETC2023-116458

Mutahar Safdar - *McGill University,* **Jiarui Xie** - *McGill University* , **Hyunwoong Ko** - *Arizona State University,* **Yan Lu** - *National Institute of Standards and Technology* , **Guy Lamouche** - *National Research Council Canada* , **Yaoyao Fiona Zhao** - *McGill University*

CIE-25-01: AMS/CAPPD/SEIKM JOINT TOPICS
1:15PM–2:55PM **BERKELEY (MEZZ)**

Chair: Hyunwoong Ko - *Arizona State University*
Co-Chair: Zhuo Yang - *NIST*

Methods for Mapping Empirical Data to Authoritative Definitions for Additive Manufacturing Part Validation

Technical Paper Publication: IDETC2023-116710

Fahad Milaat - *National Institute of Standards and Technology* , **Paul Witherell** - *National Institute of Standards and Technology* , **Martin Hardwick** - *STEP Tools Inc.,* **Ho Yeung** - *National Institute of Standards and Technology*

Coupling Simulated Annealing and Homogenization to Design Thermally Conductive Hybrid Lattice Support Structures for LPF

Technical Paper Publication: IDETC2023-114953

Lisha White - *Carnegie Mellon University* , **Xuan Liang** - *Carnegie Mellon University* , **Guanglu Zhang** - *Carnegie Mellon University* , **Jonathan Cagan** - *Carnegie Mellon University,* **Yongjie Jessica Zhang** - *Carnegie Mellon University*

Defining and Modeling of Height-Related Geometrical Parameters for Thin Wall Structures Manufactured by Metal Additive Manufacturing

Technical Paper Publication: IDETC2023-114987

Mostafa Rahmani Dehaghani - *Simon Fraser University* , **Yifan Tang** - *Simon Fraser University,* **Suraj Panicker** - *Tampere University* , **Di Wu** - *Tampere University,* **Eric Coatanea** - *Tampere University* , **Gary Wang** - *Simon Fraser University*

Print as a Dance Duet: Communication Strategies for Collision-Free Arm-Arm Coordination in Cooperative Three- Dimensional Printing

Technical Paper Publication: IDETC2023-114959

Ronnie Stone - *The University of Texas at Austin* , **Wenchao Zhou** - *The University of Arkansas* , **Ergun Akleman** - *Texas A&M University,* **Vinayak Raman Krishnamurthy** - *Texas A&M University* , **Zhenghui Sha** - *The University of Texas at Austin*

A Design Automation Framework Supporting Design for Additive Manufacturing

Technical Paper Publication: IDETC2023-116415

Anton Wiberg - *Linköping University* , **Johan A. Persson** - *Linköping University* , **Johan Ölvander** - *Linköping University*

CIE-27-01: AI&ML APPROACHES FOR ENGINEERING
1:15PM–2:55PM **CLARENDON (MEZZ)**

Chair: Javier Villena Toro - *Linköping University*
Co-Chair: John Steuben - *Naval Research Laboratory*

Self-Supervised Learning of Temporally Varying Process Parameter Models for Direct Ink Writing

Technical Paper Publication: IDETC2023- 116337

Yeo Jung Yoon - *USC* , **Yang Yang** - *USC Satyandra Gupta*

Physics-Based Automated Data Preprocessing (ADP) for Machine Learning Applications

Technical Paper Publication: IDETC2023-114624

Saleh Valizadeh Sotubadi - *Michigan Technological University,* **Vinh Nguyen** - *Michigan Technological University*

Variabletypography: Artificial Intelligence Augmented Reading Experience

Technical Paper Publication: IDETC2023-114811

Shuhui Shi - *Zhejiang University* , **Weitao You** - *Zhejiang University* , **Kaixin Han** - *Zhejiang University* , **Jinyu Song** - *Zhejiang University,* **Lingyun Sun** - *Zhejiang University, Alibaba-Zhejiang University*

Multi-Modal Machine Learning for Vehicle Rating Predictions Using Image, Text, and Parametric Data

Technical Paper Publication: IDETC2023- 115076

Hanqi Su - *Massachusetts Institute of Technology,* **Binyang Song** - *Massachusetts Institute of Technology,* **Faez Ahmed** - *Massachusetts Institute of Technology*

Multiphysics Missing Data Synthesis (Midas): A Machine-Learning Approach for Mitigating Data Gaps and Artifacts

Technical Paper Publication: IDETC2023-115260

John Steuben - *U.S. Naval Research Laboratory* , **Andrew Geltmacher** - *U.S. Naval Research Laboratory* , **Steven Rodriguez** - *U.S. Naval Research Laboratory* , **Benjamin Graber** - *U.S. Naval Research Laboratory,* **Athanasios Iliopoulos** - *U.S. Naval Research Laboratory* , **John Michopoulos** - *U.S. Naval Research Laboratory*

Model Architecture Exploration Using Chatgpt for Specific Manufacturing Applications

Technical Paper Publication: IDETC2023-116483

Javier Villena Toro - *Linköping University* , **Mehdi Tarkian** - *Linköping University*

MR-3-4: COMPLIANT MECHANISMS (A. MIDHA SYMPOSIUM)
3:15PM–4:55PM   STUDIO 1 (LOBBY LEVEL)

Chair: Giovanni Berselli - *University of Genova*
Co-Chair: Dongming Gan - *Purdue University*

Numerical Optimization of Underactuated Flexure-Based Grippers

Technical Paper Publication: IDETC2023-116752

Boi Okken - *University of Twente* , **Jan Dekker** - *University of Twente* , **Jan De Jong** - *University of Twente,* **Dannis Brouwer** - *University of Twente*

A Customizable and Responsive Mechanism for a Chair to Assist During All Phases of Stand-to-Sit and Sit-to-Stand Maneuvers

Technical Paper Publication: IDETC2023-117037

Sanchit Jhunjhunwala - *Translead Medtech* , **Manoj Kumar R** - *Translead Medtech* , **Chandrashekhara KI** - *Translead Medtech* , **Sanjay Patil** - *Translead Medtech,* **Kiran J** - *Translead Medtech,* **Ahmad Shaikh** - *Indian Institute of Science,* **Gk Ananthasuresh** - *Indian Institute of Science*

Machine Learning Based Deflection Prediction and Inverse Design for Discrete Variable Stiffness Units

Technical Paper Publication: IDETC2023-117322

Jiaming Fu - *Purdue University* , **Qianyu Guo** - *Purdue University* , **Dongming Gan** - *Purdue University*

A Double Stepped Compliant Beam for Displacement Amplication

Technical Presentation: IDETC2023-117524

Le-An Tran - *Graduate Institute of Precision Engineering,* **Le Thanh Phuc** - *HCMC University of Technology and Education* , **Dung-An Wang** - *National Chung Hsing University*

Screw-Enabled Large-Range Compliant Transmission Mechanism

Technical Presentation: IDETC2023-117590

Nigel Archer - *University of California, Los Angeles* , **Jonathan Hopkins** - *University of California, Los Angeles*

MR-5-2: MOTION PLANNING, DYNAMICS, AND CONTROL OF ROBOTS
3:15PM–4:55PM   THE LOFT (LOBBY LEVEL)

Chair: Damien Chablat - *CNRS Nantes*
Co-Chair: Joo H. Kim - *New York University*

Influence of Support Posture on Working Plate Operation for Grasp-Less Handling Technology With an Industrial Dual-Arm SCARA Robot

Technical Paper Publication: IDETC2023-116404

Genki Yamanishi - *Doshisha University* , **Hiroaki Hanai** - *Doshisha University,* **Yuma Mita** - *Doshisha University* , **Toshiki Hirogaki** - *Doshisha University* , **Eiichi Aoyama** - *Doshisha University*

Control of a Bipedal Walking Using Partial Feedback Linearization and Gaussian Process Regression-Based of the Step-to-Step Map

Technical Paper Publication: IDETC2023-116945

Daniel Torres - *University of Illinois at Chicago,* **Ernesto Hernandez Hinojosa** - *University of Illinois at Chicago ,* **Pranav Bhounsule** - *University of Illinois at Chicago*

Gaussian Process Regression for Sim-to-Real Transfer of Hopping Gaits

Technical Paper Publication: IDETC2023-116959

Jeremy Krause - *University of Illinois at Chicago,* **Adel Alaeddini** - *The University of Texas at San Antonio ,* **Pranav Bhounsule** - *University of Illinois at Chicago*

Lifting Task Stability Evaluation Based on Balanced State Basins of a Humanoid Robot

Technical Paper Publication: IDETC2023-117042

Hyunjong Song - *New York University ,* **William Peng** - *New York University ,* **Joo H. Kim** - *New York University*

MR-7-5: NOVEL MECHANISMS, ROBOTS, AND APPLICATIONS
3:15PM–4:55PM   STUDIO 2 (LOBBY LEVEL)

Chair: Satyandra Gupta - *University of Southern California*
Co-Chair: Devin Carroll - *University of Pennsylvania*

Stickbot: A Methodology for Building Robots and Other Functional Elements From Tree Branches and String

Technical Paper Publication: IDETC2023-109541

Devin Carroll - *University of Pennsylvania ,* **Valerie Ang** - *University of Pennsylvania ,* **Mark Yim** - *University of Pennsylvania*

Design and System Identification of an Actuation-Coordinated Mobile Parallel Robot With Hybrid Mobile and Manipulation Motion

Technical Paper Publication: IDETC2023-114992

Han Lin - *Purdue University ,* **Jiayu Luo** - *Purdue University,* **Xiaotong Huang** - *Purdue University ,* **Haoguang Yang** - *Purdue Universtiy ,* **Jiaming Fu** - *Purdue University ,* **Richard Voyles** - *Purdue University ,* **Dongming Gan** - *Purdue University*

A Lightweight Mobile Robot for Climbing Steel Structures With an Extending and Bending Tape Spring Limb

Technical Paper Publication: IDETC2023-115048

Justin Quan - *Robotics and Mechanisms Laboratory,* **Mingzhang Zhu** - *University of California, Los Angeles,* **Dennis Hong** - *University of California, Los Angeles*

Safe Robot to Human Tool Handover to Support Effective Collaboration

Technical Paper Publication: IDETC2023-116334

Jeon Ho Kang - *University of Southern California ,* **Paolo Limcaoco** - *University of Southern California ,* **Neel Dhanaraj** - *University of Southern California ,* **Satyandra Gupta** - *University of Southern California*

Design of a Person-Carrying Robot for Contact Compliant Navigation

Technical Paper Publication: IDETC2023-117215

Carlos Gonzalez - *The University of Texas at Austin ,* **Samantha Lee** - *The University of Texas at Austin ,* **Francisco Montano** - *The University of Texas at Austin ,* **Steven Ortega** - *The University of Texas at Austin ,* **Dong Ho Kang** - *The University of Texas at Austin ,* **Mehar Jaiswal** - *The University of Texas at Austin ,* **Junfeng Jiao** - *The University of Texas at Austin,* **Luis Sentis** - *The University of Texas at Austin*

VIB-07/MSNDC-14-03: INDUSTRY APPLICATIONS OF VIBRATION, ACOUSTICS, AND DYNAMICS
3:15PM–4:55PM   TREMONT (4TH FL)

Chair: Ata Donmez - *The Ohio State University*
Co-Chair: Ryan Monroe - *Oakland University*
Co-Chair: Brian Olson - *Johns Hopkins University*
Co-Chair: Justin Wilbanks - *Sandia National Laboratories*
Co-Chair: Peter Coffin - *Sandia National Laboratories*
Co-Chair: Ron Couch - *Johns Hopkins University*

A Rattle Noise Index for Multi-Mesh Gear Trains

Technical Presentation: IDETC2023-117945

Ata Donmez - *The Ohio State University ,* **Ahmet Kahraman** - *The Ohio State University*

Steering Control With Feedback Delays for Balancing a Motorcycle at Zero Longitudinal Speed

Technical Presentation: IDETC2023-117906

Hanna Zsofia Horvath - *Budapest University of Technology,* **Denes Takacs** - *ELKH-BME Dynamics of Machines Research Group*

Vibro-Impact Motions of Multi-Mesh Gear Systems

Technical Presentation: IDETC2023-118045

Ata Donmez - *The Ohio State University ,* **Ahmet Kahraman** - *The Ohio State University*

Nonlinear Aspects of Pressure Relief Valve Dynamics Coupled With Pipe Dynamics

Technical Presentation: IDETC2023-117804

Fanni Kadar - *Budapest University Of Technology and Economics,* **Gabor Stepan** - *Budapest University of Technology and Economics*

MSNDC-04/VIB-09-05: NONLINEAR DYNAMICS OF SYSTEMS AND STRUCTURES
3:15PM–4:55PM   WHITTIER (4TH FL)

Chair: Ajeet Kumar - *Indian Institute of Technology Delhi*
Co-Chair: Gizem Acar - *Stevens Institute of Technology*
Co-Chair: Richard Wiebe - *University of Washington*
Co-Chair: Stefano Lenci - *Polytechnic University of Marche*
Co-Chair: Brian Feeny - *Michigan State University*

Dynamics of Nonlinear Blades Equipped With Locally Resonant Meta-Structures

Technical Presentation: IDETC2023-117688

Bing Wu - *Stevens Institute of Technology ,* **Gizem Acar** - *Stevens Institute of Technology*

Dynamics and Constraint Loading in a Nonholonomic Model of Undulatory Locomotion

Technical Presentation: IDETC2023-118169

Jamal Ardister - *Michigan State University ,* **Brian Feeny** - *Michigan State University ,* **Junlin Yuan** - *Michigan State University*

Introduction of Local Resonators to a Nonlinear Metamaterial With Topological Features

Technical Paper Publication: IDETC2023-116669

Arun Malla - *Virginia Tech ,* **Joshua Legrande** - *Virginia Tech,* **Mohammad Bukhari** - *Virginia Tech ,* **Oumar Barry** - *Virginia Tech*

Summarized LQG/LTR Controller for a Subscale Aircraft Arrestment System With Nonlinear Dynamics and Minimal Sensors

Technical Presentation: IDETC2023-117951

Yacine Boudria - *Electro Standards Laboratories ,* **Steve Bastien** - *Electro Standards Laboratories ,* **Raymond B. Sepe, Jr**. - *Electro Standards Laboratories,* **Musa Jouaneh** - *University of Rhode Island*

DAC-25-02: AI-DRIVEN DESIGN INNOVATION
3:15PM–4:55PM   ARLINGTON (MEZZ)

Chair: Chao Hu - *Iowa State University*
Co-Chair: Wei Chen - *Northwestern University*
Co-Chair: Ada-Rhodes Short - *University of Omaha*

Chat Generative Pretrained Transformer: Extinction of the Designer or Rise of an Augmented Designer

Technical Paper Publication: IDETC2023- 116971

Amaninder Gill - *Centralia College*

State of the Art: A Review of Ai Art Generation Methods for Rigorous Design

Technical Paper Publication: IDETC2023-116833

Lauren Bertelsen - *University of Nebraska at Omaha ,* **Ada-Rhodes Short** - *University of Nebraska at Omaha*

Toward Artificial Empathy for Human-Centered Design: A Framework

Technical Paper Publication: IDETC2023-117266

Qihao Zhu - *Singapore University of Technology and Design,* **Jianxi Luo** - *Singapore University of Technology and Design*

A Generative Design Process to Consider the Feasibility of Generated Designs

Technical Presentation: IDETC2023-118120

Kijung Park - *Incheon National University* , **Jungyoon Moon** - *Incheon National University*

Conditional Labels for More Intuitive, cGAN-Based, Interactive Structural Design Exploration

Technical Presentation: IDETC2023-118198

Sofia Valdez - *The University of Texas at Austin* , **C. Seepersad** - *The University of Texas at Austin*

CIE-18: VES DESIGN UX FOR VIRTUAL ENVIRONMENTS
3:15PM–4:55PM   GEORGIAN (MEZZ)

Chair: Vinayak Krishnamurthy - Texas A&M University, Yunbo "WILL" Zhang - Rochester Institute of Technology

Design and User Experience Evaluation of 3D Product Information in XR Shopping Application

Technical Paper Publication: IDETC2023-109088

Kaitong Qin - *Zhejiang University* , **Yankun Zhen** - *Alibaba Group* , **Tianshu Dong** - *Zhejiang University* , **Liuqing Chen** - *Zhejiang University* , **Ting Zhang** - *Zhejiang University* , **Yumou Zhang** - *Alibaba Group* , **Tingting Zhou** - *Alibaba Group*

Utilize Immersive Virtual Reality to Improve Marine Debris Awareness

Technical Presentation: IDETC2023-115247

Junfeng Ma - *Mississippi State University*

Kinesthetically-Guided Virtual Object Manipulation Based on Space Colonization Algorithm

Technical Presentation: IDETC2023-117553

Abhijeet Singh Raina - *Texas A&M University* , **Vipul Mone** - *Texas A&M University,* **Vinayak Krishnamurthy** - *Texas A&M University*

Does Scenario Immersiveness Matter in Assessing Pedestrian Trust in Autonomous Vehicles?

Technical Presentation: IDETC2023-118057

Jinjuan She - *University Miami Ohio* , **Marufa Islam** - *Miami University*

Extended Abstract: Rubber Hand Illusion Induced by a 3-Dimensional Platform for Passive Touch in Remote Palpation

Technical Presentation: IDETC2023-118138

Pijuan Yu - *Texas A&M University* , **Rebecca Friesen** - *Texas A&M University*

Addressing the Limitations of Tactile Touchscreens: Response of Fingerpad to Discrete Friction Patches

Technical Presentation: IDETC2023-117702

MacKenzie Harnett - *Texas A&M University* , **Rebecca Friesen** - *Texas A&M University*

CIE-25-02: AMS/CAPPD/SEIKM JOINT SESSIONS
3:15PM–4:55PM   BERKELEY (MEZZ)

Chair: Yan Lu - *National Institute of Standards and Technology*
Co-Chair: Zhuo Yang - *University of Massachusetts Amhurst*

Distributing Design Domains for Topology Optimization in Systems Design

Technical Paper Publication: IDETC2023-114883

Felix Endress - *Technical University of Munich,* **Timoleon Kipouros** - *University of Cambridge* , **Markus Zimmermann** - *Technical University of Munich*

Capturing Local Temperature Evolution During Additive Manufacturing Through Fourier Neural Operators

Technical Paper Publication: IDETC2023-117055

Jiangce Chen - *Carnegie Mellon University* , **Wenzhuo Xu** - *Carnegie Mellon University* , **Martha Baldwin** - *Carnegie Mellon University* , **Bjorn Nijhuis** - *University of Twente,* **Ton Van Den Boogaard** - *University of Twente,* **Noelia Grande Gutiérrez** - *Carnegie Mellon University* , **Sneha Prabha Narra** - *Carnegie Mellon University* , **Christopher McComb** - *Carnegie Mellon University*

The Design of a Low-Cost Voluntary Closing Finger Prosthetic for Developing Countries

Technical Paper Publication: IDETC2023-117072

Kelvin Loutan - *The University of Trinidad and Tobago* , **Umesh Persad** *- University of Florida*

Modeling the Influence of Process Parameters on Material Properties in Vat Photopolymerization

Technical Presentation: IDETC2023-118043

Iman Valizadeh - *Technical University of Darmstadt* , **Oliver Weeger** *- Technical University of Darmstadt*

CIE-27-02: AI&ML APPROACHES FOR ENGINEERING
3:15PM–4:55PM   CLARENDON (MEZZ)

Chair: Byeng Dong Youn - *Seoul National University*
Co-Chair: John Steuben - *Naval Research Laboratory*

A Design Knowledge Guided Position Encoding Methodology for Implicit Need Identification From User Reviews

Technical Paper Publication: IDETC2023-116789

Yi Han - *Northeastern University,* **Mohsen Moghaddam** - *Northeastern University*

Convolutional Auto-Encoder Based Boiler Tube Leakage Detection Method in a Thermal Power Plant

Technical Presentation: IDETC2023- 113335

Hyeongmin Kim - *Seoul National University* , **Kyumin Na** - *Seoul National University,* **Jin Uk Ko** - *Seoul National University* , **Heonjun Yoon** - *Soongsil University,* **Byeng Dong Youn** - *Seoul National University*

Multi-Level Domain Adaptation Network Based Fault Diagnosis of Rotating Machinery

Technical Presentation: IDETC2023-114994

Jinwook Lee - *Seoul National University* , **Myungyon Kim** - *Seoul National University* , **Jin Uk Ko** - *Seoul National University* , **Joon Ha Jung** - *Ajou University,* **Kyung Ho Sun** - *Korea Institute of Machinery and Materials* , **Byeng D. Youn** - *Soul National University*

Few-Shot Learning Method for Fault Diagnosis of Permanent Magnet Synchronous Motors Under New Operating Conditions

Technical Presentation: IDETC2023-116413

Minseok Chae - *Seoul National University* , **Hyeongmin Kim** - *Seoul National University* , **Hye Jun Oh** - *Seoul National University* , **Chan Hee Park** - *Seoul National University* , **Heonjun Yoon** - *Seoul National University,* **Byeng Dong Youn** - *Seoul National University*

A Design Knowledge Guided Position Encoding Methodology for Implicit Need Identification From User Reviews

Technical Presentation: IDETC2023-117785

Yi Han - *Northeastern University,* **Mohsen Moghaddam** - *Northeastern University*

DDE-GAN: Integrating a Data-Driven Design Evaluator Into Generative Adversarial Networks for Desirable and Diverse Concept Generation

Technical Presentation: IDETC2023-118131

Chenxi Yuan - *Northeastern University* , **Tucker Marion** - *Northeastern University,* **Mohsen Moghaddam** - *Northeastern University*

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Christopher	Adams	DTM-02-01: Artificial Intelligence in Design	116912
Jeremy	Agozzino	DFMLC-04-01: Design for Manufacturing and Assembly	117195
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Jiacheng	Cai	CIE-26: Poster Session	117668
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Matthew	Campbell	DAC-07-01: Design for Additive Manufacturing	111726
Matthew	Campbell	DAC-13-01: Geometric Modeling and Algorithms for Design and Manufacturing	110757
Roxana	Carbonell	DFMLC-05-01: Design for Additive Manufacturing	116885
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Jie	Chen	DAC-03-02: Novel AI or ML Frameworks for Design or Systems Science	114605
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04: Advances in Ground Vehicle Safety and Ergonomics
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Co-Chair James Yang, *Texas Tech University*

05: Advances in Vehicle Electrification and Powertrain Design
Chair: Joel Anstrom, *The Pennsylvania State University*
Co-Chair: Angelo Bonfitto, *Politecnico di Torino*
Co-Chair: Venkat Ramakrishnan, *FCA Group*

06: Advances in Light Vehicles Design
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07: Advances in Off-Road, Agriculture, Military and Commercial Ground Vehicle Design and Testing
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Co-Chair: Corina Sandu, *Virginia Polytech Institute and State University*
Co-Chair: Peijun Xu, *Ebco Inc.*

08: Advances in Intelligent Vehicles
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Co-Chair: Guangqiang Wu, *Tongji University Shanghai*

CIE-01 AMS: Advanced Modeling and Simulation (AMS General)
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Co-Chair: James Yang, *Texas Tech University*
Co-Chair: Piyush Pandita, *GE Research*
Co-Chair: Anh Tran, *Sandia National Laboratories*
Co-Chair: Ashish Chaudhari, *Purdue University*

CIE-02 AMS: Inverse Problems in Science and Engineering
Chair: John Michopoulos, *U.S. Naval Research Laboratory*
Co-Chair: Brian Dennis, *The University of Texas at Arlington*
Co-Chair: Athanasios Iliopoulos, *U.S. Naval Research Laboratory*
Co-Chair: Guanglu Zhang, *Carnegie Mellon University*

CIE-03 AMS: Computational Multiphysics Applications
Chair: John Michopoulos, *U.S. Naval Research Laboratory*
Co-Chair: Athanasios Iliopoulos, *U.S. Naval Research Laboratory*

CIE-04 AMS: Uncertainty Quantification in Simulation and Model Verification & Validation
Chair: Anh Tran, *Sandia National Laboratories*
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Co-Chair: Yan Wang, *Georgia Institute of Technology*
Co-Chair: Chao Hu, *Iowa State University*

CIE-05 AMS: Simulation in Advanced Manufacturing
Chair: Gaurav Ameta, *Siemens*
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CIE-06 AMS: Material Characterization Methods and Applications
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Co-Chair: Anand Balu Nellippallil, *Florida Institute of Technology*
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CIE-08 CAPPD: Human-in-the Loop Product Design and Automation
Chair: Ehsan T. Esfahani, *University at Buffalo*
Co-Chair: Tsz Ho Kwok, *Concordia University*

CIE-09 CAPPD: Digital Human Modelling for Design and Manufacturing
Chair: Giorgio Colombo, *Politecnico di Milano*
Co-Chair: Daniele Regazzoni, *University of Bergamo*
Co-Chair: Satchit Ramnath, *The Ohio State University*

CIE-10 CAPPD: Product and Process Design Automation for Industry 4.0
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CIE-11 CAPPD: Data-Driven Product Design and Fabrication
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Co-Chair: Luis Segura, *University of Louisville*

CIE-12 SEIKM: Systems Engineering Information Knowledge Management (SEIKM General)
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Co-Chair: Yaoyao Fiona Zhao, *McGill University*
Co-Chair: Douglas Van Bossuyt, *KTM Research*

CIE-13 SEIKM: Design Informatics
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Co-Chair: Zhenghui Sha, *The University of Texas at Austin*

CIE-14 SEIKM: Systems Engineering and Complex Systems
Chair: Douglas Van Bossuyt, *KTM Research*

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CIE-15 SEIKM: Knowledge Capture, Reuse, and Management
Chair: Farhad Ameri, *Texas State University*
Co-Chair: Christopher Hoyle, *Oregon State University*
Co-Chair: Mutahar Safdar, *McGill University*

CIE-16 SEIKM: Smart Manufacturing Informatics
Chair: Ying Liu, *Cardiff University*
Co-Chair: Hyunwoong Ko, *Arizona State University*

CIE-17 SEIKM: Advanced Manufacturing for Bioeconomy and Circular Economy
Chair: Boonserm Kulvatunyou, *NA*
Co-Chair: Evan Wallace, *National Institute of Standards and Technology*
Co-Chair: Farhad Ameri, *Texas State University*
Co-Chair: Vincenzo Ferrero, *National Institute of Standards and Technology*

CIE-18 VES: Designing User Experiences for Virtual Environments
Chair: Senthil Chandrasegaran, *Delft University of Technology*
Co-Chair: Rebecca Friesen, *Texas A&M University*
Co-Chair: Ronak Mohanty, *Reality Labs (Meta)*
Co-Chair: Vinayak Krishnamurthy, *Texas A&M University*

CIE-19 VES: Virtual Systems for Engineering Applications
Chair: Junfeng Ma, *Mississippi State University*
Co-Chair: Jinjuan She, *University Miami Ohio*
Co-Chair: Yunbo Zhang, *Rochester Institute of Technology*

CIE-21 AMS/CAPPD Joint Topic: Digital Twin: Advanced Human Modeling and Simulation in Engineering
Chair: James Yang, *Texas Tech University*
Co-Chair: Yujiang Xiang, *Oklahoma State University*
Co-Chair: Xianlian Zhou, *New Jersey Institute of Technology*
Co-Chair: Tsz Ho Kwok, *Concordia University*

CIE-22 AMS/SEIKIM Joint Topic: Digital Twin Modeling and Analytics for Advanced Manufacturing
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Co-Chair: Dehao Liu, *Georgia Institute of Technology*
Co-Chair: Sheng Yang, *NA*
Co-Chair: Anh Tran, *Sandia National Laboratories*

CIE-23 AMS/SEIKIM Joint Topic: Physics-Informed Machine Learning for Design and Advanced Manufacturing
Chair: Dehao Liu, *Georgia Institute of Technology*
Co-Chair: Hyunwoong Ko, *Arizona State University*
Co-Chair: Yanglong Lu, *Hong Kong University of Science and Technology*
Co-Chair: Anh Tran, *Sandia National Laboratories*

CIE-24 SEIKM-AMS: Artificial Intelligence and Machine Learning in Design and Manufacturing
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Co-Chair: Xiaotong Ma, *McGill University*

CIE-25 AMS-CAPPD-SEIKM: Design, Simulation and Optimization for Additive Manufacturing
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Co-Chair: Jaehyuk Kim, *National Institute of Standards and Technology*
Co-Chair: Fahad Milaat, *National Institute of Standards and Technology*

CIE–26: Graduate Student Poster Symposium
Chair: Jun Wang, *University of Maryland, College Park*
Co-Chair: Satchit Ramnath, *The Ohio State University*

CIE-27: AI & ML Approaches for Engineering
Chair: John Steuben, *NA*

DAC-01: Control Co-Design
Chair: Daniel Herber, *Colorado State University*
Co-Chair Herschel Pangborn, *The Pennsylvania State University*

DAC-02: Artificial Intelligence and Machine Learning for Challenging Real-World Problems in Design Automation
Chair: Payam Ghassemi, *University of Buffalo*
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Co-Chair: Zhibo Zhang, *University at Buffalo, SUNY*

DAC-03: Novel AI or ML Frameworks for Design or Systems Science
Chair: Daniel Selva, *Texas A&M University*
Co-Chair: Souma Chowdhury, *University of Buffalo*
Co-Chair: Wei Chen, *Northwestern University*

DAC-04: Data-Driven Design
Chair: Faez Ahmed, *Massachusetts Institute of Technology*
Co-Chair: Souma Chowdhury, *University of Buffalo*
Co-Chair: Ali Mehmani, *Prescriptive Data*

DAC-05: Decision Making in Engineering Design
Chair: Jesse Austin-Breneman, *University of Michigan*
Co-Chair: Venkat Nemani, *Iowa State University*

DAC-06: Design and Optimization of Energy Systems
Chair: Jie Zhang, *The University of Texas at Dallas*
Co-Chair: Ali Mehmani, *Prescriptive Data*
Co-Chair: Cong Feng, *The University of Texas at Dallas*

DAC-07: Design for Additive Manufacturing
Chair: Nicholas Meisel, *The Pennsylvania State University*
Co-Chair: Yaoyao Fiona Zhao, *McGill University*
Co-Chair: Josh Hamel, *NA*

DAC-08: Design for Market Systems
Chair: Kate Whitefoot, *Carnegie Mellon University*
Co-Chair: Yan Fu, *Ford Motor Company*

DAC-09: Design for Resilience and Failure Recover   {Should the last word here be "Recovery"?
Chair: Zequn Wang, *Michigan Technological University*
Co-Chair: Nita Yodo, *NA*
Co-Chair: Zhen Hu, *University of Michigan*

DAC-10: Design of Complex Systems
Chair: Beshoy Morkos, *University of Georgia*
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DAC-11: Design of Engineering Materials and Structures
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Co-Chair: Xingchen Liu, *International Computer Science Institute*

DAC-12: Engineering for Global Development
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DAC-13: Geometric Modeling and Algorithms for Design and Manufacturing
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Co-Chair: Morad Behandish, *PARC*

DAC-14: Metamodel-Based Design Optimization (MBDO)
Chair: Payam Ghassemi, *University of Buffalo*
Co-Chair: Yuanzhi Liu, *Apple*

DAC-15: Multidisciplinary Design Optimization, Multiobjective Optimization, and Sensitivity Analysis
Chair: Hongyi Xu, *University of Connecticut*
Co-Chair: Mian Li, *Shanghi Jiao Tong University*

DAC-17: Design and Decision Making Under Uncertainty
Chair: Xiaoping Du, *Indiana University*
Co-Chair: Ramin Bostanabad, *University of California, Irvine*
Co-Chair: Zhen Hu, *University of Michigan*
Co-Chair: Leifur Leifsson, *Purdue University*

DAC-18: Computational Design for Biomedical Applications
Chair: Julian Norato, *University of Connecticut*
Co-Chair: Paul Egan, *Texas Tech University*

DAC-19: Human-Artificial Intelligence Collaboration in Engineering System Design
Chair: Alparslan Emrah Bayrak, *Stevens Institute of Technology*
Co-Chair: Namwoo Kang, *Korea Advanced Institute of Science and Technology*

DAC-20: Design of Autonomous Systems
Chair: Souma Chowdhury, *University of Buffalo*
Co-Chair: Ehsan T. Esfahani, *University at Buffalo*
Co-Chair: Zhimin Xi, *Rutgers University*

DAC-21: Evolving Cyber-Physical-Social Systems
Chair: Janet K. Allen, *The University of Oklahoma*
Co-Chair: Farrokh Mistree, *The University of Oklahoma*
Co-Chair: Zhenjun Ming, *NA*

DAC-22: Special Session with DFMLC: Modeling and Optimization for Sustainable Design and Manufacturing
Chair: Bryony DuPont, *Oregon State University*
Co-Chair: Daniel Cooper, *University of Michigan*
Co-Chair: William Bernstein, *Air Force Research Laboratory*

DAC-23: The Automation of Artistic and Creative Design
Chair: Ada-Rhodes Short, *University of Nebraska Omaha*
Co-Chair: Bryony DuPont, *Oregon State University*

DAC-24: UQ of ML Models for Data-Driven Design
Chair: Venkat Nemani, *Iowa State University*
Co-Chair: Zhen Hu, *University of Michigan*
Co-Chair: Anh Tran, *Sandia National Laboratories*

DAC-25: AI-Driven Design Innovation
Chair: Wei Chen, *Northwestern University*
Co-Chair: Binyang Song, *Massachusetts Institute of Technology*

DEC-01 Implementation, Assessment and Research Methods Across the Curriculum
Chair: Nicholas Meisel, *The Pennsylvania State University*
Co-Chair: Charlotte De Vries, *The Pennsylvania State University*
Co-Chair: Elizabeth Starkey, *The Pennsylvania State University*
Co-Chair: Rahul Sharan Renu, *Francis Marion University*
Co-Chair: Mohammad Fazelpour, *University of Maryland*

DEC-02 Diversity and Inclusion in Design Education
Chair: Elizabeth Starkey, *The Pennsylvania State University*

DEC-03 Innovative Practices in Design Education (Other Topics)
Chair: Charlotte De Vries, *The Pennsylvania State University*
Co-Chair: Mohammad Fazelpour, *University of Maryland*
Co-Chair: Rahul Sharan Renu, *Francis Marion University*
Co-Chair: Nicholas Meisel, *The Pennsylvania State University*
Co-Chair: Elizabeth Starkey, *The Pennsylvania State University*

DEC-04 Demos and Presentation Only
Chair: Charlotte De Vries, *The Pennsylvania State University*
Co-Chair: Nicholas Meisel, *The Pennsylvania State University*
Co-Chair: Elizabeth Starkey, *The Pennsylvania State University*
Co-Chair: Rahul Sharan Renu, *Francis Marion University*
Co-Chair: Mohammad Fazelpour, *University of Maryland*

DEC-05 DfAM Principles and their Education
Chair: Nicholas Meisel, *The Pennsylvania State University*
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Co-Chair: Elizabeth Starkey, *The Pennsylvania State University*
Co-Chair: Mohammad Fazelpour, *University of Maryland*
Co-Chair: Rahul Sharan Renu, *Francis Marion University*

DFMLC 1: Life Cycle & Human Factors Decision Making
Chair: William Bernstein, *Air Force Research Laboratory*
Co-Chair: Vincenzo Ferrero, *National Institute of Standards and Technology*
Co-Chair: Hao Zhang, *James Madison University*

DFMLC 2: Modeling and Optimization for Sustainable Design and Manufacturing
Chair: Bryony DuPont, *Oregon State University*
Co-Chair: Yong Hoon Lee, *University of Memphis*

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DFMLC 3: Design for Supply Chain and End of Life Recovery
Chair: Sara Behdad, *University of Florida*
Co-Chair: Yongxian Zhu, *University of Michigan*

DFMLC 4: Design for Manufacturing and Assembly
Chair: Soonjo Kwon, *Kumoh National Institute of Technology*
Co-Chair: Satya R.T. Peddada, *NA*

DFMLC 5: Design for Additive Manufacturing
Chair: Yaoyao Fiona Zhao, *McGill University*
Co-Chair: Paul Egan, *Texas Tech University*

DFMLC 6: Design for Large and Distributed Systems
Chair: Albert Patterson, *Texas A&M University*
Co-Chair: Satya R.T. Peddada, *NA*

DFMLC 7: Design of Product-Service and Energy Systems
Chair: Amin Mirkouei, *University of Idaho*
Co-Chair: Abigail Clarke-Sather, *University of Minnesota Duluth*

DFMLC 8: Design Tool & Commercialization Showcase
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Co-Chair: Paul Egan, *Texas Tech University*

DTM 01: Design Theory
Chair: Rahul Sharan Renu, *Francis Marion University*
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Co-Chair: Mansur Arief, *Carnegie Mellon University*
Co-Chair: Youyi Bi, *Shanghai Jiao Tong University*
Co-Chair: Srinivasan Venkataraman, *Indian Institute of Technology Delhi*
Co-Chair: Ambrosio Valencia-Romero, *Northeastern University*

DTM-02: Design Methods
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Co-Chair: Hyeonik Song, *Texas A&M University*
Co-Chair: Zhenghui Sha, *The University of Texas at Austin*
Co-Chair: Jinjuan She, *University Miami Ohio*
Co-Chair: James Righter, *The Citadel*
Co-Chair: Kelley Dugan, *University of Michigan*
Co-Chair: Vrushank Phadnis, *Massachusetts Institute of Technology*

DTM-03: Design People
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Co-Chair: Vimal Viswanathan, *San Jose State University*
Co-Chair: Astrid Layton, *Texas A&M University*
Co-Chair: Rohan Prabhu, *Lafayette College*
Co-Chair: Joshua Summers, *The University of Texas at Dallas*
Co-Chair: Apurva Patel, *The University of Texas at Dallas*
Co-Chair: Christine Toh, *University of Nebraska at Omaha*
Co-Chair: Apurva Patel, *The University of Texas at Dallas*

DTM-04: Design Practice
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Co-Chair: Kosa Goucher-Lambert, *University of California, Berkeley*
Co-Chair: Vivek Rao, *University of California, Berkeley*
Co-Chair: Paul Grogan, *Stevens Institute of Technology*
Co-Chair: Maha Haji, *Cornell University*

DTM-05: DfAM Principles and their Education
Chair: Rahul Sharan Renu, *Francis Marion University*
Co-Chair: Vimal Viswanathan, *San Jose State University*

MESA-01: Artificial Intelligence and Emerging Technologies for Mechatronics and Embedded Systems
Chair: Ching-Yuan Chang, *National Taiwan University of Science and Technology*
Co-Chair: YangQuan Chen, *University of California, Merced*

MESA-02: Bio-Inspired Robotics and Soft Robotic
Chair: Chris Pretty, *University of Canterbury*

MESA-03: Robotics and Mobile Machines
Chair: Matteo C. Palpacelli, *Polytechnic University of Marche*

MESA-04: Mechatronic and Embedded Systems for Agriculture 4.0
Chair: Abhijit Nagchaudhuri, *University of Maryland Eastern Shore*

MESA-06: Mechatronics and Embedded Systems Applications
Chair: Adriano Mancini, *UNIVPM*

MESA-08: Embedded Vision and Ambient Intelligence
Chair: Marina Paolanti, *University of Macerata*
Co-Chair: Emanuele Frontoni, *Università di Macerata*

MESA-09: Mechatronics and Industry 4.0
Chair: Luca Romeo

MESA-10 Smart Cyber-Physical Systems
Chair: Po Ting Lin, *National Taiwan University of Science and Technology*

MESA-11: Mechatronics and Embedded Systems Education
Chair: Tim Giffney, *University of Canterbury*
Co-Chair: Chris Pretty, *University of Canterbury*

MESA-13: Micro-/Nano-Manipulation Technologies and Applications
Chair: Peng Yan, *Shandong University*
Co-Chair: Zhen Zhang, *Tsinghua University*

MESA-14: Fractional Derivatives and Their Applications
Chair: YangQuan Chen, *University of California Merced*

MESA-15: Unmanned Vehicle Technologies and Applications
Chair: YangQuan Chen, *University of California, Merced*

MESA-16: Bio-Mechatronics - Medical Devices & Technologies
Chair: Chris Pretty, *University of Canterbury*

MNS-1: Nonlinear Dynamics and Vibrations of MEMS and NEMS
Chair: Najib Kacem, *Femto*
Co-Chair: Jian Zhao, *Dalian*
Co-Chair: Hanna Cho, *The Ohio State University*
Co-Chair: Lior Medina, *NA*

MNS-2: Micro/Nano Bioengineering
Chair: Dumitru Caruntu, *The University of Texas Rio Grande Valley*
Co-Chair: Brian Jensen, *Brigham Young University*
Co-Chair: Chu-Yu Huang, *National Chung Hsing University*
Co-Chair: Mohammad Shavezipur, *Southern Illinois University Edwardsville*

MNS-3: Micro/Nano Robotics and Functional Materials
Chair: Irene Fassi, *CNR*
Co-Chair: Yu Liu, *Jiangnan University*
Co-Chair: Hoe Joon Kim, *DGIST*
Co-Chair: Mohammad Hasan, *NA*
Co-Chair: Longqiu Li, *Harbin Institute of Technology*

MNS-4: Micro/Nano IoT, Sensors and Digital Computing
Chair: Muhammad Khan, *NSWC, IHD*
Co-Chair: Fadi Alsaleem, *University of Nebraska-Lincoln*
Co-Chair: Siavash Pourkamali, *The University of Texas at Dallas*
Co-Chair: Mohammad Shavezipur, *Southern Illinois University Edwardsville*

MR-1: Mechanisms Synthesis & Analysis
Chair: Latifah Nurahmi, *Institut Teknologi Sepuluh Nopember*
Co-Chair: Kuan-Lun Hsu, *National Taiwan University*
Co-Chair: Jieyu Wang, *NA*

MR-10: Student Mechanism and Robot Design Competition
Chair: Mark Plecnik, *University of Notre Dame*

MR-2: Theoretical & Computational Kinematics (A.T. Yang Symposium)
Chair: Nina Robson, *California State University, Fullerton*
Co-Chair: Hongliang Shi, *SLAC National Accelerator Laboratory, Stanford University*
Co-Chair: Haohan Zhang, *The University of Utah*

MR-3: Compliant Mechanisms
Chair: Hongzhe Zhao, *Beihang University*
Co-Chair: Jovana Jovanova, *Technische Universität Delft*
Co-Chair: Giovanni Berselli, *University of Genova*

MR-4: Origami-Based Engineering Design
Chair: Shikui Chen, *Stony Brook University*
Co-Chair: Suyi Li, *Virginia Polytechnic Institute and State University*
Co-Chair: Jared Butler, *The Pennsylvania State University*

MR-5: Motion Planning, Dynamics, and Control of Robots
Chair: Damien Chablat, *CNRS Nantes*
Co-Chair: Joo H. Kim, *New York University*
Co-Chair: Jeffrey Herrmann, *University of Maryland*
Co-Chair: Andreas Muller, *Johannes Kepler University*

MR-6: Medical and Rehabilitation Robotics
Chair: Carl Nelson, *University of Nebraska-Lincoln*
Co-Chair: Abbas Attah, *Widener University*

MR-7: Novel Mechanisms, Robots, and Applications
Chair: Guowu Wei, *University of Salford*
Co-Chair: Reza Fotouhi, *University of Saskatchewan*
Co-Chair: Salih Abdelaziz, *NA*

MR-8: Soft and Continuum Mechanisms
Chair: Girish Krishnan, *University of Illinois at Urbana-Champaign*
Co-Chair: Sree Kalyan Patiballa, *NA*
Co-Chair: Vishesh Vikas, *NA*

MR-9: Design, Analysis and Fabrication of Architected Materials and Structures (Abstract only)
Chair: Long Wang, *Stevens Institute of Technology*
Co-Chair: Gaurav Singh, *Yale University*
Co-Chair: Haiyang Li, *NA*
Co-Chair: Huijuan Feng, *NA*
Co-Chair: Colette Abah, *NA*

MSNDC-1: Computational Methods and Software Tools in Multibody Systems and Nonlinear Dynamics
Chair: Francisco Gonzalez, *University of A Coruña*
Co-Chair: Alessandro Tasora, *University of Parma*
Co-Chair: Grzegorz Orzechowski, *LUT University*

MSNDC-10: Nonlinear and Computational Dynamics Aspects in Biomechanics
Chair: James Chagdes, *Miami University*
Co-Chair: Adam Kłodowski, *LUT University*

MSNDC-11: Dynamics and Control of Smart Structures and Systems
Chair: Andrea Arena, *Sapienza University of Rome*
Co-Chair: Sichen Yuan, *Lawrence Technological University*
Co-Chair: Kai Zhou, *Michigan Technological University*
Co-Chair: Francesco Danzi, *University of California, Merced*

MSNDC-12: Dynamics of Rotating Systems
Chair: Andrea Zanoni, *Politecnico di Milano*
Co-Chair: Meng-Hsuan Tien, *National Tsing Hua University*

MSNDC-13: Nonlinear Dynamics and Vibrations of MEMS and NEMS
Chair: Andrea Arena, *Sapienza University of Rome*
Co-Chair: Francesco Danzi, *University of California, Merced*
Co-Chair: Sichen Yuan, *Lawrence Technological University*
Co-Chair: Kai Zhou, *Michigan Technological University*

MSNDC-14: Industry Applications of Vibration, Acoustics, and Dynamics
Chair: Ata Donmez, *NA*
Co-Chair: Brian Olson, *Johns Hopkins University*
Co-Chair: Peter Coffin, *Sandia National Laboratories*
Co-Chair: Ronald Couch, *Johns Hopkins University*
Co-Chair: Ryan Monroe, *Oakland University*

MSNDC-2: Flexible Multibody Dynamics
Chair: Johannes Gerstmayr, *University of Innsbruck*
Co-Chair: Andreas Zwölfer, *Technical University of Munich*

MSNDC-3: Contact Dynamics and Jointed Structures
Chair: Marco Morandini, *Politecnico di Milano*
Co-Chair: Akira Saito, *Meiji University*

MSNDC-4: Nonlinear Dynamics of Systems and Structures
Chair: Ajeet Kumar, *Indian Institute of Technology Delhi*
Co-Chair: Stefano Lenci, *Polytechnic University of Marche*
Co-Chair: Richard Wiebe, *University of Washington*
Co-Chair: Gizem Acar, *Stevens Institute of Technology*

Topics Organizers

MSNDC-5: Modeling and Simulation of Vehicle Dynamics and Mobility Hiroyuki
Chair: Sugiyama, *The University of Iowa*
Co-Chair: Jose Escalona, *University of Seville*
Co-Chair: Robert Seifried, *Hamburg University of Technology*
Co-Chair: Paramsothy Jayakumar, *U.S. Army GVSC*

MSNDC-6: Machine Learning in Dynamics and Vibrations
Chair: Jozsef Kovecses, *NA*
Co-Chair: David A. Najera-Flores, *ATA Engineering*
Co-Chair: Anthony Garland, *Sandia National Laboratories*

MSNDC-7: Time-Delay, Time-Varying and Discontinuous Dynamical Systems
Chair: Zoltan Dombovari, *Budapest University of Technology and Economics*
Co-Chair: Ashu Sharma, *Auburn University*
Co-Chair: Nikhil Bajaj, *University of Pittsburgh*
Co-Chair: David Lehotzky, *Budapest University of Technology and Economics*

MSNDC-8: Motion Planning, Dynamics, and Control of Robots
Chair: Andreas Muller, *Johannes Kepler University*
Co-Chair: Joo H. Kim, *New York University*
Co-Chair: Damien Chablat, *CNRS Nantes*

MSNDC-9: Optimization, Sensitivity Analysis, and Uncertainty Quantification in Dynamic Systems
Chair: Radu Serban, *University of Wisconsin-Madison*
Co-Chair: Antonio Recuero, *Idaho National Laboratory*

PTG-01: Gear Geometry
Chair: Fuentes Aznar, *Rochester Institute of Technology*

PTG-02: Gear Analysis, Materials, Fatigue
Chair: Hai Xu, *General Motors*

PTG-03: Gear Dynamics and Noise
Chair: Ahmet Kahraman, *The Ohio State University*
Co-Chair: David Talbot, *The Ohio State University*

PTG-04: Gearbox Design, Reliability, and Diagnostics
Chair: Murat Inalpolat, *University of Massachusetts Lowell*

PTG-05: Gear Manufacturing
Chair: Qi Fan, *The Gleason Works*

PTG-06: Lubrication and Efficiency
Chair: Sheng Li, *Wright State University*

PTG-07: Bearings, Clutches, Couplings, and Splines
Chair: David Talbot, *The Ohio State University*
Co-Chair: Isaac Hong, *The Ohio State University*

PTG-08: Transmission Systems Including Novel Concepts
Chair: David Talbot, *The Ohio State University*

VIB-01: Dynamics & Waves in Solids and Metamaterials
Chair: Serife Tol, *University of Michigan*
Co-Chair: Michael Leamy, *Georgia Institute of Technology*
Co-Chair: Pai Wang, *The University of Utah*

VIB-02: Vibration and Stability of Mechanical Systems
Chair: Chengzhi Shi, *Georgia Institute of Technology*
Co-Chair: Robert Parker, *The University of Utah*

VIB-03: Energy Harvesting
Chair: Wei Che Tai, *Michigan State University*
Co-Chair: Feng Qian, *Penn State Behrend*
Co-Chair: Shengxi Zhou, *Northwestern Polytechnical University*

VIB-04: Origami-Inspired Engineering: Design, Dynamics, and Everything in Between
Chair: Suyi Li, *Virginia Polytechnic Institute and State University*

VIB-05: Nonlinear Dynamics and Vibrations of MEMS and NEMS
Chair: Dumitru Caruntu, *The University of Texas Rio Grande Valley*
Co-Chair: Najib Kacem, *Femto*
Co-Chair: Jian Zhao, *Dalian*
Co-Chair: Lior Medina, *NA*
Co-Chair: Fadi Alsaleem, *University of Nebraska-Lincoln*

VIB-06: Contact Dynamics and Jointed Structures
Chair: Akira Saito, *Meiji University*

VIB-07: Industrial Applications of Vibration, Acoustics & Dynamics
Chair: Brian Olson, *Johns Hopkins University*
Co-Chair: Peter Coffin, *Sandia National Laboratories*
Co-Chair: Ronald, Couch, *Johns Hopkins University*
Co-Chair: Ryan Monroe, *Oakland University*

VIB-08: Rotating Systems and Rotor Dynamics
Chair: Meng-Hsuan Tien, *National Tsing Hua University*

VIB-09: Nonlinear Systems & Phenomena
Chair: Gizem Acar, *Stevens Institute of Technology*
Co-Chair: Brian Feeny, *Michigan State University*

VIB-10: Machine Learning Applications in Vibrations and Dynamics
Chair: David A. Najera-Flores, *ATA Engineering*
Co-Chair: Anthony Garland, *Sandia National Laboratories*

VIB-12: Dynamics and Control of Smart Structures and Systems
Chair: Kai Zhou, *Michigan Technological University*
Co-Chair: Sichen Yuan, *Lawrence Technological University*

VIB-13: Dynamics of Biological, Bio-Inspired and Biomimetic Systems
Chair: Ebru Demir, *NA*

VIB-14: Gear Dynamics and Noise
Chair: Ahmet Kahraman, *The Ohio State University*

VIB-15: Vibration Measurement, Signal Processing, and Structural Damage Detection
Chair: Weidong Zhu, *University of Maryland*
Co-Chair: Sichen Yuan, *Lawrence Technological University*

LOBBY LEVEL

Located off the lobby level, Avenue 34 and The Square offer a unique city vibe, with art Deco inspired design, exposed beams and ductwork, and modern touches that create an industrial chic space to perfectly complement the hotel's more traditional event space. Both locations offer a flexible floor plan, ideal for corporate events, meetings and wedding celebrations.

Columbus Avenue

Studio 1,2 & Loft

Park, Kenmore, Copley, Scollay (The Square)

Park Plaza

Hotel Floor Plan

The Mezzanine Level features most of the hotel's larger meeting spaces including the iconic Grand Ballroom, as well as generous pre-function areas overlooking the beautiful lobby.

The Fourth Floor offers twenty smaller meeting rooms, all with natural light, that are perfect for breakouts, seminars and training sessions. These rooms offer a convenient centralized location that is easy to reach from the larger rooms on the Mezzanine Level.

See you in 2024 at the
JW Marriott Washington, DC!
August 25–28, 2024