



IDETC-CIE 2026

INTERNATIONAL DESIGN ENGINEERING TECHNICAL
CONFERENCES & COMPUTERS AND INFORMATION IN
ENGINEERING CONFERENCE

PROGRAM

CONFERENCE
AUGUST 23-26, 2026

HILTON AMERICAS HOUSTON
HOUSTON, TX, USA

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



WELCOME TO IDETC-CIE 2026!

It is our distinct pleasure and honor, on behalf of the 2026 IDETC-CIE Conference Organizing Committee, to welcome you to Houston, Texas, and to the Hilton Americas-Houston for the 2026 ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC-CIE).

For decades, IDETC-CIE has served as one of ASME's foremost international forums for the design, manufacturing, and information engineering communities.

The 2026 conference will be held in Houston, Texas, from August 23 to 26, 2026, and will bring together more than 1,000 professionals, researchers, educators, students, and industry leaders. This gathering will provide a valuable opportunity to exchange scholarly and technical knowledge, disseminate recent research findings, identify emerging research directions, and foster new collaborations across academia, industry, and government.

The 2026 technical program encompasses eleven conferences and tracks, addressing a broad spectrum of topics, including advanced vehicle technologies, computers and information in engineering, design automation, design education, design for manufacturing and the life cycle, design theory and methodology, mechanisms and robotics, micro and nano systems, multibody systems, power transmission and gearing, and mechanical vibration and noise. These areas collectively reflect both the breadth and depth of contemporary research in design engineering and related disciplines. The program will emphasize emerging technologies and methodologies that address critical engineering challenges in product design and development, manufacturing, and the management and integration of information systems throughout the product life cycle.

Participants will benefit from a rich program that includes technical and special sessions, distinguished keynote lectures, preconference workshops, the CIE Graduate Student Poster Session, the NSF/ASME Student Design Essay Competition, and the ASME-CIE Student Hackathon, which will focus on artificial intelligence for integrated design-to-manufacturing. The conference will also include networking opportunities, award events, and technical tours hosted by Rice University, the University of Houston, and the University of Houston Sugar Land Campus.

Houston offers an exceptional setting for this event. It provides attendees and their guests with access to world-class cultural institutions, museums, hotels and restaurants, entertainment venues, and professional sports facilities, all within a vibrant urban environment.

We wish to express our sincere appreciation to the conference organizing committees, technical committees, volunteers, sponsors, exhibitors, and ASME staff for their dedication and commitment in planning and implementing this event. We are equally grateful to the authors, reviewers, presenters, workshop organizers, students, and attendees, whose contributions are essential to the success of IDETC-CIE 2026.

Welcome to ASME IDETC-CIE 2026. We hope that your participation in the conference will be intellectually rewarding, professionally enriching, and personally enjoyable, and we wish you a pleasant stay in Houston.

Sincerely,

Costin Untaroiu General Program Chair,
Massimiliano Gobbi and **Giorgio Colombo** Technical Program Chairs,
Weihsang Zhu Local Chair



CONFERENCE INFORMATION

REGISTRATION INFORMATION

**Third Floor,
Ballroom Level**

Registration Hours:

Sunday, August 23
7:00AM–5:00PM

Monday, August 24
7:00AM–6:00PM

Tuesday, August 25
7:00AM–5:00PM

Wednesday, August 26
7:00AM–12:00PM

EXHIBIT INFORMATION

Hours

Monday, August 24
7:00AM–5:00PM

Tuesday, August 25
7:00AM–5:00PM

Wednesday, August 26
7:00AM–3:00PM

AMERICAN SOCIETY OF MECHANICAL ENGINEERS INTERNATIONAL

ASME'S PURPOSE: "ADVANCE ENGINEERING FOR THE BENEFIT OF HUMANITY."

ASME'S MISSION: "INSPIRE, EDUCATE, AND CONVENE THOSE DEDICATED TO IMPROVING QUALITY OF LIFE THROUGH ENGINEERING."

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AUDIOVISUAL EQUIPMENT IN SESSION ROOMS

All technical session rooms are equipped with an LCD projector, screen, and laptop. Presenters **MUST** bring their presentation on a thumb drive or have an HDMI capable laptop to use to present their presentation.

BADGE REQUIRED FOR ADMISSION

All conference attendees must wear the official ASME 2026 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 awards luncheons will be confirmed by your badge code. If you wish to bring a guest to an awards luncheon, dinner, 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.



ASME 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
- View Final Papers
- And More!

INTERNET ACCESS IN THE HOTEL

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

Network: **Hilton Meetings**

Passcode: **IDETC2026**

Please go to the registration desk and ask 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.

QUIET ROOM

230, Level 2, will serve as a Quiet Room from 7:00AM to 5:00PM on Monday and Tuesday, and 7:00AM to 3:00PM on Wednesday.

SPEAKER PRACTICE ROOM

333, Level 3, will serve as the Speaker Practice/ Speaker Ready Room from 7:00AM to 5:00PM on Monday and Tuesday, and 7:00AM to 3:00PM on Wednesday. An LCD projector and screen will be available for speakers 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.



FOOD FUNCTIONS & NETWORKING

Continental Breakfasts

Please join our sponsors, exhibitors, conference organizers, and division leadership from Monday through Wednesday from 7:00AM - 7:50AM in the Ballroom of the Americas Pre-Function (Level 2).

Network with your fellow attendees and discuss new ideas, programs, and activities. Badges Required. Guests not permitted.

Refreshment Breaks

Monday, August 24	10:30AM - 10:50AM 3:50PM - 4:10PM
Tuesday, August 25	10:40AM - 11:00AM 4:00PM - 4:20PM
Wednesday, August 26	9:40AM - 10:00AM

Location: Pre-Function (Level 3)

Awards Luncheons

One Division Awards Luncheon is included in each Full Conference Registration. Attendees have preselected a specific meal 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. Badges will be scanned to verify the lunch selection.

Computers & Information in Engineering (CIE) Awards Luncheon

- Monday, August 24, 12:10PM-2:10PM
- Location: Ballroom of the Americas A-C (Level 2)
- Advanced Selection or Purchase Required

Design Engineering Division (DED) Awards Luncheon

- Tuesday, August 25, 12:20PM-2:20PM
- Location: Ballroom of the Americas A-C (Level 2)
- Advanced Selection or Purchase Required

Opening Reception

- IDETC-CIE Conference Opening Reception
 - Monday, August 24, 6:00PM-7:30PM
 - Location: Pre-Function (Level 2)
 - Included in each Full Conference Registration.
 - Additional or Guest Tickets may be purchased.



CONFERENCE SPONSORS

THANK YOU TO ALL OF THE SPONSORS AND EXHIBITORS FOR THEIR SUPPORT

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<https://www.ntop.com/education/>

nTop is a computational design software that helps engineers close the loop between geometry and physics for faster, smarter iteration. Trusted by 450+ leading engineering teams from across Aerospace & Defense, Automotive, Medical Device, and Consumer Product industries, nTop allows you to quickly make changes to your design and instantly understand how it impacts performance. To help the next generation of engineers, nTop provides free educational licenses to students and educators.



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At Siemens, we combine the real world of industry, infrastructure, and transportation with the digital world of software, data, and AI. This is how we help our customers become more competitive, more resilient, and more sustainable.

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SolidProfessor is an e-learning platform designed to support engineering, architecture, drafting, and manufacturing pathways by providing bite-sized video tutorials, exercises, quizzes, projects, and industry-ready certification prep. We work with over 100 postsecondary institutions across the country to support these programs and aim to help more institutions access resources that prepare students for certifications in SOLIDWORKS, AutoDesk, and Onshape.

SPRINGER

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Springer is the leading book publisher in the field of engineering, with particular strengths in design, manufacturing, industrial engineering, mechanics, and automotive engineering. Our portfolio includes textbooks for both undergraduate and graduate students, as well as books targeted at professionals in industry and cutting-edge titles on the latest research.

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CONTACT EXHIBITS@ASME.ORG**



SCHEDULE AT A GLANCE

SUNDAY, AUGUST 23						
Rooms	9:00am - 4:00pm		9:30am - 1:00pm	1:30pm - 5:00pm		
337A			Student Hackathon			
337B						
338				DED Ex-Comm Meeting (Closed)		
336A		Workshop: Building Models of Hazardous Behavior to Quantify Systems Resilience				
335B		Workshop: From Data to Design: Challenges and Opportunities across Industry and Academia				
Rooms	9:00am - 12:00pm	9:00am - 1:00pm	1:30pm - 5:00pm	1:00pm - 5:00pm	2:00pm - 5:00pm	5:30pm - 6:30pm
Ballroom of the Americas F						Student Networking Event
335A	Workshop: AI Experiments in Engineering Design: A Tutorial on the Design Research Open-Source Ecosystem				Workshop: Rethinking CAD: Beyond Geometry Toward Intent-Driven Design with AI	
336B	Workshop: Integrating Accessible Design Principles in Research and Practice				Workshop: ASME Journal of Mechanical Design New Author Development Workshop	
335C	Workshop: Practical Methods for Robust, Interoperable Digital Twins			Workshop: A Hands-On Workshop on AI-Based Reduced-Order Modeling (ROM) with MATLAB and Simulink		
337B					CIE Ex-Comm Meeting (Closed)	
339A	Workshop: Foundations of Applied Ontology: Semantic Computing with Basic Formal Ontology					
339B		Workshop: Advanced Gear Design with IGD			Workshop: 5th Workshop on Trends in Human-AI Teaming for Engineering Design	



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MONDAY, AUGUST 24											
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 - 7:30pm	7:30pm - 8:30pm
3rd Floor Prefunction				Refreshment Break				Refreshment Break			
Ballroom of the Americas Prefunction	Continental Breakfast									Opening Reception	
Ballroom of the Americas A						CIE Awards Luncheon					
Ballroom of the Americas B											
Ballroom of the Americas C											
Ballroom of the Americas D		MR Keynote 1	MR-05/MSNDC-08-01		MR 6-1		MR@50 Session I		MR 7-1		
Ballroom of the Americas E		CIE Keynote I									
Ballroom of the Americas F		DAC Keynote									
327			DAC-02-01		DAC-16		DAC-08		DAC-13-01		
328			DAC-12-01		DAC-05-01		DAC-03-01		DAC-21		
329			CIE-30-01		CIE-31-01		CIE-04-01		CIE-33-01		
333			CIE-21-01		CIE-23-01		CIE-06-01		CIE-10-01		
335A			DAC-15-01		DAC-20-01		DAC-04-01		DAC-09		
335B			CIE-09-01				CIE-00-01		CIE-05-01		
335C			MR 1-1		MR 1-2				MR 3-1		
336A			MR 2-1		MR 2-2				MR-05/MSNDC-08-02		
336B			VIB-10-01				VIB-01/MSNDC-01 & VIB-03/MSNDC-03			TCVS meeting (7:00pm-8:30pm)	
337AB		DTM 07-01: Social, Justice, and Ethical Impacts within Design	DTM 01-01: Benchmarking Design Research Progress		DTM 05-01: Technical Presentation Lightning Talks		DTM 02-01: Design Theory and Methodology in Practice and Industry		DTM 04-01: Human-AI Design Collaboration		
338		VIB invited Keynote	VIB-02/MSNDC-02-01		VIB Mote keynote		VIB-02/MSNDC-02-02		VIB Panel: Navigating Careers in Industry, Government, and Academia		
339A			AVT-04 + AVT-06		MILLIKEN LECTURE		AVT-07		Panel on Energy storage systems for vehicular applications		
339B			DEC-02		DEC-05		DEC-01: AI in Design Education		DEC-03		
340A			MSNDC - ND keynote				MSNDC -Best student paper				
340B					MSNDC - Keynote D'Alembert Award		JCND Best Paper Award Lecture				
342					MNS-01-01				DED General Meeting (5:00-5:50pm)		
343A		PTG-00-01	PTG-01-01		PTG-02-01		PTG-02-02		PTG-03-01		
343B			AI/ML Panel				SEIKM-25-01		CIE-01-01		
344A			DFMLC-05-01		DFMLC Special Session: Panel		DFMLC-10/DAC-11		DFMLC 11/DAC 17-01		
344B						JMR Lunch Meeting					



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TUESDAY, AUGUST 25											
Rooms	7:00am - 7:50am	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
3rd Floor Prefunction				Refreshment Break				Refreshment Break	CIE & NSF Poster Sessions		
Ballroom of the Americas Pre-Function	Continental Breakfast										
Ballroom of the Americas A						DED Awards Luncheon				DAC Townhall Meeting	
Ballroom of the Americas B											
Ballroom of the Americas C											
Ballroom of the Americas D		MR Keynote II	MR-07-02		MR-07-03				MR SEC-Sess 1		
Ballroom of the Americas E		CIE Keynote II							Lasting Impact Paper Award & DTM Posters Session		
Ballroom of the Americas F			DAC JMD: Future of Design				Women in ME ASME		DAC Signature Event		
327		DAC-10-01	DAC-02-02		DAC-10-03		DAC-06-VIB-06				
328		DAC-10-02	DAC-12-02		DAC-05-02		DAC-03-02				
329			CIE-31-02		CIE-11-01		CIE-18-01		CIE-18-02		
333			CIE-24-01		CIE-22-01				CIE-03-01		
335A		DAC-23	DAC-15-02		DAC-19		DAC-04-02				
335B							CIE-05-02		CIE-00-02		Computers and Information in Engineering General Committee Meeting
335C			MR 3-2		MR 3-3						
336A			MR 4-1		MR 4-2					Advanced Modeling and Simulation Technical Committee Meeting	
336B			VIB-10-02		VIB-10-03		VIB-09				
337AB		DTM 08-01: Theory Development in Design Research			DTM 05-02: Technical Presentation Lightning Talks		DTM 03-01: Designer & Team Thinking and Behavior			DTM Technical Committee Meeting	
338		VIB Myklestad Keynote	VIB-07-01		VIB-07-02		VIB-04/MSNDC-04-02		An Overview of the NSF DCSD Program panel	Computer-Aided Product and Process Development Technical Committee Meeting	
339A		AVT-05	AVT-03		AVT-01		AVT-02-01		AVT-02-02	AVT Committee meeting	
339B			DEC-04-01		DEC-04-02		DEC Keynote Panel: "Going from Classroom Observations to Publishable Research"		NASA Student Design Competition Information and Q&A + DEC Technical Committee	Systems Engineering, Information, and Knowledge Management Technical Committee Meeting	
340A		MSNDC - MS Keynote	VIB-04/MSNDC-04-01/MSNDC-09				VIB-02/MSNDC-02-03		VIB-02/MSNDC-02-04	Virtual Environments and Systems Technical Committee Meeting	
340B					MSNDC-10		MSNDC-06		MSNDC-07	MSNDC Technical Committee Meeting	
342					MNS-02-01		MNS-03-01			MNS Committee Meeting	
343A		PTG-04-01	PTG-05-01		PTG-06-01		PTG Committee Meeting				
343B			CIE-09-02				CIE-01-02		SEIKM-25-02	CIE/AI/ML Meeting	
344A		DFMLC Keynote Speaker	DAC-07-01/DFMLC-03-01		DFMLC-02-01		DFMLC-10-02/DAC-11-02		DFMLC-01 & DFMLC-06	DFMLC Technical Committee meeting	



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WEDNESDAY, AUGUST 26						
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
3rd Floor Prefunction			Refreshment Break			
Ballroom of the Americas Pre-Function	Continental Breakfast				Lunch On Own	
Ballroom of the Americas D		MR SEC-Sess II		MR-07-04		
327		DAC-10-04		DAC-13-02		DAC-10-05
328		DAC-03-03		DAC-14		DAC-03-04
329		CIE-01-03		CIE-17-01		
333		CIE-21-02		CIE-03-02		
335A		DAC-20-02		DAC-04-03		DAC-20-03
335B		CIE-00-03		CIE-05-03		
335C				MR 8-1		
336A				MR 9-1		
336B		VIB Mary Baker keynote		VIB-05/MSNDC-05-01		VIB-05/MSNDC-05-02
337AB		DTM 06-01: Rethinking Design in the Age of Artificial Intelligence		DTM 02-02: Design Theory and Methodology in Practice and Industry		DTM 03-02: Designer & Team Thinking and Behavior
338				VIB-08		
339B	IDETC-CIE 2027 Meeting (Closed)					
343B		CIE-09-03		SEIKM-05-03		
344A		DFMLC 11/DAC 17-02		DFMLC-05-02		DAC-07-02/DFMLC-03-02



COMMITTEE MEETINGS

SUNDAY, AUGUST 23		
ROOM	EVENT	TIME
339A	DED Executive Committee Meeting (Closed)	1:30PM–5:00PM
338	CIE Executive Committee Meeting (Closed)	2:00PM–3:00PM
MONDAY, AUGUST 24		
ROOM	EVENT	TIME
336B	TCVS Meeting	7:30PM–8:30PM
342	DED General Meeting	5:00PM–5:50PM
TUESDAY, AUGUST 25		
ROOM	EVENT	TIME
343A	PTG Committee Meeting	2:20pm - 4:00pm
339B	NASA Student Design Competition Information and Q&A + DEC Technical Committee Meeting	4:20pm - 6:00pm
336A	Advanced Modeling and Simulation Technical Committee Meeting	6:10pm - 7:10pm
337AB	DTM Technical Committee Meeting	6:10pm - 7:10pm
338	Computer-Aided Product and Process Development Technical Committee Meeting	6:10pm - 7:10pm
339A	AVT Committee Meeting	6:10pm - 7:10pm
339B	Systems Engineering, Information, and Knowledge Management Technical Committee Meeting	6:10pm - 7:10pm
340A	Virtual Environments and Systems Technical Committee Meeting	6:10pm - 7:10pm
340B	MSNDC Technical Committee Meeting	6:10pm - 8:10pm
342	MNS Committee Meeting	6:10pm - 7:10pm
343B	CIE:AI/ML Meeting	6:10pm - 7:10pm
344A	DFMLC Technical Committee Meeting	6:10pm - 7:10pm
335C	MR Committee Meeting	6:10pm - 8:10pm
Ballroom of the Americas F	DAC Townhall Meeting	6:10pm - 8:10pm
335B	Computers and Information in Engineering General Committee Meeting	7:10pm - 8:10pm
WEDNESDAY, AUGUST 26		
ROOM	EVENT	TIME
339B	IDETC-CIE 2027 Meeting (Closed)	7:00AM–7:50AM



CONFERENCE CHAIR WELCOME LETTERS

28th International Conference on Advanced Vehicle Technologies (AVT)



Angelo Bonfitto
Conference Chair



**Joel Robert
Anstrom**
Program Chair

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, performance, and autonomy, the human-vehicle interaction, advanced driver assistance systems, connectivity features, as well as electrification and emerging technologies for 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, simulation, and validation.

The VDC is pleased to welcome you to the 28th International Conference on Advanced Vehicle Technologies, held as a part of the 2026 ASME IDETC-CIE. This year, the AVT conference will consist of six symposia for a total of seven sessions in the areas of: Ground Vehicles Dynamics and Controls; Methods for Ground Vehicle Systems Design; Vehicle Electrification and Powertrain Design; Lightweight and Energy Efficient Vehicles; Off-road Agriculture, Military and Commercial Ground Vehicle Design and Testing; and Intelligent Vehicles. We sincerely appreciate the time and services of these symposium organizers.

This year, the VDC is especially honored to host Professor Mike Blundell, from Future Transport and Cities Research Institute at Coventry University, and the chassis and vehicle dynamic specialist Prof. Damian Harty for the William Milliken Lecture, which is entitled, "The Multibody Systems Approach to Vehicle Dynamics – Past, Present, Future." In this lecture, Professor Blundell and Professor Harty will present a very fine summary and progression of multibody systems modeling support to vehicle dynamics design over the last 60 years, and how it can be implemented in the current and future challenges of automated vehicle operations.

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!



46th Computers and Information in Engineering Conference (CIE)

Dear IDETC-CIE 2026 Participants,

On behalf of the ASME's Computers and Information in Engineering (CIE) Division, we are honored to welcome you to the 46th Annual Computers and Information in Engineering Conference taking place in Houston Texas, USA.

Thanks to the efforts of outstanding authors, speakers, reviewers, and organizers, the CIE conference remains an authoritative venue for sharing research contributions. The flux of novel ideas and impactful applications of computing in engineering brings together researchers, practicing engineers, educators, and students from the broadest international scope of domains in academia, industry, and government. The CIE research community has endured and evolved for nearly 50 years and continues to explore the cutting edge of engineering challenges using computational technologies. This year, we come together once more to share scientific and technical insights, foster new connections, and cultivate the next generation of talented students to carry forward our professional community.

This year's technical program includes more than 130 technical papers with presentations, as well as more than 40 additional presentation-only talks. These talks will be presented in sessions organized under the five Technical Committees of the CIE Division:

- Advanced Modeling and Simulation (AMS)
- Computer-Aided Product and Process Development (CAPPD)
- Systems Engineering Information Knowledge Management (SEIKM)
- Virtual and Augmented Reality Environments (VARE)
- AI/ML Approaches for Engineering (AIML)

In addition to the comprehensive technical program, the CIE Division is proud to offer a rich array of special events. We encourage all attendees to join us for the *CIE Keynote Talk*, as well as the returning *Women in CIE Panel*. During these events, distinguished leaders from academia, industry, and government will discuss the present-day and future evolution of computational and information sciences. The *Graduate Student Poster Session*, graciously organized by the CAPPD technical committee, will spotlight outstanding work by award-winning graduate students. In addition, the *CIE Student Hackathon* returns with a focus on the latest topics in artificial intelligence for engineering applications. We look forward to celebrating the manifold forms of excellence in our community during the *CIE Awards Ceremony Lunch*, where the Conference Best Paper Awards and CIE Division Awards will be presented. We warmly invite all attendees to join us on Monday, August 24, as we recognize the exceptional work of our mentors, colleagues, and students.



Those interested in the future of the CIE Division are encouraged to attend the *Technical Committee Meetings* and *Division Meeting* taking place on the evening of Tuesday August 25. These gatherings offer time and space to evaluate the conference, elect new officers to the Technical Committees, and make the initial decisions shaping the 2027 conference. We encourage you to attend and consider joining one of the committees to become more actively involved in CIE—new participants are always welcome!

The CIE Division must express its profound thanks to several groups. We first wish to recognize the tireless work of all the Technical Committee members for organizing and reviewing the submissions to this year's conference. In particular, we recognize the outstanding efforts of Dehao Liu (AMS), Satchit Ramnath (CAPPD), Abheek Chatterjee (SEIKM), Marco Rossoni (VARE), and Ashly Joseph (AIML). We also thank our numerous symposium organizers and chairs for their commitment to keeping the conference running smoothly and on schedule! We offer our sincere thanks to all those who contributed peer reviews; the time and effort that they have contributed is what upholds the exemplary technical standards of the conference. We also wish to extend our deepest gratitude to the authors and speakers who have contributed their research and expertise to help foster the spirit of innovation and discovery within our community. Finally, we thank the ASME staff who have made this event possible, especially the incredible work of Laraine Lee (Webtool Specialist and Technical Support), Keli Bell-Cole (Meetings and Conference Manager), and Barbara Zlatnik (Senior Manager and TEC Operations).

Finally, we thank *you* for attending and participating in the CIE community. We hope that you will find this year's conference to be a fruitful experience and look forward to welcoming you again at IDETC-CIE 2027!

John C. Steuben

CIE Conference Chair

Xiaozhi (Christina) Wang

CIE Conference Program Chair



52nd ASME Design Automation Conference (DAC)

Dear Colleagues,

On behalf of the DAC Executive Committee, welcome to the **52nd ASME Design Automation Conference (DAC)**!

Following a rigorous review process, this year's DAC technical program consists of 107 accepted papers across 24 active research areas, corresponding to an acceptance rate of approximately 82%. This year, we also solicited and accepted 59 presentation-only submissions. The technical program will be presented from Monday, August 24, to Wednesday, August 26.

Complementing our technical sessions, we will host the DAC Keynote given by **Dr. David Gorsich** on the topic of **"Thirty Years Developing Modeling and Simulation Tools"** and the DAC Signature Event on the topic of **"AI-Empowered Digital Twins for Engineering Design and Manufacturing,"** consisting of a panel of four members of active contributors to DAC:

- Austin Downey (University of South Carolina)
- Chenhui Shao (University of Michigan)
- Elizabeth Qian (Georgia Tech)
- Ramin Bostanabad (University of California, Irvine)

This year, we are also collaborating with the *ASME Journal of Mechanical Design* (JMD) on its new initiative, **"Future of Design,"** inviting members of the engineering design community to discuss the state of the art and the primary challenges in engineering design research. The first session was held in conjunction with the Design Society's annual meeting and led to an editorial published in JMD earlier this year. At this year's DAC conference, we will organize the second in-person session, after which a new editorial will be curated and published in JMD.

Please join us for the DAC Technical Committee Meeting on Tuesday evening, August 25. During that meeting, we will also present the Design Automation Dissertation Award winner, the Design Automation Young Investigator Award winner, the Design Automation Award winner, and the DAC Best Paper Award winners. We look forward to our community coming together to meet old friends and make new ones.

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

- DETC2026-194154 (DAC-20: AI-driven Design Innovation): "Variable-Geometry Graph Neural Networks: An Adaptive Surrogate Model for Structural Analyses With Varied Geometries," Jiquan Yan, Weifei Hu, Chengrui Zhang, Yikang Hei, Demin Liu, Liwen Wang, and Yu Zeng.



- DETC2026-194022 (DAC-01: Control Co-Design): “Bridging Spatial Packaging and Robot Execution: Why Co-Designing Configuration, Sequence, Motion, and Robot Design Can Be Beneficial,” Abbas Bataleblu, Chad Peterson, and James T. Allison.
- DETC2026-193969 (DAC-04: Data-Driven Design): “Ortho2CAD: 3d CAD Generation from Orthographic Drawings Using Vision Language Models,” Aditya Joglekar, Amit Regmi, Kenji Shimada, and Levent Burak Kara.
- DETC2026-195037 (DAC-05: Design and Optimization of Energy Systems): “Physics-Informed Self-Cross Attention Operator Network for Heat Map Prediction in Large-Scale Battery Thermal Management Systems,” Yuan Jiang and Pingfeng Wang.
- DETC2026-193788 (DAC-07/DFMLC-03: Design for Additive Manufacturing): “Comparison of Computational and Human-Sourced Print Fidelity Assessments for 3D Printed Foods,” A.K.M. Ahasun Habib, Farnaz Maleky, Ranadip Pal, Martin Binks, and Paul F. Egan.
- DETC2026-186939 (DAC-24 Design for E-Mobility): “A Multi-Agent System for IPMSM Design Optimization via an Fea-Ai Hybrid Approach,” Jinseong Han, Sunwoong Yang, and Namwoo Kang
- DETC2026-194357 (DAC-03: Novel AI or ML Frameworks for Design or Systems Science): “COSMIC: Concurrent Optimization of Structure, Material, and Integrated Control for Robotic Systems,” Qinsong Guo and Liwei Wang
- DETC2026-193841 (DAC-10 Design of Engineering Materials and Structures): “Tool-path-Driven Shape Optimization for Multi-Axis Machining via Configuration Space,” Kota Nozaki, Shuzhi Xu, Kentaro Yaji, and Kikuo Fujita.
- DETC2026-192508 (DAC-13: Multidisciplinary Design Optimization): “Implicit Nonlinear Geometry Parameterization for Multidisciplinary Design Optimization,” Andrew H. Fletcher and John T. Hwang.
- DETC2026-193891 (DAC-19: UQ of ML Models for Data-Driven Design): “Adaptive Conformal Prediction With Asymmetric Intervals for Online Learning,” Yizhe He, Yuwei Zong, Xiwei Tang, Patrick Brandt, Jie Zhang, and Yanwen Xu.

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:



Ferdous Alam, Saeed Azad, A. Emrah Bayrak, Amir Behjat, Amy Bilton, Ramin Bostanabad, Hannah Budinoff, Grace Burleson, Cheng Chen, Hongrui Chen, Jie Chen, Lei Chen, Wei (Wayne) Chen, Souma Chowdhury, Abigail Clarke-Sather, Daniel Cooper, Shiguang Deng, Xiaoping Du, Bryony DuPont, Ehsan Esfahani, Cong Feng, Maha Haji, Daniel Herber, Zhen Hu, Horea Ilies, Roshni Anna Jacob, Namwoo Kang, Paghava Kommalapti, Yong Hoon Lee, Leifur J Leifsson, Ting Liao, Ketki Lichade, Po Ting Lin, Zheng Liu, Chris Mabey, Hemanth Manjunatha, Ali Mehmani, Seung Ki Moon, Manaswin Oddiraju, Kijung Park, Steve Paul, Cyril Picard, Monsuru Ramoni, Anabel Renteria, Daniel Selva, Zhenghui Sha, Gulai Shen, Ada-Rhodes Short, Binyang Song, Xiaoshi Su, Anh Tran, Anton van Beek, Liwei Wang, Zequn Wang, Natasha Wright, Zhimin Xi, Xinyi Xiao, Yinshuang Xiao, Hongyi Xu, Yanwen Xu, Kentaro Yaji, Wenhua Yang, Chen Zeng, and Lei Zuo.

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 Houston, Texas!

Souma Chowdhury

Conference Chair

Zhenghui Sha

Program Chair



23rd International Conference on Design Education

On behalf of the Design Education Committee, we welcome you to the 23rd 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 – *AI in Design Education*, *Innovative Practices in Design Education*, *Project-Based Design Education*, *Research Across the Design Curriculum*, and *Social Topics in Design Education*. Refer to the conference Technical Program for the times and locations of the technical sessions.

In addition to our technical symposia, we are hosting a **special DEC Keynote Panel**: "Going from Classroom Observations to Publishable Research" with five invited speakers.

The DEC Best Paper for the 2026 Conference is IDETC2026-193050: "Measuring Engineering Identity: Evaluating Definitions, Keywords, and Concept Maps as Research Instruments" by Vaishnavi Josyula, Pavan Kumar, and Joshua Summers.

We extend special appreciation to our technical session Review Coordinators: Rahul Renu, Rohan Prabhu, and Ada-Rhodes Wish; together with us, 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 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.



Shraddha Joshi
Conference
Program Chair



Arlindo Silva
Conference Chair



31st Design for Manufacturing and the Life Cycle Conference (DFMLC)

The ASME Design for Manufacturing and the Life Cycle Committee welcomes participants to the 31st 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, in partnership with the Design Automation Conference (DAC) for two sessions, includes 31 full technical papers and 14 technical presentations across six regular sessions:

- DFMLC-1&6: Design for Recycling, Remanufacturing, and Circularity
- DFMLC-2: Decision Making in Life Cycle and Human Factors Design
- DFMLC-3/DAC-7: Joint Session with DAC - Design for Additive Manufacturing
- DFMLC-4&5: Design for Manufacturing, Assembly, and Systems Integration
- DFMLC-10/DAC-11: Joint Session with DAC - Engineering for Sustainable Development (ESD)
- DFMLC-11/DAC-17: Joint Session with DAC: Modeling and Optimization for Sustainable Design and Manufacturing

Of our 31 full accepted papers, one was awarded the 2025 DFMLC Best Paper Award and two were designated as Papers of Distinction:

- **2026 DFMLC Best Paper Award:** DETC-193893 Repurposing End-of-Life Wind Turbine Blades Using an Attribute-Driven Design Framework by Shenal Hewa Witharanage, Alison Parker, and Katja Hölttä-Otto
- **DFMLC Paper of Distinction:** DETC-193788 Comparison of Computational and Human-Sourced Print Fidelity Assessments for 3D Printed Foods by A.K.M. Ahasun Habib, Ranadip Pal, Farnaz Maleky, Martin Binks, and Paul Egan
- **DFMLC Paper of Distinction:** DETC-194587 Permanent Magnet Manufacturing From Idaho-Sourced Minerals: Environmental Impact Assessment by Sneha Pradhangha, Amin Mirkouei, and Rostam Reifschneider



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 Christopher Mabey, and the paper review coordinators/co-coordinators for managing the papers through the review process: Sara Behdad, Amy Bilton, Hannah Budinoff, Grace Burleson, Charul Chadha, Daniel Cooper, Paul Egan, Vincenzo Ferrero, Buddhika Hapuwatte, Ashley Hartwell, Yong Hoon Lee, Christopher Mabey, Albert Patterson, Chad Peterson, Natasha Wright, Xinyi Xiao, and Hao Zhang. Your participation and hard work have been vital for the success of the DFMLC conference!

This year, Dr. Satyandra K. Gupta, Smith International Professorship in the Viterbi School of Engineering at the University of Southern California and Director of the Center for Advanced Manufacturing, will present the DFMLC keynote lecture. Professor Gupta is a decorated academic and ASME Fellow as well as an entrepreneur holding 28 U.S. patents and Co-Founder/Chief Scientist at GrayMatter Robotics. His contributions to engineering design and manufacturing are defined by the integration of artificial intelligence (AI), human-centered robotics, and advanced manufacturing processes. From utilizing CAD geometry information to automate assessment of manufacturability to creating bio-inspired robots and pioneering methods for humans and robots to perform complex assembly operations safely together, Dr. Gupta's contribution to the DFMLC community is outstanding.

This year we are hosting a special panel session with Engineering for Sustainable Development (ESD) experts who have experience in this interdisciplinary practice vital for tackling urgent global crises like climate change, resource scarcity, and social inequality. This panel will explore the future of ESD research and the pivotal role engineers play in advancing worldwide well-being. Attendees will be invited to actively participate in shaping the fundamental scientific questions and domains that will drive the field forward.

The ASME Design for Manufacturing and Life Cycle (DFMLC) Technical Committee annually presents the DED-DFMLC Kos Ishii-Toshiba Award. Sponsored by Toshiba. The award was established in honor of Kos Ishii, an internationally recognized and highly influential researcher and educator in design for manufacturing and life-cycle engineering. Presented no more than once per year, the award recognizes individuals for sustained and distinguished contributions to the development and application of technical modeling approaches that support product development decisions related to design, manufacturing, and life-cycle management.



The DFMLC technical committee meeting will include a review of DFMLC activities during the 2025–2026 cycle. The DFMLC Awards, including the Best Paper Award for the 2026 DFMLC conference, in addition to the two Papers of Distinction, will also be presented in this meeting, as well as the technical committee will plan for next year's conference. Everyone is welcome to attend. The meeting will be held on Tuesday August 25th from 6:10 to 7:10PM in room 344A.

On behalf of the entire DFMLC community, we welcome you to the 31st Design for Manufacturing and the Life Cycle conference!



**Abigail
Clarke-Sather**
University of
Minnesota-Duluth
Conference Chair



Vincenzo Ferrero
Amazon
Program Chair



38th 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 38th International Conference on Design Theory and Methodology (DTM). Our conference focuses on fundamental design theory and methodologies, and to apply them in an engineering context, with contributions provided by both researchers and practitioners. This 2026 DTM conference includes 40 technical papers and 18 technical presentations presented across seven topic areas shown below, with specific dates and times for sessions noted in the program, as follows:

- Benchmarking Design Research Progress
- Design Theory and Methodology in Practice and Industry
- Designer & Team Thinking and Behavior
- Human-AI Design Collaboration
- Rethinking Design in the Age of Artificial Intelligence
- Social, Justice, and Ethical Impacts within Design
- Theory Development in Design Research

We would like to thank the authors for submitting their research to the conference. The paper review process is essential to the success of the conference, and this year we are indebted to an excellent group of reviewers for committing their time and considerable expertise. As always, this peer review process was successfully managed by several DTM Review Coordinators (in alphabetical order by last name): Eric Brubaker, Cheng Chen, Leah Chong, Madhurima Das, Katherine Fu, Kosa Goucher-Lambert, Maha Haji, Bingling Huang, Euiyoung Kim, Astrid Layton, Xingang Li, Ting Liao, Soheyl Massoudi, Yutaka Nomaguchi, Anastasia Kouvaras Ostrowski, Aoran Peng, Anastasia Schauer, Sita Syal, Taylan Topcu, and Georgia Van de Zande. We sincerely appreciate the time and effort these individuals contributed to maintaining the high quality of this DTM conference.

This year *Friend or Foe? How Framing AI as a Collaborator or Competitor Affects Design Fixation* (Paper #194673), by Kalyani Lakkanige, Aliaa Maar, CJ Witherell, Bethany Parkinson, Ming-Hua Chang, Zoe Marazita, Matthew Parkinson, and Jessica Menold was selected as the ASME Design Theory and Methods best paper for the 2026 IDETC conference. You can see this paper's presentation, along with some of the other best paper nominees during the Tuesday, 2:20–3:40PM session.

On Tuesday afternoon, from 4:20 to 6:00pm, there will be a special DTM session that includes first a DTM Poster Session for the technical presentations submitted this year, from 4:20 to 5:45PM followed by the presentation of the DTM Lasting Impact Award paper from 5:45 to 6:00PM. This year's DTM Lasting Impact Paper Award goes to *The Design for Additive*



Manufacturing Worksheet by Joran W. Booth, Jeffrey Alperovich, Pratik Chawla, Jiayan Ma, Tahira N. Reid, and Karthik Ramani, which was originally presented at the 2016 DTM Conference. This special session will immediately proceed with the Design Theory and Methods Technical Committee meeting.

This year we also include a special joint session with the Design Automation Committee (DAC) on the “Future of Design” coordinated with the *ASME Journal of Mechanical Design*, which highlights emerging areas and speakers across these two communities.

This year, the ASME Design Theory and Methodology Award will be presented to Dr. Joshua D. Summers, and the ASME Design Theory and Methodology Young Investigator Award will be presented to Dr. Sita M. Syal.

We welcome you to Houston and the 38th International Conference on Design Theory and Methodology!

Thank you,

Jessica Menold

Conference Chair

The Pennsylvania State University

Mark Fuge

Program Chair

ETH Zürich



50th Mechanisms and Robotics Conference

The Mechanisms and Robotics Technical Committee of the ASME Design Engineering Division would like to warmly welcome you to the 50th 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, including nine technical symposia, two keynote speeches, an Industrial session and a Student Mechanism & Robot Design Competition (SMRDC), and special sessions celebrating the 50th anniversary of the conference. 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. The SMRDC will hold its final round, which includes demonstrations of mechanisms and robots by the finalists.

Submitted papers were eligible for several awards, including the Mechanisms and Robotics Best Paper Award, A.T. Yang Memorial Award in Theoretical Kinematics, and Ashok Midha Memorial Award in Compliant Mechanisms. We would like to thank Jian Dai, Chair of the Awards Committee, for coordinating the selection of the awards. 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*.

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

- MR-1: Mechanisms Synthesis & Analysis: Vu Linh Nguyen
- MR-2: Theoretical & Computational Kinematics (A.T. Yang Symposium): Mario Baggetta, Carl Nelson
- MR-3: Compliant Mechanisms (A. Midha Symposium): Giovanni Berselli, Jared Butler
- MR-4: Origami-Based Engineering Design: Jared Butler
- MR-5: Motion Planning, Dynamics, and Control of Robots: Joo Kim, Andreas Muller,



Damien Chablat, Jeffrey W. Herrmann

- MR-6: Medical & Rehabilitation Robotics: Abbas Fattah, Anirban Sinha
- MR-7: Novel Mechanisms, Robots, and Applications: Guowu Wei, Reza Fotouhi
- MR-8: Soft & Continuum Mechanisms: Vishesh Vikas
- MR-09: MR/MESA Joint Symposium on Translational Robotics: Kuan-Lun Hsu, Damien Chablat, Po Ting Lin

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 of our future Mechanisms and Robotics Conferences.



20th International Conference on Micro- and Nanosystems (MNS)

On behalf of the Organizing Committee, it is our great pleasure to welcome you to the 20th International Conference on Micro- and Nanosystems (MNS). We are delighted to have you join us and sincerely thank you for your participation and contributions.

The MNS conference, organized by the Technical Committee on Micro and Nano-Systems (MNS) within the ASME Design Engineering Division, provides a vibrant international forum for researchers from academia, industry, and government laboratories to exchange ideas and present advances in the rapidly evolving fields of micro- and nano-systems. The conference spans a broad range of topics, including design, mechanics, dynamics, control, fabrication, and emerging applications of micro-scale (MEMS) and nano-scale (NEMS) technologies.

We warmly invite contributions based on experimental, computational, and theoretical research. We especially encourage submissions from across disciplines, including those beyond traditional mechanical engineering, to foster a diverse and innovative scientific dialogue. The 2026 technical program will feature the following symposia:

- MNS-1: Dynamics of Micro/Nano Systems
- MNS-2: Micro/Nano Bioengineering and Fluidics
- MNS-3: Micro/Nano Robotics
- MNS-4: Micro/Nano Materials and Manufacturing
- MNS-5: Micro/Nano IoT, Sensors and Computing

This conference serves as a unique platform for researchers, practitioners, educators, and students to share their latest findings, discuss emerging challenges, and build collaborations that advance our field. We extend our deepest appreciation to all authors for their valuable submissions, to the reviewers for their thoughtful and constructive feedback, and to the session chairs and co-chairs for their essential role in ensuring a high-quality technical program.

We are confident that the MNS community will continue to grow and thrive through your active engagement as we collectively shape the future of micro- and nanosystems research. We are pleased to welcome you to the 20th International Conference on Micro- and Nanosystems.

Sincerely,

Lin Dong (Conference Chair)

On behalf of the 2026 MNS Conference Organizing Committee



22nd International Conference on Multibody Systems, Nonlinear Dynamics, and Control

On behalf of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics, we warmly welcome the attendees of the 22nd International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC). The conference includes 10 symposia and features nearly 60 contributions on both traditional and emerging topics in the broad areas of multibody systems and nonlinear dynamics. Selected symposia are cross-listed with the 28th International Conference on Advanced Vehicle Technologies (AVT), the 50th Mechanisms and Robotics Conference (MR), the 19th International Conference on Micro- and Nanosystems (MNS), and the 38th Conference on Mechanical Vibration and Noise (VIB), further broadening the technical program for the MSNDC community. This event presents a unique opportunity for researchers, practitioners, educators, and students to report their accomplishments, exchange ideas, and engage in emerging trends in the field. The conference will also feature the MSNDC Best Paper and Best Student Paper competitions.

This year, we are honored to recognize Professor Jorge A.C. Ambrósio as the recipient of the D'ALEMBERT Award, established in 2003, for his lifelong contributions to research, practice, and education in the field of multibody dynamics. Professor Ambrósio received his Ph.D. degree from the University of Arizona in 1991 and is Full Professor and head of the Structural and Computational Mechanics group at the Mechanical Engineering Department of Instituto Superior Técnico at the University of Lisbon, Portugal. He has authored more than 300 publications, including books and numerous journal papers in multibody dynamics, flexible multibody dynamics, structural mechanics, vehicle dynamics, crashworthiness and biomechanics. His SCOPUS H-index exceeds 50 with more than 8000 citations. He advised more than 30 Ph.D. students and numerous M.Sc. students, created courses in mechanical systems, vehicle dynamics, and biomechanics. He led national and international projects in railway dynamics, biomechanics, and passive safety. He is a co-founder and current Editor-in-Chief of *Multibody System Dynamics*, and member of the editorial boards of several international journals.

We are also honored to host two keynote lectures featuring distinguished speakers, Professor Olivier Brûls and Professor Anil K. Bajaj.

Dr. Olivier Brûls is Full Professor in the Department of Aerospace and Mechanical Engineering at the University of Liège in Belgium. He received his master's degree in mechanical engineering in 2001 and his Ph.D. from the University of Liège in 2005. He then spent a postdoctoral year within the Institute of Engineering and Computational Mechanics at the University of Stuttgart, Germany. Since 2008, he headed the Multibody and Mechatronic Systems Lab at the University of Liège. His research focuses on flexible multibody dynamics, mechatronics, numerical simulation, control, and optimization methods with applications in the fields of robotics, biomechanics, and deployable structures. He is also involved in the Laboratory of Human Motion Analysis of the University of Liège. He serves



as associate editor of *Mechanism and Machine Theory*, is a member of the advisory board of “Multibody System Dynamics,” and is part of the steering committee of the overlay journal, *Journal of Theoretical, Computational and Applied Mechanics* (JTCAM). He is one of the coordinators of the European Network for Nonsmooth Dynamics (ENNSD).

Dr. Anil K. Bajaj is the Alpha P. Jamison Professor of Mechanical Engineering at Purdue University. He served as a Visiting Professor and Arcot Ramachandran Chair in Department of Applied Mechanics at the Indian Institute of Technology Madras and Chennai, India, in 2019–2020. At Purdue, he was the William E. and Florence E. Perry Head of Mechanical Engineering (6/2011–6/2019) and Associate Head for Research and Graduate Education (1998–2010). He received his B.Tech. (1973) and M.Tech. (1976) in Mechanical Engineering from the Indian Institute of Technology, Kharagpur and Kanpur, India, respectively, and Ph.D. in Mechanics (1981) from the University of Minnesota. His research spans the areas of nonlinear dynamics of structural systems; linear stability and dynamics of systems and structures; brake squeal predication and sensitivity analysis; dynamics of seat-occupant systems; MEMS designs using nonlinear resonances; flow-induced dynamics of elastic bodies; uncertainty analysis in dynamical systems; and modeling of viscoelastic properties of foam. He is a Fellow of ASME and has received several Purdue University awards for mentoring and faculty excellence. He has published more than 250 archival journal and conference papers and has advised or co-advised more than 52 M.S. and Ph.D. students. Dr. Bajaj served as a Contributing Editor of the journal, *Nonlinear Dynamics*, until 2015. He was awarded the 2019 Thomas K. Caughey Dynamics Award by the Applied Mechanics Division (AMD) of the ASME.

“We gratefully acknowledge the essential efforts of the symposium organizers and manuscript reviewers, whose work has been central to the success of the technical program. We also thank all contributors for choosing MSNDC as the venue to share their latest research and ideas. We look forward to an engaging and productive conference.”

Conference Co-Chairs:



James R. Chagdes
Miami University



Andrea Zanoni
Politecnico di
Milano



Francesco Danzi
University of
California Merced



Xinxin Yu
Tampere
University

Program Co-Chairs:



38th Conference on Mechanical Vibration and Noise

On behalf of the Technical Committee on Vibration and Sound (TCVS), we cordially welcome you to the **38th Conference on Mechanical Vibration and Noise (VIB)**, held as part of ASME IDETC-CIE 2026 at the Hilton Americas-Houston, Houston, TX, August 23–26, 2026. This conference covers a broad spectrum of topics related to vibratory systems, including 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 in 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-01: Nonlinear Dynamics and Control of Smart Structures and Systems
- VIB-02: Nonlinear Dynamics of Systems and Nonlinear Phenomena
- VIB-03: Contact Dynamics of Mechanical Structures
- VIB-04: Data-Driven and Machine Learning Techniques in Vibrations and Dynamics
- VIB-05: Industry Applications of Vibration, Shock, Acoustics, and Dynamics
- VIB-06: Design for Blue Economy
- VIB-07: Dynamics & Waves in Solids, Acoustic Metamaterials, and Architected Materials
- VIB-08: Energy Harvesting
- VIB-09: Vibration Measurement, Signal Processing, and Structural Damage Detection
- VIB-10: General Dynamics, Vibration, and Acoustics

VIB is pleased to feature keynote and award presentations by leaders in dynamics, vibration, and acoustics, including Professor Mahmoud I. Hussein, University of Colorado Boulder; Dr. Zhenhua Tian, Virginia Tech, recipient of the 2026 ASME C. D. Mote, Jr. Early Career Award; Professor Daniel J. Segalman, Michigan State University, recipient of the 2026 ASME Mary Baker Industry Achievement Award; and Professor Lei Zuo, University of Michigan, recipient of the N.O. Myklestad Award.

As part of VIB, NSF supports several student-oriented and community events, including the student paper competition with cash prizes, travel support for students and postdocs, an Industry-Academia Career Panel, and a K-12 workshop on vibration and acoustics. We gratefully acknowledge financial support from NSF through award 2609868.

In addition, in collaboration with the *ASME Journal of Vibration and Acoustics*, high-quality papers will be considered through the Conference-to-Journal initiative.



IDETC-CIE 2026

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

Mohammad Bukhari

Wayne State University
Conference Chair

Keegan Moore

Georgia Institute of Technology
Conference Co-Chair

Nikhil Bajaj

University of Pittsburgh
Conference Co-Chair

Vipin Agarwal

University of Memphis
Conference Co-Chair



ASME 2026 Power Transmission and Gearing Conference (PTG)

On behalf of the ASME Power Transmission and Gearing (PTG) Technical Committee, it is our distinct pleasure to welcome you to the **2026 International Conference on Power Transmission and Gearing**, held at the Hilton Americas-Houston in the vibrant city of Houston, Texas, from August 23 to 26, 2026.

As a premier global event, this conference brings together leading experts, researchers, and practitioners to share the latest advancements and shape the future of power transmission and gearing innovations. We extend our sincere gratitude to the authors for presenting their cutting-edge research findings and to all of our attendees for participating. We encourage you to take full advantage of this unique opportunity to explore emerging trends, exchange ideas, and build valuable professional networks.

The technical program features an outstanding lineup of research papers and presentations covering a comprehensive range of topics. These include gear geometry, manufacturing, dynamics and noise, materials, fatigue, as well as the latest developments in bearings, clutches, and other transmission systems.

An event of this scale is a collaborative effort. We would like to express our deepest appreciation to the topic organizers and reviewers for their help with the evaluation of submissions, and to the members of the PTG Committee for their dedicated and continuous service in organizing this conference.

Once again, welcome to Houston and to the 2026 Power Transmission and Gearing Conference. We look forward to your active participation and hope you have an incredibly productive, inspiring, and enjoyable experience.



**Alfonso Fuentes
Aznar**
Rochester Institute
of Technology
Conference Chair



Yawen Wang
The University of
Texas at Arlington
Program Chair



KEYNOTES

AVT MILLIKEN LECTURE

MONDAY, AUGUST 24, 10:50AM–12:10PM

ROOM 339A

THE MULTIBODY SYSTEMS APPROACH TO VEHICLE DYNAMICS – PAST, PRESENT, FUTURE



Damian Harty,
Future Vehicle Systems Ltd



Mike Blundell,
Coventry University

Abstract: This paper reviews the use of Multibody Systems (MBS) analysis to support the vehicle dynamics design and development process and how it has evolved over the last 60 years. The historical contributions of great vehicle dynamics pioneers, including Lanchester, Olley, Segal, Milliken, and Sharp, are described leading to the early use of MBS and the processes involved to plan, develop and process efficient full vehicle simulations of proving ground test track maneuvers is described.

The present situation where sophisticated model building toolkits enable more challenging scenarios to be addressed is covered, including the growing capability to include flexible bodies. This is discussed in the context of modeling vehicles other than passenger cars (motorcycles and commercial vehicles).

The paper concludes by looking to the future and the growing use of autonomy in vehicle operation.

The authors will argue that there is a substantial safety case to address when considering the execution of vehicle motions using digital interventions to driver inputs. In this context, MBS offers an important capability by allowing testing to proceed significantly faster than real time and considering scenarios which might otherwise prove unreasonably hazardous to perform. Using numerical implementations of Newtonian models allows us to fully investigate the design space and improve our confidence in any assertion that such systems are acceptably safe.

Damian Harty is a vehicle dynamics specialist (“making vehicles steer and stop”) with over 30 years’ experience across automotive, motorsport, military, and powersports applications. He has held both academic and industrial roles, teaching at Master’s level and co-authoring the first and second editions of *The Multibody Systems Approach to Vehicle Dynamics*, with a particular emphasis on embedding multibody dynamics methods within the vehicle design and development process. In industry, he has held senior technical roles delivering high-performance and electric vehicles, using multibody methods as a unifying framework for vehicle system design and attribute delivery. Damian has contributed both theoretically and practically across a wide range of programs, including World Rally at Prodrive and the 1,000+ horsepower Lucid Air.

Professor Mike Blundell has research that focuses on automotive safety and vehicle dynamics and the use of multi-body systems (MBS) software. He is based in the Future Transport and Cities Research Institute at Coventry University, and he has over 40 years of experience in industry and academia and a strong research track record having supervised over 30 successful Ph.D. completions, acted as principal investigator on a range of UK and EU funded projects, and has over 150 publications. He is co-author of a well-known text-book, *The Multibody Systems Approach to Vehicle Dynamics*, that is used by universities, research centers, and industry around the world. He has held posts as a Visiting Academic at Purdue (USA), University of Windsor (Canada), and Bergamo University (Italy). His current work focusses on the use of active systems to improve safe driving in wet road conditions and to prevent aquaplaning.



AVT PANEL ON ENERGY STORAGE SYSTEM FOR VEHICULAR APPLICATIONS

MONDAY, AUGUST 24, 4:10PM–5:50PM

ROOM 339A

EXTENDING THE LITHIUM-ION BATTERY LIFE-CYCLE: AGEING IDENTIFICATION AND THERMAL MANAGEMENT DESIGN



Alberto Ponso
Politecnico di Torino, Turin, Italy



Saulius Pakštys,
Politecnico di Torino, Turin, Italy

Abstract: Progressive ageing is a distinctive characteristic of batteries and represents the most relevant operational difference from traditional power sources such as fossil fuels. Such ageing causes degradation of battery performance, i.e., capacity reduction and internal resistance increase. These phenomena are most evident in vehicular applications, where energy/mass ratio is crucial, and the increased Joule losses due to internal resistance are an additional challenge for thermal management. Therefore, focus on the lifetime augmentation of battery systems, also thanks to optimized thermal management solutions, is of notable interest within the development of novel solutions for automotive applications. This presentation is divided into two parts.

The first part will focus on battery aging mechanisms, which will be discussed considering a high-power low-energy module for mild-hybrid application as a reference. The presentation will cover the theory of aging, the characterization procedures, and some real-time and offline techniques of moni-

toring and diagnostics. A comparison will be drawn between current profiles in vehicular and stationary applications.

The discussion on novel methods of battery thermal management is discussed in the second part of the presentation. Here, the exploitation of immersion thermal management is presented for cylindrical lithium-ion cells, where experimental work is conducted. Additionally, high-fidelity semi-empirical electrochemical models coupled with heat transfer are presented and applied to the design of partial immersion thermal management systems for highly integrated battery packs. An exploration of virtual temperature sensing techniques for real-time monitoring of axial temperature gradients of cells is also included, where data-driven methods based on graph convolutional neural networks are discussed.

Alberto Ponso received the B.Sc. and M.Sc. degrees in automotive engineering from Politecnico di Torino, Turin, Italy, in 2020 and 2022, respectively, where he has been currently working toward the Ph.D. degree in Mechanical Engineering, since 2022. His research interests include vehicle electrification, sustainable transportation, route planning of electric vehicles for grid integration, and battery testing for state of health assessment and second-life addressing. He is a member of the Interdepartmental Center for Automotive Research and Sustainable Mobility (CARS) at Politecnico di Torino.

Saulius Pakštys received the B.Sc. and M.Sc. degrees in Mechanical Engineering in 2021 and 2022, respectively, from Politecnico di Torino, Turin, Italy, where he is currently working toward the Ph.D. degree in mechanical engineering with Mechatronics Laboratory. His research interests include energy management strategies for hybrid energy storage systems, highly integrated battery systems design, and electric machine thermal analysis. Within the topics of actuators and energy storage systems, he explores thermal management design and virtual sensing techniques for difficult-to-access regions.



DAC KEYNOTE

MONDAY, AUGUST 24, 8:00AM–9:00AM

BALLROOM OF THE AMERICAS F

THIRTY YEARS DEVELOPING MODELING AND SIMULATION TOOLS



Dr. David J. Gorsich
Chief Scientist
U.S. Army Ground
Vehicle Systems

Abstract: The U.S. Army has been investing in the development of modeling and simulation tools to design and assess ground vehicle systems for over 30 years. The use of these tools across the lifecycle of Army systems was initially limited but now involves every aspect supporting system development. Where initially there were doubts about the fidelity of the tools over all the use cases the systems would be subject to, now there is an insatiable demand for more computing infrastructure. The story is not just about AI, but how the community has sought to balance fidelity with speed. Meta modeling and surrogate modeling were long under development before the newest foundation models were introduced. Also given the amount of data now managed across the lifecycle for these systems, demand for digital engineering environments and digital threads to move the data around has greatly increased. These tools have aided the Army in the analysis of many aspects of systems and the physics involved, to include electromagnetic signatures, vehicle dynamics and mobility, intelligent control, structural analysis, and the operational environment. This keynote will talk about the journey we have been on and where we are going.

Biography: Dr. David J. Gorsich is currently on a special assignment with the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. Prior to that he was working for the

Deputy Assistant Secretary of the Army for Data, Engineering and Software and developed the Army's Digital Engineering Strategy. He was selected for a Scientific and Professional (ST) position in January 2009 and currently serves as the Army's Chief Scientist for Ground Vehicle Systems, with a technical specialization in Modeling and Simulation (M&S). His current research interests are digital engineering, vehicle design and mobility, autonomy, AI, and modeling & simulation. Prior to his current role, he served in various positions of progressing responsibility in the U.S. Army Ground Vehicle System Center, such as Director of the Strategic Plans and Programs Office, Associate Director for Modeling and Simulation, Team Leader in Robotics and Vehicle Intelligence, among others. He also worked assignments in Army Materiel Command (AMC), Secretary of the Army for Research, Development and Acquisition (SARDA) and the Army Research Laboratory (ARL). In recognition of his service, he was awarded several Commander's Coins and the Commander's Award for Civilian Service in 2003. He is also the recipient of numerous awards, such as the 2020 ASME Milliken Career Award and the SAE Arch T. Colwell Merit Award.

Dr. Gorsich is a Fellow of Society of Automotive Engineers (SAE) and American Society of Mechanical Engineers (ASME), and served on the SAE Board of Directors, and Standards, and is the Editor-in-Chief of *ASME Journal of Autonomous Vehicles and Systems*, an Associate Editor for several highly respected technical journals, such as *ASME Journal of Mechanical Design*, *International Journal of Terramechanics*, and *International Journal for Reliability and Safety*. He has published extensively with more than 150 conference and journal articles, including more than 50 articles in peer-reviewed journals, such as *Transactions of SAE*, *International Journal of Vehicle Design*, *Journal of Mechanical Design*, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *Contemporary Mathematics*, *Physical Review*, among others. He co-authored a book called, *The TARDEC Story: Sixty-five Years of Innovation*, which traces the evolution of innovation in TARDEC to its current position as the center of excellence for ground vehicle development and integration in the U.S. Army. He received his Ph.D. in Applied Mathematics from the Massachusetts Institute of Technology, his M.S. degree in Applied Mathematics from George Washington University, and his B.S. degree in Electrical Engineering from Lawrence Technological University.



DAC SIGNATURE EVENT

TUESDAY, AUGUST 25, 4:20PM–6:00PM

BALLROOM OF THE AMERICAS F

AI-EMPOWERED DIGITAL TWINS FOR ENGINEERING DESIGN AND MANUFACTURING

Format:

- Brief intro: 5 minutes
- Lightning presentations: 6 minutes each for 24 minutes total contribute to the theme Q&A
- Questions from moderator: 25 minutes
- Q&A from the audience: 40 minutes
- Closing remarks: 6 minutes

Panelist



Dr. Austin Downey

Associate Professor of
Mechanical Engineering
University of South Carolina

Dr. Austin Downey is an Associate Professor of Mechanical Engineering at the University of South Carolina. He received his B.S. and Ph.D. degrees from Iowa State University. His research focuses on physics-informed artificial intelligence, digital twins, and real-time data assimilation. He develops low-latency AI/ML and physics-informed machine learning (PIML) approaches for physics-constrained digital twin frameworks that support online structural validation and adaptive decision-making in additively manufactured components. His work has received support and recognition through the NSF CAREER Award, Air Force Office of Scientific Research (AFOSR) Young Investigator Program (YIP) Award, Fulbright Award, and the ASME Gary Anderson Early Achievement Award.

Panelist



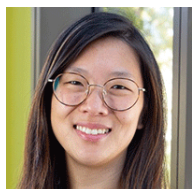
Dr. Chenhui Shao

Associate Professor of
Mechanical Engineering
University of Michigan,
Ann Arbor

Dr. Chenhui Shao is an Associate Professor in the Department of Mechanical Engineering at the University of Michigan, Ann Arbor. Before joining Michigan, he served on the faculty at the University of Illinois at Urbana-Champaign between 2016 and 2023, where he advanced to the rank of Associate Professor in the Department of Mechanical Science and Engineering. Chenhui received his B.E. degree in Automation from the University of Science and Technology of China, M.S.E. degree in Industrial and Operations Engineering, M.A. degree in Statistics, and Ph.D. degree in Mechanical Engineering, all from the University of Michigan, Ann Arbor. His research focuses on smart manufacturing, machine learning, statistics, materials joining, and manufacturing systems control and automation. Chenhui's honors and awards include S.M. Wu Research Implementation Award, NSF CAREER Award, ASME Chao and Trigger Young Manufacturing Engineer Award, IISE Manufacturing and Design Division Outstanding Young Investigator Award, SME Barbara M. Fossum Outstanding Young Manufacturing Engineer Award, SME 30 Under 30 Honoree, and Dean's Award for Excellence in Research at Illinois. His research contributions have been recognized by multiple best paper awards and highlighted in the Manufacturing USA Report. In 2025, Chenhui was selected to participate in the National Academy of Engineering (NAE) Grainger Foundation Frontiers of Engineering Symposium, and in 2021, he was chosen as one of only 30 nationwide to attend the ASEE DELTA Junior Faculty Institute. He currently serves as an associate editor for the *Journal of Manufacturing Processes* and the *ASME Journal of Dynamic Systems, Measurement, and Control*.



Panelist

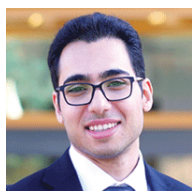


Dr. Elizabeth Qian

Assistant Professor Aerospace Engineering and Computational Science and Engineering
Georgia Tech

Dr. Elizabeth Qian is an Assistant Professor at Georgia Tech jointly appointed in the School of Aerospace Engineering and the School of Computational Science and Engineering. Her interdisciplinary research develops new computational methods to enable engineering design and decision-making for complex systems, with particular foci on reduced modeling, scientific machine learning, and multi-fidelity methods. Prior to joining Georgia Tech, Elizabeth was von Karman Instructor at Caltech in the Department of Computing and Mathematical Sciences, and earned her Ph.D., SM, and SB degrees from the MIT Department of Aeronautics and Astronautics. Highlights of her awards and honors include a Caltech-wide teaching award from the undergraduate student body, an NSF CAREER grant, an AFOSR Young Investigator Program grant, the Fannie and John Hertz Foundation Fellowship, and a U.S. Fulbright Student grant. Elizabeth also currently holds a visiting faculty appointment as a Hans Fischer Fellow at the Technical University of Munich.

Panelist



Dr. Ramin Bostanabad

Associate Professor
Mechanical and Aerospace Engineering
University of California, Irvine

Dr. Ramin Bostanabad is an Associate Professor in the Department of Mechanical and Aerospace Engineering at University of California, Irvine (UCI). Dr. Bostanabad completed his bachelor's degree at the University of Tehran and earned his Ph.D. in 2019 from Northwestern University, where his works were recognized with a number of awards including Terminal Year Fellowship, Martin Outstanding doc-

toral Fellowship, Predictive Science and Engineering Design Fellowship, and Walter P. Murphy Fellowship. His research focuses on uncertainty quantification, optimization, and design under uncertainty, with an emphasis on developing interpretable and probabilistic machine-learning methods. At UCI, his group develops data-driven and physics-informed frameworks for applications spanning materials discovery, advanced manufacturing, computational mechanics, and topology optimization. His research has been recognized with several awards, including 2023 NSF CAREER Award and 2021 NASA Early Career Faculty Award. Dr. Bostanabad is a Review Editor of the *Structural and Multidisciplinary Optimization* journal and recently led a special issue on Design under Uncertainty in the *ASME Journal of Mechanical Design*.

Moderator



Dr. Zhen Hu

Associate Professor of
Industrial and Manufacturing
Systems Engineering
University of
Michigan-Dearborn

Dr. Zhen Hu is an associate professor in the Department of Industrial and Manufacturing Systems Engineering (IMSE) at the University of Michigan-Dearborn (UM-Dearborn). Prior to joining UM-Dearborn, he was a research assistant professor and post-doctoral research scholar at Vanderbilt University. Dr. Hu earned his Ph.D. in Mechanical Engineering from Missouri University of Science and Technology (formerly the University of Missouri-Rolla) in 2014. His research areas of interest are uncertainty quantification, Bayesian data analytics, risk and reliability, structural health monitoring, prognostics and health management, model verification and validation, machine learning/artificial intelligence, and optimization under uncertainty. He has won multiple best paper awards and is the recipient of the 2023 ASME Design Automation Young Investigator Award. He is currently serving as a Review Editor of the *Structural and Multidisciplinary Optimization* journal, an Associate Editor of *Engineering Optimization*, an Associate Managing Editor of *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems*, and an Editorial



Board member of several other journals. He has served as the 2022 technical discipline chair of the AIAA SciTech, Non-Deterministic Approach (NDA) Conference.

DEC KEYNOTE PANEL: "GOING FROM CLASSROOM OBSERVATIONS TO PUBLISHABLE RESEARCH"

TUESDAY, AUGUST 25, 2:20PM-4:00PM

ROOM 339B

DFMLC KEYNOTE

TUESDAY, AUGUST 25, 8:10AM-9:10AM

ROOM 344A

DESIGN FOR ROBOTIC ASSEMBLY



Satyandra K. Gupta

Director of the Center for Advanced Manufacturing
Viterbi School of Engineering
University of Southern California

Abstract: Addressing labor shortages requires a strategic shift toward automating assembly processes. Beyond managing costs and capacity, deploying automation significantly improves ergonomics and product quality. However, products originally designed for manual assembly often present insurmountable challenges for automated assembly. Recent breakthroughs in physical AI are changing our endowing robots with unprecedented capabilities. Therefore, robotic assembly is becoming an attractive option in high-mix manufacturing applications. This presentation focuses on the principles of

designing products for robotic assembly with little to no human intervention.

Key topics include:

- *Overview of AI-Powered Robots:* Current technologies and future trends, focusing on grasping, assembly, and perception.
- *Design Rules for Automation:* Strategies to simplify assembly through part consolidation, automated part feeding, reliable and efficient insertion, and mistake-proofing.
- *Digital Threads & Digital Twins:* The impact of robot-generated data on creating robust digital twins and preserving digital threads.
- *Practical Use-Cases:* Analysis of existing products, assessing their suitability for automation, and exploring redesign strategies to ensure robotic assembly.

Biography: Dr. Satyandra K. Gupta holds Smith International Professorship in the Viterbi School of Engineering at the University of Southern California and serves as the Director of the Center for Advanced Manufacturing. He is also Co-Founder and Chief Scientist at GrayMatter Robotics. His research interests are physical artificial intelligence, computational foundations for decision-making, and human-centered automation. He has published more than 500 technical articles in journals, conference proceedings, and edited books. He also holds 28 U.S. patents. He is a fellow of the American Association for the Advancement of Science (AAAS), American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronics Engineers (IEEE), National Academy of Inventors (NAI), Solid Modeling Association (SMA), and Society of Manufacturing Engineers (SME). He is a former editor-in-chief of the *ASME Journal of Computing and Information Science in Engineering*.

He has received numerous honors and awards for his scholarly contributions. Representative examples include a Presidential Early Career Award for Scientists and Engineers in 2001, Invention of the Year Award at the University of Maryland in 2007, Excellence in Research Award from ASME Computers and Information in Engineering Division in 2013, Distinguished Alumnus Award from Indian Institute of Technology, Roorkee in 2014, ASME Design Automation Award in 2021, Distinguished Alumni Award



from Indian Institute of Technology, Delhi in 2022, Lifetime Achievement Award from ASME Computers and Information in Engineering Division in 2024, Eli Whitney Productivity Award from SME in 2025, and William T. Ennor Manufacturing Technology Award from ASME in 2025. He has also received eleven best paper awards at international conferences. He currently serves as a member of the Technical Advisory Committee for Advanced Robotics for Manufacturing (ARM) Institute and a member of A3 Robotics Technology Strategy Board. He also served as a member of the National Materials and Manufacturing Board (NMMB).

DFMLC SPECIAL SESSION: PANEL

MONDAY, AUGUST 24, 10:50AM–12:10PM

ROOM 344A

Engineering for Sustainable Development (ESD) refers to the broad interdisciplinary practice of engineering to improve the quality of life of society, and the environment worldwide. Our world faces challenges of unprecedented scale, such as climate change, food insecurity, disease, access to safe and reliable water, and growing economic inequality. It has been ten years since the publication of the editorial “Why the Developing World Needs Mechanical Design.” This is one of the first formal publications from ASME to bring the field together. Over the last decade, attitudes and practices on ESD have continued to evolve. The session will provide a structured reflection on the past, present, and future of ESD research and practice. Panelists will discuss how methods have evolved, how to identify opportunities, how to navigate the current funding landscape, and how to work with community partners.

VIB KEYNOTE

MONDAY, AUGUST 24, 8:00AM–9:00AM

ROOM 338

FLOW-PHONON INTERACTION: HOW VIBRATION ENGINEERING CAN TRANSFORM THE FIELD OF FLOW CONTROL



Mahmoud I. Hussein

Alvah and Harriet Hovlid
Professor

Ann & H.J. Smead Department
of Aerospace Engineering
Sciences

Department of Physics
University of Colorado Boulder

Abstract: Flow control over surfaces is a long-standing, multidisciplinary engineering challenge. It seeks passive or active means of intervening in the flow field to induce desirable changes in overall behavior. For streamlined bodies moving through air or water, a central goal is to control flow instabilities that appear as fluid waves—perturbations in the velocity field that, if unchecked, can trigger transition from laminar to turbulent flow and sharply increase skin-friction drag. Elevated drag reduces the efficiency of vehicles, wind turbines, pipelines, and other systems, motivating methods to suppress instability growth. In some cases, however, the aim is the opposite: to accelerate instability growth to delay or prevent flow separation.

Phononics, on the other hand, is a contemporary field focused on understanding the nature of intrinsic mechanical vibrations in artificially structured materials, generally referred to as phononic materials, and uses this knowledge to extend the boundaries of physical response at the material and structural levels. The field bridges multiple disciplines across applied physics and engineering, and spans scales from the atomic scale (THz) to the macroscale (Hz-GHz).



In this talk, he will present an emerging paradigm—proposed by the group in 2015—that merges these two fields to enable control of the fundamental flow mechanisms mentioned above (Hussein et al., *Proc. R. Soc. A*, 2015). The central premise is to engineer phonon motion beneath the flow-exposed surface so that prescribed spectrally shaped phonon characteristics passively transmit into the flow and alter its dynamics. Such phonon behavior can be realized using any type of phononic material, such as a phononic crystal or an elastic metamaterial. Once installed, the material has finite size and thus functions as a phononic subsurface (PSub)—a general concept that may be implemented in a variety of forms and designed based on different criteria. A key advantage of PSubs is their ability to achieve precise phase synchronization between structural and fluid response. By preprogramming the PSub's band-structure and truncation properties—corresponding to frequency, wavevector, phase, and amplitude—it is possible, in principle, to attain unprecedented command of flow behavior. After introducing the topic, he will overview the group's latest contributions, namely extending the concept to (1) a lattice of PSubs for downstream control (Hussein et al., arXiv:2503.18835v4, 2025) and (2) a super-resonant PSub capable of broadband control (Harris et al., arXiv:2509.15142v1, 2025).

Biography: Mahmoud I. Hussein is the Alvah and Harriet Hovlid Professor at the Smead Department of Aerospace Engineering Sciences at the University of Colorado Boulder. He holds a courtesy faculty appointment in the Department of Physics and has formally served as the Engineering Faculty Director of the Pre-Engineering Program and the Program of Exploratory Studies. He received a B.S. degree from the American University in Cairo (1994) and M.S. degrees from Imperial College London (1995) and the University of Michigan Ann Arbor (1999, 2002). In 2004, he received a Ph.D. degree from the University of Michigan Ann Arbor, after which he spent two years at the University of Cambridge as a postdoctoral research associate.

Dr. Hussein's research focuses on the dynamics of materials and structures, especially phononic crystals and metamaterials, at both the continuum and atomistic scales. He received a DARPA Young Faculty

Award in 2011, an NSF CAREER award in 2013, and in 2017 was honored with a Provost's Faculty Achievement Award for Tenured Faculty at CU Boulder. He was awarded as PI two multimillion dollar grants, both on concepts he discovered—nanophononic metamaterials (NPMs, *Phys. Rev. Lett.*, 2014; ARPA-E 2019–2023) and phononic subsurfaces (PSubs, *Proc. R. Soc. A*, 2015; ONR MURI 2024–2029). He has co-edited a book titled, *Dynamics of Lattice Materials*, published by Wiley. He is a Fellow of ASME and has served as an associate editor for the *ASME Journal of Vibration and Acoustics*. In addition, he is the founding vice president of the International Phononics Society and has co-established the biennial Phononics 20xx conference series, which has helped create a new multidisciplinary research community and is widely viewed as the world's premier event in the emerging field of phononics.

MSNDC-NONLINEAR DYNAMICS KEYNOTE

MONDAY, AUGUST 24, 9:10AM–10:30AM
ROOM 340A

RANDOM/CHAOTIC EXCURSIONS IN NON- LINEAR MECHANICS: JETS, RESONANT STRUC- TURES, 'CAR SEATS,' AND MICRORESONATORS



Anil K. Bajaj

Alpha P. Jamison Professor of
Mechanical Engineering
Purdue University

ABSTRACT: The faculty career of Anil Bajaj can be delineated into two distinct components: (i) research, teaching, and scholarly activities, and (ii) service to Purdue academic programs, primarily in mechanical engineering. Beginning with some historical context of his early research effort, the talk will focus on some of the research that has been con-



ducted by Anil Bajaj and his collaborators, including graduate students and faculty over the past 40 or so years. A few of the research areas will receive greater attention. The first project involves “bifurcation phenomena” arising in self-excited oscillations of fluid-conveying pipes. The second research area involves “resonant dynamics” of nonlinear elastic structures including spherical pendulum, strings, beams, and plates with various boundary conditions. While, in the past, structures were selected for analysis based on their characteristics, some more recent studies on synthesis of such structures will also be described. Lastly, detailed multi-degree-of-freedom modeling effort investigating the dynamics of seat-occupant systems to characterize low frequency vibrations affecting the occupant’s ride will be presented.

Biography: Anil K. Bajaj is the Alpha P. Jamison Professor of Mechanical Engineering at Purdue University. He served as a Visiting Professor and Arcot Ramachandran Chair in Department of Applied Mechanics at the Indian Institute of Technology Madras and Chennai, India, in 2019–2020. He was the William E. and Florence E. Perry Head of Mechanical Engineering (6/2011–6/2019) and Associate Head for Research and Graduate Education (1998–2010), all at Purdue. Dr. Bajaj completed his B.Tech. (1973) and M.Tech. (1976), both in Mechanical Engineering from the Indian Institute of Technology, Kharagpur and Kanpur, India, respectively, and Ph.D. in Mechanics (1981) from the University of Minnesota. Dr. Bajaj’s research is in the areas of nonlinear dynamics of structural systems; linear stability and dynamics of systems and structures; brake squeal predication and sensitivity analysis; dynamics of seat-occupant systems; MEMS designs using nonlinear resonances; flow-induced dynamics of elastic bodies; Uncertainty Analysis in Dynamical Systems; and modeling of Viscoelastic Properties of Foam. He is a Fellow of the ASME and has received many Purdue University awards (“Provost’s Award for Outstanding Graduate Mentors,” Purdue Graduate School, 2006; College of Engineering “Mentorship” Award for Faculty Excellence, and “Team” Award for Faculty Excellence, 2009). He has published more than 250 archival journal and conference proceedings papers and has advised (or co-advised) more than 52 M.S. and Ph.D. students. Dr. Bajaj served as a Contributing Editor of

the journal, *Nonlinear Dynamics*, until 2015. He was awarded the 2019 Thomas K. Caughey Dynamics Award by the Applied Mechanics Division (AMD) of the ASME.

VIB KEYNOTE: 2026 ASME C.D. MOTE JR., EARLY CAREER AWARD

MONDAY, AUGUST 24, 10:50AM–12:10PM

ROOM 338

LEVERAGING ACOUSTICS: FROM DAMAGE DIAGNOSIS TO PARTICLE MANIPULATION



Dr. Zhenhua Tian
Assistant Professor
Department of Mechanical Engineering at
Virginia Tech University

Abstract: Acoustic waves carry both information and energy, allowing them to inspect material damage and create invisible robotic hands capable of manipulating nano- to millimeter-scale particles. This talk covers our studies on acoustics-based damage diagnosis and noncontact bioparticle manipulation. The first part of the talk focuses on ultrasonic phased arrays and laser ultrasonics for measuring material property distributions and detecting defects in various structures, such as 3D-printed metallic and composite panels. The second part of the talk focuses on acoustic tweezers that leverage transducer arrays to dynamically control acoustic fields for noncontact, versatile manipulation of objects across multiple length scales. Their key functions and potential applications will be discussed, including (i) constructing diverse lattice-like patterns of cells and dynamically transforming these patterns, (ii) printing anisotropic tissues with aligned cells, (iii) stimulating and disrupting single cells using highly focused ultrasound with $<100\ \mu\text{m}$ resolution, (iv) characterizing the biophysical properties of single cells, (v)



contactless transport and levitation of droplets, and (vi) transporting small targets inside blood vessels shielded by the skull. Lastly, Dr. Tian will present recent experiments leveraging acoustic waves to manipulate particles and bubbles under microgravity.

Biography: Dr. Zhenhua Tian received his Ph.D. in Mechanical Engineering from the University of South Carolina in December 2015 and completed postdoctoral training at Duke University in August 2019. He is currently an Assistant Professor in the Department of Mechanical Engineering at Virginia Tech. He received the Virginia Tech Dean's Awards of Excellence Outstanding New Assistant Professor, Dean's Awards of Excellence Faculty Fellow Award, Achenbach Medal, Lab on a Chip Emerging Investigator recognition, ASME Rising Star Award, and NSF CAREER Award. His research focuses on acoustics-based manipulation of nano- to millimeter-scale objects, ultrasonic nondestructive evaluation, and acoustic metamaterials. In these areas, he has published 90+ journal papers with a total citation of 5,000+. More details about this research area can be found on the website of the [Acoustics and Functional Materials Laboratory](#).

MSNDC-D'ALEMBERT AWARD LECTURE

MONDAY, AUGUST 24, 10:50AM–12:10PM

ROOM 340B

MULTIBODY DYNAMICS: A SHORT HISTORICAL OVERVIEW LOOKING FOR THE FUTURE



Jorge Ambrósio
Mechanical Engineering
Department
Instituto Superior Técnico

ABSTRACT: As a branch computational dynamics, within the broader area of computational mechan-

ics, multibody dynamics is now an independent mature scientific area fundamental to the design and analysis of complex engineered systems. With its theoretic foundations in the classic Newtonian mechanics, its basis has been developed by mechanists and mathematicians before the computer age. Computational Multibody Dynamics methods start developing independently with the access to computers, being recognized, today, as an autonomous part of computational mechanics with its particular methods, dedicated computer codes, conferences, scientific journals, and international associations, being taught in a large number of university courses worldwide with dedicated textbooks. Originally more focused in aerospace systems and gyroscopes, multibody dynamics found new fields of applications in biomechanics, initially in crashworthiness and later on general movement, machine design and vehicle dynamics. The breath of applications was further developed in its classical fields with important developments on flexible multibody dynamics for aerospace, machines and surface vehicle applications, biomechanics for biomedical engineering, sports sciences, and veterinary studies or mechatronics and general control. Bridging the present and the future, the coupling between the classical Multibody Formulations and other fields of computational mechanics, via co-simulation paradigms, is being found to be an important discipline for multiphysics computational environments. The possibilities offered by the opportunities created by the Artificial Intelligence arise with challenges and dangers, which can only be overcome with solid foundations and Natural Intelligence. The need for Digital Twins in all major engineering applications is another area that is reshaping the use of computational procedures in Multibody Dynamics.

BIOGRAPHY: Prof. Jorge A.C. Ambrósio, having received his Ph.D. degree from the University of Arizona in 1991. He is currently Full Professor and head of the Structural and Computational Mechanics group at the Mechanical Engineering Department of Instituto Superior Técnico at the University of Lisbon, Portugal. He is the author of more than 300 publications, including several books and a large number of papers in international journals in the areas of Multibody Dynamics, Flexible Multibody Dynamics, Structural Mechanics, Vehicle Dynamics, Crashwor-



thiness, and Biomechanics. His current SCOPUS h-index is over 50 with more than 8,000 citations. He was the advisor of more than 30 Ph.D. students and a large number of M.Sc. students, being the responsible for the creation of diverse courses in Mechanical Systems, Vehicle Dynamics, and Biomechanics in which the computational core is Multibody Dynamics. He has been the responsible of several national and international projects in railway dynamics, biomechanics, and passive safety. Currently, he is the Editor-in-Chief of *Multibody System Dynamics*, for which is the co-founder, and member of the editorial boards of several international journals.

MSNDC-MULTIBODY SYSTEMS KEYNOTE

TUESDAY, AUGUST 25, 8:10AM–9:10AM

ROOM 340B

NON-SMOOTH FORMULATIONS FOR FLEXIBLE MULTIBODY SYSTEMS: FROM FRICTIONAL CONTACT LAWS TO NUMERICAL SIMULATION



Olivier Brûls

Department of Aerospace and Mechanical Engineering
University of Liège

ABSTRACT: This talk addresses the numerical simulation of multibody systems composed of rigid and flexible bodies interacting through frictional contact. Particular attention is devoted to interactions involving slender structural components, such as flexible beams and cables. Such configurations arise in many applications, including textile engineering, soft robotics, cable assemblies, and cable-driven mechanical systems. The Signorini-Coulomb model describes unilateral contact by combining the Signorini condition for non-penetration with Coulomb's law of dry friction. It provides a simple and physically meaningful idealization of dry contact with a minimal set

of parameters, making it particularly suitable for system-level simulation.

The treatment of non-smooth contact laws in systems involving flexible beams raises several fundamental questions: What is the interplay between beam kinematic assumptions and the contact law? How should the contact interface along a flexible component be spatially discretized? How can the framework be extended to dynamics, and what role does the impact law play in that context? Finally, how can the equations of motion be integrated in time in the presence of nonsmooth phenomena and strong flexibility effects? The talk will discuss modeling and numerical strategies that enable non-smooth contact formulations to be effectively combined with flexible multibody dynamics in practical simulation frameworks.

BIOGRAPHY: Olivier Brûls is Full Professor in the Department of Aerospace and Mechanical Engineering at the University of Liège in Belgium. He obtained a Master's degree in Mechanical Engineering in 2001 and earned his Ph.D. degree from the University of Liège in 2005. He spent a postdoctoral year within the Institute of Engineering and Computational Mechanics at the University of Stuttgart, Germany. Since 2008, he is the head of the Multibody and Mechatronic Systems Lab at the University of Liège. His research focuses on flexible multibody dynamics, mechatronics, numerical simulation, control, and optimization methods with applications in the fields of robotics, biomechanics, and deployable structures. He is also involved in the Laboratory of Human Motion Analysis of the University of Liège. He serves as associate editor of *Mechanism and Machine Theory*, is member of the advisory board of *Multibody System Dynamics*, and is part of the steering committee of the overlay journal, *Journal of Theoretical, Computational and Applied Mechanics* (JTCAM). He is one of the coordinators of the European Network for Nonsmooth Dynamics (ENNSD).

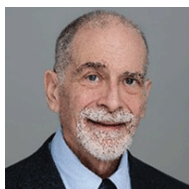


VIB KEYNOTE: 2026 ASME MARY BAKER INDUSTRY ACHIEVEMENT AWARD

WEDNESDAY, AUGUST 26, 8:00AM–9:40AM

ROOM 336B

ACCEPTABLE MODELS WHEN THE ANSWERS MUST BE CORRECT



Daniel J. Segalman
Professor of
Mechanical Engineering
Michigan State University

Abstract: Engineers rely on models every day—some exceptionally accurate, others merely convenient. More often than we admit, we choose the most tractable model while knowing it falls short of reality. Signs of model inadequacy are easy to recognize: a name that is almost self-contradictory, such as an “amplitude-dependent linear model;” heavy post-hoc calibration when a predictive tool was what was actually needed; or designs that require generous safety factors to compensate for uncertain predictions. Yet imperfect models persist for two practical reasons: first, we may not know how to do better; second, the consequences of being wrong may be small. This talk examines models that survive under one or both of these conditions, and how sustained programmatic needs can justify the investment required to replace them with models that are both more accurate and more useful. When the “right” answer truly matters, better modeling becomes a strategic priority.

Throughout that process, culture and management are as important as mathematics. They shape how problems are recognized, how resources are assembled, how support is sustained, and how new methods are integrated into everyday practice. These themes will be illustrated through four engineering problems I encountered across my career—usually while working alongside people smarter than I am.

Biography: Daniel J. Segalman is Professor of Mechanical Engineering at Michigan State University and a Fellow of the American Society of Mechanical Engineers. He is internationally recognized for contributions to structural dynamics, vibration, uncertainty quantification, model validation, and nonlinear mechanics. Before joining Michigan State University in 2015, he spent nearly three decades at Sandia National Laboratories, where he retired as a Distinguished Member of Technical Staff. Prior to that he spent eight years in industrial research laboratories. Over the course of his career, he has led major research programs, developed influential analytical methods for jointed structures and nonlinear systems, and advanced predictive engineering simulation. Dr. Segalman has received numerous honors, including the ASME Myklestad Award, the ASME Robert E. Abbott Award, and now the 2026 ASME Mary Baker Industry Achievement Award. He has authored an extensive body of scholarly publications and patents spanning dynamics, smart materials, contact mechanics, and computational engineering.

VIB KEYNOTE: N.O. MYKLESTAD AWARD

TUESDAY, AUGUST 25, 8:10AM–9:10AM

ROOM 338

OCEAN WAVE ENERGY CONVERSION: FROM DYNAMICS AND CONTROL TO COMMUNITY-CENTRIC RESEARCH CONVERGENCE



Lei Zuo
Herbert C. Sadler Collegiate
Professor of Engineering
University of Michigan

Abstract: Covering more than 72% of the Earth's surface, the ocean holds vast and largely untapped



energy resources, particularly in oscillatory ocean waves. The theoretical global wave energy potential exceeds 30,000 TWh per year, more than current worldwide electricity consumption, with a power density five to ten times greater than wind or solar energy. Despite more than 250 concepts proposed since the first patent in 1799, wave energy remains in its infancy. A fundamental challenge lies in the irregular, low-speed nature of waves, with time-varying amplitudes and frequencies. To address this, a mechanical motion rectification mechanism was invented to convert bidirectional oscillatory motion into unidirectional rotation. While this improves energy conversion efficiency, it also introduces discontinuity and controllability challenges. To overcome these limitations, a control co-design framework has been developed that concurrently considers hydrodynamics, wave-structure interaction, power takeoff, and control strategies to optimize global “wave-to-wire” performance. Beyond engineering challenges, wave energy development involves economic, environmental, and sociological complexities. To address these issues, a community-centric research convergence approach is being explored through coastal community-engaged decision-making, techno-economic-socio-environmental assessment, and transdisciplinary co-design. This lecture will conclude with a vision for advancing marine energy through multidisciplinary collaboration, academia-industry-community partnerships, and multidimensional workforce development.

Biography: Lei Zuo is the Herbert C. Sadler Collegiate Professor of Engineering at the University of Michigan and the founding Director of the NSF Industry-University Cooperative Research Center for Growing Ocean Energy Technologies and the Blue Economy (GO Blue). His research spans marine energy, energy harvesting, vibration control, mechatronic design, and advanced manufacturing. Professor Zuo has authored over 400 publications, including 20 award-winning papers, and has supervised more than 100 graduate students, mentored over 20 postdoctoral researchers, and advised more than 400 undergraduate students. His honors include the ASME Thar Energy Design Award, the ASME Leonardo da Vinci Award, the ASME N.O. Myklestad Award, the ASME McDonald Mentoring Award, two R&D 100 Awards, and the SAE Ralph R. Teetor Educational Award.

CIE KEYNOTE

TUESDAY, AUGUST 25, 8:10AM–9:10AM

BALLROOM OF THE AMERICAS E (LEVEL 2)



Jitesh H. Panchal
School of Mechanical
Engineering
Purdue University

Presentation Title: Secure Design and Manufacturing: Advancing IP-Protected Collaboration and Anti-Counterfeiting

Abstract: The rapid digitization and globalization of engineering systems have introduced unprecedented opportunities, but they have also escalated critical security vulnerabilities. Across complex supply chains, the industry faces mounting economic losses due to intellectual property (IP) theft, cyber-physical attacks, and counterfeiting. Furthermore, collaborative design is often hindered by reluctance to share sensitive data, leading to suboptimal engineering solutions and missed opportunities for innovation. This keynote will present emerging methodologies that bridge the gap between secure design and robust manufacturing, enabling IP-protected collaboration without sacrificing engineering performance.

Addressing the design phase, the Secure Co-Design (SCD) framework will be introduced as a comprehensive foundation for IP-protected collaboration. Using computationally efficient protocols, SCD offers a practical, lightweight alternative to computationally intensive cryptographic techniques, such as homomorphic encryption, enabling collaborators to perform complex computations without exposing confidential data. This overarching framework facilitates specific engineering applications, including Secure Finite Element Analysis (sFEA), and enables diverse optimization scenarios, such as requirements-driven, objective-driven, and Nash noncooperation models. Furthermore, to guide iterative design, techniques to quantify the trade-off between value gained and confidentiality lost will be presented.



Transitioning to manufacturing, the presentation will explore advancements in part authentication that exploit the inherent randomness of materials and fabrication processes. Specific techniques include utilizing topologically transformed error distributions derived from geometric deviations to authenticate manufacturing configurations, alongside deploying ultrasound-based decoding to retrieve information hidden within complex internal geometries, such as additively manufactured metal lattices. Furthermore, the discussion will examine methods for embedding surface features, such as QR codes, by controlling printing speed in fused deposition modeling (FDM). Finally, the implementation of microstructure-based optical Physical Unclonable Functions (PUFs) for metallic goods will be discussed, demonstrating how these provide unique identifiers that remain robust against part damage. By integrating these approaches, this keynote will highlight research opportunities and pathways to combat counterfeiting, protect intellectual property, and foster highly effective, IP-protected collaborations across the Manufacturing 4.0 landscape.

Biography: Dr. Jitesh Panchal is a Professor and Associate Head of Undergraduate Programs in the School of Mechanical Engineering at Purdue University. He received his B.Tech. (2000) from the Indian Institute of Technology (IIT) Guwahati and M.S. (2003), and Ph.D. (2005) in Mechanical Engineering from Georgia Tech. His research interests are in (1) secure design and manufacturing, (2) computational methods and tools for digital engineering, and (3) design at the interface of social and physical phenomena. He is a recipient of the NSF CAREER Award and the Distinguished Alumni Award from IIT Guwahati. He received the Young Engineer Award, Guest Associate Editor Award, and five best paper awards from the ASME CIE division and ASEE. He was recognized with the B.F.S. Schaefer Outstanding Young Faculty Scholar Award, the Ruth and Joel Spira Award, and the designation of one of the Most Impactful Faculty Inventors at Purdue University. Dr. Panchal has co-authored two books and co-edited one book on engineering systems design. He served as an NSF Expert for the Engineering Design and Systems Engineering (EDSE) program and as an Associate Editor for the *ASME Journal of Mechanical Design* (JMD) and the *ASME Journal of Computing and Information Science in Engineering* (JCISE).



SPECIAL SESSIONS & PANELS

STUDENT HACKATHON

SUNDAY, AUGUST 23, 9:30AM–1:00PM

ROOMS 337A, 337B, AND 338

Description: The Computer & Information in Engineering (CIE) Division of the American Society of Mechanical Engineers (ASME) held past hackathon events at the IDETC/CIE 2020–2025 Conferences. These hackathon events provide students and engineering practitioners with a unique opportunity to learn how data science and machine learning techniques can be leveraged to solve real-world engineering problems.

STUDENT NETWORKING EVENT

SUNDAY, AUGUST 23, 5:30PM–6:30PM

BALLROOM OF THE AMERICAS F (LEVEL 2)

We've put together an engaging and fun student networking event that we're confident you'll find valuable. The networking event will serve as 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. We hope you can attend.

WOMEN IN ME PANEL & NETWORKING EVENT

TUESDAY, AUGUST 25, 2:20PM–4:00PM

BALLROOM OF THE AMERICAS F

Women in Mechanical Engineering is a networking event designed to connect students, engineers, academics, and industry leaders who are passionate about advancing in the mechanical engineering field. The event provides a welcoming space to share experiences, discuss career pathways, explore industry trends, and build meaningful professional relationships. Through presentation and conversation, attendees will gain insight, inspiration, and valuable connections that support career growth and leadership in mechanical engineering.

MODERATOR



Dr. Christina Wang
Vice President,
Engineering Applications
American Bureau
of Shipping (ABS)

Biography: Dr. Christina Wang serves as Vice President of Engineering Applications at the American Bureau of Shipping (ABS), where she plays a pivotal role in supporting safety, regulatory compliance, and digital innovation within the marine and offshore industries. Her journey from a Ph.D.-trained expert in classical naval architecture to a forward-thinking executive in emerging technologies reflects both her professional evolution and her enduring commitment to the global maritime community. Dr. Wang earned her M.Sc. and Ph.D. in Marine Structures from the Norwegian University of Science and Technology. She is a Fellow of both the American Society of Mechanical Engineers (ASME) and the Society of Naval Architects and Marine Engineers (SNAME). In addition to her technical and leadership credentials, she has completed the Stanford Executive Program and holds an Executive Certificate in Management.



KEYNOTE



Dr. Yan Lu
Deputy Division Chief, System
Integration
National Institute of Standards
and Technology

BE POSITIVE, BE CURIOUS, BE STRATEGIC: CAREER LESSONS FROM INDUSTRY TO GOVERNMENT—AND WHAT AI CHANGES NEXT

Biography: Yan Lu is a deputy division chief, group leader and project lead in the Systems Integration Division at the National Institute of Standards and Technology (NIST) Engineering Laboratory, where her research focuses on additive manufacturing and human-AI teaming. She holds a Ph.D. in Electrical and Computer Engineering from Carnegie Mellon University and previously led the Production Operation and Optimization Research Group at Siemens Corporate Technology. Over her career spanning industry, government, and academia, Dr. Lu has authored more than 150 peer-reviewed publications and holds over 15 patents in industrial and building automation technologies. She serves as the U.S. expert to IEC Technical Committee 65 and is an active contributor to ASTM, ASME, and IEEE standards development efforts.

PANELIST



Dr. Briana Luceadams
R&D Engineer
Los Alamos National Laboratory

Biography: Briana Luceadams is a Research and Development Engineer in the Advanced Systems Development Group at Los Alamos National Laboratory. She has worked as a Systems Engineer on several satellites and instruments during her aerospace tenure, including national weather satellites and the SuperCam (Perseverance Mars2020 Rover) instru-

ment. Her formal engineering education includes degrees from Colorado School of Mines and Johns Hopkins University. Her background as an aerospace engineer working on satellites and scientific imaging instrumentation at Ball Aerospace and Technologies Corporation has informed her use of Systems Engineering in basic science and applied research. A stint of efforts in design-by-analogy, science policy, and humanitarian engineering has laid a foundation for her previous research in the design, optimization, and deployment of concentrating solar power systems in emerging markets and thermal-structural stress modeling on in-situ Additive Manufacturing.

PANELIST



Dr. Caterina Rizzi
Professor
University of Bergamo

Biography: Caterina Rizzi is Full Professor of Technical Drawing, Product Lifecycle Management (PLM), and Human Modelling at the University of Bergamo. From September 2014 to September 2020, she served as Head of the Department of Management, Information, and Production Engineering. Since April 2023, she has been the Director of the Ph.D. Programme in Health and Longevity, a joint initiative between the University of Bergamo and the Mario Negri Institute.

She currently chairs a multidisciplinary research group, the Virtualization & Knowledge (V&K) Group, comprising approximately 20 members, including full and associate professors, assistant professors, Ph.D. students, and research fellows. Her current research interests include virtual prototyping and extended reality; methods and tools for product and process ergonomics; human body acquisition and motion analysis; design and simulation of patient-specific medical devices; human and patient digital twins; innovative solutions for motor and neurocognitive rehabilitation; telemedicine and telerehabilitation; and sustainable design.

She has participated in numerous European, national and regional research projects, often as project



coordinator, and has also served as a project evaluator for the European Commission within several Framework Programmes. She is the author or co-author of more than 300 scientific publications in international journals and conference proceedings and has served as both member and chair of several international scientific conference committees. She has been a member of the Executive Committee of the American Society of Mechanical Engineers (ASME) CIE Division from 2018 to 2025, serving as Conference Chair for ASME CIE 2023 and IDETC-CIE 2024. Since November 2021, she has also served as Member-at-Large of the Congress Organizing Committee of the ASME IMECE Conference. She has been elected a Fellow of ASME.

PANELIST



Dr. Carolyn Conner Seepersad
Professor and Eugene C. Gwaltney, Jr., School Chair
Georgia Institute of Technology

Biography: Dr. Carolyn Conner Seepersad is a Woodruff Professor in the George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology, where she leads the Digital Design and Manufacturing research group and the TechMade initiative for engineering design and manufacturing. Professor Seepersad joined Georgia Tech after 18 years as a faculty member in the Walker Department of Mechanical Engineering at The University of Texas at Austin, where she founded the Center for Additive Manufacturing and Design Innovation. She received a Ph.D. in Mechanical Engineering from Georgia Tech, an M.A./B.A. in Philosophy, Politics and Economics from Oxford University (as a Rhodes Scholar), and a B.S. in Mechanical Engineering from West Virginia University. Professor Seepersad's research interests include design for additive manufacturing, simulation-based design of materials and structures, and process innovation in additive manufacturing.

She is the Editor-in-Chief of the *ASME Journal of Mechanical Design*, an elected member of the advisory board for the Design Society, a member of

SME's Additive Manufacturing Technical Leadership Committee, and a former chair of the ASME Design Engineering Division Executive Committee. Professor Seepersad has earned many awards for her research and teaching, including the ASME Design Automation Award and the University of Texas Regents' Award for Outstanding Teaching (the highest teaching award for faculty in The University of Texas System). She is the author of more than 150 peer-reviewed publications and one book. Her publications have earned Best Paper Awards from the ASME Design Automation Conference, the ASME Design Theory and Methodology Conference, the ASME International Conference on Design Education, and the ASEE Annual Conference and Exposition. She teaches courses on Additive Manufacturing, Engineering Optimization, and Product Design and Realization.

PANELIST



Dr. Yaoyao Fiona Zhao
Professor
McGill University

Biography: Dr. Yaoyao Fiona Zhao is a Professor in the Department of Mechanical Engineering at McGill University, William Dawson Scholar, Ram Panda Faculty Scholar in Sustainable Engineering and Design, and Director of the Additive Design and Manufacturing Laboratory. She also serves as Associate Director of the Trottier Institute for Sustainability in Engineering and Design. Her research focuses on design for additive manufacturing, sustainable design and manufacturing, design and manufacturing informatics, and the application of machine learning and AI in engineering design and manufacturing. She is an ASME Fellow and has held leadership roles in the ASME Design Engineering Division and the Design Society. As a researcher, educator, and mentor, Dr. Zhao is committed to advancing intelligent and sustainable manufacturing systems while supporting the next generation of engineers.



CIE STUDENT POSTER SESSION

TUESDAY, AUGUST 25, 4:20PM–6:00PM

**BALLROOM OF THE AMERICAS
PRE-FUNCTION**

Join the CIE community in celebrating and viewing these student posters in a networking setting

NSF/ASME STUDENT DESIGN ESSAY COMPETITION

TUESDAY, AUGUST 25, 4:20PM–6:00PM

**BALLROOM OF THE AMERICAS
PRE-FUNCTION**

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.

LASTING IMPACT PAPER AWARD & DTM POSTER SESSION

TUESDAY, AUGUST 25, 4:20PM–6:00PM

BALLROOM OF THE AMERICAS E

ASME JOURNAL OF MECHANICAL DESIGN: FUTURE OF DESIGN PANEL

TUESDAY, AUGUST 25, 9:20AM–10:40PM

BALLROOM OF THE AMERICAS F

NAVIGATING CAREERS IN INDUSTRY AND ACADEMIA PANEL

MONDAY, AUGUST 24, 4:10PM–5:50PM

ROOM 338

The panel will provide a comprehensive and nuanced understanding of the differences, opportunities, and challenges associated with each career path. By featuring early career and experienced professionals from industry, government, academia, and startups, the panel will:

- Inform and educate attendees about the typical roles, responsibilities, and day-to-day activities they can expect in each environment
- Demystify transitions between sectors by addressing common challenges and misconceptions through personal stories and experiences that illustrate realistic pathways to success
- Highlight unique opportunities and benefits in each sector, such as innovation projects in industry or research freedom in academia, while offering practical advice on skill development and navigating organizational structures
- Discuss emerging trends that may influence future career options such as advancements in technology or changes in funding models
- Promote networking by facilitating connections between attendees and panelists
- Encourage personal reflection by prompting attendees to articulate their own career aspirations and align them with the realities of each sector



Panel Chair: Brian Olson (Chief Scientist, Johns Hopkins University)

AI/ML PANEL

MONDAY, AUGUST 24, 9:10AM–10:30AM

ROOM 343B

PHYSICAL AI IN ROBOTICS AND MANUFACTURING

Physical AI is transforming manufacturing and robotics by enabling systems to move beyond rigid, rule-based automation toward intelligent, adaptive behavior in dynamic physical environments. By integrating AI for physical systems with multimodal sensor data and physics-based modeling, these systems can perceive, reason, and respond in real time across interconnected manufacturing processes and robotic platforms. This convergence enhances safety, precision, and operational flexibility while enabling seamless coordination across robotic systems, manufacturing processes, and human collaborators. This panel will examine the technical foundations of Physical AI for manufacturing and robotics, focusing on advances in digital twins, design and process optimization, synthetic data, and machine learning that are accelerating the development of intelligent, collaborative, and scalable physical systems.



INVITED TECHNICAL SESSIONS

VIB KEYNOTE: 2026 ASME C. D. MOTE JR., EARLY CAREER AWARD

MONDAY, AUGUST 24, 10:50AM

ROOM 338

Leveraging Acoustics: From Damage Diagnosis to Particle Manipulation

Dr. Zhenhua Tian, Virginia Tech University

MNS-01-01

MONDAY, AUGUST 24, 10:50AM

ROOM 342

An Overview of Different Gas-Sensing MemS Sensor Technologies

Negar Rafieedolatabadi, Sensirion Inc.

PTG-00-01: OPENING REMARKS AND SPECIAL PRESENTATION

MONDAY, AUGUST 24, 8:00AM

ROOM 343A

Introduction to the Motion + Power Manufacturers Alliance

Todd Praneis, Motion + Power Manufacturers Alliance



WORKSHOPS

All workshops will be held on Sunday, August 23.

FOUNDATIONS OF APPLIED ONTOLOGY: SEMANTIC COMPUTING WITH BASIC FORMAL ONTOLOGY

TIME: 9:00AM–12:00PM

ROOM 339A

Presenters: Ali Hasanzadeh, Arizona State University and Dr. Farhad Ameri, Arizona State University

Description: Engineering systems increasingly rely on data-driven methods, yet lack shared semantics, which often limits interoperability, reuse, and reasoning across tools and domains. Applied Ontology offers a systematic approach to addressing these challenges by providing formally grounded representations of definitions and relations. This workshop introduces participants to semantic computing through the lens of Basic Formal Ontology (BFO) and Industrial Formal Ontology (IOF), widely adopted upper-level ontologies used across a variety of scientific and industrial knowledge systems.

The workshop will introduce core ontological concepts—such as objects, processes, functions, and relations—and knowledge patterns to demonstrate how a well-formed semantic framework supports consistent data integration, knowledge modeling, and automated reasoning, thereby enabling the creation of inferred knowledge. Through practical examples drawn from engineering and manufacturing contexts, participants will learn how BFO-based ontologies enable improved system interoperability, traceability, and model-driven decision support. No prior background in ontology is required. The workshop is intended for researchers and practitioners interested in leveraging semantic technologies to

enhance engineering design, analysis, and lifecycle integration.

AI EXPERIMENTS IN ENGINEERING DESIGN: A TUTORIAL ON THE DESIGN RESEARCH OPEN-SOURCE ECOSYSTEM

TIME: 9:00AM–12:00PM

ROOM 335A

Presenters: Christopher McComb, Carnegie Mellon University and Jessica Menold, Penn State University

Description: This tutorial introduces an open-source software ecosystem for rigorous, reproducible research in engineering design. Participants will learn how the design-research library suite supports the full research workflow: defining benchmark problems, building and evaluating AI agents, structuring controlled experiments, and analyzing results. The tutorial is centered on a hands-on workflow that connects the major libraries in the ecosystem (i.e., problems, agents, experiments, and analysis) so attendees can see how methodological choices translate into executable research pipelines. The session is designed for researchers and practitioners interested in AI for engineering design, design automation, and computational design studies. By the end of the tutorial, participants will understand how to set up a reproducible design-research study, run a simple agent-based experiment, and interpret resulting data using a shared, extensible framework. The broader goal is to help the community move toward more transparent, comparable, and reusable computational design research.



PRACTICAL METHODS FOR ROBUST, INTEROPERABLE DIGITAL TWINS

TIME: 9:00AM–12:00PM

ROOM 335C

Presenter: John Morris, University of Alabama in Huntsville

Description: This workshop walks participants through practical methods for creating digital twins that can be immediately composed with other twins to form aggregate systems. Attendees will learn about constraint hypergraphs, a graphical method for capturing system behavior, before building a digital twin of a real-world asset. Throughout the workshop, participants will discover how to form function-based models of physical systems, integrate information flows from different digital engineering software tools such as CAD and PLM, and experience how constraint hypergraphs enable autonomous simulation and knowledge retrieval from the digital twin. Participants are expected to bring a device capable of writing and running Python scripts.

INTEGRATING ACCESSIBLE DESIGN PRINCIPLES IN RESEARCH AND PRACTICE

TIME: 9:00AM–12:00PM

ROOM 335B

Presenter: Elisa Koolman, University of Texas at Austin

Description: As designers of the built environment, engineers' perspective on who designs are for can limit or broaden access to products and spaces. The power of social and environmental systems to remove access is one model of disability highlighted in Disability Studies. By understanding how design-

ers can incorporate accessible design principles—informed by Disability Studies, Disability Justice, and Design Justice—we can continue to build a more accessible environment. In this workshop, we present the design community with a brief history of the intersection between disability and design, research on accessible design principles, and an opportunity to explore ways to integrate these principles in research and practice by:

- Engaging in group discussion on our context and experiences as designers
- Interacting with existing designs that integrate Accessible Design Principles to different extents
- Brainstorming integration strategies for participants' research and practice

By the end of this workshop, participants will have gained a deeper understanding of accessibility in design, how they and other researchers and practitioners can implement accessible design principles, and resources on accessible design principles to be passed along to students and peers.

ADVANCED GEAR DESIGN WITH IGD

TIME: 9:00AM–1:00PM

ROOM 339B

Presenter: Alfonso Fuentes-Aznar, Rochester Institute of Technology

Description: Participants in this workshop will learn the principles of advanced gear design using IGD - Integrated Gear Design, the primary computational tool for the virtual generation and advanced simulation of gear drives. Through IGD, attendees will apply Tooth Contact Analysis (TCA) and Finite Element Analysis (FEA) to optimize the mechanical performance of different types of gear drives. The workshop covers among other topics, the application of micro-geometry modifications to gear tooth surfaces directed to eliminate edge contacts, as well



as the evaluation of loaded transmission errors and mesh stiffness to reduce noise and vibration. Furthermore, the contents include the compensation of errors of alignment caused by shaft deflections and specialized design strategies for spiral bevel gears as well as planetary or pericyclic gear drives. The connection of IGD with the main commercial FEA computer programs will also be covered. By the end of this workshop, participants will be ready to use IGD to design gear systems that are quieter, stronger, and more reliable for power transmission.

A HANDS-ON WORKSHOP ON AI-BASED REDUCED-ORDER MODELING (ROM) WITH MATLAB AND SIMULINK

TIME: 1:00PM–5:00PM

ROOM 335C

Presenter: Mahaveer Satra, MathWorks

Description: High-fidelity models, such as those based on Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), and Computer-Aided Engineering (CAE) models can take hours or even days to simulate. These full-order high-fidelity models, while being useful for detailed component design, are too slow and therefore impractical for system-level simulation, control design, and Hardware-in-the-Loop testing. For example, a finite element analysis model that is useful for detailed component design will be too slow to include in system-level simulations for verifying your control system or to perform system analyses that require many simulation runs. A high-fidelity model for analyzing NOx emissions will be too slow to run in real time in your embedded system. Does this mean you have to start from scratch to create faster approximations of your high-fidelity models? This is where reduced-order modeling (ROM) comes to the rescue. ROM is a set of computational techniques that helps you reuse your high-fidelity models to create faster-running, lower-fidelity approximations. In

this workshop, you will learn how to create AI-based reduced order models using the Simulink add-on for Reduced Order Modeling to replace high-fidelity models.

RETHINKING CAD: BEYOND GEOMETRY TOWARD INTENT-DRIVEN DESIGN WITH AI

TIME: 2:00PM–5:00PM

ROOM 335A

Presenters: Daniele Grandi, Autodesk; Kevin Ack-er, Autodesk; Tyson Fogel, Autodesk and Jiwon Jun, Autodesk

Description: Modern mechanical assemblies are becoming increasingly complex, requiring coordination across multiple disciplines. Yet today's CAD tools remain largely geometry-centric, limiting their ability to capture functional intent, structured requirements, and the reasoning behind design decisions. This gap makes multidisciplinary trade-offs difficult, keeps validation workflows fragmented, and leaves critical knowledge implicit rather than computable.

This interactive workshop explores emerging ideas from Autodesk Research at the intersection of AI and design, with a focus on functional and assembly design. Participants will explore what it would mean for design software to explicitly represent function, the limitations of multidisciplinary reasoning in current modeling paradigms, and how AI can offer richer representations of CAD assemblies. Through hands-on activities, attendees will experiment with leveraging LLMs to reason about assemblies, evaluate trade-offs, and support early-stage conceptual development. The workshop aims to gather input on what next-generation CAD systems should represent beyond geometry, and how AI-driven workflows can better support functional reasoning, requirement validation, and multidisciplinary design exploration.



ASME JOURNAL OF MECHANICAL DESIGN NEW AUTHOR DEVELOPMENT WORKSHOP

TIME: 2:00PM–5:00PM

ROOM 335B

Presenters: Dr. Carolyn Seepersad, Georgia Tech; Dr. Tucker Marion, Northeastern; and Dr. Scott Ferguson, NC State

Description: The *ASME Journal of Mechanical Design* (JMD) New Author Development Workshop is designed to help emerging and returning scholars strengthen their ability to publish high-quality research in JMD. The workshop focuses on the full path from idea framing to final submission, with particular attention to positioning contributions, aligning manuscripts with the journal's standards, navigating double-blind review, and responding effectively to reviewer feedback. It is intended to lower barriers for newer authors, broaden participation in the journal's community, and improve the overall quality and readiness of submissions. More broadly, the workshop supports JMD's author development mission by pairing practical guidance with editorial insight to help researchers translate promising design scholarship into publishable work.

5TH WORKSHOP ON TRENDS IN HUMAN-AI TEAMING FOR ENGINEERING DESIGN

TIME: 2:00PM–5:00PM

ROOM 339B

Presenters: Ting Liao, Fatemeh Mozaffar, and Leah Chong

Description: Human-AI teaming in engineering design is advancing quickly, but the field still faces foundational questions about the role of automation, the balance between technical capability and human judgment, and the forms of collaboration that will matter most in practice. This workshop brings together researchers and practitioners to examine emerging directions in human-AI teaming through a more interactive format than a traditional speaker series. The workshop will combine short perspective-setting talks with structured activities designed to build connections, surface shared challenges, and provoke discussion around key open questions in the field. Participants will engage in a needs-and-resources icebreaker to identify opportunities for collaboration, a landscape-mapping activity to situate their work within the broader research space, and a debate-oriented session in which small groups develop and defend contrasting perspectives on important issues in AI for engineering design. The goal is to strengthen the human-AI teaming community while generating sharper collective insight into where the field is heading and what kinds of research, tools, and practices are needed next.

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

TIME: 9:00AM–4:00PM

ROOM 336B

Presenters: Dr. Wei (Wayne) Chen, Texas A&M University, Dr. Namwoo Kang, KAIST, and Dr. Dule Shu, Toyota Research Institute

Description: Following the strong engagement and interdisciplinary discussions at our 2025 workshop, we propose a 2026 workshop that further explores how data, machine learning, and generative AI are transforming engineering design. The workshop will bring together researchers and practitioners from academia and industry to discuss challenges and



opportunities spanning design datasets, representation learning, generative synthesis, optimization, inverse design, AI-enabled CAD, material and physics-informed design, and industrial deployment. The format combines invited talks, software demonstrations, a panel discussion, and an interactive team activity so that participants can learn both foundational ideas and practical lessons from real applications. By emphasizing dialogue across methods, tools, and domains, the workshop aims to identify pressing research gaps, surface emerging best practices, and build a community around responsible, effective, and impactful data-driven design. Attendees will leave with a clearer view of current capabilities, limitations, and high-value opportunities for future collaboration.

BUILDING MODELS OF HAZARDOUS BEHAVIOR TO QUANTIFY SYSTEMS RESILIENCE

TIME: 9:00AM–4:00PM

ROOM 336A

Presenter: Daniel Hulse, NASA

Description: Capturing a complex system's resilience to hazards is inherently challenging because of the scale and coupling of interacting dynamic behaviors which can further evolve when a system enters off-nominal conditions. Thankfully, there is no need to start from scratch, and many of the common mistakes can be avoided with the application of good methodology. Building on years of design research in the simulation of hazardous modes in complex systems, the fmdtools Python library provides a flexible simulation architecture that can be applied to a wide variety use-cases. This tutorial will cover the use of fmdtools to (1) model a system and its off-nominal behavior(s), (2) simulate its resilience to hazardous scenarios, and (3) statistically analyze its resilience to these scenarios. Some basic familiarity with Python will be assumed.



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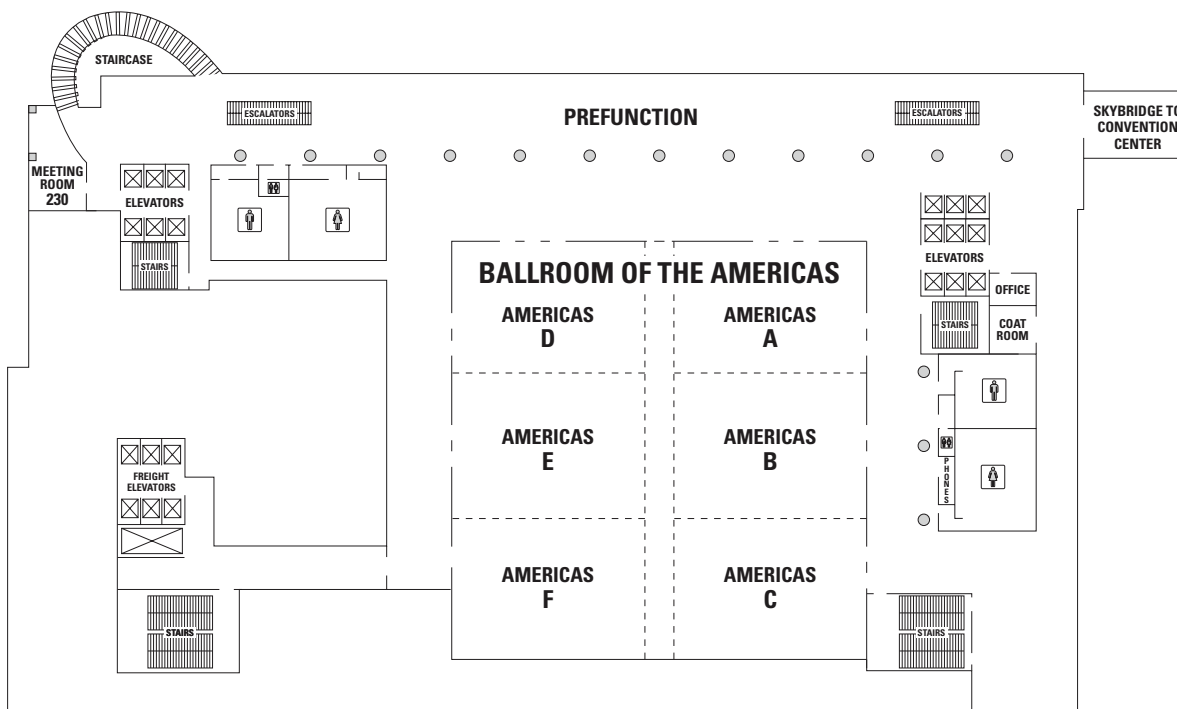
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HOTEL FLOOR PLANS

LEVEL TWO



LEVEL THREE

