FEDSM 2025

FLUIDS ENGINEERING SUMMER MEETING

CONFERENCE
JULY 27–30, 2025

DoubleTree by Hilton
Philadelphia Center City,
Philadelphia, PA

Program

https://event.asme.org/FEDSM

The American Society of Mechanical Engineers®
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SETTING THE STANDARD

Welcome Message From The Chairs

Dear Attendees,

Welcome to the 2025 Fluids Engineering Division (FED) Summer Meeting! We are thrilled to have you join us in Philadelphia, PA, for three exciting days of technical exchange, collaboration, and innovation.

The FED remains committed to advancing the field of fluids engineering by organizing conferences, facilitating panel discussions, and disseminating timely technical information. This year's meeting is a stand-alone FED conference—an exciting change from last year's co-located event with the Heat Transfer and Energy Sustainability Divisions. Two years ago, we were honored to host a joint meeting with the Japanese and Korean mechanical engineering societies (AJKFED2023) in Osaka, Japan. In addition to this summer gathering, the FED also participates annually in the ASME International Mechanical Engineering Congress and Exposition each November.

FEDSM 2025 is truly a global event, with participants representing 20 countries across five continents and over 250 presentations scheduled. The conference will showcase cutting-edge advancements from researchers in industry, academia, and government.

This year, we are proud to feature the following plenary speakers:

- **Dr. Michael Triantafyllou**, Massachusetts Institute of Technology – 2025 ASME Fluids Engineering Awardee
- **Dr. Luis San Andrés**, Texas A&M University – 2025 ASME Henry R. Worthington Medal Awardee
- **Dr. Jason Rabinovitch**, Stevens Institute of Technology

Our technical program is organized around six key committees: Fluid Applications and Systems, Fluid Measurement and Instrumentation, Fluid Mechanics, Multiphase Flow, Computational Fluid Dynamics, and Micro-Nano Fluid Dynamics. We are also pleased to host our annual Awards Program, recognizing Best Papers, Flow Visualization, Who's Who, and Graduate Student Scholars.

We invite you to attend the Awards Luncheon on Tuesday—an excellent opportunity to connect with peers and celebrate this year's honorees. Additionally, we encourage you to take part in the FED Town Hall and our Technical Committee meetings. These forums are your chance to engage deeply with the community and help shape the future of FED and its conferences.

We extend our sincere thanks to the track and topic organizers, session chairs, and reviewers whose efforts have made this meeting possible. We also greatly appreciate the ASME staff for their dedication and hard work over the past several months.

We look forward to meeting you in Philadelphia and wish you a productive and inspiring conference filled with meaningful discussions and new connections in the field of fluids engineering. Thank you for your participation and continued support of FED.

Warm regards,

Ning Zhang
FEDSM 2025 Conference Chair
McNeese State University

Kevin Anderson
FEDSM 2025 Conference Co-Chair
Cal Poly Pomona

Ning Zhang
FEDSM 2025 Conference Chair
McNeese State University

Kevin Anderson
FEDSM 2025 Conference Co-Chair
Cal Poly Pomona

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General Information

REGISTRATION HOURS

Sunday, July 27
1:00PM–5:00PM

Monday, July 28
7:00AM–5:00PM

Tuesday, July 29
7:00AM–05:00PM

Wednesday, July 30
8:00AM–2:00PM

AMERICAN SOCIETY OF MECHANICAL ENGINEERS INTERNATIONAL

ASME MISSION STATEMENT
ASME's mission is to advance engineering for the benefit of humanity.

ASME VISION STATEMENT
ASME's vision is to be the premier resource for the engineering community globally.

AUDIOVISUAL EQUIPMENT IN SESSION ROOMS

All technical sessions are equipped with one LCD projector and one screen. Laptops will NOT be provided in the sessions. Presenters MUST bring their own or make arrangements in advance with the session chairs to share theirs.

SPEAKER READY ROOM

The speaker ready room is Rhapsody, Fourth level, and is available to review and/or practice your presentation. A screen and LCD Projector will be provided. Daily hours are 7:00AM–5:00PM, Monday thru Wednesday.

BADGE REQUIRED FOR ADMISSION

All conference attendees must always wear the official ASME 2025 FEDSM badge to gain admission to technical sessions, exhibits, and other conference events. Without a badge, you will NOT be allowed to attend any conference activities.

CONFERENCE AWARD LUNCHEON

The Awards Luncheon will take place during the conference to recognize and celebrate a select group of individuals for their contributions and achievements. Fluids Engineering Summer Meeting Awards Luncheon is on Tuesday, July 29, 12:25PM–2:00PM.

CONFERENCE APP

The conference will utilize the ASME Events mobile app to enhance the experience for attendees and speakers in place of a printed program. Connect with Attendees, View Speaker Profiles, Access Session Information, and more! Options may vary by event.

SPECIAL EVENTS

TOWNHALL MEETING
The Fluids Engineering Division Townhall will present current divisional activities to all attendees.

Monday, July 28
9:00AM–10:00AM
Symphony Ballroom, Third Level

FLUIDS ENGINEERING DIVISION (FED) AWARDS LUNCHEON
Celebrate the accomplishments of your colleagues at this awards luncheon.

Tuesday, July 29
12:25PM–2:00PM
Ormandy Ballroom, Lobby Level

CONFERENCE PROCEEDINGS AND DIGITAL PAPERS

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, are submitted for abstracting and indexing, and can be purchased. The proceedings are published in 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, you can message ConferencePubs@asme.org.

CONFERENCE REFRESHMENT BREAKS

Morning and afternoon breaks will be provided in the Overture on the Third level. Come and meet our exhibitors and join your fellow attendees for a few minutes of networking and discussion. The schedule is as follows:

Monday–Wednesday, July 28–30
10:00AM–10:50AM 3:35PM–3:50PM

EMERGENCY INFORMATION

If you are experiencing a health emergency, please dial 911. If you are able or someone else is able, please dial 0 and inform the Security personnel so that the hotel can be on the alert for the emergency response team. The hotel also has 24-hour security and officers trained in first aid, CPR, & AED service.

REGISTRANTS WITH DISABILITIES

Whenever possible, we are pleased to plan for registrants with disabilities. Advance notice may be required for certain requests. For on-site assistance, please visit the conference registration area and ask to speak with a conference representative.

CONFERENCE WIFI

To access conference WIFI

1. Select wireless network **“DOUBLETREE_MEETINGS”**
2. Open Internet browser.
3. Enter code to login. **FEDS2025**

Schedule-at-a-Glance

FLUIDS ENGINEERING DIVISION SUMMER MEETING 2025*

Sunday, July 27	Monday, July 28	Tuesday, July 29	Wednesday, July 30
Registration/Exhibits **Overture, 3rd Level**	Registration/Exhibits **Overture, 3rd Level**	Registration/Exhibits **Overture, 3rd Level**	Registration/Exhibits **Overture, 3rd Level**
Committee Meeting Executive Committee (CLOSED) 3:00PM–5:00PM **Assembly F, 5th Level**	**Plenary Session** 8:00AM–9:00AM Michael Triantafyllou **Presentation Title:** "From Biomimetic Fluid Mechanics to "Intelligent" Hydrodynamics" **Symphony Ballroom, 3rd Level**	**Plenary Session** 8:00AM–9:00AM Luis San Andrés **Presentation Title:** "Wet Annular Seals in Multiphase Pumps: Leakage and Rotordynamic Force Coefficients and a Method to Promote Seal Direct Stiffness" **Symphony Ballroom, 3rd Level**	**Plenary Session** 8:00AM–9:00AM Jason Rabinovitch **Presentation Title:** "High-Speed Compressible Flows and Space Exploration!" **Symphony Ballroom, 3rd Level**
Committee Meeting EC open meeting w/Chairs (CLOSED) 5:00PM–6:00PM **Assembly F, 5th Level**	**Town Hall Open Meeting** 9:00AM–10:00AM **Symphony Ballroom, 3rd Level**	**Technical Sessions** 9:00AM–10:35AM	**Technical Sessions** 9:00AM–10:35AM
Open Reception 6:00PM–7:00PM **The Terrace, 5th Level**	**Poster Session & AM Break** 10:00AM–10:50AM	**Break** 10:35AM–10:50AM	**Break** 10:35AM–10:50AM
End of Day 1	**Technical Sessions** 10:50AM–12:25PM	**Technical Sessions** 10:50AM–12:25PM	**Technical Sessions** 10:50AM–12:25PM
	Lunch on own 12:25PM–2:00PM	**Fluids Engineering Division (FED)** Awards Luncheon 12:00PM–2:00PM **Ormandy Ballroom, Lobby Level**	**Lunch on own** 12:25PM–2:00PM
	GSSC Committee (INVITE ONLY) 1:00PM–2:00PM **Assembly F, 5th Level**	**Honors and Awards Committee** CLOSED 2:00PM–3:00PM **Assembly F, 5th Level**	**Technical Sessions** 2:00PM–3:35PM
	Poster Session 1:00PM–2:00PM	**Technical Sessions** 2:00PM–3:35PM	**Break** 3:35PM–3:50PM
	Technical Sessions 2:00PM–3:35PM	**Break** 3:35PM–3:50PM	**Committee Meetings** **Assembly F, 5th Level** 4:00PM–5:00PM EC Closing Meeting with TC Chairs (CLOSED) 5:00PM–6:00PM EC Closing Meeting (CLOSED)
	Break 3:35PM–3:50PM	**Technical Sessions** 3:50PM–5:25PM	**End of Conference**
	Technical Sessions 3:50PM–5:25PM	**Committee Meetings** **Assembly F, 5th Level** 5:00PM–6:00PM MNFD Technical Committee Meeting (OPEN) 6:00PM–7:00PM MF Technical Committee Meeting (OPEN) 7:00PM–8:00PM FM Committee Meeting (OPEN)	
	Committee Meetings **Assembly F, 5th Level** 5:00PM–6:00PM FAS Technical Committee Meeting (OPEN) 6:00PM–7:00PM CFD Technical Committee Meeting (OPEN) **Rhapsody, 4th Level** 5:00PM–6:00PM FMI Technical Committee Meeting (OPEN)	**End of Day 3**	
	End of Day 2		

*Updated 6-29-25 - Subject to change

Plenary Speakers

Monday, July 28, 2025, 8:00AM–9:00AM
Symphony Ballroom, Third Level

Presentation Title:
From Biomimetic Fluid Mechanics to “Intelligent” Hydrodynamics

Biography:
Michael Triantafyllou is the Henry L. and Grace Doherty Professor in Ocean Science & Engineering in the Department of Mechanical Engineering at the Massachusetts Institute of Technology. He is the Director of the MIT Sea Grant Program. He teaches and has published over 370 journal articles and referred conference papers in the areas of biomimetic robotics and sensing, dynamics and control of marine systems, cable mechanics, and experimental fluid mechanics. He pioneered the development of science-driven biomimetic robots to study the basic mechanisms of flow control that lead to the outstanding agility of fish and cetaceans. The RoboTuna original design is at the Science Museum in London, while a second version of the robot was on exhibit at the MIT Museum. He is currently applying machine learning methods for flow control to increase hydrodynamic performance and maneuvering of marine vehicles, and he is developing digital twins for the offshore industry.

He is a Life Fellow of the American Physical Society and a Life Fellow of the Society of Naval Architects and Marine Engineers. He served as Associate Department Head in the Department of Mechanical Engineering (2008–2010), Director of the Center for Ocean Engineering (2005–2017), and is a Visiting Scientist at the Woods Hole Oceanographic Institution since 1991. He has been serving on the American Bureau of Shipping’s Marine Technical Committee since 2015. He was Chairman of the Board of the National Technical University of Athens (2013–2017).

Michael Triantafyllou

Henry L. and Grace Doherty Professor of Ocean Science and Engineering, Department of Mechanical Engineering, Massachusetts Institute of Technology

Plenary Speaker

Monday,
July 28, 2025
8:00AM–9:00AM

Symphony Ballroom,
Third Level

Tuesday, July 29, 2025, 8:00AM–9:00AM
Symphony Ballroom, Third Level

Presentation Title:
Wet Annular Seals in Multiphase Pumps: Leakage and Rotordynamic Force Coefficients and a Method to Promote Seal Direct Stiffness

Biography:
Luis San Andrés, former Mast-Childs Chair Professor of Mechanical Engineering at Texas A&M University (1991–2023), conducted experimental and analytical research on the rotordynamics of pump seals for rocket engine turbopumps and electrical submersible pumps and compressor seals for oil and gas applications. Luis is a Life Fellow of ASME, STLE, GPPS, and a member of the Industrial Advisory Committees for the Texas A&M Turbomachinery and Pump Symposia. Dr. San Andrés and graduate students published over 200 journal papers, several recognized as best in various international conferences.

ASME distinguished Dr. San Andrés with the 2022 Aircraft Engine Technology Award (International Gas Turbine Institute), the 2023 Mayo D. Hersey Award (Tribology Division), and the 2025 Henry R. Worthington Medal for his contributions to pump rotordynamics.

Luis San Andrés

Professor Emeritus,

Texas A&M University

Plenary Speaker

Tuesday,
July 29, 2025
8:00AM–9:00AM

Symphony Ballroom,
Third Level

Plenary Speakers

Dr. Prof. Jason Rabinovitch

Stevens Institute of Technology

Plenary Speaker

Wednesday, July 30, 2025 8:00AM–9:00AM

Symphony Ballroom, Third Level

Wednesday, July 30, 2025, 8:00AM–9:00AM
Symphony Ballroom, Third Level

Presentation Title:
High-Speed Compressible Flows and Space Exploration!

Biography:
Jason Rabinovitch is an Assistant Professor in the Mechanical Engineering Department at Stevens Institute of Technology (Hoboken, NJ, USA). Before Stevens, Jason was a Mechanical Engineer at NASA's Jet Propulsion Laboratory (JPL), California Institute of Technology, where he worked in the Entry, Descent, and Landing & Formulation Group for ~6.5 years. He received a B.Sc. in Mechanical Engineering from Yale University in 2008, a M.Sc. in Aerospace Engineering from the California Institute of Technology in 2009, a M.Sc. in Fluid Mechanics from École Polytechnique (Paris) in 2010, and a Ph.D. in Aeronautics from Caltech in 2014. While at JPL, Jason was fortunate to work on a wide range of projects, from delivering flight hardware to the Mars 2020 mission, designing, implementing, and testing a low-density low-speed open jet fan-array wind tunnel for the (successful!) Mars Helicopter, to developing a hybrid rocket propulsion system for small satellites. His current research interests span a wide range of topics related to experimental and computational fluid mechanics applied to EDL, vehicle design, propulsion, and geophysical applications.

Keynote Speakers

Track Keynotes are speakers that will be highlighted within a specific track. The speaker will be presenting for an extended time and occur during a regular breakout technical session.

Monday, July 28, 2025, 10:50AM–11:28AM
Room Aria B, Third Level

Presentation Title:
Hypersonic Turbulent Quantities and Drop Aerobreakup/Impact

Track keynote sponsored by the Fluid Measurement and Instrumentation Technical Committee (FMITC)

Biography:
Nick Parziale is the George Meade Bond Professor of Mechanical Engineering at Stevens Institute of Technology. Nick joined Stevens in 2013 after earning his Ph.D. in Aeronautics from the California Institute of Technology. Currently, his group's research focuses on supersonic and hypersonic aerodynamics and multiphase flow problems, including boundary-layer instability, turbulence, and drop aerobreakup and impact. Nick's group has been recognized with the AFOSR (2016) and ONR (2020) Young Investigator Program awards, four Air Force Summer Faculty Fellowships (2014–2017), and the Presidential Early Career Award for Scientists and Engineers (PECASE) in 2025.

Nick Parziale

Geroge Meade Bond Professor

Stevens Institute of Technology

Department of Mechanical Engineering

Keynote Speaker

Monday,
July 28, 2025
10:50AM–11:28AM

Room Aria B,
Third Level

Monday, July 28, 2025, 10:50AM–11:28AM
Room Maestro B, Fourth Level

Presentation Title:
Simulation and Modeling of Noncanonical Turbulent Boundary Layers

Track keynote sponsored by the Fluid Mechanics Technical Committee (FMTC)

Biography:
Dr. Junlin Yuan is an associate professor in the Department of Mechanical Engineering at Michigan State University. She obtained both an M.S. and Ph.D. degree (2015) from Queen's University, Canada. She developed large-scale, high-fidelity numerical simulation methods of complex turbulent shear flows. Her research goal is to push the boundaries of physical understandings of complex, realistic turbulence, and to develop physics-based data-driven models for a wide range of applications. Topics include non-equilibrium turbulence, wall roughness, wall permeability, turbulence-induced noise, and fluid-structure interaction. Applications cover engineering, environmental, and bio-locomotive topics. Her research has been funded by ONR, NSF, and the industry.

Dr. Junlin Yuan

Associate Professor, Mechanical Engineering

Michigan State University

Keynote Speaker

Tuesday,
July 28, 2025
10:50AM–11:28AM

Room Maestro B,
Fourth Level

Keynote Speakers

Dr. Phil Ligrani

Professor of Mechanical and Aerospace Engineering,

Eminent Scholar in Propulsion

Department of Mechanical and Aerospace Engineering

University of Alabama in Huntsville

Keynote Speaker

Monday, July 28, 2025 2:00PM–3:38PM

Room Concerto B, Third Level

Monday, July 28, 2025, 2:00PM–2:38PM
Room Concerto B, Third Level

Presentation Title:
Design, Development, and Performance of Innovative Micro-Scale, Millimeter-Scale and Macro-Scale Pumping Devices

Track keynote sponsored by the Fluid Application and System Technical Committee (FASTC)

Biography:
Dr. Phil Ligrani is currently the Eminent Scholar in Propulsion, and Professor of Mechanical and Aerospace Engineering in the College of Engineering at The University of Alabama in Huntsville. Prior to August 2014, Dr. Phil Ligrani was the Oliver L. Parks Endowed Chair, and Professor of Aerospace and Mechanical Engineering at Parks College of Saint Louis University. Prior to that appointment, he was the Donald Schultz Professor of Turbomachinery in the Department of Engineering Science at the University of Oxford. There, from 2006 to 2009, he was also Director of Oxford University's Rolls-Royce UTC (University Technology Centre) in Heat Transfer and Aerodynamics. From 1994 to 2006, he was a Professor of Mechanical Engineering, Adjunct Professor in the Department of Bioengineering, Director of the Convective Heat Transfer Laboratory, and Associate Department Chair in the Department of Mechanical Engineering at the University of Utah. Research interests include turbomachinery, convective heat transfer, fluid mechanics, transonic, supersonic, and hypersonic flows, as well as micro-fluidics, microscale and millimeter-scale pumping devices, and measurement technologies. He has received numerous academic awards and recognition from the University of Alabama in Huntsville, as well as from the American Institute of Aeronautics and Astronautics (AIAA), and the American Society of Mechanical Engineers (ASME). He is also currently a member of the European Union Academy of Sciences (EUAS).

Simon Schneiderbauer

Department of Particulate Flow Modelling

Johannes Kepler University

Linz, Austria

Keynote Speaker

Tuesday, July 29, 2025 2:00PM–2:38PM

Room Maestro A, Fourth Level

Tuesday, July 29, 2025, 2:00PM–2:38PM
Room Maestro A, Fourth Level

Presentation Title:
Length Scales, Energy Transfer, and Energy Decay in Turbulent Gas-Particle Flows: From Theory to Application

Track keynote sponsored by the Multiphase Flow Technical Committee (MFTC)

Biography:
Simon Schneiderbauer is the deputy head of the Department of Particulate Flow Modelling at Johannes Kepler University (JKU) Linz. He earned his Ph.D. in Engineering Sciences with distinction from JKU in 2010, where he dealt with the numerical modelling of snow drift in alpine environments. In 2011, he received the Erwin Wenzl Award for his outstanding doctoral thesis and began his role as a Senior Scientist at JKU. In 2015, he achieved his habilitation in Fluid Mechanics and Heat Transfer. From 2016 to 2023, he led the Christian-Doppler Laboratory for Multi-scale Modeling of Multiphase Processes with participation of major steel industry. Schneiderbauer's research focuses on the numerical and mathematical multi-scale modeling of multiphase flows, encompassing model development, experimental validation, practical applications and multiphase turbulence. Finally, Schneiderbauer (co)-authored more the 60 journal publications in the field of multiphase flows, which cover basic theoretical advancements to practical application.

Tuesday, July 29, 2025, 10:50AM–11:28AM
Room Maestro B, Fourth Level

Presentation Title:
Acoustofluidic Interfacial Fluid Dynamics

Track keynote sponsored by the Multiphase Flow Technical Committee (MFTC)

Biography:
James Friend leads the Medically Advanced Devices Laboratory in the Center for Medical Devices at the University of California, San Diego. He holds the Stanford S. and Beverly P. Penner Endowed Chair in Engineering and Physics and is a professor in both the Department of Mechanical and Aerospace Engineering, Jacobs School of Engineering and the Department of Surgery, School of Medicine. He spent 14 years abroad as a faculty member in Japan and Australia before returning to the U.S. His research interests are principally in exploring and exploiting acoustic phenomena at small scales, mainly for biomedical applications. He currently supervises a team of seven Ph.D. students. Over the years, he has published over 350 peer-reviewed research publications, with 205 journal papers and nine book chapters (H-factor = 61), and has 30 granted patents, completed 42 postgraduate students, and supervised 23 postdoctoral staff, and been awarded over $37 million in competitive grant-based research funding. He most recently helped found Latchability, an infant health diagnostics company, GlideNeuro, an endovascular intervention technology company, and Sonocharge Energy, a rapidly rechargeable battery company which has grown to a valuation of $70M. Among other awards, he received UCSD's Distinguished Teaching Award in 2021, was noted as a highly cited author of the Royal Society of Chemistry in 2020, is a Fellow of the Royal Society of Chemistry from 2022, a Fellow of the IEEE from 2018, a Keck Fellow in 2018–2021, and was awarded the IEEE Carl Hellmuth Hertz Ultrasonics Award from the IEEE in 2015.

James Friend

Professor in both the Department of Mechanical and Aerospace Engineering

Jacobs School of Engineering and the Department of Surgery, School of Medicine

University of California, San Diego

Keynote Speaker

Tuesday,
July 29, 2025
10:50AM–11:28AM

Room Maestro B,
Fourth Level

Tracks and Chairs

ARTIFICIAL INTELLIGENCE (AI) FOR FLUIDS

- **Yang Liu,** City College of New York
- **Jingsen Ma,** Dynaflow, Inc.
- **Shanti Bhushan,** Mississippi State University

CFD METHODS

- **Shanti Bhushan,** Mississippi State University
- **Chengyu Li,** Villanova University

CFD APPLICATIONS

- **Shanti Bhushan,** Mississippi State University
- **Chengyu Li,** Villanova University
- **Zhongquan (Charlie) Zheng,** Utah State University

BIO-INSPIRED AND BIOMEDICAL FLUID DYNAMICS

- **Bei Fan,** Michigan State University
- **Shanti Bhushan,** Mississippi State University
- **Mehdi Salek,** Massachusetts Institute of Technology

FLUID MEASUREMENT AND INSTRUMENTATION

- **Yang Liu,** City College of New York
- **Mehdi Salek,** Massachusetts Institute of Technology

ENERGY & SUSTAINABILITY

- **Ernesto Primera,** University of Delaware
- **Aarthi Sekaran,** SUNY Polytechnic Institute
- **Shanti Bhushan,** Mississippi State University

MULTIPHASE FLOWS

- **Jingsen Ma,** Dynaflow, Inc.
- **Cristian Marchioli,** Università degli Studi di Udine

FLUIDS APPLICATIONS

- **Ernesto Primera,** University of Delaware
- **Bei Fan,** Michigan State University

MICROFLUIDICS

- **Mehdi Salek,** Massachusetts Institute of Technology
- **Sangjin Ryu,** University of Nebraska-Lincoln

FLUIDS MECHANICS FUNDAMENTALS

- **Bei Fan,** Michigan State University
- **Jinxiang Xi,** University of Massachusetts Lowell
- **Shanti Bhushan,** Mississippi State University

FLUIDS ENGINEERING EDUCATION

- **Bei Fan,** Michigan State University
- **Jinxiang Xi,** University of Massachusetts Lowell

FLOW VISUALIZATION COMPETITION

- **Philipp Epple,** Coburg University of Applied Sciences

WHO'S WHO COMPETITION

- **Zhongquang (Charlie) Zheng,** Utah State University

SUNDAY, JULY 27

Assembly F, 5th Level

3:00PM–5:00PM Executive Committee Opening Meeting (CLOSED)
5:00PM–6:00PM Executive Committee Opening Meeting with Technical Chairs (CLOSED)

MONDAY, JULY 28

Assembly F, 5th Level

1:00PM–2:00PM GSSC Committee (Invite Only)
5:00PM–6:00PM FAS Technical Committee Meeting (open to all)
6:00PM–7:00PM CFD Technical Committee Meeting (open to all)
7:00PM–8:00PM FMI Technical Committee Meeting (open to all)

TUESDAY, JULY 29

Assembly F, 5th Level

2:00PM–3:00PM Honors and Awards Committee (CLOSED)
5:00PM–6:00PM MNFD Technical Committee Meeting (open to all)
6:00PM–7:00PM MF Technical Committee Meeting (open to all)
7:00PM–8:00PM FM Committee Meeting (open to all)

WEDNESDAY, JULY 30

Assembly F, 5th Level

4:00PM–5:00PM EC Closing Meeting with TC Chairs (CLOSED)
5:00PM–6:00PM EC Closing Meeting (CLOSED)

TUESDAY, AUGUST 5 (AFTER CONFERENCE)

2:00PM–3:00PM Advisory Board meeting (CLOSED) virtual (link to follow)

MONDAY, JULY 28, 2025

PLENARY KEYNOTE
MICHAEL TRIANTAFYLLOU
Symphony Ballroom, Third Level **8:00AM–8:55AM**

From Biomimetic Fluid Mechanics to 'Intelligent' Hydrodynamics

Keynote Presentation: FEDSM2025-171485

Michael Triantafyllou, *Massachusetts Institute of Technology*

12.2
FLOW VISUALIZATION COMPETITION SESSION & POSTER SESSION
Overture, Third Level **10:00AM–10:50AM**

Chair: **Ning Zhang,** *McNeese State University*
Chair: **Philipp Epple,** *Coburg University of Applied Sciences*

Vortex Field Visualization in the Near Blade Region of a Vertical-Axis Marine Hydrokinetic Turbine

Technical Presentation Only: FEDSM2025-170216

Amin Hafdaoui, *Keio University,* **Shinnosuke Obi,** *Keio University*

Visualization of Unsteady Flows Using the High-Fidelity IDS Solver

Technical Presentation Only: FEDSM2025-170300

Dehua Feng, *North Carolina A&T State University,* **Yang Gao,** *North Carolina A&T State University,* **Frederick Ferguson,** *North Carolina A&T State University,* **Xinru Niu,** *North Carolina A&T State University*

Experimental Flow Visualization Around a Sphere Using Particle Image Velocimetry

Technical Presentation Only: FEDSM2025-170536

Philipp Epple, *Coburg University of Applied Sciences,* **Ivana Milanovic,** *University of Hartford,* **Manuel Fritsche,** *Coburg University,* **Thomas Braemer,** *LaVision GmbH,* **Thomas Rockstroh,** *LaVision GmbH*

Simulation of the Impact of Droplets on Wind Turbine Blade

Technical Presentation Only: FEDSM2025-170540

Noushin Azimy, *University of Tulsa,* **Soroor Karimi,** *University of Tulsa*

Experimental and CFD Study of Multiphase Flow Effects in Erosion of Elbows Under Slug/churn Flow

Technical Presentation Only: FEDSM2025-170534

Farshad Biglari, *University of Tulsa,* **Mazen Othayq,** *Jazan University,* **Saeid Pour Nemat,** *University of Tulsa*, **Haijing Gao,** *Chevron Energy Technology Company,* **Simona Duplat,** *Chevron Energy Technology Company,* **Soroor Karimi,** *University of Tulsa,* **Siamack Shirazi,** *University of Tulsa*

Bubble Interactions in Slug Flows: Unmasking the Master-Slave Relationship

Technical Presentation Only: FEDSM2025-170461

Shahriyar Ghazanfari Holagh, *University of Guelph,* **Wael H. Ahmed,** *University of Guelph*

Plasma as a Candle in the Dark

Technical Presentation Only: FEDSM2025-170506

Jorge Arturo Ahumada Lazo, *The City College of New York,* **Yang Liu,** *The City College of New York*

Flow Structures in the Human Trachea – Experiments and Matched Simulations

Technical Presentation Only: FEDSM2025-170416

Aarthi Sekaran, *SUNY Polytechnic Institute,* **Ahmed Abdelaal,** *SUNY Polytechnic Insititute*

3-D Visualization of Transient Vortex Dynamics in a Three-Bladed Magnus Vertical Axis Wind Turbine

Technical Presentation Only: FEDSM2025-170467

Fandi Dwiputra Suprianto, *National Taiwan University of Science and Technology,* **Ming-Jyh Chern,** *National University of Science and Technology,* **Ching-Cheng Wang,** *National Taipei University of Technology*

Numerical Flow Visualization of Tip Leakage Vortices in Axial Fans Using LES

Technical Presentation Only: FEDSM2025-170504

Manuel Fritsche, *Coburg University of Applied Sciences,* **Philipp Epple,** *Coburg University of Applied Sciences*

Optical Burst

Technical Presentation Only: FEDSM2025-170507

Jorge Ahumada, *The City College of New York,* **Tad Jerzy Misztal,** *The City College of New York,* **Sandeep Kumar,** *The City College of New York,* **Navdeep Badhan,** *The City College of New York,* **Yang Liu,** *The City College of New York*

Visualization of Dynamic Fluid-Structure-Interaction of a Pelton Turbine

Technical Presentation Only: FEDSM2025-170509

Boris Kubrak, *Mechanical Solutions, Incorporated*

Can You See the Plasma

Technical Presentation Only: FEDSM2025-170512

Jorge Ahumada, *The City College of New York,* **Yang Liu,** *The City College of New York*

Rolling With the Flow: Multi-View Reconstruction and High-Fidelity Flow Simulation of a Bluegill Sunfish Maneuver

Technical Presentation Only: FEDSM2025-170527

Annabelle Cao, *Western Albemarle High School,* **Alec Menzer,** *University of Virginia,* **George Lauder,** *Harvard University,* **Haibo Dong,** *University of Virginia*

Unsteady Wake Dynamics Behind a Sphere: A Computational and Visual Study

Technical Presentation Only: FEDSM2025-170532

Philipp Epple, *Coburg University,* **Ivana Milanovic,** *University of Hartford,* **Manuel Fritsche,** *Coburg University*

2.1
RECENT DEVELOPMENT IN CFD AND VERIFICATION AND VALIDATION METHODS

Concerto A, Third Level **10:50AM–12:25PM**

Chair: Zhongquan Zheng, *Utah State University*
Chair: Ning Zhang, *McNeese State University*
Chair: Kevin Dowding, *Sandia*

Sharp Interface for Compressible Multiphase Flow With Surface Tension on Irregular Meshes

Technical Paper Publication: FEDSM2025-158485

Joseph Marziale, *University of Buffalo, State University of New York,* **Jason Sun,** *University at Buffalo, State University of New York,* **David Salac,** *University at Buffalo, State University of New York,* **James Chen,** *University at Buffalo, State University of New York*

Robust Solution Verification Experiments on Non-Uniform Meshes

Technical Paper Publication: FEDSM2025-158275

Justin Weinmeister, *Oak Ridge National Laboratory,* **Devina Sanjaya,** *The University of Tennessee, Knoxville*

Development and Verification of Finite Volume and Finite Element Solvers for Multi-Species Flow Simulations

Technical Paper Publication: FEDSM2025-158472

Asmaa Chakir, *Mississippi State University,* **Anup Zope,** *Center for Advanced Vehicular Systems,* **Eric Collins,** *High Performance Computing Collaboratory (HPC^2),* **Shanti Bhushan,** *Mississippi State University,* **Scott Murman,** *NASA Ames Research Center*

Verifying and Validating the Integro-Differential Scheme Capability to Solve the 1D Unsteady Gas Dynamic Equations

Technical Paper Publication: FEDSM2025-158616

Frederick Ferguson, *North Carolina A&T State University,* **Xinru Niu,** *North Carolina A&T State University,* **Yang Gao,** *North Carolina A&T State University,* **Mookesh Dhanasar,** *North Carolina A&T State University*

A High-Order Computational Framework for Wind Farm Modeling Using Flux Reconstruction and Actuator Disk Models

Technical Paper Publication: FEDSM2025-158587

Abdullah Al Imran, *University of Maryland Baltimore County,* **Meilin Yu,** *University of Maryland Baltimore County*

7.1
HEAT AND MASS TRANSFER IN MULTIPHASE FLOWS
Maestro A, Fourth Level **10:50AM–12:25PM**

Chair: Dr. Francesco Zonta, *Newcastle University*
Chair: Theodore (Ted) J. Heindel, *Iowa State University*
Chair: Cristian Marchioli, *University of Udine*

Mass Transfer in Bubble-Laden Turbulent Channel Flow

Technical Paper Publication: FEDSM2025-158101

Simone Di Giorgio, *Istituto di Ingegneria del Mare, Consiglio Nazionale delle Ricerche,* **Francesco Zonta,** *Newcastle University,* **Sergio Pirozzoli,** *Sapienza Universita di Roma,* **Alessandro Iafrati,** *Istituto di Ingegneria del Mare, Consiglio Nazionale delle Ricerche (INM-CNR),* **Alfredo Soldati,** *Institute of Fluid Mechanics and Heat Transfer, TU-Wien*

Ice Accretion Analysis on NACA0012 Airfoil With Conjugate Heat Transfer

Technical Paper Publication: FEDSM2025-158739

Sobhan Ghorbani Nohooji, *Concordia University,* **Moussa Tembely,** *Concordia University*

The Role of Particles in the Convective Turbulence Modulation in a Differentially Heated Channel

Technical Paper Publication: FEDSM2025-157904

Lee Rosenberg, *Oakland University,* **Sarah Beetham,** *Oakland University*

Experiments on Hot Wall Cooling With a Falling Liquid Film

Technical Presentation Only: FEDSM2025-170214

Tomio Okawa, *The University of Electro-Communications,* **Hiroyuki Umebayashi,** *The University of Electro-Communications,* **Som Onn Ouch,** *The University of Electro-Communications*

Numerical Investigation of Conjugate Heat Transfer in Oscillating Heat Pipes

Technical Presentation Only: FEDSM2025-170292

Joseph Feser, *University of Delaware*

10.1
BOUNDARY LAYER FLOWS
Maestro B, Fourth Level **10:50AM–12:25PM**

Chair: Deify Law, *California State University, Fresno*
Chair: Bei Fan, *Michigan State University*

Simulation and Modeling of Non-Canonical Turbulent Boundary Layers

Keynote Presentation: FEDSM2025-171484

Junlin Yuan, *Michigan State University*

On the Development of a Wall-Model for Ablating Solid Fuel Reacting Boundary Layers

Technical Paper Publication: FEDSM2025-158470

Kenneth Budzinski, *State University of New York at Buffalo,* **Paul Desjardin,** *State University of New York at Buffalo*

Investigation of Safety Glasses Fogging Due to Mask-Wearing: A Combined Numerical and Experimental Study

Technical Presentation Only: FEDSM2025-158697

Kian Barari, *UMass-Lowell,* **Rozhin Hajian,** *UMass-Lowell,* **Xiuhua Si,** *California Baptist University,* **Jinxiang Xi,** *UMass-Lowell*

4.2
APPLICATIONS OF CFD IN MEDICINE AND BIOMEDICAL SYSTEMS
Aria A, Third Level **10:50AM–12:25PM**

Chair: Isaac Perez-Raya, *Rochester Institute of Technology*
Chair: Yassin Hassan, *Professor, Texas A&M*
Chair: Zhenglun Wei, *Worcester Polytechnic Institute*

Flow Through an Intubated Human Trachea Analyzed via Computational Fluid Dynamics and Matched Experiments

Technical Paper Publication: FEDSM2025-157973

Aarthi Sekaran, *SUNY Polytechnic Institute,* **Ahmed Abdelaal,** *SUNY Polytechnic Institute,* **Miljan Mandic,** *SUNY Polytechnic Institute*

Numerical Assessment of Vapor Evaporation Effects on Mdi Spray Dosimetry in Pulmonary Drug Delivery

Technical Presentation Only: FEDSM2025-156085

Mohamed Talaat, *University of Massachusetts, Lowell,* **Xiuhua Si,** *California Baptist University,* **Jinxiang Xi,** *University of Massachusetts, Lowell*

Modeling and Simulation of Blood Flow Dynamics of Aortic Regurgitation in Mice

Technical Presentation Only: FEDSM2025-158673

Mohammad Hossan, *Univ Of Central Oklahoma,* **Jasim Ahamed,** *Oklahoma Medical Research Foundation*

Emergent Collective Behavior of Platelets in Blood Clotting: Lessons for Designing Active Polymeric Networks

Technical Presentation Only: FEDSM2025-170265

Yueyi Sun, *Lafayette College*

8.2
FLUID MACHINERY
Concerto B, Third Level **10:50AM–12:25PM**

Chair: Ernesto Primera, *University of Tennessee*
Chair: Aarthi Sekaran, *SUNY Polytechnic Institute*
Chair: Bruno Schiavello, *Retired Consultant*

Effect of Pressure-Dependent Deformation of Safety Valve Disc on Sealing Performance

Technical Paper Publication: FEDSM2025-158114

Ji-Yuan Yang, *Zhejiang University,* **Xiao-Hui Luo,** *China Nuclear Power Engineering Co., Ltd.,* **Li Song,** *China Nuclear Power Engineering Co., Ltd.,* **Liang Zhao,** *China Nuclear Power Engineering Co., Ltd.,* **Gui-Bin Wu,** *China Nuclear Power Engineering Co., Ltd.,* **Chuang Liu,** *Zhejiang University,* **Zhe-Hui Ma,** *Zhejiang University,* **Jin-Yuan Qian,** *Zhejiang University*

AI-Prediction of Pressure Characteristics for Centrifugal Fans

Technical Paper Publication: FEDSM2025-156474

Manuel Fritsche, *Coburg University of Applied Sciences,* **Philipp Epple,** *Coburg University of Applied Sciences*

The Effects of a Diffuser on the Wake Characteristics of a Squareback Ahmed Body

Technical Paper Publication: FEDSM2025-155309

Matt Molnar, *University of Windsor,* **Vesselina Roussinova,** *University of Windsor,* **Ram Balachandar,** *University of Windsor*

Optimization of the Resin Transfer Molding Process to Manufacture Semi-Rigid Boats With Composites Applying Computational Fluid Dynamics Simulation and Novel Analytical Approaches

Technical Paper Publication: FEDSM2025-158478

Martin Mayer, *National Distance Education University,* **Paul Bosauder,** *Sequence Engineering Ltd.,* **Daniel Fernández-Martín,** *National Distance Education University,,* **Ana M. Camacho,** *National Distance Education University,* **Alvaro Rodriguez-Prieto,** *SGS TECNOS and UNED University*

Numerical Analysis of Cavitating Flow Fields in a Rocket Inducer With a Backflow Restriction Step

Technical Presentation Only: FEDSM2025-169505

Takeru Yoshino, *Tohoku University,* **Satoshi Kawasaki,** *Kakuda Space Center, Japan Aerospace Exploration Agency,* **Yuka Iga,** *Tohoku University*

5.1.1
ADVANCED THERMAL-FLOW DIAGNOSTIC TECHNIQUES - I
Aria B, Third Level **10:50AM–12:25PM**

Chair: Yang Liu, *The City College of New York*
Chair: Jingsen Ma, *Dynaflow, Inc.*
Chair: Hui Hu, *Iowa State University*

Hypersonic Turbulent Quantities and Drop Aerobreakup/Impact

Keynote Presentation: FEDSM2025-172055

Nick Parziale, *Stevens Institute of Technology*

Dynamic Random Freezing Phenomena and Nucleation Rates of Supercooled Water Droplets Colliding With Cold Surfaces

Technical Presentation Only: FEDSM2025-165896

Tianbao Wang, *Tsinghua University,* **Min Chen,** *Tsinghua University*

Scaling Law-Based Analysis of Coalescence Dynamics of Colloidal Droplets on Substrates During the Freezing Process

Technical Paper Publication: FEDSM2025-158596

Haipeng Zhang, *The City College of New York,* **Sandeep Kumar,** *The City College of New York,* **Yang Liu,** *The City College of New York*

Development of a Novel Freezing-Levitation System for Producing Supercooled Droplet With Precise Control of Supercooling Degrees

Technical Paper Publication: FEDSM2025-158642

Md Sohaib Bin Sarvar, *The City College of New York,* **Haipeng Zhang,** *The City College of New York,* **Yang Liu,** *The City College of New York*

POSTER SESSION & 12.2- FLOW VISUALIZATION COMPETITION SESSION

Overture, Third Level **1:00PM–2:00PM**

Chair: Ning Zhang, *McNeese State University*

Clustering and Classification Techniques for Improved Flux Calculations

Poster Presentation: FEDSM2025-156121

Amandine Maidenberg, *Embry-Riddle Aeronautical University,* **Leitao Chen,** *Embry-Riddle Aeronautical University*

Effects of Reynolds Number on Separated Flow Around an Elongated Rectangular Cylinder

Poster Presentation: FEDSM2025-158121

Erin Van Veen, *University of Manitoba,* **Yasmeen Shalaby,** *University of Manitoba,* **Fati Bio Abdul-Salam,** *University of Manitoba,* **Mark Francis Tachie,** *University of Manitoba*

High-Fidelity Simulations of Helium-Air Mixing in HTGR Cavities

Poster Presentation: FEDSM2025-158431

Hai Lu Lin, *The City College of New York,* **Chunheng Zhao,***The City College of New York,* **Saumil Patel,** *Argonne National Laboratory,* **Taehun Lee,** *The City College of New York*

Effects of Leading-Edge Separation Angle on the Characteristics of Separated Flows Around a Rectangular Cylinder

Poster Presentation: FEDSM2025-158150

Bronwyn Rempel, *University of Manitoba,* **Fati Abdul-Salam,** *University of Manitoba,* **Scott Ormiston,** *University of Manitoba,* **Mark Tachie,** *University of Manitoba*

A Numerical Study of Sand Particle Erosion in Reducing Elbows

Poster Presentation: FEDSM2025-158183

Mohammad Ali Rasoulian, *Amirkabir University of Technology,* **Ali Farokhipour,** *Amirkabir University of Technology,* **Aminolah Rasteh,** *Amirkabir University of Technology,* **Pouyan Talebizadehsardari,** *University of Nottingham,* **Zohreh Mansoori,** *Amirkabir University of Technology,* **Goodarz Ahmadi,** *Clarkson University*

Simulation Study of Water Flow Through Cracks of Various Shapes in Concrete

Poster Presentation: FEDSM2025-169477

Heather Ji, *Round Rock High School*

3.1.1 COMPUTATIONAL MODELING IN HYDRO- AND AERO- FLOW DYNAMICS I

Concerto A, Third Level **2:00PM–3:35PM**

Chair: Haibo Dong, *University of Virginia*
Chair: Shanti Bhushan, *Mississippi State University*
Chair: Chengyu Li, *Case Western Reserve University*

Hydrodynamic Interactions During Submerged Body Docking at Moving Walls: A Computational Study

Technical Paper Publication: FEDSM2025-156496

Jonathan Ryerse, *Virginia Tech,* **Erick Rivas,** *Virginia Tech,* **Edwin Lopez Ramos,** *U.S. Naval Undersea Warfare Center Division Newport,* **Emily Guzas,** *U.S. Naval Undersea Warfare Center Division Newport,* **Kevin Wang,** *Virginia Tech*

Comparative Study of Mini Propeller Geometry for Thrust Enhancement on a Laboratory-Scaled Watercraft Using Openfoam

Technical Paper Publication: FEDSM2025-158126

Hoa Truong, *Fulbright University Vietnam,* **Maria Laura Beninati,** *Bucknell University,* **Shinnosuke Obi,** *Keio University,* **Minh Doan,** *Fulbright University Vietnam*

Investigation of Sharp Leading-Edge Symmetric Airfoils in Transitional Flow

Technical Paper Publication: FEDSM2025-158278

Jonathan Rud, *California State University, Northridge,* **Hamid Johari,** *California State University, Northridge*

Development, Verification and Validation of Machine Learned Actuator Line Propeller Model

Technical Paper Publication: FEDSM2025-158665

Joshua Bowman, *Mississippi State University,* **Karly Mims,** *Mississippi State University,* **Shanti Bhushan,** *Mississippi State University,* **Shawn Aram,** *U.S. Navy*

Dynamic Fluid-Structure-Analysis of a Pelton Turbine

Technical Presentation Only: FEDSM2025-170517

Boris Kubrak, *Mechanical Solutions, Inc.,* **Edward Bennett,** *Mechanical Solutions, Inc.*

Kinematic Characterization of Bee Flight Modes Using Deep Learning for Prospective Fluid Flow Analysis

Technical Paper Publication: FEDSM2025-158136

Clayton F. Fernandes, *University at Buffalo - The State University of New York,* **Chi Nnoka,** *University at Buffalo - The State University of New York,* **Javid Bayandor,** *University at Buffalo - The State University of New York*

Hydrodynamic Interactions and Performance Enhancement in Stingray Schools

Technical Paper Publication: FEDSM2025-158217

Zihao Huang, *University of Virginia,* **Haibo Dong,** *University of Virginia*

4.1.1
INTERACTIONS IN BIO-INSPIRED PROPULSIONDYNAMICS I
Aria A, Third Level **2:00PM–3:35PM**

Chair: Chengyu Li, *Case Western Reserve University*
Chair: Javid Bayandor, *The State University of New York*
Chair: Haibo Dong, *University of Virginia*

Flight Performance and Mechanosensory Response to Spanwise Wing Damage in Blue Bottle Flies

Technical Paper Publication: FEDSM2025-158216

Naeem Haider, *Case Western Reserve University,* **Seth Lionetti,** *Case Western Reserve University,* **Menglong Lei,** *Case Western Reserve University,* **Chengyu Li,** *Case Western Reserve University*

Hydrodynamic Analysis of Fish Schools in the Vertical Plane

Technical Paper Publication: FEDSM2025-158116

Alec Menzer, *University of Virginia,* **Haibo Dong,** *University of Virginia*

The Role of Appendage Spacing in the Hydrodynamics of Metachronal Propulsion

Technical Paper Publication: FEDSM2025-160892

Mohammadreza Zharfa, *The Pennsylvania State University,* **David J. Peterman,** *The Pennsylvania State University,* **Adrian Herrera-Amaya,** *Brown University,* **Margaret L. Byron,** *The Pennsylvania State University*

7.2.1
CAVITATION I
Maestro A, Fourth Level **2:00PM–3:35PM**

Chair: Aswin Gnanaskandan, *Worcester Polytechnic Institute*
Chair: Mauro Rodriguez, *Brown University*
Chair: Jingsen Ma, *Dynaflow, Inc.*

A Hybrid Euler-Lagrange Multiscale Model for Nuclei-Initiated Cavitation

Technical Paper Publication: FEDSM2025-155755

Mahdi Lavari, *Worcester Polytechnic Institute,* **Aswin Gnanaskandan,** *Worcester Polytechnic Institute*

A Post-Hoc Physics-Guided Neural Network for Parameter Estimation in an Equation of State of Cavitation Bubbles

Technical Paper Publication: FEDSM2025-156200

Pritam Mandal, *Indian Institute of Technology Kharagpur,* **Prabhakar Akurati,** *Indian Institute of Technology Kharagpur,* **Ritwik Ghoshal,** *Indian Institute of Technology Kharagpur*

Numerical Prediction of Cavitation for a Marine Propeller

Technical Paper Publication: FEDSM2025-157915

Xuewei Zhang, *Dassault Systèmes,* **Avinash Jammalamadaka,** *Dassault Systèmes*

Unsteady Eulerian Multiphase Analysis of a Cavitating Turbopump Inducer

Technical Presentation Only: FEDSM2025-170168

Edward Bennett, *Mechanical Solutions, Incorporated,* **Boris Kubrak,** *Mechanical Solutions, Incorporated*

Study on the Mechanism of Cavitation Detachment in a Centrifugal Pump

Technical Presentation Only: FEDSM2025-156675

Weiguo Zhao, *Lanzhou University of Technology,* **Yanyan Wang,** *Lanzhou Petrochemical University of Vocational Technology,* **Wei Han,** *Lanzhou University of Technology,* **Zhengjing Shen,** *Lanzhou University of Technology*

10.3.1
TURBULENT FLOWS I
Maestro B, Fourth Level **2:00PM–3:35PM**

Chair: Jun Chen, *Purdue University*
Chair: Bei Fan, *Michigan State University*

The Effect of Freestream Turbulence on the Drag and Lift Coefficients of Rotating Baseballs and Spheres

Technical Paper Publication: FEDSM2025-158115

Kaita Odani, *Hofstra University,* **Kyle Raymond,** *Hofstra University,* **David Rooney,** *Hofstra University,* **John Vaccaro,** *Hofstra University*

Dynamics of Separated Flow Over a Rectangular Prism With Chord-to-Length Ratio of 6 at Moderate Reynolds Numbers

Technical Paper Publication: FEDSM2025-158120

Erin Van Veen, *University of Manitoba,* **Fati-Bio Abdul-Salam,** *University of Manitoba,* **Mark Francis Tachie,** *University of Manitoba*

Understanding the Anisotropy of Turbulence Introduced by Off-Axis Rotation: An Experimental Study Using Co-Rotating PIV and Tomo-PIV

Technical Paper Publication: FEDSM2025-157945

Yijie Wang, *Purdue University,* **Jun Chen,** *Purdue University,* **Leonardo Chamorro,** *University of Illinois Urbana-Champaign*

5.1.2
ADVANCED THERMAL-FLOW DIAGNOSTIC TECHNIQUES II
Aria B, Third Level **2:00PM–3:35PM**

Chair: Yang Liu, *The City College of New York*
Chair: Jingsen Ma, *Dynaflow, Inc.*
Chair: Hui Hu, *Iowa University*

Real-Time Monitoring of the Casting Iron Jets From a Blast Furnace

Technical Paper Publication: FEDSM2025-158127

Weixiao Shang, *Purdue University,* **Jun Chen,** *Purdue University,* **Tyamo Okosun,** *Purdue University Northwest,* **Chenn Q. Zhou,** *Purdue University Northwest*

Development of a Simultaneous Gas/droplet Imaging System for Characterizing Shock-Droplet Interactions Approaching a Solid Surface

Technical Paper Publication: FEDSM2025-158651

Tad Misztal, *City College of New York,* **Jorge Ahumada Lazo,** *City College of New York,* **Sandeep Kumar,** *City College of New York,* **Yang Liu,** *City College of New York*

Parametric Optimization of Design Parameters for a Novel Shell-and-Tube Heat Exchanger to Maximize Effectiveness

Technical Presentation Only: FEDSM2025-171387

Yogendra Panta, *West Virginia University,* **Maya Panta,** *Woodrow Wilson High School*

8.3.1
PUMPING MACHINERY I
Concerto B, Third Level **2:00PM–3:35PM**

Chair: Tamara Guimaraes Bucalo, *Penn State University*
Chair: Ernesto Primera, *University of Tennessee*
Chair: Ravinder Yerram

Design, Development, and Performance of Innovative MicroScale, Millimeter-Scale and Macro-Scale Pumping Devices

Keynote Presentation: FEDSM2025-164833

Phil Ligrani, *Professor of Mechanical and Aerospace Engineering, University of Alabama in Huntsville*

Leveraging Harmonic Distortion in Discharge Pressure for Clogging Detection in Wastewater Pumps

Technical Paper Publication: FEDSM2025-158037

Florian Brokhausen, *Technische Universität Berlin,* **Paul Uwe Thamsen,** *Technische Universität Berlin*

The Effect of Backward Curved Back Vanes and Back Channels on Fiber Entry Into the Back Shroud Cavity of a Wastewater Pump

Technical Paper Publication: FEDSM2025-155465

Tobias Rinnert, *Technische Universität Berlin,* **Paul Uwe Thamsen,** *Technische Universität Berlin*

Computational Fluid Dynamics Based Cavitation Erosion Prediction in a Swash Plate Piston Pump

Technical Paper Publication: FEDSM2025-158312

Shyam Sundar Pasunurthi, *Simerics Inc.,* **Alessandro Corvaglia,** *Casappa S.p.A,* **Manuel Rigosi,** *Casappa S.p.A,* **Sujan Dhar,** *Simerics Inc.,* **Venkata Harish Babu Manne,** *Simerics Inc.,* **Hui Ding,** *Simerics Inc.,* **Federico Monterosso,** *Omiq Srl*

8.1
AEROSPACE
Concerto B, Third Level **3:50PM–5:25PM**

Chair: Javid Bayandor, *The State University of New York*
Chair: Bei Fan, *Michigan State University*

CFD Analysis of Sulfuric Acid Particles and Nitrogen Gas Flow Within a Venusian Cloud Test Chamber

Technical Paper Publication: FEDSM2025-156685

Mary Suehrstedt, *California State Polytechnic Univ., Pomona,* **Mason Epperson,** *California State Polytechnic Univ., Pomona,* **Mike Pauken,** *Jet Propulsion Laboratory-Caltech,* **Kevin Anderson,** *California State Polytechnic Univ., Pomona*

Additive Manufacturing of Airfoil Models for Wind Tunnel Testing

Technical Paper Publication: FEDSM2025-158164

Luke Freimuth, *University of St. Thomas,* **Theodore Graham,** *University of St. Thomas,* **Thomas Shepard,** *University of St. Thomas,* **Muhammad Warsi,** *University of St. Thomas*

Impact of Blockage Ratio on Flow Characteristics for a NACA 0015 Airfoil at Low Reynolds Number

Technical Paper Publication: FEDSM2025-158206

Theodore Graham, *University of St. Thomas,* **Luke Freimuth,** *University of St. Thomas,* **Thomas Shepard,** *University of St. Thomas*

WHO'S WHO COMPETITION
Aria A, Third Level **3:50PM–5:25PM**

Chair: Zhongquan Zheng, *Utah State University*
Chair: Ning Zhang, *McNeese State University*

Aimcardio Lab - Bridging Fluid Engineering Innovation With Real-World Medical Applications

Technical Presentation Only: FEDSM2025-169643

Zhenglun Wei, *Worcester Polytechnic Institute*

MBAFUS: A Virtual Lab of Microbubble-Augmented Focused Ultrasound for Noninvasive Surgery Based on Two-Way Coupled Euler-Lagrange Modeling

Technical Presentation Only: FEDSM2025-170342

Jingsen Ma, *Dynaflow, Inc.*

Erosion/Corrosion Research Center

Technical Presentation Only: FEDSM2025-170529

Soroor Karimi, *The University of Tulsa,* **Siamack Shirazi,** *The University of Tulsa*

Abstract for the Who's Who Video Contest to Accompany the Technical Paper FEDSM2025-158551 "Analysis of the Slip Relation Parameters in the Developing Region of Vertical Upward Two-Phase Flow With Co-Flowing Streams" by Ivan Nepomnyashchikh and James A. Liburdy

Technical Presentation Only: FEDSM2025-170510

Ivan Nepomnyashchikh, *Oregon State University*

10.3.2
TURBULENT FLOWS II
Maestro B, Fourth Level **3:50PM–5:25PM**

Chair: Jun Chen, *Purdue University*
Chair: Bei Fan, *Michigan State University*

Impact of Smooth Perturbations on Turbulent Pipe Flow Manipulation Using Targeted Wall Shapes

Technical Presentation Only: FEDSM2025-157806

Yaren Dincoglu, *University of Alberta,* **Suyash Verma,** *University of Alberta,* **Arman Hemmati,** *University of Alberta*

Investigating the Wake Structure Behind a Perforated Cylinder

Technical Paper Publication: FEDSM2025-158151

Maria Gudisey, *University of Windsor,* **Vesselina Roussinova,** *University of Windsor,* **Ram Balachandar,** *University of Windsor*

Energy Transfer Mechanisms in Off-Axis Rotational Turbulence

Technical Paper Publication: FEDSM2025-158598

Yijie Wang, *Purdue University,* **Jun Chen,** *Purdue University,* **Leonardo Chamorro,** *University of Illinois Urbana-Champaign*

3.1.2
COMPUTATIONAL MODELING IN HYDRO- AND AERO-FLOW DYNAMICS II
Concerto A, Third Level **3:50PM–5:25PM**

Chair: Haibo Dong, *University of Virginia*
Chair: Chengyu Li, *Case Western Reserve University*
Chair: Shanti Bhushan, *Mississippi State University*

CFD and Hydraulic Modeling for Coastal Flooding

Technical Presentation Only: FEDSM2025-151956

Ning Zhang, *McNeese State University*

High-Resolution Simulation of Oblique Detonation Using a Reduced Chemistry Model

Technical Presentation Only: FEDSM2025-158052

Yang-Yao Niu, *Tamkang University,* **Yi-Jhen Wu,** *Tamkang University*

An Approach to Quantifying Added Mass From Computational Simulations of Water Entry of Solid Objects

Technical Presentation Only: FEDSM2025-158218

Kartik Gupta, *University of Massachusetts Dartmouth,* **Mehdi Raessi,** *University of Massachusetts Dartmouth,* **Jesse L. Belden,** *Naval Undersea Warfare Center*

Dynamic Interaction of Tandem Circular Cylinders Under Vortex-Induced Vibration at Re=1000

Technical Presentation Only: FEDSM2025-158502

Jing-Yuan Fan, *National Taiwan University of Science and Technology,* **Ming-Jyh Chern,** *National Taiwan University of Science and Technology,* **Yosua Heru Irawan,** *Institut Teknologi Nasional Yogyakarta,* **Syed Ahmad Raza,** *NED University of Engineering & Technology*

6.1
FLOW DYNAMICS OF WIND TURBINES
Aria A, Third Level **3:50PM–5:25PM**

Chair: Linyue Gao, *University of Colorado Denver*
Chair: Yang Liu, *The City College of New York*

Windsr-4D: Super-Resolution Spatiotemporal Wind Forecasting at Wind Farm Scale

Technical Paper Publication: FEDSM2025-156477

Fuhao Chen, *University of Colorado Denver,* **Linyue Gao,** *University of Colorado Denver*

Diffuser-Type Augmentation Impact on Dual Rotor Vertical Axis Wind Turbine Performance

Technical Paper Publication: FEDSM2025-158297

Belal Shanab, *Virginia Tech,* **Muhammad Mubashar Ashraf,** *Virginia Tech,* **Alexandrina Untaroiu,** *Virginia Tech*

Experimental Analysis of Vortex Interactions in the Near-Blade Region of a Tandem Vertical-Axis Turbine System

Technical Presentation Only: FEDSM2025-163557

Amin Hafdaoui, *Keio University,* **Shinnosuke Obi,** *Keio University*

7.2.2
CAVITATION II
Maestro A, Fourth Level **3:50PM–5:25PM**

Chair: Aswin Gnanaskandan, *Worcester Polytechnic Institute*
Chair: Mauro Rodriguez, *Brown University*
Chair: Jingsen Ma, *Dynaflow, Inc.*

Thermodynamic Self-Suppression Effect of Unsteady Cavitation in Hot Water With Scale Effect

Technical Presentation Only: FEDSM2025-167625

Gen Nakamura, *Tohoku University,* **Junnosuke Okajima,** *Tohoku University,* **Yuka Iga,** *Tohoku University*

Ultra-High Speed Photography of Shock Waves During Collapse of Cloud Cavitation Induced by Submerged Water-Jet

Technical Presentation Only: FEDSM2025-167063

Takahiro Ushioku, *Waseda University,* **Ryo Kangyu,** *Waseda University,* **Hiroaki Yoshimura,** *Waseda University*

An Experimental Study on Ventilated Cavity Flows Under Streamwise Gravitational Effect

Technical Presentation Only: FEDSM2025-158643

Qian Wang, *Shanghai Jiao Tong University,* **Chang Shu,** *Shanghai Jiao Tong University,* **Hua Liu,** *Shanghai Jiao Tong University*

TUESDAY, JULY 29, 2025

PLENARY KEYNOTE
LUIS SAN ANDRÉS
Symphony Ballroom, Third Level **8:00AM–8:55AM**

Wet Annular Seals in Multiphase Pumps: Leakage and Rotordynamic Force Coefficients and a Method to Promote Seal Direct Stiffness

Keynote Presentation: FEDSM2025-164088

6.2
RENEWABLE ENERGY
Aria A, Third Level **9:00AM–10:35AM**

Chair: Aarthi Sekaran, *SUNY Polytechnic Institute*
Chair: Ravinder Yerram
Chair: Tamara Guimaraes Bucalo, *Penn State University*

Experimental Analysis of Energy Scavenging From Bio-Mimic Piezoelectric Eel

Technical Paper Publication: FEDSM2025-151950

Usman Latif, *National University of Sciences & Technology,* **Mariam Akber,** *National University of Sciences & Technology,* **Mujahid Saeed,** *National University of Sciences & Technology,* **Emad Uddin,** *National University of Sciences & Technology,* **M. Yamin Younis,** *National University of Sciences & Technology*

Thermal-Hydraulic Performance of Solar Air Heaters Integrated With Vortex Generators

Technical Paper Publication: FEDSM2025-155424

Mohannad Khair, *The Pennsylvania State University,* **Tamy Guimaraes,** *The Pennsylvania State University,* **Wallace Ferreira,** *Federal University of ABC,* **Daniel Dezan,** *Federal University of ABC,* **Antônio Gallego,** *Federal University of ABC,* **Rodrigo Pinto,** *Federal University of ABC,* **Rafael Duarte,** *Federal University of ABC*

Pressure Fluctuation Analysis of a Pumped Storage System With Three-Dimensional Penstock During Ball Valve Closure: Turbine Mode

Technical Paper Publication: FEDSM2025-158038

Huanyu Wu, *Tsinghua University,* **Yuhao Yan,** *Tsinghua University,* **Zhengwei Wang,** *Tsinghua University,* **Yishu Shi,** *Tsinghua University*

7.8
MULTIPHASE CHALLENGES ADDRESSED BY MODELING AND EXPERIMENTS

Maestro A, Fourth Level **9:00AM–10:35AM**

Chair: **Donna Guillen,** *Idaho National Laboratory*
Chair: **Victor Coppo Leite,** *Idaho National Laboratory*

Experimental Measurement and Modelling of Interfacial Parameters in Upward and Downward Flow Boiling

Technical Presentation Only: FEDSM2025-158299

Paul Ayegba, *California State University Long Beach*

Parameter Study of a High-Level Waste Melter With Computational Fluid Dynamics

Technical Presentation Only: FEDSM2025-158669

Victor Coppo Leite, *Idaho National Laboratory,* **Donna Guillen,** *Idaho National Laboratory,* **Pavel Ferkl,** *Pacific Northwest National Laboratory,* **Mark Hall,** *Pacific Northwest National Laboratory,* **Richard Pokorny,** *University of Chemistry and Technology,* **William Eaton,** *Pacific Northwest National Laboratory,* **Albert Kruger,** *U.S. Department of Energy*

Gravitational Effect on the Hydrodynamic Process of Drop Impact on a Liquid Film

Technical Presentation Only: FEDSM2025-160279

Tomio Okawa, *The University of Electro-Communications,* **Takaaki Shirakata,** *The University of Electro-Communications*

Analysis of the Slip Relation Parameters in the Developing Region of Vertical Upward Two-Phase Flow With Co-Flowing Streams

Technical Paper Publication: FEDSM2025-158551

Ivan Nepomnyashchikh, *Oregon State University,* **James Liburdy,** *Oregon State University*

Phase-Field Modeling of Boiling Heat Transfer

Technical Paper Publication: FEDSM2025-157816

Alessio Roccon, *University of Udine,* **Matteo Bucci,** *Massachusetts Institute of Technology*

8.3.2
PUMPING MACHINERY II

Concerto B, Third Level **9:00AM–10:35AM**

Chair: **Tamara Guimaraes Bucalo,** *Penn State University*
Chair: **Ravinder Yerram**
Chair: **Ernesto Primera,** *University of Tennessee*

Research on a Rapid Evaluation Method for Unsteady Characteristics of Centrifugal Pumps Based on the Steady Flow Field Structure

Technical Paper Publication: FEDSM2025-158093

Xinxiang He, *Zhejiang University,* **Xin Yang,** *Zhejiang University,* **Zhiwei Sun,** *Zhejiang University,* **Bin Huang,** *Zhejiang University,* **Shuai Yang,** *Zhejiang University,* **Peng Wu,** *Zhejiang University,* **Dazhuan Wu,** *Zhejiang University*

Improving Functionality of a High-Efficiency Semi-Open 2-Channel Impeller by Connected Leading Edges

Technical Paper Publication: FEDSM2025-158021

David Beck, *Technische Universität Berlin,* **Paul Uwe Thamsen,** *Technische Universität Berlin*

The Effect of Wear Gap on Cavitation Behavior in Sewage Pump - One Channel Impeller

Technical Paper Publication: FEDSM2025-158773

Samer Mekhael, *Technical University of Berlin,* **Paul Uwe Thamsen,** *Technical University of Berlin*

Experimental and Computational Investigation of Balance Hole Flow Coefficient for Predicting Axial Thrust in an Unshrouded Centrifugal

Technical Presentation Only: FEDSM2025-168513

Kento Sakai, *Waseda University,* **Shota Yoshida,** *Waseda University,* **Kazuyoshi Miyagawa,** *Waseda University,* **Toru Kuga,** *IHI Corporation,* **Toru Tsukano,** *IHI Corporation*

Parameter Study of a Classic Impeller Using Previous Method of Optimum Meridian Profile With Additional Design Parameters

Technical Paper Publication: FEDSM2025-155329

Takuji Tsugawa, *Independent Consultant*

10.4.1
VORTEX DYNAMICS I
Maestro B, Fourth Level **9:00AM–10:35AM**

Chair: S.A. Sherif, *University of Florida*
Chair: Bei Fan, *Michigan State University*

Study of Wake Dynamics and Turbulent Heat Transport in Single Jet and Multiple Jets with Different Jet Spacing Using Dynamic Mode Decomposition

Technical Paper Publication: FEDSM2025-158102

Xidong Hu, *Institute of Science Tokyo,* Ryo Onishi, *Institute of Science Tokyo,* Shaoxiang Qian, *JGC Corporation*

Mid-plane Stereo PIV Measurements on a Thin Circular Disk at Re 1800

Technical Paper Publication: FEDSM2025-158202

Travis Bouck, *California Polytechnic State University, San Luis Obispo,* Nandeesh Hiremath, *California Polytechnic State University, San Luis Obispo*

Grinding Mechanism From Flow Characteristics of a Ball Mill

Technical Paper Publication: FEDSM2025-158124

Masaki Fuchiwaki, *Kyushu Institute of Technology,* Peerawatt Nunthavarawong, *King Mongkut's University of Technology North Bangkok,* Torsak Boonthai, *King Mongkut's University of Technology North Bangkok*

Experimental Investigation of Flow Dynamics of Chamfer on a Wall Mounted Square Cylinder

Technical Paper Publication: FEDSM2025-151952

Usman Latif, *National University of Sciences & Technology,* M. Najam Ul Hassan, *National University of Sciences & Technology,* Mariam Akbar, *National University of Sciences & Technology,* Emad Uddin, *National University of Sciences & Technology,* M. Yamin Younis, *National University of Sciences & Technology*

5.2.1
NOVEL MEASUREMENT TECHNIQUES IN FLUID ENGINEERING I
Aria B, Third Level **9:00AM–10:35AM**

Chair: Yang Liu, *The City College of New York*
Chair: Keldon Anderson, *The University of Tulsa*

Developments in a High-Resolution Computational Model for the Flow Domain of L-Shaped Five-Hole Probes

Technical Paper Publication: FEDSM2025-155268

Thomas Christopher Denver, *Penn State University,* Dahae Jeong, *Penn State University,* Tamara Guimarães, *Penn State University*

Characterization of the Velocity Distribution of the Impinging Sheet

Technical Paper Publication: FEDSM2025-158541

Weixiao Shang, *Purdue University,* Jun Chen, *Purdue University*

Method for Acquiring Forces and Pressure Distributions for Rotating Bluff Body Aerodynamics

Technical Paper Publication: FEDSM2025-158687

Bryan Hasselman, *California Polytechnic State University, San Luis Obispo,* Pyeongkang Kim, *California Polytechnic State University, San Luis Obispo,* Nandeesh Hiremath, *California Polytechnic State University, San Luis Obispo*

Experimental Analysis of Electrohydrodynamic Atomization of Different Fluids

Technical Paper Publication: FEDSM2025-158667

Gustavo Nunes, *Universidade da Beira Interior,* Miguel Moreira, *Universidade da Beira Interior,* Frederico Rodrigues, *Universidade da Beira Interior,* José Páscoa, *Universidade da Beira Interior*

10.2.1
INTERFACIAL PHENOMENA AND FLOWS I
Maestro B, Fourth Level **10:50AM–12:25PM**

Chair: Thomas Shepard, *University of St. Thomas*
Chair: Bei Fan, *Michigan State University*

Acoustofluidic Interfacial Fluid Dynamics

Keynote Presentation: FEDSM2025-170392

James Friend, *University of California San Diego*

Experimental Evaluation of Synthetic Mucus Coatings for Intranasal

Spray Deposition in 3D-Printed Models

Technical Presentation Only: FEDSM2025-158581

Amr Seifelnasr, *University of Massachusetts, Lowell,* **Jinxiang Xi,** *University of Massachusetts Lowell,* **Xiuhua Si,** *California Baptist University*

Numerical Study on the Effects of Injection Parameters on Bubble Formation at a Quasi-Static Condition

Technical Paper Publication: FEDSM2025-158568

Maher Ibrahim, *California State University, Fresno,* **Deify Law,** *California State University, Fresno*

Slippery Liquid-Like Surfaces as a Promising Solution for Sustainable Drag Reduction

Technical Presentation Only: FEDSM2025-170294

Bei Fan, *Michigan State University*

2.2
TURBULENCE MODELS & OTHER EMERGING CFD METHODS
Concerto A, Third Level **10:50AM–12:25PM**

Chair: Daniel Garmann, *Air Force Research Laboratory*
Chair: Shanti Bhushan, *Mississippi State University*
Chair: Javid Bayandor, *The State University of New York*

Wall-Modeled Large-Eddy Simulation of Axial Flow Over a Slender Body of Revolution

Technical Paper Publication: FEDSM2025-157681

Samuel Johnson, *The Pennsylvania State University,* **Tom Chyczewski,** *The Pennsylvania State University,* **Sven Schmitz,** *The Pennsylvania State University,* **Xiang Yang,** *The Pennsylvania State University*

Testing of Quantum Entanglement and Its Potential Applications in CFD Simulations

Technical Presentation Only: FEDSM2025-157942

Kaylee Zhang, *Afred Barbe High School*

Dirichlet Boundary Conditions for a Meshless Solver of the Discrete Boltzmann Equation

Technical Paper Publication: FEDSM2025-158550

Amandine R. Maidenberg, *Embry-Riddle Aeronautical University,* **Leitao Chen,** *Embry-Riddle Aeronautical University*

Evaluation of Subgrid-Scale Models, Near-Wall Treatments, Inlet Conditions, and Grid Configurations for Large Eddy Simulation of a Submerged Impinging Jet

Technical Paper Publication (Iran): FEDSM2025-158374

Zahra Dastyar, *Shahid Chamran University of Ahvaz,* **Qiuchen Wang,** *The University of Tulsa,* **Soroor Karimi,** *The University of Tulsa,* **Siamack A. Shirazi,** *The University of Tulsa*

6.3
CFD FOR SUSTAINABLE INNOVATIONS AND INDUSTRY APPLICATIONS
Aria A, Third Level **10:50AM–12:25PM**

Chair: Jun Zhang, *University of Tulsa*
Chair: Ning Zhang, *McNeese State University*
Chair: Zhongquan Zheng, *Utah State University*

Hydraulic Analysis of Petroleum Flow in 90-Degree Elbows Loss Coefficient Estimation

Technical Paper Publication: FEDSM2025-158597

Manuel Fuentes, *Universidad Metropolitana de Caracas,* **Miguel Suarez,** *Universidad Metropolitana de Caracas,* **Jose Del Valle,** *Universidad Metropolitana de Caracas,* **Simon Vera,** *Universidad Metropolitana de Caracas,* **Miguel Asuaje,** *Universidad Metropolitana de Caracas*

A Comparative Study on the Heat Transfer Performance of Heat Sinks With Radial and Parallel Fins Under Natural Convection

Technical Presentation Only: FEDSM2025-169226

Trailokya Tripathy, *Indian Institute of Technology Kharagpur,* **Sukanta Dash,** *Indian Institute of Technology Kharagpur*

CFD Analysis of Air Flow Distribution in a Shipping Container

Technical Presentation Only: FEDSM2025-169814

Andrijana Stojanovic, *University at Buffalo,* **Francine Battaglia,** *University at Buffalo*

Performance Analysis of Infrared-Suppression Devices in Mixed Convection Regime

Technical Presentation Only: FEDSM2025-170211

Akshay Chetpelly, *IIT Kharagpur,* **Sukanta Dash,** *IIT Kharagpur*

7.3
GAS-LIQUID FLOWS
Maestro A, Fourth Level **10:50AM–12:25PM**

Chair: Cristian Marchioli, *University of Udine*
Chair: Thomas Shepard, *University of St. Thomas*
Chair: Goodarz Ahmadi, *Clarkson University*

Liquid Phase Stabilization in Gravity-Driven Slug Flows: Insights From PIV-PLIF Analysis

Technical Paper Publication: FEDSM2025-157758

Shahriyar Ghazanfari Holagh, *University of Guelph,* **Wael H. Ahmed,** *University of Guelph*

An Experimental and Data-Based Study of Liquid-Gas Flow in Downward Vertical Tubulars

Technical Paper Publication: FEDSM2025-158357

Oluchi Osuagwu, *University of Oklahoma,* **Hamidreza Karami,** *University of Oklahoma*

Impact of Liquid Density on Taylor Bubble Dynamics in Airlift Pump: A Flow Visualization Study

Technical Paper Publication: FEDSM2025-158419

Josh Rosettani, *University of Guelph,* **Wael Ahmed,** *University of Guelph*

Inverse Bubble-Mass Cascade in Coalescence-Dominated Turbulent Flows

Technical Presentation Only: FEDSM2025-170314

Vivek Kumar, *Georgia Institute of Technology,* **Prasoon Suchandra,** *Georgia Institute of Technology,* **Shivam Prajapati,** *Georgia Institute of Technology,* **Ardalan Javadi,** *Georgia Institute of Technology,* **Suhas S. Jain,** *Georgia Institute of Technology,* **Cyrus Aidun,** *Georgia Institute of Technology*

Using XCT to Quantify Air Entrainment at the Gas-Liquid Interface of a Stirred Tank Reactor

Technical Presentation Only: FEDSM2025-169667

Mohammed Y. Al-Subaey, *Iowa State University,* **Alberto Passalacqua,** *Iowa State University,* **Theodore (Ted) J. Heindel,** *Iowa State University*

8.4
TURBOMACHINERY
Concerto B, Third Level **10:50AM–12:25PM**

Chair: Tamara Guimaraes Bucalo, *Penn State University*
Chair: Ravinder Yerram
Chair: Ernesto Primera, *ASME*

Optimization of Stator and Adoption of Bionic Rotor Blade on Noise Level of an Axial Flow Fan

Technical Paper Publication: FEDSM2025-158610

Yonghui Wu, *Xi'an Jiaotong University,* **Lezhi Xia,** *Xi'an Jiaotong University,* **Penghua Guo,** *Xi'an Jiaotong University,* **Jingyin Li,** *Xi'an Jiaotong University*

Study on the Effect of Inhaled Droplets on Internal Energy Loss in the Centrifugal Compressor

Technical Paper Publication: FEDSM2025-158094

Jun Zhang, *Zhejiang University,* **Shiyang Li,** *Hangzhou Zhixin Electromechanical Design Co.,* **Bangxiao Zhu,** *Zhejiang University,* **Peng Wu,** *Zhejiang University,* **Dazhuan Wu,** *Zhejiang University*

Analysis of Oil-Air Two-Phase Flow in Thrust Bearing Spray System of a Large-Scale Hydro-Turbine Unit

Technical Paper Publication: FEDSM2025-158104

Yishu Shi, *Tsinghua University,* **Zhengwei Wang,** *Tsinghua University,* **Yutong Luo,** *Tsinghua University,* **Huanyu Wu,** *Tsinghua University,* **Ningdong Ouyang,** *Dongfang Electric Corporation,* **Kun Jin,** *China Three Gorges Construction Engineering Corporation*

Two-Sided Feed Analysis in Gerotor Pumps to Enhance Filling Performance

Technical Paper Publication: FEDSM2025-155239

Massimo Rundo, *Politecnico di Torino,* **Carmine Conte,** *Politecnico di Torino*

A Forgotten Gem? A Performance Analysis Using CFD

Technical Paper Publication: FEDSM2025-158724

Miguel Suarez, *Universidad Metropolitana de Caracas,* **Juan Tovar,** *Universidad Metropolitana de Caracas,* **Rodrigo Arriaga,** *Universidad Metropolitana de Caracas,* **Pedro Cadenas,** *Universidad Metropolitana de Caracas,* **Miguel Asuaje,** *Universidad Metropolitana de Caracas*

5.2.2
NOVEL MEASUREMENT TECHNIQUES IN FLUID ENGINEERING II
Aria B, Third Level **10:50AM–12:25PM**

Chair: Yang Liu, *The City College of New York*
Chair: Keldon Anderson, *The University of Tulsa*

Dynamic Characteristics Research of the Positive Pressure Reducing Valve Based on AMESim

Technical Paper Publication: FEDSM2025-158118

Zhao-Nian Zhou, *Zhejiang University,* **Zhe-Hui Ma,** *Zhejiang University,* **Zhao-Tong Wang,** *Zhejiang University,* **Wen-Qing Li,** *Zhejiang University,* **Zhi-Jiang Jin,** *Zheijiang University,* **Jin-Yuan Qian,** *Zhejiang University*

Towards Understanding the Dynamics of Liquid Mixing in the Airlift External Loop Bubble Column Reactor

Technical Paper Publication: FEDSM2025-158685

Cora Dickie-Wilson, *University of Guelph,* **Wael Ahmed,** *University of Guelph*

Acoustic Bubble Spectrometer: Noninvasive Real-Time Measurement of Bubbles in Complex Systems

Technical Presentation Only: FEDSM2025-170339

Jingsen Ma, *Dynaflow, Inc.*

1.1
DATA DRIVEN AI AND MACHINE LEARNING FOR FLUIDS
Aria B, Third Level **2:00PM–3:35PM**

Chair: S. Balachandar, *University of Florida*
Chair: Cristian Marchioli, *University of Udine*
Chair: Prashant Khare, *University of Cincinnati*

Physics Informed Operator Learning for Predicting Bubble Dynamics

Technical Paper Publication: FEDSM2025-158123

Yunhao Zhang, *Worcester Polytechnic Institute,* **Lin Cheng,** *University of Maryland,* **Aswin Gnanaskandan,** *Worcester Polytechnic Institute*

A Review of Erosion in Plugged Tees and Elbows

Technical Paper Publication: FEDSM2025-157802

Hafiz Muneeb Ahmad, *The University of Tulsa,* **Jun Zhang,** *The University of Tulsa,* **Siamack Shirazi,** *The University of Tulsa,* **Soroor Karimi,** *The University of Tulsa*

Machine-Learning Aided Calibration and Analysis of Porous Media CFD Models Used for Rotating Packed Beds

Technical Presentation Only: FEDSM2025-157882

Ahmed Alatyar, *Khalifa University,* **Abdallah Sofiane Berrouk,** *Khalifa University*

Enhancing Erosion Rate Prediction Through NPDR-Based Feature Selection and Machine Learning Models

Technical Paper Publication: FEDSM2025-158960

Yijie (Jamie) Li, *The University of Tulsa,* **Jun Zhang,** *The University of Tulsa,* **Brett A. Mckinney,** *The University of Tulsa,* **Soroor Karimi,** *The University of Tulsa,* **Siamack A. Shirazi,** *The University of Tulsa*

3.2
COMPUTATIONAL TURBULENT COMBUSTION
Concerto A, Third Level **2:00PM–3:35PM**

Chair: Chaitanya Ghodke, *Convergent Science Inc.*
Chair: Leitao Chen, *Embry-Riddle Aeronautical University*

Computational Fluid Dynamics Modeling of Turbulent Combustion and Heat Transfer in Cement Rotary Kilns

Technical Paper Publication: FEDSM2025-158133

Rongze Hu, *Purdue University,* **Chengcheng Tao,** *Purdue University*

CFD Modeling of Multiphase Turbulent Oxy-Petroleum Coke Combustion to Enhance Co_2 Capture in Full-Scale Cement Kiln Precalciner

Technical Paper Publication: FEDSM2025-157261

Eugen Dan Cristea, *Università degli Studi di Bergamo,* **Pierangelo Cont,** *Università degli Studi di Bergamo*

Performance Modeling and Scaling of PETSc Based Direct Numerical Simulations for Slab Burner Simulations

Technical Paper Publication: FEDSM2025-158539

Kolos Retfalvi, *University at Buffalo,* **Matthew Knepley,** *University at Buffalo,* **Paul Desjardin,** *University at Buffalo*

7.4.1
FLUID-SOLID FLOWS I
Maestro A, Fourth Level **2:00PM–3:35PM**

Chair: Goodarz Ahmadi, *Clarkson University*
Chair: Cristian Marchioli, *University of Udine*

Length Scales, Energy Transfer and Energy Decay in Turbulent Gas-Particle Flows: From Theory to Application

Keynote Presentation: FEDSM2025-171481

Simon Schneiderbauer, *Johannes Kepler University*

Electrostatic and Flow-Induced Detachment Mechanisms of Corona Ion-Charged Bumpy Particles in Turbulent Airflows

Technical Paper Publication: FEDSM2025-156624

Abbas Khanmohammadi, *Clarkson University,* **Goodarz Ahmadi,** *Clarkson University*

Microfiber Transport and Deposition Simulation Using Traditional and Single-Step and Simplified Lattice Boltzmann Method

Technical Paper Publication: FEDSM2025-157990

Lin Tian, *RMIT University,* **Arturo Delgado-Gutiérrez,** *RMIT University,* **Pier Marzocca,** *RMIT University,* **Goodarz Ahmadi,** *Clarkson University*

8.5
FLUID STRUCTURE INTERACTION
Concerto B, Third Level **2:00PM–3:35PM**

Chair: Deify Law, *California State University, Fresno*
Chair: Caleb Barnes, *Air Force Research Laboratory*
Chair: Yuqing Liu, *Bechtel Oil, Gas, and Chemical*

Propagation Mechanism of Vibration in Mountains With Penstocks Induced by Water Hammer Waves

Technical Paper Publication: FEDSM2025-158000

Yuhao Yan, *Tsinghua University,* **Zhengwei Wang,** *Tsinghua University,* **Huanyu Wu,** *Tsinghua University,* **Yutong Luo,** *Tsinghua University*

Hydraulic Characteristics and Flow-Induced Responses of Pump-Turbine Preloading Spiral Case During Load-Rejection Under Different Vane Closing Law

Technical Paper Publication: FEDSM2025-158108

Yutong Luo, *Tsinghua University,* **Zhengwei Wang,** *Tsinghua University,* **Yishu Shi,** *Tsinghua University,* **Yuhao Yan,** *Tsinghua University*

Risk Management Strategy to Minimize Damages of Water Supply System Caused by Large Scale Natural Disasters

Technical Presentation Only: FEDSM2025-170239

Yoshiaki Ohkami, *Keio University*

4.1.2
INTERACTIONS IN BIO-INSPIRED PROPULSION
Aria A, Third Level **2:00PM–3:35PM**

Chair: Haibo Dong, *University of Virginia*
Chair: Javid Bayandor, *The State University of New York*
Chair: D. Keith Walters, *University of Arkansas*

Hydrodynamic Interactions Between Schooling Fish in a Three-Dimensional Non-Planar Cluster

Technical Paper Publication: FEDSM2025-158490

Jiacheng Guo, *University of Virginia,* **Haibo Dong,** *University of Virginia*

Effects of Wing Flexibility on the Aerodynamic Performance and Mechanosensory Function in Flapping Flight

Technical Paper Publication: FEDSM2025-158345

Yiding Feng, *Case Western Reserve University,* **Naeem Haider,** *Case Western Reserve University,* **Chengyu Li,** *Case Western Reserve University*

Fin-Fin Interactions and the Impact on Performance of an Underwater Tuna-Like Robot

Technical Paper Publication: : FEDSM2025-158560

Genevieve Forrer, *University of Virginia,* **John Kelly,** *University of Virginia,* **Alec Menzer,** *University of Virginia,* **Joseph Zhu,** *University of Virginia,* **Hilary Bart-Smith,** *University of Virginia,* **Haibo Dong,** *University of Virginia*

Investigation of *Citrobacter freundii* CF 8090 Biofilm Grown on Patterned Two-Dimensional Graphene, and Hexagonal Boron Nitride (HBN)

Technical Paper Publication: FEDSM2025-158601

Niaz Morshed Faysa, *South Dakota School of Mines and Technology,* **Venkataramana Gadhamshetty,** *South Dakota School of Mines and Technology,* **Joseph John Thalakkottor,** *South Dakota School of Mines and Technology*

Data-Driven Optimization of Fish Schooling Formations for Enhanced Propulsive Efficiency

Technical Paper Publication: FEDSM2025-158575

Zhanqin Huang, *University of Virginia,* **Alec Menzer,** *University of Virginia,* **Jiacheng Guo,** *University of Virginia,* **John Kelly,** *University of Virginia,* **Haibo Dong,** *University of Virginia*

10.2.2
INTERFACIAL PHENOMENA AND FLOWS II
Maestro B, Fourth Level **2:00PM–3:35PM**

Chair: Thomas Shepard, *University of St. Thomas*
Chair: Bei Fan, *Michigan State University*

Film Climbing in Impulsively-Driven Capillary Flows

Technical Presentation Only: FEDSM2025-158194

Pooria Pirdavari, *Baylor University,* **Huy Tran,** *Baylor University,* **Ziwen He,** *Baylor University,* **Min Pack,** *Baylor University*

Study of the Droplets Collision Process and the Influence on Velocity and Pressure Fields

Technical Paper Publication: FEDSM2025-158229

Shuxia Yuan, *Xi'an Shiyou University,* **Zihan Yang,** *Xi'an Shiyou University,* **Song Wu,** *Xi'an Shiyou University,* **Lin Gao,** *Xi'an Shiyou University,* **Jingming Li,** *Xi'an Shiyou University,* **Junhao Liu,** *Xi'an Shiyou University,* **Xiangpu Zhao,** *Xi'an Shiyou University*

Experimental and Numerical Studies of Mask Misfit on Thermoregulation and Moisture Retention With Facemask Wearing

Technical Presentation Only: FEDSM2025-158593

Kian Barari, *University of Massachusetts Lowell,* **Rozhin Hajian,** *University of Massachussetts Lowell,* **Xiuhua Si,** *California Baptist University,* **Jinxiang Xi,** *UMass Lowell*

Sweeping by Sessile Drop Coalescence

Technical Presentation Only: FEDSM2025-170179

Alireza Dalili, *Farmingdale State College at State University of New York*

1.2
MACHINE LEARNING, REDUCED ORDER MODELING IN CFD AND DESIGN OPTIMIZATION
Aria B, Third Level **3:50PM–5:25PM**

Chair: Shanti Bhushan, *Mississippi State University*
Chair: Leitao Chen, *Embry-Riddle Aeronautical University*
Chair: Javid Bayandor, *The State University of New York*

Evaluating Machine Learning-Enhanced Sub-Grid Scale Stress Models With Invariance Embedding for Meso-Scale Hurricane Boundary Layer Flows

Technical Paper Publication: FEDSM2025-155524

Md Badrul Hasan, *University of Maryland, Baltimore County,* **Meilin Yu,** *University of Maryland, Baltimore County,* **Tim Oates,** *University of Maryland, Baltimore County*

Hybrid Autoencoder/Galerkin Approach for Nonlinear Reduced Order Modelling

Technical Paper Publication: FEDSM2025-158656

Nicolas Lepage, *M2N-CNAM,* **Samir Beneddine,** *DAAA ONERA,* **Camilla Fiorini,** *M2N-CNAM,* **Iraj Mortazavi,** *M2N-CNAM,* **Denis Sipp,** *DAA ONERA,* **Nicolas Thome,** *ISIR Sorbonne University*

Discovery of Reduced Order Models Using Complexity-Penalized Sparse Regression

Technical Paper Publication: FEDSM2025-157903

Sarah Beetham, *Oakland University*

An AI-Powered Seal-Whisker-Inspired Hydrodynamic Sensing System

Technical Presentation Only: FEDSM2025-158198

Luke Ingraham, *Rochester Institute of Technology,* **Winston Jiang,** *Rochester Institute of Technology,* **Qian Xue,** *Rochester Institute of Technology,* **Dingrong Wang,** *Rochester Institute of Technology,* **Qi Yu,** *Rochester Institute of Technology,* **Xudong Zheng,** *Rochester Institute of Technology*

CFD-Based Optimization of Autonomous Underwater Vehicles Using Neural Networks

Technical Presentation Only: FEDSM2025-169365

Albara Salem, *Istanbul Technical University*

3.3
OPEN SOURCE CFD
Concerto A, Third Level **3:50PM–5:25PM**

Chair: Shanti Bhushan, *Mississippi State University*
Chair: Chengyu Li, *Case Western Reserve University*

Simulating the Steady Hemolymph Flow and Transient Perfusion in the Forewing Vein Network of Drosophila Using Openfoam

Technical Paper Publication: FEDSM2025-158086

Jacob White, *University of Nebraska Omaha,* **Mahboub Baccouch,** *University of Nebraska Omaha,* **Sangjin Ryu,** *University of Nebraska Lincoln*

IMEXLBM: Portable Single-Phase Lattice Boltzmann Solver Based on Kokkos Library

Technical Paper Publication: FEDSM2025-158589

Chunheng Zhao, *The City College of New York,* **Saumil Patel,** *Argonne National Laboratory,* **Ramesh Balakrishnan,** *Argonne National Laboratory,* **Taehun Lee,** *The City College of New York*

CFD Study of the Effect on Mixing Effectiveness of an Annular Premix Burner Nozzle When Varying Burner Geometric Parameters

Technical Paper Publication: FEDSM2025-158707

Joseph Foster, *Mississippi State University,* **Shanti Bhushan,** *Mississippi State University*

Computational Fluid Dynamics Investigations of Slurry Flow Behavior and Replenishment Patterns During Chemical Mechanical Planarization

Technical Paper Publication: FEDSM2025-158016

Atefeh Sadri Mofakham, *Clarkson University,* **Jihoon Seo,** *Clarkson University,* **Goodarz Ahmadi,** *Clarkson University*

A Study on Aerodynamic Analysis of a Photovoltaic Electric Vehicle With a Pair of Built-in Diffusers During Motion

Technical Presentation Only: FEDSM2025-168065

Yeongyun Ay, *University of Michigan,* **Meng-Hsuan Cheng,** *National Kaohsiung University of Science and Technology,* **Herchang Ay,** *National Kaohsiung University of Science and Technology*

10.2.3
INTERFACIAL PHENOMENA AND FLOWS III
Maestro B, Fourth Level **3:50PM–5:25PM**

Chair: Thomas Shepard, *University of St. Thomas*
Chair: Bei Fan, *Michigan State University*

Falling Water Droplet on Water Surface for Coalescence Cascade

Technical Paper Publication: FEDSM2025-158078

Jong Lee, *Kongju National University*

Experimental Analysis and Machine Learning Modeling of Maximum Droplet Spreading

Technical Paper Publication: FEDSM2025-158132

Shaybal Das Gupta, *Southern Illinois University Edwardsville,* **Jeff Darabi,** *Southern Illinois University Edwardsville*

Minute Density Differences Cause Particle-Laden Droplets to Splash

Technical Paper Publication: FEDSM2025-158209

Marufa Upoma, *Baylor University,* **Min Pack,** *Baylor University*

A Numerical Investigation on the Effect of Contact-Line Mobility on Sessile Drop Oscillation Dynamics

Technical Paper Publication: FEDSM2025-158049

Sadegh Ahmadi, *University of South Carolina,* **Yash Kulkarni,** *Institut Jean Le Rond d'Alembert, Sorbonne Universite and CNRS, UMR 7190,* **Stephane Zaleski,** *Institut Jean Le Rond d'Alembert, Sorbonne Universite and CNRS, UMR 7190,* **Yue Ling,** *University of South Carolina*

4.1.3
BIO-INSPIRED PROPULSION AND BIOMEDICAL APPLICATIONS OF MICRO- AND NANO-FLUIDICS
Aria A, Third Level **3:50PM–5:25PM**

Chair: Yuanhang Zhu
Chair: Chengyu Li, *Case Western Reserve University*
Chair: D. Keith Walters, *University of Arkansas*

Drag Reduction Mechanisms in Collective Swimming Revealed by a Robotic Fish Swimming With a Live School

Technical Presentation Only: FEDSM2025-158570

Yu Pan, *Harvard University,* **Geroge Lauder,** *Harvard University*

Hydrodynamic Impacts of Body Shape on Propulsion Efficiency in Underwater Robot Design

Technical Paper Publication: FEDSM2025-158661

John Kelly, *University of Virginia,* **Zhanqin Huang,** *University of Virginia,* **Haibo Dong,** *University of Virginia*

Computational Study on Analysis of Dominant Motion in a Hydrofoil Subjected to Combined Motion of Surface-Undulation and Pitching

Technical Presentation Only: FEDSM2025-170190

Sarvesh Shukla, *Georgia Institute of Technology,* **Atul Sharma,** *Indian Institute of Technology Bombay,* **Amit Agrawal,** *Indian Institute of Technology Bombay,* **Rajneesh Bhardwaj,** *Indian Institute of Technology Bombay*

Modeling Surface Patterning to Evaluate Effects on Sensitivity of Mini Pressure Sensors for Cardiovascular Applications

Technical Paper Publication: FEDSM2025-158479

Irina Silvesan, *National University of Science and Technology Politehnica Bucharest,* **Ioana Voiculescu,** *The City College of New York,* **Alexandrina Untaroiu,** *Virginia Tech*

8.6
PLASMA FLOWS
Concerto B, Third Level **3:50PM–5:25PM**

Chair: Leitao Chen, *Embry-Riddle Aeronautical University*
Chair: Yang Liu, *The City College of New York*
Chair: Jorge Arturo Ahumada Lazo, *The City College of New York*

A Lattice Boltzmann Model for Pulsed Low-Temperature Plasma

Technical Presentation Only: FEDSM2025-155056

Leitao Chen, *Embry-Riddle Aeronautical University,* **Mubarak Mujawar,** *Embry-Riddle Aeronautical University*

Thermal Effects and Dynamic Response of Droplet Impact on a Sliding Dielectric Barrier Discharge Plasma Actuator

Technical Paper Publication: FEDSM2025-158533

Jorge Ahumada Lazo, *The City College of New York,* **Petr Lelikov,** *The City College of New York,* **Md Sohaib Bin Sarwar,** *The City College of New York,* **Sandeep Kumar,** *The City College of New York,* **Yang Liu,** *The City College of New York*

Dynamics of a Supercooled Water Droplet During In-Flight Interactions With a Dielectric Barrier Discharge Plasma

Technical Paper Publication: FEDSM2025-158561

Jorge Ahumada Lazo, *The City College of New York,* **Petr Lelikov,** *The City College of New York,* **Md Sohaib Bin Sarwar,** *The City College of New York,* **Sandeep Kumar,** *The City College of New York,* **Yang Liu,** *The City College of New York*

Dynamics of Supercooled Water Droplet Upon Impacting on Surface Dielectric Barrier Discharge Plasma

Technical Paper Publication: FEDSM2025-158646

Md Sohaib Bin Sarwar, *The City College of New York,* **Jorge Ahumada Lazo,** *The City College of New York,* **Yang Liu,** *The City College of New York*

Electrospray Optimization Using Dielectric Barrier Discharge Plasma Actuators Through a Conical Nozzle

Technical Paper Publication: FEDSM2025-158537

Miguel Moreira, *Universidade da Beira Interior,* **Gustavo Nunes,** *Universidade da Beira Interior,* **Frederico Rodrigues,** *Universidade da Beira Interior,* **José Páscoa,** *Universidade da Beira Interior*

7.4.2
FLUID-SOLID FLOWS II
Maestro A, Fourth Level **3:50PM–5:25PM**

Chair: Cristian Marchioli, *University of Udine*
Chair: Goodarz Ahmadi, *Clarkson University*

Influence of Thermal Plume on Cough-Generated Droplet Aspiration and Deposition in the Airway Under Unsteady Breathing

Technical Paper Publication (Iran): FEDSM2025-158072

Mehrdad Azhdari, *Islamic Azad University,* **Mohammad Mehdi Tavakol,** *Islamic Azad University,* **Goodarz Ahmadi,** *Clarkson University*

Slender Heavy Fibers in Turbulent Channel Flow

Technical Presentation Only: FEDSM2025-156164

Darish Jeswin Dhas, *University of Udine,* **Cristian Marchioli,** *University of Udine*

Numerical Analysis of Respiratory Droplet Dispersion in Ventilated Spaces: Impacts of Ventilation Rates and Physical Barriers on Airborne Transmission

Technical Paper Publication: FEDSM2025-157875

Amirmasoud Anvari, *Clarkson University,* **Goodarz Ahmadi,** *Clarkson University*

Study of Hydrosol Dynamics and Deposition in Turbulent Channel Flow

Technical Presentation Only: FEDSM2025-158430

Sanaz Abbasi, *University of Missouri-Kansas City,* **Amirfarhang Mehdizadeh,** *University of Missouri-Kansas City*

The Morphology and Impact Forces of a Droplet Impacting on a Droplet-Carrying Solid Surface

Technical Paper Publication: FEDSM2025-158554

Qian Lv, *Xi'an Jiaotong University,* **Jingyin Li,** *Xi'an Jiaotong University,* **Pengbo Tang,** *Xi'an Jiaotong University,* **Penghua Guo,** *Xi'an Jiaotong University*

WEDNESDAY, JULY 30, 2025

PLENARY KEYNOTE
JASON RABINOVITCH
Symphony Ballroom, Third Level **8:00AM–8:55AM**

High-Speed Compressible Flows and Space Exploration

Keynote Presentation: FEDSM2025-171482

Jason Rabinovitch, *Stevens Institute of Technology*

9.1
THEORY AND APPLICATION FOR MICRO- NANO-FLUIDICS
Aria A, Third Level **9:00AM–10:35AM**

Chair: Mohammad Mehdi Salek, *Massachusetts Institute of Technology*
Chair: Mohammed Jalal Ahamed, *University of Windsor*
Chair: Sangjin Ryu, *University of Nebraska-Lincoln*

Characterizing 3D Printed Microfluidic Device Utilizing EIS and Micro-PIV System

Technical Presentation Only: FEDSM2025-158954

Nazmul Islam, *University of Texas Rio Grande Valley*

From Molecules to Turbulence: A Multiscale Study of Hydrodynamic Slip in Shear-Driven Flow

Technical Presentation Only: FEDSM2025-170269

Abdul Aziz Shuvo, *The Pennsylvania State University,* **Xiang Yang,** *The Pennsylvania State University,* **Bladimir Ramos-Alvarado,** *The Pennsylvania State University*

Hybrid Polydimethylsiloxane (PDMS) Made From Sylgard 184 Elastomer Base and Sylgard 186 Elastomer Curing Agent

Technical Paper Publication: FEDSM2025-158390

Carson Emeigh, *University of Nebraska-Lincoln,* **Drew Froistad,** *University of Nebraska-Lincoln,* **Terrol Wilson,** *University of Nebraska-Lincoln,* **Udochukwu Anuta,** *University of Nebraska-Lincoln,* **Sangjin Ryu,** *University of Nebraska-Lincoln*

Design and Fabrication of a Lamp-Based Microfluidic Diagnostic Device Using a 3D Printed Mold

Technical Paper Publication: FEDSM2025-158237

Prabin Sherpaili, *University of Nebraska-Lincoln,* **Emily Ciesielski,** *University of Nebraska-Lincoln,* **Ahmed T. Ghonim,** *Alexandria University,* **Carson Emeigh,** *University of Nebraska-Lincoln,* **Samodha Fernando,** *University of Nebraska-Lincoln,* **Takayuki Shibata,** *Toyohashi University of Technology,* **Sangjin Ryu,** *University of Nebraska-Lincoln*

Ultra-Thin PDMS Membrane for Highly Efficient Cluster Cell to Single Cell Micropatterning and Intracellular Delivery

Technical Presentation Only: FEDSM2025-158469

Tuhin Subhra Santra, *Indian Institute of Technology,* **Donia Dominic,** *Indian Institute of Technology,* **Moeto Nagai,** *Toyohashi University of Technology*

11.1.1
ADVANCES IN FLUIDS ENGINEERING EDUCATION I
Aria B, Third Level **9:00AM–10:35AM**

Chair: Ivana Milanovic, *University of Hartford*
Chair: Ray Taghavi, *University of Kansas*
Chair: Isaac Perez-Raya, *Rochester Institute of Technology*

The Complex Structure of the Flow Around a Sphere: A Numerical & Experimental Investigation

Technical Paper Publication: FEDSM2025-158066

Philipp Epple, *Coburg University of Applied Sciences,* **Manuel Fritsche,** *Coburg University of Applied Sciences,* **Maximilian Hornung,** *Coburg University of Applied Sciences,* **Ivana Milanovic,** *University of Hartford*

Multidisciplinary Course Driving Student Autonomous Research

Technical Paper Publication: FEDSM2025-157980

Ivana Milanovic, *University of Hartford,* **Tom A. Eppes,** *University of Hartford,* **Jagbir Singh Shergill,** *University of Hartford*

The Fluids Mechanics of Art: A Student-Centered Laboratory to Bring Fluid Instabilities to Life

Technical Paper Publication: FEDSM2025-157876

Sarah Beetham, *Oakland University*

A Laboratory-Scaled Watercraft for Interdisciplinary Engineering Education: Design, Testing, and Applications

Technical Paper Publication: FEDSM2025-158122

Anh Dinh, *Fulbright University Vietnam,* **Uyen Le,** *Fulbright University Vietnam,* **Hoa Truong,** *Fulbright University Vietnam,* **Minh Doan,** *Fulbright University Vietnam*

3.4
CFD FOR NUCLEAR THERMAL HYDRAULICS
Concerto A, Third Level **9:00AM–10:35AM**

Chair: Victor Coppo Leite, *Idaho National Laboratory*
Chair: Elia Merzari, *Pennsylvania State University*

High-Fidelity Simulation of Buoyancy-Driven Flows and Conjugate Heat Transfer in Fusion Reactor Systems Using the Spectral Element Method

Technical Paper Publication: FEDSM2025-156138

Logan Hiland, *Pennsylvania State University,* **Tri Nguyen,** *Pennsylvania State University,* **Carolina Bourdot Dutra,** *Pennsylvania State University,* **Elia Merzari,** *Pennsylvania State University,* **Dominykas Buta,** *University of Leeds,* **Aleksandr Dubas,** *The Culham Centre for Fusion Energy,* **Andrew Davis,** *UK Atomic Energy Authority,* **Yu-Hsiang Lan,** *University of Illinois Urbana-Champaign,* **Misun Min,** *Argonne National Laboratory,* **Paul Fischer,** *Argonne National Laboratory*

Multiscale Overlapping Domain Coupling for Thermal Hydraulics Simulations Within the Bluecrab Code Suite

Technical Paper Publication: FEDSM2025-157123

Victor Coppo Leite, *Idaho National Laboratory,* **David Reger,** *Idaho National Laboratory,* **Mauricio Tano Retamales,** *Idaho National Laboratory,* **Mahmoud Yaseen,** *Idaho National Laboratory,* **Elia Merzari,** *The Pennsylvania State University,* **Sebastian Schunert,** *Idaho National Laboratory*

Large Eddy Simulation of Tall-3D Facility Using Spectral Element Method

Technical Paper Publication: FEDSM2025-158076

Tri Nguyen, *Pennsylvania State University,* **Elia Merzari,** *Pennsylvania State University,* **Yu-Hsiang Lan,** *University of Illinois Urbana-Champaign*

Numerical Investigation of a Control Valve for High-Temperature Gas-Cooled Reactors With Large Pressure Drop

Technical Presentation Only: FEDSM2025-170186

Shunyang Li, *Tsinghua University,* **Li Wan,** *Tsinghua University*

7.5.1
EROSION, SLURRY FLOW, AND SEDIMENTATION I
Maestro A, Fourth Level **9:00AM–10:35AM**

Chair: Soroor Karimi, *The University of Tulsa*
Chair: Siamack Shirazi, *The University of Tulsa*
Chair: Judith Bamberger, *Pacific Northwest National Laboratory*

A Mechanism-Based Machine Learning Model for Sand Transport in Gas and Liquid Systems

Technical Paper Publication: FEDSM2025-155826

Qiuchen Wang, *The University of Tulsa,* **Siamack Shirazi,** *The University of Tulsa,* **Soroor Karimi,** *The University of Tulsa*

Experimental Investigations of Sedimentation at a 90° Ascending Inverted Siphon Branch

Technical Paper Publication: FEDSM2025-158515

Tim Nitzsche, *Technische Universität Berlin,* **Paul Uwe Thamsen,** *Technische Universität Berlin*

Effects of Ratio of Material to Erodent Hardnesses on Erosion

Technical Paper Publication: FEDSM2025-158075

Peyman Baghernejad, *The University of Tulsa,* **Siamack A. Shirazi,** *The University of Tulsa,* **Soroor Karimi,** *The University of Tulsa,* **Lawrence Berg,** *RJM-International*

Erosive Wear Modeling for Particle-Based Concentrated Solar Power Systems Using the Discrete Element Method

Technical Paper Publication: FEDSM2025-157959

Anders Johnson, *Western Washington University,* **Soroor Karimi,** *The University of Tulsa,* **Nipun Goel,** *Western Washington University*

7.7.1
NUMERICAL METHODS FOR MULTIPHASE FLOWS I
Concerto B, Third Level **9:00AM–10:35AM**

Chair: Michael Kinzel, *Embry-Riddle Aeronautical University*
Chair: Douglas Fontes
Chair: Leitao Chen, *Embry-Riddle Aeronautical University*

A Hardware Accelerated Euler-Lagrange Algorithm for Simulating Acoustic Cavitation of Microbubbles

Technical Paper Publication: FEDSM2025-157813

Diego Vaca Revelo, *Worcester Polytechnic Institute,* **Aswin Gnanaskandan,** *Worcester Polytechnic Institute*

A Coupled Finite Volume/Material Point Method for Compressible Gas-Liquid Two-Phase Flows for Application to Atomization

Technical Paper Publication: FEDSM2025-158484

Paul DesJardin, *University at Buffalo, the State University of New York,* **Elektra Katz-Ismael,** *University at Buffalo, the State University of New York,* **Kenny Budzinski,** *University at Buffalo, the State University of New York,* **Kolos Retfalvi,** *University at Buffalo, the State University of New York*

Numerical Modelling of Cryogenic Chilldown of Transfer Lines Using Liquid Hydrogen in Simulink

Technical Paper Publication: FEDSM2025-158030

Vinay Sharma, *University of Oxford,* **John Coull,** *University of Oxford,* **Peter Ireland,** *University of Oxford*

Modeling of Bubble Merging With Localized Adaptive Mesh Refinement in Customized Ansys-Fluent

Technical Paper Publication: FEDSM2025-158691

Winston James, *Rochester Institute of Technology,* **Isaac Perez-Raya,** *Rochester Institute of Technology*

10.4.2
VORTEX DYNAMICS II
Maestro B, Fourth Level **9:00AM–10:35AM**

Chair: S.A. Sherif, *University of Florida*
Chair: Bei Fan, *Michigan State University*

Dynamic Response and Force Analysis of a Vortex Induced Cylinder Vibration: Insights Into Boundary Layer Pressure Distribution, Flow Structures, and Phase Dynamics

Technical Paper Publication: FEDSM2025-155094

Andrei Fershalov, *The City College of New York,* **Niell Elvin,** *The City College of New York,* **Ilya Avros,** *The City College of New York,* **Pieter Orlandini,** *The City College of New York,* **Yang Liu,** *The City College of New York*

Spectral Proper Orthogonal Decomposition Flow Analysis of Gust Mitigation With the Morphing Airfoil Technology at Low Reynolds Number

Technical Paper Publication: FEDSM2025-157976

Cindy Zozimo Aranda De Almeida, *University of Maryland Baltimore County,* **David Booth,** *DEVCOM Army Research Lab,* **John Hrynuk,** *DEVCOM Army Research Lab,* **Meilin Yu,** *University of Maryland Baltimore County*

Comparison of Delta Wing Vortices in the Near-Wake: Flow Regimes and Methods

Technical Paper Publication: FEDSM2025-158048

Jagbir Singh Shergill, *University of Hartford,* **Ivana Milanovic,** *University of Hartford*

Spatiotemporal Dynamics of Separated Flows Around Elongated Rectangular Prism With Different Leading-Edge Separation Angles

Technical Paper Publication: FEDSM2025-158146

Bronwyn Rempel, *University of Manitoba,* **Fati B. Abdul-Salam,** *University of Manitoba,* **Scott J. Ormiston,** *University of Manitoba,* **Mark F. Tachie,** *University of Manitoba*

3.5.1
COUPLED MULTIPHYSICS SIMULATION I
Concerto A, Third Level **10:50AM–12:25PM**

Chair: Haoxiang Luo, *Vanderbilt University*
Chair: China Rama Lakshman Anumolu, *Convergent Science Inc.*
Chair: Shanti Bhushan, *Mississippi State University*

Performance Enhancement of Latent Heat Thermal Energy Storage System by Integrating Nature Inspired Fins, Metal Foam and Nanoparticles in the Melting/Charging Process of Phase Change Material

Technical Paper Publication: FEDSM2025-157456

Prashant Saini, *National Renewable Energy Laboratory,* **Julian Osorio,** *National Renewable Energy Laboratory,* **Munjal P. Shah,** *National Renewable Energy Laboratory,* **Umang Patel,** *National Renewable Energy Laboratory*

Enhanced Multiphysics Framework for ECM: Computational Modeling and Experimental Validation for Large Grid Deformations

Technical Paper Publication: FEDSM2025-157987

Bashir Alnajar, *Corrdesa LLC,* **Julio Mendez,** *Corrdesa LLC,* **Siva Palani,** *Corrdesa LLC,* **Christopher Humiston,** *U.S. Army, Combat Capabilities Development Command Armaments Center,* **Elaine Humiston,** *U.S. Army, Combat Capabilities Development Command Armaments Center FDCC-ACW-BA,* **Alan Rose,** *Corrdesa LLC*

Coupled Multiphysics Simulation for Root Cause Analysis of Process Flow Vibrations in Piping Systems

Technical Paper Publication: FEDSM2025-158525

Paul Bosauder, *Sequence Engineering Ltd.,* **Ernesto Primera,** *University of Tennessee,* **Alvaro Rodriguez-Prieto,** *SGS TECNOS and UNED University*

Structural Optimization for the Action Rapidness of the Piezoelectric

Technical Paper Publication: FEDSM2025-158117

Ling-Feng Hang, *Zhejiang University,* **An-Qi Guan,** *Zhejiang University,* **Zhen-Hao Lin,** *Hangzhou Valvever Intelligent Technology Co., Ltd.,* **Zhi-Jiang Jin,** *Zhejiang University,* **Jin-Yuan Qian,** *Zhejiang University*

9.2
DROPLET MICROFLUIDIC
Aria A, Third Level **10:50AM–12:25PM**

Chair: Mohammad Mehdi Salek, *Massachusetts Institute of Technology*
Chair: Mohammed Jalal Ahamed, *University of Windsor*
Chair: Sangjin Ryu, *University of Nebraska-Lincoln*

Synthesis of Magnetic Fluid Encapsulated Microcapsules Using Needle-Based Droplet Microfluidics

Technical Paper Publication: FEDSM2025-158600

Yong Ren, *University of Nottingham Ningbo China,* **Jing Wang,** *University of Nottingham Ningbo Chian*

Machine Learning Based Autonomous Optimization System for Droplet Generation

Technical Presentation Only: FEDSM2025-158368

Seongsu Cho, *Sungkyunkwan University,* **Seonghun Shin,** *Sungkyunkwan University,* **Haengyeong Kim,** *Sungkyunkwan University,* **Minki Lee,** *Chosun University,* **Jinkee Lee,** *Sungkyunkwan University*

Artificial Intelligence-Driven Microfluidic Droplet Library Generation System

FEDSM2022-158417
Technical Presentation Only: FEDSM2025-158417

Seonghun Shin, *Sungkyunkwan University,* **Owen Land,** *University of Pennsylvania,* **Warren Seider,** *University of Pennsylvania,* **Daeyeon Lee,** *University of Pennsylvania,* **Jinkee Lee,** *Sungkyunkwan University*

Design, Assembly, and Application of a Sea Spray Aerosol Microfluidic Droplet Generator for Experimental Atmospheric Simulations

Technical Presentation Only: FEDSM2025-158725

Augustine Debrah, *Georgia Institute of Technology,* **Amanda Stockton,** *Georgia Institute of Technology,* **Tyler Robinson,** *University of Arizona*

7.5.2
EROSION, SLURRY FLOW AND SEDIMENTATION II
Maestro A, Fourth Level **10:50AM–12:25PM**

Chair: Siamack Shirazi, *The University of Tulsa*
Chair: Judith Bamberger, *Pacific Northwest National Laboratory*
Chair: Soroor Karimi, *The University of Tulsa*

Experimental and CFD Study of Multiphase Flow Effects in Erosion of Elbows Under Slug/Churn Flow

Technical Paper Publication: FEDSM2025-158141

Farshad Biglari, *University of Tulsa,* **Mazen Othayq,** *Jazan University,* **Saeid Pour Nemat,** *University of Tulsa,* **Haijing Gao,** *Chevron,* **Simona Duplat,** *Chevron,* **Soroor Karimi,** *University of Tulsa,* **Siamack Shirazi,** *University of Tulsa*

Erosion Dependency of Various Types of Non-Metallic Materials on Impact Velocity

Technical Paper Publication: FEDSM2025-158680

Mohammadreza Karami, *University of Tulsa,* **Qiuchen Wang,** *University of Tulsa,* **Siamack A. Shirazi,** *University of Tulsa,* **Soroor Karimi,** *University of Tulsa*

An Experimental and CFD Investigation Into the Effect of Solid Particle Size on Erosion in an Annular Flow

Technical Paper Publication: FEDSM2025-158717

Mubashir Hasan, *University of Tulsa,* **Thiana Sedrez,** *University of Tulsa,* **Farzin Darihaki,** *University of Tulsa,* **Siamack Shirazi,** *University of Tulsa,* **Soroor Karimi,** *University of Tulsa*

CFD and Experimental Analysis of the Effect of Solid Particle Size on Erosion Rate in Elbows in Series Under Liquid-Dominated Multiphase Flow

Technical Paper Publication: FEDSM2025-158718

Saeid Pour Nemat, *The University of Tulsa,* **Farshad Biglari,** *The University of Tulsa,* **Farzin Darihaki,** *The University of Tulsa,* **Soroor Karimi,** *The University of Tulsa,* **Siamack A. Shirazi,** *The University of Tulsa*

Investigating the Effect of Different Impact Angles on Liquid Droplet Erosion of Metallic and Non-Metallic Materials

Technical Paper Publication: FEDSM2025-158720

Noushin Azimy, *University of Tulsa,* **Keldon Anderson,** *University of Tulsa,* **Soroor Karimi,** *University of Tulsa*

11.1.2
ADVANCES IN FLUIDS ENGINEERING EDUCATION II
Aria B, Third Level **10:50AM–12:25PM**

Chair: Ivana Milanovic, *University of Hartford*
Chair: Ray Taghavi, *University of Kansas*
Chair: Isaac Perez-Raya, *Rochester Institute of Technology*

Year 1 of the US-Japan NSF ITRS Program for Developing Portable Point-of-Care Testing Devices

Technical Presentation Only: FEDSM2025-158389

Sangjin Ryu, *University of Nebraska-Lincoln*

Bridging Academia and Industry: Translating Research Into Real-World Innovation

Technical Presentation Only: FEDSM2025-158493

Ning Zhang, *McNeese State University*

AI in Engineering Education and the New Reality for Academic Honesty and Grading

Technical Presentation Only: FEDSM2025-158741

Ivaylo Nedyalkov, *University of New Hampshire*

Virtual Laboratories Developed for the Aerospace Engineering Program

Technical Presentation Only: FEDSM2025-158703

Lu Zhao, *University of Kansas,* **Ray Taghavi,** *University of Kansas*

10.4.3
VORTEX DYNAMICS III
Maestro B, Fourth Level **10:50AM–12:25PM**

Chair: S.A. Sherif, *University of Florida*
Chair: Bei Fan, *Michigan State University*

Impact of Vortex Generators on Shear Layer and Separation Bubble Dynamics Under Unsteady Inflow

Technical Paper Publication: FEDSM2025-158567

Santosh Paudyal, *The University of Akron,* **Saikishan Suryanarayanan,** *The University of Akron,* **Nicholas Garafolo,** *The University of Akron*

Experimental Study of Turbulence Transition Thresholds in Physiologically Relevant Helical Flows

Technical Paper Publication: FEDSM2025-158696

Sifat Karim Chowdhury, *North Dakota State University,* **Yan Zhang,** *North Dakota State University*

Investigating the Integro-Differential Scheme Computational Capability to Predict Vortex Dominated Flow Fields

Technical Paper Publication: FEDSM2025-158711

Frederick Ferguson, *North Carolina A&T State University,* **Xinru Niu,** *North Carolina A&T State University,* **Yang Gao,** *North Carolina A&T State University,* **Dehua Feng,** *North Carolina A&T State University*

Using Schlieren Imaging and Flow Feature Analysis to Classify Alphabetic Speech Sounds

Technical Presentation Only: FEDSM2025-158722

Mohamed Talaat, *University of Massachusetts, Lowell,* **Rozhin Hajian,** *University of Massachusetts, Lowell,* **Xiuhua Si,** *California Baptist University,* **Jinxiang Xi,** *University of Massachusetts, Lowell*

7.7.2
NUMERICAL METHODS FOR MULTIPHASE FLOWS II
Concerto B, Third Level **10:50AM–12:25PM**

Chair: Michael Kinzel, *Embry-Riddle Aeronautical University*
Chair: Douglas Fontes
Chair: Leitao Chen, *Embry-Riddle Aeronautical University*

A Novel Multiphase Solver for Nuclear Applications

Technical Presentation Only: FEDSM2025-170246

Filipe Brandao, *Oak Ridge National Laboratory,* **Kellis Kincaid,** *Oak Ridge National Laboratory,* **Arpan Sircar,** *Oak Ridge National Laboratory,* **Marco Delchini,** *Oak Ridge National Laboratory*

Resolution Requirements for Numerical Simulations of Two-Phase Flows

Technical Presentation Only: FEDSM2025-169912

Pranav Nathan, *Georgia Institute of Technology,* **Luis Hatashita,** *Georgia Institute of Technology,* **Suhas Jain,** *Georgia Institute of Technology*

Automating Computational Fluid Dynamics Simulations for Bubble Velocity Detection in Glass Melters Using Machine Learning

Technical Presentation Only: FEDSM2025-156513

Donna Guillen, *Idaho National Laboratory,* **Conner Lacey,** *Idaho National Laboratory,* **Victor Coppo Leite,** *Idaho National Laboratory,* **Albert Kruger,** *U.S. Department of Energy*

7.6
EXPERIMENTAL METHODS FOR MULTIPHASE FLOWS
Concerto B, Third Level **2:00PM–3:35PM**

Chair: Justin Weinmeister, *Oak Ridge National Laboratory*
Chair: Filippo Coletti, *ETH Zürich*
Chair: Qingqing Liu, *Mississippi State University*

Experimental Investigation of Neutrally Buoyant Immiscible Drop Dynamics in Collapsible Vessels

Technical Paper Publication: FEDSM2025-158577

Nafis Resan, *North Dakota State University,* **Yan Zhang,** *North Dakota State University*

Measuring Droplet Size Distributions From Mass Entrainment of a Melting Wax Slab Under High Shear

Technical Paper Publication: FEDSM2025-157939

Elektra Katz Ismael, *SUNY Buffalo,* **Kenneth Budzinski,** *SUNY Buffalo,* **Paul Desjardin,** *SUNY Buffalo*

Control of Compact Separators for Oil-Water Separation

Technical Paper Publication: FEDSM2025-158614

Areeba Ali, *The University of Tulsa,* **Ram Mohan,** *The University of Tulsa,* **Nagu Daraboina,** *The University of Tulsa,* **Ovadia Shoham,** *The University of Tulsa*

Rheology of Aqueous Foam in Multiphase Forming: An Experimental Approach

Technical Presentation Only: FEDSM2025-170093

Sarvesh Shukla, *Georgia Institute of Technology,* **Shivam Prajapati,** *Georgia Institute of Technology,* **Hanjiang Xu,** *Georgia Institute of Technology,* **Aruna Weerasekara,** *Georgia Institute of Technology,* **Cyrus K. Aidun,** *Georgia Institute of Technology*

Velocity Field Measurements and Bubble Size Distribution in Bubble-Laden Turbulent Flows: Insights Into Flow Dynamics From Piv and High-Speed Imaging

Technical Presentation Only: FEDSM2025-170242

Prasoon Suchandra, *Georgia Institute of Technology,* **Vivek Kumar,** *Georgia Institute of Technology,* **Ardalan Javadi,** *Georgia Institute of Technology,* **Suhas Jain,** *Georgia Institute of Technology,* **Cyrus Aidun,** *Georgia Institute of Technology*

7.9
MULTIPHASE FLOWS IN ENVIRONMENTAL AND INDUSTRIAL APPLICATIONS
Maestro A, Fourth Level **2:00PM–3:35PM**

Chair: Cristian Marchioli, *University of Udine*
Chair: Yangqing Dou, *Johnson & Johnson*
Chair: Stathis Michaelides, *Texas Christian University*

Experimental Investigation of Gas Bubble Formation Due to Supersaturation in a Plate Heat Exchanger

Technical Paper Publication: FEDSM2025-156356

Roberto Bricalli, *Aarhus University,* **Navid Zehtabiyan-Rezaie,** *Aarhus University,* **Ulrich Doll,** *Aarhus University,* **Tobias Randers Olesen,** *Grundfos Holding A/S (GMA),* **Mahdi Abkar,** *Aarhus University*

Estimation of Localized Loss Coefficients in 90° Elbows for Two-Phase Crude Oil and Water Flow Using CFD

Technical Paper Publication: FEDSM2025-158607

Jose Del Valle, *Universidad Metropolitana de Caracas,* **Simon Vera,** *Universidad Metropolitana de Caracas,* **Juan Tovar,** *Universidad Metropolitana de Caracas,* **Miguel Asuaje,** *Universidad Metropolitana de Caracas*

Study of the Behavior of Biphasic Liquid – Liquid and Liquid – Solid Flows Through Divergent Pipe Type “Yee” With a 45° Angle Using Computational Fluid Dynamics Techniques

Technical Paper Publication: FEDSM2025-158726

Miguel Arbej, *Universidad Metropolitana de Caracas,* **Rodrigo Arriaga,** *Universidad Metropolitana de Caracas,* **Jonnathan Sandoval,** *Universidad Metropolitana de Caracas,* **Miguel Asuaje,** *Universidad Metropolitana de Caracas*

Morphodynamics of Melting Ice Over Turbulent Warm Water Streams

Technical Presentation Only: FEDSM2025-158657

Diego Perissutti, *University of Udine,* **Cristian Marchioli,** *University of Udine,* **Alfredo Soldati,** *TU Wien*

10.5
NON-NEWTONIAN FLUID FLOWS
Maestro A, Fourth Level **2:00PM–3:35PM**

Chair: Mohamed Garman, *GIW Industries*
Chair: Bei Fan, *Michigan State University*

Inflow Inertia and the Evolution Characteristics of Submerged Annular Viscoplastic Jets

Technical Paper Publication: FEDSM2025-156271

Khaled J. Hammad, *Central Connecticut State University*

Hydrodynamics of Thin and Mildly Thick Food Boluses in the Oropharynx During Pharyngeal Constriction and Epiglottis Motion

Technical Presentation Only: FEDSM2025-158585

Amr Seifelnasr, *University of Massachusetts, Lowell,* **Chen Sun,** *The First Hospital of Jilin University,* **Peng Ding, Xiuhua Xi,** *California Baptist University,* **Jinxiang Xi,** *University of Massachusetts, Lowell*

Direct Numerical Simulation of Relaminarization in Pipe Flow of a Herschel--Bulkley Fluid

Technical Presentation Only: FEDSM2025-170319

Shivam Prajapati, *Georgia Institute of Technology,* **Ardalan Javadi,** *Georgia Institute of Technology,* **Vivek Kumar,** *Georgia Institute of Technology,* **Prasoon Suchandra,** *Georgia Institute of Technology,* **Suhas S. Jain,** *Georgia Institute of Technology,* **Cyrus Aidun,** *Georgia Institute of Technology*

Heat Transfer Enhancement of an Automotive Radiator Using Hybrid Nanofluid

Technical Paper Publication: FEDSM2025-158761

Luke Onyekwere Ajuka, *University of Ibadan,* **Peter O. Akindele,** *Achievers University*

3.5.2
COUPLED MULTIPHYSICS SIMULATION II
Concerto A, Third Level **2:00PM–3:35PM**

Chair: Haoxiang Luo, *Vanderbilt University*
Chair: S. M. Mahbobur Rahman, *Virginia Tech College of Engineering*
Chair: Chengyu Li, *Case Western Reserve University*

Enhancing CFD Enthalpy-Porosity Method Accuracy Through Molecular Dynamics Estimation of NACL Partition Coefficient in Ice-Saline Water System

Technical Paper Publication: FEDSM2025-158617

Khadije El Kadi, *Khalifa University of Science and Technology,* **Sohail Murad,** *Illinois Institute of Technology,* **Isam Janajreh,** *Khalifa University of Science and Technology*

CFD Simulation of the Impact of Liquid Droplet Pressure on Non-Metallic Materials

Technical Paper Publication: FEDSM2025-158686

Noushin Azimy, *University of Tulsa,* **Soroor Karimi,** *University of Tulsa*

Sand Production During Formation Sampling Through Modeling of Near Wellbore Flow and Rock Deformation

Technical Paper Publication: FEDSM2025-158161

Yong Chang, *SLB,* **Niranjan Gudibande,** *SLB,* **Ashers Partouche,** *SLB*

Reactive Flow Modelling of Coal Gasification Including Tar Formation and Cracking

Technical Paper Publication: FEDSM2025-158618

Haider Khan, *Khalifa University of Science and Technology,* **Manar Almazrouei,** *United Arab Emirates University,* **Isam Janajreh,** *Khalifa University of Science and Technology*

FEDSM 2025

Fluids Engineering Division Summer Meeting

CONFERENCE
July 27-30, 2025

DoubleTree by Hilton Philadelphia Center City Philadelphia, PA, USA

Quantum Computing for CFD: Panel Discussion at FEDSM25

Quantum computing is an emerging new paradigm of computing. Quantum computing offers high speeds and memory to become the new tool for high performance computing. Quantum computing uses Qubits to manipulate information and perform scientific computing. However, the technology is very much in infancy and significant research and progress needs to be made before it can become a common computing environment. The purpose of this panel is to discuss the status of this technology through the eyes of a computer scientist, a fluid dynamics expert, and a small business entrepreneur. The panel will be moderated by Professors Pratap Vanka of UIUC and Elia Merzari of Penn State University.

Moderators

Pratap Vanka is Professor Emeritus in the Department of Mechanical Science and Engineering, UIUC. He has pioneered several numerical algorithms including multigrid methods, Lattice Boltzmann methods, meshless techniques, GPU computing, and partially parabolic methods. He is a Life Fellow of ASME, Fellow of APS, Associate Fellow of AIAA, Fellow of ASTFE and recipient of several teaching and research awards including the ASME Freeman Scholar lecture award.

Elia Merzari is a professor at the Department of Nuclear Engineering at Penn State University. He served in various roles at Argonne National Laboratory between 2009 and 2019. His expertise covers modeling and simulation of advanced reactors including safety analysis. He has received several awards in HPC, including the ANS Landis Young Member Engineering Achievement Award, and the ASME George Westinghouse Silver Medal. He is a Fellow of ASME and ANS.

Gushu Li is an Assistant Professor in Computer and Information Science at the University of Pennsylvania. He leads the Penn Quantum System Lab, where he focuses on critical quantum computing problems. His research objective is to understand and develop powerful quantum computer systems by combining theoretical foundations and practical implementation. His research has been widely recognized by the community, including a Distinguished Paper Award at OOPSLA'20 and an NSF QuantumInformation Science and Engineering Network (QISE-NET) Triplet Fellowship Grant. His research output has been adopted by several industry and academia quantum software frameworks and widely used in the community. He has won several awards including Intel Rising Star Faculty Award, NSF Faculty Early CAREER award, NSF (QISE-NET) Award and others.

Abhishek Chopra is the Founder and CEO of BQP, a cutting-edge deep tech company advancing the application of quantum computing to engineering simulations, with a strong emphasis on Computational Fluid Dynamics (CFD). At the intersection of computational sciences, quantum technology, and entrepreneurship, Abhishek is driving the development of next-generation simulation tools tailored for mission-critical industries. Under his leadership, BosonQ Psi has raised over $7 million in venture capital and government funding and formed strategic collaborations with industry and research leaders such as the Air Force Research Laboratory, Moog, IAI North America, IBM, and Intel. Abhishek's work exemplifies the next generation of engineering leadership, championing the integration of quantum computing with CFD simulations of industrial significance.

Peyman Givi is Distinguished Professor and the James T. MacLeod Chair in Mechanical Engineering at the University of Pittsburgh. Previously he was the SUNY Buffalo Distinguished Professor of Aerospace Engineering. He has also worked at Flow Research Company, with frequent visiting appointments at the NASA Langley & Glenn research centers. Peyman is one of the original developers of DNS of turbulent reacting flows and pioneered the filtered density function (FDF) method for LES of such flows. Peyman is also one of the very first who introduced quantum computing (QC) for computational fluid dynamics, and he has been utilizing a variety of QC methods for DNS and LES. Givi is Fellow of ASME, AIAA, APS and the Combustion Institute.

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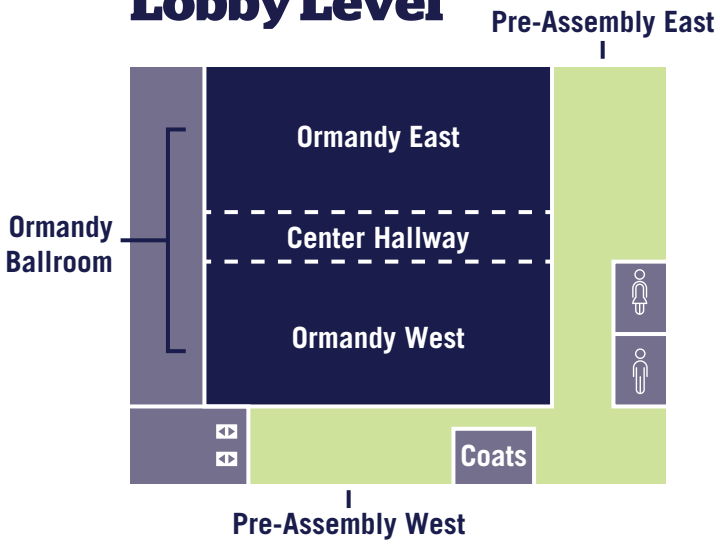
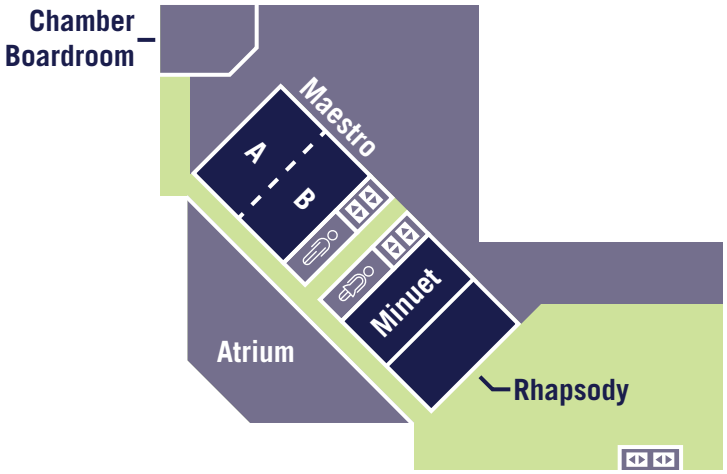
Floor Map Key

- Elevators
- Meeting/Conference Rooms
- Amenities/Service Areas
- Foyer Space

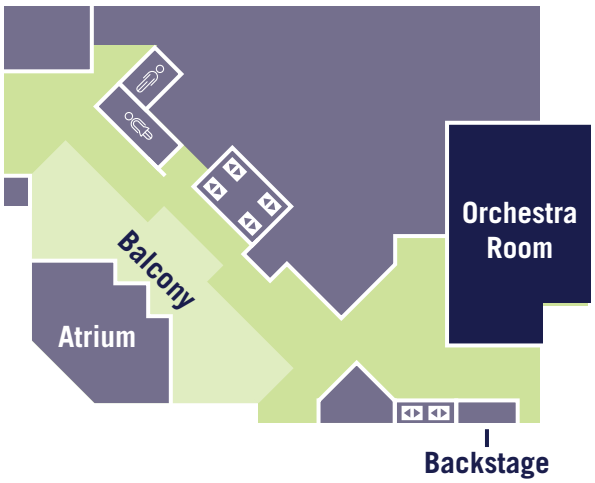
Lobby Level



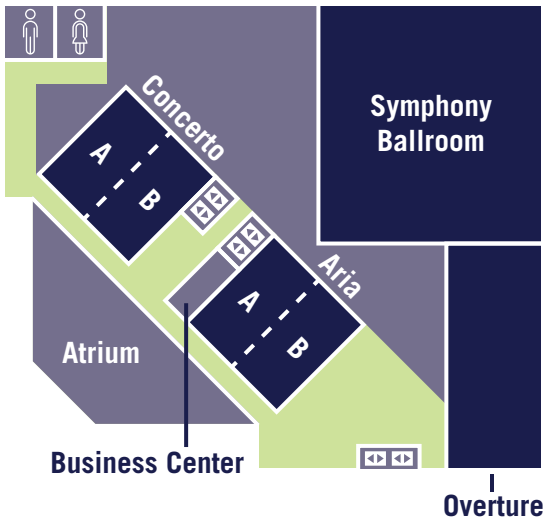
Fourth Level



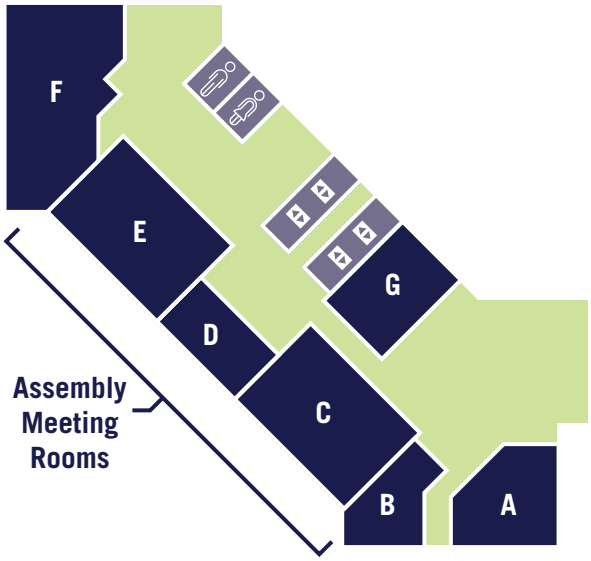
Mezzanine Level



Third Level



Fifth Level Assembly On 5



Fifth Level Terrace

Notes

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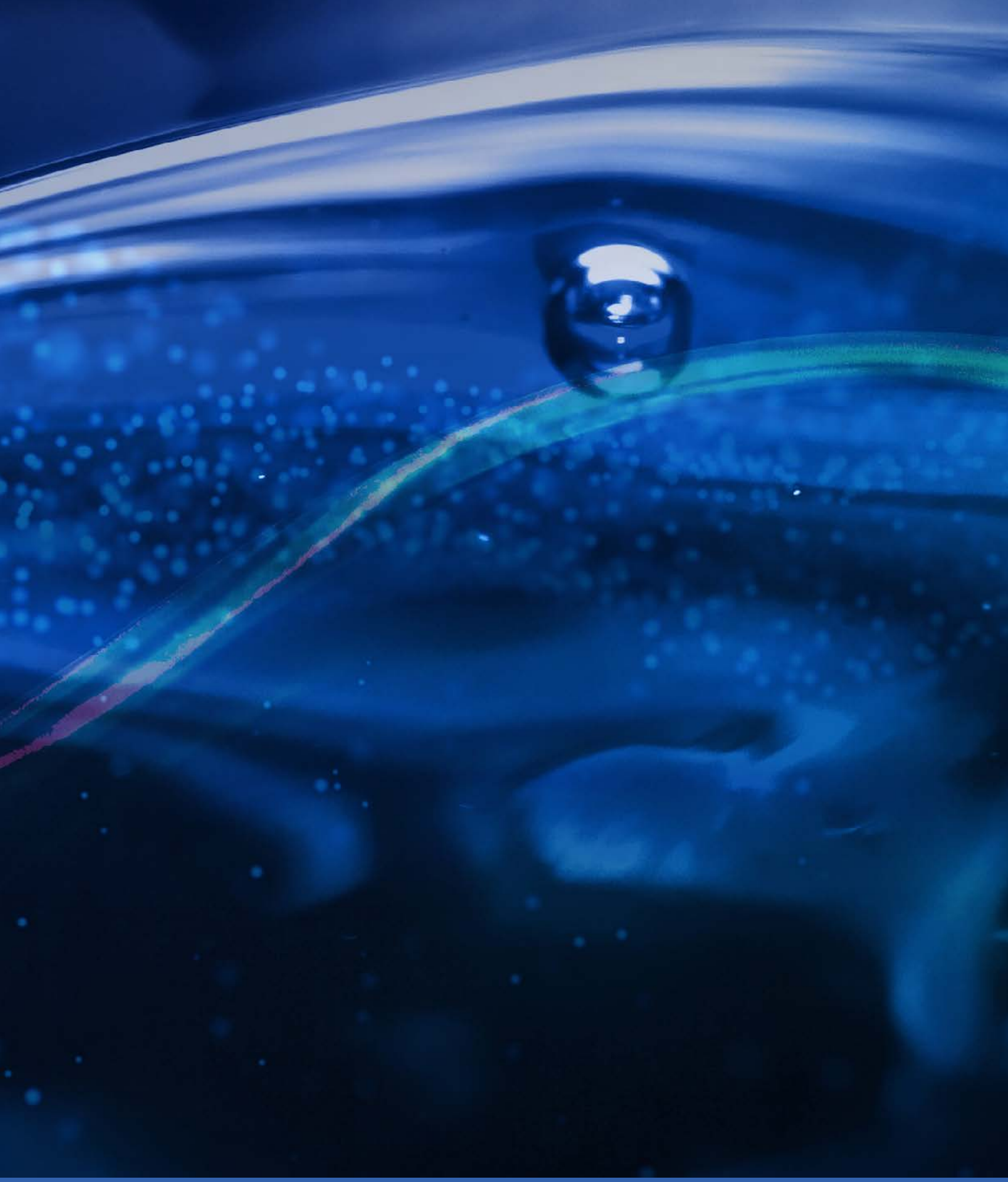

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