ASME® 2021 FEDSM

Fluids Engineering Division Summer Meeting

CONFERENCE
August 10–12, 2021

Virtual, Online

Program

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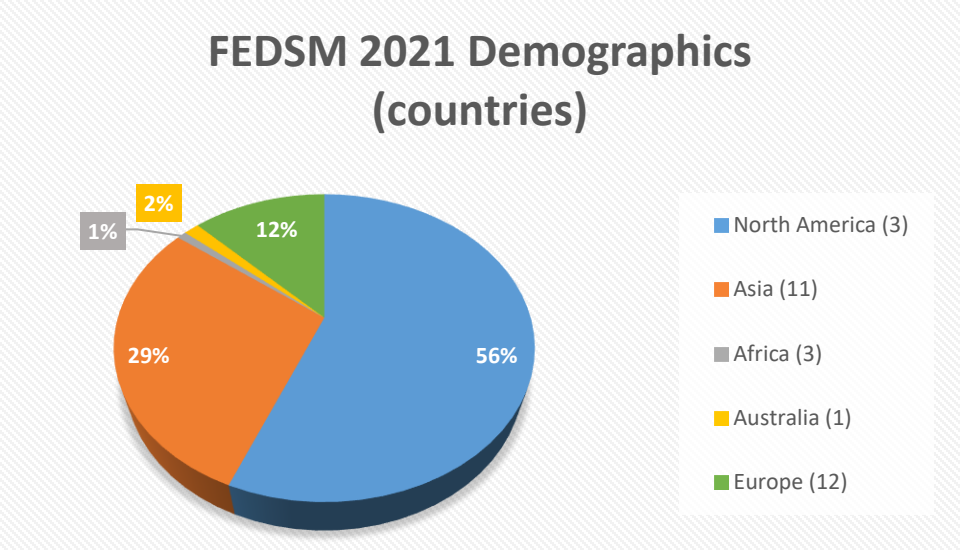
Welcome to FEDSM 2021!

Welcome to the 2021 Fluids Engineering Division's (FED) Summer Meeting! While FEDSM 2020 was our first virtual event, I hope FEDSM 2021 is the last virtual FEDSM. FED continues to strive to meet the challenges of disseminating timely technical information by organizing technical conferences and conducting workshops and panel discussions. This year the summer meeting is a FED focused event, and we are collaborating with the ASME Aerospace Engineering Division who sponsors a track at FEDSM 2021. Some recent past collaborations in FEDSM include: FEDSM 2020 with the ASME Heat Transfer Division and the International Conference on Multi-Mini-and Nano Channels, AJK2019 with the Japanese and Korean mechanical engineering societies. In addition, FED also participates annually in the ASME International Mechanical Engineering Congress and Exposition each November.

Despite the challenges we all have been facing, FEDSM 2021 is still truly international, which is evident in international participation, including 30 countries spanning five continents with more than 350 presentations. The State-of-the-Art in the world of Fluids Engineering will be presented from industrial, academic, and governmental researchers.



Our FED plenaries feature

- 2020 ASME Fluids Engineering Awardee: Howard Stone, Princeton University
- 2021 ASME Fluids Engineering Awardee: Steven Ceccio, University of Michigan
- 2021 ASME Freeman Scholar: Rajat Mittal, Johns Hopkins University
- 2021 ASME Henry R. Worthington Medal Awardee: Robert Visintainer, GIW Industries Inc., A KSB Company

Our conference is organized around our technical committees: Fluid Applications and Systems, Fluid Measurement and Instrumentation, Fluid Mechanics, Multiphase Flow, Computational Fluid Dynamics, and Micro-Nano Fluid Dynamics. This year the program includes keynote speakers who will introduce topics and provide insight regarding research directions in that area. Our Awards Program will recognize Best-Papers, Flow-Visualization, and Graduate-Student Scholars and Returning Scholars. To encourage and enhance FEDSM 2021 virtual event, we have added Best Presentation Video and Who's Who Video competitions. You are invited to participate in our Towne Hall Meeting where we provide an update of the direction FED is pursuing and to join and participate in our committee meetings to network and help organize our future conferences. We especially thank our topic organizers and reviewers who make FEDSM2021 possible by inviting presenters, organizing sessions and reviewing papers.

We very much look forward to interesting and though provoking cutting-edge presentations, panels, and discussions as well as networking and meeting virtually and feel sure this will be a rewarding and exciting meeting. See you soon!

FEDSM 2021 Conference Chair

Zhongquan Charlie Zheng, FASME

Utah State University

FEDSM 2021 Conference Co-Chair

Philipp Epple, FASME

Coburg University of Applied Sciences

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FED Honors and Awards Committee (2020)

Chair: Ning Zhang (2018-2021) (CFDTC)
McNeese State University
Ivana Milanovic (FMTC) (2019-2022)
University of Hartford
Bahram Khalighi (MNFDTC) (2019-2022)
General Motors Global R & D
Stanley Ling (MFTC) (2020-2023)
Baylor University
Pavlos Vlachos (FMITC) (2020-2023)
Purdue University
Alexandriana Untarioiu (2020-2023)
Virginia Polytechnic Institute and State University
Terry Beck (YEP, non-voting member, 2021-2024)
Kansas State University

FED Graduate Student Steering Committee (2019-2022)

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California State Polytechnic University, Pomona
Vice Chair: Ivo Nedyalkov
University of New Hampshire

FED Technical Committees (2019-2021)

Fluid Applications and Systems
Chair: Kevin Anderson
California State Polytechnic University, Pomona
Vice Chair: Ravinder Yerram
GE Gas Power

FEDSM 2021 Conference Chair: Zhongquan Charlie Zheng
Utah State University
FEDSM 2021 Conference Co-Chair: Philipp Epple
Coburg University of Applied Sciences

FEDSM2021 Track Chairs

Track 1 Fluid Applications and Systems
Chair: Kevin Anderson
California State Polytechnic University, Pomona
Co-Chair: Ravinder Yerram
GE Gas Power

Track 2 Fluid Measurement & Instrumentation
Chair: Ivo Nedyalkov
University of New Hampshire
Co-Chair: Soroor Karimi
The University of Tulsa

Track 3 Fluid Mechanics
Chair: Jun Chen
Purdue University
Co-Chair: Deify Law
Cal State University Fresno

Track 4 Multiphase Flow
Chair: Robert Kunz
The Pennsylvania State University
Co-Chair: Bertrand Rollin
Embry Riddle University

Track 5 Computational Fluid Dynamics

Chair: Haibo Dong
University of Virginia
Co-Chair: Sijun Zhang
ESI CFD, Inc.

Track 6 Micro & Nano Fluid Dynamics

Chair: Mohammad Hossan
University of Central Oklahoma
Co-Chair: Rasim Guildiken
University of Florida

Track 7 Aerospace Engineering Division Joint Track

Chair: Lea-Der Chen
Texas A&M Corpus Christi
Co-Chair: David Bridges
Texas A&M Corpus Christi
Co-Chair: Javid Bayandor
University at Buffalo, The State University of New York
Co-Chair: Yu-Tai Lee
Retired, Naval Surface Warfare Center, West Bethesda

Track 8 Plenary Track

Chair: Zhongquan Charlie Zheng
Utah State University
Co-Chair: Philipp Epple
Coburg University of Applied Sciences

Track 9 Flow Visualization Competition

Chair: Philipp Epple
Coburg University of Applied Sciences

Track 10 Who's Who Competition

Chair: Zhongquan Charlie Zheng
Utah State University
Co-Chair: Philipp Epple
Coburg University of Applied Sciences

FEDSM 2021 Schedule At-A-Glance

(all times in U.S. EDT)

Start Time	Duration Minutes	Tuesday - August 10, 2021							
		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
9:45am	60	**Welcome by ASME CEO Thomas Costabile; Zhongquan Charlie Zheng; Judith Bamberger Special Session 1 - Plenary 2020 ASME Fluids Engineering Award Prof. Howard A. Stone**							
10:45am	5	**Break**							
10:50am	60	01-01-01 Fluid Machinery Symposium	02-01-01 Fluid Measurement and Instrumentation	07-01-01 Aerospace	04-01-01 Numerical Methods for Multiphase Flows	05-01-01 Applied CFD	06-02-01 Micro- and Nanoscale Thermofluidic Science and Devices	01-02-01 Pumping Machinery Symposium	
11:50am	10	**Break**							
12:00pm	45	**Special Session 2 - Plenary 2021 Freeman Scholar Dr. Rajat Mittal**							
12:45pm	5	**Break**							
12:50pm	60	01-01-02 Fluid Machinery Symposium	02-01-02 Fluid Measurement and Instrumentation	03-01-01 Advances in Fluids Engineering Education	04-04-02 Gas-Liquid Flows	05-01-02 Applied CFD	06-03-01 Biologically Enabled Microfluidics and Biomicrofluidics	01-04-01 Automotive Flows	05-08-01 Emerging Methods in CFD
1:50pm	10	**Break**							
2:00pm	45	**Special Session 3 - Towne Hall Meeting and Networking**							
Start Time	Duration Minutes	**Wednesday - August 11, 2021**							
		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
10:00am	45	**Special Session 4 - Plenary 2021 ASME Fluids Engineering Award Dr. Steven Ceccio**							
10:45am	5	**Break**							
10:50am	60	01-02-02 Pumping Machinery Symposium	02-08-01 Experimental Facilities in Fluid Mechanics	03-03-01 Fluid Power	04-05-01 Liquid-Solid Flows	05-03-01 DNS, LES and Hybrid-RANS/LES Methods	06-03-02 Biologically Enabled Microfluidics and Biomicrofluidics	03-05-01 Turbulent Flows	
11:50am	10	**Break**							
12:00pm	45	**Special Session 5 - Plenary 2021 ASME Henry R. Worthington Medal Robert J. Visintainer**							
12:45pm	5	**Break**							
12:50pm	10	01-07-01 Industrial Fluid Mechanics	02-03-01 Fluid Dynamics of Wind Energy	03-04-01 Bio-Inspired and Biomedical Fluid Mechanics	04-04-01 Gas-Liquid Flows	05-01-04 Applied CFD	05-09-01 Open Source CFD Applications	03-06-01 Flow Manipulation and Active Control	04-06-01 Gas-Solid Flows
1:50pm	10	**Break**							
2:00pm	45	**Special Session 6 - Networking and Who's Who**							
Start Time	Duration Minutes	**Thursday - August 12, 2021**							
		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
10:00am	45	**Special Session 7 - Siemens Talk Dr. Claudio Santarelli**							
10:45am	5	**Break**							
10:50am	50	01-07-02 Industrial Fluid Mechanics	05-11-01 Multi-physics Simulation	03-14-01 Vortex Dynamics	04-07-01 Bubble, Droplet, and Aerosol Dynamics	05-04-01 Fluid Structure Interaction (including IBM)	05-14-01 CFD Graduate Student Scholarship Competitions	04-09-01 Erosion, Slurry, Sedimentation	06-04-01 Micro-Total-Analysis Systems (MicroTAS) and Lab-On-A-Chip Applications
11:50am	10	**Break**							
12:00pm	45	**Special Session 8 - Flow Visualization Presentations and Awards**							
12:45pm	5	**Break**							
12:50pm	60	01-11-01 Rotating Machinery / Turbomachinery	05-02-01 CFD Development	03-13-01 High-Speed Flows	04-10-01 Multiphase Flows in Petroleum Engineering	05-01-03 Applied CFD	05-07-01 Optimization, Data-based Simulations, and Machine Learning	04-08-01 Interfacial Phenomena and Flows	03-06-02 Flow Manipulation and Active Control
1:50pm	10	**Break**							
2:00pm	45	**Special Session 9 - Awards and Networking**							

2021 PLENARY SPEAKERS

2020 ASME Fluids Engineering Award
Prof. Howard A. Stone
Donald R. Dixon '69 and Elizabeth W. Dixon Professor in Mechanical and Aerospace Engineering at Princeton University

2021 Freeman Scholar Award
Dr. Rajat Mittal
Professor of Mechanical Engineering at the Johns Hopkins University

2021 ASME Fluids Engineering Award
Dr. Steven Ceccio
Professor, Naval Architecture and Marine Engineering; Professor, Mechanical Engineering and Applied Mechanics; Associate Dean for Academic Affairs at the University of Michigan

2021 ASME Henry R. Worthington Medal
Robert J. Visintainer
Vice President of Engineering and Research & Development
GIW Industries Inc., A KSB Company

Special Session - Siemens Talk: **Dr. Claudio Santarelli**

Prof. Howard A. Stone
Lecture Title: Seeking Intersections Between Disciplines: "Boundaries" in Multiphase Flows
Tuesday August 10, 10:00 AM EDT

Abstract: Fluid mechanics has a rich history. Modern research themes introduce new questions, some of which can be understood using fundamental concepts. This feature is sometimes the case in the flows of complex fluids, which link fundamental research questions to potential applications, both in industry and for understanding natural phenomena. In this talk I will survey research questions that we have studied in recent years that have this character: (1) Although flows at modest Reynolds numbers at a T-shaped junction is a geometry where one should expect everything is known, nevertheless we uncover previously unrecognized complexity in three-dimensional solutions to the Navier-Stokes equations, which rationalize our experimental observations of particle trapping in this common flow configuration. (2) The motion of a particle adjacent to a flexible membrane links fluid and elastic responses, which we show produces interactions capable of separating particles by size. (3) We document experimentally the time and (three-dimensional) space variations of the shape of a falling thin film near an edge, and rationalize the quantitative features using a similarity scaling with a unique feature that takes a three-dimensional problem and converts it to a one-dimensional problem.

Dr. Rajat Mittal
Lecture Title: Immersed Boundary Methods-Translating Concepts into Simulations
Tuesday, August 10 12:00 PM EDT

Abstract: The last 25 years have seen a phenomenal growth in the application of Immersed Boundary Methods (IBMs) to the computational modeling of fluid flows. The power of IBM lies in the fact that it frees the fluid dynamicist from the need to generate body-conformal grids, thereby allowing rapid translation from concepts to simulations. The very early applications of the IBM were in the areas of interfacial and biological fluid dynamics, and while these remain the strongholds for these methods, application have expanded to encompass most areas of fluids dynamics including fluid-structure interaction, multiphase flows, acoustics, fluidic microdevices, heat transfer, design optimization, reacting flows and others. This expanded scope has also been accompanied by significant numerical and computational advancements in these methods. In my talk I will review the history as well as the state-of-the-art of IBMs. The particular emphasis of my talk will be on some areas that have been the focus of my own research in recent years: IBMs with improved accuracy and conservation properties, and application to biological flows, bioacoustics, and fluid-structure interaction.

Dr. Steven Ceccio
Lecture Title: The Role of Compressibility on the Dynamics of Developed Cavitation
Wednesday, August 11 10:00 AM EDT

Abstract: Developed cavitation can occur on liquid flows over lifting surfaces, in the passages of turbomachinery, and in the wakes of bluff bodies. Such cavitation can be very deleterious to system performance, leading to thrust breakdown, vibration, and erosion. Alternatively, pockets of developed cavitation can be actively employed to reduce hydrodynamic resistance. The cyclical shedding of large-scale vapor and gas clouds (cloud cavitation) is an important feature of these flows, and the mechanisms

responsible for sheet-to-cloud transition have received considerable study. Re-entrant liquid flow has traditionally been identified and the dominant mechanism for the creation of unstable sheet cavitation, but recent studies have revealed that a second important process is responsible for flow instability. High volume-fraction bubbly mixtures exhibit compressibility and can manifest sound speeds that are very low compared to the freestream speed of the flow. When this occurs, the local Mach number (based on local speed of sound) within the region of bubbly flow can exceed unity, leading to the formation of dynamic condensation waves. We have shown how this process leads to sheet-to-cloud transition, and how consideration of the local Mach number can explain a variety of previously observed flow cavity flow phenomena that cannot be explained simply with re-entrant flow dynamics. We have visualized these cavitating flows using traditional optical and cinematographic X-ray imaging. In the present talk, we will explore the importance of compressibility on cavity dynamics for flows over a variety of canonical bodies and discuss the relationship between the cavitating mixture properties, the resulting sound speed (Mach number), and the formation of bubbly shock waves. We will also show how the injection of non-condensable gas can be used to suppress these flow dynamics by lowering the local mixture Mach number.

Robert Visintainer
Lecture Title: Pumping Rocks: Hydrotransport and the Centrifugal Slurry Pump
Wednesday, August 11 12:00 PM EDT

Abstract: Centrifugal pumps are one of the most common machines in use worldwide, with a long history dating back to the 17th century. Applications are as varied as the pump designs themselves. In the great majority of cases, their primary purpose is the transport of some fluid, such as water, fuel, or other mixtures used in the chemical and food processing industries. In some cases, the fluids may be laden with solids, for example river water, sewage, drainage, or wash water. However, a special class of centrifugal pump exists whose primary function is the transport solids, and where the fluids represent little more than a transport medium, an application sometimes referred to as "hydrotransport". The pumps that power these systems are called slurry pumps. Slurry pumps are common in the mineral processing and dredging industries, and as one may imagine, the erosive stresses on their pumping components are severe. The solids range from fine silt to boulders and are often handled at high concentration, since they are the primary focus of transport. They substantially alter pump and pipeline hydraulic behavior, which can be further complicated by entrained gasses or viscous fluids. In this presentation, we will examine some of the technical challenges encountered in hydrotransport and slurry pump applications and give examples of the design strategies and scientific methods developed over the last 50 years to address them.

Special Session - Siemens Talk: Dr. Claudio Santarelli
Thursday, August 12 10:00 AM EDT

Committee Meetings

Monday August 9

- Opening Executive Committee FED Executive Committee (Closed Meeting): 10:00 AM EDT
- Executive Committee w/ Technical Committee Chairs (Closed Meeting): 11:30 AM EDT
- GSS and Committee Meeting: 12:30 PM EDT

Tuesday August 10

- Fluid Applications and Systems Technical Committee (FASTC): 3:00 PM EDT
- Fluid Measurement & Instrumentation Technical Committee (FMITC): 4:00 PM EDT
- Fluid Mechanics Technical Committee (FMTC): 5:00 PM EDT
- Multiphase Flow Technical Committee (MFTC): 6:00 PM EDT

Wednesday August 11

- Computational Fluid Dynamics Technical Committee (CFDTC): 3:00 PM EDT
- Micro Nano Fluid Dynamics Technical Committee (MNFDTC): 4:00 PM EDT
- Honors & Awards Committee (Closed Meeting): 5:00 PM EDT
- FED Advisory Committee (Closed Meeting): 6:00 PM EDT

Friday August 13

- Closing Executive Committee w/ Technical Committee Chairs (Closed Meeting): 10:00 AM EDT
- Closing Executive Committee (Closed Meeting): 11:00 AM EDT

Technical Presentations

TUESDAY, AUGUST 10

01-01-01 Fluid Machinery Symposium
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Aarthi Sekaran - Texas A&M University***

Fluid Engineering to Face the Challenges to 2050., {FEDSM2021-76484}
Keynote
Charles Soothill - Sulzer

Fluid Dynamics and Contact Stress on Hard Sealing Surface Analysis of LNG Cryogenic Ball Valve, {FEDSM2021-65667}
Technical Paper Publication
Zhen-Hao Li - Zhejiang University
Jia-Jie Lu - SUFA Technology Industry Co., Ltd.
Jun-Ye Li - SUFA Technology Industry Co., Ltd.
Jin-yuan Qian - Zhejiang University

Effects of Valve Disc on Flow Characteristics Inside a Swing Check Valve During Opening and Closing Processes, {FEDSM2021-65674}
Technical Paper Publication
Yi-Xiang Xu - Zhejiang University
Qiang Ru - SUFA Technology Industry Co., Ltd.
Huai-Yu Yao - Zhejiang University
Zhi-Jiang Jin - Zhejiang University
Jin-Yuan Qian - Zhejiang University

Modified Operating Parameter-Based Iyer Correlation for the Coefficient of Performance (COP) Prediction of Different Fluid Pairs in Double-Effect Vapor Absorption Refrigeration (VAR) Cycles, {FEDSM2021-65709}
Technical Paper Publication
Muhammad Saad Khan - Texas A&M University at Qatar
Sambhaji Kadam - Texas A&M University at Qatar
Alexios Kyriakidis - Chemical Process and Energy Resources Institute, Centre for Research and Technology Hellas
Ibrahim Hassan - Texas A&M University at Qatar
Mohammad Azizur Rahman - Texas A&M University at Qatar
Athanasios Papadopoulos - Chemical Process and Energy Resources Institute, Centre for Research and Technology
Panos Seferlis - Aristotle University of Thessaloniki

Flow Field Investigation in Draft Tube of Francis Turbine at Off-Design Operation Using a Vortex Identification Algorithm, {FEDSM2021-65742}
Technical Paper Publication
Sandeep Kumar - Indian Institute of Technology Roorkee
Bhupendra Kumar Gandhi - Indian Institute of Technology Roorkee
Subodh Khullar - Indian Institute of Technology Roorkee

01-02-01 Pumping Machinery Symposium
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Srinivasa Rao Billa - Turbo Energy Private Limited***

Blade Thickness Redesign to Improve Efficiency and Decrease Unsteady Pressure Pulsation of a Low Specific Speed Centrifugal Pump, {FEDSM2021-65088}
Technical Paper Publication
Chengshuo Wu - Zhejiang University
Peng Wu - Zhejiang University
Dazhuan Wu - Zhejiang University

Control Optimization Through Prediction-Based Wastewater Management, {FEDSM2021-65375}
Technical Paper Publication
David Konstantin Tilcher - Technische Universität Berlin
Florin Popescu - Fraunhofer Institute for Open Communication Systems
Harald Sommer - Ingenieurgesellschaft Prof. Dr. Sieker mbH
Lauritz Thamsen - Distributed and Operating Systems
Paul Uwe Thamsen - Technische Universität Berlin

Different Clogging Behavior of Wastewater Pumps, {FEDSM2021-65422}
Technical Paper Publication
David Beck - Chair of Fluid System Dynamics
Yvonne Holzbauer - Chair of Fluid System Dynamics
Paul Uwe Thamsen - Technische Universität Berlin

Visualization of Interactions Between Impeller and Textile in a Wastewater Pump, {FEDSM2021-65427}
Technical Paper Publication
Matthias Steffen - Technische Universität Berlin
Paul Uwe Thamsen - Technische Universität Berlin

Effect of Speed Variation on Clogging of Sewage Pumps, {FEDSM2021-65515}
Technical Paper Publication
Enrico Müller - TU Berlin / KSB SE & Co. KGaA
Thomas Pensler - KSB SE & Co. KGaA
Paul Uwe Thamsen - Technische Universität Berlin

02-01-01 Fluid Measurement and Instrumentation
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Ivaylo Nedyalkov The University of New Hampshire***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Soroor Karimi - The University of Tulsa***

Boundary Layer Multi-Property Flow Measurements Using a Micro-Plasma Sensor, {FEDSM2021-65560}
Technical Paper Publication
George Papadopoulos - Innoveering, LLC
Daniel Bivolaru - Innoveering, LLC
Nicholas Martin - Innoveering, LLC
Timothy Dawideit - Innoveering, LLC

How to Improve Accuracy of Existing Ultrasonic Water Meters, {FEDSM2021-63247}
Technical Paper Publication
Iryna Gryshanova - National Technical University of Ukraine "I. Sikorsky KPI"
Ivan Korobko - National Technical University of Ukraine "I. Sikorsky KPI"

Estimation of Turbulent Length Scales at a Turbocharger Inlet Using Particle Image Velocimetry, {FEDSM2021-63456}
Technical Paper Publication
Deb Banerjee - The Ohio State University
Ahmet Selamet - The Ohio State University
Rick Dehner - The Ohio State University

Dual-Luminescence Imaging and Particle Tracking Velocimetry for Simultaneous Temperature and Velocity Field Measurements in Hydrocarbons Liquid, {FEDSM2021-61460}
Technical Paper Publication
Tatsunori Hayashi - University of Notre Dame
Hamed Farmahini Farahani - Worcester Polytechnic Institute
Ali S. Rangwala - Worcester Polytechnic Institute
Hirotaka Sakaue - University of Notre Dame

Experimental Measurement of Oil Droplets Size and Velocity Above the Rotor/Stator in a Rotary Compressor, {FEDSM2021-65874}
Technical Paper Publication
Puyuan Wu - Purdue University
Jun Chen - Purdue University
Paul Sojka - Purdue University
Yang Li - Guangdong Meizhi Compressor Co., Ltd.
Hongjun Cao - Guangdong Meizhi Compressor Co., Ltd.

04-01-01 Numerical Methods for Multiphase Flows
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Michael Kinzel - University of Central Florida***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***
Chair: ***William Straka - Penn State/ARL***

Hybrid MPI-OpenMP Accelerated Euler-Lagrange Simulations of Microbubble Enhanced HIFU, {FEDSM2021-65815}
Technical Paper Publication
Jingsen Ma - Dynaflow, Inc
Xiaolong Deng - Dynaflow, Inc.
Chao-Tsung Hsiao - Dynaflow, Inc.
Georges Chahine - Dynaflow, Inc.

Parametric Identification of Rotating Cavitation in a Three-Bladed Axial Inducer, {FEDSM2021-61746}
Technical Paper Publication
Antonio Costanzo - University of Pisa
Dario Valentini - University of Pisa

Giovanni Pace - University of Pisa
Ruzbeh Hadavandi - University of Pisa
Lucio Torre - University of Pisa
Angelo Pasini - University of Pisa
Luca D'Agostino - University of Pisa

A Mass-Momentum-Energy Consistent Volume-of-Fluid Method for Direct Numerical Simulation of Compressible Interfacial Multiphase Flows, {FEDSM2021-65907}
Technical Presentation Only
Yue Ling - Baylor University
Bo Zhang - Baylor University

Wall-Pressure Fluctuations Inside Attached Cavitation, {FEDSM2021-65501}
Technical Paper Publication
Changchang Wang - Beijing Institute of Technology
Guoyu Wang - Beijing Institute of Technology
Mindi Zhang - Beijing Institute of Technology
Qin Wu - Beijing Institute of Technology

Acceleration-Induced Cavitation of Cerebrospinal Fluid, {FEDSM2021-74731}
Technical Presentation Only
Akihito Kiyama - Utah State University
Jeffrey Fonnesbeck - Utah State University
Aaron Olsen - Utah State University
Tadd Truscott - Utah State University

05-01-01 Applied CFD
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Ning Zhang - McNeese State University***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Viability of OpenFOAM as the Numerical Engine for Augmented Reality Sandbox, {FEDSM2021-65991}
Technical Paper Publication
Elizabeth Smith - University of North Carolina at Charlotte

Effects of Aerodynamics on Line Sail During Parachute Deployment, {FEDSM2021-65585}
Technical Paper Publication
Mingzhang Tang - Beijing Institute of Space Mechatronic
Liwu Wang - Beijing Institute of Space Mechatronic
Yu Liu - Beijing Institute of Space Mechatronic
Sijun Zhang - ESI US R&D, Inc.

Numerical Investigating of Oxcillatory Flow and Heat Transfer Through Stirling Regenerator, {FEDSM2021-65624}
Technical Paper Publication
Houda Hachem - Energy Research and Technology Center (CRTEn)
Ramla Gheith - University of Monastir, Ecole Nationale d'Ingénieurs de Monastir
Fethi Aloui - Université Polytechnique Hauts-de-France, INSA Hauts-de-France

Analysis of Aeroacoustic Generated From a Rotating Tire With a Longitudinal Groove Using Large-Eddy Simulation, {FEDSM2021-66009}
Technical Paper Publication
Satoshi Sekimoto - Tokyo University of Agriculture and Technology
Kimie Ito - Tokyo University of Science
Tomoaki Tatsukawa - Tokyo University of Science
Kozo Fujii - Tokyo University of Science
Masataka Koishi - The Yokohama Rubber Co., Ltd.
Toshiyuki Ikeda - The Yokohama Rubber Co., Ltd.
Kengo Asada - Tokyo University of Science

Computation of Rotor Turbulence-Ingestion Noise, {FEDSM2021-76489}
Keynote
Meng Wang - University of Notre Dame

07-01-01 Aerospace
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Lea Der Chen - Texas A&M University - Corpus Christi***
Chair: ***David Bridegs- Texas A&M University - Corpus Christi***
Chair: ***Javid Bayandor - University at Buffalo, The State University of New York***
Chair: ***Yu-Tai Lee - Retired, Naval Surface Warfare Center, West Bethesda***

Influence of Exposed Electrode Thickness on Plasma Actuators Performance for Coupled Deicing and Flow Control Applications, {FEDSM2021-65728}
Technical Paper Publication
Frederico Rodrigues - Universidade da Beira Interior
Mahdi Abdollahzadeh - Universidade da Beira Interior
Jose Pascoa - Universidade da Beira Interior
Luis Pires - Universidade da Beira Interior

Numerical Analysis of Solid Propellant Rocket Motor Nozzle, {FEDSM2021-75791}
Technical Presentation Only
Meihua Zhang - Utah State University
Zhongquan Charlie Zheng - Utah State University

Computational Study on Radiative Aerothermodynamics of a Reentry Space Vehicle, {FEDSM2021-61455}

Technical Paper Publication
Qi Li - Beijing Institute of Spacecraft System Engineering
Sijun Zhang - ESI US R&D, Inc.

Plume Chamber Studies to Characterize Turbulent Buoyant Plumes, {FEDSM2021-64999}
Technical Presentation Only
Daniel Alejandro Castell - The University of Texas at San Antonio
Kiran Bhaganagar - The University of Texas at San Antonio

06-02-01 Micro- and Nanoscale Thermofluidic Science and Devices
8/10/2021
10:50 AM - 11:50 AM

Chair: ***Rasim Guldiken - University of South Florida***
Chair: ***Mohammad Hossan - University Of Central Oklahoma***

Repurposed Tesla Microvalve Arrays for Smart Irrigation in Precision Agriculture Applications, {FEDSM2021-65900}
Technical Presentation Only
Alaba Bamido - Texas A&M University
Nandan Shettigar - Texas A&M University
Debjyoti Banerjee - Texas A&M University

Investigation of the Effect of Cross Section on the Convective Heat Transfer Performance of Nanoemulsion in Microchannel Heat Exchanger, {FEDSM2021-66048}
Technical Paper Publication
Jiajun Xu - University of the District of Columbia
Takele Gemeda - University of the District of Columbia
Mehdi Kabir - University of the District of Columbia

A Thermally Actuated Microvalve for Smart Irrigation in Precision Agriculture Applications, {FEDSM2021-65899}
Technical Paper Publication
Alaba Bamido - Texas A&M University
Debjyoti Banerjee - Texas A&M University

Fluid Flow and Heat Transfer of Liquid Sodium in Small-Scale Heat Sinks With Different Geometries, {FEDSM2021-65869}
Technical Paper Publication
Mahyar Pourghasemi - The University of New Mexico
Nima Fathi - The University of New Mexico

Computational Study of Viscoelastic Flows in Microchannels, {FEDSM2021-65699}
Technical Paper Publication
Guanyang Xue - Lehigh University
Xuanhong Cheng - Lehigh University
Alparslan Oztekin - Lehigh University

Investigating the Potential Drag Reduction and Thermal Transport Improvement in Textured Microchannels, {FEDSM2021-65760}
Technical Paper Publication
Nastaran Rabiei - Northeastern University
Grace Mcdonough - Northeastern University
Carlos H. Hidrovo - Northeastern University

01-04-01 Automotive Flows
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Ankit Tiwari - Gentherm***

0D Modeling of Fuel Tank for Vapor Generation, {FEDSM2021-66670}
Technical Paper Publication
Luca Romagnuolo - University of Naples Federico II
Francesco Fortunato - Stellantis
Emma Frosina - University of Sannio Benevento
Vincenzo Mirante - Stellantis
Assunta Andreozzi - University of Naples Federico II
Adolfo Senatore - University of Naples Federico II

Influence of Rectangular Strips' Size on Aerodynamic Performance of a High-Speed Train Subjected to Crosswind, {FEDSM2021-65692}
Technical Paper Publication
Mengying Wang - Chinese Academy of Sciences
Zhenxu Sun - Chinese Academy of Sciences
Shengjun Ju - Chinese Academy of Sciences
Guowei Yang - Chinese Academy of Sciences

Influence of the Topological Structures of the Nose of High-Speed Maglev Train on Aerodynamic Performances, {FEDSM2021-65711}
Technical Paper Publication
Wang Yeteng - Institute of Mechanics,Chinese Academy of Sciences
Sun Zhenxu - Institute of Mechanics, Chinese Academy of Sciences

The Four Stage Development of Starting Turbulent Buoyant Plumes, {FEDSM2021-65540}
Technical Paper Publication
Thanh Tran - University of Texas at San Antonio
Kiran Bhaganagar - University of Texas at San Antonio

Impact of Urban Microclimate on Air Conditioning Energy Consumption Using Different Convective Heat Transfer Coefficient Correlations Available in Building Energy Simulation Tools, {FEDSM2021-65589}
Technical Paper Publication
Sambhaji Kadam - Texas A&M University at Qatar
Ibrahim Hassan - Texas A&M University at Qatar
Liangzhu (Leon) Wang - Concordia University
Mohammad Azizur Rahman - Texas A&M University at Qatar

03-01-01 Advances in Fluids Engineering Education
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Ivana Milanovic - University of Hartford***
Chair: ***Ray Taghavi - University of Kansas***
Chair: ***Kalyan Goparaju - ANSYS, Inc***

Are We Preparing Students Better for Their Career Today Than Yesterday?, {FEDSM2021-66015}
Keynote
William Cousins - United Technologies Research Center, Retired

Teaching Limiting Behavior of Plane Oblique Shocks, {FEDSM2021-62451}
Technical Paper Publication
Ray Taghavi - University of Kansas
Saeed Farokhi - University of Kansas

Digital Assignments for Thermo-Fluids Courses, {FEDSM2021-65613}
Technical Paper Publication
Ivana Milanovic - University of Hartford
Tom Eppes - University of Hartford
Kalyan Goparaju - ANSYS, Inc

Engines for Unpiloted Aero Vehicles: An Educational Perspective, {FEDSM2021-66047}
Technical Presentation Only
Ray Taghavi - University of Kansas

Wall Bounded Flows and a General Proof of the Validity of the Universal Logarithmic Law of the Wall, {FEDSM2021-65733}
Technical Paper Publication
Philipp Epple - Coburg University of Applied Sciences
Andreas Malcherek - Universitaet der Bundeswehr Muenchen
Michael Steppert - Coburg University of Applied Sciences

05-08-01 Emerging Methods in CFD
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Sijun Zhang - ESI US R&D, Inc.***
Chair: ***Javid Bayandor - University at Buffalo, The State University***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***

Three-Dimensional Weighted Multiple-Relaxation-Time Pseudopotential Lattice Boltzmann Method for Multiphase Flow, {FEDSM2021-65506}
Technical Paper Publication
Jun Tang - Shanghai Jiao Tong University
Shengyuan Zhang - Shanghai Jiao Tong University
Huiying Wu - Shanghai Jiao Tong University

A Three Dimensional Phase Field Based Nonorthogonal Multiple-Relaxation-Time Lattice Boltzmann Method for Interface Tracking, {FEDSM2021-65509}
Technical Paper Publication
Shengyuan Zhang - Shanghai Jiao Tong University
Jun Tang - Shanghai Jiao Tong University
Huiying Wu - Shanghai Jiao Tong University

Solution-Responsive Particle Size Adaptivity in Lagrangian Vortex Particle Methods, {FEDSM2021-65621}
Technical Paper Publication
Mark Stock - Applied Scientific Research Inc
Adrin Gharakhani - Applied Scientific Research, Inc.

A Hybrid High-Order Vorticity-Based Eulerian and Lagrangian Vortex Particle Method, the 2-D Case, {FEDSM2021-65637}
Technical Paper Publication
Mark Stock - Applied Scientific Research Inc
Adrin Gharakhani - Applied Scientific Research Inc.

Performing Fourier Transform on a Velocity Profile From Atmospheric Turbulence Studies, {FEDSM2021-65812}
Technical Paper Publication
Richard Adansi - The University of Texas at El Paso
Jose Terrazas - The University of Texas at El Paso
Arturo Rodriguez - The University of Texas at El Paso
Aldo Rubio - The University of Texas at El Paso
Edgar Avalos - The University of Texas at El Paso
V M Krushnarao Kotteda - University of Wyoming
Vinod Kumar - The University of Texas at El Paso

06-03-01 Biologically Enabled Microfluidics and Biomicrofluidics
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Rasim Guldiken - University of South Florida***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Mohammad Hossan - University of Central Oklahoma***

Movement of Myoblast Flowing Through Electric Field Perpendicular to Flow Channel, {FEDSM2021-65204}
Technical Paper Publication
Shigehiro Hashimoto - Kogakuin University
Kiyoshi Yoshinaka - National Institute of Advanced Industrial Science & Technology

Behavior of Cell Passing Through Micro Slit Between Micro Machined Plates, {FEDSM2021-65209}
Technical Paper Publication
Shigehiro Hashimoto - Kogakuin University
Kiyoshi Yoshinaka - National Institute of Advanced Industrial Science and Technology
Hiroki Yonezawa - Kogakuin University

Tracings of Behavior of Myoblasts Cultured Under Couette Type of Shear Flow Between Parallel Disks, {FEDSM2021-65207}
Technical Paper Publication
Shigehiro Hashimoto - Kogakuin University
Hiroki Yonezawa - Kogakuin University

Movement of Cell Flowing Over Oblique Micro Grooves in Flow Channel, {FEDSM2021-65211}
Technical Paper Publication
Shigehiro Hashimoto - Kogakuin University
Hiroki Yonezawa - Kogakuin University

05-01-02 Applied CFD
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Ning Zhang - McNeese State University***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***S. Bhushan - Assistant Professor, Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***

Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Volume of Fluid Simulations of Copper Droplet Splat and Sensitivity to Modeling Methods, {FEDSM2021-65318}
Technical Paper Publication
Laurie Florio – U.S. ARMY DEVCOM - AC

Effect of Aerodynamic Moment on High-Speed Maglev Train Under Complicated Conditions, {FEDSM2021-61883}
Technical Paper Publication
Bo Yin - Institute of Mechanics, Chinese Academy of Sciences
Zhanzhou Hao - Institute of Mechanics, Chinese Academy of Sciences
Guowei Yang - Institute of Mechanics, Chinese Academy of Sciences
Pan Xiao - Institute of Mechanics, Chinese Academy of Sciences

Shape Optimisation of NACA4412 In-Ground Effect- Selection of a Turbulence Model, {FEDSM2021-65600}
Technical Paper Publication
Jithin P. N. - Rajagiri School of Engineering & Technology
Ajith Kumar Arumugham-Achari - Rajagiri School of Engineering & Technology

Numerical Simulation of Bubble Growth During Flow Boiling in Microchannel, {FEDSM2021-67323}
Technical Presentation Only
Lin Yuhao - Zhejiang university
Li Wei - Zhejiang University

CFD Simulation of COVID Aerosol Dispersion in Indoor Environments, {FEDSM2021-65877}
Technical Paper Publication
Mohammed Abushamleh - McNeese State University
Ning Zhang - McNeese State University

02-01-02 Fluid Measurement and Instrumentation
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Ivaylo Nedyalkov – The University of New Hampshire***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Soroor Karimi - The University of Tulsa***

Thermal Imaging for Non-Invasive Temperature Measurement in Thin Fluid Encapsulations, {FEDSM2021-74614}
Technical Presentation Only
Kyle Teather - Western University

Kamran Siddiqui - Western University

Experimental Investigations on the Effect of a Wavy Surface on Hydrodynamic Instabilities in a Taylor-Couette System, {FEDSM2021-65631}
Technical Paper Publication
Lamia Gaied - Université Polytechnique Hauts-de-France, INSA Hauts-de-France
Emna Berrich - Université de Nantes
Marc Lippert - Université Polytechnique Hauts-de-France
Fethi Aloui - Université Polytechnique Hauts-de-France, INSA Hauts-de-France
Laurent Keirsbulck - Université Polytechnique Hauts-de-France, INSA Hauts-de-France

Low Temperature Testing of Ultrasound Sensors in Liquid Nitrogen, {FEDSM2021-64577}
Technical Paper Publication
Joseph Chul Chung - Cytroniq Inc.
Michael Myung-Sub Lee - Cytroniq Inc.
Sejong Chun - Korea Research Institute of Standards and Science
Inseok Yang - Korea Research Institute of Standards and Science

Use of Laser Doppler Vibrometry for Measuring Flow-Induced Vibration of a Thermowell in a Pipe Flow, {FEDSM2021-64609}
Technical Paper Publication
Sejong Chun - Korea Research Institute of Standards and Science
Sibok Lee - WISE Control Inc.
Hyewon Yoon - WISE Control Inc.

Inverse Problems in Magnetic Resonance Velocimetry: Shape, Forcing and Boundary Condition Inference, {FEDSM2021-66080}
Technical Paper Publication
Alexandros Kontogiannis - University of Cambridge
Matthew Juniper - University of Cambridge

01-01-02 Fluid Machinery Symposium
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Chadalavada Venkateswara Babu - GE, retired***

Impact of Flow Characteristics on the Pressure Distribution on Sluice Gates, {FEDSM2021-65396}
Technical Paper Publication
Michael Steppert - Coburg University of Applied Sciences
Andreas Malcherek - Universitaet der Bundeswehr Muenchen
Philipp Epple - Coburg University of Applied Sciences

Study on Overall Design of a Vertical Take-Off and Landing Unmanned Aerial Vehicle Powered by Electric Ducted Fans, {FEDSM2021-65556}
Technical Paper Publication

Tawei Chou - Tsinghua University
Qiyu Ying - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Yuping Qian - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Weilin Zhuge - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Yangjun Zhang - State Key Laboratory of Automotive Safety and Energy, Tsinghua University

Performance Analysis of Multi-Sectional Cycloidal Hydrokinetic Turbines, {FEDSM2021-65643}
Technical Paper Publication
Ang Li - Purdue University
Yijie Wang - Purdue University
Jun Chen - Purdue University
Greg Jensen - Purdue University
Haiyan Zhang - Purdue University

Performance Optimization for Cycloidal Hydrokinetic Turbine With Augmentation Duct for Harvesting Riverine Energy, {FEDSM2021-65753}
Technical Paper Publication
Yijie Wang - Purdue University
Ang Li - Purdue University
Greg Jensen - Purdue University
Jun Chen - Purdue University
Haiyan Zhang - Purdue University

Flow Characteristics and Leakage Analysis of Rotary Engines, {FEDSM2021-65658}
Technical Presentation Only
Kuan-Ting Chen - National Formosa University
Chiu-Fan Hsieh - National Formosa University
Tehseen Johar - National Formosa University

Suppression of Diffuser Rotating Stall in a Centrifugal Pump by Use of Slit Vane, {FEDSM2021-65519}
Technical Paper Publication
Shunya Takao - Osaka Institute of Technology
Shinich Konno – Nikkiso Co, Ltd.
Shinichirou Ejiri - Nikkiso Co, Ltd.
Masahiro Miyabe - Osaka Institute of Technology

04-04-02 Gas-Liquid Flows
8/10/2021
12:50 PM - 1:50 PM

Chair: ***Timothy O'Hern - 4-4 Topic Organizer and Sandia National Laboratory, retired***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Yue Ling - Baylor University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Influence of the Local Airflow Behavior on Liquid Jet Droplet Dynamics, {FEDSM2021-75774}
Technical Presentation Only
Matthew Mahaffy - University of Western Ontario
Kamran Siddiqui - University of Western Ontario

Jet Dynamics Associated With Drop Impact on Microstructured Hydrophilic Substrates, {FEDSM2021-65789}
Technical Presentation Only
Brooklyn Asai - Washington State University Vancouver
Anayet Siddique - Washington State University Vancouver
Hua Tan - Washington State University-Vancouver

Drop Fragmentation on Biological Surfaces, {FEDSM2021-65981}
Technical Presentation Only
Seungho Kim - Cornell University
Brian Wu - Cornell University
Jason Dombroskie - Cornell University
Sunghwan Jung - Cornell University

Numerical Simulation of the Covid-19 Airborne Transmission in Trains, {FEDSM2021-65841}
Technical Presentation Only
Mohammad Hejazi - Shiraz University
Sasan Sadrizadeh - KTH Royal Institute of Technology
Goodarz Ahmadi - Clarkson University
Omid Abouali - Shiraz University

Research on the Performance of a Passive Gas-Liquid Separator Used in Space, {FEDSM2021-66268}
Technical Paper Publication
Chengshuo Wu - Zhejiang University
Bin Huang - Zhejiang University
Peng Wu - Zhejiang University
Dazhuan Wu - Zhejiang University

WEDNESDAY, AUGUST 11

02-08-01 Experimental Facilities in Fluid Mechanics
8/11/2021
10:50 AM - 11:50 AM

Chair: ***Ivaylo Nedyalkov – The University of New Hampshire***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Soroor Karimi - The University of Tulsa***

An Experimental Study on the Effects of Burst Pressure on Air Blast Development in a Blast Wave Simulator, {FEDSM2021-65930}
Technical Paper Publication
Parker Zieg - East Carolina University
John Benson - East Carolina University
Yang Liu - East Carolina University

Design of Gust Wind Tunnel With Unsteady and Shear Main-Flows, {FEDSM2021-65946}
Technical Paper Publication
Yu Nishio - Seikei University
Ryotaro Miyazaki - Seikei University
Takanobu Ogawa - Seikei University

Experimental Investigation of Lagrangian Coherent Structures and Lobe Dynamics in Perturbed Rayleigh-Benard Convection, {FEDSM2021-64945}
Technical Paper Publication
Masahito Watanabe - Waseda University
Hiroaki Yoshimura - Waseda University

Stereographic Backlit Imaging and Bubble Identification From a Plunging Jet With Floor Interactions, {FEDSM2021-65313}
Technical Paper Publication
Roy Pillers - Iowa State University
Theodore Heindel - Iowa State Univeristy

03-03-01 Fluid Power
8/11/2021
10:50 AM - 11:50 AM

Chair: ***Javid Bayandor - The State University of New York***
Chair: ***Sylvester Abanteriba - RMIT University***
Chair: ***Jun Chen - Purdue University***
Chair: ***Deify Law - California State University, Fresno***

Optimal Aerodynamic Design of Ducted Wind Turbines for Maximum Power Output, {FEDSM2021-66075}
Technical Presentation Only
Nojan Bagheri Sadeghi - Clarkson University
Brian Helenbrook - Clarkson University
Kenneth Visser - Clarkson University

Performance of Kaplan Turbine Operating at Design Condition, {FEDSM2021-65561}
Technical Paper Publication
Muhannad Altimemy - Lehigh University
Justin Caspar - Lehigh University
Saif Watheq - Kufa University
Alparslan Oztekin - Lehigh University

Flow Characterization of an Industrial Size Francis Turbine Operating at Ultra-Low Load: The Effect of Water Injection, {FEDSM2021-65559}
Technical Paper Publication
Muhannad Altimemy - Lehigh University
Justin Caspar - Lehigh University

Saif Watheq - Kufa University
Alparslan Oztekin - Lehigh University

Numerical Simulations and Data Analyses to Identify Aerodynamic Noise Sources Emitted From Small Axial Fan, {FEDSM2021-65995}
Technical Paper Publication
Wataru Obayashi - Tokyo University of Science
Hikaru Aono - Shinshu University
Tomoaki Tatsukawa - Tokyo University of Science
Kozo Fujii - Tokyo University of Science
Koichi Takeda - MinebeaMitsumi Inc.
Kazutoshi Takemi - MinebeaMitsumi Inc.
Naoya Murakami - MinebeaMitsumi Inc.

03-05-01 Turbulent Flows
8/11/2021
10:50 AM - 11:50 AM

Chair: ***Lyes Khezzar - Khalifa University of Science and Technology***
Chair: ***Jun Chen - Purdue University***
Chair: ***Kamran Siddiqui - University of Western Ontario***
Chair: ***Suraj Jain Megharaja - University at Buffalo***
Chair: ***Deify Law - California State University, Fresno***
Chair: ***Navid Goudarzi - University of North Carolina at Charlotte***

Vortical Structures and Mixing Characteristics of Flow in Randomly Packed Porous Media During Transition to Turbulence, {FEDSM2021-65431}
Technical Paper Publication
Reza Ziazi - Worcester Polytechnic Institute
James Liburdy - Oregon State University

Interactions Between the Shear Layer Emanating From Rectangular Cylinders and the Near Wake Region, {FEDSM2021-65448}
Technical Paper Publication
Sedem Kumahor - University of Manitoba
Samuel Addai - University of Manitoba
Mark F. Tachie - University of Manitoba

Modeling of Cube Array Roughness: RANS, LES, and DNS, {FEDSM2021-65494}
Technical Paper Publication
Samuel Altland - The Pennsylvania State University
Haosen Xu - The Pennsylvania State University
Xiang Yang - The Pennsylvania State University
Robert Kunz - The Pennsylvania State University

Second Moment Closure Modeling and DNS of Stratified Shear Layers, {FEDSM2021-65570}

Technical Paper Publication
Naman Jain - The Pennsylvania State University
Hieu T. Pham - University of California San Diego
Xinyi Huang - The Pennsylvania State University
Sutanu Sarkar - University of California San Diego
Xiang Yang - The Pennsylvania State University
Robert Kunz - The Pennsylvania State University

Influence of Wall Proximity on the Wake Dynamics Behind a Square Cylinder, {FEDSM2021-65593}
Technical Paper Publication
Samuel Addai - University of Manitoba
Afua Adobea Mante - University of Manitoba
Sedem Kumahor - University of Manitoba
Xingjun Fang - University of Manitoba
Mark F. Tachie - University of Manitoba

Influence of Stroke Length on Heat Transfer Characteristics of Impinging Axisymmetric Synthetic Jet, {FEDSM2021-60912}
Technical Presentation Only
Malkeet Singh - Indian Institute of Technology Kanpur
Arun K. Saha - Indian Institute of Technology Kanpur

04-05-01 Liquid-Solid Flows
8/11/2021
10:50 AM - 11:50 AM

Chair: ***Mark R Duignan - Savannah River National Laboratory***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Machine Learning Approach to Predict Sand Transport in Horizontal and Inclined Flow, {FEDSM2021-65229}
Technical Paper Publication
Ronald Vieira - The University of Tulsa
Bohan Xu - The University of Tulsa
Soroor Karimi - The University of Tulsa
Siamack Shirazi - The University of Tulsa

An LBM Study of the Sedimentation Behaviors of Double Particles With Non-Identical Sizes, {FEDSM2021-65510}
Technical Paper Publication
Wentao Dai - Shanghai Jiao Tong University
Jun Tang - Shanghai Jiao Tong University
Shengyuan Zhang - Shanghai Jiao Tong University
Huiying Wu - Shanghai Jiao Tong University

Large Particle Separation From Non-Newtonian Slurries Using Bump Arrays, {FEDSM2021-65904}
Technical Paper Publication
Judith Bamberger - FEDSM2020 Chair and Senior Research Engineer, Pacific Northwest National Laboratory
Leonard Pease - Pacific Northwest National Laboratory
Carolyn Burns - Pacific Northwest National Laboratory
Michael Minette - Pacific Northwest National Laboratory

Can Bump Arrays Separate Particles From Turbulent Flows?, {FEDSM2021-67696}
Technical Paper Publication
Judith Bamberger - FEDSM2020 Chair and Senior Research Engineer, Pacific Northwest National Laboratory
Leonard Pease - Pacific Northwest National Laboratory
Jason Serkowski - Pacific Northwest National Laboratory
Timothy Veldman - Pacific Northwest National Laboratory
Jonathan Williams - Pacific Northwest National Laboratory
Xiao-Ying Yu - Pacific Northwest National Laboratory
Michael Minette - Pacific Northwest National Laboratory
Carolyn Burns - Pacific Northwest National Laboratory

Multiresolution Analysis of Lagrangian Trajectories in Multiphase Flow Mixing, {FEDSM2021-67356}
Technical Presentation Only
Chiya Savari - University of Birmingham
Mostafa Barigou - University of Birmingham

05-03-01 DNS, LES and Hybrid-RANS/LES Methods
8/11/2021
10:50 AM - 11:50 AM

Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***Haibo Dong - University of Virginia***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Assessment of Predictive Capability of Hybrid RANS/LES Turbulence Models for Thermofluid Applications, {FEDSM2021-65808}
Technical Paper Publication
Anup Zope - Mississippi State University
Avery Schemmel - Mississippi State University
Xiao Wang - Mississippi State University
Shanti Bhushan - Mississippi State University
Prashant Singh - Mississippi State University
Edward Luke - Mississippi State University

Statistically Targeted Forcing (STF) Method for Synthetic Turbulence Generation of Initial Conditions in Three-Dimensional Turbulent Mixing Layer Flow, {FEDSM2021-65916}
Technical Paper Publication
Olalekan Shobayo - University of Oklahoma
Dibbon Keith Walters - University of Oklahoma

LES Analysis of Flow Around the Airfoil According to Airfoil Shape and Reynolds Numbers, {FEDSM2021-74381}
Technical Presentation Only
Chaeyoung Song - Seoul national University of Science and Technology
Jungwoo Kim - Seoul national University of Science and Technology

Computational Modeling of Planing Hull Dynamics and Slamming in Head Waves, {FEDSM2021-65548}
Technical Paper Publication
Konstantin Matveev - Washington State University

Towards Industrial Large Eddg Simulation With Adaptive High-Order Methods, {FEDSM2021-76168}
Keynote
Zhi Wang - University of Kansas

01-02-02 Pumping Machinery Symposium
8/11/2021
10:50 AM - 11:50 AM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Ernesto Primero - Chevron***

From Research to Impact, {FEDSM2021-76798}
Keynote
Steffen Poulsen - Siemens Gamesa

Research on Formation Mechanism and Suppression Method of Surface Force Caused by Pump Jet Propeller, {FEDSM2021-65423}
Technical Paper Publication
Yu Zhang - Zhejiang University
Dazhuan Wu - Zhejiang University

Fuzzy Method Applied at Energetic and Economic Rehabilitation of Pumping Station, {FEDSM2021-65616}
Technical Paper Publication

Victorita Radulescu - University Politehnica of Bucharest

Improvements of Flow Control With Fluid Injection for the Suppression of Flow Instabilities in Pump-Turbines, {FEDSM2021-65115}
Technical Paper Publication
Sabri Deniz - Lucerne University of Applied Sciences
Fabio Asaro - Lucerne Univerisity of Applied Sciences

Comparison of Axial Water and Air Injections in the Draft Tube of a Francis Turbine for RVR Mitigation, {FEDSM2021-65503}
Technical Paper Publication
Subodh Khullar - Indian Institute of Technology Roorkee
Krishna Singh - Indian Institute of Technology Roorkee
Michel Cervantes - Lulea University of Technology
Bhupendra Gandhi - Indian Institute of Technology Roorkee

06-03-02 Biologically Enabled Microfluidics and Biomicrofluidics
8/11/2021
10:50 AM - 11:50 AM

Chair: ***Rasim Guldiken - University of South Florida***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Mohammad Hossan - University of Central Oklahoma***

Automated Mini-Channel Platform for Studying Plant Root Environments, {FEDSM2021-65493}
Technical Paper Publication
Kevin Kreis - University of Nebraska-Lincoln
Sangjin Ryu - University of Nebraska-Lincoln

Hysteresis Effect of Tangential Force Field With Centrifuge on Myoblast: Cultured on Striped Pattern of Micro Ridge for Direction Control, {FEDSM2021-65639}
Technical Paper Publication
Shigehiro Hashimoto - Kogakuin University

A Microfluidic Platform for On-Chip Analysis of Circulating Tumor Cells, {FEDSM2021-65766}
Technical Paper Publication
Jeff Darabi - Southern Illinois University Edwardsville
Joseph Schober - Southern Illinois University Edwardsville

A Comprehensive Review of Three-Dimensional Neuro-Organoids and Engineering Brain-on-a-Chip Microfluidic Devices, {FEDSM2021-65892}
Technical Paper Publication
Lamees I. El Nihum - Texas A&M University; Houston Methodist Hospital;
Nandan Shettigar - Texas A&M University
Debjyoti Banerjee - Texas A&M University
Robert Krencik - Houston Methodist Research Institute

01-07-01 Industrial Fluid Mechanics
8/11/2021
12:50 PM - 1:50 PM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Gen Fu - Virginia Tech***
Chair: ***Kevin Anderson - California State Polytechnic University***

Modeling Supersonic Parachute Inflations and Plume-Surface Interactions for Landing Spacecraft on Mars, {FEDSM2021-76393}
Keynote
Jason Rabinovitch - Stevens Institute of Technology

Multiphysics Modeling and Simulation of an Arc-Jet Sprayer, {FEDSM2021-65319}
Technical Paper Publication
Kevin Anderson - California State Polytechnic University
Juan J. Campos Manzo - California State Polytechnic University at Pomona
Nicole Wagner - California State Polytechnic University at Pomona

Pressure Drop Mechanisms Generated in a Cooling System Enclosure of Construction Machinery, {FEDSM2021-65578}
Technical Paper Publication
Takashi Kawano - Tadano Ltd.
Masaki Fuchiwaki - Kyushu Institute of Technology

The Effect of Membrane Topology on Separation Performance of Vacuum Membrane Distillation Module, {FEDSM2021-65611}
Technical Paper Publication
Justin Caspar - Lehigh University
Guanyang Xue - Lehigh University
Robert Krysko - Lehigh University
Alparslan Oztekin - Lehigh University

Performance Characterization of Hollow Fiber Vacuum Membrane Distillation Module for Desalination, {FEDSM2021-65612}
Technical Paper Publication
Justin Caspar - Lehigh University
Guanyang Xue - Lehigh University
Alparslan Oztekin - Lehigh University
Robert Krysko - Lehigh University

2-03-01 Fluid Dynamics of Wind Energy

/11/2021
12:50 PM - –:50 PM

Chair: ***Ivaylo Nedyalkov – The University of New Hampshire***
Chair: ***Philipp Epple - –oburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - –tah State University***
Chair: ***Soroor Karimi - –he University of Tulsa***

Wind Tunnel Experiment on the Aerodynamic Interaction Between Vertical Axis Wind Turbine Pair, {FEDSM2021-65280}
Technical Paper Publication
Hao Su - –singhua University
Haoran Meng - –singhua University
Jia Guo - –singhua University
Timing Qu - –singhua University
Liping Lei - –singhua University

Aerodynamic Performance and Wake Characteristics of a Wind Turbine Model Subjected to Surge and Sway Motions, {FEDSM2021-65608}
Technical Paper Publication
Haoran Meng - –singhua University
Hao Su - –singhua University
Jia Guo - –singhua University
Timing Qu - –singhua University
Liping Lei - –singhua University

Numerical Simulation of Wind Effect Over Industrial Chimneys in CET West Bucharest, {FEDSM2021-65618}
Technical Paper Publication
Victorita Radulescu - –niversity Politehnica of Bucharest

Shape Reconstruction of Liquid Ligaments and Droplets Model via Multi-View Digital Inline Holography, {FEDSM2021-65861}
Technical Paper Publication
Weixiao Shang - –urdue University
Jun Chen - –urdue University
Terrence Meyer - –urdue University
Mateo Gomez-Gomez - –urdue University

A Single-Camera Synthetic Schlieren Method for Measuring Two-Dimensional Liquid Surfaces, {FEDSM2021-66507}
Technical Paper Publication
Duo Xu - –he State Key Laboratory of Nonlinear Mechanics, Institute of Mechanics, Chinese Academy of Sciences
Huixin Li - –enter of Applied Space Technology and Microgravity, University of Bremen
Marc Avila - –enter of Applied Space Technology and Microgravity, University of Bremen

03-04-01 Bio-Inspired and Biomedical Fluid Mechanics
8/11/2021
12:50 PM - –:50 PM

Chair: ***Javid Bayandor - –niversity at Buffalo, The State University of New York***
Chair: ***Michael Plesniak- George Washington University***
Chair: ***Keith Walters- University of Oklahoma***
Chair: ***Jun Chen - –urdue University***
Chair: ***Deify Law - –alifornia State University, Fresno***

Swimming of the Trophont Zooid of Vorticella Convallaria, {FEDSM2021-63265}
Technical Paper Publication
Dilziba Kizghin - –niversity of Nebraska-Lincoln
Sangjin Ryu - –niversity of Nebraska-Lincoln
Younggil Park - –lorida Polytechnic University
Sunghwan Jung - –ornell University

Tracings of Interaction Between Myoblasts Under Shear Flow in Vitro, {FEDSM2021-65203}
Technical Paper Publication
Shigehiro Hashimoto - –ogakuin University
Takashi Yokomizo - –ogakuin University

Behavior of Cell Under Wall Shear Stress in Flow Field: Comparison Among Cell Types, {FEDSM2021-65205}
Technical Paper Publication
Shigehiro Hashimoto - –ogakuin University
Kiyoshi Yoshinaka - –ational Institute of Advanced Industrial Science & Technology
Hiroki Yonezawa - –ogakuin University

A Novel Mathematical Framework for the Venous Valve Leaflet Morphology Extracted From In-Vitro Images Using Machine Learning Assisted Stereological Analysis, {FEDSM2021-65744}
Technical Paper Publication
V M Krushnarao Kotteda - –niversity of Wyoming
Herb Janssen - –eepVein Inc
Christopher Harris - –eepVein Inc
Vinod Kumar - –eepVein Inc

Volumetric Flow Visualization and Measurement on Housefly Using High Speed Schlieren Photography and Shake-the-Box System, {FEDSM2021-75005}
Technical Presentation Only
Yun Liu - –urdue University Northwest
Angel Galarza - –urdue University Northwest

03-06-01 Flow Manipulation and Active Control
8/11/2021
12:50 PM - 1:50 PM

Chair: ***Hassan Peerhossaini - Université Paris Diderot***
Chair: ***Jun Chen - Purdue University***
Chair: ***Deify Law - California State University, Fresno***

Passive Drag Reduction Technology Using Microfiber Coatings, {FEDSM2021-61461}
Technical Paper Publication
Mitsugu Hasegawa - University of Notre Dame
Hirotaka Sakaue - University of Notre Dame

Experimental Study on Heat Transfer of Dielectric Barrier Discharge Plasma Actuator Considering Heat Conduction of Dielectric Material, {FEDSM2021-64270}
Technical Paper Publication
Asami Hatamoto - Tokyo University of Agriculture and Technology
Kenta Emori - Tokyo University of Agriculture and Technology
Hiroyuki Nishida - Tokyo University of Agriculture and Technology

Frequency Response of Synthetic Jets Emanating From an Array of Circular Orifices, {FEDSM2021-65225}
Technical Paper Publication
Nadim Arafa - University of Toronto
Alis Ekmekci - University of Toronto
Pierre Sullivan - University of Toronto

Numerical Study of Aerodynamic Forces of Two Airfoils in Tandem Configuration at Low Reynolds Number, {FEDSM2021-65301}
Technical Paper Publication (Iran)
Mehran Tadjfar - Amirkabir University of Technology
Niloofar Hosseini - Amirkabir University of Technology
Antonella Abba - Politecnico di Milano

Analysis and Implementation of Dielectric Barrier Discharge Plasma Actuators for Ground Vehicles Wake Reduction, {FEDSM2021-65735}
Technical Paper Publication
Frederico Rodrigues - Universidade da Beira Interior
Miguel Moreira - Universidade da Beira Interior
Jose Pascoa - Universidade da Beira Interior

PIV Visualization of Flow Around Airfoil Controlled by Synthetic Jet Actuators at Shear-Layer and Wake Instability Frequencies, {FEDSM2021-65482}
Technical Paper Publication
Eric Yang - University of Toronto
Pierre Sullivan - University of Toronto

04-04-01 Gas-Liquid Flows
8/11/2021
12:50 PM - 1:50 PM

Chair: ***Timothy O'Hern - 4-4 Topic Organizer and Sandia National Laboratory, retired***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Yue Ling - Baylor University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Experimental Testing and Numerical Modeling of Small-Scale Boat With Drag-Reducing Air-Cavity System, {FEDSM2021-62556}
Technical Paper Publication
Jeffrey Collins - Washington State University
Phillip Whitworth - Washington State University
Konstantin Matveev - Washington State University

CFD Modelling for Gas-Liquid and Liquid-Liquid Taylor Flows in the Entrance Region of Microchannels, {FEDSM2021-64172}
Technical Paper Publication
Amin Etminan - Memorial University of Newfoundland
Yuri S. Muzychka - Memorial University of Newfoundland
Kevin Pope - Memorial University of Newfoundland

RANS-VOF Simulations of Fully Developed Density-Stratified Air-Water Flow in a 3D Rectangular Duct, {FEDSM2021-65177}
Technical Paper Publication
Chandrima Jana Maiti - University of Cincinnati
Urmila Ghia - University of Cincinnati
Leonid Turkevich - National Institute of Occupational Health and Safety

Elementary Numerical Analysis of Wet Foam Formation and Study of Its Flow Structures and Physical Behavior, {FEDSM2021-65627}
Technical Paper Publication (Iran)
Sima Nasirzade - Isfahan University of Technology
Ebrahim Shirani - Isfahan University of Technology
Fethi Aloui - Université Polytechnique Hauts-de-France, INSA Hauts-de-France

Experimental Characterization of Two-Phase Swirl Flow Interacting With a Circular Bluff Body, {FEDSM2021-65664}
Technical Paper Publication
Rafael Hernandez - Khalifa University
Afshin Goharzadeh - Khalifa University of Science and Technology
Mahmoud Meribout - Khalifa University
Lyes Khezzar - Khalifa University of Science and Technology

04-06-01 Gas-Solid Flows
8/11/2021
12:50 PM - 1:50 PM

Chair: ***Goodarz Ahmadi - Clarkson University***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Detailed Analysis of Fiber Motion in Human Nasal Airways, {FEDSM2021-65576}
Technical Paper Publication
Jiang Li - RMIT University
Jiawei Ma - Fusetec 3D Pty Ltd
Goodarz Ahmadi - Clarkson Univ
Jiyuan Tu - RMIT University
Lin Tian - RMIT University

Influence of Thermal Plume on Particle Inhalability of a Lying Mannequin in a Room, {FEDSM2021-65652}
Technical Paper Publication (Iran)
Maryam Habibi - Shiraz Branch, Islamic Azad University
Mohsen Heidary - Shiraz Branch, Islamic Azad University
Mohammad Mehdi Tavakol - Shiraz Branch, Islamic Azad University
Goodarz Ahmadi - Clarkson University

Dispersion of Particles Coming out of the Mouth While Speaking in a Ventilated Indoor Environment, {FEDSM2021-65837}
Technical Paper Publication (Iran)
Morteza Ali Masoomi - Shahid Bahonar University of Kerman
Mazyar Salmanzadeh - Shahid Bahonar University of Kerman
Goodarz Ahmadi - Clarkson Univ

Shock-Induced Multiphase Instability in a High Volume Fraction Finite-Thickness Particle Layer, {FEDSM2021-65446}
Technical Paper Publication
Bertrand Rollin - Embry-Riddle Aeronautical University
Frederick Ouellet - Los Alamos National Laboratory
Bradford Durant - University of Florida
Rahul Babu Koneru - University of Maryland
S. Balachandar - University of Florida

A Gas-Particle Analogue to the Richtmyer-Meshkov Instability: Comparing Multiphase Simulations to Shock Tube Experiments, {FEDSM2021-65852}
Technical Paper Publication
Frederick Ouellet - Los Alamos National Laboratory
Bertrand Rollin - Embry-Riddle Aeronautical University
Bradford Durant - University of Florida
Rahul Babu Koneru - University of Maryland, College Park

S. Balachandar - University of Florida

05-09-01 Open Source CFD Applications
8/11/2021
12:50 PM - 1:50 PM

Chair: ***Sijun Zhang - ESI US R&D, Inc.***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***

Numerical Analysis on the Flow Bifurcation and Heat Transfer Regulation in the Constricted Cavity Under the Transverse Magnetic Field Using OpenFOAM, {FEDSM2021-61944}
Technical Paper Publication
Ranjit Singh - Visvesvaraya National Institute of Technology Nagpur
Trushar Gohil - Visvesvaraya National Institute of Technology Nagpur

Aeroacoustic Analysis of a UAV Propeller Operable at Various Altitudes, {FEDSM2021-65363}
Technical Paper Publication
Ji-Hun Song - Sungkyunkwan University
Seungsoo Jang - Sungkyunkwan University
Youn-Jea Kim - Sungkyunkwan University

Application of OpenFOAM in Numerical Simulations of High-Speed Trains Aerodynamics, {FEDSM2021-65684}
Technical Paper Publication
Panpan Lu - Institute of Mechanics, Chinese Academic of Sciences
Bo Yin - Institute of Mechanics Chinese Academy of Sciences
Guowei Yang - Institute of Mechanics, Chinese Academic of Sciences
Zhanling Ji - Institute of Mechanics, Chinese Academy of Sciences

Harnessing the Power of the Cloud - Computational Fluid Dynamics With SimScale, {FEDSM2021-66406}
Technical Paper Publication
Jousef Murad - SimScale

Study of Fluid Dynamics in Ice-Covered Lakes Using Openfoam, {FEDSM2021-74240}
Technical Presentation Only
Tyler Ainsworth – University of North Carolina at Charlotte

05-01-04 Applied CFD
8/11/2021
12:50 PM - 1:50 PM

Chair: ***Ning Zhang - McNeese State University***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Three-Dimensional Two-Phase Flow Simulations of Water Braking Phenomena for High-Speed Test Track Sled, {FEDSM2021-65799}
Technical Paper Publication
Jose Terrazas - The University of Texas at El Paso
Arturo Rodriguez - The University of Texas at El Paso
Richard Adansi - The University of Texas at El Paso
Vinod Kumar - The University of Texas at El Paso
V M Krushnarao Kotteda - University of Wyoming

Numerical Simulation of Single-Phase Flow and Heat Transfer in Various Manifold Microchannel, {FEDSM2021-67086}
Technical Presentation Only
Lin Yuhao - Zhejiang university
Li Wei - Zhejiang University

Parametric Study on Wing-Lambda-Shock Formation, {FEDSM2021-60958}
Technical Paper Publication
Prasert Prapamonthon - King Mongkut's Institute of Technology Ladkrabang
Pattarasuda Chairach - King Mongkut's Institute of Technology Ladkrabang
Sirikorn Chainok - King Mongkut's Institute of Technology Ladkrabang
Thanapol Rungroch - King Mongkut's Institute of Technology Ladkrabang
Soemsak Yooyen - King Mongkut's Institute of Technology Ladkrabang
Bo Yin - Institute of Mechanics, Chinese Academy of Sciences
Guowei Yang - Institute of Mechanics, Chinese Academy of Sciences
Shengjun Ju - Institute of Mechanics, Chinese Academy of Sciences

Optimization of a Turbine Rotor Profile by Means of the Use of CFD and Generic Algorithms, {FEDSM2021-68137}
Technical Presentation Only
Miguel Toledo Velázquez - Instituto Politécnico Nacional
Francisco Eduardo Chavolla Alcalá - General Electric Querétaro
Mónica Toledo García - Instituto Politécnico Nacional

A Comprehensive Review of 4D Flow MRI and CFD in Cardiovascular and Congenital Heart Disease, {FEDSM2021-65886}
Technical Paper Publication
Lamees I. El Nihum - Texas A&M University
Ponraj Chinnadurai - Siemens Medical Solutions USA Inc.
C. Huie Lin - Houston Methodist DeBakey Heart & Vascular Center ; Weill Cornell Medical College
Debjyoti Banerjee - Texas A&M University

Flow Characterization in the Upper Cavity of a Rotary Compressor, {FEDSM2021-65868}
Technical Paper Publication
Puyuan Wu - Purdue University
Ang Li - Purdue University
Jun Chen - Purdue University
Paul Sojka - Purdue University
Yang Li - Guangdong Meizhi Compressor Co., Ltd.
Hongjun Cao - Guangdong Meizhi Compressor Co., Ltd.

THURSDAY, AUGUST 12

03-14-01 Vortex Dynamics
8/12/2021
10:50 AM - 11:50 AM

Chair: ***S.A. Sherif - University of Florida***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Jun Chen - Purdue University***
Chair: ***Deify Law - California State University, Fresno***

Observation and Discussion of Leading Edge Vortex Shedding From Laboratory-Scaled Cross-Flow Hydrokinetic Turbines in Counter-Rotating Configurations, {FEDSM2021-61338}
Technical Paper Publication
Minh Doan - Keio University
Yuriko Kai - Keio University
Takuya Kawata - Keio University
Ivan Alayeto - Keio University
Shinnosuke Obi - Keio University

Vorticity Growth Formed in Vicinity of a Wall on a Moving Elastic Airfoil, {FEDSM2021-65513}
Technical Paper Publication
Masaki Fuchiwaki - Kyushu Institute of Technology

Structural Analysis of Couette-Taylor Flow With Periodic Oscillation of the Inner Cylinder in Different Flow Regimes, {FEDSM2021-65626}
Technical Paper Publication (Iran)
Ebrahim Shirani - Isfahan University of Technology
Shima Mahmoodi - Isfahan University of Technology
Fethi Aloui - Université Polytechnique Hauts-de-France

Liutex Core Line for Vortex Structure in Turbulence, {FEDSM2021-66012}
Technical Paper Publication
Oscar Alvarez - University of Texas at Arlington
Chaoqun Liu - University of Texas at Arlington
Yifei Yu - University of Texas at Arlington

Large Scale Structures in Elevated Jet Normal to Crossflow, {FEDSM2021-66037}
Technical Paper Publication
Jyoti Gupta - Indian Institute of Technology Kanpur
Arun K Saha - Indian Institute of Technology Kanpur

Liutex and Third Generation of Vortex Identification, {FEDSM2021-66169}
Technical Paper Publication
Yifei Yu - University of Texas at Arlington
Chaoqun Liu - University of Texas at Arlington
Charles Nottage - University of Texas at Arlington
Oscar Alvarez - University of Texas at Arlington

04-07-01 Bubble, Droplet, and Aerosol Dynamics
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Thomas Shepard - University of St. Thomas***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Significance of Vocal Tract Geometrical Variations and Loudness on Airflow and Droplet Dispersion in a Two-Dimensional Representation of [F], {FEDSM2021-65485}
Technical Paper Publication
Amir A. Mofakham - Clarkson University
Brian Helenbrook - Clarkson University
Tanvir Ahmed - Clarkson University
Byron Erath - Clarkson University
Andrea Ferro - Clarkson University
Deborah Brown - Trudeau Institute
Goodarz Ahmadi - Clarkson University

An Investigation on the Bubble Breakup Characteristics by Recirculation Flow in a Venturi Channel, {FEDSM2021-65716}
Technical Paper Publication
Guodong Ding - China University of Petroleum Beijing
Jiaqing Chen - Beijing Institute of Petrochemical Technology
Zhenlin Li - China University of Petroleum Beijing

CFD Analysis on Biogas Bubble Creation Within a Stirred Tank of a Wastewater Treatment Plant, {FEDSM2021-65750}
Technical Paper Publication
Wolfgang Rauch - Universitaet Innsbruck
Soroush Dabiri - Universitaet Innsbruck

Stability Analysis of Vortex Flow With Dispersed Micro Droplets, {FEDSM2021-65824}
Technical Presentation Only
Shuai Shuai - Arizona State University
Mohamed Houssem Kasbaoui - Arizona State University

04-09-01 Erosion, Slurry, Sedimentation
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Mark R Duignan - Savannah River National Laboratory***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Francois Francois - Los Alamos National Laboratory***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Experimental Study of the Effect of Particle Size on Erosion of Elbows in Series for Annular Gas-Liquid Flows, {FEDSM2021-64375}
Technical Paper Publication
Mazen Othayq - The University of Tulsa
Ghulam Haider - The University of Tulsa
Ronald Vieira - The University of Tulsa
Siamack Shirazi - The University of Tulsa

Numerical Analysis of Elbow Erosion Mitigation Using Swirl Pipes in Gas-Particle Two-Phase Flows, {FEDSM2021-66013}
Technical Paper Publication (Iran)
Ali Farokhipour - Amirkabir University of Technology
Zohreh Mansoori - Amirkabir University of Technology
Majid Saffar-Avval - Amirkabir University of Technology
Goodarz Ahmadi - Clarkson University

Investigation of the Entrainment of Sediment Grains in an Oscillatory Boundary Layer at Increasing Reynolds Number Using High-Fidelity Eulerian-Lagrangian Simulations, {FEDSM2021-65850}
Technical Presentation Only
Jonathan Van Doren - Arizona State University
Mohamed Kasbaoui - Arizona State University

Numerical Investigation of Cloud Cavitation and Its Induced Shock Waves, {FEDSM2021-65731}
Technical Paper Publication
Takahiro Ushioku - Waseda University
Hiroaki Yoshimura - Waseda University

Investigation of Particle Size Effects on Solid Particle Erosion of Elbows in Series for Liquid-Solid Flows, {FEDSM2021-65875}
Technical Paper Publication

Yeshwanth Raj Rajkumar - The University of Tulsa
Soroor Karimi - The University of Tulsa
Siamack Shirazi - The University of Tulsa

05-04-01 Fluid Structure Interaction (Including IBM)
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Chengyu Li - Villanova University***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Wing Flutter Analysis Using Computational Fluid-Structure Interaction Dynamics, {FEDSM2021-61453}
Technical Paper Publication
Jeremy Pohly - The University of Alabama in Huntsville
Sijun Zhang - ESI US R&D, Inc.
Mike Zhang - The University of Alabama in Huntsville

Numerical Study of Fully Coupled Fluid-Structure Interaction of Stented Ureter by Varying the Stent Side-Holes, {FEDSM2021-64044}
Technical Paper Publication
Erick Martinez - University of Texas Rio Grande Valley
Ben Xu - Mississippi State University
Jianzhi Li - University of Texas Rio Grande Valley
Yingchen Yang - University of Texas Rio Grande Valley

Fluid-Structure Interaction Simulations of Parachute Deployment and Inflation, {FEDSM2021-65583}
Technical Paper Publication
Mingzhang Tang - Beijing Institute of Space Mechatronic
Liwu Wang - Beijing Institute of Space Mechatronic
Yu Liu - Beijing Institute of Space Mechatronic
Sijun Zhang - ESI US R&D, Inc.

Aerodynamic Performance of Design for a CO2 Dragster, {FEDSM2021-65793}
Technical Paper Publication
Brandon Paez - University of Texas at El Paso
Nicholas Dudu - University of Texas at El Paso
Arturo Rodriguez - University of Texas at El Paso
Jose Terrazas - University of Texas at El Paso
Richard Adansi - University of Texas at El Paso
Vinod Kumar - University of Texas at El Paso
Julio Aguilar - University of Texas at El Paso
V M Krushnarao Kotteda - University of Wyoming

A Novel Approach to Immersed Boundaries Based on the Volume-Filtering Framework, {FEDSM2021-65571}
Technical Presentation Only

Himanshu Dave - Arizona State University
Houssem Kasbaoui - Arizona State University

A Versatile IBM-Based AMR Method for Studying Human Snoring, {FEDSM2021-65790}
Technical Paper Publication
Wei Zhang - University of Virginia
Yu Pan - University of Virginia
Haibo Dong - University of Virginia
Jinxiang Xi - University of Massachusetts Lowell
Yuchen Gong - University of Virginia

05-11-01 Multi-physics Simulation
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Chengyu Li - Villanova University***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Numerical Investigation of Supercritical N-Dodecane Flows in a Heated Circular Pipe With Thermal Cracking, {FEDSM2021-65261}
Technical Paper Publication
Shuto Yatsuyanagi - Tohoku University
Takashi Furusawa - Tohoku University
Satoru Yamamoto - Tohoku University
Takuo Onodera - Japan Aerospace Exploration Agency
Sadatake Tomioka - Japan Aerospace Exploration Agency

The CFD Analysis of Cavitation Erosion and Structural Optimization for an Unloading Valve, {FEDSM2021-65695}
Technical Paper Publication
Kamal Upadhyay - Zhejiang University
Rui Yu - Zhejiang University
Hua Zhou - Zhejiang University
Huayong Yang - Zhejiang University

Turbulent Flow Simulation of Supercritical Hydrothermal Synthesis in T-Shaped Channel, {FEDSM2021-66023}
Technical Paper Publication
Takashi Furusawa - Tohoku University
Kenta Matsui - Tohoku University
Shuto Yatsuyanagi - Tohoku University
Satoru Yamamoto - Tohoku University
Akira Yoko - WPI-Advanced Institute for Materials Research, Tohoku University
Tadafumi Adschiri - WPI-Advanced Institute for Materials Research, Tohoku University

An Extended Fiver Framework for Modelling Laser-Fluid Coupling and Laser-Induced Cavitation, {FEDSM2021-65876}
Technical Presentation Only
Xuning Zhao - Virginia Tech
Wentao Ma - Virginia Tech
Ben Zhao - Virginia Tech
Olivier Coutier-Delgosha - Virginia Tech
Kevin Wang - Virginia Tech

Computational Investigation of Thrust Production of a Dolphin at Various Swimming Speeds, {FEDSM2021-65792}
Technical Paper Publication
Junshi Wang - University of Virginia
Zhipeng Lou - University of Virginia
Vadim Pavlov - Florida International University
Haibo Dong - University of Virginia

Cfd Modeling of Blood Flow in a Bidirectional Glenn Shunt and a Combined Bidirectional Glenn and Blalock-Taussig Shunt, {FEDSM2021-65102}
Technical Paper Publication
Chunhui Wang - Washington University in St. Louis
Ramesh Agarwal - Washington University

05-14-01 CFD Graduate Student Scholarship Competitions
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Sijun Zhang - ESI US R&D, Inc.***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***

Effects of Wing Kinematics on Modulating Odor Plume Structures in the Odor Tracking Flight of Fruit Flies, {FEDSM2021-61832}
Technical Paper Publication
Menglong Lei - Villanova University
Chengyu Li - Villanova University

An Improved Level-Set-Based Immersed Boundary Reconstruction Method for Computing Bio-Inspired Underwater Propulsion, {FEDSM2021-65599}
Technical Paper Publication
Yu Pan - University of Virginia
Haibo Dong - University of Virginia
Wei Zhang - University of Virginia

An Investigation of the Effects of Volume Fraction on Drag Coefficient of Non-Spherical Particles Using PR-DNS, {FEDSM2021-65809}

Technical Paper Publication
Pratik Mahyawansi - Florida International University
Cheng-xian Lin - Florida International University

A New RANS Correction to Account for Varying Viscosity Effects, {FEDSM2021-65823}
Technical Paper Publication
Victor Coppo Leite - Pennsylvania State University
Elia Merzari - Pennsylvania State University

Application of Scale-Resolving Simulations and Hybrid Models for Contraction-Expansion Pipe Flows, {FEDSM2021-65917}
Technical Paper Publication
Farzin Darihaki - The University of Tulsa
Siamack Shirazi - The University of Tulsa
Jun Zhang - The University of Tulsa

Uncertainty Estimation in CFD Simulations of Erosion for Elbows, {FEDSM2021-65987}
Technical Paper Publication
Elham Fallah Shojaie - University of Tulsa
Thiana A. Sedrez - University of Tulsa
Farzin Darihaki - University of Tulsa
Siamack Shirazi - University of Tulsa

06-04-01 Micro-Total-Analysis Systems (MicroTAS) and Lab-on-a-Chip Applications
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Rasim Guldiken - University of South Florida***
Chair: ***Mohammad Hossan - University of Central Oklahoma***

Design, Microfabrication and Testing of Brain-on-a-Chip (BOC) Platform Using Neural Organoids (Spheroids), {FEDSM2021-65894}
Technical Paper Publication
Nandan Shettigar - Texas A&M University
Lamees I. El Nihum - Texas A&M University; Houston Methodist Hospital
Ashok Thyagarajan - Texas A&M University
Debjyoti Banerjee - Texas A&M University
Robert Krencik - Houston Methodist Research Institute

Study on Fluid Mixing in a Magnetism-Driven Microfluidic Mixer, {FEDSM2021-61826}
Technical Presentation Only
Ran Zhou - Purdue University Northwest
Athira Surendran - Purdue University Northwest.

Simple, Cost-Effective Fabrication, and Flow Dynamics Analysis of a Passive Microfluidic Mixer Using 3D Printing and Soft Lithography, {FEDSM2021-65572}

Technical Paper Publication
Md Fazlay Rubby - University of Texas Rio Grande Valley
Mohammad Salman Parvez - University of Texas Rio Grande Valley
Nazmul Islam - University of Texas Rio Grande Valley

Effect of Non-Planar Tungsten V-Electrode Pattern in a 3D Printed Microfluidic System, {FEDSM2021-65659}
Technical Paper Publication
Mohammad Salman Parvez - University of Texas Rio Grande Valley
Md. Fazlay Rubby - University of Texas Rio Grande Valley
Shanzida Kabir - University of Texas Rio Grande Valley
Meah Imtiaz Zulkarnain - University of Texas Rio Grande Valley
Nazmul Islam - University of Texas Rio Grande Valley

Miniaturized Platform for On-Site Detection of E. Coli in Water Samples, {FEDSM2021-74545}
Technical Presentation Only
Carlos Manzanas - University of Florida
Elise Morrison - University of Florida
Todd Z. Osborne - University of Florida
Z. Hugh Fan - University of Florida

01-07-02 Industrial Fluid Mechanics
8/12/2021
10:50 AM - 11:50 AM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Ankit Tiwari - Gentherm***

CFD Analysis of Refrigeration Cycle Ejector, {FEDSM2021-62237}
Technical Paper Publication
Kevin Anderson - California State Polytechnic University
Franz Forster - Landshut University
Alex Deravanessian - California State Polytechnic University at Pomona
Matthew Nazarian - California State Polytechnic University at Pomona
Mariano Rubio - Citrus College - Automotive Technology

CFD Analysis and Wind Tunnel Testing of Human Powered Vehicle Drag Coefficients, {FEDSM2021-65393}
Technical Paper Publication
Kevin Anderson - University State Polytechnic University
Tony Estrada - University State Polytechnic Univ. at Pomona
Ivan Gundersen - University State Polytechnic Univ. at Pomona
Chuck Johnston - University State Polytechnic Univ. at Pomona

A Unified Theory for the Pressure Change of Sudden Expansions and Contractions Based on the Momentum Balance, {FEDSM2021-65703}
Technical Paper Publication
Sebastian Mueller - Bundeswehr University Munich
Andreas Malcherek - Bundeswehr University Munich

Numerical Study on a Flow Field in the Rinsing Process of a Beverage Can Transported With a Constant Velocity, {FEDSM2021-66025}
Technical Paper Publication
Tatsuma Kawachi - Seikei University
Takuto Sasaki - Seikei University
Aya Kaneko - Seikei University
Yu Nishio - Seikei University
Takanobu Ogawa - Seikei University

Multiplane Characterization of Mean and Turbulent Fields in a Channel Flow With Wall-Confined, Offset Columns, {FEDSM2021-74658}
Technical Presentation Only
Jamie Sammon - University of Western Ontario
Kamran Siddiqui - University of Western Ontario

Time Resolved PIV Measurements of a Slot Lobed Jet Issuing Into a Crossflow, {FEDSM2021-65783}
Technical Paper Publication
Michael Lewandowski - Texas A&M University
Paul Kristo - Texas A&M University
Abdullah Weiss - Texas A&M University
Mark Kimber - Texas A&M University

Flow Visualization Presentations and Awards
8/12/2021
12:00 PM - 12:45 PM

Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***

Flow Pattern on Microfin Enhanced Surfaces (Videos), {FEDSM2021-65450}
Flow Visualization Presentation
Puxuan Li - Kansas State University
Matthew Campbell - Kansas State University
Steven Eckels - Kansas State University

Experimental Characterization of Two-Phase Swirl Flow Interacting With a Circular Bluff Body, {FEDSM2021-65675}
Flow Visualization Presentation
Rafael Gonzalez Hernandez - Khalifa University

Sphere Falling Onto a Liquid Jet, {FEDSM2021-76400}
Flow Visualization Presentation

Rafsan Rabbi - Utah State University
Akihito Kiyama - Utah State University
Nathan Speirs - Naval Undersea Warfare Center
Jesse Belden - Naval Undersea Warfare Center
Tadd Truscott - Utah State University

Stereographic Backlit Videos of a Plunging Jet With Floor Interactions, {FEDSM2021-65316}
Flow Visualization Presentation
Roy Pillers - Iowa State University
Theodore Heindel - Iowa State University

Flow Visualization of Protection Effectiveness of Partition Walls and Face Masks, {FEDSM2021-74656}
Flow Visualization Presentation
Philipp Epple - Coburg University of Applied Sciences
Michael Steppert - Coburg University of Applied Sciences
Michael Florschütz - Coburg University of Applied Sciences
Peter Dahlem - REGIOMED Medical Center, University of Split

High-Speed Visualization of Bubble Trapping Wakes in Liquid-Gas Flow Around a Cylinder, {FEDSM2021-74748}
Flow Visualization Presentation
Dohwan Kim - The Pennsylvania State University
Matthew Rau - The Pennsylvania State University

Deformable Sphere Impact on Resting Droplets, {FEDSM2021-76399}
Flow Visualization Presentation
Rafsan Rabbi - Utah State University
Akihito Kiyama - Utah State University
John Allen - University of Hawaii at Manoa
Tadd Truscott - Utah State University

Flow Visualization of Wing Tip Vortices of Wings Without and With Winglets, {FEDSM2021-76479}
Flow Visualization Presentation
Philipp Epple - Coburg University of Applied Sciences
Michael Steppert - Coburg University of Applied Sciences
Michael Florschuetz - Coburg University of Applied Sciences

Visualization of Liquid Jets in Gaseous Environment, {FEDSM2021-65428}
Flow Visualization Presentation
Mehran Tadjfar - Amirkabir University of Technology
Amin Jaberi - Amirkabir University of Technology
Saman Kasmaiee - Amirkabir University of Technology
Siroos Kasmaiee - Amirkabir University of Technology
Saman Najafi - Amirkabir University of Technology
Afsoon Hatami - Amirkabir University of Technology
Kasra Asadollahbeiki - Amirkabir University of Technology
Mohammad Ebrahimi - Amirkabir University of Technology
Bahman Khazaei - Amirkabir University of Technology

Flow Pattern on Microfin Enhanced Surfaces (Images), {FEDSM2021-65445}
Flow Visualization Presentation
Puxuan Li - Kansas State University

Matthew Campbell - Kansas State University
Steven Eckels - Kansas State University

Experimental Observation of Lagrangian Coherent Structures in Perturbed Rayleigh-Benard Convection, {FEDSM2021-74717}
Flow Visualization Presentation
Masahito Watanabe - Waseda University
Hiroaki Yoshimura - Waseda University

01-11-01 Rotating Machinery / Turbomachinery
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Ravinder Yerram - GE Gas Power***
Chair: ***Kevin Anderson - California State Polytechnic University***
Chair: ***Rakesh Ranjan - Linde***

Effect of Hub Configuration on the Performance of Mixed Flow Turbine for Micro Hydropower in Pipes, {FEDSM2021-63691}
Technical Paper Publication
Seungsoo Jang - Sungkyunkwan University
Ji-Hun Song - Sungkyunkwan University
Youn-Jea Kim - Sungkyunkwan University

Design and Investigation on a Centrifugal Compressor for PEM Fuel Cell System, {FEDSM2021-65274}
Technical Paper Publication
Bihuan Zong - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Weilin Zhuge - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Qiyu Ying - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Haoxiang Chen - State Key Laboratory of Automotive Safety and Energy, Tsinghua University
Yangjun Zhang - State Key Laboratory of Automotive Safety and Energy, Tsinghua University

Large Eddy Simulations of a Turbocharger Radial Turbine Under Pulsating Flow Conditions, {FEDSM2021-65704}
Technical Paper Publication
Roberto Mosca - KTH Royal Institute of Technology
Shyang Maw Lim - KTH Royal Institute of Technology
Mihai Mihaescu - KTH Royal Institute of Technology

Impact of Skew Vane Cut on Alternating Stress in a Low Specific Speed Radial Pump Impeller Vane Using Fluid-Structure Interaction (FSI) Simulations, {FEDSM2021-65734}
Technical Paper Publication
Rajavamsi Gangipamula - Kirloskar Brothers Limited
Ashish Prajapati - Kirloskar Brothers Limited
Ravindra Birajdar - Kirloskar Brothers Limited
Shyam Shukla - Kirloskar Brothers Limited

Secondary Flow Loss Reduction Method by Use of Endwall Contouring in Gas Turbine Cascade Using Optimization Method, {FEDSM2021-65787}
Technical Paper Publication
Kazuki Yamamoto - Osaka Institute of Technology
Masahiro Miyabe - Osaka Institute of Technology
Ryota Uehara - Osaka Institute of Technology
Shohei Mizuguchi - Osaka Institute of Technology

Influence of the Blade Design Parameters on Hydraulic Noise Generation by a Low Specific Speed Radial Pump With Narrow Channel Flow, {FEDSM2021-65670}
Technical Paper Publication
Rajavamsi Gangipamula - Kirloskar Brothers Limited
Pritanshu Ranjan - Birla Institute of Technology & Science, Pilani
Ranjit Patil - Birla Institute of Technology & Science, Pilani

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03-13-01 High-Speed Flows
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Jun Chen - Purdue University***
Chair: ***Khaled Hammad - Central Connecticut State University***
Chair: ***Deify Law - California State University, Fresno***

Highly Transient High Speed Jet Flow From Different Orifice Geometries, {FEDSM2021-62228}
Technical Paper Publication
Nicholas Findanis - Pentair

Characterizing Surface Roughness Effects on Supersonic Turbulent Boundary Layers, {FEDSM2021-65574}
Technical Paper Publication
Rozie Zangeneh - Lawrence Technological University

Experimental and Computational Studies on Flow Characteristics of Single Expansion Nozzle, {FEDSM2021-66275}
Technical Paper Publication
Dakshina Murthy Inturi - Lakireddy Bali Reddy College of Engineering
Lovaraju Pinnam - Lakireddy Bali Reddy College of Engineering
Ramachandra Raju Vegesina - Jawaharlal Nehru Technological University Kakinada

Characterization of Flow Coherent Structures in Stirred Vessels, {FEDSM2021-67437}
Technical Presentation Only
Kun Li - University of Birmingham
Chiya Savari - University of Birmingham
Ananda Jadhav - University of Birmingham
Mostafa Barigou - University of Birmingham

Application and Verification of Time-Domain Impedance Boundary Conditions in CAA Simulations, {FEDSM2021-65644}
Technical Paper Publication
Ang Li - Purdue University
Jun Chen - Purdue University

Wake Structures and Effect of Hydrofoil Shapes in Efficient Flapping Propulsion, {FEDSM2021-65655}
Technical Paper Publication
John Kelly - University of Virginia
Pan Han - University of Virginia
Haibo Dong - University of Virginia
Tyler Van Buren - University of Delaware

04-10-01 Multiphase Flows in Petroleum Engineering
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Srinivas Swaroop Kolla - The University of Tulsa***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Investigation of Proppant Distributions in Rock Fractures With Applications to Hydraulic Fracturing, {FEDSM2021-65833}
Technical Paper Publication
Amir A. Mofakham - Clarkson University
Farid Rousta - Clarkson University
Dustin Crandall - National Energy Technology Laboratory
Goodarz Ahmadi - Clarkson University

Experimental and Numerical Investigation of Small Particle Erosion in Gas Dominated Multiphase Flow, {FEDSM2021-64371}
Technical Paper Publication
Ghulam Haider - The University of Tulsa
Mazen Othayq - The University of Tulsa
Siamack Shirazi - The University of Tulsa

Numerical Analysis of Oil/water Dispersion Interface Prediction in Horizontal Pipe Separators, {FEDSM2021-66074}
Technical Paper Publication
Srinivas Swaroop Kolla - The University of Tulsa
Ram Mohan – The University of Tulsa
Ovadia Shoham – The University of Tulsa

Multiphase Flow Simulation of Subsea Pipeline Leakage Detected by Acoustic Emission Method, {FEDSM2021-65619}
Technical Paper Publication
Ahmed Shama - UNSW Canberra
Ahmed Swidan - UNSW Canberra
John Young - UNSW Canberra

Investigation of Tool-Joint Effect on Non-Newtonian Drilling Fluids Following the Herschel–Bulkley Model Flow Behavior in Oil Well Drilling, {FEDSM2021-65577}
Technical Paper Publication (Iran)
Ardeshir Gholami - Amirkabir University of Technology
Zohreh Mansoori - Amirkabir University of Technology
Majid Saffar Avval - Amirkabir University of Technology
Goodarz Ahmadi - Clarkson University

Experimental Evaluation of Novel Swirl Flow Air-Water Separation Apparatus for Desalination/Water Remediation Applications, {FEDSM2021-65863}
Technical Paper Publication
Ashok Thyagarajan - Texas A&M University
Vijay Dhir - University of California, Los Angeles; Hagler Institute at Texas A&M University
Debjyoti Banerjee - Texas A&M University

05-02-01 CFD Development
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Sijun Zhang - ESI US R&D, Inc.***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***

Progress in Analytical Modeling of Water Hammer, {FEDSM2021-65920}
Technical Paper Publication
Haixiao Jing - Xi'an University of Technology
Bergant Anton - Litostroj Power d.o.o.
Stosiak Michal - Wrocław University of Science and Technology
Marek Lubecki - Wrocław University of Science and Technology
Kamil Urbanowicz - West Pomeranian University of Technology

Minimum Wall Distance Computations With Time-Dependent Geometry for CFD, {FEDSM2021-61454}
Technical Paper Publication
Yu Liu - Beijing Institute of Space Mechatronic
Liwu Wang - Southeast University
Jian Feng - Southeast University
Sijun Zhang - ESI US R&D, Inc.

A High-Order Flux Reconstruction Method for 2-D Vorticity Transport, {FEDSM2021-63196}
Technical Paper Publication
Adrin Gharakhani - Applied Scientific Research

Transient Rayleigh-Bénard Thermal Convection With Radiation Heat Transfer in Participating Media Using the Control Volume Finite Element Method (CVFEM) and Lattice Boltzmann Method, {FEDSM2021-65629}
Technical Paper Publication

Raoudha Chaabane - University of Monastir
Abdelmajid Jemni - University of Monastir
Fethi Aloui - Université Polytechnique Hauts-de-France, INSA Hauts-de-France

An Improved Hybrid Alternative WENO Scheme for High Mach Number Flows, {FEDSM2021-65717}
Technical Paper Publication
Uttam Rajput - Indian Institute of Technology Roorkee
Krishna Singh - Indian Institute of Technology Roorkee

Implementation of Quantum Computing for Iterative CFD Solvers, {FEDSM2021-75446}
Technical Presentation Only
Chao Lu - McNeese State University
Ning Zhang - McNeese State University
Bei Xie - McNeese State University

05-07-01 Optimization, Data-Based Simulations, and Machine Learning
8/12/2021
12:50 PM to 1:50 PM

Chair: ***Haibo Dong - University of Virginia***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Ning Zhang - McNeese State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Fractal and Convolutional Analysis for Deep Atmospheric Turbulence Using Machine Learning, {FEDSM2021-65798}
Technical Paper Publication
Nicholas Dudu – The University of Texas at El Paso
Arturo Rodriguez – The University of Texas at El Paso
Gael Moran - Captain John L. Chapin High School
Jose Terrazas – The University of Texas at El Paso
Richard Adansi – The University of Texas at El Paso
V M Krushnarao Kotteda - University of Wyoming
Vinod Kumar - The University of Texas at El Paso
Chris Harris - Imperial College London

Causal Inference Analysis to Find Relationships Found in Boundary-Layer Transition – Part I: Theoretical, {FEDSM2021-61843}
Technical Paper Publication
Arturo Rodriguez – The University of Texas at El Paso
Jose Terrazas – The University of Texas at El Paso
Richard Adansi – The University of Texas at El Paso
V M Krushnarao Kotteda – The University of Wyoming
Jorge Munoz – The University of Texas at El Paso
Vinod Kumar – The University of Texas at El Paso

Deep Learning Techniques for Effective Prediction of Aerodynamic Properties of Elliptical Bluff Bodies, {FEDSM2021-66265}
Technical Paper Publication
W. M. Upeka Weerasekara - University of Moratuwa

H. M. Chamika D. B. Gunarathna - University of Moratuwa
W. A. Kavinda P. Wanigasooriya - University of Moratuwa
Tharindu Pradeeptha Miyanawala - University of Moratuwa

Computational Analysis of Non-Premixed Combustion in a Scramjet Combustor With a Wedge Shaped Strut Injector, {FEDSM2021-65951}
Technical Paper Publication
Sajal Katare - Bundelkhand Institute of Engineering and Technology, Jhansi
Nagendra P. Yadav - Bundelkhand Institute of Engineering and Technology, Jhansi

Prediction of Combustion Performance of Biodiesel in Gas Turbine Combustor, {FEDSM2021-66282}
Technical Paper Publication
Priyanka Yadav - Bundelkhand Institute of Engineering and Technology, Jhansi
Nagendra Prasad - Bundelkhand Institute of Engineering and Technology, Jhansi

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03-06-02 Flow Manipulation and Active Control
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Hassan Peerhossaini - Université Paris Diderot***
Chair: ***Jun Chen - Purdue Univ***
Chair: ***Deify Law - California State University, Fresno***

Comparative Evaluation of Dielectric Materials for Plasma Actuators Active Flow Control and Heat Transfer Applications, {FEDSM2021-65748}
Technical Paper Publication
Frederico Rodrigues - Universidade da Beira Interior
João Nunes-Pereira - Universidade da Beira Interior
Mahdi Abdollahzadeh - Universidade da Beira Interior
Jose Pascoa - Universidade da Beira Interior
Senentxu Lanceros-Mendez - Universidad del País Vasco

Modelling Optical Properties of Algae Using the Finite-Difference Time Domain Method, {FEDSM2021-66314}
Technical Paper Publication
Zahra Samadi - Western University
Eric Johlin - Western University
Christopher DeGroot - University of Western Ontario
Hassan Peerhossaini - Western University

Development of a Computationally Cost-Effective Model of Fluid Flow in Redox Flow Batteries, {FEDSM2021-74701}
Technical Presentation Only
Erfan Asadipour - Washington University in St. Louis
Vijay Ramani - Washington University in St. Louis

Transient Flow Behaviour of a Phase Change Material (PCM) Encased in a Circular Domain, {FEDSM2021-74710}
Technical Presentation Only
Kyle Teather - Western University
Kamran Siddiqui - Western University

05-01-03 Applied CFD
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Ning Zhang - McNeese State University***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***S. Bhushan - Mississippi State University***
Chair: ***Haibo Dong - University of Virginia***
Chair: ***Sijun Zhang - ESI US R&D, Inc.***

Computational Fluid Dynamic Analysis of the Flow Around a Propeller Blade of Multirotor Unmanned Aerodynamic Vehicle, {FEDSM2021-65771}
Technical Paper Publication
Victor Martinez - University of Texas at San Antonio
Kiran Bhaganagar - University of Texas at San Antonio

3-D Computational Study of a Diffuser Augmented Micro Wind Turbine, {FEDSM2021-65661}
Technical Paper Publication
Kiran M S - Birla Institute of Technology & Science, Pilani
Aakash Rajawat - Birla Institute of Technology & Science, Pilani
Pritanshu Ranjan - Birla Institute of Technology & Science, Pilani

Numerical Simulation of a Canadian Well With Several Circumferential Rows of Internal Vortex Generators, {FEDSM2021-65814}
Technical Paper Publication
Nabil Kharoua - Ecole Nationale Polytechnique de Constantine
Hamza Semmari - Ecole Nationale Polytechnique de Constantine
Houssem Korichi - Ecole Nationale Polytechnique de Constantine
Mehdi Haroun - Ecole Nationale Polytechnique de Constantine

Numerical Simulation of Annular Flow Boiling in Microchannel, {FEDSM2021-67325}
Technical Presentation Only
Lin Yuhao - Zhejiang university
Li Wei - Zhejiang University

Aerodynamic Performance Evaluation of a Skydio UAV via CFD as a Platform for Bridge Girder Inspection: Phase 1 Study, {FEDSM2021-65996}
Technical Paper Publication
Rodward Hewlin - University of North Carolina at Charlotte
Elizabeth Smith - University of North Carolina at Charlotte
Tara Cavalline - University of North Carolina at Charlotte
Ali Karomoddini - North Carolina A&T State University

04-08-01 Interfacial Phenomena and Flows
8/12/2021
12:50 PM - 1:50 PM

Chair: ***Timothy O'Hern - 4-4 Topic Organizer and Sandia National Laboratory, retired***
Chair: ***Philipp Epple - Coburg University of Applied Sciences***
Chair: ***Zhongquan Zheng - Utah State University***
Chair: ***Yue Ling - Baylor University***
Chair: ***Robert Kunz - Penn State University***
Chair: ***Bertrand Rollin - Embry-Riddle Aeronautical University***

Reducing the Forces of Water Entry, {FEDSM2021-76444}
Keynote
Tadd Truscott - Utah State University
Rafsan Rabbi - Utah State University
Nathan Speirs - Naval Undersea Warfare Center
Akihito Kiyama - Utah State University
Jesse Belden - Naval Undersea Warfare Center

A CNN With Deep Learning for Non-Equilibrium Characterization of Al-Sm Melt Infusion Into a B4C Packed Bed, {FEDSM2021-65794}
Technical Paper Publication
Julio Aguilar II – The University of Texas at El Paso
Laura Sandoval – The University of Texas at El Paso
Arturo Rodriguez – The University of Texas at El Paso
Sanjay Kumar – The University of Texas at El Paso
Jose Terrazas – The University of Texas at El Paso
Richard Adansi – The University of Texas at El Paso
Vinod Kumar – The University of Texas at El Paso
Arturo Bronson – The University of Texas at El Paso

Interface Retaining Coarsening for Data-Driven Modeling of Multiphase Flows, {FEDSM2021-74606}
Technical Presentation Only
Xianyang Chen - Johns Hopkins University
Jiacai Lu - Johns Hopkins University
Gretar Tryggvason - Johns Hopkins University

Impacts of Circular Liquid Jet Injection Angle Into Low Subsonic Crossflow, {FEDSM2021-65312}
Technical Paper Publication (Iran)
Mehran Tadjfar - Amirkabir University of Technology
Siroos Kasmaiee - Amirkabir University of Technology
Saman Kasmaiee - Amirkabir University of Technology

Water Drop Transportation in a Parallel Channel via a Passive Actuation Module, {FEDSM2021-65564}
Technical Presentation Only
Mehran Abolghasemibizaki - Washington University in St. Louis
Patricia Weisensee - Washington University in St. Louis

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