



A Division of the American Physical Society

VIRTUAL
CHICAGO
APS DFD 2020
November 22-24



Letter from the Chair

Welcome to the Spring/Summer 2020 newsletter of the Division of Fluid Dynamics. I hope you are all staying safe and well, and appreciate the opportunity to share updates on the DFD and our Annual Meeting in these extraordinary times. The DFD Executive Committee, the local organizing committee, and the special ad hoc committee charged with evaluating issues relating to COVID 19, have worked closely with APS to monitor the COVID-19 pandemic in the United States and worldwide.



*Minami Yoda
2019-20 Chair
APS Division of Fluid
Dynamics*

Based on public health guidance and Governor Pritzker’s Restore Illinois plan, it appears that large (>50) gatherings will not be possible in the state of Illinois until there is a vaccine or equivalent widely available treatment. The DFD Executive Committee has therefore decided to **cancel the “in person” Annual Meeting in Chicago this year to ensure the safety and well-being of our community and move to a streamlined online meeting format.**

As we move to this virtual format there are several key goals that will guide us in planning.

Inclusion. Accept all abstracts, per our usual meeting in accordance with our long-standing tradition, provide the community a point of interaction this Fall, and offer students in fluid mechanics a venue for their work.

Engagement. It will be difficult to replicate some of the interactions of the in-person meeting.

IN THIS ISSUE

- 1 Key Dates
- 7 2019 Meeting Highlights
- 8 APS/DFD Officers

The articles in this issue represent the views of the Division of Fluid Dynamics (DFD) publication committee and are not necessarily those of individual DFD members or the APS.

Facilitating information exchange and fostering fruitful interactions and networking as well as taking advantage of the virtual meeting format to develop new ways to support these goals, is a priority.

Acknowledgment. COVID-19 has not uniformly affected our community or society; unfortunately, it seems instead to have amplified long established inequalities. This should be recognized and acknowledged. The meeting should support those most affected by COVID-19 and encourage their participation, if resources permit, through childcare grants and grants to support persons with disabilities.

Flexibility. Provide the meeting in a flexible and scalable format, where possible, to accommodate a diverse variety of attendees.

This newsletter provides preliminary information about our upcoming 73rd Annual Meeting and we will be updating our website as more information becomes available so please visit <http://dfd2020chicago.org/>.

Additionally, this newsletter presents highlights of the very successful 72nd Annual Meeting in Seattle in November 2019, which set records for the number of registered attendees (nearly 3600, including almost 1300 international attendees) and parallel sessions (42). As always, the meeting captured the excitement, creativity and breadth of fluid mechanics, ranging from the student posters and the new flash presentation/posters to the invited talks and the LaPorte Lecture. The lively discussions during the reception at the Museum of Flight were, as always, a highlight of the Meeting, and are treasured memories for many of us who have been “sheltering in place” since March.

The APS held its Annual Leadership Meeting at the end of January, preceded by the Congressional Visits Day, where we were joined by the new APS (undergraduate and graduate) Student Ambassadors. For the first time, APS had an International Leadership Forum on the benefits and risks of international collaboration and competition to American research, with talks by Dr. Steven Chu of Stanford, formerly the U.S. Secretary of Energy, Dr. David Reitze of Caltech on LIGO (the Laser Interferometer Gravitational-Wave Observatory), and Dr. Christopher Monroe of the University of Maryland on quantum computing, as well as panels on international competition and collaboration. Although a significant portion of the discussion focused on the Chinese research community, the Chinese representatives could not participate because of travel restrictions and quarantines due to COVID-19. Many of the activities that were launched at the Leadership Meeting are on hold due to the pandemic and the cancellation of the “in-person” versions of the March and April meetings.

Despite the closures worldwide of university campuses

and research laboratories and the challenges of moving courses on-line, many in our community have refocused their research on very short notice to study various aspects of COVID-19, including the transport of respiratory droplets by sneezing and coughing, different face mask, air filter, and ventilator designs, and sample collection and testing. Thank you for all of your efforts and contributions to fighting this global crisis. I look forward to hearing more about your work at our future DFD Annual Meetings.

The **Abstract Submission** portal is now open. The abstract submission deadline is August 3, 2020. During abstract submission, you will select a sorting category for your abstract. Note that there may or may not be a direct correspondence between the sorting category and an actual session at the meeting.

2020 Virtual Meeting at a Glance

The 2020 meeting will consist broadly of two live-streamed parallel tracks of invited talks running in parallel Sunday, November 22-Monday, November 23, all with following on-demand access. Interspersed throughout the three days will be networking events, the Gallery of Fluid Motion, and exhibitor advertising and promotions. Abstracts will be organized with author-provided supplemental materials available through all three days, including opportunities for Q&A.

Invited & Award Presentations

For 2020, the scientific program will include four award lectures, along with twelve invited lectures, and four minisymposia sessions. Each year the APS Division of Fluid Dynamics awards the Fluid Dynamics Prize, the Francois N. Frenkiel Award, the Andreas Acrivos Dissertation Award, and the Stanley Corrsin Award. Each of these will present a scheduled streamed lecture on Sunday and Monday. These will be moderated by a chair, and will be available on-demand for the remainder of the meeting. Additionally, the 2020 Fellowships will be awarded.

Submitted Abstracts

The usual 1300-character APS abstracts will be available for the entire three days meeting along with flexible supplemental on-demand material uploaded by the authors. The uploaded material will be posters, presentation slides, recorded lectures, or whatever the authors deem most appropriate for their work. Text-based Q&A will be available, and authors will be encouraged to monitor questions about their work. Abstracts will be organized topically, similar to past meetings. Please visit the meeting website with more details on the abstract submission process.

Gallery of Fluid Motion

The 39th Annual Gallery of Fluid Motion will be held as part of the meeting and will be a series of high-resolution videos and posters that can be watched or viewed throughout the conference with an active text-based Q&A chat box.

The Gallery consists of posters or videos submitted by the community illustrating the science— and very often also the beauty—of fluid motion. Both computational and experimental entries are encouraged. Poster and video entries must not duplicate one another. Outstanding posters and videos, selected by a panel of referees, will be recognized in a Fall 2021 issue of *Physical Review Fluids*.

Networking Events

Throughout the three-day meeting, DFD will offer interactive networking. Additionally, organizers are evaluating technology to facilitate person-to-person or group interactions.

Exhibitors

Exhibits and banner displays will be incorporated into the meeting platform.

Registration

The cost of the online meeting will be a small fraction of that of the travel, lodging, and registration for the usual in-person meeting. The fee will offset the costs of the virtual meeting and is in the process of being determined.

Key Dates

Abstract Submissions

Abstract Submission Portal is Now Open
Abstract Portal Closes: August 3, 2020 5pm EDT

Gallery of Fluid Motion Dates

Entries must be started on or before 11:59 pm EDT on Monday, September 14
Entry submission must be completed on or before 11:59 pm EDT on Monday, October 12

Meeting Registration Deadlines

Registration Opens: Mid-August, 2020

Key Contacts

Meeting Chair

Jonathan Freund
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Program Chair

Randy Ewoldt
University of Illinois at Urbana-Champaign
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Abstract Help Line

(301) 209-3290
Monday through Friday, 9:00 am – 5:00 pm EDT
abs-help@aps.org

General Meeting Questions

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Meetings and More
Phone: (301) 526-8129
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Peggy Holland
Meetings and More
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peggy@meetingsandmore.net

Future APS/DFD Meetings

2021: Phoenix, AZ

Marcus Herrmann, Meeting Chair
Arizona State University

2022: Indianapolis, IN

Luciano Castillo, Meeting Chair
Purdue University

2023: Washington, DC

Kenneth Kiger, Meeting Co-Chair
University of Maryland
Michael Plesniak, Meeting Co-Chair
George Washington University

2024: Salt Lake City, UT

Marc Calaf, Meeting Co-Chair
University of Utah
Henry Fu, Meeting Co-Chair
University of Utah

APS/DFD 2019 Awards, Prizes, New Fellows, and Gallery Winners



2019 Fluid Dynamics Prize

Alexander Smits, Princeton University, is the recipient of the 2019 Fluid Dynamics Prize, which recognizes major contributions to fundamental fluid dynamics made during the career of outstanding work. The citation reads, “For transformative contributions to the measuring and understanding of wall turbulence in extreme Reynolds and Mach number regimes, for pioneering research on bio-inspired propulsion, and in recognition of exemplary technical leadership, mentoring, and community service.”



2019 Stanley Corrsin Award

Jeffrey Morris, Levich Institute, City College of New York, is the ninth recipient of the Stanley Corrsin Award which “recognizes and encourages a particularly influential contribution to fundamental fluid dynamics.” The citation reads: “For outstanding contributions that elucidate the microscopic basis of the flow properties of suspensions, and their influence on macroscopic flow phenomena.”

The Stanley Corrsin Award is supported by an endowment fund contributed by the Division of Fluid Dynamics and held by the APS.



2019 Andreas Acrivos Dissertation Award

Peter Balogh, (now at Duke University) is the 2019 Acrivos award recipient for his Rutgers University PhD Thesis: *The Development and Application of a Computational Method for Modeling Cellular-Scale Blood Flow in Complex Geometry*. The Andreas Acrivos Dissertation Award provides recognition to a young scientist who has performed original doctoral thesis work of outstanding scientific quality and achievement in the area of fluid dynamics.



2019 François N. Frenkiel Award

Thomasina Ball, University of British Columbia, and **Jerome Neufeld**, University of Cambridge

Award for the paper titled: *Static and dynamic fluid-driven fracturing of adhered elastica* PRF_3.074101. The award is given in recognition of significant contributions to fluid mechanics by young investigators. The award, which is sponsored by the Division of Fluid Dynamics, is given in honor of a paper published in the *Physical Review Fluids*.



New Fellows

Luciano Castillo Purdue University

For demonstrating the importance of the initial conditions and deepening our understanding of scaling arguments in turbulent boundary layers, and demonstrating the importance of turbulence in wind energy, while mentoring and creating new opportunities for minorities in fluid dynamics.



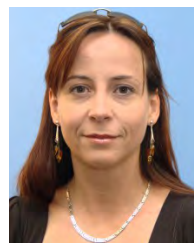
François Gallaire Ecole polytechnique fédérale de Lausanne (EPFL)

For fundamental contributions to hydrodynamic instability, balanced on the tripod of theory, numerics and experiments, with an emphasis on predictive theoretical understanding of vortex dynamics, droplets, coating flows, and theoretical microfluidics.



Pascale Garaud University of California Santa Cruz

For contributions to our understanding of double diffusion, and especially of the formation of layers and staircases.





George Haller
Eidgenössische Technische Hochschule Zürich (ETH Zürich)

For manifold contributions to nonlinear dynamics as applied to fluid flows, including stochastic transport, Lagrangian methods for coherent vortices and structure identification, and applications to geophysical transport processes, mixing and suspension flows.



Gianluca Iaccarino
Stanford University

For seminal contributions to turbulence modeling, development of advanced numerical methods for complex flows, and pioneering research in uncertainty quantification for turbulent flow simulations.



Anne Juel
The University of Manchester

For fundamental contributions to the understanding of instabilities and dynamics of free surfaces, interfaces, and bubbles, gained by combining precision laboratory experiments with mathematical modeling.



Anke Lindner
École supérieure de physique et de chimie industrielles de la Ville de Paris (ESPCI Paris)

For outstanding contributions to physics of complex fluids, interfacial flow instabilities, purely elastic instabilities, flexible fibers in Newtonian and complex fluids, active matter, and pioneering use of microfluidic experiments in these fields.



Stephen G. Monismith
Stanford University

For fundamental contributions to the field of environmental fluid mechanics through innovative field studies of flows on coral reefs, and for increasing our understanding of stratified turbulence and flows and biophysical interactions in estuaries and the nearshore coastal ocean.



Katherine P. Prestridge
Los Alamos National Laboratory

For thoughtfully-designed experiments on shock-driven mixing and turbulence and the development of advanced flow diagnostics that bring insights to our physical understanding of mixing in extreme flows.



Petia M. Vlahovska
Northwestern University

For pioneering work on problems in interfacial flows and soft matter, including the fluid-structure interaction in Stokes flow, the mechanics of biomembranes and electrohydrodynamics.



Sarah L. Waters
University of Oxford

For exposing the intricate fluid mechanics of biomedical systems and impactfully analyzing them with elegant mathematics.

The 2019 Gallery of Fluid Motion and the Milton Van Dyke Award Winners

As has long been the tradition, the best posters and videos are chosen amongst the entries at the meeting each year. The top three from each category are awarded the Milton Van Dyke Award for fluid flow visualization. The posters and videos can be viewed at gfm.aps.org.

2019 Milton Van Dyke Award (Posters)

Gas giants zonal jets in the laboratory

Daphné Lemasquerier, Benjamin Favier, Michael Le Bars, Aix-Marseille Univ, CNRS, Centrale Marseille, Institut de Recherche sur les Phénomènes Hors Équilibre

Computational simulations of turbulent liquid jets

Cristian Ricardo Constante Amores, Lyes Kahouadji, Assen Batchvarov, Omar K. Matar, Imperial College London

Fluid dynamics of millefiori

Cooper Kovar, Lisa Panczner, Heidi Reuter, Azar Eslam-Panah, Pennsylvania State University

2019 Gallery of Fluid Motion Award (Poster)

Hydrodynamic tweezing: Using water waves to push and pull

Ahmed Sherif, Leif Ristroph, New York University

Vortex bursting

Wim M. van Rees, Massachusetts Institute of Technology

2019 Milton Van Dyke Award (Video)

Impaled droplets: On the breakup of drops impacting singularities

Guillaume Durey, Quentin Magdelaine, Mathias Kasiulis, Hoon Kwon, Julien Mazet, Université PSL; Pierre Chantelot, Anaïs Gauthier, Christophe Clanet, David Quéré, ESPCI Paris & École Polytechnique

Crystal critters

Samantha McBride, Henri-Louis Girard, Kripa Varanasi, MIT

Blooming patterns in drying drops

Paul Lilin, Guillaume Sintès, Irmgard Bischofberger, MIT; Philippe Bourrienne, Princeton

2019 Gallery of Fluid Motion Award (Video)

Breaking waves: to foam or not to foam?

Petr Karnakov, Sergey Litvinov, Petros Koumoutsakos, ETH Zurich; Jean M. Favre, Swiss National Supercomputing Centre

Swinging jets

Arnaud Bertsch, Alessandro Bongarzone, Eunok Yim, Philippe Renaud, François Gallaire, École Polytechnique Fédérale de Lausanne

Unraveling the interplay of two counter-rotating helical vortices

Alessandro Capone, Francisco Alves Pereira, CNR-INM Institute of Marine Engineering

Gas escape behavior from bursting bubbles

Ali Al Dasouqi, David Murphy, University of South Florida

Student Poster Competition Award Winners

The Student Poster Competition is an opportunity for undergraduate and graduate students to refine their presentation skills and network. Awards were presented for 1st and 2nd place in two categories. Congratulations to the following:

Theoretical/Computational

1st prize:

Dynamics of pulsing soft corals

Gabrielle Hobson, Laura Miller, Shilpa Khatri

2nd prize:

Multiplicity in stable orbits for prolate capsules in simple shear flow

Xiao Zhang, Michael D. Graham

Experimental

1st prize:

Effect of seed density on dispersal of seeds from wet splash cup plants

Kelsy Bryson, Emily Sawicky, Rachel Pepper

2nd prize:

Experimental analysis of dilute particle-laden liquids over and through patterned structures

Eileen Haffner, Jonathan Higham, Parisa Mirbod

Additional Highlights of the 72nd Annual DFD Meeting in Seattle, WA

The 2019 DFD meeting was held in November at the Washington State Convention Center in Seattle, WA with over 3500 attendees. The technical program included a record of 3,400 abstracts in 42 parallel sessions, including 83 technical posters and 92 student posters. In 2019, 220 of the submitted abstracts were presented in a new Oral Flash Presentation format with each presenter giving a one - minute oral presentation followed by a poster presentation immediately following. Additionally, there were 140 entries into the Gallery of Fluid Motion.

The meeting included 4 award lectures (see page 4 for 2019 award winners), 12 invited talks, 5 minisymposia and 18 focus sessions covering 10 topical areas. The Division would like to thank Alberto Aliseda and Dana Dabiri from the University of Washington for chairing the event and for the following sponsoring universities: the University of Washington, the University of Washington – Applied Physics Lab, Northwest Research Associates, Oregon State University, Portland State University, Saint Martin's University, the University of British Columbia and the University of Idaho.

2019 Invited Talks

P.K. Yeung, Georgia Institute of Technology

Advancing Understanding of Turbulence Through Extreme-Scale Computation

Eleni Katifori, University of Pennsylvania

Living Flow Networks

Mickaël Bourgoïn, Physics Laboratory, CNRS / ENS de Lyon

Lagrangian Turbulent Thermal Convection

Joanna Austin, California Institute of Technology

Dissecting Shock-Boundary Layer Interaction in Hypervelocity Flow

Shawn Shadden, University of California Berkeley

Reduced Order Modeling of Blood Flow

C.P. Caulfield, BP Institute & DAMTP, University of Cambridge

Open Questions in Turbulent Stratified Mixing: Do We Even Know What We Do Not Know?

Ruben Juanes, Massachusetts Institute of Technology

Impact of Wettability on Multiphase Flow and Granular Mechanics: Experiments, Modeling and Theory

Anya Jones, University of Maryland–College Park

Unsteady Aerodynamic Response of Rigid Wings in Gust Encounters

Chris Bretherton, University of Washington

Meteorological Fluid Dynamics and Climate Change

Shankar Subramaniam, Iowa State University

Multiphase Flows: Rich Physics, Challenging Theory, and Big Simulations

Pascale Garaud, University of California Santa Cruz

Journey to the Center of the Stars: The Realm of low Prandtl Number Fluid Dynamic

Nicole Sharp, Sharp Science Communications Consulting, LLC

Adopting a Communication Lifestyle

2019 Minisymposia

State of the Art in Naval Hydrodynamics

Fluid Dynamics in the Clinical Management of Intracranial Aneurysms

Machine Learning in Fluid Mechanics

Bubbles, Drops and Particles in Non-Newtonian Fluids

Fluid Mechanics and Art

2019 Focus Sessions

Advances in Magnetic Resonance Velocimetry

Competing Roles of Surfactants in Free Surface Flows with Hydrodynamic Singularities

Direct Numerical Simulations of Fluid Interfaces, Deformation and Break-Up in Turbulence

Exascale Computations of Complex Turbulent Flows

Fish Swimming Kinematics and Hydrodynamics

Immersive Education Platforms for Fluid Dynamics/Education and Outreach

Leidenfrost Drops and the Physics of the Vapor Layer

Probing Multi-scale Flows by Coarse graining

Recent Advances in Data-driven and Machine Learning Methods for Turbulent Flows

Smoothed Particle Hydrodynamics for Simulating Fluid Flow

APS/DFD 2019-2020 Leadership

EXECUTIVE COMMITTEE

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Minami Yoda
(11/19 - 10/20)
Georgia Inst of Technology

Chair-Elect:
Shelley Lynn Anna
(11/19 - 10/20)
Carnegie Mellon University

Vice Chair:
John O Dabiri
(11/19 - 10/20)
Caltech

Past Chair:
Charles Meneveau
(11/19 - 10/20)
Johns Hopkins University

Secretary/Treasurer:
Jeffrey F Morris
(11/18 - 10/21)
The City College of New York

Councilor:
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(01/19 - 12/22)
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David Saintillan
(11/17 - 10/20)
University of California,
San Diego

Member-at-Large:
Sarah L Waters
(11/17 - 10/20)
University of Oxford

Member-at-Large:
Petia M Vlahovska
(11/18 - 10/21)
Northwestern University

Member-at-Large:
Emilie Dressaire
(11/18 - 10/21)
University of California,
Santa Barbara

Member-at-Large:
Alison L Marsden
(11/19 - 10/22)
Stanford University

Member-at-Large:
Satish Kumar
(11/19 - 10/22)
University of Minnesota

NOMINATING COMMITTEE

8 members, staggered 2-year terms

Mike Plesniak, Chair (12/20)
Luca Biferale, Vice Chair (12/21)
Carlos Hidrovo (12/20)
Gareth McKinley (12/20)
Pavlos Vlachos (12/20)
Joanna Austin (12/21)
Anke Lindner (12/21)
Shu Takagi (12/21)

PROGRAM COMMITTEE

8 members, staggered 3-year terms + March Meeting liaison + 2 local organ. committee members

Shelley Anna, Chair (12/20)
John Dabiri, Vice Chair (12/20)
Dennice Gayme (12/20)
Jean Hertzberg (12/20)
Rui Ni (12/20)
Michael Brenner (12/21)
Marcus Herrmann (12/21)
David Richter (12/21)
Paulo Arratia, MM liaison (12/21)
Jon Freund, LOC '20 (12/20)
Randy Ewoldt, LOC '20 (12/20)

FELLOWSHIP COMMITTEE

8 fellows, staggered 2-year terms

John Dabiri, Chair (12/20)
Shelley Anna, Vice Chair (12/20)
Colm-cille Caulfield (12/20)
Fernando Grinstein (12/20)
Guowei He (12/20)
Paul Steen (12/20)
Jacqueline Chen (12/21)
Anne De Wit (12/21)

EXTERNAL AFFAIRS COMMITTEE

8 members, staggered 3-year terms

Satish Kumar, Co-Chair (12/21)
Hassan Masoud, Co-Chair (12/20)
Kiran Bhaganagar, Vice Chair (12/21)
Arvind Santhanakrishnan (12/20)
Arindam Banerjee (12/21)
Kirti Sahu (12/21)
Parisa Mirbod (12/22)

FLUID DYNAMICS PRIZE COMMITTEE

8 members, staggered 2-year terms, and award winner from previous cycle, 1-year term

Leslie Smith, Chair (12/20)
Thomas Corke, Vice Chair (12/21)
Ellen Longmire (12/20)
Rajat Mittal (12/20)
Todd Squires (12/20)
Lex Smits, 2019 Award Winner (12/20)
Lyderic Bocquet (12/21)
Yoshifumi Kimura (12/21)

CORRSIN AWARD COMMITTEE

7 members, staggered 2-year terms, and award winner from previous cycle, 1-year term

Roberto Verzicco, Chair (12/20)
Richard Lueptow, Vice Chair (12/21)
Paul Durbin (12/20)
Kausik Sarkar (12/20)
Jeff Morris, 2019 Award Winner (12/20)
Lisa Fauci (12/21)
Hyung Jin Sung (12/21)
Laurette Tuckerman (12/21)

ACRIVOS AWARD COMMITTEE

7 members, staggered 2-year terms

Daniel Bodony, Chair (12/20)
Tim Colonius, Vice Chair (12/21)
Irmgard Bischofberger (12/20)
Eric Lauga (12/20)
Duan Z. Zhang (12/20)
Christine Gilbert (12/21)
Karen Mulleners (12/21)

FRENKIEL AWARD COMMITTEE

6 members, staggered 2-year terms, award winner from previous cycle, 1-year term, and Physical Review Fluids liaison

Diego Donzis, Chair (12/20)
Eva Kanso, Vice Chair (12/21)
Haecheon Choi (12/20)
Thomas Cubaud (12/20)
Federico Toschi (12/20)
Jerome Neufeld, 2019 Award Winner (12/20)
Roman Grigoriev (12/21)
Clancy Rowley, PRF Liaison (12/21)

MEDIA & SCIENCE RELATIONS COMMITTEE

7 members, staggered 3-year terms

Azar Eslam-Panah, Chair (12/20)
Anya Jones, Vice Chair (12/22)
Pirouz Kavehpour (12/20)
Ivan Marusic (12/20)
Maysam Mousaviraad (12/20)
David Hu (12/21)
Mattia Gazzola (12/22)
Vivek Narsimhan (12/21) (ex-officio DFD Web maintenance & Facebook, Twitter interfacing)
Ken Kiger (ex-officio Gallery of Fluid Motion maintenance)

EDUCATIONAL & CAREER OUTREACH COMMITTEE

6 members, staggered 2-year terms

Megan Leftwich, Chair (12/20)
Keith Moored, Vice Chair (12/21)
Devesh Ranjan (12/20)
Adrian Sescu (12/20)
Andres Goza (12/21)
Kerstin Nordstrom (12/21)

DIVERSITY AND INCLUSION COMMITTEE

8 members, staggered 3-year terms

Raul Cal, Chair (12/21)
Luciano Castillo, Vice Chair (12/21)
Monica Martinez (12/20)
Thomas Ward (12/20)
Roberto Zenit (12/20)
Petia Vlahovska (12/20)
P. K. Yeung (12/21)
Melissa Green (12/22)

GALLERY OF FLUID MOTION

Ken Kiger

APS REPRESENTATIVE ON US NATIONAL COMMITTEE FOR THEORETICAL AND APPLIED MECHANICS

Beverly McKeon