

# 65<sup>th</sup> Annual meeting of the Division of Fluid Dynamics

18 – 20 November 2012

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## **WELCOME**

On behalf of the organizing committee, we welcome you to the 65th Annual Meeting of the APS Division of Fluid Dynamics. This year we have more than 2200 contributed papers, 150 Gallery of Fluid Motion entries, and 120 posters. We will have 32 parallel sessions over the three days of the meeting, which takes place on the Upper Level of the magnificent San Diego Convention Center. Each year the meeting continues to grow and we hope that this year will reflect the many successful meetings that have preceded San Diego.

We look forward to the presentation of four award lectures, and eight invited lectures, as well as mini-symposia and focus sessions. We are also pleased to welcome exhibitors and affiliated activities such as the APS Journal Editors, the Geophysical Fluid Dynamics program, the Resume Help Desk, the Reporter/Media Resource Table, and the Fluids Education Mini-Symposium.

This year's DFD Meeting launches the first Student Poster Competition. The poster session will be held prior to the Dinner Reception. Student posters will be judged and awarded 1st and 2nd Prize for "Best Poster" in several categories. Winners in each category will receive award certificates and will be highlighted in the DFD Newsletter. While the Poster Session of the DFD Meeting is open to all participants, the Poster Competition constitutes a specific opportunity for graduate and undergraduate students to enhance their presentation skills and to build their professional network.

We extend a special thanks to all who helped plan and execute this meeting. We recognize the contributions of faculty and students from UC San Diego, including the Dean of the Jacobs School of Engineering. Colleagues from San Diego State University and the University of San Diego are acknowledged for their participation.

Along with our colleagues on the Organizing Committee, we wish you a successful and productive meeting. We look forward to APS DFD 2013 in Pittsburgh!

Juan C. Lasheras  
Conference Co-Chair

Sutanu Sarkar  
Conference Co-Chair

## 65th Annual Meeting Committee

Juan C. Lasheras (Co-Chair)  
Juan C. del Álamo (UCSD)  
Carlos Coimbra (UCSD)  
Gustaaf Jacobs (SDSU)  
Eric Lauga (UCSD)  
Alison Marsden (UCSD)  
Geno Pawlak (UCSD)  
Kal Seshadri (UCSD)  
Kraig Winters (UCSD/SIO)

Sutanu Sarkar (Co-Chair)  
Tom Bewley (UCSD)  
Frank Jacobitz (USD)  
Jan Kleissl (UCSD)  
Stefan Llewellyn Smith (UCSD)  
Keiko Nomura (UCSD)  
James Rottman (UCSD)  
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## **APS/DFD 2012 OFFICERS AND COMMITTEES**

### **Executive Committee**

**Chair:** [Kenny Breuer](#) (11/11 - 10/12)

**Chair-Elect:** [James Riley](#) (11/11 - 10/12)

**Vice Chair:** [Nadine Aubry](#) (11/11 - 10/12)

**Past Chair:** [Ann Karagozian](#) (11/11 - 10/12)

**Secretary/Treasurer:** [Eckart Meiburg](#) (11/09 - 10/12)

**Councilor:** [James Wallace](#) (01/11 - 12/14)

**Member-at-Large:** [Timothy Colonius](#) (11/09 - 10/12)

**Member-at-Large:** [James Duncan](#) (11/10 - 10/12)

**Member-at-Large:** [Elisabeth Guazzelli](#) (11/09 - 10/12)

**Member-at-Large:** [Michael Plesniak](#) (11/10 - 10/13)

**Member-at-Large:** [Sanjiva Lele](#) (11/11 - 10/14)

**Member-at-Large:** [Detlef Lohse](#) (11/11 - 10/14)

### **Nominating Committee**

Lance Collins (12/12)

David Dowling (12/12)

Ellen Longmire (12/12) **Chair**

Arne Perlstein (12/13) **Vice Chair**

Joseph Powers (12/12)

Mike Plesniak (12/13)

Peter Schmid (12/13)

Kathleen Stebe (12/12)

### **Program Committee**

Nadine Aubrey, **Chair**

Andrew Belmonte (12/14)

Dan Bodony (12/14)

Eric Lauga (12/14)

Krishnan Mahesh (12/12)

James Riley (12/12), **Vice-Chair**

Sutanu Sarkar (12/12)

Wendy Zhang (12/13)

### **Fellowship Committee**

Nadine Aubry **Vice Chair**

Haecheon Choi (12/13)

Manoochehr Koochesfahani (12/12)

Richard Lueptow (12/12)

Yuriko Renardy (12/12)

James Riley (12/12) **Chair**

Geoff Spedding (12/13)

Laurette Tuckerman (12/12)

### **External Affairs Committee**

Alberto Aliseda (12/12)

Tom Bewley (12/12)

Aline Cotel (12/12) **Chair**

Charlie Henoeh (12/14)

Charles Meneveau (12/13)

David Santillian (12/14)

Alexandra Techet (12/13) **Vice Chair**

Larry Ukeiley (12/14)

### **Fluid Dynamics Prize Selection Committee**

Henrik Alfredsson (12/13)

Tom Corke (12/12) **Chair**

Julian Andrzej Domaradzki (12/12)

Elisabeth Guazzelli (12/12)

Pirouz Kavehpour (12/13)

Tony Maxworthy (12/12)

Neelesh Patankar (12/13), **Vice Chair**

Sandra Troian (12/12)

**Corrsin Award Selection Committee**

Mark Glauser (12/13)  
Martin Maxey (12/12) Chair  
Philip Marcus (12/12)  
Charles Meneveau (12/12)  
Elaine Oran (12/12)  
Roman Stocker (12/13)  
Gretar Tryggvason (12/13) Vice Chair  
Jane Wang (12/13)

**Acrivos Award Selection Committee**

Shelley Anna (12/12) Chair  
Miki Amitay (12/13)  
Jacob Cohen (12/13)  
Lisa Fauci (12/13)  
Jeffrey Jacobs (12/12)  
Jonathan Rothstein (12/13), Vice Chair  
John Torczynski (12/12)

**Frenkiel Award Selection Committee**

Triantaphyllos Akylas (12/12)  
Ali Beskok (12/13) Vice Chair  
Ken Christiansen (12/13)  
Ching-Long Lin (12/12)  
Helen Reed (12/13)  
Michael Shelley (12/12) – AE from POF  
P.-K. Yeung (12/12) Chair

**Committee on Media & Science Relations**

James Brasseur (12/12)  
Anette (Peko) Hosoi (12/12) Chair  
William Schultz (12/13) Vice Chair  
Timothy Wei (12/12)  
Rajat Mittal (12/14)

**Committee on Educational & Career Outreach**

Karen Flack, Vice Chair (12/12)  
Jean Hertzberg Vice Chair (12/13)  
Meredith Metzger (12/12)  
Andrew Pollard (12/13)  
Kathy Prestridge (12/12)  
Patrick Underhill (12/13)

**Division Website Development Officer**

Jeff Eldredge

**Gallery of Fluid Motion Coordinator** -- Ken Kiger

## **DFD 2012 EVENTS**

All events will be held at the San Diego Convention Center (SDCC), Upper Level, unless otherwise noted. The Sunday evening Dinner/Reception will be at the Sails Pavilion on the Upper Level.

### **Registration Desk Hours**

Foyer Adjacent to Ballroom 20  
Saturday, November 17 13:00 – 20:00  
Sunday, November 18 07:00 – 17:00  
Monday, November 19 07:30 – 17:00

### **Speaker Ready Room Hours**

Room 21  
Saturday, November 17 16:00 – 20:00  
Sunday, November 18 07:00 – 17:00  
Monday, November 19 07:00 – 17:00  
Tuesday, November 20 07:00 – 12:00

### **DFD Executive Committee Meeting**

Saturday, November 17 18:00  
San Diego Marriott Marquis and Marina  
Cardiff/Carlsbad Room, South Tower 3rd  
Floor

### **Awards Ceremony**

Sunday, November 18 10:00-11:50  
Ballroom 20ABC

The DFD awards, prizes, and fellowships will be presented immediately after the first session on Sunday. Each year the DFD presents the Fluid Dynamics Prize, the Francois Frenkiel Award, the Stanley Corrsin Award, and the Andreas Acrivos Dissertaton Award.

### **Exhibits**

Ballroom 20D  
Sunday, November 18 07:30 – 18:00  
Monday, November 19 08:30 – 17:00  
Tuesday, November 20 08:30 – 12:00

The Exhibit Hall showcases products from industry, education, and government sponsors.

### **Invited Lectures**

Invited lectures are scheduled Sunday, Monday, and Tuesday

### **Refreshments**

Complimentary beverages and snacks will be served in the exhibit area and foyers during select morning and afternoon breaks.

### **Conference Dinner**

Sunday, November 18, 19:00-21:00  
Sails Pavilion  
The dinner brings together attendees and guests in the beautiful and spacious Sails Pavilion on the Upper Level of the San Diego Convention Center. The reception/dinner is included in the registration fee for those who register as APS Members, Non-members, Graduate Students and Retired Members. Additional tickets may be purchased for \$80 each.

### **Gallery of Fluid Motion**

Sunday, November 18 – Tuesday,  
November 20, 2012  
Ballroom 20D

The 30th Annual Gallery of Fluid Motion consists of computational and experimental still images and videos submitted by attendees. A panel selects outstanding entries based on artistic value, scientific content, and originality. The winning entries will be displayed at the Annual APS Meeting in March 2013 and will appear in Physics of Fluids, September 2013. Award winning entries will be announced on Tuesday, November 20 during the morning coffee break.

## **DFD 2012 EVENTS**

### **Posters**

The number of poster research contributions to the Annual DFD Meeting has doubled in the past three years (from 27 posters in 2009 to 54 posters in 2011) and we have 120 this year. In order to better showcase this growing section, the 65th Annual DFD Meeting launches the first Student Poster Competition. The poster session will be held Sunday during a dedicated time slot from 17:50 to 18:50 prior to the Dinner Reception. Student posters will be judged and awarded 1st and 2nd Prize for "Best Poster" in several categories. Winners in each category will receive award certificates on Sunday evening and will be highlighted in the DFD Newsletter. While the Poster Session of the DFD Meeting is open to all participants, the Poster Competition will constitute a specific opportunity for graduate and undergraduate students to enhance presentation skills and to build networks.

### **Resume Help Desk**

November 18-20, 2012  
Ballroom 20D

The second annual Resume/CV help desk will be held at Booth#114. To be guaranteed an appointment, please sign up any time at the booth for appointment times on Sunday 9:30-10 and 4:15-4:45, Monday 10-10:30 and Tuesday 10-10:30. Please bring a hard copy of your CV, if possible. Drop-ins are welcome, and if we are not busy we will help you out! This is a great chance to get an objective assessment of your CV from experienced faculty and scientists in your field.

### **Meet the APS Journal Editors**

Monday, November 19, 16:30-18:00  
Upper Level Foyer Adjacent to 27A  
The Editors of the APS journals cordially invite you to join them for conversation and refreshments. Your questions, criticisms, compliments, and suggestions about the journals are welcome. We hope you will be able to join us.

### **Geophysical Fluid Dynamics Reception**

Monday, November 19, 19:00-20:30  
San Diego Marriott Marquis and Marina Hotel  
The Dining Room at the Marina Kitchen Restaurant

An open reception for alumni and friends of the Geophysical Fluid Dynamics (GFD) The GFD program is an interdisciplinary summer program for graduate students that has been held since 1959 at the Woods Hole Oceanographic Institution. It has promoted the exchange of ideas relating to fluid mechanics among many fields, such as oceanography, meteorology, astrophysics, geology, planetary atmospheres, and applied mathematics. Over its 50 year history the GFD program has produced numerous alumni and touched many junior and senior scientists, and the purpose of the reception is to bring them together along with any other interested parties. Information on how to participate in the program will be provided.

### **APS/DFD Reporter and Media Resource**

Monday, November 19 7:00-7:45 a.m.  
Location 20D Workroom  
Charles Blue, AIP

## **Panel Session: Visual Communication in Science**

Monday, November 19, 13:00 – 15:00  
Room 29A  
Professor Rajat Mittal, Johns Hopkins  
University

## **Editorial Board Meeting – Journal of Fluid Mechanics**

Monday, November 19 18:00-19:30  
Location 20D Workroom  
Dr. Neil Hammond, STM Journals –  
Cambridge University Press

## **Instructions to Speakers, Session Chairs and Poster Presenters**

1. Speakers should arrive at least 10 minutes prior to the start of the session and introduce themselves to the Session Chair.
2. A TV monitor in each room is used to time the sessions. Timing will be strictly enforced by the Session Chair.
3. Contributed papers are limited to 10 minutes with 2 additional minutes for discussion. This is followed by 1 minute for transition to the next paper and introduction of the next speaker. During the talk, the monitor will indicate at 8 minutes that the speaker has to finish in 2 minutes. At 10 minutes, it will indicate that the speaker's presentation time is over. At 12 minutes, it will indicate that transition to the next speaker must occur.
4. A minisymposium paper is 26 minutes long, including questions and transition. This makes a minisymposium paper twice as long as a regular contributed paper, allowing attendees to move between regular talks and minisymposia.
5. Minisymposium talks will be 20-22 minutes long with 3-5 minutes for discussion and 1 minute for transition. NOTE: the TV time monitor in each room will keep the regular 13 minute schedule.
6. The Fluid Dynamics and Stanley Corrsin lectures are 40 minutes with 5 additional minutes for discussion (total 45 minutes). Invited lectures are 30 minutes long with an additional 5 minutes for discussion (total 35 minutes). The Andreas Acrivos Dissertation Award Lecture and Francois Frenkiel Award lectures are 17 minutes with 3 additional minutes for discussion (total 20 minutes).
7. Each presentation room is equipped with a LCD projector **with standard VGA inputs only**, screen, podium and microphone. **If you need an adapter to hook your computer to a VGA projector, it is your responsibility to bring an appropriate such adapter."**
8. Each presentation room is equipped with a LCD projector, screen, podium and microphone. Speakers must provide their own laptop computer. Macintosh users should provide their own adaptor to connect their laptop to the projector. Speakers are responsible for procurement and cost of renting any additional AV equipment. Also note that the APS is not responsible for the security of any personal computers.
9. There is very little time to recover from AV malfunction should one occur. Please check for the following common reasons for malfunction before your presentation:



- \* Meeting room projectors will have 1024 x 768 resolution. Please set your laptop resolution to these numbers or lower. Your images will not display properly if your laptop resolution is higher than the projector.
- \* Set the power profile, monitor profile, and screensaver on your laptop to turn off the sleep/hibernate mode. Your laptop will usually revert to its default resolution if it goes into sleep/hibernate.
- \* Animations and equations in PowerPoint are not necessarily compatible across different versions. If you load your presentation on to a different computer, please check that it displays correctly.
- \* Show up ten minutes before the session starts.
- \* Macintosh users should bring their own adaptor to connect their laptop to the projector.
- \* A Speaker Ready Room staffed by technicians is available for your use. Please test your presentations and confirm your laptop settings in the Speaker Ready Room (Room 21) prior to your talk

## **INSTRUCTIONS TO SPEAKERS, SESSION CHAIRS AND POSTER PRESENTERS**

### **Notes to Session Chairs:**

1. Please be on time. Arrive in the presentation room at least 10 minutes prior to the session start time. Just before the session begins, briefly introduce yourself and explain the timing system to the audience.
2. Start the session on time. Announce the first abstract and author when the monitor timing system signals the beginning of the talk.
3. Strictly adhere to the timing signals. The purpose of the timing signals is to allow attendees to move from one session to another and to be able to rely on the exact time of each presentation as listed in the program. Speakers must be asked to stop when their allotted time is up.
4. Please check the Corrigenda and program agenda for your session. If a presentation has been withdrawn or should a speaker fail to appear, allow the preceding discussion to continue, or suspend the session until it is time for the next scheduled abstract. You may allow a speaker who misses his/her scheduled time to speak at the end of the session if time allows.

### **Internet Access**

November 18-20, 2012

San Diego Convention Center

**Wireless connectivity will be available for free on the Lower Level of the Convention Center. On the Upper Level, wireless connectivity is available in the Ballroom/Exhibit Hall (20D).**

## **PRIZES AND AWARDS**

**Sunday, 18 November  
Ballroom 20ABC**

**Session B1: Welcome, Presentation of  
Awards and DFD Fellowships  
10:00**

Chair: Kenny Breuer, Brown University

### **2012 FLUID DYNAMICS PRIZE**

Professor John Brady, California Institute of Technology, is the recipient of the 2012 Fluid Dynamics Prize which recognizes major contributions to fundamental fluid dynamics made during a career of outstanding work. The citation reads: "For his seminal contributions to the rheology of "complex fluids", for creating the Stokesian Dynamics technique for predicting the macroscopic properties of concentrated suspensions under shear, and for his services to Fluid Dynamics as Associate Editor and Editor, respectively, of two top journals."

**Session B100002: Fluid Dynamics  
Prize Lecture  
10:25**

### **2012 STANLEY CORRSIN AWARD**

Professor Daniel Lathrop, University of Maryland, is the recipient of the Stanley Corrsin Award which is given to recognize and encourage a particularly influential contribution to fundamental fluid dynamics. The citation reads "For his striking observations of flow in a quantum fluid, including detection of counter-flow that confirmed the two-fluid picture of quantum fluid, observation and characterization of reconnections of quantized vortices, and the discovery of an inverse-cube tail in the velocity distribution of superfluid turbulence."

**Session B1.00003: Stanley Corrsin  
Award Lecture  
11:10**

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**Tuesday, November 20 at 11:10  
Ballroom 20A**

### **2012 ANDREAS ACRIVOS DISSERTATION AWARD**

Dr. William Durham, Oxford University  
The thesis title is: Phytoplankton In Flow  
Advisor: Professor Roman Stocker, MIT

Session P33: Andreas Acrivos Dissertation  
Award Lecture  
Session Chair: Shelley Anna, Carnegie  
Mellon University

**Tuesday, November 20 at 11:10 a.m.  
Ballroom 20BC**

### **2012 FRANCOIS FRENKIEL AWARD**

Professor Thomas Cubaud, SUNY  
Stonybrook, is the recipient of the Francois  
Frenkiel award. The award is given in  
recognition of significant contributions to  
fluid mechanics that have been published in  
Physics of Fluids during the preceding year  
by young investigators.

Title: Folded micro-threads: Role of  
viscosity and interfacial tension  
Session P34: Francois Frenkiel Award  
Lecture  
Session Chair: P.K. Yeung, Georgia Tech

## 2012 DIVISION OF FLUID DYNAMICS FELLOWS

### **P. Alfredsson**

Royal Institute of Technology, Stockholm, Sweden

> For the development of innovative, creative and rigorous experimental methods leading to seminal contributions to our understanding of instabilities, transitional and turbulent flows.

### **David Dowling**

University of Michigan, Ann Arbor, MI

> For conduct and analysis of experiments on turbulent mixing and high-Reynolds number wall-bounded flows, and for contributions to fluids education.

### **Alfonso Gañán-Calvo**

Universidad de Sevilla, Sevilla, Spain

> For novel insights, including experiments and theory, for molding fluid jets into micro jets using aerodynamic, hydrodynamic or electrical forces.

### **Ephraim Gutmark**

University of Cincinnati, Cincinnati, Ohio

> For his pioneering contributions to the fundamental flow physics and the development of flow control methodologies to achieve quiet aircraft engines, clean, stable and efficient combustion, and innovative propulsion systems.

### **Dan Henningson**

Royal Institute of Technology, Stockholm, Sweden

> For pioneering contributions to linear and nonlinear hydrodynamic stability and numerical simulations of transitional and turbulent flows, including in-depth understanding of receptivity, bypass transition, and feedback control of these flows.

### **Anette Hosoi**

MIT Lincoln Laboratory, Cambridge, MA

> For innovative work in thin fluid films and in the study of nonlinear interactions between viscous fluids and deformable interfaces including shape, kinematic and rheological optimization in biological systems.

### **Petros Koumoutsakos**

ETH, Zurich, Switzerland

> For pioneering contributions in the development of vortex methods, particle methods, and bio-inspired algorithms, and their insightful use to advance fundamental understanding of bluff body flows, biological flows, and nanofluidics.

### **Norman Lebovitz**

University of Chicago, Chicago, IL

> For fundamental work on the fluid mechanics of rotating stars and self-gravitating masses, and for the development and use of mathematical methods applied to geophysical and astrophysical fluid dynamics.

### **Bernd Noack**

University of Poitiers, Poitiers, France

> For pioneering contributions to closed-loop turbulence control using methods ranging from reduced-order modeling to numerical and experimental demonstrations.

### **Neelesh Patankar**

Northwestern University, Evanston, IL

> For pioneering contributions to the understanding of superhydrophobicity, the development of computational methods for immersed bodies, and the numerical analysis of electro-osmotic flows.

## **2012 DIVISION OF FLUID DYNAMICS FELLOWS**

### **Heinz Pitsch**

RWTH, Aachen, Germany

> For groundbreaking contributions to the development of large-eddy simulations of turbulent combustion as well as their application to aircraft-engine, gas-turbine and reciprocating-engine combustion.

### **William Schultz**

University of Michigan, Ann Arbor, MI

> For deep contributions to nonlinear water waves, die swell, fiber formation and fish swimming, using innovative asymptotic methods and numerical techniques in FEM, BIM and spectral representation.

### **Sigurdur Thoroddsen**

King Abdullah University, Thuwal, Saudi Arabia

> For the development and use of high-speed imaging to understand small-scale multiphase and interfacial flows, and therefore bubbles and drops, breakup and coalescence, cavitation, splashes and other free surface flows.

### **Oleg Vasilyey**

University of Colorado, Boulder, CO

> For pioneering work on adaptive wavelet methods for CFD, fundamental contributions to Adaptive LES and explicit filtering in LES, and development of volume penalization methods for compressible flows.

### **Minami Yoda**

Georgia Institute of Technology, Atlanta, GA

> For outstanding contributions to experimental fluid dynamics and optical diagnostics and, specifically, for innovative contributions to the development of evanescent-wave illumination techniques to study flows in near-wall regions.

# INVITED LECTURES

**Sunday, November 18**

**Invited Session C33**

**13:30, Ballroom 20A**

Chair: Eric Lauga, UC San Diego  
Raymond Goldstein, University of  
Cambridge UK  
Synchronization of Eukaryotic Flagella

**Invited Session C34**

**13:30, Ballroom 20BC**

Chair: Juan C. del Álamo, UC San Diego  
Javier Jiménez, Universidad Politécnica  
Madrid  
The logarithmic layer of wall-bounded  
turbulent flows

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**Monday, November 19**

**Invited Session J33**

**14:00, Ballroom 20A**

Chair: Sutanu Sarkar, UC San Diego  
Ugo Piomelli, Queen's University  
Kingston Canada  
Boundary layers in favourable pressure  
gradients

**Invited Session K33**

**14:40, Ballroom 20A**

Chair: Juan Lasheras, UC San Diego  
Eckart Meiburg, UC Santa Barbara  
Numerical Investigations of Turbidity  
Current

**Invited Session J34**

**14:00, Ballroom 20BC**

Chair: Tom Bewley, UC San Diego  
Peter Schmid, LadHyX Ecole  
Polytechnique  
Control of oscillator and amplifier flows

**Invited Session K 34**

**14:40, Ballroom 20BC**

Chair: Geno Pawlak, UC San Diego  
Shelley Anna, Carnegie Mellon  
University  
Tipstreaming and other methods of  
producing fine fluid threads

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**Tuesday, November 20**

**Invited Session N33**

**10:30, Ballroom 20A**

Chair: Kraig Winters, UC San Diego  
Stephen Monismith, Stanford University  
Waves and wave-driven flow on a coral  
reef

**Invited Session N34**

**10:30, Ballroom 20BC**

Chair: Stefan Llewellyn Smith, UC San  
Diego  
Alison Marsden, UC San Diego  
Simulation-based planning of surgical  
interventions in pediatric cardiology

## MINISYMPOSIA

**Sunday, November 18**

### **Minisymposium Session A19**

**08:00-9:44 Room 28E**

High-Speed, High-Energy, Multi-material Flows

Chair: Gustaaf Jacobs, San Diego State University

### **Minisymposium Session H33**

**10:30-12:27, Room 29A**

Complex fluid flows II

In memory of Daniel D. Joseph

Chair: Howard Hu, University of Pennsylvania

### **Minisymposium Session G33**

**8:00-10:10, Room 29A**

Complex fluid flows I

In memory of Daniel D. Joseph

Chair: Howard Hu, University of Pennsylvania

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## FOCUS SESSIONS

**Sunday November 18**

This year's program includes Focus Sessions in "Interfacial Energy in Thermal Fluids" and "Vortex Dynamics in Fluid-Structure Interactions."

### **Session A31**

**8:00-9:44, Room 33B**

Interfacial Energy in Thermal Fluids – I

Chair: Neelesh Patankar, Northwestern University

### **Session D32**

**14:15-16:25, Room 33C**

Vortex Dynamics in Fluid-Structure Interactions – II

Chair: Darren Crowdy, Imperial College

### **Session E31**

**16:45-17:50, Room 33B**

Interfacial Energy in Thermal Fluids – II

Chair: Kripa Varanasi, MIT

### **Session E32**

**16:45-17:50, Room 33C**

Vortex Dynamics in Fluid-Structures Interactions – III

Chair: Silas Alben, University of Michigan

### **Session A32**

**8:00-9:31, Room 33C**

Vortex Dynamics in Fluid-Structure Interactions – I

Chair: Stefan Llewellyn Smith, UC San Diego

## GALLERY OF FLUID MOTION

November 18-20, 2012  
Exhibit Hall (Room 20D)

The 30th Annual Gallery of Fluid Motion consists of computational and experimental still images and videos submitted by attendees. A panel selects outstanding entries based on artistic value, scientific content, and originality. The winning entries will be displayed at the Annual APS Meeting in March 2013 and will appear in *Physics of Fluids*, September 2013.

### POSTERS

1. Please place your poster in the section marked "Gallery of Fluid Motion."
2. Boards will be in place and numbered by 16:00 on Saturday, November 17, 2012.
3. Entries may be put up between 16:00 and 20:00 on Saturday or between 7:00 and 9:00 on Sunday, November 18.
4. Entries are to be mounted in the numbered space that has been reserved for it. Refer to the listing below for assigned number.
5. Velcro and pushpins will be provided. Presenters must bring any other supplies needed to mount their posters to the boards.
6. Poster boards (approx.  $\frac{1}{2}$  of an 8'x4' poster boards for each entry = 45" x 45") will be available for mounting.
7. Presenters must dismantle their posters by 11:00 on Tuesday. After that they will be discarded.

**P01. Visualization of Shock Patterns During Tunnel Start up Transient.** Shashi B. Verma, Manisankar, C. (NAL Bangalore).

**P02. Coherent structures in the transition of spatially developing pipe flow.** Xiaohua Wu (Royal Military College of Canada), Parviz Moin (Stanford University), Ronald J. Adrian, Jon Baltzer (Arizona State University), Jean-Pierre Hickey (Royal Military College of Canada)

**P03. Streamlines Over Chicago.** Roger Lee, Kyle Lueptow (Northwestern University)

**P04. Two-phase sediment cloud.** Bing Zhao (CEE, NTU, Singapore), Adrian C.H. Lai (CENSAM, SMART, Singapore), Adrian W. K. Law (CEE, NTU, Singapore), Eric E. Adams (CEE, MIT)

## POSTERS

- P05. Carbon 12, Art & Climate change: Planet Laboratory installation.**  
Helen Evans, Heiko Hansen, Jean-Marc Chomaz, Antonine Garcia (LadHyX, CNRS-Ecole Polytechnique)
- P06. Stratification in modulated heap flow.**  
Yi Fan, David McDonald, Paul Umbanhowar, Julio Ottino, Richard M Lueptow (Northwestern University).
- P07. Fine-Scale Mixing in Turbulent Shear Flows.**  
Jens Henrik Goebbert, Michael Gauding, Fabian Hennig, Norbert Peters (RWTH Aachen University).
- P08. The birth of a detonation wave.**  
Rohit Bhattacharjee, Logan Maley, Matei Radulescu (University of Ottawa)
- P09. Dynamics of Elasto-Inertial Turbulence.**  
Yves Dubief (University of Vermont), Vincent Terrapon (University of Liege), Julio Soria (Monash University).
- P10. The Jumbling Jet In Crossflow.**  
Mirko Gamba (University of Michigan), M. Godfrey Mungal (Santa Clara University, Stanford University), Ronald K. Hanson (Stanford University)
- P11. The spreading of a hydrosoluble surfactant on water.**  
Matthieu Roche (MAE, Princeton University), Zhenzhen Li (MMN, ESPCI, Paris, France), Ian M. Griffiths (OCCAM, Oxford University, Oxford UK), Arnaud St Jalmes (IPR Universite Rennes, France), Howard A. Stone (MAE, Princeton University).
- P12. Visualizing Whole Genome Sequencing : Microfluidics on a Massive Scale.**  
Bill Peck, Mark Fuller, Anthony Delacruz, Sarah Van Kuelen, Elodie Nguyen (Complete Genomics)
- P13. The Mixing of Distant Sources.**  
Mihkel Kree (Aix Marseille University, France), Jerome Duplat (Universite Joseph Fourier, France), Emmanuel Villermaux (Aix Marseille University, France).
- P14. Beads-on-a-string.**  
Changxue Xue, Nicole Coutris, Yong Huang, (Clemson University)
- P15. Viscoelastic fountain on a tubeless straw.**  
Salima Rafai (CNRS-University of Grenoble), Patrice Ballet (University of Grenoble), Thomas Podgorski (CNRS-University of Grenoble).
- P16. Squeezing blood cells.**  
Badr Kaoui, Timm Kruger ,Stefan Frijters (Eindhoven University of Technology).
- P17. Microdroplets & Nanoparticles.**  
Badr Kaoui, Stefan Frijters, Florian Gunther, Jens Harting (Eindhoven University of Technology).
- P18. Feeding flow dynamics of developing zebrafish larvae**  
Chia-Yuan Chen (National Taiwan University of Science and Technology, Taiwan), Brian Y. Chang (Carnegie Mellon University), Roi Holzman (The Inter-University institute for Marine Sciences, Israel), Kerem Pekkan (Carnegie Mellon University)



## POSTERS

- P19. Absolutely iso-surface of vorticity and velocity vectors around a normal hovering fruitfly at six consecutive instances.**  
Wu Di, Yeo Khoon Seng, Lim Tee Tai (National University of Singapore).
- P20. Formation of Biofilm Streamers in a Porous Microfluidic Device under Different Hydrodynamical Conditions.**  
Amin Valiei (University of Alberta, Edmonton, AB, Canada), Alope Kumar (Oak Ridge National Laboratory, TN, USA), Partha P. Mukherjee (Texas A & M University, College Station, TX, USA), Yang Liu (University of Alberta, Edmonton, AB, Canada), Thomas Thundat (University of Alberta, Edmonton, AB, Canada).
- P21. Integrated Analysis of Cicada Freely Forward Flight.**  
Haibo Dong (University of Virginia), Kuo Gai, Hui Wan (Wright State University), Yan Ren (University of Virginia).
- P22. Hydrodynamics based bio-inspired surfaces for preventing microbial adhesion.**  
Alope Kumar, David Karig, Rajesh Acharya, (Biosciences Division, Oak Ridge National Laboratory, TN), Partha Mukherjee (Department of Mechanical Engg, Texas A & M University), Scott Retterer (Biosciences Division, Oak Ridge National Laboratory, TN), Mitchel Doktycz (Biosciences Division, Oak Ridge National Laboratory, TN).
- P23. Causing a stir: Cilia-driven flow landscapes on a coral surface.**  
Orr Shapiro (MIT, Weizmann Institute of Science), Vicente Fernandez, Melissa Garren, Theresa Santiano-McHatton (MIT), Assaf Vardi (Weizmann Institute of Science), Roman Stocker (MIT).
- P24. The Great Navier-Stokes Snowball Fight.**  
Jules Soto, Evan Variano (UC Berkeley).
- P25. Splatter Patterns.**  
Said Shakerin, Melissa M. Sweet (University of the Pacific).
- P26. Bubbles, Drops, Streams: A Flow Visualization Device for Informal Science Education.**  
Said Shakerin (University of the Pacific).
- P27. Rotating Water Sheet.**  
Said Shakerin, Jonhathan J. Sweet (University of the Pacific).
- P28. Water Flowers.**  
Said Shakerin, Melissa M. Sweet (University of the Pacific).
- P29. [WITHDRAWN]**
- P30. Pearling of sneezes.**  
Lydia Bourouiba, Barry E. Scharfman, Alexandra H. Tchet (MIT).
- P31. Clapping Wet Hands.**  
Brian Chang (Virginia Tech), Brice Slama (Ecole Polytechnique), Sunghwan Jung (Virginia Tech).
- P32. Explosive Boiling.**  
M. van Limbeek, H. Lhuissier, C. Sun, A. Prosperetti, D. Lohse (POF - University of Twente).
- P33. A Rising Bubble Ring.**  
T. T. Lim (National University of Singapore), M. Cheng, J. Lou (Institute of High Performance Computing, Singapore), C.T. Toh (National University of Singapore)

## POSTERS

- P34. Particle breaching or bouncing on fluid interface.**  
Alex Kotsch (Virginia Tech), Sungyon Lee (UCLA), Sunghwan Jung (Virginia Tech).
- P35. Bubble cavitating inside liquid fountain of beads upon ultrasonic atomization.**  
Kazuma Fujita, Katsumi Tsuchiya (Doshisha University).
- P36. Water (white) rinsing 0.7% 15M PAM (blue).**  
Travis Walker, Armen Mekhdjian, Theresa Hsu, Gerald Fuller (Stanford University).
- P37. Fluid Dynamics at Gas Evolving Electrodes: From Bubbles to Gas Film Formation.**  
Zahra Ghorbani, Rolf Wuthrich, Marius Paraschivoiu, Hoi Dick Ng (Concordia University, Montreal, Canada).
- P38. A new angle on water entry.**  
Tadd Truscott, Kyle Bodily, Zhao Pan, Ken Langley (BYU).
- P39. Surface tension of a soap film with non-circular disruption.**  
Md Rajib Anwar, Bin Hu, Sarah Kieweg, Zouhair Talbi, Thora Whitmore (University of Kansas)
- P40. The sphere uprising.**  
Tadd Truscott, Randy Munns, Eric Hardester, Jonathon Pendlebury (BYU).
- P41. Impact Dynamics of Binary Droplet Collision.**  
Xiaodong Chen, Vigor Yang (Georgia Institute of Technology).
- P42. Patterns of thermomagnetic convection: thermomagnetic rolls, waves and cells.**  
Alexandra A. Bozhko, Gennady F. Putin, Alexandr S. Sidorov (Perm State National Research University, Russia), Sergey A. Suslov (Swinburne University of Technology, Australia).
- P43. Stretched Coiling Instability.**  
Kyle J Lueptow (Evanston Township HS), Richard M Lueptow (Northwestern University).
- P44. A star-shaped wave.**  
Jean Rajchenbach, Didier Clamond, Alphonse Leroux (LPMC, CNRS, Universite de Nice, France)
- P45. Forebody Vortex Control through Plasma Actuation.**  
John Farnsworth, Zachary Francis, Reid Witt, Chris Porter, Thomas McLaughlin (US Air Force Academy).
- P46. Crosswaves induced by the vertical oscillation of a fully immersed linear disturbance.**  
Frederic Moisy (Universite Paris-Sud), Guy-Jean Michon (UPMC), Marc Rabaud (Universite Paris-Sud), Eric Sultan (UPMC)
- P47. The Wake of a Forced Oscillating Flexible Cylinder.**  
Zafar Bangash, Francisco J. Huera-Huarte (Universitat Rovira Virgili).
- P48. Vorticity in the wake of an oscillating foil.**  
Rafael Fernandez-Prats, Francisco J. Huera-Huarte (Universitat Rovira Virgili).
- P49. Dynamics of Perturbed Vortex Pairs Impinging on a Boundary**  
Daniel Asselin, Charles Williamson (Cornell University).

## POSTERS

- P50. Wind turbine wakes.**  
Stephane Backaert (Universite catholique de Louvain), Stefan Kern, Thierry Maeder (GE Global Research), Philippe Chatelain (Universite catholique de Louvain).
- P51. Tornado in a Tank.**  
Mohamed Fayed, Hamid Ait Abderrahmane, Georgios H. Vatistas, Hoi Dick Ng (Concordia University, Montreal, Canada).
- P52. Plethora of Vortices in the wake of a Dual Step Cylinder.**  
Chris Morton, Serhiy Yarusevych (University of Waterloo).
- P53. Vortices During Electrocoalescence.**  
Brad Hamlin, William Ristenpart (UC Davis).
- P54. Vortex Ring Generated by an Impulsively Started Circular Disk.**  
Laibing Jia, Li Lu, Anqing Xuan, Haijun Wu, Xin Xu, Xiezhen Yin (USTC, Hefei, Anhui, China).
- P55. Leading edge vortices of flow over a delta wing.**  
Sebastian Eichelbaum, Jens Kasten, Mario Hlawitschka, Gerik Scheuermann (University of Leipzig, Germany), Bernd R. Noack (Institute PPRIME, France).
- P56. Knotted and Unknotted Vortices.**  
Dustin Kleckner, Martin Scheeler, William T. M. Irvine (University of Chicago).
- P57. Seeing the invisible - air vortices around a splashing drop.**  
Irmgard Bischofberger, Kelly Mauser, Sidney Nagel (The University of Chicago).
- P58. Vortex Structure of a 2D Plunging Plate.**  
Azar Eslam Panah, James H. Buchholz (University of Iowa).
- P59. Pancake vortices formed by a plume trapped in sharp stratification.**  
Michael Baker, Roberto Camassa, Claudia Falcon, Rich McLaughlin, Johnny Reis, Chung-Nan Tzou, Jeremy Ward, Brian White (UNC).

## GALLERY OF FLUID MOTION – VIDEOS

- |             |  |             |  |
|-------------|--|-------------|--|
| <b>V01.</b> | <p><b>Stirring faces: mixing in a quiescent fluid.</b><br/>Steven L. Brunton, Clarence W. Rowley (Princeton University).</p>   | <b>V07.</b> | <p><b>Granular Impact: Acoustics and Fluctuations</b><br/>Abe Clark, R.P. Behringer (Duke University).</p>   |
| <b>V02.</b> | <p><b>Boundary layer evolution in turbulent Rayleigh-Benard convection.</b><br/>Herwig Zilken (Research Centre Juelich, Germany), Mohammad S. Emran, Joerg Schumacher (Ilmenau University of Technology, Germany).</p>   | <b>V08.</b> | <p><b>Bi-disperse particle-laden flows in the Stokes regime</b><br/>Gilberto Urdaneta (UCLA), Saro Meguerdijian (USC), Kali Allison (Harvey Mudd), Thomas Crawford (University of Cambridge), Wylie Rosenthal (Harvey Mudd), Sungyon Lee (UCLA), Andrea L Bertozzi (UCLA).</p> |
| <b>V03.</b> | <p><b>Jets from Hollows.</b><br/>Thomas Seon, Arnaud Antkowiak (Institut d'Alembert, UPMC &amp; CNRS, Jussieu, Paris).</p>   | <b>V09.</b> | <p><b>Indirect detonation initiation using acoustic timescale thermal power deposition</b><br/>David R. Kassoy (University of Colorado. Boulder).</p>  |
| <b>V04.</b> | <p><b>Startup of free and forced horizontal convection in an enclosure with mechanical and thermal forcing.</b><br/>Gregory J. Sheard, Kean Y. Wong (Monash University, Australia), Martin P. King (Bjerknes Centre for Climate Research, Norway).</p>   | <b>V10.</b> | <p><b>Domestic Catastrophe n3: Planet laboratory</b><br/>Helen Evans, Heiko Hansen (HeHe), Jean-Marc Chomaz, Antoine Garcia (LadHyX, CNRS-Ecole Polytechnique).</p>  |
| <b>V05.</b> | <p><b>Boundary layers in turbulent Rayleigh-Benard convection.</b><br/>Christian Resagk, Johannes Rilck, Michael Schoepf, Andre Thess (Ilmenau University of Technology).</p>  | <b>V11.</b> | <p><b>Dynamics of unconfined spherical flames</b><br/>Louis Leblanc, Lacy Caron (University of Ottawa), Zhe (Rita) Liang (Atomic Energy Canada Limited), Matei I. Radulescu (University of Ottawa).</p>  |
| <b>V06.</b> | <p><b>Grain size effect on the behaviour of sediment clouds</b><br/>Bing Zhao (School of Civil and Environmental Engineering, Nanyang Techn.), Adrian C. H. Lai, (Center for Environmental Sensing and Modeling, Singapore-MIT), Adrian W. K. Law (School of Civil and Environmental Engineering, Nanyang Techn.), Eric E. Adams (Department of Civil and Environmental Engineering, Mass.).</p> | <b>V12.</b> | <p><b>The 3D structure of turbulent channels at <math>Re_{\tau}=4000</math></b><br/>Adrian Lozano-Duran, Javier Jimenez (Universidad Politecnica de Madrid).</p>   |
|             |  | <b>V13.</b> | <p><b>The turbulent / non turbulent interface in boundary layers</b><br/>Guillem Borrell, Juan A. Sillero, Javier Jimenez (Universidad Politecnica de Madrid).</p>   |

## VIDEOS

- V14. Flow visualisation of spatially developing turbulent boundary layer along a flat plate**  
JungHoon Lee, YongSeok Kwon, Nicholas Hutchins, Jason Monty (The University of Melbourne, Victoria, 3010, Australia).
- V15. Leidenfrost explosion**  
F. Moreau (University of Liege), P. Colinet (University of Bruxelles), S. Dorbolo (University of Liege).
- V16. Discrete tones around airfoils**  
Miguel Fosas de Pando, Peter J. Schmid (LadHyX, CNRS-Ecole Polytechnique), Denis Sipp (DAFE, ONERA Meudon).
- V17. Prediction of supersonic jet noise using large-eddy simulation: effects of chevrons**  
Joseph W. Nichols, Sanjiva K. Lele (Center for Turbulence Research, Stanford University), Frank E. Ham (Cascade Technologies, Inc., Palo Alto, CA), James E. Bridges (Acoustics Branch, NASA Glenn Research Center, Cleveland, OH).
- V18. Particle-laden currents interacting with complex bottom topography: a numerical investigation**  
Mohamad Nasr-Azadani, Eckart Meiburg (UC Santa Barbara).
- V19. Clustering Dynamics of Droplets in Turbulence**  
Humberto Bocanegra Evans, Nico Dam, Willem van de Water (Mechanical Eng. Faculty, Eindhoven University of Technology).
- V20. High-speed imaging of aerodynamically driven instabilities in annular liquid sheets with axial co-flow**  
Damon Honnery, Julio Soria (Monash University, Australia).
- V21. Stability of Capillary Surfaces Supported by a Helical Wire**  
Jorge A. Bernate (Stanford University), David B. Thiessen (Washington State University).
- V22. Vorticity and capillaries at the surface of a jet**  
Matthieu A. Andre, Philippe M. Bardet (The George Washington University).
- V23. Slow Motion of Free Vortex Formation**  
Ahmad Falahatpisheh, Arash Kheradvar (Mechanical Eng. Dept., University of California, Irvine).
- V24. Kelvin-Helmholtz and Buckling Instabilities for a Viscoelastic Liquid**  
Bavand Keshavarz, Gareth H McKinley (?).
- V25. Vortex Merger of Long Filaments**  
Akshay Khandekar, Jamey Jacob (Oklahoma State University).
- V26. Vortex Shedding in the Wake of a Dual Step Cylinder**  
Chris Morton, Serhiy Yarusevych (University of Waterloo).
- V27. Vortices within vortices: hierarchical nature of vortex tubes in turbulence**  
Kai Buerger, Marc Treib, Ruediger Westermann (Technische Universitaet Muenchen), Suzanne Werner, Cristian C Lalescu, Alexander Szalay, Charles Meneveau, Gregory L Eyink (The Johns Hopkins University).
- V28. Is it shedding?**  
Jeffrey Young, Maria-Isabel Carnasciali (University of New Haven), Mike Kandis (Pioneer Aerospace)

## **VIDEOS**

- V29. Visualization of Kelvin waves on quantum vortices**  
Enrico Fonda, David P. Meichle (University of Maryland), Nicholas T. Ouellette (Yale University), Daniel P. Lathrop (University of Maryland)
- V30. Fast, large amplitude vibrations of compliant cylindrical shells carrying a fluid**  
Pawel Zimoch, Elliott Tixier, Julia Hsu, Amos Winter, Anette Hosoi (Massachusetts Institute of Technology)
- V31. Spontaneous Formation of Columnar Vortices**  
Jared P. Whitehead, Beth A. Wingate (Los Alamos National Laboratory)
- V32. A butterfly effect: The structure of the elliptic flow instability**  
Sharath Girimaji (TAMU, College Station, Texas)
- V33. Interfacial Instabilities in Torsional Flows**  
Y.-T. Sun, Y.-Y. Chen (Dept. of Physics, Nat'l Taiwan University), P. Arratia (Dept. of Mechanical Engineering, University of Pennsylvania), J.- C. Tsai (Inst. of Physics, Academia Sinica, Taipei, Taiwan)
- V34. High-Speed Acquisition of Free Vortex Formation**  
Ahmad Falahatpisheh, Arash Kheradvar (Mechanical Eng. Dept., University of California, Irvine)
- V35. Jumping Droplets**  
Shahriar Afkhami, Lou Kondic (NJIT)
- V36. Spontaneous Capillarity-Driven Droplet Ejection**  
Andrew Wollman (Portland State University), Trevor Snyder (Xerox Inc.), Donald Pettit (NASA, Johnson Space Center), Mark Weislogel (Portland State University)
- V37. Droplets bouncing over a vibrating fluid layer**  
Pablo Cabrera, Roberto Zenit (Universidad Nacional Autonoma de Mexico)
- V38. Unwrapping Chains**  
A. D. Cambou, B. D. Gamari (University of Massachusetts, Amherst), E. Hamm (Universidad de Santiago de Chile), J. A. Hanna, N. Menon, C. D. Santangelo, L. Walsh (University of Massachusetts, Amherst)
- V39. Enhancing acoustic cavitation**  
Bram Verhaagen, Oscar R. Enriquez Paz Y Puente, Michel Versluis (University of Twente), Andrea Prosperetti (Johns Hopkins University and University of Twente), Detlef Lohse, Han Gardeniers (University of Twente).
- V40. Film Boiling**  
Sander Wildeman, Henri Lhuissier, Chao Sun, Detlef Lohse (University of Twente)
- V41. Simulation of a Small Planing Vessel in Short-crested Seas**  
Thomas T. O'Shea, Kyle A. Brucker, Douglas G. Dommermuth (SAIC), Randall Hand, Paul Adams, Richard Walters, Kevin George, Mike Stephens (UDACC).
- V42. Numerical Simulation of a Seaway with Breaking**  
Douglas G. Dommermuth, Thomas T. O'Shea, Kyle A. Brucker, Donald C. Wyatt (SAIC), Randall Hand, Paul Adams, , Richard Walters, Kevin George, Mike Stephens (UDACC).

## VIDEOS

- V43. Around the cusp singularity and the breaking of waves**  
Tejerina-Risso J., Le Gal P. (IMERA, Aix-Marseille Univ.)
- V44. Effect of bubble deformability on vertical channel bubbly flow**  
Sadegh Dabiri (University of Notre Dame), Jiakai Lu (Worcester Polytechnic Institute), Gretar Tryggvason (University of Notre Dame).
- V45. Freezing Drops with Powders**  
Ying Zhu, Ivan Vakarelski, Sigurdur Thoroddsen (KAUST).
- V46. Siquieros accidental painting technique: a fluid dynamics point of view**  
Sandra Zetina, Roberto Zenit (Universidad Nacional Autonoma de Mexico).
- V47. Flow Visualization inside a Ranque-Hilsch Tube**  
David Porta Zepeda, Carlos Echeverria Arjonilla, Catalina Stern Forgach (Universidad Nacional Autonoma de Mexico).
- V48. Water-Oil Drainage Dynamics in Oil-Wet Random Microfluidic Porous Media Analogs**  
Wei Xu (Petroleum Engineering, Colorado School of Mines), Jeong Tae Ok, Keith Neeves (Chemical Engineering, Colorado School of Mines).
- V49. Surface Explosion Cavities**  
Adrien Benusiglio (Ladhyx, Ecole Polytechnique), David Qu?r? (PMMH, ESPCI), Christophe Clanet (Ladhyx, Ecole Polytechnique).
- V50. Evaporation in Motion**  
H. Machrafi (Universite de Liege), A. Rednikov, P. Colinet (Universite Libre de Bruxelles), P.C. Dauby (Universite de Liege).
- V51. Droplet beak-up with negative momentum**  
Laurent Tanguy (University of Freiburg), Dong Liang (HSG-IMIT), Roland Zengerle, Peter Koltay (University of Freiburg).
- V52. Viscous Drops Impacting Water**  
Travis Walker, Alison Logia, Gerald Fuller (Stanford University).
- V53. Catastrophic cracking courtesy of quiescent cavitation**  
Tadd Truscott, Ken Langley, Jesse Daily, Scott Thomson (BYU).
- V54. Self healing soap films**  
Taylor Killian, Jordan Huey, Joshua Bryson, Tadd Truscott (BYU).
- V55. Shear-Induced Droplet Breakup and Subsequent Coalescence of the Daughter Droplets**  
Orest Shardt, Alexandra Komrakova, J.J. Derksen, Sushanta K. Mitra (University of Alberta).
- V56. Bubble chandeliers**  
Sigurdur Thoroddsen, Marie-Jean Thoraval (KAUST, Saudi Arabia), Kohsei Takehara, T. Goji Etoh (Kinki University, Japan).
- V57. Bubble rings entrapments**  
Marie-Jean Thoraval, Sigurdur Thoroddsen (KAUST, Saudi Arabia), Kohsei Takehara, T. Goji Etoh (Kinki University, Japan).
- V58. On-orbit experiment on liquid bridge pinch off under thermocapillary effect in Japan Experiment Module 'Kibo' aboard the ISS.**  
Ichiro Ueno (Tokyo University of Science), Koichi Nishino (Yokohama National University), Mitsuru Ohnishi (Japan Aerospace Exploration Agency), Hiroshi Kawamura (Tokyo University of Science, Suwa), Masato Sakurai, Satoshi Matsumoto (Japan Aerospace Exploration Agency).

## VIDEOS

- V59. Emptying a bottle.**  
Seungho Kim (Seoul National University), L. Mahadevan (Harvard University), Ho-Young Kim (Seoul National University),
- V60. Dye Visualization of a Vanishing Hollow Foil.**  
Stephanie Steele (MIT), Jason Dahl (University of Rhode Island), Gabriel Weymouth (Singapore-MIT Alliance for Research and Technology), Michael Triantafyllou (MIT)
- V61. 3D Shock-Bubble Interactions.**  
Babak Hejazialhosseini, Diego Rossinelli, Christian Conti, Petros Koumoutsakos (CSE Lab – ETHZ).
- V62. When a water drop freezes before it solidifies.**  
Faryar Tavakoli, Alen Sarkissians, Pirouz Kavehpour (UCLA).
- V63. Mass Transfer In Bubbly Flow Using a Subscale Description.**  
Bahman Aboulhasanzadeh, Gretar Tryggvason (University of Notre Dame).
- V64. Impinging Jet Dynamics.**  
Xiaodong Chen, Vigor Yang (Georgia Tech).
- V65. Newtonian and Non-Newtonian Droplet Collision.**  
Xiaodong Chen, Vigor Yang (Georgia Tech).
- V66. The short life of a droplet.**  
Guillermo Hernández-Cruz (Centro de Investigación en Energía UNAM), Minerva Gpe. Vargas (Instituto Tecnológico de Zacatepec), J. Arturo Pimentel (Instituto de Biotecnología UNAM), Heberto Perez (Centro de Investigación en Energía UNAM), Gabriel Corkidi (Instituto de Biotecnología UNAM),
- V67. Shedding droplets during condensation.**  
Eduardo Ramos (Centro de Investigación en Energía UNAM)
- V68. The evolution of aortic valve vortices**  
Adam T. Paxson, Rajeev Dhiman, J. David Smith, Kripa K. Varanasi (MIT).
- V69. Do proximate, C. elegans swimmers synchronize their gait?**  
Trung Bao Le, Fotis Sotiropoulos, Anvar Gilmanov, Henryk Stolarski (University of Minnesota)
- V70. Electron Beam Artifacts in Liquid-Cell Electron Microscopy.**  
J. Yuan, K. Lee, D. M. Raizen, H. H. Bau (University of Pennsylvania)
- V71. Steady, accelerating, and turning locomotion of Paramecia.**  
J. Grogan (University of Pennsylvania), F. Ross (IBM, T. J. Watson Research Center), H. H. Bau (University of Pennsylvania)
- V72. Meandering rivulets.**  
Saikat Jana, Matthew Giarra, Pavlos Vlachos, Sunghwan Jung (Virginia Tech)
- V73. Myco-fluidics: nuclear mixing in a growing filamentous fungus.**  
Stephanie Couvreur, Adrian Daerr (Universite Paris Diderot)
- Patrick C. Hickey (UCLA), Anna Simonin (University of Sydney), N. Louise Glass (UC Berkeley), Marcus Roper (UCLA).



## VIDEOS

- V74. Diving with microparticles in an acoustic field.**  
Alvaro Marin, Massimiliano Rossi (Bundeswehr University Munich, Germany), Rune Barnkob (DTU Physics, Denmark), Per Augustsson (Lund University, Sweden), Peter Muller, Henrik Bruus (DTU Physics, Denmark), Thomas Laurell (Lund University, Sweden), Christian Kahler (Bundeswehr University Munich, Germany).
- V75. A closer look at superhydrophobic contact lines.**  
Adam T. Paxson, Kripa K. Varanasi (MIT).
- V76. Microfluidic vortex flows generated by opto-electrokinetic technique.**  
Choongbae Park, Steven T. Wereley (Purdue University).
- V77. Drop Impingement on Highly Wetting Porous Surfaces.**  
Young Soo Joung, Cullen R. Buie (MIT).
- V78. Bouncing and Rolling of Droplets on Superhydrophilic Surfaces.**  
Young Soo Joung, Cullen R. Buie (MIT).
- V79. The Pilot-wave dynamics of walking droplets.**  
Daniel M. Harris, John W. M. Bush (MIT).
- V80. Unsteady Flow and Force Control in Butterfly Take-off Flight.**  
Haibo Dong, Chengyu Li, Zongxian Liang (University of Virginia), Xiang Yun (Wright State University).
- V81. Fluid Rude Goldberg Machine.**  
Manu Prakash (Stanford University), Kevin Miklasz (Iridescent Learning), Nate James Cira (Stanford University), Haripriya Mukundarajan, James Clements, Jim Cybulski (Stanford University), Mariana Rutigliano, Cristiano Meira (Iridescent Learning).
- V82. Clocked microfluidic circuits.**  
Georgios Katsikis, Manu Prakash (Stanford University).
- V83. Wake shift enhances lift in flying snake.**  
Anush Krishnan, Lorena A Barba (Boston University), John J Socha, Pavlos Vlachos (Virginia Tech).
- V84. Airflow in subject specific human lungs: normal breathing**  
Jiwoong Choi, Youbing Yin, Eric A. Hoffman (University of Iowa), Merryn H. Tawhai (The University of Auckland), Ching-Long Lin (University of Iowa).
- V85. The 'Swiss cheese' instability of bacterial biofilms.**  
Hongchul Jang, Roberto Rusconi, Roman Stocker (MIT).

## **Sunday Evening, 18 November 2012**

### **F1. Student Poster Session**

**5:50–6:50, Room: Ballroom 20D Foyer**

#### **F1.1 MICROFLUIDICS**

**F1.2** Film Thickness Between A Bubble And The Inner Wall Of Vertical Tubes Containing Viscous Liquids  
Guadalupe Gutierrez, Abel Lopez-Villa, Abraham Medina

**F1.3** Self-introduced Thermocapillary Convection In The Evaporating Process Of A Suspending Drop  
JingChang Xie

**F1.4** Hole-Closing Of A Surfactant Layer On A Thin Fluid Film  
Matthew Hin, M. Richard Sayanagi, Rachel Levy, Karen Daniels

**F1.5** Investigation Of Thin Film Coating Process For Printed Electronics With Suspension Ink By Slot Die Coating  
Seung-Hyun Lee, Inyoung Kim

**F1.6** Molecular Dynamics Simulations Of The Evaporation Of Particle-laden Drops  
Weikang Chen, Joel Koplik, Ilona Kretzschmar

**F1.7** Non-Linear Oscillation In Ionic Current Due To Size Effect In Glass Nanopipette  
Tomohide Takami, Xiao Long Deng, Jong Wan Son, Eun Ji Kang, Tomoji Kawai, Bae Ho Park

**F1.8** Resolving Distinct Conformations Of Spectrally Similar Silver-DNA Nanoclusters Using Electrokinetic Flows  
Jackson Del Bonis-O'Donnell, Deborah

Fygenson, Sumita Pennathur

**F1.9** Stochastic Analysis Of Antibody-antigen Binding In A Microfluidic Device  
Shauna Adams, Cong Zhang, Harvey Zambrano, A.T. Conlisk

**F1.10** Understanding The Nonlinear-optical Response Of A Liquid-core Photonic-crystal Fiber  
Ilya Fedotov, Vladimir Mitrokhin, Alexander Voronin, Andrey Fedotov, Dmitriy Sidorov-Biryukov, Aleksey Zheltikov

**F1.11** On-chip Micro- And Nanofluidic Electrokinetic Injection And Separation for PEGylation Analysis  
Elijah Shelton, Mary Baum, Dan Morse, Sumita Pennathur

**F1.12** The Clogging Behavior of Tapered Microchannels  
Sorell Massenburg, Kaare Jensen, David Weitz

**F1.13** Fluid Surface Deformation By Objects In The Cheerios Effect  
Khoi Nguyen, Michael Miller, Shreyas Mandre

**F1.14** Shape Control Of Doctor Blade Coated Polymer Electrodes Via Microflow Control In A Drying Droplet  
Yunseok Jang, Jeongdai Jo, Seung-Hyun Lee

**F1.15** Electrical Power Generation By Mechanically Modulating Electrical Double Layers  
Dongyun Lee, Jong Kyun Moon, Jaeki Jeong, Hyuk Kyu Pak

**F1.16** Direct Numerical Simulation Of Current-induced Convection Near An Ion-selective Surface  
Clara Druzgalski, Mathias B. Andersen, Ali Mani

**F1.17** Soret-driven Convection In Colloidal Suspensions  
Mahmoud DarAssi, Layachi Hadji

**F1.18** Super Free Fall In A Semi-infinite Cone Filled With A Low Viscosity Liquid  
Ayax Torres, Guadalupe Gutierrez, Abel Lopez-Villa, Abraham Medina

**F1.19** The Thinning Of Viscous Liquid Threads.  
J. Rafael Castrejon-Pita, Alfonso A. Castrejon-Pita, Ian M. Hutchings

## Student Poster Session

**F1.20** Spreading and Fragmenting Characteristics of Impacting Droplet On Micro/ Nanostructured Water-Repellent Surfaces Hyungmo Kim, Chan Lee, Moo Hwan Kim, Joonwon Kim

**F1.21** Enhanced Two Photon Fluorescence Microfluidic Sensor Based on Dual Cladding Photonic-crystal Fiber Lyubov Amitonova, Ilya Fedotov, Andrey Fedotov, Aleksei Zheltikov

**F1.22** Speed Of A Taylor Swimmer In Newtonian And Viscoelastic Fluids Moumita Dasgupta, Bin Liu, Henry Fu, Michael Berhanu, Kenneth Breuer, Thomas Powers, Arshad Kudrolli

**F1.23** Interaction Between Shape And Lipid Flow In Bilayer Membranes Padmini Rangamani, Ashutosh Agrawal, Kranthi Mandadapu, George Oster, David Steigmann

**F1.24** Oscillation-induced Drop Transport Using Low-frequency Ac Electrowetting Jiwoo Hong, Seung Jun Lee, Kwan Hyoung Kang

**F1.25** A Pipette Dispenses A Charged Droplet Dongwhi Choi, Horim Lee, Do Jin Im, In Seok Kang, Kwan Hyoung Kang

**F1.26** An Experimental Study Of The Effect Of Viscosity On Bouncing Soap Droplets Onto A Horizontal Soap Film Amy-Lee Gunter, Hoi Dick Ng

**F1.27** Nonlinear Dynamics In A Microfluidic Loop Device: Chaos And Fractals Jeevan Maddala, Raghunathan Rengaswamy

**F1.28** Accumulation Of BSA In Packed-bed Microfluidics Samantha Summers, Chuntian Hu, Ryan Hartman

**F1.29** Measurement Of The Extensional Viscosity For Newtonian and Viscoelastic Liquids Using the Selective Withdrawal Technique E. Trejo-Peimbert, R. Zenit, J.J. Feng

**F1.30** Optoelectrokinetic Trapping Of Gold Nanoparticles For SERS

Applications Avanish Mishra, Raviraj Thakur, Stuart Williams, Alope Kumar, Steve Wereley

**F1.31** Experimental Results of Electrothermal Vortex in Parallel ITO-glass with High Conductivity Medium and AC Electric Field and Laser Jupyong Kim, Jae-sung Kwon, Steve Wereley

**F1.32** BIOFLUIDS

**F1.33** Simultaneous Analysis of Wake Structure and Force Measurements Of Unsteady Hydrofoils Timothy Jeter, Jr., Melissa Green

**F1.34** Characterization of Surface Acoustic Wave Nebulization: Atomization Dynamics and Resulting Droplet Size Distribution Alicia Clark, Alberto Aliseda, Scott Heron, Yue Huang, David Goodlett

**F1.35** Thermodynamic Of Cellulose Solvation In Novel Solvent Mixtures Ritankar Das

**F1.36** A Computational Model of Optimal Vein Graft Adaptation In An Arterial Environment Abhay B. Ramachandra, Sethuraman Sankaran, Jay Humphrey, Alison Marsden

**F1.37** Deformation Of Congenital Bicuspid Aortic Valves In Systole Kai Szeto, Peter Pastuszko, Vishal Nigam, Juan Lasheras

**F1.38** WITHDRAWN

**F1.39** Characterization Of Intraventricular Flow Patterns In Healthy Neonates From Conventional Color-Doppler Ultrasound Shai Tejman-Yarden, Callie Rzasa, Yolanda Benito, Marta Alhama, Tina Leone, Raquel Yotti, Javier Bermejo, Beth Printz, Juan C. del Alamo

## Student Poster Session

**F1.40** Forewing-hindwing Phase-lag Effect in the Propulsive Performance Of A Four-winged Flapping Flyer

Mariana Centeno, Daniel Pradal, Benjamin Thiria, Ramiro Godoy-Diana

**F1.41** Three-dimensional Flow Around A Hovering Hummingbird Jialei

Song, Haoxiang Luo, Tyson Hedrick

**F1.42** Understanding Cell Passage Through Constricted Microfluidic Channels Marco A. Cartas-Ayala, Rohit Karnik

**F1.43** Continuous-flow Separation of Live and Dead Yeasts Using Reservoir-based Dielectrophoresis (rDEP) Saurin Patel, Daniel Showers, Pallavi Vedantam, Tzuen-Rong Tzeng, Shizhi Qian, Xiangchun Xuan

**F1.44** WITHDRAWN

**F1.45** Establishing Live Cell Directional 2-point Particle Tracking Microrheology Ricardo Serrano, Manuel Gomez-Gonzalez, Juan C. del Alamo

**F1.46** Comprehensive Spatial Display of the Microcirculation In A Capillary Bundle from Rat Spinotrapezius Muscle Fascia Tissue Niki Yamamura, Frank Jacobitz, Geert Schmid-Schönbein

**F1.47** Simulations of the Microcirculation in the Human Conjunctiva William Dow, Frank Jacobitz, Peter Chen

**F1.48** Proteins at Flowing Interfaces: From Understanding Structure To Treating Disease David Posada, James Young, Amir Hirs

**F1.49** Separation Control Effects Of Mako Shark Skin Applied To A Cylinder Michael Bradshaw, Amy Lang, Philip Motta, Maria Habegger, Robert Hueter

**F1.50** DPPC: Is It Ever Newtonian? Amir Sadoughi, Amir Hirs, Juan Lopez

**F1.51** Non-Dimensional Formulation of Ventricular Work-Load Severity

Under Concomitant Heart Valve Disease Melody Dong, Rachael Simon-Walker, Lakshmi Dasi

**F1.52** Aortic Emboli Show Surprising Size Dependent Predilection For Cerebral Arteries: Results from Computational Fluid Dynamics Ian Carr Robert Schwartz, Shawn Shadden

**F1.53** Capture Of Magnetic Nanoparticles In Simulated Blood Vessels: Effects Of Proteins And Coating With Poly(ethylene Glycol) Jaimee Robertson, Christopher Brazel

**F1.54** Effect Of Varying The Angle Of Attack Of The Scales On A Biomimetic Shark Skin Model On Embedded Vortex Formation Jennifer Wheelus, Amy Lang, Michael Bradshaw, Emily Jones, Farhana Afroz, Philip Motta, Maria Habegger

**F1.55** Swimming Micro-robot Powered by Stimuli-sensitive Gel Hassan Masoud, Alexander Alexeev

**F1.56** Analysis of High Speed Liquid Jets Emitted From Needle Free Jet Injectors Rocco Portaro, Amy-Lee Gunter, Hoi Dick Ng

**F1.57** An Experimental Study Of Flow Separation Over A Flat Plate With Transverse Grooves Emily Jones, Amy Lang

**F1.58** Formation of Clogs Under Ultrasound Excitation: A Microfluidic Study Erin Barney, Emilie Dressaire

**F1.59** Characterization Of Intracellular Streaming And Traction Forces In Migrating Physarum Plasmodia Shun Zhang, Juan C. del Alamo, Robert D. Guy, Juan C. Lasheras

**F1.60** GENERAL

**F1.61** Vorticity Flux Of Low-Speed Flow Over A Deforming Arc Airfoil Majid Molki, Negin Sattari

## Student Poster Session

**F1.62** Unsteady Flow Around Impacting Square Cylinder Changyoung Choi, Man Yeong Ha, Hyun Sik Yoon

**F1.63** Density Measurements In Water Using Background Oriented Schlieren Technique Shi Qiu, Chuanxi Wang, Veronica Eliasson

**F1.64** Thermal-Stability Characterization Of Quantum Dot On Anodized Aluminum As Global Temperature Sensing Hiroataka Sakaue, Akihisa Aikawa

**F1.65** Effect Of PTFE Particle On Super-Hydrophobic Coating For Anti-Icing Riho Kamada, Katsuaki Morita, Koji Okamoto, Akihito Aoki, Shigeo Kimura, Hiroataka Sakaue

**F1.66** Design Patterns For Training Fluid Dynamics Experimentalists Randall Tagg

**F1.67** A Variational Scheme For Optimal Lifting In Probe-tack Adhesion Eduardo Dias, Jose Miranda

**F1.68** WITHDRAWN

**F1.69** Dynamics Of Spheroid Particles In Channel Flow Wenbin Mao, Alexander Alexeev

**F1.70** Two-Dimensional Particle-in-Cell Simulation Of Cylindrical Magnetron Sputters For The Improvement Of Target Utilization Hur Min-Young, Bae Hown-Won, Lee Ho-Jun, Lee Hae-Jun

**F1.71** Eulerian And Lagrangian Analysis Of A Simulated Unsteady Flow Behind A Circular Cylinder Keith Holmes, Melissa Green

**F1.72** Physics Based Compressive Sensing Approach Applied To Airfoil Data Collection And Analysis Zhe Bai, Thakshila Wimalajeewa, Zachary Berger, Mark Glauser, Pramod Varshney, Donald Leskiw

**F1.73** Simulations Of Bubble-wall Collision And Bouncing Sohrab Towfighi, Hadi Mehrabian, Roberto Zenit, James J. Feng

**F1.74** Laminar Separation Bubble Formation Using A Circular Cylinder Rotating Adjacent To A Flat Plate Farhana Afroz, Amy Lang, Emily Jones, Michael Bradshaw

**F1.75** Selective Interaction Between Microbubbles And Modulating Waves In A Taylor-Couette Flow Tomoaki Watamura, Yuji Tasaka, Yuichi Murai

**F1.76** Wave Localization Of Linear Gravity Waves In Shallow Water: Global Measurements And Agreement Between Random Matrix Theory And Experiments Andrea Schmessane

**F1.77** STABILITY

**F1.78** The Effect Of A Magnetic Field On Vortex Breakdown In An Enclosed Swirling Flow Yang Yu, Benwen Li, Andre Thess

**F1.79** Three-dimensional Instability In The Wake Of An Angulated Cylinder Kyung-Soo Yang, Choon-Bum Choi

**F1.80** Experimental Investigation Of Richtmyer-Meshkov Instability On Inclined Interface Chris McDonald, Jacob McFarland, David Reiley, Brian Reid, Devesh Ranjan

**F1.81** Spatiotemporal Spectral Analysis of A Forced Cylinder Wake JuanD'Adamo, Ramiro Godoy-Diana, Jos'e Eduardo Wesfreid

**F1.82** Analysis of Görtler Vortices Spanwise Wavelength Influence In Heat Transfer Rates Leandro F. Souza, Vinicius Malatesta, Joseph T.C. Liu

**F1.83** Flow Control Characterization Of PIV Flow Field Using POD Matthew Berry, Zach Berger, Kerwin Low, Alexis Zelenyak, Sivaram Gogineni, Mark Glauser

**F1.84** Magnetic Resonance Imaging Study Of Rayleigh-Benard Convection In Near and Supercritical Hexafluoroethane Joshua M. Bray, Sarah L. Codd, Joseph D. Seymour

## Student Poster Session

**F1.85** Using Lyapunov Vectors To Quantify Spatiotemporal Chaos In Rayleigh-Benard Convection Mu Xu, Alireza Karimi, Jeffrey Tithof, Miro Kramar, Vidit Nanda, Michael Schatz, Konstantin Mischaikow, Mark Paul  
**F1.86** Penetrative Convection Induced By A Statically Unstable Density Distribution In A Very Thin Central Layer Rishad Shahmurov, Layachi Hadji  
**F1.87** Investigation Of Instability Of Displacement Front In Non-isothermal Flow Problems Natalia Syulyukina, Anna Pergament  
**F1.88** Understanding The Impact Of Initial Condition On Low Atwood Number Rayleigh-Taylor Driven Flows Sarat Chandra Kuchibhatla, Devesh Ranjan  
**F1.89** Miscible And Immiscible Experiments On The Rayleigh-Taylor Instability Using Simultaneous Planar Laser Induced Fluorescence And Backlight Visualization. Matthew Mokler, Michael Roberts, Jeffrey Jacobs  
**F1.90** Simulations Of MHD Instabilities In Protoplanetary Disks Ezekiel Hadley, Joseph Barranco  
**F1.91** TURBULENCE  
**F1.92** Passive and Active Transport In A Chaotic Flow Field Christopher Mehrvarzi, Mark Paul  
**F1.93** Turbulent Heat Transfer In Ribbed Pipe Flow Changwoo Kang, Kyung-Soo Yang  
**F1.94** Experimental Analysis Of Coherent Structures In The Unsteady Wake Of A Circular Cylinder Jacob Morrida  
**F1.95** Geostrophic Balance and the Emergence Of Helicity In Rotating Stratified Turbulence Raffaele Marino, Pablo D. Mininni, Duane Rosenberg, Annick Pouquet  
**F1.96** Development And Assessment Of Dynamic Water-surface Roughness Model For Large-eddy Simulation Of

Winds Blowing Over Water Waves Lian Shen, Di Yang, Charles Meneveau  
**F1.97** Generation Of Hairpin Vortex Packet In Channel Flow At Re 590, Kyoungyoun Kim  
**F1.98** Effect Of Seeding Particles On The Shock Structure Of A Supersonic Jet David Porta, Carlos Echeverría, Catalina Stern  
**F1.99** Calibration Of Discrete Random Walk (DRW) Model Via G.I Taylor's Dispersion Theory Teymour Javaherchi, Alberto Aliseda  
**F1.100** A Comparative Study Of Spatially Evolving Self-Propelled Wakes And A Patch Of Turbulence In A Stratified Fluid Anikesh Pal, Matthew deStadler, Sutanu Sarkar  
**F1.101** Volumetric Lattice Boltzmann Simulation For Fluid Dynamics And Turbulence In Practical Syringes Everton Lima, Debanjan Deep, Huidan (Whitney) Yu  
**F1.102** 10kHz TRPIV Near-field Velocity And Far-field Noise: Experimental Results Of A Mach 0.6 Jet Pinqing Kan, Jacques Lewalle  
**F1.103** Comparison Of 10kHz TR-PIV And LES Near-field Data In High Speed Jets Jacques Lewalle, Pinqing Kan  
**F1.104** An Experimental Study Of The Turbulent Development of Richtmyer-Meshkov Instability With A Random Initial Perturbation Vladimer Tsiklashvili, Oleg Lokhatchev, Jeffrey Jacobs  
**F1.105** Fluid Dynamics At Transition Regions Of Enhanced Heat Transfer Channels Jennifer C. Case, Nicholas A. Pohlman  
**F1.106** Characterization Of Shear Turbulence In Keplerian Systems Zoe Yan

## Student Poster Session

**F1.107** On Self-Similarity Of Turbulent Flows Over Porous Media Ariane Papke, Ilenia Battiato

### **F1.108** ENERGY

**F1.109** Dynamic Behavior Of Low-dimensional Model For Double Diffusive Natural Convection Yohsuke Yamada, Riyota Takeuchi, Hiroshi Gotoda

**F1.110** Numerical Study On Heat Transfer And Flow Of Natural Convection In A Square Enclosure With Two Vertically Aligned Cylinders Yong Gap Park, Man Yeong Ha, Hyun Sik Yoon

**F1.111** A Numerical Study of Natural Convection In A Square Enclosure With A Circular Cylinder At Different Temperature Of Bottom Surface Minsung Kim, Man Yeong Ha, Hyun Sik Yoon

**F1.112** Prediction Of Thermal Hydraulic Characteristics Inside The Storage Tank Of A Horizontal Condensation Heat Exchanger Using MARS-KS Byung Soo Shin, Kwang Won Seoul, Kyu Sik Do

**F1.113** Heat Transfer and Fluid Flow Of Solid-liquid Two-phase Media Of Different Heat Conductivities Takaaki Tsutsumi, Shintaro Takeuchi, Takeo Kajishima

**F1.114** Modeling Thermophoretic Deposition Of Particles From A Hot Fluid Stream Zachary Mills, Wenbin Mao, Alok Warey, Anil Singh Bika, Venkatesh Gopalakrishnan, Alexander Alexeev

**F1.115** Geometric Effects on Power Generation By Reverse Electrodialysis with Self-induced Electrolyte Flow In Ion-Selective Nanochannels Byoung Jae Kim, Dong-Kwon Kim, Seung-Hyun Lee

**F1.116** An Experimental Investigation Into The Effect Of Marine Hydrokinetic (MHK) Turbine Array Spacing on Turbine Efficiency and Turbine Wake

Characteristics Nick Stelzenmuller, Alberto Aliseda

**F1.117** Windblown Dust Emission, Transport And Deposition In Solar Farms Chuanjin Lan, Zhen Li, Yanbao Ma

**F1.118** Detached-eddy Simulations Of Hydrokinetic Turbines Using Actuator Disks Domenico Sciolla, Cristian Escauriaza

**F1.119** Analysis Of Tumble And Its Effects On EGR Tolerance For A Gasoline Engine Running At High Loads Jordan Easter, Paulius Puzinauskas, Timothy Pyles

**F1.120** In-Depth Absorption Of Thermal Radiation In Phase Change Materials Laura Pershern, Morgan Minton, John Baker

**F1.121** Flow Through Porous Media With Fractal Geometry: Effect Of Wettability D. Hernandez, O. Chavez, R. Zenit

### **F1.122** GEOPHYSICAL

**F1.123** Simulation Based Study of The Effect Of Ocean Waves On Floating Wind Farm Di Yang, Charles Meneveau, Lian Shen

**F1.124** Internal Waves And Turbulence Created By Tidal Flow Over Small-scale Topographic Features Masoud Jalali Bidgoli, Narsimha Rapaka, Sutanu Sarkar

**F1.125** Effect Of The Bottom Profile On Coastal Topographic Waves Gerardo Ram´Irez Rosario, Luis Zavala Sans´on

**F1.126** Numerical Experiments Of Atmospheric Flow Off Baja California, M´exico Carlos Torres, Sergio Larios, Adan Mejia, Jaime Garcia, Eduardo Gil

**F1.127** Thermally Driven Flow In A Mock Street Canyon Ann Dallman, Sigurdur Magnusson, Leslie Norford, Harindra J.S. Fernando, Dara Entekhabi, Rex Britter, Shanshan Pan

**F1.128** Ventilation Exhaust Power Recovery Design Jeremy Yandell

## EXHIBITS

Ballroom 20D

Sunday, November 18, 2012	7:30 – 18:00
Monday, November 19, 2012	8:30 – 17:00
Tuesday, November 20, 2012	8:30 – 12:00

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