SPRING/SUMMER 2004

Division of Fluid Dynamics Newsletter

DFD News

A Division of The American Physical Society

APS-DFD MEETINGS

The 57th Annual DFD Meeting
Seattle, Washington
November 21-23, 2004

Meeting Venue

The site for the meeting is the Westin Seattle Hotel, located in the heart of downtown Seattle with easy access to the thriving shopping district, a great international restaurant community, and such popular attractions as the Pike Place Market, historic Pioneer Square, the Space Needle, and Seattle's exciting waterfront.

Seattle

Seattle and the Puget Sound region offer a tremendous depth and diversity of cultural offerings for visitors and residents. Performances, galleries, museums, concerts, festivals, and attractions offer limitless possibilities to experience art, history and culture. From edgy contemporary and youthful innovation to more traditional and classic forms of expression, we encourage you to discover and explore the creative vitality that makes Seattle a great place to live and visit. Enjoy the fine art of living, Seattle style.

Website: www.seeseattle.org (Seattle's Convention and Visitors Bureau)

Exhibitors

Do not miss this opportunity to reach over 1000 attendees of the APS/DFD Annual Meeting! For more information on exhibiting or sponsorship, please contact **Meetings And More** at (301) 229-1037 or mtgs911@aol.com.

View of Seattle's Convention and Visitors Bureau

Meeting Hosts

The University of Washington
Washington State University
The University of Oregon
The University of British Columbia
Northwest Research Associates
The Boeing Company

Conference Website

http://depts.washington.edu/apsdfd04/

Inside...

Program Information

James J. Riley, Organizing Committee Chair
University of Washington
Department of Mechanical Engineering
Phone: 206 543-5347
Email: rileyj@u.washington.edu

Peter J. Schmid, Organizing Committee co-Chair
University of Washington
Department of Applied Mathematics
Phone: 206 685-2971
Email: pjs@amath.washington.edu

General Meeting & Exhibiting Information

Meetings And More
5257 River Road, PMB 905
Bethesda, MD 20816
Tel.: (301) 229-1037
Fax: (301) 229-0206
Email: mtgs911@aol.com

Housing

The Westin Seattle (meeting site)
1900 Fifth Avenue
Seattle, WA 98101-1281
Tel: (206) 728-1000
Fax: (206) 727-5896
Website: www.westin.com/seattle
Rate: $129 single or double plus tax
(currently 15.6%)

The Westin Seattle, a landmark of the Seattle skyline, is just steps away from the Washington State Convention Center, Pike Place Market and Seattle's most enticing shops. The hotel's famed architecture features two unique circular towers that afford spectacular views from every guest room. Guests enjoy unique views of the city, Lake Union and Puget Sound; also the convenience of High Speed Internet Access, dual-line speaker phones with voice mail, and many other amenities will be available in all guest rooms.

Mayflower Park Hotel
405 Olive Way
Seattle, WA 98101
Tel: (206) 623-8700
Fax: (206) 382-6996
Website: www.mayflowerpart.com
Rate: $109 single or double + tax

The unique Mayflower Park Hotel is located about one block from the Westin Seattle Hotel in the heart of downtown Seattle. Built in 1927, this historic property blends old world charm with modern day amenities. Whether traveling on business or pleasure, the Mayflower Park Hotel meets the needs of the most discerning guest. Each of the 171 spacious and comfortably appointed guest rooms are attractively decorated with elegant Queen Anne furnishings. All guests will enjoy the warm, professional staff service in this European style hotel.

About the Program

Scientific Program

This year's scientific program will include three award lectures, seven invited lectures, five mini-symposia, contributed papers, exhibits, and the Gallery of Fluid Motion. The invited lectures are selected to illustrate the richness of topics, techniques and applications inherent in the study of fluid dynamics. More than 950 contributed abstracts, divided into 14 concurrent sessions, are anticipated.

Award Program

Each year the APS Division of Fluid Dynamics presents several awards: the Fluid Dynamics Prize, the Francois Frenkiel Award, and the Andreas Acrivos Dissertation Award. Winners of these awards will be announced in the fall. A lecture by each award winner will be given at the meeting.

Invited Lectures

Tom Daniel, University of Washington
Aeroelastic Coupling in Insect Flight?
Mory Gharib, Caltech
The Fluid Mechanics of Heart Failures
Edward Greitzer, MIT
Topics in Air-Breathing Propulsion
Ellen Longmire, University of Minnesota
Pinch-off and Coalescence in Liquid-liquid mixtures
Julio Ottino, Northwestern University
Dynamics of segregation, mixing, and coarsening of granular matter

Peter Rhines, University of Washington
Global Climate meets Dynamics in the Fluids Laboratory
Philippe Spalart, Boeing
Research Directions in Unsteady Aerodynamics

Mini-symposia

Motion of Aquatic Organisms
Multi-Phase Flows
Packing of Colloidal Particles
Surface Wave Breaking
Supersonic Turbulence

Audiovisual Equipment

For the first time an LCD projector and a computer will be provided in each room for both invited and contributed talks. In addition, in each session room there will be an overhead projector, screen, laser pointer, and lapel microphone. More details on how to utilize this equipment will be provided in an email this summer, and on the meeting web-site.

SOCIAL ACTIVITIES

Conference Reception

A highlight of the meeting will be the Conference Reception on Sunday evening, November 21, 2004. The Reception will be held at the world famous Museum of Flight. All paid attendees receive a ticket to this event.

The Museum of Flight features 54 of the world's most awe-inspiring airplanes—authentic and in mint condition. In the steel and glass Great Gallery, the history of aviation soars past, with dozens of full-size aircraft flying in formation six stories above. Sit in the cockpit of a real SR-71 Blackbird or F/A-18 Hornet. Step back 85 years in the magnificently restored Red Barn®, birthplace of The Boeing Company. Including hands-on kid's workshops, the Museum of Flight offers something to every guest. Come experience the story of flight from the dawn of aviation to the Space Age.

Website: www.museumofflight.org

Deadlines

Abstract Submission……6 August 2004

Subsequent DFD Meetings

2005, Chicago, IL. Contact: Richard Lueptow, Northwestern University
2006, tentatively planned to be held at a site in Florida

Highlights of the 56th Annual Meeting, NYC/New Jersey (by Mark Glauser, Chair)

The November 2003 DFD meeting in NYC/New Jersey concluded with more than 1325 registrants, 1150 contributed and invited lectures, 56 poster and 26 video submissions to the Gallery of Fluid Motion, and 14 exhibitors. The meeting events began early Sunday morning with the opening sessions of the technical program. The Awards ceremony took place in the afternoon. The 2003 Fluid Dynamics Prize recipient was Dr. Jerry Gollub of Haverford College, who presented his lecture entitled "Nonlinear Dynamics of Fluid Motion." The 2003 Otto LaPorte Award recipient was Dr. Norman J. Zabusky from Rutgers University who presented his lecture entitled "Visionmetrics: From Solitions to Vortex Projectiles—Art and Science of Fluid Motions." The 2003 Francois Frenkiel Award was presented to Dr Maxime Nicolas of Ecole Polytechnique in Marseille France. The 2003 Andreas Acrivos Dissertation was presented to Prosenjit Bagchi who did his doctoral thesis work at UIUC. Meeting activities on Sunday were topped off with the Sunday evening reception which was held at New York City's most celebrated restaurant, the world famous **Tavern on the Green,** which is located in Central Park. This was a wonderful evening and the weather for late November was splendid! The meeting also included outstanding invited lectures by William K. George, Philip A. Blythe, Sheldon Weinbaum, Robert Moser, William Saric, Lance Collins, Lars Bildsten and Erich E. Kunhardt.

We continued the very successful Graduate Student Luncheon (initiated by Peter Raad at the 55th Annual Meeting) to give our students the opportunity to participate in discussions with experts on topics of interest while enjoying a complimentary box lunch. The 2003 APS/DFD Graduate Student luncheon was organized with two simultaneous sessions on Monday 11/24/03 during lunch. Session 1 was entitled "Grantsmanship, Prospects for Securing Funds from Federal Agencies: ONR, NSF & ARO perspectives." Mike Plesniak (NSF) and Ron Joslin (ONR) gave informal overviews of their respective programs and Mark Glauser served as moderator for the discussion. Session 2 was entitled "Emerging areas of Research &

Technology Commercialization - Inventions & Technology Commercialization" by Erich Kunhardt (Stevens Institute of Technology). Volkan Otugan and Siva Thangam served as moderators. About 110 students attended the sessions (60 in the first and 50 in the second). There was a considerable amount of discussion during and after the sessions. Informal feedback from the attendees after the sessions was very positive and it seems desirable to continue with this student luncheon in future years.

The 21st Annual Gallery of Fluid Motion included 56 poster and 26 video entries representing research from academia, government laboratories and private companies in the United States and foreign countries. This year's entries exhibited a wide and outstanding display of experimental and numerical results that presented combined artistic beauty and deep physical insight into a broad range of phenomena in fluid mechanics. A panel of eight distinguished experts in the fluid dynamics community served as judges. Poster winners included: **Running Magnetic Spouts and Hedgehogs**, José Bico, Thomas Blum, Maxime Jullian, Patrice Jenffer, Marc Fermigier and José Edouardo Weisfreid; **Chaotic Mixing in 3D Flows**, Paulo E. Arratia, Mario M. Alvarez, Troy Shinbrot, and Fernando J. Muzzio; **Hydraulic Jumps with Broken Symmetry**, J. Leblanc, J. Aristoff, A. Hosoi and J. Bush; **Touchdown of a Sphere**, Thomas Leweke, Mark. C. Thompson and Kerry Hourigan; **Bubble Dynamics at Boundaries at Microsecond Time Scales**, Robert Schueler, Kevin Cissner, and Roger Becker; **Chaotic Mixing in Viscous Fluids,** Mario Alvarez, Troy Shinbrot and Fernando Muzzio; **Taylor-Saffman Instability in a Hele-Shaw Cell**, Marilyn Poon, Robert Neilson, Dustin Grace, Jessica Todd and Jean Hertzberg. Video winners included: **Evolution of Quasi-Streamwise Vortex Tubes and Wall Streaks in a Bubble-Laden Turbulent Boundary Layer over a Flat Plate,** Antonino Ferrante, Said Elghobashi, Paul Adams, Miguel Valenciano and David Longmire; **Vortical Interface Between Immiscible Fluids**, W. Alexandra, S. Roland and A. Shen; **Bubble Dynamics Under Vertical Vibrations**, Farzam Zoueshtiagh, Marc Legendre, Nicolas Vandewalle, Hervé Caps; **Falling Snow & Lava Plumes: Drainage Patterns in Soap Films**, S. Berg, E.A. Adelizzi and S.M. Troian. The winning entries will be published in a Gallery of Fluid Motion article in the September 2004 issue of Physics of Fluids, and were also displayed at the March meeting in Montreal.

The local organizing committee at Syracuse University, RPI, Stevens, CCNY and Polytechnic thanks the participants for their contributions to a very successful meeting.

2003 DFD FELLOWS

Fellows are elected based on nominations considered by the DFD Fellowship Committee, review by the APS Fellowship Committee, and approval by the APS Council. Only 0.5 % of the APS membership is selected for Fellowship in the Society each year.

Eberhard Bodenschatz, Cornell University

For illuminating experiments on Rayleigh-Bénard convection and directional solidification, for ground breaking measurements of acceleration in fully developed turbulence, and for significant contributions to understanding electro-convection in liquid crystals.

Morton M. Denn, The City College of the City University of New York

For outstanding contributions to non-Newtonian fluid mechanics and polymer rheology, especially his pioneering studies on the stability of viscoelastic flow and the causes and effects of wall slip.

Gerard M. Faeth, University of Michigan

For contributions to understanding the dynamics of liquid breakup in sprays, the properties of self-preserving turbulent flows and the mechanism of turbulence generation in dispersed multiphase flows.

Francis H. Harlow , Los Alamos National Laboratory

For his contributions to our understanding of low-speed, free-surface, and turbulent flow through computational modeling, and his invention of completely original methods to address these issues.

E. John Hinch, University of Cambridge

For many contributions to complex fluids, including novel ideas and physical insight combined with asymptotic and numerical studies, which have illuminated suspension mechanics, viscous, multiphase and viscoelastic flows, and electrokinetics.

Paul F. Linden, University of California, San Diego

For fundamental contributions to geophysical and environmental fluid dynamics, gained by a combination of elegant laboratory experiments, deep physical insight, and penetrating mathematical analysis.

H. Keith Moffatt, Cambridge University

For lasting contributions to the interaction between turbulence and electromagnetic fields in conducting fluids, the role of helicity in hydrodynamic turbulence and topological fluid dynamics.

Helen L. Reed, Arizona State University

For her innovative research in boundary-layer stability and receptivity, and her leadership in promoting and communicating fluid dynamics.

Howard A. Stone, Harvard University

For pioneering work on the dynamics of complex fluids in small-scale systems.

Charles H.K. Williamson, Cornell University

For imaginative, innovative experiments that have injected new life into the study of wake dynamics behind bluff bodies and of trailing vortices.

DFD NOTES

After much discussion over many years the DFD Executive Committee voted to make a change in the handling of the Fluid Dynamics Prize and the Otto Laporte Award:

At its meeting in November 2003, the DFD Executive Committee considered and approved a recommendation of a distinguished Ad Hoc Committee that the Division should have only one annual major Award/Prize to recognize outstanding scientific achievement in our field: the Fluid Dynamics Prize.

The rationale provided by the Ad Hoc committee when recommending this change was that the DFD community is of a size which is about right for one prize and too small for two. This change will elevate the stature of the Fluid Dynamics Prize to be more nearly equal to that of the major APS Prizes, such as the Buckley Prize and the Onsager Prize.

The Executive Committee also decided that the monetary value of the Fluid Dynamics Prize should be increased to $10,000, in keeping with major prizes of other APS divisions and the recommendation of the APS Council. The Executive Committee considered these changes carefully, and concluded that they will contribute to the health of the DFD over the long run.

The Fluid Dynamics Prize and the second award of the DFD, the Otto Laporte Award, will be combined into one award - the Fluid Dynamics Prize - for 2004 and thereafter. The endowment of the Otto Laporte Award will be combined with the existing endowment of the Fluid Dynamics Prize to fund the larger amount of the award. In the description of how the Prize is supported financially, it will be noted that support comes from friends of Otto Laporte together with support from the Division of Fluid Dynamics and the American Institute of Physics journal, Physics of Fluids. Past recipients of the Otto Laporte Award will continue to be listed on the APS web site.

Nominations for the Otto Laporte Award that have been held over from last year will be included this year as candidates for the Fluid Dynamics Prize.

Upcoming conferences:

ScArt4: 4th International Symposium in Science and Art. To be held in June 2005 at Rutgers University (New Brunswick/Piscataway, NJ, USA). This four-day meeting (to be held for the first time in the USA) will look at the connections between art and science, focusing on fluids, large molecules, flows, waves and diffusive processes (including geophysical, astrophysical and biological). Talks, posters, exhibitions will be made by visual artists, scientists-and-engineers, and historians. Currently scheduled artistic participants include Donna Cox, Ned Kahn, June Wayne and Peter Galison. For more information see http://mechanical.rutgers.edu/scart4/. Specific dates will soon be announced. To be on our email list contact Prosenjit Bagchi at pbagchi@jove.rutgers.edu

Prizes & Awards

2003 Fluid Dynamics Prize

The Fluid Dynamics Prize was established in 1979 "to recognize and encourage outstanding achievement in fluid dynamics research." It is endowed by *Physics of Fluids* and the Division of Fluid Dynamics.

Jerry P. Gollub
Haverford College and the University of Pennsylvania
Citation: "For his elucidation of chaos, instabilities, mixing and pattern formation in various contexts including fluid convection, and his contributions to our understanding of surface waves, film and granular flows, through his clever experiments, lucid papers and lively lectures."

2003 Otto Laporte Award

This award, established in 1985, is given "to recognize outstanding research accomplishments pertaining to the physics of fluids", and was named to honor Otto Laporte. It is endowed by the Friends of Otto Laporte and the Division of Fluid Dynamics.

Norman J. Zabusky
Rutgers University
Citation: "For pioneering and enduring contributions in nonlinear and vortex physics and computational fluid dynamics, including: the soliton; contour dynamics and V-states for 2D flows; vortex projectiles for accelerated inhomogeneous flows; and visiometrics for reduced modeling."

2003 Andreas Acrivos Dissertation Award

This award, established in 1998, provides recognition to exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality and achievement in the area of fluid dynamics." The award honors the contributions to fluid mechanics of Andreas Acrivos, particularly his distinguished editorship of *Physics of Fluids*. It is supported by donations from members and friends of the Division of Fluid Dynamics.

Prosenjit Bagchi
University of Illinois at Urbana Champaign
(Advisor: S. Balachandar)
Dissertation Title: "Particle dynamics in inhomogeneous flows at moderate to high Reynolds number"

Citation: "For his careful and extensive numerical experiments elucidating the fundamental mechanisms governing the motion of a spherical particle subject to complex unsteady and inhomogeneous flows at moderate to high Reynolds number."

2003 Frenkiel Award

This Award recognizes significant contributions to fluid mechanics that have been published in *Physics of Fluids* during the preceding year by young investigators.

Maxime Nicolas
IUSTI, Marseille, France
"Experimental study of gravity-driven dense suspension jets," *Physics of Fluids*,14, pp. 3570-3576 (2003).

Prize, Award, and Fellowship Nominations for 2005

For information about the nomination process and requirements, please see the announcements posted at www.aps.org.

Personal Notes Regarding DFD Members

A fluid dynamics classic has been reissued! Dover Publications have issued as a paperback a classic text by H. Liepmann and A. Roshko. In the Dover edition, corrections have been made to misprints and errors in the original Wiley edition. The details are as follows:

Elements of Gasdynamics by H. W. Liepmann and A. Roshko, Dover Publications, Mineola, New York, 2001. List price $24.95. (Available from Amazon)

William C. Meecham, UCLA professor of mechanical and aerospace engineering and an outspoken authority on the effects of airport noise, died March 11 2003 from heart failure. He was 77.

Meecham earned his B.S. and M.S. degrees in 1948 and his Ph.D. in mathematical physics in 1954, all from the University of Michigan, where he also served as an assistant professor, and joined the faculty at UCLA's engineering school in 1967. He was a respected researcher and teacher, according to colleagues. He was an expert on the effects of jet noise on mortality rates, mental hospital admissions and other adverse community health effects and was a consultant for dozens of companies and government agencies.

A 1982 investigation by Meecham found a higher rate of cardiovascular deaths, strokes, suicides and murder among 200,000 people who lived in a flight-path corridor near Los Angeles International Airport, compared with those living in other areas of the city. He attributed this difference partly to the effects of prolonged exposure to loud noise. Partly due to Meecham's efforts, the schools beneath the flight path were moved.

William Craig Reynolds, professor emeritus of mechanical engineering at Stanford University died of a malignant brain tumor January 3 in his Los Altos home. He was 70. He was affiliated with Stanford for 53 years (he completed his bachelor's (1954), master's (1955) and doctoral (1957) degrees at Stanford, after which he joined the faculty) and his time there was marked by relentless innovation and a contagious zeal for teaching.

Reynolds was an expert in turbulence modeling and control and he brought esoteric concepts to life in the classroom. Reynolds' textbooks, *Thermodynamics* and *Engineering Thermodynamics* (co-author is H.C. Perkins), and his chemical equilibrium analysis software, STANJAN, are used in engineering education and research worldwide. Reynolds won teaching awards from the American Society of Engineering Education and the Tau Beta Pi engineering honor society, and his dramatic style lives on through those he inspired.

Reynolds helped found and manage the Center for Turbulence Research, a joint research consortium between NASA and Stanford. He also spearheaded the establishment of the Institute for Energy Studies and the Department of Energy's Center for Integrated Turbulence Simulations. As an indication of his practical abilities, Reynolds designed and installed the air-conditioning system for the Center for Turbulence Research and wrote an early computer program used by the Department of Mechanical Engineering to sort graduate student applications. He also designed and built his Los Altos home and re-engineered it after the 1989 Loma Prieta earthquake.

Reynolds was a pioneer in the development of turbulent flow control strategies that can help improve engine fuel efficiency and reduce the aerodynamic drag on cars and commercial airplanes. He was elected to the National Academy of Engineering and the American Academy of Arts and Sciences, and was a Fellow of the American Society of Mechanical Engineers and of the American Physical Society.

Please send additional Notes to Howard Stone (has@deas.harvard.edu) for the Fall Newsletter.

APS/DFD 2004 Leadership & Contact Info.

DFD members are invited to contact the DFD Leadership with suggestions and concerns.

EXECUTIVE COMMITTEE

James M. Wallace (Chair, 11/04)
Jerry P. Gollub (Chair-Elect, 11/04)
Howard A. Stone (Vice-Chair, 11/04)
Fazle Hussain (Past Chair, 11/04)
James Duncan (Secretary/Treasurer, 11/06)
Harry L. Swinney (Divisional Councilor, 12/06)
John Kim (ex officio, Editor of Phys. Fluids)
Gary Leal (ex officio, Editor of Phys. Fluids)
Michael Brenner, (ex officio, Editor of Phys. Rev. E)
Paul F. Linden (11/04)
Timothy Wei (11/04)
Robert P. Behringer (11/05)
Ellen K. Longmire (11/05)
John Foss (11/06)
Gretar Tryggvason (11/06)

NOMINATING COMMITTEE

Lex Smits (Chair, 11/04)
Nadine Aubry (Vice-chair, 11/05)
Bob Ecke (11/05) (APS appointee)
Bill Schultz (11/05)
Mary Silber (11/04)
Emil Hopfinger (11/04)
Tom Corke (11/04)

PUBLICATIONS COMMITTEE

Peter Carpenter (Chair, 11/04)
Ugo Piomelli (Vice-Chair, 11/05)
Werner Dahm (11/05)
Jim Duncan (11/06)
Gareth McKinley (11/05)
Gretar Tryggvason (11/06)
Emmanuel Villermaux (11/05)

PROGRAM COMMITTEE

Jerry Gollub (Chair) (11/04)
Bob Behringer (11/04)
Eberhard Bodenschatz (11/04)
Julian Hunt (11/04)
Ivan Marusic (11/05)
Sandra Troian (11/05)
Zellman Warhaft (11/05)

2003 FELLOWSHIP COMMITTEE

Howard Stone (Chair) (11/04)
E. B. Dussan (11/04)
Bud Homsy (11/05)
Tim Pedley (11/04)
Helen Reed (11/05)
Hermann Riecke (11/05)
Israel Wygnanski (11/04)

EXTERNAL AFFAIRS COMMITTEE

Mohamed Gad-el-Hak (Chair, 11/04)
Elaine Oran (Vice Chair) 11/05
John Foss 11/06
Javier Jimenez 11/04
George Karniadakis 11/04
Bhimsen Shivamoggi 11/04
Stavros Tavoularis 11/05

SELECTION COMMITTEE FOR 2004 FLUID DYNAMICS PRIZE

Ron Panton (**Chair**) 11/04
Marvin Goldstein (**Vice Chair** 11/05)
Ann Karagozian (11/05)
Jean-Marc Chomaz (11/04)
Jim Grotberg (11/04)
Keith Moffatt (11/04)
Michael Plesniak (11/04)

SELECTION COMMITTEE FOR 2004 ACRIVOS AWARD

Sutanu Sarkar (**Chair** 11/04)
Jim Brasseur (**Vice Chair**) 11/05
Ken Melville (11/05)
John de Bruyn (11/04)
Fernando Grinstein (11/04)
Marc Perlin (11/05)
Ellen Longmire (11/05)

FRENKIEL AWARD

Charles Meneveau (Chair, 11/04)
Don Koch (**Vice Chair**, 11/05)
Bob Moser (Assoc. Ed. of Physics of Fluids) (11/05)
H. Joe Fernando (11/04)
D. V. Gaitonde (11/04)
Detlef Lohse (11/04)
Candace Wark (11/05)

DFD Website Coordinator

Ken Kiger

DFD Membership Coordinator

Timoth Wei

NEWSLETTER INFORMATION

Material to be considered for the Fall Newsletter should be sent to Howard Stone has@deas.harvard.edu