

IPST Newsletter



Inside this issue:

NSF Major Research Grant goes to IPST Faculty	2
Fluid Dynamics International Tutorial School	2
External Review of IPST	3
CMPS/CLFS Merger	4
Frontier of Knowledge Award goes to Michael E. Fisher	5
Burgers Faculty Attend International Symposium	5
Jim Wallace presents at J.M. Burgers Center	6
Emergency Dialing	6
University Rideshare Program	6
Autobiographical Notes of J.M. Burgers	7
About IPST	8

Fifth Annual Systems Biology Workshop

The University of Maryland and the National Cancer Institute hosted the fifth in a series of systems biology workshops on January 26, 2010 at the Jeong Kim Engineering Building at the University of Maryland College Park. Organizers Wolfgang Losert (UMD), Jim McNally (NCI), and Dave Levens (NCI) said the aim of the workshops has been to transmit scientific information between the NCI and UMD in biophysics, systems biology, bioengineering, and bioinformatics.

The workshop was well attended, there were 104 registered attendees, a mix of 18 shorts talks, overview presentations, posters and free time for discussions.

Ten University of Maryland students now work on joint research projects that connect the expertise of UMD faculty and NCI mentors. Approximately twenty faculty and NCI mentors participate. The first group of physics graduate students will be graduating by the end of the 2009-2010 academic year. The number of interactions has the potential to increase based on the overlap of interests between UMD and NCI researchers.



Attendance at the Fifth Annual Systems Biology Workshop topped the last four years with 104 registered attendees. At the podium is Jim McNally of NCI, NIH.

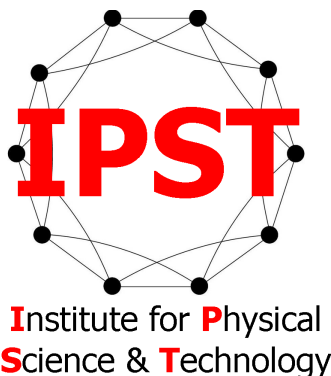
Upcoming Events

- **External Review** – February 25-26, 2010
- **Spring Break**, Monday-Friday, March 15-19, 2010. IPST Business Offices and University CLOSED March 15-18, 2010.
- **Maryland Day**, Saturday, April 24, 2010
- **IPST Spring Assembly Meeting**, Wednesday, May 12, 2010
- **Spring Commencement**, Thursday, May 20, 2010, 7 p.m. at the Comcast Center
- **CMPS Commencement**, Friday, May 21, 2010.
- **Memorial Day**, Monday, May 31, 2010 – University CLOSED

IPST Faculty Members obtain NSF Major Research Instrumentation Award

Millard Alexander, Christopher Jarzynski, Dev Thirumalai and John Weeks have recently obtained an NSF Major Research Instrumentation award of \$445,000 for the ***Acquisition of a High-performance Computer Cluster for the Computational Study of Complex Chemical Systems: from Small Molecules to Biological Nanomachines***. The money is being used to purchase a large number of linked cluster computers administered by the University's High-Performance Computing Consortium. Alexander, Jarzynski, Thirumalai and Weeks are theoretical chemists with joint faculty appointments in the Institute for Physical Science and Technology and the Department of Chemistry and Biochemistry.

The best work in theoretical chemistry combines innovative mathematical methods, new algorithms or the computational implementation of these methods, and large-scale, computer-intensive simulations. The proposed research will impact a wide range of areas of chemistry and chemical biology, including combustion, atmospheric chemistry, complex fluids and interfaces, the thermodynamics of complex systems, and the functioning of biological and artificial nanomachines. Progress in these areas of basic research is crucial to addressing problems of importance to society, such as cleaner combustion, efficient lubrication, higher throughput fluid transport, new nano-materials and a better understanding of fundamental biological process.



International Tutorial School on Fluid Dynamics

The Burgers Program will hold its First Annual International Tutorial School on Fluid Dynamics for advanced graduate students and post-docs May 24-28, 2010 at the Center for Scientific Computation and Mathematical Modelling (CSCAMM). The subject of the first school is turbulence <http://www.cscamm.umd.edu/programs/trb10/>. It is being organized in collaboration with CSCAMM and the Johns Hopkins Center for Environmental and Applied Fluid Mechanics.

External Review of IPST

IPST began with an Internal Review in the fall of 2009. The External Review by the External Review Committee will be on February 25 and 26, 2010. Members of the External Review Committee are:

- William A. Eaton, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health
- Barbara Lee Keyfitz, Department of Mathematics, The Ohio State University
- Joel L. Lebowitz, Department of Mathematics, Rutgers University
- and Committee Chair, Harry L. Swinney, Department of Physics, The University of Texas at Austin

For information about the schedule, please visit our website at <http://ipst.umd.edu>.



William A. Eaton



Barbara Lee Keyfitz



Joel L. Lebowitz



Harry L. Swinney

News from College of Computer, Mathematical and Physical Sciences — CMPS/CLFS Merger

The Provost believes that merging CMPS with the College of Chemical and Life Sciences will bring benefits to both colleges and to the university, provided that a significant majority of the faculty in each college supports the merger. It is clear that the response in both colleges will depend on how this would be implemented. Consequently, on the recommendation of the two deans, a working group has been formed. The members are Norma Andrews (CLFS), Mike Brown (CMPS), Larry Davis (CMPS), Bonnie Dorr (CMPS), Mike Doyle (CLFS), Bob Infantino (CLFS), Bill Jeffery (CLFS), Dean Kitchen (CMPS), Raj Roy (CMPS), Barbara Thorne (CLFS), Stuart Vogel (CMPS), and Jerry Wilkinson (CLFS). Associate Provost Mahlon Straszheim will serve as the convener.

The working group will discuss (i) the merits of merging CMPS and CLFS, and (ii) if they find the initiative worthy, to agree on a plan for moving forward. The Provost expects that the members will receive input from their colleagues so that the collective views of the

faculty of the two colleges will be represented.

From the group, possible recommendations are:

1. The merger idea should not be pursued either because it does not have merit or because it is so complex it is impossible to implement it at this time
2. The idea is good and should be pursued expeditiously
3. The idea is good, but intermediate steps are needed before the development of a plan.

If the working group's recommendation is 1, the Provost will not pursue the merger. If it is 2, he will share the working group's recommendation with the members of the two colleges to ensure there is a significant majority behind its recommendations before moving forward. If it is 3, he will consider implementing the interim steps will be considered after additional input from the two colleges.

You are encouraged to send your thoughts on this important matters to members of the committee.



CMPS
at the edge of discovery ...



COLLEGE OF
CHEMICAL &
LIFE SCIENCES

2009 BBVA Foundation of Frontiers of Knowledge Award in Basic Sciences goes to Michael E. Fisher

Michael E. Fisher of the Institute for Physical Science and Technology and Department of Physics shares the 2009 BBVA Foundation Frontiers of Knowledge Award in Basic Sciences with Richard N. Zare of Stanford University. He has explained phenomena ranging from why water evaporates to the functioning of molecular motors in cells.

The jury singled out “his (Fisher’s) fundamental contributions to statistical mechanics. His work helps to interpret the vast diversity of the behaviors of bulk matter in

terms of the characteristics of the component atomic or molecular parts and their interactions”.



Michael E. Fisher

The Frontiers of Knowledge Awards honor world-class research and artistic creation. The breadth of disciplines addressed and their monetary amount places them among the foremost international awards. They are closely aligned with the scientific, technological, social, and economic challenges of the present century.

The Basic Sciences award honors outstanding contributions in Physics, Chemistry and Mathematics.

Burgers Faculty attend International Symposium

Jim Wallace and Dan Lathrop attended the International Symposium on Turbulence held September 21-29, 2009 at Peking University. While there, they met with Professor Shiyi Chen, Dean of Engineering, and Professor Zhe-Su She, Director of the State Key Laboratory. They discussed a formal collaborative arrangement between the Burgers Program for Fluid Dynamics of the University of Maryland and the State Key Laboratory for Turbulence and Complex Systems/ College of Engineering of Peking University. The arrangements would be modeled after the current agreement between the Burgers Program at Maryland and the J.M. Burgers Fluid Dynamics Center in the Netherlands.



Jim Wallace



Dan Lathrop

Wallace presents at J.M. Burgers Fluid Dynamics Center

Jim Wallace gave the Burger Lecture *Twenty years of experimental and direct numerical simulation access to the velocity gradient tensor - What have we learned about turbulence?* at the annual Burgers Day of the J.M. Burgers Fluid Dynamics Center, a multi-university national research school in the Netherlands. The symposium, held at Twente University and hosted by Detlef Lohse, our 2008 Burgers Lecturer, was attended by over 250 faculty, graduate students, post-docs, and researchers from industry and academia. After the symposium, Wallace visited the research groups of Bruno Eckhardt, 2004 visiting Burgers Professor and Lecturer, in Marburg and Eberhard Bodensatz in Goettingen.

Emergency Dialing for Campus Emergencies

The University of Maryland Department of Public Safety (UMDPS) is pleased to announce a new abbreviated dialing capability that enables community members with mobile phones with service provided by Sprint/Nextel, ATT, or Verizon Wireless, to contact UMDPS directly in an emergency using abbreviated dialing. In case of an emergency on campus, dial #3333 from your mobile phone. Be aware that airtime, long distance, roaming, and other fees or charges may apply per subscribers' agreements and calling plans with their service providers.

University Rideshare Program

The Department of Transportation Services (DOTS) announced the new Zimride rideshare system. Zimride is an easy way to find single rides, as well as coordinate your daily commute. Zimride makes it easy to share the seats in your car or catch a ride with fellow Maryland friends, colleagues or classmates.

If you have a car, add your ride offer and split the costs by driving with friends, coworkers or classmates. If you need a ride, add your ride request. By posting the origin, destination and time, the Zimride system will help find others making similar trips.

To participate in UMD Zimride, please do the following:

1. Visit <http://zimride.umd.edu> and log in
2. Add your ride offer or request

If you carpool to and from campus, and have a current individual parking permit, you are eligible to receive a reduction in the permit cost. For more information please visit www.transportation.umd.edu/alt_trans/carpool.html.

Autobiographical Notes of J.M. Burgers

After his illustrious career at the Technical University Delft, where he had founded the Laboratory of Aero- and Hydrodynamics, Johannes M. Burgers (Jan Burgers) moved to the University of Maryland in 1955, where he became a Professor in what at that time was the Institute for Fluid Dynamics and Applied Mathematics (IFDAM). In 1976 IFDAM was merged with the Institute for Molecular Physics (IMP) to become the present Institute for Physical Science and Technology (IPST). At the University of Maryland Burgers found an academic environment with several prominent scientists like Shih-I Pai and Elliott W. Montroll.

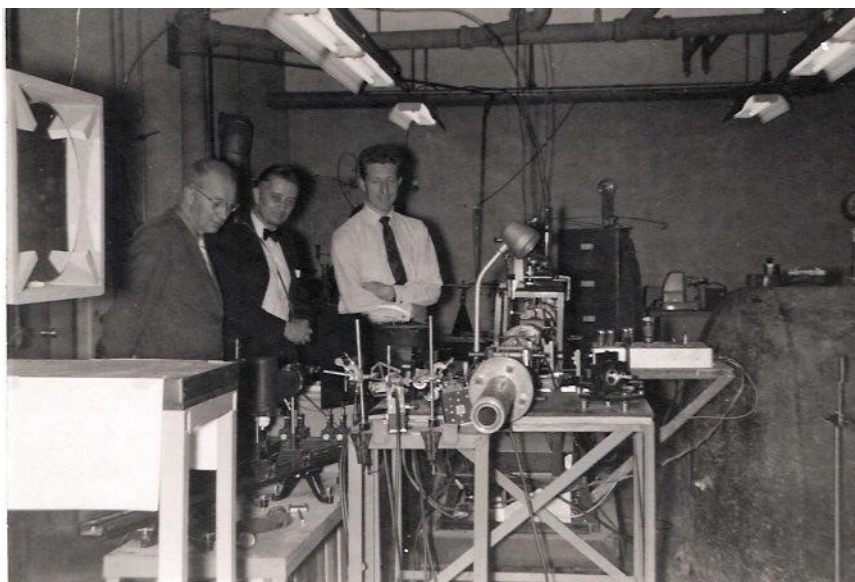
At the University of Maryland Burgers established a laboratory (see picture), began work on plasma dynamics and magnetohydrodynamics, continued his interest in philosophy, and further explored the implications of the non-linear equation named after him: the Burgers equation. This latter work led to his monograph "The Non-linear Diffusion Equation" in 1974; this monograph was reprinted by Kluwer in 2004 on the occasion of the inauguration of the Burgers Program for Fluid Dynamics at the University of Maryland. Johannes Burgers himself remained active as a scientist at the University of Maryland, first in IFDAM and subsequently in IPST, until his death in 1981.

When I went through the archives at the University of Maryland and Gijs Ooms, Director of the J.M. Burgers Centre, through the archives at the Delft University of Technology, we found in both archives 35 typewritten

pages of biographical notes written by J.M. Burgers at the University of Maryland in 1962. These autobiographical notes cover two topics: a first chapter discussing his environment at home and a second chapter dealing with his school and university education. In the manner these autobiographical notes were written, it would seem that they were intended to be followed by additional chapters. However, upon further checking the archives at the University of Maryland, at the Delft University of Technology, and at the Niels Bohr Library of the American Institute of Physics, no additional chapters have been found. The only other autobiographical information available are some memories of Burgers' early work in fluid mechanics that have appeared in the Annual Review of Fluid Mechanics **7** (1975), pp. 1-11.

Because of their great historical interest the autobiographical notes of J.M. Burgers were published in *JMBC 15 Years* (J.M. Burgerscentrum, The Netherlands, 2007), pp. 20-59. The first chapter discusses extensively the influence of the parents on the

young Jan Burgers. The second chapter deals with his primary and secondary school education and with his experience as a student at the University of Leiden including the somewhat complex interactions with his Ph.D advisor, Paul Ehrenfest. These autobiographical notes can now also be accessed at the website of IPST by going to <http://www.ipst.umd.edu/aboutus/history.php>.



Tob de Boer (right) and Jan Burgers (left) in the laboratory at the University of Maryland with Burgers' former student from Delft, Ir. Ruys (center).
[Photo courtesy of P.C. Tobias de Boer, Professor Emeritus, Cornell University]

About IPST

The primary mission of the Institute for Physical Science and Technology (IPST) is to foster excellence in interdisciplinary research and education at the University of Maryland. The Institute strives to provide an environment in which both theoretical and experimental research can flourish. Current research programs are in the areas of Biophysics, Chaotic Dynamics, Chemical Physics, Optical Physics, Space and Upper Atmospheric Physics, Scientific Computation, and Statistical Physics. The Institute takes pride in the fact that one third of the Distinguished University Professors on campus hold appointments in IPST and that a number of its faculty are National Academy of Science members. A few of the research topics of current concern to Institute faculty are:

- Studies of the properties of fluids far from equilibrium. Theories for the properties of superfluids, fluids in glasslike states, and fluids near critical points are being developed.
- Studies of electrons in the upper atmosphere. The Institute has a radio telescope at the South Pole to support these studies.
- Computation and Visualization in Fluid Dynamics and Magnetohydrodynamics.
- A study of nonlinear mathematical systems which show very irregular or chaotic behavior.
- Studies of ionized gases in space varying from theoretical investigations of shock waves to experimental programs using packages on several spacecraft.

- Development and application of the tools of non-equilibrium statistical mechanics to the control of nano-structures on surfaces.

The Institute has approximately forty faculty members, most of whom hold a joint appointment with an academic unit. The majority of the joint appointments are with Physics, Mathematics, Chemistry, and Engineering. The Institute offers M.S. and Ph.D. degrees in Chemical Physics, Biophysics and Applied Mathematics & Statistics, and Scientific Computation, and provides financial support and faculty supervision for approximately sixty graduate students. Graduate students are drawn from various disciplines including Physics, Mathematics, Chemistry, and Engineering.

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www.ipst.umd.edu

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August 1, 2010



IPST

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