Department of Energy Awards Ceremony

Office of Science and Office of Defense Programs

Early Career Scientist and Engineer Awards

Office of Science
U.S. Department of Energy

NNSA

James Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20585

November 1, 2007

The Secretary of Energy
Washington, D.C. 20585

In Recognition and Appreciation

The Department of Energy today is proud to salute eight exemplary investigators from the Department's National Laboratories and collaborating universities. Each of these investigators is the recipient of one of the special annual awards the Department's Office of Science and Office of Defense Programs sponsor: the Early Career Scientist and Engineer Awards.

I want to take this opportunity to recognize the extraordinary scientific and technical achievements represented by the awardees' contributions. These departmental awards reflect our belief that the representatives of the new generation of scientists and engineers honored by these awards are meeting demanding scientific and technical challenges with superior leadership, knowledge, and insight.

The awards demonstrate the Department's enduring interest in creative scientific and technical talent. Each honoree has made a distinctive contribution both as an independent investigator and as a team member. Individually and collectively, they continue to be sources of invaluable technical direction and expertise in support of the Department's research and development and national security missions.

It is absolutely crucial to these departmental missions that we continue to invest in and to nurture the development of the technical leaders of the future. It is equally important that the Department, on occasions such as this, recognizes its critical need for active and sustained partnerships with the Nation's scientific and technical communities.

I am pleased to offer my heartiest congratulations to this group of outstanding investigators on the occasion of their receipt of these departmental awards.

Samuel W. Bodman

2006 AWARDEES

Kyle Cranmer
Brookhaven National Laboratory

Julia Laskin
Pacific Northwest National Laboratory

Ho Nyung Lee
Oak Ridge National Laboratory

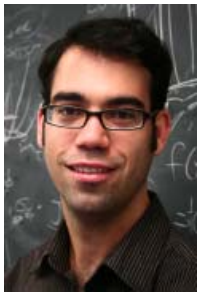
Len A. Pennacchio
Lawrence Berkeley National Laboratory

Brian J. Kirby
Cornell University

Jeffrey Kysar
Columbia University

Shawn Newsam
University of California, Merced

Carlos Pantano-Rubino
University of Illinois
at Urbana-Champaign

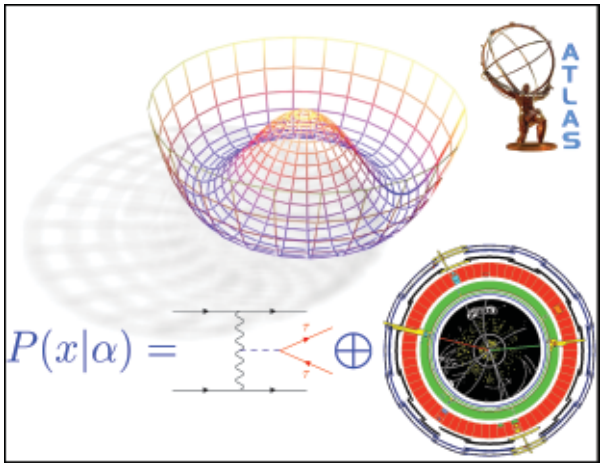


Kyle Cranmer

Brookhaven National Laboratory

For his unique contributions to the ATLAS experiment's search for the Higgs boson, including seminal studies of the Higgs boson production via Vector Boson Fusion and the trigger algorithms needed to identify missing transverse energy.

Kyle Cranmer was nominated by Brookhaven National Laboratory, where he was a Goldhaber fellow, for his work as an experimental high-energy physicist on the ATLAS experiment, part of the Large Hadron Collider (LHC) located at CERN. He is now an assistant professor at New York University, where he continues his work on the ATLAS experiment.



Professor Cranmer specializes in advanced data analysis and statistical techniques, which are key to a ROBUST discovery of new physics in an uncertain environment like that of the Large Hadron Collider. While his research is relevant to searches for new physics in general, he has focused on searches for the Higgs boson. The Higgs boson is the last unobserved particle predicted by the Standard Model of particle physics and is believed to be the origin of mass for fundamental particles. Professor Cranmer began searching for the Higgs boson on the ALEPH experiment. As a graduate student at the University of Wisconsin-Madison, he collaborated with theorists there to verify their initial studies that ATLAS should be able to discover a Higgs boson produced via the Vector Boson Fusion process. While at Brookhaven, he led the effort in the search for Higgs decaying to tau leptons, and has developed analysis tools used widely in the collaboration.

Professor Cranmer has also developed algorithms used in the ATLAS trigger, the system that selects which interactions should be saved in the data. These algorithms are crucial for discovery of new physics, such as supersymmetry.

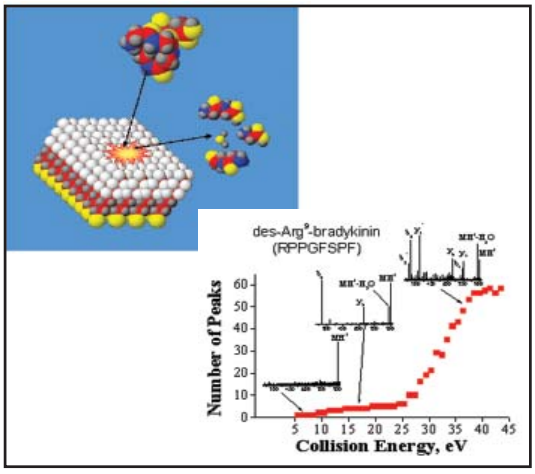
Professor Cranmer has been very active in the support system for U.S. collaborators working on ATLAS. He has organized Analysis Jamborees and serves as the convener for the Standard Model and Higgs forum.

JULIA LASKIN

Pacific Northwest National Laboratory

For internationally recognized contributions to ion chemistry, mass spectrometry, and ion surface reactions leading to fundamental understanding of kinetics of dissociation of large molecules.

Julia Laskin is a Senior Research Scientist in the Fundamental and Computational Science Directorate at the Pacific Northwest National Laboratory. She is Principal Investigator (PI) for the Office of Basic Energy Sciences-sponsored project "Activation and Dissociation of Large Ions in Mass Spectrometry" within the Analytical Chemistry Program, PI for a Laboratory Directed Research and Development (LDRD) project on "Preparation and Characterization of Peptide Arrays Using Soft Landing" and co-PI for an LDRD project on "Controlled Modification of Surfaces with Peptide Ions."



Dr. Laskin is an acknowledged leader in the field of gas-phase ion chemistry and mass spectrometry. Her fundamental research on activation and dissociation of complex molecular ions provides an important background for development of new analytical approaches in tandem mass spectrometry–one of the most important analytical methods developed in the last century. Dr. Laskin's investigation of the energetics and dynamics of gas-phase fragmentation, along with theoretical modeling of these reactions, made it possible to determine critical dissociation energies of complex molecules with higher precision than any other method. This work also demonstrated the extraordinary importance of entropy effects in peptide decomposition reactions. Recent studies of reactive and non-reactive deposition of large ions on self-assembled monolayer surfaces suggest a path for development of new technology relevant to DOE missions in catalysis, materials science, and biotechnology.

Dr. Laskin has published more than 70 peer-reviewed articles, including three invited reviews and one invited book chapter. She is co-editor of a book entitled *Principles of Mass Spectrometry Applied to Biomolecules*. Dr. Laskin is active in professional societies, organizing workshops and technical sessions within her research field. She regularly serves as a reviewer for international journals.

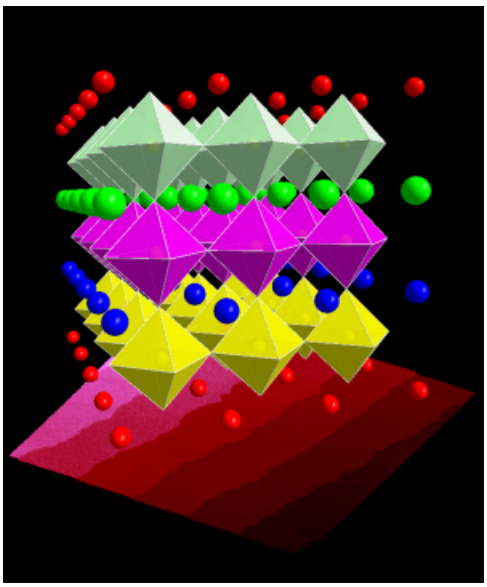
Dr. Laskin is actively engaged in educational activities and community service. She routinely hosts and advises visiting scientists and graduate students from U.S. and foreign universities at the Environmental Molecular Sciences Laboratory – a DOE national user facility – and mentors postdoctoral fellows and undergraduate summer interns. She is a member of the Board of Directors of the American Society for Mass Spectrometry, the primary professional society for her field.

Ho Nyung Lee

Oak Ridge National Laboratory

For his pioneering development of experimental methods and theoretical understanding leading to the atomic scale synthesis by pulsed-laser deposition of ultrathin complex oxide heterostructures and completely artificial superlattice crystals with designed-in functionalities.

Ho Nyung Lee is an experimental physicist in the Materials Science and Technology Division at Oak Ridge National Laboratory (ORNL). His research focuses on understanding interactions at the atomic-scale and controlling interfaces in artificially-layered complex oxides in order to discover new functionalities and behaviors in heterostructures and superlattices.



Dr. Lee has advanced high-pressure, pulsed-laser deposition as a versatile layer-by-layer growth method for single-crystalline oxide heterostructures previously thought to be achievable only by a molecular beam epitaxy approach. The methods developed by Dr. Lee allow an unprecedented freedom for materials design, as they can be applied to synthesize artificially-layered superlattice crystals in which the functionally cross-coupled interfaces introduce new behaviors or improved physical properties unique to two-dimensional systems.

In addition to the study of interfacial effects, Dr. Lee's research interests include understanding electronic self-organization that results in the rich variety of remarkable electric and magnetic properties of transition-metal oxides, as well as investigating fundamental aspects of ferroelectrics. The basic scientific questions addressed in his research are of great technological significance due to these materials' broad range of applications, such as sensors, actuators, data storage, and energy conversion. The samples synthesized at ORNL exhibit unprecedented quality and are being characterized through a number of national and international collaborations.

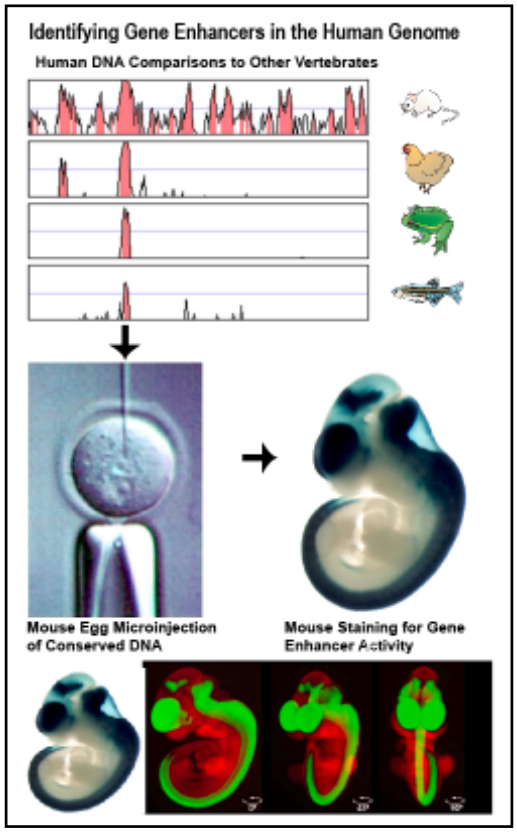
Dr. Lee received his Ph.D. from the Physics Department of Korea University in 1999 and joined ORNL as a strategic hire in 2002, after having spent two and a half years as a postdoctoral researcher at the Max Planck Institute of Microstructure Physics in Halle (Saale), Germany. He has published more than 50 peer-reviewed papers, which have been cited more than 600 times, including publications in the top scientific journals, and has presented more than 30 invited talks, seminars, and university colloquia. Dr. Lee has received other recognition for his research. In 2002, he was awarded the first Bombi Prize of the Korean Physical Society for outstanding research in condensed matter physics by a young scientist under the age of 35. Dr. Lee also won UT-Battelle's 2005 Science and Technology Award for best scientific research by a team or individual.

Len A. Pennacchio

Lawrence Berkeley National Laboratory

For systematically assigning gene regulatory function to the human genome through the coupling of vertebrate comparative genomics and large-scale studies in mice, using a world-class and unique mouse resource that he established.

Len Pennacchio is a Senior Staff Scientist in the Genomics Divisions at Lawrence Berkeley National Laboratory, where he has made significant contributions to the generation and interpretation of the human genome sequence.



A major current focus of research is using the mouse as a model system to identify genetic switches ("enhancers") in the human genome that determine when and where genes are expressed in the body. Despite the availability of the human genome sequence, such gene regulatory sequences have remained elusive. Through the establishment of a world-class mouse program and sequence analysis group at Berkeley Lab, his group has exponentially expanded the number of known enhancers in the human genome. Importantly, all of these data are publicly available and are enabling internal and external investigators in a broad range of applications (including assessing their roles in human disease).

After receiving a high school and undergraduate education in the California public school system, Dr. Pennacchio received his Ph.D. in Biological Sciences from Stanford University in 1998. During his graduate studies, he identified one of the first genes responsible for human epilepsy, resulting in two pre-doctoral awards (from the American Society of Human Genetics and the American Epilepsy Society). He went on to perform his post-doctoral research at Berkeley Lab as an Alexander Hollaender Distinguished Postdoctoral Fellow with an emphasis in comparative genomics and joined Berkeley Lab as a career Staff Scientist in 2003. Dr. Pennacchio's broad research program has led to more than 65 peer reviewed publications, more than 50 external scientific presentations, invitations to serve on numerous DOE and National Institutes of Health Study Sections, and membership on several scientific journal editorial boards. Dr. Pennacchio is also affiliated with the DOE Joint Genome Institute, where he serves on the Senior and Strategic Management teams and contributes to genetic studies in a wide range of species including plants likely to serve as future bioenergy feedstocks.

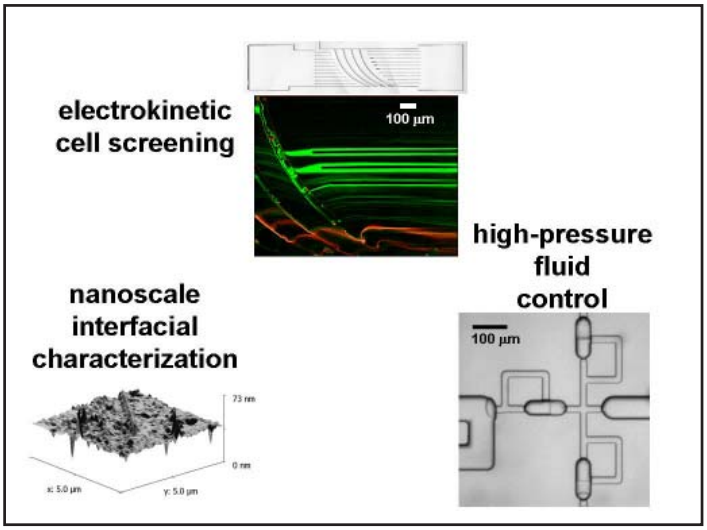
Brian J. Kirby

Cornell University

For his pioneering work in nanoscale electrokinetic transport, pathogen and chemical detection, quantum data storage, and advanced microsystems that are critical to developing technical capabilities for stockpile stewardship, enhanced surety, and non-proliferation.

Brian Kirby was nominated by Sandia National Laboratories for his leadership in the field of nanoscale transport phenomena. He is an assistant professor in the Sibley School of Mechanical and Aerospace Engineering at Cornell University. His work in nanoscale electrokinetic transport, quantum data storage, and advanced microsystems is critical to developing these core scientific and technical capabilities for advances in stockpile stewardship, enhanced surety, and non-proliferation.

Professor Kirby's research group at Cornell focuses on employing micro/nanofluidic systems with application to biotoxin and pathogen concentration and detection, quantum data storage, and tissue engineering. His research projects include the development of low-cost, miniaturized, dielectrophoretic, micro-particle analyzers for water surety applications, microfluidic synthesis in photonic band-gap fibers for quantum data storage, massively-parallel microfluidic devices for combinatorial exploration of protein refolding protocols, engineered hydrogel scaffolds for tissue engineering and repair, and integrated pathogen concentration and biosensor systems for water analysis.



In 2002, Professor Kirby received an R&D 100 Award for his work on high-pressure, monolithic, microfluidic valves while a staff member of Sandia National Laboratories. In 2004, he received the J.D. Watson Investigator Award for his exemplary research at Cornell.

He has exhibited a strong commitment to educating the next generation of American scientists and engineers, and he has mentored more than 15 students and post-docs over his career. Professor Kirby is a dynamic and highly sought after instructor at one of America's top schools for engineering, and continually strives to establish the opportunities necessary for his students to succeed. He is recognized as one of the top professionals in his field and is a frequent reviewer for several of the world's best peer-reviewed journals. He is also active in the larger scientific community through his participation and leadership at national and international conferences.

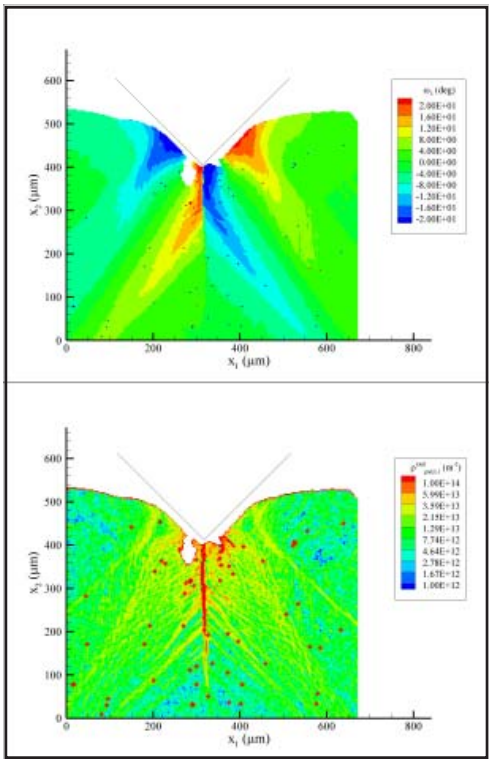
JEFFREY KYSAR

Columbia University

For fundamental research into the deformation of materials under high-rate loading, including development of mechanistic models of microstructure and material fracture evolution for the Stockpile Stewardship Program.

Jeffrey Kysar was nominated by Lawrence Livermore National Laboratory for his fundamental research into the deformation of materials at small length scales, under high-strain-gradient, and under high-rate-loading conditions. His work includes the development of novel experimental methods and the formulation of multi-scale mechanistic models that describe material fracture and characterize the evolution of materials deformation. Understanding these complex processes at the mesoscale, which cannot be solved by simulations using molecular dynamics, is essential to modeling multiscale phenomena in support of the National Nuclear Security Administration's Stockpile Stewardship Program.

Professor Kysar is an associate professor of mechanical engineering at Columbia University, where his current research interests include the work for which he was nominated as well as investigations that span broader understanding of the fracture process from the atomic length scale to the macroscopic length scale, especially in materials that exhibit an elastic-plastic constitutive behavior such as ductile metals.



In 2003, Professor Kysar was one of 83 of the nation's top young engineers selected to participate in the National Academy of Engineering's ninth annual Frontiers of Engineering symposium. The three-day event brought together engineers age 30 to 45 who were performing leading-edge engineering research and technical work. The participants – from industry, academia, and government – were nominated by fellow engineers or organizations and chosen from a field of nearly 170 applicants. He has published more than 20 articles on crack propagation and behavior in materials in journals such as the *Journal of the Mechanics and Physics of Solids*, *Acta Materialia*, and the *Journal of Applied Mechanics*.

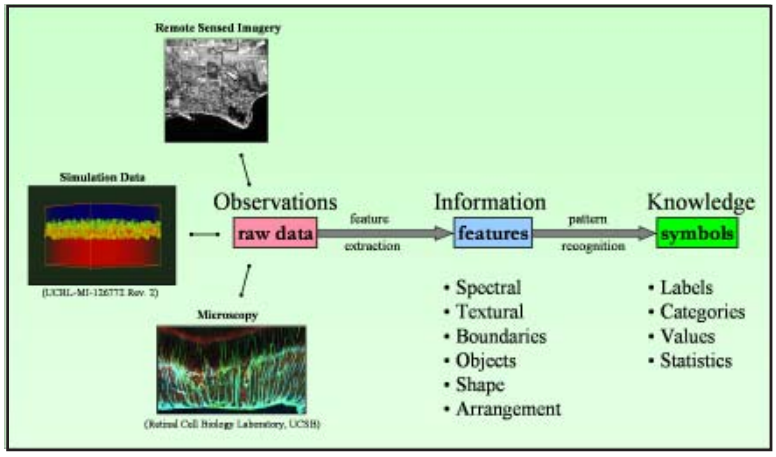
Shawn Newsam

University of California, Merced

For outstanding research in image processing, pattern recognition, and data mining, and for his leading role in educating young scientists and engineers by developing a new and innovative academic program in computer science and engineering.

Shawn Newsam was nominated by Lawrence Livermore National Laboratory for his fundamental research on knowledge discovery in complex scientific datasets. His research includes work on image processing, computer vision, pattern recognition, machine learning, content-based information retrieval, digital libraries, data mining, and knowledge discovery in spatio-temporal, multimedia and scientific datasets. He employs advanced data analysis techniques to perform novel quantitative analysis of large simulation outputs. His contributions in this area represent innovative research that enables scientists to quantify the simulated physical phenomena with greater precision than previously achievable through visualization.

Professor Newsam, who received his Ph.D. from University of California, Santa Barbara, is currently an assistant professor in the School of Engineering at the University of California at Merced. He was founding faculty member at the new University of California at Merced, the first American research university to be built in the twenty-first century.



Professor Newsam also has worked extensively on quantitative analysis of immunofluorescent retinal images, measurements of respiratory bursts in alveolar macrophages, pattern recognition techniques for characterizing unstructured proteins, and terrestrial remote sensing for monitoring atmospheric particulates. This research has resulted in numerous papers that appeared in high-profile, peer-reviewed journals and international conference proceedings, including the *Journal of Applied Optics*, *Acta Astronautica*, and the International Symposium on Visual Computing. He has also served on the organizing committees of numerous conferences, including the SIAM International Conference on Data Mining and the INSTICC International Conference on Computer Vision Theory and Applications (VISAPP).

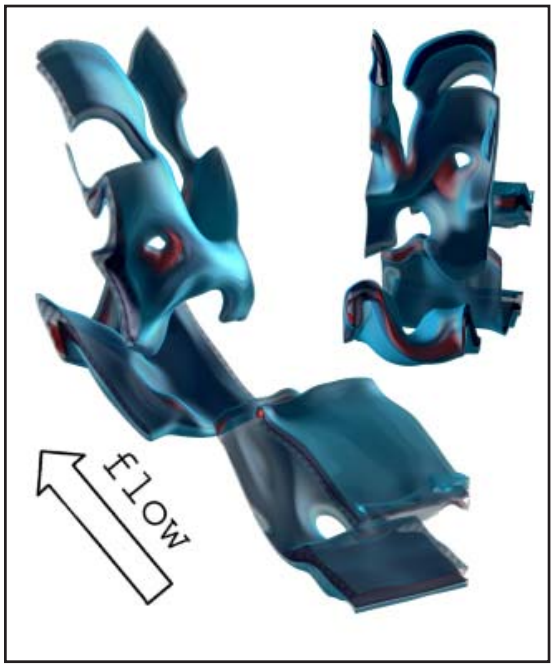
Carlos Pantano-Rubino

University of Illinois at Urbana-Champaign

For innovative development of computational turbulence models and advanced simulations of turbulent flows, contributions to the theory of laminar flames, and the statistical modeling of flame-hole dynamics.

Carlos Pantano-Rubino was nominated by Lawrence Livermore National Laboratory for his fluid mechanics and thermal sciences research, which is focused on the physics of turbulence-combustion interaction. He uses techniques from applied mathematics, fluid physics, and high-performance simulation to investigate the elementary mechanisms and principles involved in these flows. This research is complemented by the development of specialized numerical methods in cases where current techniques are inappropriate, including highly accurate and adaptive resolution techniques for fluid dynamics. The results of these detailed studies are then used to develop models for more comprehensive simulation tools that are capable of representing all aspects of the design and optimization of energy conversion systems, i.e. fluid, thermal, structural.

Professor Pantano received his Ph.D. in Mechanical and Aerospace Engineering at the University of California, San Diego, and is currently on the faculty of the Department of Mechanical Science and Engineering at the University of Illinois at Urbana-Champaign. Before taking the faculty position at Illinois, Professor Pantano was a Senior Research Fellow and Senior Post Doctoral Fellow in the Graduate Aeronautical Laboratories at the California Institute of Technology.



In addition to the research that is cited in his nomination, Professor Pantano has worked on the interactions of chemistry and fluid dynamics, numerical methods, heterogeneous chemistry and electrochemistry required for fuel cells, molecular dynamics and large eddy simulations in complex geometries. He has published numerous articles on fluid mechanics in high-profile journals such as the *Journal of Fluid Mechanics*, *Physics of Fluids*, and the *Journal of Aerosol Science*.

The Presidential Early Career Award for Scientists and Engineers (PECASE)

In 1996, the National Science and Technology Council (NSTC) was commissioned to create an award to recognize and honor outstanding scientists and engineers at the outset of their independent research careers. The NSTC was established to coordinate the multiagency science and technology policy-making process, and to implement and integrate the President's science and technology policy agenda across the federal government.

The Presidential Early Career Award for Scientists and Engineers (PECASE) embodies the high priority placed by the government on maintaining the leadership position of the United States in science by producing outstanding scientists and engineers and nurturing their continued development. The Awards identify a cadre of outstanding scientists and engineers who will broadly advance science and the missions important to the participating agencies.

The PECASE Awards are intended to recognize some of the finest scientists and engineers who, while early in their research careers, show exceptional potential for leadership at the frontiers of scientific knowledge during the twenty-first century. The Awards foster innovative and far-reaching developments in science and technology, increase awareness of careers in science and engineering, give recognition to the scientific missions of participating agencies, enhance connections between fundamental research and national goals, and highlight the importance of science and technology for the nation's future.

The PECASE Award is the highest honor bestowed by the U.S. government on outstanding scientists and engineers beginning their independent careers. The Awards are conferred annually at the White House following recommendations from participating agencies. To be eligible for a PECASE Award, an individual must be a U.S. citizen, national, or permanent resident. Each PECASE Award is for a duration of five years. Individuals can receive only one PECASE award in their careers.

The agencies participating in the PECASE Awards program are:
Department of Agriculture
Department of Commerce
Department of Defense
Department of Education
Department of Energy
Department of Health and Human Services: National Institutes of Health
Department of Veterans Affairs
National Aeronautics and Space Administration
National Science Foundation

U.S. Department of Energy
Early Career Award
Past Recipients

	Office of Science Recipients	Office of Defense Programs Recipients
1996	Michael Smith John P. Hill Philip M. Jardine Christine Hartmann	Shenda M. Baker Richard A. Cairncross
1997	Andrew Brandt David J.Dean Lori A. Freitag David E. Newman John Shanklin	Bruno S. Bauer Thomas J. Matula
1998	Mari Lou Balmer James W. Lee Anthony Mezzacappa Gary P. Wiederrecht	Tonya L. Kuhl Roya Maboudian Christopher Palmer
1999	Kenneth M. Kemner John F. Mitchell Lynne E. Parker Xian Chen	Ken R. Czerwinski David M. Ford
2000	Richard B. Lehoucq Zhihongb Lin Zheng-Tian Lu Andrey Zheludev	Aaron L. Odom Jonas C. Peters
2001	Ian Anderson Vincent Cianciolo Mark Herrmann Jizhong Zhou	Kenneth A. Gall Paul Ricker Z. John Zhang
2002	Jeffrey C. Blackmon Edmond Chow Sergei Maslov Jonathan E. Menard Christine Orme	Carl Boehlert Krishnakumar Garikipati

	Office of Science Recipients	Office of Defense Programs Recipients
2003	Tamara G. Kolda Saskia Mioduszewski Margaret S. Torn Jian Shen	Catherine M. Snelson Donald P. Visco, Jr. Brian D. Wirth
2004	John Arrington William Ashmanskas Hong Qin Robert B Ross Paul Vaska Zhangbu Xu	Wei Cai William P. King Yunfeng Lu
2005	Daniel Bardayan Todd Munson Wynne Schiffer Yanwen Zhang	Christopher J. Roy Wendelin Wright Michael A. Zingale

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