

# APS Announces 2015 Prize & Award Recipients

Thirty-Eight prizes and awards will be presented during special sessions at three spring meetings of the Society: the March Meeting 2015, March 2-6, in San Antonio, TX, the April Meeting 2015, April 11-14, in Baltimore, MD, and the Atomic, Molecular and Optical Physics Meeting 2015, June 8-12, in Columbus, OH.

Citations and biographical information for each recipient follow. The Apker Award recipients appeared in the December 2014 issue of *APS News* (<http://www.aps.org/programs/honors/awards/apker.cfm>). Additional biographical information and appropriate web links can be found at the APS web site (<http://www.aps.org/programs/honors/index.cfm>). Nominations for most of next year's prizes and awards are now being accepted. For details, see page 8 of this insert.

## Prizes

### 2015 HANS A. BETHE PRIZE

**James Lattimer, State University of New York, Stony Brook**  
*For outstanding theoretical work connecting observations of supernovae and neutron stars with neutrino emission and the equation of state of matter beyond nuclear density.*



JAMES LATTIMER received his B.S. in physics from Notre Dame in 1972 and his Ph.D. from the University of Texas at Austin in 1976. His thesis explored black hole—neutron star collisions, and he proposed that decompression of neutron star matter could be the source of r-process elements. Since 1979 he has been on the faculty in the earth and space sciences and the physics and astronomy departments at Stony Brook University. He was appointed a Distinguished Professor in 2013. His early

work also concerned gravitational collapse supernovae, and he helped develop an equation of state for hot, dense matter. His 1986 simulations, with A. Burrows, of newly-formed neutron stars, or proto-neutron stars, closely matched neutrino observations from SN 1987A. Lattimer is a fellow of APS and a member of the American Astronomical Society, the International Astronomical Union, and the American Geophysical Union. He has received the Alfred P. Sloan Foundation Award, the Ernest F. Fullam Award, a John Simon Guggenheim Fellowship, and a Yukawa Visiting Professorship.

### 2015 TOM W. BONNER PRIZE IN NUCLEAR PHYSICS (2)

**Miklos Gyulassy, Columbia University**  
**Howard Wieman, Lawrence Berkeley National Laboratory**  
*For developing foundational experimental and theoretical tools to enable and guide generations of experiments in relativistic heavy ion physics. The combination of experiment and theory led to the initial discoveries at RHIC, ongoing precision studies of the properties of hot nuclear matter, and to exploration of the nuclear matter phase diagram.*



MIKLOS GYULASSY received his B.A. and Ph.D. from the University of California, Berkeley. Between 1974 and 1976 he was a postdoctoral fellow with W. Greiner in Frankfurt, where his interests turned to the theory of high density nuclear matter and the phenomenology of relativistic heavy ion reactions. He moved to Columbia University in 1992 as a professor of physics. In 2004, he proposed with Larry McLerran an interpretation of the first three years of RHIC data that pointed to

the discovery at RHIC of two new forms of ultra-dense QCD matter: the strongly-interacting quarkgluon plasma and its color glass condensate nuclear initial state. Gyulassy is a fellow of APS and a foreign member of the Hungarian Academy of Science. He has received the Alexander von Humboldt Research Award for Senior U.S. Scientists and the Ernest Orlando Lawrence Award from the Department of Energy (DOE). He participated in the 1983 and 1996 DOE nuclear science long-range planning committees and has served on several national lab advisory committees.



HOWARD WIEMAN received his B.S. from Oregon State University and completed his Ph.D. under Isaac Halpern at the University of Washington, Seattle in 1975. After a postdoc at the University of Colorado, he started at the Lawrence Berkeley National Laboratory (LBNL) as outside-user liaison for the 88" cyclotron. At LBNL he worked on a number of detector-related developments at the Bevalac, including design and installation of the low

energy beam line. He was the physicist in charge of designing and building the time projection chamber portion of the STAR experiment facility installed at the Relativistic Heavy Ion Collider. He initiated and guided the design and construction of a vertex detector, which was installed and began operation in the STAR experiment in 2014. It is a significant advance in vertex detector performance and was developed to identify D meson decays in the high track density environment of heavy ion collisions. Wieman received the LBNL J.M. Nitschke Technical Excellence Award and is a fellow of APS.

### 2015 HERBERT P. BROIDA PRIZE

**Michael Ashfold, University of Bristol**  
*For his innovative work on molecular photodynamics, especially in combining multiwavelength experiments on small molecules, high quality electronic structure calculations, and physical organic chemistry concepts into a "bigger picture" for broad understanding of experimental photodynamics of systems of increasing complexity.*



MICHAEL ASHFOLD received his B.Sc. in 1975 and Ph.D. degree in 1978 from the University of Birmingham, prior to postdoctoral research at Oxford University and appointment as a Lecturer, Reader and, since 1992, professor of physical chemistry at the University of Bristol. His research interests include molecular photochemistry, diamond growth by chemical vapor deposition methods, and the physics and application of pulsed laser ablation processes. His recent activities seek to

explore the extent to which knowledge gained from studying prototypical small molecules can inform our understanding of the photochemistry of larger, more complex systems, and the extent to which understanding derived from gas phase studies can inform our understanding of solution-phase photochemistry. His research has been recognized by various awards including the Marlow Award, Corday-Morgan Prize, Tilden Prize, and Liversidge Award from the Royal Society of Chemistry, an Engineering and Physical Sciences Research Council Senior Research Fellowship, Royal Society Leverhulme Trust Senior Research fellowships, and a Daiwa-Adrian Prize. He was elected to fellowship of the Royal Society in 2009.

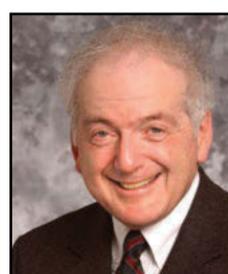
### 2015 OLIVER E. BUCKLEY CONDENSED MATTER PHYSICS PRIZE (4)

**Matthew Fisher, University of California, Santa Barbara**  
**Allen Goldman, University of Minnesota**  
**Arthur F. Hebard, University of Florida**  
**Aharon Kapitulnik, Stanford University**  
*For discovery and pioneering investigations of the superconductor/insulator transition, a paradigm for quantum phase transitions.*



MATTHEW FISHER obtained a bachelor's degree in engineering physics from Cornell University in 1981, and a Ph.D. in theoretical physics from the University of Illinois at Urbana-Champaign in 1986. He was a visiting scientist and then research staff member at the IBM T. J. Watson Research Center from 1986 to 1993, before joining the Kavli Institute for Theoretical Physics in Santa Barbara. In 2007 Fisher joined Microsoft Research Station Q as a research physicist, and was on the Caltech

faculty from 2009 to 2010. Since 2010 Fisher has been in the University of California, Santa Barbara physics department. Fisher's research has focused broadly on theories of strongly interacting quantum many-body systems, especially those which exhibit exotic behavior. Fisher received the Alan T. Waterman Award from the National Science Foundation, as well as the National Academy of Sciences (NAS) Award for Initiatives in Research (1997). He was elected as a member of the American Academy of Arts and Sciences in 2003 and to the NAS in 2012.



ALLEN GOLDMAN was born in the Bronx and attended the Bronx High School of Science. He received his A.B. in physics and chemistry from Harvard in 1958 and his Ph.D. in physics from Stanford in 1965. After a postdoc at Stanford, he joined the physics faculty at the University of Minnesota as an Assistant Professor. He is now a Regents Professor. The focus of Goldman's research is on electronic transport properties of superconductors, with emphasis on the effects

of disorder and dimensional constraints. This work includes studies of quantum size effects, electronic localization, topological phase transitions, and quantum phase transitions. Current interests also include the investigation of the properties of high-Tc superconductors and superconducting nanowires, and the electrostatic control of the ground states of novel materials. Goldman is a fellow of APS and the American Association for the Advancement of Science. He is a recipient of the Fritz London Memorial Prize for low temperature physics and is a member of the National Academy of Sciences.



ARTHUR F. HEBARD received his B.A. in physics from Yale University in 1962 and his Ph.D. from Stanford University in 1971. His thesis work focused on an experimental search for free quarks residing on magnetically suspended superconducting spheres. In 1972 Hebard became a member of the technical staff at AT&T Bell Telephone Laboratories, where he specialized in research on thin-film superconductors. This research included the discovery

of superconductivity in alkali-metal-doped carbon sixty (C60). In 1996 Hebard moved to the University of Florida, where he is currently a distinguished professor of physics specializing in the study of magnetism in graphene, semiconductors, thin films, and at thin film interfaces of complex oxides. He is co-author on more than 260 peer-reviewed papers, holds 10 patents, and currently serves as an associate editor for *Reviews of Modern Physics*. Hebard is a fellow of APS and the American Association for the Advancement of Science, and is a recipient of the APS James C. McGroddy Prize for New Materials.



AHARON KAPITULNIK is the Theodore and Sydney Rosenberg Professor in Applied Physics at Stanford University. He received both his undergraduate degree, in 1978, and his Ph.D., in 1983, from Tel-Aviv University in Israel. Shortly thereafter he joined the applied physics department at Stanford, and since 1993 he has held a joint appointment in the applied physics and physics departments. Kapitulnik's research focuses on phenomena associated with the behavior of correlated and disordered electron systems,

particularly in reduced dimensions, and the development of precision detection instrumentation. In particular he developed the Sagnac Interferometer for sensitive detection of time-reversal symmetrybreaking effects in solids, and novel, cantilever-based instrumentation for testing the inverse square law of gravity at sub-mm distances. He has also been engaged in scanning tunneling microscopy and spectroscopy studies of correlated electron systems. Among other recognitions, he was awarded an Alfred P. Sloan Fellowship, a Presidential Young Investigator Award, and the Kamerlingh Onnes Prize. He is a fellow of APS and the American Academy of Arts and Sciences.

### 2015 DAVISSON-GERMER PRIZE IN ATOMIC OR SURFACE PHYSICS (2)

**Tai-Chang Chiang, University of Illinois, Urbana-Champaign**  
*For his elegant demonstration of multiple quantum well resonances in metallic thin films achieved by growing films of unprecedented uniformity, and his demonstration and use of quantum effects to understand and control the stability of thin films.*



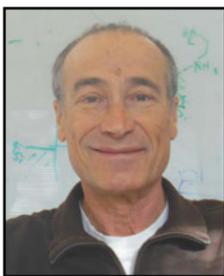
TAI-CHANG CHIANG received a B.S. in physics from the National Taiwan University in 1971 and a Ph.D. in physics from the University of California, Berkeley in 1978. After working for two years as a postdoctoral fellow at the IBM T.J. Watson Research Center, he joined the Department of Physics at the University of Illinois at Urbana-Champaign in 1980. There he served as the associate director of the Frederick Seitz Materials Research Laboratory

from 1999 to 2006. His research in recent years has been focused on the electronic, spin, lattice, and phonon structures of solids, surfaces, and thin film systems. Much of his experimental work has been performed using synchrotron radiation at the Advanced Photon Source at Argonne National Laboratory, the Advanced Light Source at Lawrence Berkeley National Laboratory, and the Synchrotron Radiation Center at the University of Wisconsin—Madison. Chiang is a fellow of APS, an Outstanding Referee for APS journals, and a recipient of the National Science Foundation Presidential Young Investigator Award.

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**Miquel B. Salmeron, Lawrence Berkeley National Laboratory**  
*For the development of instrumentation for atmospheric pressure photoelectron spectroscopy and STM at high pressures and temperatures, and for his elegant studies of hydrogen dissociation and reactivity and the wetting of water films on metal surfaces at the atomic level.*



MIQUEL B. SALMERON earned his B.A. in physics from the University of Barcelona, Spain in 1967, and his Ph.D. in physics from the Universidad Autónoma de Madrid, Spain in 1975. He is a senior scientist in the Materials Science Division of the Lawrence Berkeley National Laboratory and adjunct professor in the Materials Science and Engineering Department at the University of California, Berkeley. He investigates the atomic structure and on the electronic, mechanical and chemical properties of surfaces, including adsorbed atoms and molecules, their diffusion, and film growth. He developed instrumentation that can operate under ambient conditions of gases and liquids, including scanning tunneling and atomic force microscopy and ambient pressure photoelectron spectroscopy. He is a fellow of APS. He has received the Medard W. Welch Award of the American Vacuum Society, the Langmuir Lecturer Award of the American Chemical Society, and the MRS Medal from the Materials Research Society.

### 2015 MAX DELBRUCK PRIZE IN BIOLOGICAL PHYSICS

**Stanislas Leibler, The Rockefeller University**

*For establishing the study of genetic network design principles as a foundation for the field of systems biology, and for pioneering work on the robustness of biological systems.*



STANISLAS LEIBLER did his undergraduate studies in physics at the University of Warsaw. He received three degrees from the University of Paris: an M.S. in theoretical physics in 1979, a Ph.D. in theoretical physics in 1981, and a second Ph.D. in physics in 1984. He spent a year at the École Normale Supérieure and became a tenured research fellow at the Centre d'Études de Saclay in 1984, staying until 1992. Then, Leibler moved to Princeton

University as a professor in the department of physics, becoming a professor in the department of molecular biology in 1993. He moved to The Rockefeller University in 2001 and was a Tri-Institutional professor at Weill Cornell Medical College and the Sloan-Kettering Institute from 2003 to 2010. Since April 2009, he has been at both Rockefeller and the Institute for Advanced Study, where he is a professor at the School of Natural Sciences.

### 2015 EINSTEIN PRIZE

**Jacob Bekenstein, Hebrew University**

*For his groundbreaking work on black hole entropy, which launched the field of black hole thermodynamics and transformed the long effort to unify quantum mechanics and gravitation.*



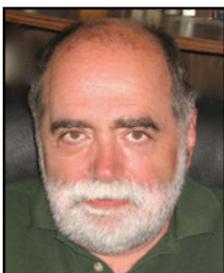
JACOB BEKENSTEIN obtained his undergraduate and M.Sc. degrees in 1969 from the Polytechnic Institute of Brooklyn (currently the Polytechnic Institute of New York University), and his Ph.D. in 1972 from Princeton University, under the guidance of John A. Wheeler. He was a faculty member at the Ben Gurion University. Since 1990 he has been at the Hebrew University of Jerusalem. Bekenstein's scientific interests have included gravitational theory in general, black hole

physics (including black hole thermodynamics, which started with his work), relativistic magnetohydrodynamics, galactic dynamics, and the physical aspects of information theory. Currently he is interested in designing realistic experiments to explore quantum gravity and also in the role of space-time fluctuations in resolving various black hole paradoxes. He is a member of the Israel Academy of Sciences and Humanities, and he has been honored with the Landau Prize, the Rothschild Prize, the Israel National Prize, the Weizmann Prize, and the Wolf Prize.

### 2015 HERMAN FESHBACH PRIZE IN THEORETICAL NUCLEAR PHYSICS

**Larry McLerran, Brookhaven National Laboratory**

*For his pioneering contributions to our understanding of quantum chromodynamics at high energy density and laying the theoretical foundations of experimental ultrarelativistic heavy ion collisions. His work has been a crucial guide to experiments at RHIC and LHC, and he has mentored a generation of young theorists.*



LARRY MCLERRAN received his B.S. in 1971 and Ph.D. in 1975 from the University of Washington. In 1999 he became a Senior Scientist at Brookhaven National Laboratory (BNL). He was Group Leader for Nuclear Theory and is Theory Director at the RIKEN BNL Center. He did pioneering work on the properties of ultrarelativistic nuclear collisions. McLerran and colleagues showed that after a collision, the high gluon density color glass condensate (CGC) forms a highly coherent ensemble of color fields called the glasma. In 2005, he and Miklos Gyulassy argued that a quark gluon plasma had been made at the Relativistic Heavy Ion Collider from the initial CGC of the nuclei. His awards include the Alfred Sloan Fellowship, Alexander Humboldt Prize, Hans Jensen Prize at the University of Heidelberg, and an Honorary Ph.D. and the Liu Lian Shou Professorship at Central China Normal University in Wuhan.

### 2014 FLUID DYNAMICS PRIZE

**Geneviève Comte-Bellot, École Centrale de Lyon**

*For significant contributions to understanding the physics of turbulent flow, aero-acoustics, and hot-wire anemometry by excellent measurements of mean and fluctuating properties.*



GENEVIÈVE COMTE-BELLOT obtained her undergraduate diploma in 1953 at the University of Grenoble, and her Ph.D. in 1963 at the University of Grenoble in the Department of Fluid Dynamics, with a dissertation on turbulent flow between two parallel walls. As a postdoc in fluid mechanics at The Johns Hopkins University in the team of Professor Stanley Corrsin, she studied decay laws and the Eulerian space-time correlation. Then she returned to

France and became a professor at the École Centrale de Lyon. There she launched research into aeroacoustics. This new field proved to be fruitful, attracting young staff to investigate jet noise, propagation of acoustic waves through turbulent flows, and wall pressure fluctuations. She is a corresponding member of the Academie des Sciences in Paris, a member of the French Academie des Technologies, and an associate member of the American National Academy of Engineering.

### 2015 DANNIE HEINEMAN PRIZE FOR MATHEMATICAL PHYSICS

**Pierre Ramond, University of Florida**

*For pioneering foundational discoveries in supersymmetry and superstring theory, in particular the dual model of fermions and the theory of the Kalb-Ramond field.*

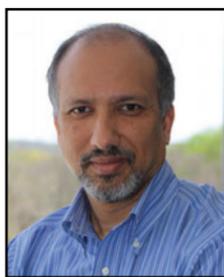


PIERRE RAMOND obtained his B.S. in electrical engineering from Newark College of Engineering in 1965 and a Ph.D. in theoretical physics from Syracuse University in 1969. During his first postdoctoral post at the National Accelerator Laboratory (now FermiLab), he generalized the Dirac equation to dual resonance models (string theory). This necessitated the introduction of bosonic and fermionic degrees of freedom, the building block for superstrings, and opened the way to a new type of symmetry which we call supersymmetry. A few years later, while at Yale, he and his student Michael Kalb generalized the vector potential to strings and hypothesized the Kalb-Ramond field, a ubiquitous feature of superstrings. In his present research, he seeks to understand the mass and mixing parameters which stem from the triplication of chiral families of the Standard Model of particle physics. Ramond is a fellow of APS and the American Academy of Arts and Sciences.

### 2015 PRIZE FOR INDUSTRIAL APPLICATIONS OF PHYSICS

**Supratik Guha, IBM T. J. Watson Research Center**

*For seminal contributions to the science of silicon microelectronics and particularly, the development of high dielectric constant oxide transistor technology.*



SUPRATIK GUHA received his B.Tech. from the Indian Institute of Technology, Kharagpur, in 1985, and his Ph.D. in materials science from the University of Southern California in 1991. From 1992 to 1995 he was a staff member at the 3M Corporate Research Labs, where he worked in the research group that pioneered the blue II-VI semiconductor injection laser. He returned to IBM Research in 1995, and he is now Director of Physical Sciences. Supratik pioneered the materials research that led to IBM's high dielectric constant oxide-metal gate technology, extensively used today in both high performance and low power microprocessor products, such as servers and mobile phones. His own current technical work is in new materials for electronics and energy conversion applications, and also in sensor-based physical analytics. As a manager he has initiated or expanded several successful programs at IBM, including silicon photonics, quantum computing, carbon electronics, and photovoltaics. He is a fellow of APS and the Materials Research Society.

### 2015 IRVING LANGMUIR PRIZE IN CHEMICAL PHYSICS

**Jens K. Nørskov, Stanford University**

*For his groundbreaking contributions to elucidating fundamental principles of reactivity on solid surfaces and the prediction of improved catalysts.*



JENS K. NØRSKOV received a M.Sc. in physics and chemistry in 1976, and a Ph.D. in theoretical physics in 1979, both from the University of Aarhus. He is a professor at both Stanford and SLAC National Accelerator Laboratory, where he also serves as director of the SUNCAT Center for Interface Science and Catalysis. Nørskov's group focuses on electronic structure methods to describe interface phenomena, including adsorption, surface chemical reactions, heterogeneous catalysis, electrocatalysis, and photocatalysis. The goal is to design new catalytic surfaces and nanostructures. Nørskov is a fellow of APS and a member of the Royal Danish Academy of Science and Letters and The Danish Academy of Engineering. Recent awards include the Michel Boudart Award from the North American Catalysis Society and the European Federation of Catalysis Societies and the Gabor A. Somorjai Award from the American Chemical Society.

### 2015 JULIUS EDGAR LILIENTHAL PRIZE

**David Awschalom, University of Chicago**

*For sustained contributions to the physics of spin-coherent materials and systems, including optical discovery of the spin Hall effect and spin control in quantum nanostructures and non-magnetic semiconductors, as well as his superb lecturing on these topics to diverse audiences.*



DAVID AWSCHALOM received his B.Sc. in physics in 1978 from the University of Illinois, and his Ph.D. in physics in 1982 from Cornell University. He joined the University of California, Santa Barbara in 1991 as a professor of physics, and was additionally appointed as a professor of electrical and computer engineering. He is presently the Liew Family Professor of Spintronics and Quantum Information at the University of Chicago. His experiments focus on spintronics and solid state

quantum information processing and involve understanding and coherently controlling the spins of electrons, ions, and nuclei in semiconductors. Awschalom received an IBM Outstanding Innovation Award, the Materials Research Society (MRS) Outstanding Investigator Prize, the International Union of Pure and Applied Physics International Magnetism Prize, the APS Oliver E. Buckley Prize, the American Association for the Advancement of Science (AAAS) Newcomb Cleveland Prize, and the MRS David Turnbull Award. He is a fellow of APS and AAAS, and a member of the National Academy of Sciences and the National Academy of Engineering.

### 2014 JAMES CLERK MAXWELL PRIZE FOR PLASMA PHYSICS

**Clifford Surko, University of California, San Diego**

*For the invention of and development of techniques to accumulate, confine, and utilize positron plasmas, and for seminal experimental studies of waves and turbulence in tokamak plasmas.*



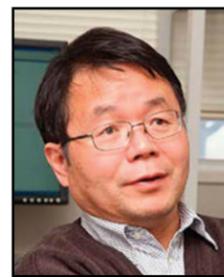
CLIFFORD SURKO received an A.B. degree in mathematics and physics in 1964 and a Ph.D. in physics in 1968 from the University of California, Berkeley. He was a staff member and then department head at AT&T Bell Laboratories, before coming to the University of California, San Diego in 1988, where he is now a distinguished professor of physics. Surko's research has ranged over topics in plasma and atomic physics, nonlinear dynamics, and condensed matter physics. With colleagues,

he developed small-angle laser scattering techniques to study waves and turbulence in tokamak plasmas, and he invented the buffer-gas positron trap, now used worldwide for a variety of antimatter-physics applications. Current research includes a variety of positron-atomic physics studies and development of plasma-based tools to utilize positrons and study positron plasmas. With John Ahearn, he co-chaired the 1995 National Research Council study Plasma Science. He is a fellow of APS and the American Association for the Advancement of Science.

### 2015 JAMES C. MCGRODDY PRIZE FOR NEW MATERIALS

**Hideo Hosono, Tokyo Institute of Technology**

*For his discovery of iron-based superconductors.*



HIDEO HOSONO received his B.E. in 1977 and his Ph.D. in 1982 from Tokyo Metropolitan University, both in applied chemistry. He became a full professor at the Tokyo Institute of Technology in 1999. He is the founding director of the Materials Research Center of Element Strategy, and a professor at the Frontier Research Center at the Tokyo Institute of Technology. Since 2003, he has concentrated on electro-active function cultivation of transparent oxide-based materials. Among his achievements

are the conversion of a cement constituent to a metallic conductor and eventually to a superconductor. His current interests are iron-based superconductors and electrode materials. Hosono received the Otto Schott Research Award, the W.H. Zachariasen Award, the Jan Raychman Prize, and is a Thompson Reuter Citation Laureate in 2013 in physics. He is a member of APS and the Materials Research Society.

### 2015 LARS ONSAGER PRIZE

**Franz Wegner, University of Heidelberg**

*For far-sighted contributions furthering our understanding of the very meaning of order and disorder, including formulation of Ising lattice gauge theory, work on the localization transition and the renormalization group.*



FRANZ WEGNER received his diploma degree in 1964, his doctoral degree in 1968 at the Technical University in Munich, and his habilitation in 1972 at the University in Cologne. He held postdoctoral positions at the Max Planck Institute for Physics and Astrophysics, Munich, at the Institute Max von Laue-Paul Langevin in Garching, at the Institute for Solid State Research at the Research Center Jülich, and at the physics department at Brown University. Since 1974 he has been full professor at

the Ruprecht-Karls-University Heidelberg. Wegner's main accomplishments are in critical phenomena. He made important contributions to the Kadanoff-Wilson renormalization picture, corrections to scaling laws, and the investigation of the tricritical behavior in three dimensions. Duality led him to a gauge invariant Ising model, which in different phases yields area and perimeter laws. He is a fellow of APS and a member of the Heidelberg Academy of Sciences and Humanities and the German Physical Society. He has received both the Walter Schottky Prize and the Max Planck Medal from the German Physical Society.

## 2015 ABRAHAM PAIS PRIZE FOR HISTORY OF PHYSICS

**Spencer R. Weart, American Institute of Physics (Retired)**

*For foundational contributions to the intellectual progress, institutional underpinnings, and public impact of the history of physics, from nuclear physics to condensed matter to climate change.*



SPENCER R. WEART was trained as a physicist (B.A. Cornell University in 1963, Ph.D. University of Colorado, Boulder in 1968) and worked as a fellow of the Mt. Wilson and Palomar Observatories. He then went to the University of California, Berkeley, to study the history of science. From 1974 until his retirement in 2009, he served as director of the Center for History of Physics at the American Institute of Physics; the Center and its affiliated Niels Bohr Library are dedicated to preserving

and making known the history of physics and related disciplines. Among his numerous published works are a history of the rise of nuclear science and technology in France, a collection of essays on the history of solid-state physics, *The Rise of Nuclear Fear*, and *The Discovery of Global Warming*. He is a fellow of the American Association for the Advancement of Science.

## 2015 GEORGE E. PAKE PRIZE

**Thomas N. Theis, IBM T. J. Watson Research Center**

*For his major individual contributions at the forefront of semiconductor science, and his inspiring and insightful leadership in the management of industrial research in nanoscale science and technology.*



THOMAS N. THEIS received his B.S. in physics from Rensselaer Polytechnic Institute in 1972 and his Ph.D. in physics from Brown University in 1978. He joined the IBM T.J. Watson Research Center in December of 1978. As IBM's worldwide director for research in the physical sciences from 1998 to 2010, he championed successful new research initiatives in nanoelectronics, nanophotonics, exploratory memory devices, quantum computing, and special projects addressing energy, the environment, and infrastructure. His current research focuses on new devices for computing and the physical principles by which such devices can evade certain fundamental limits of the field effect transistor. He is now on assignment from the IBM Corporation to serve as the executive director of the Semiconductor Research Corporation's Nanoelectronics Research Initiative (NRI), based at the Watson Research Center. He is an APS and IEEE fellow, and serves on numerous advisory boards and committees. He has authored or co-authored over 70 scientific and technical publications.

and making known the history of physics and related disciplines. Among his numerous published works are a history of the rise of nuclear science and technology in France, a collection of essays on the history of solid-state physics, *The Rise of Nuclear Fear*, and *The Discovery of Global Warming*. He is a fellow of the American Association for the Advancement of Science.

## 2015 W. K. H. PANOFSKY PRIZE IN EXPERIMENTAL PARTICLE PHYSICS

**Stanley G. Wojcicki, Stanford University**

*For his leadership and innovative contributions to experiments probing the flavor structure of quarks and leptons, in particular for his seminal role in the success of the MINOS neutrino oscillation experiment.*



STANLEY G. WOJCICKI received an A.B. in physics from Harvard University in 1957 and a Ph.D. in physics from the University of California, Berkeley in 1962. He has been a member of the physics department faculty at Stanford University since September, 1966. His professional work included the discovery of particle resonances in the 1960s, measurement of CP violation parameters in the K0 system, measurement of g-2 of the muon, and the study of charm production in hadronic interactions. Most

recently he has worked on neutrino oscillations. Wojcicki is a fellow of APS. He was an Alfred P. Sloan Foundation Fellow and a John Simon Guggenheim Fellow. His awards include the Dean's Award for Distinguished Teaching from Stanford, the Alexander von Humboldt Senior American Scientist Award, and the Bruno Pontecorvo Prize from the Joint Institute for Nuclear Research. In 2014, he was elected a foreign member of the Polish Academy of Arts and Sciences.

## 2015 EARLE K. PLYLER PRIZE FOR MOLECULAR SPECTROSCOPY & DYNAMICS

**Majed Chergui, École Polytechnique Federale de Lausanne**

*For developing new methods and redefining the boundaries of molecular spectroscopy through extending the temporal and spectral range, and for his pioneering work in ultrafast X-ray spectroscopy for studies in solution and the solid state.*



MAJED CHERGUI received his B.S. in physics and mathematics from Chelsea College, University of London in 1977 and his Ph.D. in molecular physics from the Université Paris-Sud in 1981. He completed his habilitation in 1986 at the Université Paris-Nord. In 1993 he was appointed full professor of condensed matter physics at the Université de Lausanne, and in 2003 he became professor of chemistry and physics at the EPF Lausanne. He is most noted for his contribution to the development of new

ultrafast spectroscopic techniques, such as X-ray absorption spectroscopy, UV fluorescence up-conversion, and 2-dimensional UV spectroscopy, with which he addressed fundamental questions in the photophysics of transition metal complexes, solvation dynamics, protein dynamics, and the charge carrier dynamics in semiconductors and, more recently, in metal oxides. His group has recently developed a novel experiment for ultrafast XUV photoelectron spectroscopy of liquid solutions and solids. He is editor-in-chief of *Structural Dynamics* (American Institute of Physics Publishing). He has received the Kuwait Prize for Physics and the Humboldt Research Award.

## 2015 POLYMER PHYSICS PRIZE

**Mark D. Ediger, University of Wisconsin, Madison**

*For pioneering fundamental studies of dynamics in polymer glasses.*



MARK D. EDIGER received a B.A. in chemistry and mathematics in 1979 from Bethel College, Kansas, and a Ph.D. in chemistry in 1984 from Stanford University, under the direction of M.D. Fayer. Since 1984, Ediger has been on the faculty of the University of Wisconsin, Madison, where he is currently the Hyuk Yu Professor of Chemistry. He heads a research group studying the properties of glass-forming materials, including polymers and also molecular glasses produced by physical vapor deposition. He received the John H. Dillon Medal of the APS Division of Polymer Physics. He is a fellow of APS and the American Association for the Advancement of Science, and he currently serves on the APS Council of Representatives. In 2013, the American Chemical Society presented him the Joel Henry Hildebrand Award in the Theoretical and Experimental Chemistry of Liquids.

## 2015 I. I. RABI PRIZE IN ATOMIC, MOLECULAR AND OPTICAL PHYSICS

**Ian Spielman, National Institute of Standards and Technology**

*For the development of quantum simulations using ultra-cold atoms, creation of synthetic electromagnetic fields, demonstration of synthetic spin-orbit coupling, and applications to studying new physical systems.*



IAN SPIELMAN received his undergraduate degree in physics and mathematics from the University of Oklahoma in 1998, and proceeded to Caltech for his graduate research studying the Josephson effect in Quantum Hall bilayers. He then was awarded a two-year National Research Council postdoctoral fellowship in the laser cooling and trapping group at the National Institute of Standards and Technology (NIST) Gaithersburg, studying ultracold atoms in optical lattice potentials. Then in 2006 he was hired as a permanent member of the NIST staff and a fellow of the Joint Quantum Institute (JQI). At the JQI, Spielman's research has focused on creating artificial gauge fields for ultracold atomic gases. This research has led to artificial magnetic fields, spin-orbit coupling along with the measurement of associated effects. He is a fellow of APS, and he has received the Junior Bose Einstein Condensation Award, the International Union of Pure and Applied Physics Prize, the Arthur S. Flemming Award, and a Presidential Early Career Award for Scientists and Engineers.

target experiment. Isenhower has worked on experiments at CERN Intersecting Storage Rings and Large Electron Positron Collider, St. Petersburg Nuclear Physics Institute, and the Los Alamos Meson Physics Facility. ACU honored him with the Outstanding Professor Award in 1993 and the Career Achievement Award in 2006. He was the Society of Physics Students Chapter Advisor from 1991 through 2004. He is a member of APS, the American Association of Physics Teachers, and IEEE.

## 2015 ANEESUR RAHMAN PRIZE FOR COMPUTATIONAL PHYSICS

**John D. Joannopoulos, Massachusetts Institute of Technology**

*For spearheading the development of ab-initio nano-photonics.*



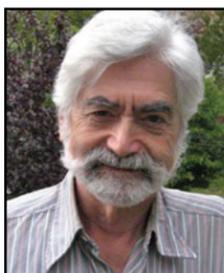
JOHN D. JOANNOPOULOS received his B.A. and Ph.D. in physics from the University of California, Berkeley in 1968 and 1974, respectively. He has been on the physics faculty at Massachusetts Institute of Technology (MIT) since 1974 and was awarded the Francis Wright Davis Professor of Physics Chair in 1996. He was appointed Director of the Institute for Soldier Nanotechnologies in 2006. His research spans two major directions.

The first is devoted to creating a realistic and microscopic theoretical description of the geometric, electronic, and dynamical structure properties of material systems. The second involves development of a new class of materials called photonic crystals, designed to control light with remarkable facility and produce effects that are impossible with conventional optics. Joannopoulos is a member of the National Academy of Sciences, and a fellow of APS and the American Association for the Advancement of Science. He is a recipient of the Student Council Graduate Teaching Award, William Buechner Teaching Prize, School of Science Graduate Teaching Award, all at MIT, and also the APS David Adler Lectureship Award.

## 2015 J. J. SAKURAI PRIZE FOR THEORETICAL PARTICLE PHYSICS

**George Zweig, Massachusetts Institute of Technology**

*For his independent proposal that hadrons are composed of fractionally charged fundamental constituents, called quarks or aces, and for developing its revolutionary implications for hadron masses and properties.*



GEORGE ZWEIG received his B.S. from the University of Michigan in 1959 and was a graduate student in physics under Richard Feynman at Caltech, where he earned his Ph.D. in 1963. He poured over all the experimental data on known particles and proposed the existence of quarks, independently of Gell-Mann and Ne'eman. He continued to work in particle physics, both experimental and theoretical, as a professor at Caltech until the early 1970s. Zweig subsequently took up neurobiology, in particular studying sound. He investigated what happens to sound when it enters the ear, and how the brain maps sound onto the spatial dimensions of the cerebral cortex. This led to the discovery of the continuous wavelet transform in 1975. Also, he developed the device known as the SigniScope, which simulates the response of the inner ear to speech. In 1985, he became a fellow at Los Alamos National Laboratory, and, in 1999, a visiting scientist at MIT. He is a 1981 MacArthur Fellow.

## 2015 ARTHUR L. SCHAWLOW PRIZE IN LASER SCIENCE

**Christopher Monroe, University of Maryland**

*For pioneering research in the use of lasers to realize the elements of quantum information processing with trapped atomic ions, including demonstrations of remote entanglement for quantum communication protocols and use of frequency combs for high-speed qubit manipulation and entanglement.*



CHRISTOPHER MONROE received his undergraduate degree from Massachusetts Institute of Technology, and then studied with Carl Wieman at the University of Colorado, Boulder, earning his Ph.D. in physics in 1992. From 1992 to 2000 he was a postdoc and then staff physicist at the National Institute of Standards and Technology, in the group of David Wineland. With Wineland, he led the research team that demonstrated the first quantum logic gate in 1995. In 2000, Monroe became professor of physics and electrical engineering at the University of Michigan, where he pioneered the use of single photons to couple quantum information between atoms and also demonstrated the first electromagnetic atom trap integrated on a semiconductor chip. In 2007, he became the Bice Zorn Professor of Physics at the University of Maryland and a fellow of the Joint Quantum Institute. In 2008, Monroe's group succeeded in producing quantum entanglement between two widely separated atoms and for the first time teleported quantum information between matter separated by a large distance.

## 2015 PRIZE FOR A FACULTY MEMBER FOR RESEARCH IN AN UNDERGRADUATE INSTITUTION

**L. Donald Isenhower, Abilene Christian University**

*For essential contributions in hardware construction, installation, calibration and operation for experiments at LAMPF, FNAL, RHIC and at CERN, and for enthusiastic mentoring of a large number of undergraduate students while being recognized for outstanding teaching at the undergraduate level.*



L. DONALD ISENHOWER received his B.S. in 1981 from Abilene Christian University (ACU) and his Ph.D. in 1986 from Iowa State University (ISU). He has been a physics professor at ACU since 1999, and was department chair from 1999 to 2005. Since 1988, his research emphasis has been as Co-PI on Department of Energy Medium Energy Nuclear Physics-funded grants to study nucleon structure, and he also has had intensive research involvement with the SeaQuest Fermilab Main Injector fixed

target experiment. Isenhower has worked on experiments at CERN Intersecting Storage Rings and Large Electron Positron Collider, St. Petersburg Nuclear Physics Institute, and the Los Alamos Meson Physics Facility. ACU honored him with the Outstanding Professor Award in 1993 and the Career Achievement Award in 2006. He was the Society of Physics Students Chapter Advisor from 1991 through 2004. He is a member of APS, the American Association of Physics Teachers, and IEEE.

## 2014 GEORGE E. VALLEY, JR. PRIZE

**Leif Ristroph, Courant Institute of Mathematical Sciences**

*For elucidation of the principles of animal flight and the application of these principles to flying robotic devices.*

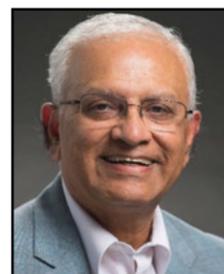


LEIF RISTROPH is an experimental physicist and applied mathematician who specializes in fluid dynamics, with a particular emphasis on fluidstructure interactions as applied to biological and geophysical flows. His biophysical work includes studies of the aerodynamics and stabilization of insect flight as well as the hydrodynamics of schooling and flow-sensing in swimming fish. He is also interested in geophysical flows, including problems ranging from instabilities of interfacial flows to the evolution of shape during fluid mechanical erosion.

## 2015 ROBERT R. WILSON PRIZE FOR ACHIEVEMENT IN THE PHYSICS OF PARTICLE ACCELERATORS

**Hasan Padamsee, Fermilab**

*For his leadership and pioneering world-renowned research in superconducting radiofrequency physics, materials science, and technology, which contributed to remarkable advances in the capability of particle accelerators.*



HASAN PADAMSEE received his B.S. in physics from Brandeis University in 1967 and his Ph.D. in physics from Northeastern University in 1973. Since then he spent most of his career at Cornell University, where he applied superconducting radiofrequency (SRF) science and technology to the design of many particle accelerators. His scientific contributions to SRF include preventing thermal breakdown by using pure, high-resistivity ratio niobium. In 1990, he launched the TeV

Energy Superconducting Linear Accelerator (TESLA) which morphed into the TESLA collaboration headed by DESY, and subsequently into the International Linear Collider. Padamsee taught SRF courses extensively at U.S. and CERN particle accelerator schools, and also authored two widely-used textbooks on SRF. In 2014, Fermilab appointed him as head of the Technical Division to oversee the development of SRF for the Linac Coherent Light Source II at SLAC National Accelerator Laboratory, as well as for the Proton Improvement Plan at Fermilab. He received the IEEE Particle Accelerator and Science Technology Award in 2012. He is an APS Fellow.

# AWARDS

## 2015 DAVID ADLER LECTURESHIP AWARD IN THE FIELD OF MATERIAL PHYSICS

**Jacqueline Krim, North Carolina State University**

*For pioneering work in the physics of tribology, including elucidation of the relative importance of electronic and phononic dissipation mechanisms, and for excellent outreach to scientific and nonscientific audiences.*



JACQUELINE KRIM received a B.A. in physics from the University of Montana in 1978 and a Ph.D. in experimental condensed matter physics from the University of Washington, Seattle in 1984. She joined North Carolina State University in 1998 after thirteen years on the physics department faculty at Northeastern University. Her research interests include nanotribology, solid-film growth processes and topologies at submicron-length scales, and liquid-film wetting

phenomena. She has served on numerous editorial boards and is a fellow of APS and the American Vacuum Society. She is a distinguished university professor of physics and associate dean for research in the College of Sciences at North Carolina State University. She has published and lectured widely on the atomic-scale origins of friction, including feature articles for *Scientific American*, *Physics World*, and *Advances in Physics*. In 2010 she was named as an NSF American Competitiveness and Innovation Fellow.

## 2014 LEROY APKER AWARD (2)

**Kevin Seltzer, Loyola University Maryland**

*Title: Finite Temperature Casimir Effect for Charged Scalars in a Magnetic Field*



KEVIN SELTZER graduated from Loyola University Maryland in with a B.S. in physics and mathematics. During the summers of 2011 and 2012, he worked with Dr. Andrea Erdas studying the Casimir effect for charged massless scalar (spin-zero) particles in a magnetic field. This research ignited Seltzer's interest in quantum field theory and analytic techniques in physics. As a result of this project, he was named a 2013 Barry M. Goldwater Scholar. In the summer of 2013, he worked with Dr. Slava Rotkin at Lehigh University on the quantum electrodynamic of carbon nanotubes. He also worked with Dr. Jiyuan Tao of the Loyola University Maryland mathematics department on finding perturbation bounds for eigenvalues in Euclid-Jordan algebras. Seltzer is a member of Phi Beta Kappa, Sigma Pi Sigma, Pi Mu Epsilon, and Alpha Sigma Nu honor societies. Currently he is a first-year Ph.D. student at Washington University in St. Louis. He anticipates continuing his research career in theoretical physics and ultimately teaching at the university level.

**Michael Veit, University of Minnesota**

*Title: Transport Measurements of the Cuprate Superconductor  $HgBa_2Cu_{4+5}$*



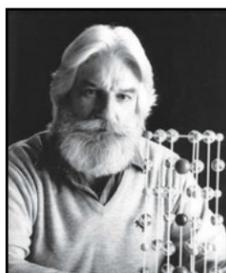
MICHAEL VEIT graduated summa cum laude with a B.S. in physics and mathematics from the University of Minnesota in 2014. He received the Jeffrey Basford Scholarship for Undergraduate Research and the Hagstrom Award from the University of Minnesota. His senior thesis research, which was conducted under Dr. Martin Greven, explored the phase diagram of the cuprate superconductors through transport measurements. He grew high-quality single crystals of the cuprate

superconductor  $HgBa_2Cu_{4+5}$  and measured the resistivity, magnetoresistance, Hall effect, and Seebeck coefficient at various doping levels. Even though the transport properties of the cuprates were previously studied intensively, Veit's work has shown that some aspects of these complex materials are rather conventional. Despite the complexity of the phase diagram, conventional Fermi-liquid metallic behavior is observed over a wide doping range below optimal doping in the so-called pseudogap regime. He is currently pursuing a Ph.D. in applied physics at Stanford University, with the support of the Stanford Graduate Fellowship in Science and Engineering.

## 2014 DISTINGUISHED LECTURESHIP AWARD ON THE APPLICATIONS OF PHYSICS

**Paul M. Grant, W2AGZ Technologies**

*For consistently promoting applications of physics and sound science within the broader public sector – encompassing industrial and governmental, as well as primary, secondary, and higher educational institutions and communities worldwide.*



PAUL M. GRANT entered the employ of IBM during the spring term of his senior year in high school, commencing what was to become a 40-year career with the company. IBM subsequently underwrote his university attendance while he remained an employee, leading to a B.S.E.E. from Clarkson University in 1960. After he obtained his Ph.D. in applied physics from Harvard University in 1965, IBM relocated Grant to its San Jose/Almaden Research Center, where he pursued a variety of fundamental material research studies, which included magnetic semiconductors, organic and polymer metals, and high temperature superconductors. He also initiated IBM's effort on magnetoresistive read head technology. Upon retiring from IBM in 1993, he accepted a position at the Electric Power Research Institute, where he funded power applications of superconductivity and other "green energy" technologies. Grant has published over 120 papers in scientific peer-reviewed journals, as well as numerous articles on science and energy issues in the popular press. He is a fellow of APS and of the Institute of Physics.

## 2015 EDWARD A. BOUCHET AWARD

**Jorge Lopez, University of Texas, El Paso**

*For extensive research accomplishments in theoretical nuclear physics, pioneering work in heavy ion collision dynamics and development of systematic ways to study problems of nuclear fragmentation and his relentless work in building bridges to Latin America and his outreach to the Hispanic community to increase diversity in physics.*



JORGE LOPEZ earned B.S. and M.S. degrees at the University of Texas, El Paso, and a Ph.D. at Texas A&M University in 1986. After postdocs at the Niels Bohr Institute and Lawrence Berkeley National Laboratory, he returned to his alma mater in 1990 where he became professor, associate dean, and department chair. His research has focused on nuclear physics. Lopez is an APS Fellow, chair of the Committee on Minorities, president of the National Society of Hispanic Physicists, and is currently president of the Radiation Physics Division of the Mexican Physics Society. He was admitted to the Mexican Academy of Sciences in 2012, and he received the 2009 Robert S. Hyer Research Award from the APS Texas Section and the APS Division of Nuclear Physics Mentoring Award. His biggest source of pride is the 60 B.S., M.S. and Ph.D. students he has supervised to date.

## 2015 JOSEPH A. BURTON FORUM AWARD

**E. William Colglazier, U.S. Department of State**

*For his contributions to scientific and public understanding of radioactive waste management, and to U.S. policy on science and technology and global scientific engagement for the betterment of society.*



E. WILLIAM COLGLAZIER received his B.S. in physics and his Ph.D. in theoretical physics from the California Institute of Technology. From 1976 to 1977, he was an American Association for the Advancement of Science (AAAS) Congressional Science Fellow. Prior to 1994 he worked at the SLAC National Accelerator Laboratory, the Institute for Advanced Study in Princeton, the Belfer Center for Science and International Affairs at the Harvard Kennedy School of Government, and the University of Tennessee. While at Harvard, he also served as associate director of the Program in Science, Technology, and Humanism of the Aspen Institute. He served as the fourth science and technology adviser to the secretary of state from 2011 to 2014. From 1994 to 2011, he was executive officer of the National Academy of Sciences and the National Research Council. He is past chair of the APS Forum on Physics and Society, and he is a fellow of APS and the AAAS.

## 2014 STANLEY CORRSIN AWARD

**Eberhard Bodenschatz, Max Planck Institute for Dynamics and Self-Organization**

*For seminal contributions to experimental techniques that enabled quantitative Lagrangian measurements which opened a new subfield of turbulence research.*



EBERHARD BODENSCHATZ received his Ph.D. in theoretical physics from the University of Bayreuth in 1989. From 1992 until 2005 he was professor of physics at Cornell University. In 2005 he became Director at the Max Planck Institute for Dynamics and Self-Organization. Since 2005 he has been adjunct professor of physics at the Sibley School of Mechanical and Aerospace Engineering at Cornell University. In 2007 he was appointed to professor at the University of Göttingen.

His scientific work is in the physics of complex systems with emphasis on fluid dynamics and biophysics. He is editor in chief of the *New Journal of Physics*, on the editorial committee of the *Annual Review of Condensed Matter Physics*, and an editorial board member of *European Physical Journal H*. He is an Alfred P. Sloan Research Fellow, a Cottrell Scholar, and a fellow of APS, the Institute of Physics, and the European Mechanics Society.

## 2014 JOHN DAWSON AWARD FOR EXCELLENCE IN PLASMA PHYSICS RESEARCH (5)

**James D. Callen, University of Wisconsin—Madison**

**Chris Hegna, University of Wisconsin—Madison**

**Robert J. La Haye, General Atomics**

**Olivier Sauter, École Polytechnique Fédérale de Lausanne**

**Hartmut Zohm, Max-Planck-Institute für Plasmaphysik**

*For the theoretical prediction and experimental demonstration of neoclassical tearing mode stabilization by localized electron cyclotron current drive.*



JAMES D. CALLEN received his B.S. in 1962 and M.S. in 1964 in nuclear engineering at Kansas State University. He completed his Ph.D. in nuclear engineering at the Massachusetts Institute of Technology in 1968. His research interests have focused primarily on theory, modeling and experimental validation of models of collisional effects in low collisionality magnetic fusion plasmas, such as in neutral beam heating, neoclassical tearing modes, neoclassical toroidal viscosity, magnetic flutter effects on plasma transport and most recently Coulomb collisional effects on linear Landau damping. At the University of Wisconsin—Madison, he has been professor of nuclear engineering and physics, D.W. Kerst Professor of Engineering Physics and Physics, and now professor emeritus. There he established and led the Center for Plasma Theory and Computation from 1988 to 2003. He is a fellow of APS and the American Nuclear Society. His honors include Department of Energy Distinguished Associate Award, Fusion Power Associates Distinguished Career Award, and election to membership in the National Academy of Engineering.



CHRIS HEGNA received his B.S. from the University of Wisconsin—Madison in applied mathematics, engineering and physics in 1986, and his Ph.D. from Columbia University in 1989. In 1991 he returned to UW—Madison, where he is currently a professor in the Department of Engineering Physics and serves as the director of the Center for Plasma Theory and Computation. Hegna's primary field is theoretical plasma physics, with an emphasis on magnetic confinement. Current research interests include the areas of nonideal and nonlinear magnetohydrodynamic instabilities, kinetic theory modifications to fluid-like descriptions of plasmas, plasma dynamics in 3-D magnetic confinement systems, and the role of magnetic geometry, symmetry and topology on plasma instabilities. Hegna is a fellow of APS and has served on the APS Division of Plasma Physics Fellowship Committee, Press Committee, and Program Committee. Additionally, he has served as the Chair of the Sherwood Fusion Theory Executive Committee, and on the Council and several committees of the United States Burning Plasma Organization.

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ROBERT J. LA HAYE received his B.S. and M.S. in physics from Queens College, and his Ph.D. in physics from the City University of New York in 1975. His Ph.D. dissertation topic was nonlinear wave propagation in a magnetic mirror plasma device. He is currently a senior specialist at General Atomics. His interests focus on the experimental behavior of nonlinear resistive magnetohydrodynamic instabilities, particularly neoclassical tearing modes. La Haye has taken many assignments abroad.

For instance, he has taken part in thin-shell reversed field pinch stability experiments on the High Beta Toroidal Experiment IC device at the Culham Center for Fusion Energy, in error-field experiments on both the COMPACT ASSEMBLY and Joint European Torus (JET) tokamaks, and in long-pulse beta limit experiments, dominated by neoclassical tearing modes on JET. He is currently the principal investigator for the General Atomics grant in support of research on the National Spherical Torus Experiment at the Princeton Plasma Physics Laboratory. La Haye is a fellow of APS.



OLIVIER SAUTER obtained the Physics Ing. Diploma at the École Polytechnique Fédérale de Lausanne (EPFL) in 1986 and his Ph.D. at the Center for Plasma Physics Research-EPFL in 1992. There a new method, at the base of the presently most powerful 2D full wave codes used for burning plasmas, was developed. Then in a postdoc at General Atomics, he contributed to the Fokker-Planck CQL3D and CQLP codes, where the Fokker-Planck equation is solved along the magnetic field

line. These codes are in worldwide use to the present day. In 1995 to 1996, he spent 18 months with the ITER Joint central team in San Diego working on magnetohydrodynamics in long pulse discharges, using ITER scenarios, initiating his contributions to neoclassical tearing mode (NTM) physics. He led the experiments demonstrating the direct role of sawteeth on triggering NTMs in low beta long pulse discharges. He is a member of the Swiss Physical Society, a Maître d'Enseignement et de Recherches at EPFL, and has directed several Ph.D. theses.



HARTMUT ZOHRM earned his Ph.D. at the Max-Planck-Institute for Plasma Physics in 1990. His main fields of interest are the magnetohydrodynamic (MHD) stability of fusion plasmas and their heating by electron cyclotron resonance heating (ECRH). By combining these two fields, he pioneered the active stabilization of neoclassical magnetic islands, which set a major performance limit to the tokamak, by ECRH. His present field is the study of tokamak physics on the Axially Symmetric

Divertor Experiment Upgrade tokamak which is operated by his department. Most recently, he became involved in the European studies for a demonstration fusion power plant. Zohm is a member of several committees, including the International Tokamak Physics Activity Coordinating Committee, the International Energy Agency Implementing Agreement on Collaboration of Tokamak Programmes, the programme advisory committees of Korean Superconducting Tokamak Advanced Research, and the EU Fusion Science and Technology Advisory Committee. He is also a member of the board of editors of *Nuclear Fusion* and a member of the advisory board of the *Annalen der Physik*.

## 2015 JOHN H. DILLON MEDAL

*For fundamental insights into block copolymer self-assembly under applied fields.*



CHINEDUM O. OSUJI received his B.S. in materials science and engineering from Cornell University. He received his Ph.D. in materials science and engineering from the Massachusetts Institute of Technology (MIT) in 2003 for studies of structure-property relationships and self-assembly of liquid crystalline block copolymers. After MIT, he spent two and a half years as a senior scientist at Surface Logix Inc., where he conducted research on the use of soft lithography, microfluidics and surface patterning for fabricating cell-based assays, planar waveguides, and other devices. Osuji conducted postdoctoral work on shear-induced structure formation and dynamics of colloidal gels with Professor David A. Weitz in applied physics at Harvard University from 2005 to 2007. In 2007 he joined the faculty at Yale University and is currently an associate professor in the Department of Chemical and Environmental Engineering. There he leads an experimental research group focused on structure and dynamics of soft matter and complex fluids. Topics of interest include structure-property relationships in ordered soft materials and directed self-assembly of block copolymers.

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## 2015 GEORGE E. DUVALL SHOCK COMPRESSION SCIENCE AWARD

**Jerry W. Forbes, Energetics Technology Center**

*For his advances in shock-compression science involving phase transformations, high explosives, and detonation physics; for extensive contributions to the shock physics community through mentorship and teaching; and for service to the Shock Compression Topical Group.*



JERRY W. FORBES received his B.S. from Western Illinois University in 1963, his M.S. in physics from the University of Maryland in 1967, and his Ph.D. in shock-wave physics from Washington State University in 1976. He was a research physicist at the Naval Surface Warfare Center and the Lawrence Livermore National Laboratory. Currently he is Senior Scientist at the Energetics Technology Center, and since 2004 he has taught a graduate course at the University of Maryland in

shock wave physics of condensed matter. His research areas include material response to rapid energy deposition, and in particular shock wave and electron beam loading of inert and energetic materials. His current interest is to measure the hydrodynamic details of detonation waves. Forbes was the secretary/treasurer of the APS Shock Compression Topical Group from 1988 to 1991, and its chairman in 1993. He authored the textbook *Shock Compression of Condensed Matter: A Primer*, which was published in 2012. He is a fellow of APS.

## 2015 EXCELLENCE IN PHYSICS EDUCATION AWARD

**Edward F. (Joe) Redish, University of Maryland**

*For leadership in the use of computers in physics education, applying cognitive research to improve student learning and critical thinking skills, tailoring physics instruction for nonphysicists, and guiding the field of physics education research through a period of significant growth.*



EDWARD F. (JOE) REDISH is a professor of physics at the University of Maryland. He received his undergraduate degree from Princeton University and his Ph.D. in theoretical nuclear physics from Massachusetts Institute of Technology in 1968. He has been at Maryland ever since, and he served as chairman of physics and astronomy from 1982 to 1985. His research in nuclear theory emphasized nuclear reactions and the quantum few-body problem. Since 1985 he has been actively involved in physics education.

He has been a leader in applying computers to education, studying the role of student attitudes and expectations, and applying ideas from the cognitive and social sciences to helping understand student thinking and learning. Redish is a fellow of APS, the American Association for the Advancement of Science, and the American Association of Physics Teachers (AAPT). He has received awards from the Washington Academy of Sciences, Dickinson College, Vanderbilt University, and AAPT (Millikan and Oersted medals). He is a National Science Foundation Director's Distinguished Teaching Scholar and was awarded the medal of the International Commission on Physics Education.

## 2015 JOSEPH F. KEITHLEY AWARD FOR ADVANCES IN MEASUREMENT SCIENCE (3)

**Robert J. Celotta, National Institute of Standards and Technology**

**Daniel T. Pierce, National Institute of Standards and Technology**

**John Unguris, National Institute of Standards and Technology**

*For the invention and development of electron spin sources and detectors, and their application to measurement science.*



ROBERT J. CELOTTA received his B.S. in physics from the City College of New York in 1964 and his Ph.D. in physics from New York University in 1969. He was a postdoctoral fellow at JILA in Boulder, Colorado. He joined the National Institute for Standards and Technology (NIST), became a NIST fellow, led the Electron Physics Group, and now directs the Center for Nanoscale Science and Technology. His most recent research activities included nanomagnetism, magnetic imaging, the use

of scanning tunneling microscopy for nanostructure characterization and assembly, the optical control of free atoms, and the generation, detection, and application of free-electron polarization to measurement. Celotta has received the Gaede-Langmuir Prize of the American Vacuum Society, the William P. Slichter and Edward Uhler Condon awards from NIST, and a Gold Medal and Silver Medal from the U.S. Department of Commerce. He twice received the Presidential Distinguished Rank Award. He is a fellow of APS, the American Association for the Advancement of Science, and the AVS.



DANIEL T. PIERCE received a B.S. in physics from Stanford University in 1962 and a Ph.D. from Stanford in 1970. After college, he taught physics with the Peace Corps in Nepal. He worked with H.C. Siegmann on early spin-polarized photoemission studies at the ETH-Zurich, where, together with F. Meier, they discovered spin-polarized photoemission from GaAs. This formed the basis for the spin-polarized electron gun developed by Pierce and coworkers when he joined the National

Institute of Standards and Technology (NIST) in 1975. The polarized electron gun was applied to studies of surface magnetism and aided the invention (with Robert J. Celotta and John Unguris) of a low-energy, fist-sized spin-polarization analyzer ideal for scanning electron microscopy with polarization analysis, a high-resolution magnetic imaging technique. He has received the NIST Edward Uhler Condon and William P. Slichter awards, Silver and Gold Medals from the Department of Commerce, and the American Vacuum Society Gaede-Langmuir Prize. He is a NIST Fellow, Emeritus and a fellow of APS and AVS.



JOHN UNGURIS received a B.S. in physics from Carnegie Mellon University in 1973, and a Ph.D. in physics from the University of Wisconsin in 1980. He initially joined the National Institute of Standards and Technology (NIST) as a National Research Council postdoctoral research associate investigating the application of electron spin measurements to various surface-sensitive spectroscopies. This work led to the development of an electron microscopy technique for directly imaging

magnetic nanostructures, scanning electron microscopy with polarization analysis (SEMPA). He has since used SEMPA to measure the magnetic properties of a wide variety of structures, including ultrathin patterned magnetic films, oscillatory exchange-coupled magnetic multilayers, and multiferroic heterostructures. He is currently a project leader at NIST in the Electron Physics Group, Center for Nanoscale Science and Technology, where he is leading multiple projects investigating the fundamental physics of magnetic nanostructures. He is a fellow of APS, and has been awarded a Bronze Medal from the Department of Commerce.

## 2014 LANDAU-SPITZER AWARD (4)

**Manuel Garcia-Munoz, University of Seville**  
**Benedikt Geiger, Max Planck Institute for Plasma Physics**  
**David Pace, General Atomics**  
**Michael Van Zeeland, General Atomics**

*For greater understanding of energetic particle transport in tokamaks through collaborative research.*



MANUEL GARCIA-MUNOZ obtained his Ph.D. in physics at the Ludwig Maximilians University in Munich in 2006. Following his thesis work, he was a postdoctoral researcher at the Institute of Plasma Physics, and after two years he became a research scientist in a permanent position. In 2012 he began teaching at the University of Seville. He is involved in numerous collaborations on fast-ion physics in the field, which comprises, besides the DIII-D collaboration, work on fast-ion detectors in the Joint European Torus, Korean Superconducting Tokamak Advanced Research, Mega Ampere Spherical Tokamak Upgrade, and TJ-II, as well as modeling of fast-ion behavior with several plasma physics theory groups.



BENEDIKT GEIGER studied physics at the Ludwig Maximilians University in Munich and graduated in 2009. His studies included two semesters abroad at the Joseph Fourier University in Grenoble, with an internship at the European Synchrotron Radiation Facility in Grenoble. He wrote his diploma thesis at the Max Planck Institute for Plasma Physics (IPP) in Garching/Munich on the subject "Optimization of ion temperature and rotation measurements by [Charge Exchange Recombination Spectroscopy] CXRS." From 2009 to 2012 Geiger worked on his Ph.D. thesis, "Fast-ion transport studies using FIDA spectroscopy at the [Axially Symmetric Divertor Experiment] ASDEX Upgrade tokamak" at IPP Garching. For his Ph.D. thesis he was awarded the Otto Hahn Medal of the Max Planck Society. In 2012 Dr. Geiger was the winner of the European Physical Society Poster Prize. Since 2013 he has been a postdoc at IPP in Garching and is working on the further extension of the fast-ion diagnostic capabilities at the ASDEX Upgrade tokamak.



DAVID PACE completed his B.Sc. in physics at University of the Pacific in 2002. His desire to work in fusion was set following participation in the National Spherical Torus Experiment program at the Princeton Plasma Physics Laboratory in 2001, where a mega-Ampere shot inspired excitement for tokamak research. He went on to earn a Ph.D. in experimental plasma physics, through work at the Large Plasma Device Laboratory at UCLA. Working with teams at the DIII-D National Fusion

Facility through the University of California, Irvine, and at the Alcator C-Mod National Tokamak Facility, Pace helped to commission fast ion loss detector diagnostic systems, leading to new studies of loss mechanisms through wave-particle interactions. He is a U.S. member of the International Tokamak Physics Activity Energetic Particles Topical Group, and leader of the United States Burning Plasma Organization Energetic Particles Topical Group. He is presently a staff scientist with General Atomics and continues to engage in energetic ion research topics anticipated to influence the operation of ITER and later devices.



MICHAEL VAN ZEELAND received his B.S. in engineering physics from the University of Arizona in 1997. He earned his Ph.D. at the University of California, Los Angeles (UCLA), working with Professor Walter Kegelmann on the Large Plasma Device (LAPD). His thesis focused on the radiation of Alfvén waves from a dense, rapidly expanding, laser-produced plasma embedded in an ambient background plasma. In 2003 he joined the DIII-D tokamak group at General Atomics, first as a postdoctoral researcher, then as a staff scientist in 2006. At DIII-D, Van Zeeland's work focuses on fast ion physics, Alfvén eigenmodes, and fusion plasma diagnostic development. He received the 2008 International Union of Pure and Applied Physics Young Scientist Prize in Plasma Physics, UCLA Chancellor's Postdoctoral Fellowship, and he has been the recipient of both the graduate and postdoctoral Department of Energy Fusion Science Fellowship.

## 2015 MARIA GOEPPERT MAYER AWARD

**Gretchen Campbell, National Institute of Standards and Technology**

*For her pioneering contributions to the study of superfluidity in atomic gas Bose-Einstein condensates using ring-shaped condensates, realizing atomic analogs to superconducting and superfluid liquid circuitry, including the use of weak links to create the first closed circuit atomtronic devices.*



GRETCHEN CAMPBELL received a B.A. in physics from Wellesley College in 2001. In 2007 she received a Ph.D. from the Massachusetts Institute of Technology, where she worked on experiments with Bose-Einstein condensates in optical lattices. She is a fellow of the Joint Quantum Institute (JQI), a joint institute between the National Institute of Standards and Technology (NIST) and the University of Maryland. From 2006 to 2009 she was a National Research Council postdoctoral

fellow at JILA in Boulder, Colorado. Campbell joined NIST and the JQI in 2009. Her current research focuses on studying superfluid "atom circuits": Bose-Einstein condensates in ring geometries intersected by a rotating barrier. She was awarded The Optical Society New Focus/Bookham Student Award in 2005, a Department of Commerce Bronze medal in 2011, the 2012 Arthur S. Flemming award, and a 2012 Presidential Early Career Award for Scientists and Engineers.

## 2015 FRANCIS M. PIPKIN AWARD

**Holger Müller, University of California, Berkeley**

*For his contributions to precision metrology and tests of fundamental laws of physics through the development and application of atom interferometry.*



HOLGER MÜLLER successfully applied for his first patent when he was 14. Later, he did his undergraduate thesis with Jürgen Mlynek at the University of Konstanz. He graduated from Humboldt University, Berlin, with Achim Peters as advisor. Müller received a fellowship of the Alexander von Humboldt Foundation and joined the group of Steven Chu in Stanford as a postdoc. In 2008 he joined the physics faculty at the University of California, Berkeley.

The basic premise of his work is that precision measurements of fundamental quantities can help to address the great challenges faced by physicists now. The focus of his work uses methods from atomic, molecular, and optical physics. It is centered on advancing the experimental technology to push the sensitivity of experiments to new levels, and to perform precision measurements of fundamental quantities.

## 2015 HENRY PRIMAKOFF AWARD FOR EARLY-CAREER PARTICLE PHYSICS

**Rouven Essig, State University of New York, Stony Brook**

*For seminal contributions to theoretical models of dark matter with new gauge interactions, and for leadership of the APEX experiment at the Jefferson Laboratory.*



ROUVEN ESSIG earned his B.Sc. in physics and mathematics from the University of the Witwatersrand, and his Ph.D. from Rutgers University in 2008. He was a postdoctoral research associate at the SLAC National Accelerator Laboratory from 2008 to 2011. He is an assistant professor at the C.N. Yang Institute for Theoretical Physics at Stony Brook University. His research focuses on developing the theoretical implications of particle physics data and on generating

ideas for experiments to search for new physics. He helped develop the theoretical foundation for a new generation of fixed-target experiments that search for MeV-to-GeV mass "dark photons." He is the co-spokesperson for one such experiment, the A' Experiment, and a member of another, the Heavy Photon Search, both at Jefferson Lab. His recent research interests include the search for sub-GeV dark matter and the search for nonstandard decays of the 125 GeV Higgs boson. He is an Alfred P. Sloan Research Fellow. He received the Department of Energy's Early Career Research Program award.

## 2015 JONATHAN F. REICHERT & BARBARA WOLFF-REICHERT AWARD FOR EXCELLENCE IN ADVANCED LABORATORY INSTRUCTION (2)

**Carl Akerlof, University of Michigan**  
**Ramón Torres-Isea, University of Michigan**

*For dedication to the spirit of hands-on experimental instruction in physics, inspirational teaching in the Advanced Undergraduate Laboratory of the University of Michigan, and continued contributions to physics laboratory instruction in the United States.*



CARL AKERLOF is a professor of physics at the University of Michigan, Ann Arbor. He obtained a B.S. degree in physics at Yale University in 1960, followed by work in experimental elementary particle physics leading to a Ph.D. at Cornell University in 1967. He moved to Michigan and worked in particle physics until 1986, when his interests shifted to astrophysics and the detection of cosmic sources of energetic gamma rays. He joined the Whipple Collaboration and participated in the discovery

of TeV photons from active galactic nuclei. In 1993, he began searching for prompt optical radiation from gamma-ray bursts (GRBs) and was rewarded by a brilliant display from GRB990123. With this breakthrough, he constructed ROTSE-III, an array of four robotic telescopes located in Australia, Texas, Namibia, and Turkey that operated for more than a decade, observing optical emission from GRBs while discovering a number of supernovae. Akerlof has taught the advanced undergraduate lab class at Michigan since 2008. He is a fellow of APS.



RAMÓN TORRES-ISEA received his B.S. and M.S. in physics from Eastern Michigan University in 1980 and 1983, and then quickly developed a career as an industrial physicist. He is an adjunct lecturer and senior research laboratory specialist at the Department of Physics at the University of Michigan, Ann Arbor. He has taught undergraduate physics for twenty years, and a graduate course in computer control of research instrumentation for ten years. He is director of the intermediate and advanced physics laboratories; he teaches intermediate laboratories, and co-teaches the senior laboratories. Torres-Isea has performed research in optical depolarization in birefringent crystals, electrical arc physics, shapememory alloys, and for the past ten years in nuclear physics, as part of a team at the University of Michigan–University of Notre Dame TwinSol facilities. He is also co-inventor of three U.S.-patented technologies: actuators which couple shape-memory alloy thermal elements with magnetic elements; arc-suppressing current interrupters; and asynchronous magnetic-bead rotation technology for use in identifying and treating bacterial infections.

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## 2014 THOMAS H. STIX AWARD FOR OUTSTANDING EARLY CAREER CONTRIBUTIONS TO PLASMA PHYSICS RESEARCH

**Ilya Dodin, Princeton University**

*For the prediction of interesting new wave effects in non-stationary plasmas and for the elegant variational formulation of wave-particle and wave-wave interactions that generalizes the ponderomotive force theory.*



ILYA DODIN graduated from Nizhny Novgorod State University with a B.A. in physics in 1998 and a M.A. in physics in 2000. In 2005, he obtained a Ph.D. in plasma physics from Princeton University. He then continued at Princeton as a postdoctoral research associate and associate research scholar in the Department of Astrophysical Sciences. Since 2009, he has taught at Princeton, as a lecturer, a course on plasma waves and instabilities within the graduate Program in Plasma Physics. Since 2011,

Dodin has been a staff research physicist at the Princeton Plasma Physics Laboratory. His research is mainly analytical and is focused on the fundamental Lagrangian physics of waves and wave-particle interactions, particularly including various manifestations of the ponderomotive effect and its relation to properties of linear and nonlinear waves in plasmas. In 2011 he received the Young Scientist Prize from the International Union of Pure and Applied Physics, Commission on Plasma Physics.

## 2015 LEO SZILARD LECTURESHIP AWARD

**Ashok Gadgil, Lawrence Berkeley National Laboratory**

*For applying physics to a variety of social problems and developing sustainable energy, environmental and public health technologies, as well as demonstrating how these could be scaled up, thus contributing to improved life for millions.*



ASHOK GADGIL earned his B.S. in physics from the University of Bombay in 1971, his M.S. from the Indian Institute of Technology in 1973, and his Ph.D. from the University of California, Berkeley, in 1979. He holds concurrent appointments at the University of California, Berkeley, as professor of civil and environmental engineering, and senior scientist and director of the Division of Environmental Energy Technology at the Lawrence Berkeley National Laboratory. His expertise includes

computational fluid dynamics of indoor air and pollutant flows, simulation of entry and transport of indoor radon, building energy efficiency, and methods to treat drinking water to make it potable. He has more than 80 refereed archival journal papers, 120 conference papers, and several patents. In 2012 he won the Lemelson-MIT Award for Global Innovation, and in he was inducted into the National Inventors Hall of Fame. He is an APS Fellow and a member of the National Academy of Engineering.

## 2015 JOHN WHEATLEY AWARD

**Per Nordblad, Uppsala University**

*For his enormous and sustained efforts of nearly three decades in nurturing physics research and education in several Third World countries, including Bangladesh, Vietnam, Thailand and Eritrea, leading to the establishment of several prominent groups pursuing internationally competitive physics today.*



PER NORDBLAD received his Ph.D. in 1980 from the Department of Technology, Uppsala University, and was postdoctoral fellow at the Department of Physics, University of California, Santa Barbara. He served during fall 1999 as professor in physics at Asmara University. He is professor in solid state physics at the Department of Engineering Sciences, Uppsala University. He has authored and co-authored more than 300 articles in international physics journals in the fields of magnetism and

superconductivity. He has throughout the years collaborated extensively with research groups in Vietnam, Bangladesh, and Thailand and co-authored some 70 papers with these. Nordblad has been acting as divisional associate editor for *Physical Review Letters* and was selected outstanding referee by APS in 2013. He is a member of APS and the Swedish Physical Society. He has been organizer, committee member, and participant or invited speaker at numerous international conferences, workshops and schools, and served as evaluator and member of evaluation committees for many different research councils and agencies.

# FELLOWSHIPS

## 2014 M. HILDRED BLEWETT FELLOWSHIP (5)

**Lusaka Bhattacharya, Kent State University**



LUSAKA BHATTACHARYA is originally from India, and in 2011, she was selected to participate in the India-U.S. Travel program that is administrated by the APS and funded by the Indo-U.S. Science and Technology Forum. She participated with Michael Strickland at Kent State University.

**Amy Daradich, University of Ottawa**



AMY DARADICH is a returning Blewett Fellow. She will continue her work on the rotational stability of terrestrial planets but will also expand her research to examine the role that long-term polar wander has played in driving changes in Earth's climate. Daradich is based at the University of Ottawa and collaborates with faculty at Harvard University. During her first year as a Blewett Fellow, she published three papers and has gained much momentum in restarting her career.

**Leslie Kerby, Los Alamos National Laboratory**



LESLIE KERBY is a returning Blewett Fellow. She returned to academia four years ago after nearly fifteen years away from research. While in graduate school, she received an offer to work on nuclear physics at Los Alamos National Laboratory. This past year Kerby and her mentor completed their analysis of Fermi breakup and are currently preparing publications on the results.

**Monique Tirion, Clarkson University**



MONIQUE TIRION is an Adjunct Research Associate Professor with Clarkson University's physics department. After a successful postdoc, she had to take time away from research to care for family. Tirion is ready to return to the work she loves, generating and inspecting motility spectra of globular proteins. The Blewett Fellowship will help her restart her research and obtain further funding.

**Ani Tshantshapanyan, North Carolina Central University**



ANI TSHANTSHAPANYAN earned her Ph.D. in semiconductor physics in 2009 from Yerevan State University in Armenia. In 2012, she followed her spouse to the U.S., where he had received a position at North Carolina Central University. The Blewett Fellowship will enable Tshantshapanyan to conduct research at North Carolina Central University and investigate electronic and optical properties of semiconductor-coated quantum dots.

## 2015 STANFORD R. OVSHINSKY SUSTAINABLE ENERGY FELLOWSHIP

**Darin Bellisario, Massachusetts Institute of Technology**



DARIN BELLISARIO received his B.S. in chemical engineering in 2009 from Tufts University, where he worked with Charles Sykes on the self-assembly of molecules on metal surfaces. He is now a Ph.D. student in physical chemistry at the Massachusetts Institute of Technology (MIT), where he is working with Michael S. Strano on the theory and optimization of carbon nanotube photovoltaics. In addition, he is conducting an experimental investigation of single-molecule tunneling junctions, formed using electromigration failure of metal wires. He is a Department of Defense National Defense Science and Engineering Graduate Fellow and an MIT Presidential Fellow.

# DISSERTATION AWARDS

## 2014 ANDREAS ACRIVOS DISSERTATION AWARD IN FLUID DYNAMICS

**Eric Vandre, University of Minnesota**

*Title: Onset of Dynamics Wetting Failure: The Mechanics of Highspeed Fluid Displacement*



ERIC VANDRE received a B.S. in chemical engineering from the University of Minnesota in 2008. As an undergraduate, he researched hydrodynamic dispersion with his undergraduate adviser, Professor H. Ted Davis. Continuing at Minnesota, he received a Ph.D. in chemical engineering in 2013. Under the guidance of professors Satish Kumar and Marcio Carvalho, Vandre conducted experimental, theoretical, and numerical research for his thesis,

“Onset of Dynamic Wetting Failure: The Mechanics of High-speed Fluid Displacement.” He currently works on coating technology as a senior research engineer at 3M Company in St. Paul, Minnesota. In this role, he investigates a variety of multi-phase phenomena (including contact line behavior, multilayer flow instabilities, and particulate-laden flows) in order to improve process understanding for precision coating techniques and enable technology scale-up from pilot to manufacturing settings.

## 2014 OUTSTANDING DOCTORAL THESIS RESEARCH IN ATOMIC, MOLECULAR, OR OPTICAL PHYSICS AWARD

**Thibault Peyronel, Harvard University**

*Title: Quantum Nonlinear Optics Using Cold Atomic Ensembles*



THIBAUT PEYRONEL grew up in Paris, France where he pursued his undergraduate studies and master's degree at Louis-Le-Grand preparatory classes and École Polytechnique. He joined Vladan Vuletic's group at the Massachusetts Institute of Technology for his Ph.D. There he focused on creating media in which photons interact strongly with one another. He then built an experiment harnessing the long-range interactions between Rydberg states to generate large nonlinearities at the

single photon level. Thibault showed that photons can become massive particles with attractive forces which bind into molecules of light. One result was the conversion of coherent light into a stream of single photons at the output of a laser-cooled atomic vapor, done in collaboration with Misha Lukin's group at Harvard, which paved the way for all-optical quantum information science and the production of new exotic states of light. He is currently a postdoctoral fellow at the Harvard Quantum Optics Center, where he works on interfacing individual photons and atoms using nano-fabricated photonic structures, under the supervision of Lukin and Marko Loncar.

## 2014 OUTSTANDING DOCTORAL THESIS RESEARCH IN BEAM PHYSICS AWARD

**Ariel Nause, UCLA**

*For outstanding theoretical contributions describing the role of longitudinal space charge in the suppression of shot-noise in the optical frequency regime, and for experimental demonstration of the suppressive effect.*



ARIEL NAUSE received his Ph.D. in physics from the University of Tel Aviv in 2014. As a Ph.D. student, he researched relativistic electronbeamnoise dynamics under the guidance of Avraham Gover. Nause conducted theoretical and numerical studies to simulate an effect of noise suppression below the shot-noise limit in relativistic electronic beams, which was considered impossible, and was able to demonstrate it experimentally for the first time ever. In his thesis “Beating the

Shot- Noise Limit: Collective Interaction Optical Noise Suppression in Charged Particle Beam,” he also developed an exact theoretical model for emission of transition radiation in the far and near zones. He is currently a postdoc at UCLA under James Rosenzweig. In this role, he helps developing novel types of electron guns and free-electron laser schemes.

## 2014 AWARD FOR OUTSTANDING DOCTORAL THESIS RESEARCH IN BIOLOGICAL PHYSICS

**Lei Dai, UCLA**

*Title: Spatio-Temporal Dynamics before Population Collapse*



LEI DAI studied theoretical physics at the University of Science and Technology of China from 2005 to 2009. As an undergraduate, he worked on phenomenological high energy physics at an electron-positron linear collider. He was amazed to recognize the close relation between high energy physics and astrophysics, which investigate objects differing by forty orders of magnitudes in size (from quarks to quasars). When he moved on to explore the world of living systems, he was thrilled to find many

links between physics and biology. Dai received his Ph.D. in physics at the Massachusetts Institute of Technology in 2014. His thesis research was supervised by Jeff Gore. In the Gore Lab for Ecological Systems Biology, he used yeast populations as a model system to investigate the spatiotemporal dynamics before population collapse. In particular, he demonstrated that a set of “critical slowing down” indicators can be used to assess the fragility of populations. He is currently pursuing his interests in evolutionary dynamics of RNA viruses as a postdoc at UCLA, where he is co-supervised by Ren Sun and James Lloyd-Smith.

## 2015 NICHOLAS METROPOLIS AWARD FOR OUTSTANDING DOCTORAL THESIS WORK IN COMPUTATIONAL PHYSICS

**William East, Princeton University**

*For masterful explorations in numerical gravity, including the first study of dynamical capture black hole/neutron star mergers, the ultrarelativistic collision problem, and development of a new algorithm to explore tidal disruption of stars by super massive black holes.*

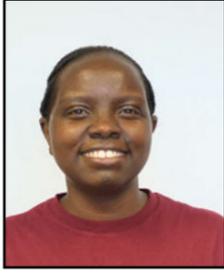


WILLIAM EAST graduated from Stanford University in 2008 with a bachelor's degree in mathematics and physics and he enrolled in the physics Ph.D. program at Princeton University. Under the supervision of Professor Frans Pretorius, he researched numerical methods for simulating hydrodynamics coupled to Einstein gravity and applied them to a range of topics including eccentric black hole/neutron star mergers, tidal disruption events, and black hole formation in ultrarelativistic collisions. While at Princeton, East was awarded the Ray Grimm Memorial Prize in Computational Physics. After earning his Ph.D. in 2013, he joined Stanford's Kavli Institute for Particle Astrophysics and Cosmology where he is currently a postdoctoral fellow. He continues to research black hole dynamics, compact object mergers, and other areas at the intersection of astrophysics and strong-field gravity.

## 2015 RICHARD L. GREENE DISSERTATION AWARD IN EXPERIMENTAL CONDENSED MATTER OR MATERIALS PHYSICS (2)

**Moureen C. Kemei, California Institute of Technology**

*For employing advanced characterization tools to gain new insights into the structure and electronic properties of magnetic materials.*



MOUREEN C. KEMEI received an A.B. degree in physics from Mount Holyoke College in 2010. She then joined the materials department at the University of California, Santa Barbara (UCSB) where she studied the coupling of spin interactions to the structure of oxides of the spinel family under the guidance of Professor Ram Seshadri. While at UCSB, she was supported by a Schlumberger Faculty for the Future Fellowship. She extensively applied

variable-temperature high-resolution synchrotron X-ray diffraction techniques developed at Argonne National Laboratory to understand spin-driven structural phase transitions in spinels, and she received her Ph.D. for this work in 2014. Kemei is currently a Resnick Institute post-doctoral scholar at the California Institute of Technology, where she is studying oxides for thermochemical cycling and examining the local structure of solid oxide fuel cell materials in Professor Sossina Haile's group.

**Matthew D. Reed, HRL Laboratories**

*For original contributions to research on superconducting qubits and for a remarkably detailed and complete description of the state-of-the-art in solid state quantum computing.*



MATTHEW D. REED received a B.S. with high honors from Harvey Mudd College in 2007 before pursuing his Ph.D. at Yale University. In the lab of Professor Robert Schoelkopf, he made substantial contributions to the emerging field of superconducting quantum computing using the cavity quantum electrodynamics (cQED) architecture. His dissertation reports the first demonstration of tripartite entanglement and quantum error correction

in a solid state device. It also details his discovery of a robust and high-fidelity qubit readout technique which exploits the diminishing nonlinearity of the cQED hamiltonian with increasing drive power as well as his development of a new design element used to inhibit qubit spontaneous emission known as a "Purcell filter." Reed's thesis was awarded the CGS/ProQuest Distinguished Dissertation Award in the field of mathematics, physical sciences, and engineering. After graduating, he joined HRL Laboratories as a research scientist, conducting fundamental research on quantum information processing with silicon quantum dots.

## 2015 DISSERTATION AWARD IN HADRONIC PHYSICS

**Daniel Pitonyak, Brookhaven National Laboratory**

*Title: Exploring the Structure of Hadrons Through Spin Asymmetries in Hard Scattering Processes*



DANIEL PITONYAK attended Lebanon Valley College on a Vickroy Scholarship and received his B.S. in May 2008 with a double major in physics and mathematics. He received his Ph.D. in theoretical physics from Temple University in 2013. During that time, he was awarded the University's Peter Havas Humanitarian Scholarship for Outstanding Physics Graduate Students, and he was also selected to attend the Lindau Nobel Laureate Meeting in Germany. He is currently a postdoc

at the RIKEN Brookhaven National Laboratory Research Center. Pitonyak's work focuses on understanding the spin structure of hadrons, with his main research centering on spin asymmetries in hard scattering processes. He recently coauthored several papers that have made significant progress towards explaining the phenomenon of transverse single-spin asymmetries in proton-proton collisions, which has been an unresolved issue for close to 40 years. This research has also led to the first ever phenomenological indication on the process dependence of the so-called Sivers function, a characteristic that was predicted over a decade ago but lacks experimental proof.

## 2015 DISSERTATION AWARD IN NUCLEAR PHYSICS

**Michael P. Mendenhall,**

**National Institute of Standards and Technology**

*Title: Measurement of the Neutron Decay Asymmetry Using Ultracold Neutrons*



MICHAEL P. MENDENHALL received an A.B. in physics and mathematics from Washington University in St. Louis in 2006, and a Ph.D. in physics from the California Institute of Technology in 2014. For his thesis research, he worked with the aCORrelation in Neutron decay (aCORN) Collaboration, using bottled ultracold neutrons to measure the angular correlation between neutron polarization and electron momentum. Such precision decay measurements determine Standard Model (and

constrain beyond-Standard-Model) parameters for the weak interaction. He is currently a National Research Council Postdoctoral Research Associate at the National Institute of Standards and Technology in Gaithersburg, Maryland, working on the aCORN electron/neutrino angular correlation experiment, along with prototype fast neutron and reactor antineutrino detectors.

## 2014 MARSHALL N. ROSENBLUTH OUTSTANDING DOCTORAL THESIS AWARD

**Mario Manuel, University of Michigan**

*For first observations of Rayleigh-Taylor-induced magnetic fields in laser-produced plasmas using both X-rays and monoenergetic 14.7 MeV protons to accurately measure the amplitude and evolution of the induced fields.*



MARIO MANUEL graduated from the University of Washington, Seattle with a B.S. in aerospace engineering, physics and astronomy in 2006. Exposure to scientific research in Giessen, Germany during an exchange program led him to seek a graduate education in experimental research. At the Massachusetts Institute of Technology, he earned an S.M. in aerospace engineering in 2008 and his Ph.D. in applied plasma physics in 2013 through the High-Energy-Density Physics Division,

led by R.D. Petrasso of the Plasma Science and Fusion Center. His dissertation research focused on the development of a monoenergetic proton radiography system to make the first experimental measurements of magnetic fields induced by Rayleigh-Taylor growth in laser-produced plasmas. In 2013, Manuel was awarded an Einstein Fellowship, through the Harvard-Smithsonian Center for Astrophysics, to explore astrophysical hydrodynamics in the laboratory. Currently a member of R.P. Drake's group at the University of Michigan, his research focuses on the dynamics of magnetized outflows in accretion systems and radiation-hydrodynamic interactions of stellar winds in supernova progenitors.

## 2014 AWARD FOR OUTSTANDING DOCTORAL DISSERTATION IN LASER SCIENCE

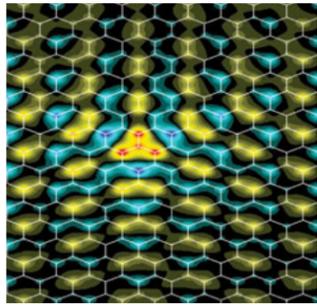
**Ido Kaminer, Technion, Israel Institute of Technology**

*Title: Shaping Light in Complex Settings*



IDO KAMINER is a graduate of the Technion Excellence Program, and received his B.S. in both electrical engineering and physics. He was granted the Knesset Award for outstanding undergraduate student achievements in 2007. He completed his Ph.D. degree in the physics department under the supervision of Distinguished University Professor Mordechai Segev. In his dissertation he discovered new classes of accelerating beams in non-linear optics and electromagnetism, for

which he received the 2012 Israel Physical Society Prize. In the end of 2011, he found the full vector solutions of Maxwell's equations for shape-preserving beams that can bend by themselves to almost 180°. He predicted that this novel dynamics of accelerating waves will exist in virtually any linear and nonlinear wave system in nature, including many classical waves, such as sound waves, surface waves, and waves on membranes. Kaminer received a Marie Curie Fellowship to work at the Massachusetts Institute of Technology (MIT) in the group of Professor Marin Soljačić. His research at MIT includes several projects at the intersection of optics, electromagnetism, and quantum mechanics.



# APS 2014 APS Fellows

The APS Council elected the Fellows of the Society at its November 2014 meeting. A list may be found at <http://www.aps.org/programs/honors/fellowships/archive-all.cfm>. Nominations for fellowship are received at APS Headquarters throughout the year, and are forwarded for review to the appropriate division, topical group or forum fellowship committees.

- The deadlines are listed on page 8 and are posted on the web.
- Fellowship nomination forms may be completed on the web at <http://fellowship.aps.org/>.
- Information for completing the form is available at <http://www.aps.org/programs/honors/fellowships/nomination-requirements.cfm>.

Abbamonte, Peter M., University of Illinois, Urbana-Champaign  
 Abraham, David W., IBM T.J. Watson Research Center  
 Aksyuk, Vladimir, National Institute of Standards and Technology  
 Alberg, Mary, Seattle University  
 Alda, Alan, State University of New York, Stony Brook  
 Altman, Michael, Hong Kong University of Science & Technology  
 Amar, Jacques, University of Toledo  
 Anna, Shelley L., Carnegie Mellon University  
 Arenholz, Elke, Lawrence Berkeley National Laboratory  
 Armstrong, Michael R., Lawrence Livermore National Laboratory  
 Arnold, Peter B., University of Virginia  
 Asner, David M., Pacific Northwest National Laboratory  
 Baer, Donald R., Pacific Northwest National Laboratory  
 Bai, Mei, Brookhaven National Laboratory  
 Bale, Stuart D., University of California, Berkeley  
 Banerjee, Kaustav, University of California, Santa Barbara  
 Barrat, Jean-Louis, Universite Joseph Fourier  
 Barty, Christopher P.J.  
 Bass, Steffen A., Duke University  
 Bassler, Kevin E., University of Houston  
 Batista, Cristian D., Los Alamos National Laboratory  
 Beach, Raymond J., Lawrence Livermore National Laboratory  
 Bernius, Mark T., The Dow Chemical Company  
 Bezryadin, Alexey, University of Illinois, Urbana-Champaign  
 Bildsten, Lars., University of California, Santa Barbara  
 Bishai, Mary R., Brookhaven National Laboratory  
 Bockstaller, Michael R., Carnegie Mellon University  
 Boggs, Steven E., University of California, Berkeley  
 Boldyrev, Stanislav A., University of Wisconsin  
 Booth, Corwin H., Lawrence Berkeley National Laboratory  
 Boronat, Jordi, Universitat Politècnica de Catalunya  
 Boshier, Malcolm G., Los Alamos National Laboratory  
 Bouyer, Philippe, CNRS Paris

Boyd, Iain D., University of Michigan, Ann Arbor  
 Briere, Roy, Carnegie Mellon University  
 Broido, David A., Boston College  
 Brown, Duncan A., Syracuse University  
 Byrum, Karen L., Argonne National Laboratory  
 Callahan, Debra A., Lawrence Livermore National Laboratory  
 Campbell, John M., Fermilab  
 Canning, Andrew M., Lawrence Berkeley National Laboratory  
 Carr, Lincoln D., Colorado School of Mines  
 Carter, Troy, University of California, Los Angeles  
 Caulfield, Colm-cille P., University of Cambridge  
 Chate, Hugues, CEA - Saclay  
 Chen, Guanhua, University of Hong Kong  
 Chin, Cheng, The University of Chicago  
 Clercx, Herman, Eindhoven University of Technology  
 Colombo, Luigi, Texas Instruments  
 Dabiri, John O., California Institute of Technology  
 Damascelli, Andrea, University of British Columbia  
 Dantus, Marcos, Michigan State University  
 Dattelbaum, Dana, Los Alamos National Laboratory  
 Davidovich, Luiz, Universidade Federal do Rio de Janeiro  
 del Alamo, Jesús A., Massachusetts Institute of Technology  
 Deshpande, Abhay L., State University of New York, Stony Brook  
 Di Matteo, Tiziana, Carnegie Mellon University  
 Ding, Yujie, Lehigh University  
 Doorn, Stephen K., Los Alamos National Laboratory  
 Ertmer, Wolfgang, University of Hannover  
 Escobedo, Fernando A., Cornell University  
 Eskildsen, Morten R., University of Notre Dame  
 Espy, Michelle A., Los Alamos National Laboratory  
 Esslinger, Tilman, ETH Zurich  
 Fawley, William M., Lawrence Berkeley National Laboratory  
 Fischer, Peter, Lawrence Berkeley National Laboratory

Fishman, Randy, Oak Ridge National Laboratory  
 Flack, Karen A., U.S. Naval Academy  
 Franz, Marcel, University of British Columbia  
 Freeland, John W., Argonne National Laboratory  
 Gambetta, Jay M., IBM T.J. Watson Research Center  
 Gang, Oleg, Brookhaven National Laboratory  
 Gardel, Margaret, The University of Chicago  
 Ginzburg, Valeriy, The Dow Chemical Company  
 Gladney, Larry D., University of Pennsylvania  
 Goldman, Daniel I., Georgia Institute of Technology  
 Gonis, Antonios, Lawrence Livermore National Laboratory  
 Goodson, Kenneth E., Stanford University  
 Greene, Senta V., Vanderbilt University  
 Griffiths, Ross W., The Australian National University  
 Guo, Jinghua, Lawrence Berkeley National Laboratory  
 Halkiadakis, Eva, Rutgers University  
 Hamilton, Alex, University of New South Wales  
 Harris, Deborah A., Fermi National Accelerator Laboratory  
 Hartemann, Frederic V., Lawrence Livermore National Laboratory  
 Harutyunyan, Avetik R., Honda Research Institute  
 Hassanein, Ahmed, Purdue University  
 Hauser, Jay, University of California, Los Angeles  
 Hays, Elizabeth A., NASA Goddard Space Flight Center  
 Heinonen, Olle G., Argonne National Laboratory  
 Hellberg, C. Stephen, U.S. Naval Research Laboratory  
 Hill, Stephen, Florida State University  
 Ho, Rong-Ming, National Tsing Hua University  
 Hussein, Mahir S., University of Sao Paulo  
 Izumi, Nobuhiko, Lawrence Livermore National Laboratory  
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Koenraad, Paul, *Eindhoven University of Technology*  
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## 2015 APS Fellowship Nomination Deadlines

Fellowship nominations may be submitted at any time, but must be received by the deadlines listed below for the next review. For submittal information see: <http://www.aps.org/programs/honors/fellowships/nominations.cfm>

### DIVISIONS

Astrophysics	06/01/2015
Biological Physics	06/01/2015
Chemical Physics	04/01/2015
Computational Physics	06/01/2015
DAMOP (Atomic, Molecular, Optical)	04/01/2015
DCMP (Condensed Matter)	PAST
Fluid Dynamics	04/01/2015
Polymer Physics	06/01/2015
Laser Science	04/01/2015
Materials Physics	PAST
Nuclear Physics	04/01/2015
Particles & Fields	04/01/2015
Physics of Beams	04/01/2015
Plasma Physics	04/01/2015

### FORUMS

Education	04/01/2015
History of Physics	06/01/2015
Industrial and Applied Physics	06/01/2015
International Physics	05/15/2015
Outreach and Engaging the Public	PAST
Physics & Society	06/01/2015

### APS GENERAL

06/01/2015  
This category is reserved for unusual situations where the contributions of the nominee clearly do not fall into the area of a technical unit. They are reviewed and recommended directly by the APS Fellowship Committee.

### TOPICAL GROUPS

Energy Research & Applications	04/01/2015
Few Body	05/31/2015
Gravitation	06/01/2015
Hadronic Physics	06/01/2015
Instrument & Measurement Science	05/01/2015
Magnetism and Its Applications	06/01/2015
Plasma Astrophysics	04/01/2015
Precision Measurement & Fund.Const	05/01/2015
Quantum Information	05/01/2015
Shock Compression	04/01/2015
Statistical & Nonlinear Physics	05/29/2015

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### PRIZES

Will Allis Prize	Lars Onsager Prize
Hans A. Bethe Prize	Abraham Pais Prize
Tom W. Bonner Prize	George E. Pake Prize
Oliver E. Buckley Prize	W. K. H. Panofsky Prize
Davisson-Germer Prize	Earle K. Plyler Prize
Max Delbruck Prize	Polymer Physics Prize
Fluid Dynamics Prize	Aneesur Rahman Prize
Herman Feshbach Prize	Andrei Sakharov Prize
Dannie Heineman Prize	J. J. Sakurai Prize
Frank Isakson Prize	Arthur L. Schalow Prize
Julius Edgar Lilienfeld Prize	Prize to a Faculty Member for
James Clerk Maxwell Prize	Research in an Undergraduate Institution
James C. McGroddy Prize	Robert R. Wilson Prize

### AWARDS, MEDALS & LECTURESHIPS

David Adler Lectureship	Henry Primakoff Award
Leroy Apker Award	Jonathan F. Reichert and Barbara
Edward A. Bouchet Award	Wolff-Reichert Award
Joseph A. Burton Award	Thomas H. Stix Award
Stanley Corrsin Award	Leo Szilard Lectureship
John Dawson Award for Excellence in	
Plasma Physics Research	
John H. Dillon Medal	
Excellence in Physics Education	
Award	
Joseph F. Keithley Award	
Maria Goeppert Mayer Award	
Dwight Nicholson Medal	

### DISSERTATION AWARDS

Andreas Acrivos
Richard L. Greene Award
Laser Science Dissertation Award
Nicholas Metropolis Award
Outstanding Doctoral Thesis Research
in Beam Physics Award