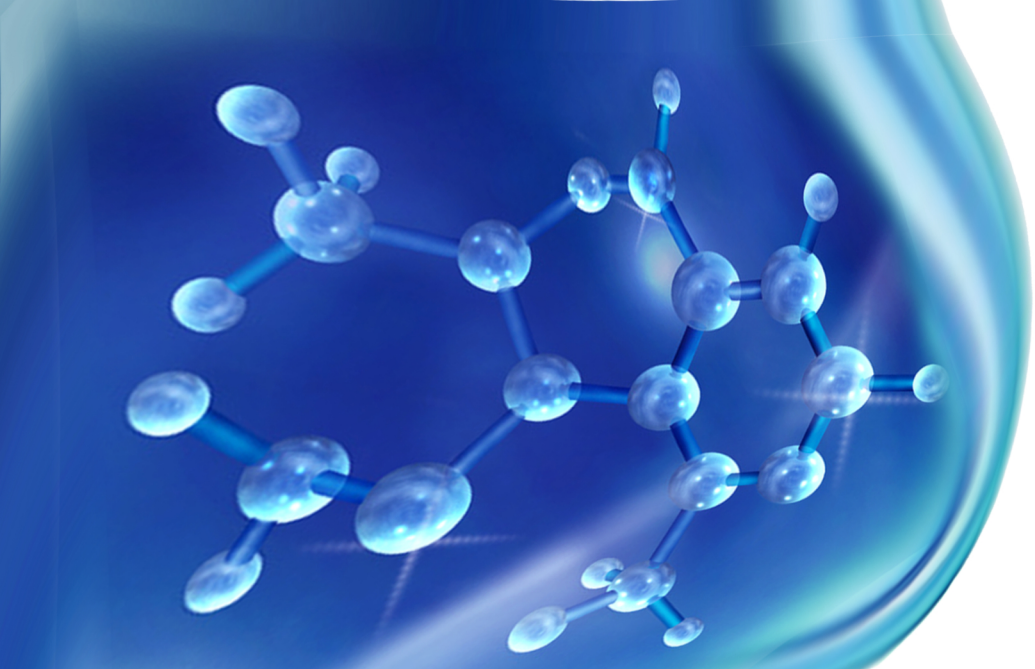


EARLY CAREER AWARDS

FOR SCIENTISTS AND ENGINEERS

Awards Ceremony

Office of Science and Office of Defense Programs

U.S. DEPARTMENT OF ENERGY
OFFICE OF SCIENCE

Agenda

Welcome

Opening Remarks

Brief Remarks on Office of Science Awards

Brief Remarks on Office of Defense Programs Awards

Presentation of Office of Defense Programs Awards

Presentation of Office of Science Awards

Group Photo

We would like to thank the Department of Energy Laboratories for the use of their images in the video for this ceremony.

Awardees and Guests are welcome to join us for a reception immediately following the conclusion of the ceremony. Reception will be held at the DOE Visitor Center on the 1st Floor lobby.

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

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

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

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

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

2009 Awardees

Office of Science

Eric D. Bauer, Ph.D.
Los Alamos National Laboratory

Jeremy T. Busby, Ph.D.
Oak Ridge National Laboratory

Gavin E. Crooks, Ph.D.
Lawrence Berkeley National Laboratory

Juan Estrada, Ph.D.
Fermi National Accelerator Laboratory

Dillon Fong, Ph.D.
Argonne National Laboratory

Jacob M. Hooker, Ph.D.
Brookhaven National Laboratory

De-en Jiang, Ph.D.
Oak Ridge National Laboratory

Sergei V. Kalinin, Ph.D.
Oak Ridge National Laboratory

Trent R. Northen, Ph.D.
Lawrence Berkeley National Laboratory

Elena V. Shevchenko, Ph.D.
Argonne National Laboratory

Jacob G. Wacker, Ph.D.
SLAC National Accelerator Laboratory

Defense Programs

Ilke Arslan, Ph.D.,
nominated by Sandia National Laboratories

Gianluca Iaccarino, Ph.D.
nominated by Lawrence Livermore National Laboratory

2009 DOE Early Career Scientist And Engineer Awards

Ilke Arslan

University of California, Davis

Nominated by Sandia National Laboratory

Defense Programs Awardee

For the advanced characterization of energy and hydrogen storage nanomaterials used in technologies critical to national defense and homeland security, for advancing the technologies necessary to characterize these materials, and for excellence in outreach and mentoring of the next generation of American scientists and engineers.

Dr. Ilke Arslan is a distinguished young professor who has made significant contributions to the Defense Programs mission. She has established a strong research program on understanding the fundamental properties of porous nanomaterials for energy storage applications that are critical for national security. She advanced the techniques in the electron and atom probe microscopes to increase the 3-D resolution necessary to analyze these important materials. This research determined the mechanisms of thermal pore degradation in Pd nanoparticles and assisted in identifying them as a candidate for storage of hydrogen isotopes.

She is an assistant professor in the Department of Chemical Engineering and Materials Science at the University of California-Davis. She was nominated for the PECASE by Sandia National Laboratories, where she was a Truman Fellow from 2006-2008. Prior to that, she received two fellowships, one from the NSF and one from the Royal Society, to perform research at the University of Cambridge, England, from 2004-2005.

Dr. Arslan has a strong dedication to teaching and mentoring young women, men, and minorities from the graduate level all the way down to elementary school level. She has been active in giving science demonstrations at local science museums, elementary schools, participating in a program for high school girls in math and science, lecturing and demonstrating to underrepresented undergraduate minorities, and advising undergraduate, masters and graduate students in research. She is also an active and recognized leader in her community through organizing symposia at conferences, teaching short courses and tutorials at conferences, traveling nationally as a Microscopy Society of America Tour Speaker, and her many invited presentations at national and international conferences. Her research, her service to the DOE, and her strong desire to educate students has made her a positive role model for the next generation of American scientists and engineers.

Eric Bauer

Los Alamos National Laboratory

Office of Science Awardee

For pioneering condensed matter physics research through the discovery and synthesis of new materials, especially strongly correlated and f-electron systems, and the elucidation of their novel physical properties; and for outreach activities with students and the scientific community.

Eric Bauer was nominated by Los Alamos National Laboratory for his pioneering research in condensed matter physics through the discovery and synthesis of new materials, especially strongly correlated f-electron systems and for his involvement in outreach activities with students and the scientific community. His work includes the discovery of superconductivity in a variety of materials ranging from nickel-based pnictides, to rare earth-based metallic compounds, and even to a compound containing plutonium. His research focuses on making single crystals of correlated electron materials and understanding their novel properties. These high-quality crystals have been used in numerous national and international collaborations that characterize and elucidate novel phenomena such as the interplay of superconductivity and magnetism, mixed-valence and heavy fermion behavior, and quantum criticality. Discovering and understanding emergent phenomena generated by strong interactions between electrons in d- and f-electron systems is a strategic component of the energy and defense missions of the Department of Energy.

Dr. Bauer received his Ph.D. from the University of California, San Diego, in 2002 and went to Los Alamos National Laboratory as a Director's Funded Postdoctoral Fellow. He continued his postdoctoral research at Los Alamos as a G. T. Seaborg Postdoctoral Fellow in 2004 and then as a Frederick Reines Distinguished Postdoctoral Fellow until 2007, when he joined the technical staff. He has more than 200 publications in peer-reviewed journals that have been cited over 3,000 times, including several in high-profile journals such as Physical Review Letters, Science, and Nature.

Dr. Bauer has also served on the organizing committees of several conferences, including the Materials Research Society Actinides Symposium, the Strongly Correlated Electron Symposium, and the Plutonium Futures – The Science 2010 conference.

2009 DOE Early Career Scientist And Engineer Awards

Jeremy Busby

Oak Ridge National Laboratory

Office of Science Awardee

For excellence in research leading to the development of high performance cast stainless steels, a critical part of the U.S. Contributions to ITER project, and for his mentoring of students both as an Adjunct Assistant Professor at the University of Michigan and at ORNL.

Jeremy Busby was nominated by Oak Ridge National Laboratory for his contributions in materials development and performance for nuclear reactor applications. Dr. Busby is a member of the Senior Research and Development Staff in the Nuclear Science and Engineering Directorate at Oak Ridge National Laboratory. His contributions in this early portion of his career have been substantial and diverse in nature and application, ranging from light water reactors to sodium reactors and space reactor systems as well as research in support of the ITER project.

Dr. Busby's research is focused on materials performance and development of materials for nuclear reactor applications. While at ORNL, Dr. Busby has participated in materials research efforts for space reactors, fusion machines, advanced fast reactors, and light water reactors. Ultimately, the results of this diverse research will enable the development of operating criteria for structural materials in a variety of adverse environments that will allow for design and operation of safe, reliable, and cost-effective nuclear systems.

As principal investigator for the DOE Office of Science ITER Program, he led an investigation into the feasibility of utilizing an innovative cast austenitic stainless steel (SS) for the first wall structure of the international ITER project. The ORNL team utilized advanced computational thermodynamics modeling to successfully devise a cast SS within the internationally approved chemical composition limits for the ITER stainless steel with a tensile strength comparable to wrought stainless steel (>50% improvement in strength over the cast stainless steel previously developed by industry), without compromising other properties.

Currently, Dr. Busby leads the Materials Aging and Degradation Pathway for the DOE – Office of Nuclear Energy Light Water Reactor Sustainability Research and Development program. He also leads the Fuel Cycle R&D Program Materials Cross-cut, and Advanced Reactor Concepts Program sodium fast reactor materials effort, in addition to participation in several nuclear industry-sponsored research tasks.

The American Nuclear Society presented Dr. Busby with the Landis Young Member Achievement award in 2006 and, in 2007 he received the ORNL Early Career Award for Engineering Accomplishment for his leadership in the cast stainless steel effort. He is an Adjunct Assistant Professor of Nuclear Engineering and Radiological Sciences at the University of Michigan and has developed and taught his own graduate level course in materials degradation and performance for fission and fusion reactors. He also is heavily involved in the leadership of many professional society activities.

2009 DOE Early Career Scientist And Engineer Awards

Dr. Gavin Crooks

Lawrence Berkley National Laboratory

Office of Science Awardee

For groundbreaking development of the Crooks Fluctuation Theorem of statistical mechanics to describe thermodynamics for systems far from equilibrium which impact nano-scale device performance, materials design, and energy storage and capture; and for excellent and extensive mentorship of developing scientists.

Dr. Gavin Crooks received his Ph.D. in Chemistry from the University of California, Berkeley, and is currently a Senior Scientist in the Physical Biosciences Division at Lawrence Berkley national laboratory.

Dr Crooks' research goal is to develop our fundamental understanding of nanoscale molecular machines, both biological and artificial. He is particularly interested in discovering design principles that will allow us to engineer and customize our own efficient and effective molecular gadgetry. He wishes to understand the thermodynamic efficiency of molecular machines, the tradeoff of efficiency with power output, how to determine the optimal thermodynamic processes, and how to engineer machines that can approach these optimal performances

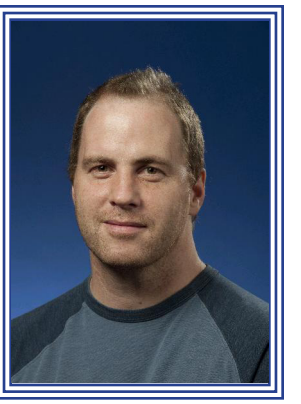
The thermodynamics of small systems away from equilibrium has many interesting applications in biology and physics. Dr. Crooks is currently involved with understanding the physics of macromolecules under tension, and, via the Helios/ SERC project at Lawrence Berkeley lab, with the design of effective artificial photosynthesis, which has the goal of alleviate the energy crisis by directly converting solar energy into a hydrocarbon fuel.

Juan Estrada

Fermi National Accelerator Laboratory

Office of Science Awardee

For his widely-recognized contributions to high-energy physics and particle astrophysics experiments, and his invention of a new detector concept that can extend searches for dark matter particles into a range not covered by existing experiments; and for actively involving high school science students and teachers in this research.



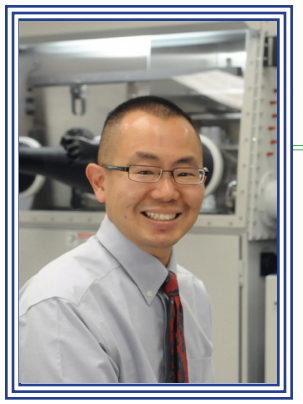
Juan Estrada is a physicist at Fermi National Accelerator Laboratory, where he works in the Center for Particles Astrophysics. He is part of the scientific team building the wide field astronomical imager for the Dark Energy Survey (DES) that will map the southern sky to improve our understanding of Dark Energy, believed to be responsible for the accelerated expansion of the Universe. The DES project plans to study the properties of Dark Energy by looking at the evolution of structure in the universe and also at its expansion history. At the same time, he is leading the effort for a direct dark matter search using Charge Coupled Devices (CCDs) based on an idea that resulted from his work with the focal plane detectors for DES. This Dark Matter search experiment named DAMIC is taking advantage of the extremely low electronic readout noise of CCDs to search for low mass dark matter particles.

Juan Estrada is a physicist born in Argentina and received his undergraduate degree there before coming to Fermi National Accelerator Laboratory as a graduate student for the University of Rochester. As a student he worked on the DZero proton-antiproton collider experiment, in the construction of the Run-II detector and producing an innovative measurement of the mass of the top quark.

In 2003 Juan Estrada was the recipient of the Tollestrup Award for outstanding work conducted by a postdoctoral researcher at Fermilab in recognition of his development and application of a new multivariate method to determine the top quark mass with greatly improved precision. In 2004 Estrada received early career recognition from IEEE for his work modeling the Visible Light Photon Counters (VLPC) in the Dzero particle tracker.

Estrada makes a special effort to include young collaborators in his research projects. He has worked with several undergraduate students from universities in the US and abroad, he has also invited a few high-school students to work at Fermilab.

2009 DOE Early Career Scientist And Engineer Awards



Dillon Fong

Argonne National Laboratory

Office of Science Awardee

For significant contributions to the understanding of nanoscale size effects on ferroelectric phase transitions and to the advancement and application of in situ synchrotron x-ray techniques for the study of thin film heterostructures critical to the development of new materials for energy technologies; and for broad scientific community outreach and mentoring of students.

Dillon Fong is a Materials Scientist at Argonne National Laboratory, where he uses in situ synchrotron methods to investigate materials synthesis and behavior in nanoscale systems.

Dr. Fong has made important contributions to the understanding of nanoscale size effects on ferroelectric behavior, discovering that ferroelectricity can persist in films only three unit cells thick. He also observed that adsorbates from the surrounding environment can help screen the depolarizing field, leading to an interesting relationship between the surface of an electroactive oxide and the surrounding environment. Dr. Fong's research program focuses on both synthesizing and characterizing novel oxide materials that exhibit tunable surface properties for reactions with the surrounding medium. The concept of dynamic control over adsorption / desorption behavior may have important implications in the field of heterogeneous catalysis.

Another focus of his research is the use of in situ methods for controlling the growth of oxide heterostructures. Such materials play critical roles in applications ranging from solid oxide fuel cells to energy storage mediums, but their properties depend strongly on how nature responds to the deposition conditions prescribed by the researcher. Dr. Fong is developing ways of using in situ methods to help understand and control the growth process in order to create new materials capable of addressing our global energy challenges.

Dr. Fong received his Ph.D. in Applied Physics from Harvard University in 2001. He is actively engaged in teaching and promoting materials science and nanoscience to the wider community through his mentoring of postdoctoral fellows and students, his work with the Materials Research Society, American Physical Society, and the Center for Nanoscale Materials, and through his lecture series at the Graduate University of Chinese Academy of Sciences in Beijing.

Jacob M. Hooker

Brookhaven National Laboratory

Office of Science Awardee

For pioneering research on adapting modern synthetic chemistry to the development of new tools for tracking and quantifying biochemical transformations and the movement of complex molecules in living systems, as well as outreach and mentorship to visiting students and scholars.

For pioneering research on adapting modern synthetic chemistry to the development of new tools for tracking and quantifying biochemical transformations and the movement of complex molecules in living systems, as well as outreach and mentorship to visiting students and scholars.

Jacob Hooker was nominated by Brookhaven National Laboratory, where he was a Goldhaber fellow, for his work to develop new chemical reactions for short-lived radioisotopes used in positron emission tomography. He is currently an assistant professor at Harvard Medical School and Director of Radiochemistry at the Martinos Center for Biomedical Imaging. Dr. Hooker maintains an appointment as an assistant chemist at Brookhaven National Laboratory.

By focusing on developments in basic science, Dr. Hooker's research has provided new tools for translational medical research. More specifically, he and his colleagues have developed new chemical reactions that allow for the construction of medical imaging agents (PET radiotracers and MRI contrast agents) and have used these tools to explore chemical interactions in vivo. A key goal of his research is to expand the use of positron emission tomography in research and diagnostic medicine by developing simplified and approachable chemical synthesis strategies. His research group is particularly interested in developing radiotracers that have broad applicability in clinical neuroscience.

Dr. Hooker received undergraduate degrees in chemistry and textile chemistry from North Carolina State University before moving to UC Berkeley to complete his graduate studies as an NSF fellow in chemistry under Professor Matt Francis. After completing his doctoral work in 2007, Dr. Hooker received an NIH postdoctoral fellowship award to pursue research in radiochemistry and PET imaging with Dr. Joanna Fowler at Brookhaven National Laboratory. During his career, he has received several awards for teaching and mentoring.

2009 DOE Early Career Scientist And Engineer Awards

Gianluca Iaccarino

Stanford University

Nominated by Lawrence Livermore National Laboratory

Defense Programs Awardee

For his extensive and deep scientific contributions in the areas of turbulent flow and uncertainty quantifications and quantified margins of uncertainty, which are amplified for the National Nuclear Security Administration (NNSA) community through his position of intellectual leadership at the NNSA Predictive Science Academic Alliance Program Center at Stanford.

Gianluca Iaccarino is an Assistant Professor at Stanford University with joint appointments in the Mechanical Engineering Department and the Institute for Computational Mathematical Engineering. He completed his graduate studies in Italy working on computational methods for fluid dynamics and worked as a Research Associate at the NASA Center for Turbulence Research before joining the Faculty at Stanford in 2007. He is the Deputy Director of the NNSA Predictive Science Academic Alliance Program (PSAAP) Center at Stanford and leads the effort on Quantification of Margins and Uncertainties, a decision-making computational framework aimed at managing risks associated to high-consequence systems.

His research activities are focused on computational fluid dynamics, in areas ranging from analysis of wind turbines, to hypersonic propulsion, to turbulence and transition modeling, to thermal management in batteries. In 2007 Dr. Iaccarino funded the Uncertainty Quantification Lab (http://uq.stanford.edu): a joint initiative between the School of Engineering and the Mathematics and Statistics Departments. The UQLab is supported by various grants from NNSA, DOE Office of Science, NSF, and industries and focuses on probabilistic algorithms for uncertainty analysis, stochastic inference and robust optimization. The research work ranges from the theoretical aspects of uncertainty representation, to algorithms for non-deterministic analysis, to large-scale applications leveraging massively parallel computers. Many of the current projects involve active collaborations with Sandia, Lawrence Livermore and Los Alamos National Laboratories.

Dr. Iaccarino is involved in various educational activities at Stanford and in the computational engineering community. He organized Uncertainty Quantification tutorials, workshops and special sessions at major engineering conferences. He has published more than 50 papers in both engineering and mathematics journals and about 70 conference papers. He is a Humboldt fellow at the University of Munich, Germany.

De-en Jiang

Oak Ridge National Laboratory

Office of Science Awardee

For internationally recognized, pioneering computational research in probing novel properties of nanostructures and chemically modified interfaces for chemical problems in separations and catalysis; and for an extraordinary record of leadership and outreach to the scientific and educational communities.

Dr. De-en Jiang is a staff scientist in the Chemical Sciences Division at Oak Ridge National Laboratory. He is a computational chemist using state-of-the-art computational methods to solve important chemical problems in separations, catalysis, and energy storage. His recent studies have dealt with topics such as reactivity and magnetism of nanographenes, porous graphene for gas separations, and structure and properties of metal nanoparticles. He demonstrated a proof of concept that graphene could be the ultimate membrane for energy-efficient gas separations when small holes were created in the sheet. He also discovered how organic groups help stabilize gold nanoparticles and keep their size small, which could be useful for synthesizing better metal-nanoparticle catalysts for energy-relevant chemical transformations.

Dr. Jiang received his B.S. and M.S. degrees in chemistry from Peking University, China. He then pursued his Ph.D. study at University of California, Los Angeles. After visiting Princeton University for one year to finish up his doctoral research, he received his Ph.D. degree in chemistry from UCLA in 2005. Then he joined Oak Ridge National Laboratory first as a postdoctoral research associate and then became a research staff member in 2006. In 2009, he won ORNL's Early Career Award for scientific achievement. He has published over 60 peer-reviewed papers, which have been cited more than 1,000 times.

2009 DOE Early Career Scientist And Engineer Awards

Sergei V. Kalinin
Oak Ridge National Laboratory

Office of Science Awardee

For extraordinary insights into scanning probe microscopy principles and applying them to fundamental research in phase transitions and energy conversion on the nanoscale, and for founding an international nanoscience workshop series and serving as an instructor in this series.

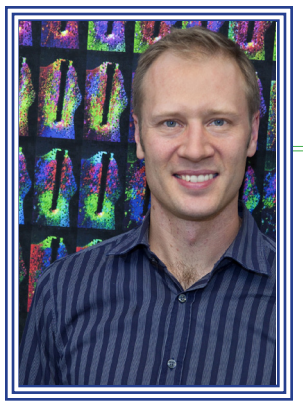
Sergei V. Kalinin is currently a senior research staff member at Oak Ridge National Laboratory and co-theme leader for scanning probe microscopy at the Center for Nanophase Materials Sciences at ORNL (since 2007), following an Eugene P. Wigner fellow appointment at ORNL (2002–2004). He is also adjunct faculty at Pennsylvania State University and adjunct associate professor at the Department of Materials Sciences and Engineering at the University of Tennessee, Knoxville.

His research is focused on local bias-induced phase transitions and electrochemical transformation in ferroelectric, ionic, and macromolecular systems. It is well recognized that functionality of these materials is dominated by defects that act as nucleation centers for a new phase or pinning centers for moving transformation fronts. Using scanning probe microscopy tip, it is possible to confine the probing electric field on the nanometer scale of single defect, and probe bias-induced transformation through strain or current signal. Sergei's work has demonstrated the possibility for probing bias-induced phase transitions in ferroelectric and multiferroic materials on a single defect level, and deciphering corresponding mesoscopic mechanisms. Furthermore, the phase transition can be guided between several possible pathways, resolving a longstanding control problem for magnetoelectric materials. These methods have recently been extended to map electrochemical reactivity and diffusivity in energy storage materials on the 10 nanometer level, providing a previously unavailable view of electrochemical functionality below the micron level.

The key element of his work is scanning probe microscopy (SPM) of electromechanical and transport phenomena, with specific emphasis of multidimensional and artificial-intelligence–assisted SPM methods. Several of his developments has been adopted and licensed by the SPM industry.

Kalinin received his Ph.D. degree in materials science at the University of Pennsylvania in 2002. During his academic career, he has been the recipient of the Burton Medal of American Microscopy Society (2010), IEEE-TUFFC Young Investigator Award (2010), the Robert L. Coble (2009) and Ross Coffin Purdy (2003) Awards of American Ceramics Society, AVS Peter Mark Memorial Award (2008), and two R&D100 awards (2010 and 2008), as well as Wigner Fellowship of Oak Ridge National Laboratory. He is the author of more than 180 scientific papers and 14 patents and patent disclosures on different aspects of SPM and ferroelectric materials applications. He has organized a series of international workshops on piezoresponse force microscopy and SPM for energy storage materials.

2009 DOE Early Career Scientist And Engineer Awards



Trent Northen

Lawrence Berkeley National Laboratory

Office of Science Awardee

For pioneering analysis of metabolomic features of biological systems with previously unattainable sensitivity and spatial resolution, providing new insights impacting biofuel development, understanding biofilms, and biological responses to low dose ionizing radiation; and for community service and diverse educational outreach.

Trent Northen is a Staff Scientist in the Life Sciences Division at Lawrence Berkeley National Laboratory (LBNL) and the Department of Energy's Joint BioEnergy Institute (JBEI). He was nominated for his incisive and pioneering analyses of metabolism. Metabolism is at the heart of all life. Detailed understanding of cellular metabolism is critically needed for the development of low-cost biofuels and the effective deployment of microbes for environmental cleanup. A better understanding of metabolism is also needed to define the role of metabolites in low-dose ionizing radiation response and mediation of breast cancer. Dr. Northen's lab is pioneering the development and application of mass spectrometry to meet these needs. He is the inventor of nanostructure-initiator mass spectrometry (NIMS), a nanotechnology-based method for generating gas phase ions with extreme sensitivity. He has shown that the impact of his approach cuts deep. NIMS can be integrated with scanning ion beam for high-resolution analysis (150nm resolution), and his lab is now applying NIMS for direct imaging of metabolites within tissues and studying microbial community metabolism.

A hallmark of Dr. Northen's efforts has been to combine engineering with biology and push research into uncharted ground. Dr. Northen obtained his B.S. in Chemical Engineering at the University of California Santa Barbara. Dr. Northen was then awarded a National Sciences Foundation IGERT fellowship to study under professor Neal Woodbury at the Biodesign Institute (ASU), where he received his Ph.D. in Chemistry. There, he developed biomaterials including peptide grafted polymer microarrays for which he was named Arizona Technology Enterprise's 'innovator of the year'. He then joined The Scripps Research Institute as a post-doctoral fellow under professor Gary Siuzdak. At Scripps, Dr. Northen developed nanotechnologies, including NIMS, for generating gas phase ions. His work has resulted in 8 patent applications and numerous papers in influential, peer-reviewed journals, such as Nature, Proceedings of the National Academy of Sciences, Advanced Materials, and Analytical Chemistry. Dr. Northen currently serves on the Scientific Advisory Board for MetaCyc (Stanford Research Institute) and the steering committee for LBNL's Carbon Cycle 2.0 initiative. Dr. Northen has long exhibited an interest in science education and outreach, making science more accessible to diverse audiences and inspiring young minds to pursue science and engineering.

Elena Shevchenko

Argonne National Laboratory

Office of Science Awardee

For development of breakthrough research techniques assembling nanosized building blocks into mondispersed supercrystals with controllable size, shape, and composition with unique electronic, optical, and magnetic properties; and for service to scientific and lay communities as an enthusiastic instructor and mentor.

Elena Shevchenko is a scientist in the Center for Nanoscale Materials at Argonne National Laboratory. Her research focuses on synthesis of nanoscale materials (magnetic, metallic, semiconductor and metal oxide nanocrystals with controllable size and shape); nanoparticle design (nanoscale multicomponent nanoparticles, such as core shells, dumbbells); and design of multifunctional materials through self-assembly of nanoparticles and study of the collective properties of such materials.

Dr. Shevchenko's current research efforts are directed to understanding the nucleation and growth of multicomponent nanoparticles as well as their self-assembly. These basic science questions are of great importance since they impact our ability to design and synthesize reproducibly nanoscale materials with advanced catalytic, optical and magnetic properties. In collaboration with other researchers she develops better materials for catalysis, batteries and solar concentrators. Also she is working on understanding the collective phenomena in self-assembled structures.

Dr. Shevchenko received her Ph.D. from the University of Hamburg, Germany in 2003. In 2003-2005 she was a postdoctoral fellow with Prof. Stephen O'Brien (Columbia University) and Dr. Christopher Murray (T.J. Watson Research Center). In 2005 she became a staff scientist at Lawrence Berkeley National Laboratory and two years later she joined Argonne National Laboratory. Dr. Shevchenko research activity led to more than 45 publications in high-profile journals including Nature, Nano Letters, Advanced Materials, and Journal of the American Chemical Society.

2009 DOE Early Career Scientist And Engineer Awards

Jacob Wacker

SLAC National Accelerator Laboratory

OFFICE OF SCIENCE AWARDEE

For the construction of new and imaginative models of elementary particles, and the development of strategies that have increased the reach and breadth of accelerator searches for new particles at the highest energies; and for his strong engagement with the experimental community to advance these new research directions.

Jacob Wacker is an assistant professor of Physics at the SLAC National Accelerator Laboratory at Stanford University. He received his Ph.D. in theoretical particle physics in 2003 from the University of California, Berkeley while performing research at Harvard University. He received his B.S. in 1998 from Iowa State University of Science and Technology in Physics and Mathematics. Dr. Wacker is a winner of the Department of Energy's Outstanding Junior Investigator award and also of the Sloan Fellowship.

Dr. Wacker's research is in the field of theoretical high energy physics which explores the foundations of the Standard Model, the current formulation of the laws of nature. His research primarily addresses two of the most important unexplained phenomenon in physics: discovering the identity of dark matter and understanding the structure of electroweak symmetry breaking.

Over 85% of the mass of the Universe consists of an unknown form of matter that was discovered though its gravitational interaction and is commonly referred to as dark matter. Dr. Wacker's research is in understanding dark matter's non-gravitational interactions. He has proposed models of composite dark matter and has shown how this hypothesis can reconcile several contradictory experimental results.

Dr. Wacker's research on the structure of electroweak symmetry breaking aims to understand why electricity and magnetism is 1032 stronger than gravity. He proposed Little Higgs theories that illustrate how this hierarchy in strengths might be a signal of new forces of nature.

Dr. Wacker is an active member of the high energy physics community, creating the Boost conference, organizing SLAC's Dark Forces workshop in 2009 and Workshop on Early Topologies for LHC Searches in 2010. He also created LHCNewPhysics.org, an interactive forum for theorists and experimentalists to collaborate online. He has authored 40 articles and proposed numerous searches for new phenomenon at the Tevatron at Fermi National Accelerator Laboratory and the Large Hadron Collider at CERN.

U.S. Department of Energy
Early Career Award for Scientists and Engineers
Recipients by Year

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

U.S. Department of Energy
Early Career Award for Scientists and Engineers
Recipients by Year

	Office of Science Recipients	Office of Defense Programs Recipients
2003	Tamara G. Kolda Saskia Mioduszewski Margaret S. Torn Jian Shen	Catherine M. Snelson Donald P. Visco, Jr. Brian D. Wirth
2004	John Arrington William Ashmanskas Hong Qin Robert B Ross Paul Vaska Zhangbu Xu	Wei Cai William P. King Yunfeng Lu
2005	Daniel Bardayan Todd Munson Wynne Schiffer Yanwen Zhang	Christopher J. Roy Wendelin Wright Michael A. Zingale
2006	Kyle Cranmer Julia Laskin Ho Nyung Lee Len A. Pennacchio	Brian J. Kirby Jeffrey Kysar Shawn Newsam Carlos Pantano-Rubino
2007	Mickey Chiu Hooman Davoudiasl Bert Debusschere Jennifer S. Martinez Wei Pan Robin Santra Yugang Sun	Jeanine Cook
2008	Cecilia Aragon Gary Baker Joshua Breslau Gianluigi Ciovati Jason Graetz Stefan Gerhardt Jeffrey Neaton Paul Sorensen Alexandre Tartakovsky Ivan Vitev	Lynford Goddard Thao (Vicky) Nguyen

2009 DOE Early Career Scientist And Engineer Awards

James C. Forrestal Building

1000 Independence Avenue, SW
Washington, DC