EXPLORE**AND**
COLLABORATE

AMERICAN INDUSTRY AND AMERICA'S NATIONAL LABS

MATERIALS FOR ENERGY APPLICATIONS

January 30-February 1, 2012

THE CLAREMONT HOTEL, BERKELEY, CALIFORNIA

EXPLORE AND COLLABORATE
AMERICAN INDUSTRY AND AMERICA'S NATIONAL LABS
MATERIALS FOR ENERGY APPLICATIONS

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Materials for Energy Applications Workshop Organizing Committee

Co-Chairs

Horst Simon, *Deputy Laboratory Director, Lawrence Berkeley National Laboratory*
David Parekh, *Vice President, Research, and Director, United Technologies Research Center*

Industry Members

Eric Amis, *Director, Physical Sciences, United Technologies Research Center*
Joseph A Kocal, *Corporate Fellow, Honeywell Specialty Material, UOP*
Theresa Kotanchek, *Vice President for Sustainable Technologies and Innovation Sourcing, Dow Chemical*
Edwin (Ned) Niccolls, *Senior Consulting Materials Engineer and Chevron Fellow, Chevron Energy Technology Company*

National Laboratory Members

Michelle Buchanan, *Associate Laboratory Director, Oak Ridge National Laboratory*
Doug Ray, *Associate Laboratory Director, Pacific Northwest National Laboratory*
Julia Phillips, *Deputy Chief Technology Officer and Director, Research Strategy & Partnerships, Sandia National Laboratories*

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WORKSHOP **AGENDA**

MATERIALS FOR ENERGY APPLICATIONS
LAWRENCE BERKELEY NATIONAL LABORATORY
THE CLAREMONT HOTEL
JANUARY 30 - FEBRUARY 1, 2012

Monday, January 30

2:00 - 4:00pm Optional LBNL Tours

5:00 - 7:00 Welcome Reception and Registration

Tuesday, January 31

7:30am Breakfast

8:30 Welcome (Empire Room) / Horst Simon, *Deputy Laboratory Director, LBNL*

8:35 Introduction of Keynote / David Parekh, *Vice President, Research Director, UTRC*

8:40 - 9:05 Keynote Part I / Paul Alivisatos, *Laboratory Director, LBNL*

9:05 - 9:25 Keynote Part II / Omar Yaghi, *Director, Molecular Foundry, LBNL*

9:30 - 10:30 Panel 1 Discussion: "How to Engage with the National Labs"
Panel Organizers: Michelle Buchanan, *Associate Laboratory Director – Physical Sciences, Oak Ridge National Laboratory* and Edwin (Ned) Niccolls, *Senior Consulting Materials Engineer and Chevron Fellow, Chevron Energy Technology Company*

Chair: Simon Bare, *Research Fellow, UOP LLC, Honeywell*
Gary Butler, *Team Leader – Advanced Materials R&D, Chevron Corporation*
Joseph Desmond, *Senior Vice President, Government Affairs & Communications, BrightSource Energy*
Alex Harris, *Chair, Chemistry Department, Brookhaven National Laboratory*
Michael Paulus, *Director, Technology Transfer, Oak Ridge National Laboratory*

BREAK

10:50 - 11:50 Panel 2 Discussion: "Technology Gaps Ripe for Industry Collaboration"
Panel Organizers: Francis Houle, *Director of Strategic Initiatives, Chemical Sciences Division, Lawrence Berkeley National Laboratory*, and Julia Phillips, *Deputy Chief Technology Officer and Director, Research Strategy & Partnerships, Sandia National Laboratories*

Chair: Eric Amis, *Director, Physical Sciences, United Technologies Research Center*
Duane Dimos, *Director, Materials Science and Engineering Center, Sandia*
Sergio Loureiro, *Director, Mechanical Systems, Pratt & Whitney*
Delia Milliron, *Deputy Director, Molecular Foundry, LBNL*
Stefan Wurm, *Director of Lithography, SEMATECH*

12:00 - 1:15 Lunch

1:30 - 2:30 Panel 3 Discussion: "How to Improve Public-Private Partnerships"
Panel Organizers: Theresa Kotanchek, *Vice President, Sustainable Technologies and Innovation Sourcing, Dow Chemical* and Doug Ray, *Associate Laboratory Director, Fundamental & Computational Sciences, Pacific Northwest National Laboratory*

Chair: Joseph Kocal, *Corporate Fellow, Honeywell Specialty Material, UOP*
Leo Christodoulou, *Program Manager, Advanced Manufacturing, Energy Efficiency and Renewable Energy (EERE), Department of Energy*
Michael Kluse, *Laboratory Director, Pacific Northwest National Laboratory*
Theresa Kotanchek, *Vice President, Sustainable Technologies and Innovation Sourcing, Dow Chemical*

BREAK

2:45 - 4:15 Multiple Breakout Sessions / Panel Organizers and Members

Breakout 1: How to Engage with the National Labs – Empire Room (plenary location)

Breakout 2: Technology Gaps Ripe for Industry Collaboration – Sonoma Room, Mezzanine Level

Breakout 3: How to Improve Public-Private partnerships – Napa Rooms 1 & 2, Mezzanine Level

4:30 - 6:30 Poster Session with Reception / See next page for details

7:00 - 8:30 Banquet with Guest Speaker: "What's Next in Energy"
Steven Koonin, *Science and Technology Policy Institute, Institute for Defense Analyses*

Wednesday, February 1

7:30am Breakfast

8:30 Introduction of Keynote (Empire Room) / Paul Alivisatos, *Laboratory Director, LBNL*

8:35 - 9:25 Keynote / Steven Chu, *Secretary of Energy*

9:35 Introduction of Keynote / David Parekh, *Vice President, Research Director, UTRC*

9:40 - 10:30 Keynote: Materials for Energy Efficiency, Energy Efficient Materials
Michael McQuade, *Senior Vice President, Science & Technologies, United Technologies*

BREAK

11:00 - 12:15 Concluding Panel: Briefing, Questions, Recommendations
Steven Chu, Michael McQuade, Eric Amis, Simon Bare, Joseph Kocal; Moderator: Douglas Ray

12:15 - 1:30 Lunch

12:40 Venture Capital Perspective / Vinod Khosla, *Founder, Khosla Ventures*

1:30 Close Out / David Parekh, Horst Simon

2:00-400 Optional LBNL Tours

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POSTER **OVERVIEW**

Topical Areas and Poster Titles	Poster Presenters
Chemical: catalysis, materials synthesis	
1. National Laboratory Chemical Synthesis Capabilities	Phillip Britt, *ORNL*
2. National Laboratories Materials Synthesis Capabilities	Simona Murph, *SRNL*
3. National Laboratory Catalysis R&D Capabilities	Alex Harris, *BNL*
4. National Laboratory Catalysis Solutions	Charles Peden, *PNNL*
Energy: grid, carbon capture/sequestration, combustion	
5. Geologic Carbon Dioxide Sequestration	Curt Oldenburg, *LBNL*
6. Carbon Dioxide Capture Research and Development	Charles Freeman, *PNNL*
7. Clean and Efficient Combustion for Energy Security	Andrew McIlroy, *SNL*
8. Industry Gateway to BES User Facilities	Piero Pianetta, *SLAC*
9. Grid Materials and Superconductivity	Qiang Li, *BNL*
Renewables, emerging energy: photovoltaics, solar fuels, electrical energy storage systems	
10. Solar PV/MPV	Elise Fox, *SRNL*
11. Wind and Water Power: Test Facilities and Industry Partnerships	Ralph Nichols, *SRNL*
12. Biomass	John Holladay, *PNNL*
13. Materials for Electrical Energy Storage	Jerry Hunt, *ANL*
14. Artificial Photosynthesis Research in the DOE National Laboratories	Joel Ager, *LBNL*
15. High-Performance Computing Capabilities Within DOE	Vince Lordi, *LLNL*
16. User Facilities for Materials Characterization	Jim Schuck, *LBNL*
Energy Efficiency: buildings, windows, light-weight materials	
17. Energy Efficient Building Envelope	Steve Selkowitz, *LBNL*
18. Passive and Active Building Energy Systems	Ron Judkoff, *NREL*
19. Indoor Air Quality- Monitoring and Remediation	Bill Fisk, *LBNL*
20. Lightweight Materials	Dan Thoma, *LANL*
21. Next Generation Lighting	Jerry Simmons, SNL

Topical Areas and Poster Titles	Poster Presenters
Manufacturing: Scalable Simulation Science	
22. Partnering in Materials Science and Leadership Computing	Suzy Tichenor & Jack Wells, *ORNL*
23. Partnering in Renewable Energy	Avi Purkayastha, *NREL*
24. Software Opportunities: Industry, ISVs and SciDAC	David Skinner, *LBNL*
25. Computing and Manufacturing	David Martin, ANL
Electronics: high voltage, low power	
26. Facilities	Jeff Bokor, *LBNL*
27. Smart Systems	Wahid Hermina, *SNL*
28. Power Systems	Wahid Hermina, *SNL*
29. New Initiatives and Alternative Technology Commercialization Programs	Gwyn Willams, *JLab*
30. How to Benefit from the DOE User Facilities	Ida Shum, *LLNL*
31. Sponsored Research: Gaining Benefits from DOE Lab Facilities and Experts	Hannah Farquar, *LLNL*
32. Collaborative Research (CRADA) - Leveraging Your Research Dollars	Cheryl Fragiadakis, *LBNL*
33. Licensing – Accessing Breakthrough Technologies	Bill Farris, *NREL*

SPEAKERS, PANELISTS, AND ORGANIZERS

Paul Alivisatos, Laboratory Director, Lawrence Berkeley National Laboratory – *Speaker*

Dr. Alivisatos has led a distinguished career in chemistry and nanoscience research. He has made groundbreaking contributions to the fundamental physical chemistry of nanocrystals, including the synthesis of size and shape controlled nanoscystals, and studies of the optical, electrical, structural, and thermodynamic properties. He has demonstrated key applications of nanocrystals in biological imaging and renewable energy. He is currently the Larry and Diane Bock Professor of Nanotechnology and is a professor in the departments of materials science and chemistry at UC Berkeley. He is the recipient of the Linus Pauling Medal, Ernest Orlando Lawrence Award, the Eni Italgas Prize for Energy and Environment, the Rank Prize for Optoelectronics, the Wilson Prize, the Coblentz Award for Advances in Molecular Spectroscopy, the American Chemical Society Award for Colloid and Surface Science, the Von Hippel Award of the Materials Research Society and most recently Israel's Wolf Prize in Chemistry which he shares with Charles Lieber. He received a Bachelor's degree in Chemistry in 1981 from the University of Chicago and a Ph.D. in Chemistry from UC Berkeley in 1986.

Eric Amis, Director, Physical Sciences, United Technologies Research Center, Organizing Committee – *Panel Chair*

Eric J. Amis is the United Technologies Research Center (UTRC) Director of Physical Sciences, a position he has held since 2009. Prior to joining UTRC, he spent 15 years in leadership roles at the National Institute of Standards and Technology (NIST) in the Materials Science and Engineering Laboratory, including 10 years in the Polymers Division. Before joining NIST, he was a member of the chemistry faculty at the University of Southern California for 11 years. His PhD in chemistry is from the University of Wisconsin-Madison. At UTRC, Amis leads a team of 140 scientists and engineers responsible for research and development in materials science, chemistry, chemical engineering, structural integrity, applied physics, and measurement science. He is responsible for developing the external partnerships and internal technical capabilities of UTRC that are aligned with the strategic direction of United Technologies. The interests of UTC advance building systems through Carrier, Otis and UTC Fire & Security; aerospace systems through Hamilton Sundstrand, Pratt & Whitney and Sikorsky; and energy systems through UTC Power and nearly all of its business units.

Simon Bare, Research Fellow, UOP LLC, Honeywell – *Panel Chair*

Simon R. Bare, Ph.D., is a Research Fellow at UOP LLC, a Honeywell Company. His main interests are in understanding structure-function relationships in catalysts using primarily in situ characterization methods. He leads UOP's characterization efforts in X-ray absorption spectroscopy, X-ray emission spectroscopy, and X-ray microtomography. He has over 20 years experience using synchrotron radiation-based techniques, primarily X-ray absorption spectroscopy, using beamlines at NSLS, APS, SSRL, HASYLAB and BESSY. He has published over 75 publications, holds 4 patents, and has presented many invited seminars nationally and internationally. He has collaborated with many groups worldwide, and is UOP's spokesperson for the Synchrotron Catalysis Consortium at NSLS at Brookhaven National Lab, and MRCAT at the APS at Argonne National Lab. He is an appointed member of the Basic Energy Sciences Advisory Committee, a member of the Photon Sources Directorate Scientific Advisory Committee at BNL, a member of the SSRL Scientific Advisory Committee, a member of the Physical Sciences Directorate Scientific Advisory Committee at ORNL, a member of the Science Advisory Committee for the Catalysis and Interfacial Science Center at SLAC/Stanford, and is a Fellow of the AAAS.

Michelle Buchanan, Associate Laboratory Director, Oak Ridge National Laboratory – *Organizing Committee*

Dr. Buchanan oversees four ORNL research divisions: Center for Nanophase Materials Science, Chemical Sciences, Materials Science and Technology, and Physics. Prior to assuming her current position, she served as director of the ORNL Chemical Sciences Division from October 2000 to November 2004. She served as associate director of the Life Sciences Division from January 1999 to September 2000. She initiated the Center for Structural Molecular Biology at ORNL, serving as its director from 1999 to 2003, and led the Organic and Biological Mass Spectrometry Group in the Chemical and Analytical Sciences Division (now the Chemical Sciences Division) from 1986 to 1999. She joined ORNL in 1978 after earning a B.S. in chemistry from the University of Kansas in Lawrence, Kansas, and a Ph.D. in analytical chemistry from the University of Wisconsin in Madison, Wisconsin. Dr. Buchanan is an adjunct professor in the Department of Chemistry at the University of Tennessee and is on the faculty of the University's Genome Science and Technology Program. She is also director of the Center for Molecular Cellular Systems, a multi-institution program for the identification and characterization of microbial protein complexes. She is the author or co-author of more than 150 scientific publications and reports, holds two patents, and was editor of a book on Fourier transform mass spectrometry.

Gary Butler, Team Leader–Advanced Materials R&D, Chevron Corporation – *Panelist*

Gary received his Bachelors Degree in Chemistry from Sonoma State University and an MBA from Saint Mary's College of California. He started his career with Chevron in 1978, as a chemist with the Chevron Asphalt Company and then progressed through assignments in Downstream & Chemicals Commercial Sales, Product Engineering, and Lubricants. Gary's responsibilities in Lubricants included Business Center Manager, Area Business Manager, Global Product Line Manager, and Manager of Global Brand and Marketing. He returned to Richmond Technology Center in 2006 as a Technical Team Leader with the Lubricants Product Life Cycle Management group. Gary joined the Chevron Energy Technology Company (ETC) Materials and Corrosion Team in April 2008 to help form up a new team and organizational capability focused on developing advanced materials, corrosion monitoring, and corrosion modeling technologies supporting Chevron Manufacturing and Upstream reliability strategies. He is also the Program Manager for the Materials and Corrosion Technology Development Programs.

Leo Christodoulou, Program Manager, Advanced Manufacturing, Energy Efficiency and Renewable Energy (EERE), Department of Energy – *Panelist*

Dr. Christodoulou is the former Director of the Defense Sciences Office, Defense Advanced Research Projects Agency. He is the recipient of 2006 National Materials Advancement Award, Federation of Materials Societies; 1998 Inventor of the Year, Martin Marietta Corporation; 1996 Grunfeld Medal and Prize, Institute of Materials; and the 1987 Jefferson Cup, Martin Marietta Corporation. He received his B.S. and Ph.D. in Metallurgy at the Imperial College of Science, Technology and Medicine, London; and was a Postdoctoral Research Fellow at Carnegie Mellon University.

Steven Chu, Secretary of Energy – *Speaker*

As United States Secretary of Energy, Dr. Steven Chu is charged with helping implement President Obama's ambitious agenda to invest in clean energy, end our addiction to foreign oil, address the global climate crisis, and create millions of new jobs. Dr. Chu is a distinguished scientist and co-winner of the Nobel Prize for Physics (1997). He has devoted his recent scientific career to the search for new solutions to our energy challenges and stopping global climate change - a mission he continues with even greater urgency as Secretary of Energy. Prior to his appointment, Dr. Chu was the Director of the Department of Energy's Lawrence Berkeley National Lab, where he led the lab in pursuit of alternative and renewable energy technologies. He also taught at the University of California as a Professor Physics and Molecular and Cell Biology. Professor Chu's research in atomic physics, quantum electronics, polymer and biophysics includes tests of fundamental theories in physics, the development of methods to laser cool and trap atoms, atom interferometry, and the manipulation and study of polymers and biological systems at the single molecule level. While at Stanford, he helped start Bio-X, a multidisciplinary initiative that brings together the physical and biological sciences with engineering and medicine. Secretary Chu is a member of the National Academy of Sciences, the American Philosophical Society, the Chinese Academy of Sciences, Academica Sinica, the Korean Academy of Sciences and Technology and numerous other civic and professional organizations. He received an A.B. degree in mathematics, a B.S. degree in physics from the University of Rochester, a Ph.D. in physics from the University of California, Berkeley as well as honorary degrees from 15 universities.

Joseph Desmond, Senior Vice President, Government Affairs and Communications, BrightSource Energy – *Panelist*

Joseph Desmond is Senior Vice President of Government Affairs and Communications for BrightSource Energy. Desmond brings more than two decades of private and public energy sector experience to his role at BrightSource Energy, where he oversees communications, marketing, and government and regulatory affairs. Prior to joining BrightSource Energy, Desmond served as Executive Vice President and Chief Marketing & Business Development Officer at Ice Energy, Inc. and Senior Vice President of External Affairs at NorthernStar Natural Gas. Desmond served in numerous executive roles under California Governor Arnold Schwarzenegger including Deputy Secretary of Energy for the State Resources Agency, Chairman of the California Energy Commission and Undersecretary for Energy Affairs. Prior to public service, Desmond spent four years as President and Chief Executive Officer of Infotility, Inc. Previously, he served as President and Chief Executive Officer of Electronic Lighting, Inc., and Vice President of Parke Industries. He serves on the Board of Directors for the American Council On Renewable Energy (ACORE). Desmond earned a B.S. in Marketing, Finance and Management from Northeastern University where he graduated magna cum laude.

Duane Dimos, Director, Materials Science and Engineering Center, Sandia National Laboratory – *Panelist*

Dr. Dimos is Director of the Materials Science and Engineering Center at Sandia National Laboratories in Albuquerque, NM. Dr. Dimos also leads the Strategic Education Initiative at Sandia, in which he is working to establish an innovation institute model as a new government-university-industry partnership approach to address critical needs in science and engineering education, innovation and competitiveness. Dr. Dimos has been at Sandia since 1990 and has held several technical management positions. His primary research interests are in the areas of electronic ceramics, rapid fabrication methods, ceramic synthesis and processing techniques, and microsystem materials and packaging. He has published over 130 technical papers, edited four proceedings volumes and holds eleven patents. He received his B.A. in Physics from U.C. Berkeley, and M.S. and Ph.D. degrees in Materials Science and Engineering from Cornell University. He also previously worked Air Products & Chemicals, Inc. and at the IBM Research Division at Yorktown Heights, NY. Dr. Dimos is a fellow of the American Ceramic Society and a past chair of the Basic Science Division of the American Ceramic Society.

Alex Harris, Chemistry Department Chair, Brookhaven National Laboratory (BNL) – *Panelist*

Dr. Harris earned a B.A. in chemistry from Swarthmore College in 1978 and a Ph.D. in physical chemistry from the University of California at Berkeley in 1985. He joined AT&T Bell Laboratories, Murray Hill, New Jersey (now Bell Labs of Alcatel-Lucent), in 1985 as a member of the technical staff, Chemical Physics Research, and became head of the Materials Physical Chemistry Research Department in 1996. In 2000, he joined Agere Systems, Allentown, Pennsylvania, as director of the Guided Wave and Electro-optics Research Department, a position he held until he came to Brookhaven in 2003. His basic research interests have focused on molecular dynamics in the condensed phase and at interfaces. He has also pursued applied research in polymers for optical communications and optical data storage applications. In his management roles, he has overseen basic research and applied R&D programs in both corporate and national laboratory settings, including materials and devices for optical communications and materials fuel cell and battery energy technologies. He is a Fellow of the American Physical Society.

Frances Houle, Director of Strategic Initiatives, Chemical Sciences Division, Lawrence Berkeley National Laboratory – *Panel Organizer*

Frances Houle is Director of Strategic Initiatives in the Chemical Sciences Division at Lawrence Berkeley National Laboratory. Her scientific interests are in the areas of mechanisms of surface and thin film chemical transformations, particularly at the nanoscale. She received the BA from the University of California at Irvine and the PhD from the California Institute of Technology, both in chemistry. Her professional experience includes a postdoctoral appointment at LBNL, 28 years as Research Staff Member in the IBM Research Division in San Jose, California, and 2 years as Manager of Materials Development at InVisage Technologies, a startup company making nanoparticle-based image sensors. She has received numerous awards including the 2009 American Vacuum Society John A Thornton Memorial Award and Lecture, the 1999 American Institute of Chemical Engineers Northern California Section Research Project of the Year, and the 1998 IBM Environmental Affairs Excellence Award. She is a Fellow of the American Physical Society and Fellow of the AVS, and member of the American Chemical Society and Materials Research Society. She has been active in professional service, and has over 125 publications and 24 US patents and patent applications.

Vinod Khosla, Founder, Khosla Ventures – *Speaker*

In 2004, Vinod, driven by the need for flexibility to accommodate four teenaged children and a desire to be more experimental, to fund sometimes imprudent "science experiments," and to take on both for-profit and for "social impact" ventures, formed khoslaventures, funded entirely with family funds. His goals remain the same: work and learn from fun and knowledgeable entrepreneurs, build impactful companies through the leverage of innovation, and spend time in a partnership that makes a difference. Vinod Khosla is a charter member of TiE, a not-for-profit global network of entrepreneurs and professionals founded in 1992 that now has more than forty chapters in nine countries. He is also a founding board member of the Indian School of Business. His current passion is social entrepreneurship, with a special emphasis on microfinance as a poverty alleviation tool. He is a supporter of many microfinance organizations in India and Africa. He has been experimenting with education and global housing. Vinod is also passionate about alternative energy, petroleum independence, and the environment.

Michael Kluse, Laboratory Director, Pacific Northwest National Laboratory – *Panelist*

Mike Kluse is Laboratory Director of the Pacific Northwest National Laboratory, operated by Battelle for the U.S. Department of Energy (DOE). He also is Senior Vice President of Battelle. Mr. Kluse is responsible for setting the vision and strategic direction of PNNL. Since assuming the helm in January 2007, he has focused PNNL on advancing the frontiers of science and solving some of our nation's most complex challenges in energy, the environment, and national security. He combines excellence in science and technology, management and operations, and community stewardship to ensure PNNL's world-class research and development. Mr. Kluse joined Battelle at its Columbus corporate headquarters in 1976 as a defense and space systems research scientist. He quickly moved up through the management ranks, serving as Vice President of Battelle's Defense Engineering business and Vice President and General Manager of Battelle's Navy Sector. Mr. Kluse then moved to PNNL in 1997 to lead PNNL's national security business, which he greatly expanded in scope, impact and the number of clients.

Joseph Kocal, Corporate Fellow, Performance Materials and Technologies, Honeywell-UOP – *Organizing Committee, Panel Chair*

Dr. Kocal joined UOP in 1981 after earning a Ph.D. in inorganic chemistry from the University of Wisconsin. Joe has developed catalyst and process technology in the areas of fuels and chemicals, which has led to 48 patents and numerous publications. Joe has been principal investigator on teams leading to the commercialization of numerous processes including production of detergents via alkylation of benzene with n-C10 to n-C14 using a heterogeneous catalyst to replace hazardous HF acid. A different heterogeneous catalyst was developed for isoparaffin alkylation with light olefins for motor fuel gasoline. Joe was technical leader of UOP's exploratory research group of which a key objective was to develop economical technology for conversion of natural gas to chemicals and fuels. Joe was principal author and PI of the 3 year ATP-NIST funded program for conversion of methane to methanol. More recently Joe has worked with a team to develop technology for the utilization of renewable resources. He was principal author and PI of several DARPA and DOE programs for the conversion of biomass to fuels. Currently Joe is scouting potential new technologies to be implemented within Honeywell.

Steven Koonin, Science and Technology Policy Institute, Institute for Defense Analyses – *Speaker*

Dr. Steven E. Koonin served as the U.S. Department of Energy's second Senate-confirmed Under Secretary for Science from May 19, 2009 through November 18, 2011. As Under Secretary for Science, Koonin functioned as the Department's chief scientific officer, coordinating and overseeing research across the DOE. Koonin particularly championed research programs in High Performance Simulation, Exascale Computing, Inertial Fusion Energy, and Greenhouse Gas Monitoring, Reporting, and Verification. He also provided technical counsel on diverse nuclear security matters. Dr. Koonin brought to the post a distinguished career as a university professor and administrator, as well as experience in industry. As the Chief Scientist at BP between 2004 and early 2009, Dr. Koonin developed the long-range technology strategy for alternative and renewable energy sources. He managed the firm's university-based research programs and played a central role in establishing the Energy Biosciences Institute at the University of California Berkeley, the Lawrence Berkeley National Laboratory, and the University of Illinois at Urbana-Champaign.

Theresa Kotanchek, Vice President, Sustainable Technologies & Innovation Sourcing, Dow Chemical – *Organizing Committee*

Theresa Kotancheck leads the strategic integration of sustainability into Dow's business portfolio and R&D function, including establishment of corporate wide metrics and delivery of three breakthroughs to world challenges. In addition, she also leads innovation sourcing, serving as Dow's global leader for external technology, with the responsibility to coordinate Dow's corporate wide interactions with external bodies, including universities, national laboratories, government agencies and development partners, to accelerate commercial delivery of Dow's innovation pipeline. Prior to assuming her current role, Theresa was the Chief Technology Officer of Dow Chemical China Company Limited where she led Asia Pacific R&D, including the development and staffing of Dow's new state-of-the-art R&D center in Shanghai, China. In addition to establishing world-class R&D capabilities in our emerging geographies, she was responsible for achieving the company's Asia Pacific growth strategy through market-driven scientific and technological innovations, enhancing current products as well as creating new business and technology platforms.

Sergio Loureiro, Director, Mechanical Systems, Pratt & Whitney – *Panelist*

Sergio M Loureiro, PhD is the Director of Materials Analysis, Mechanics and Processing at Pratt & Whitney, a world leader in the design, manufacture and service of aircraft engines, space propulsion systems and industrial gas turbines and a unit of United Technologies Corporation. Sergio has numerous years of leadership in management and engineering with extensive experience in the area of Materials Systems Development and Integration. Sergio leads Pratt & Whitney's Materials Analysis, Mechanics and Processing where he has overall responsibility for all Specimen and Component Testing & Validation, Non-Destructive Evaluation, Chemistry and Micro-Analysis, Failure Investigations, and Rapid Prototyping Casting Laboratories for all Commercial, Military, Space and Power Systems business. He joined Pratt & Whitney from GE where he worked to drive growth strategies for several businesses including Energy, Healthcare, Security and Advanced Technology Strategic Initiatives such as Nanotechnology and Integrated Gasification Combined Cycle (Clean Coal).

Michael McQuade, Senior Vice President, Science and Technology, United Technologies – *Speaker*

Dr. J. Michael McQuade was named senior vice president, science and technology in September 2006. His responsibilities include overseeing UTC Power and UTC's Research Center and providing strategic oversight and guidance for research and development activities throughout the corporation. McQuade has held senior R&D and general management positions with technology development oversight at 3M and Eastman Kodak. Beginning in 2002, he was vice president of 3M's Medical Division. Previously, he was president of Eastman Kodak's Health Imaging business, including responsibility for its research laboratories. Prior to 1998, McQuade held several positions at Imation Corp. both before and after its spinoff from 3M in 1996. McQuade holds a doctorate, master of science and bachelor of science degrees in physics from Carnegie Mellon University.

Delia Milliron, Deputy Director, Molecular Foundry, Lawrence Berkeley National Laboratory – *Panelist*

Delia J. Milliron is a Staff Scientist at Lawrence Berkeley National Laboratory and the Deputy Director of the Molecular Foundry, a research center and user facility for nanoscience supported by the U. S. Department of Energy. She received her PhD in Chemistry from the University of California, Berkeley and worked for IBM's research division before coming to LBNL. Her research is motivated by the potential for nanomaterials to introduce new functionality to and reduce manufacturing costs of electronic materials and technologies with a recent emphasis on energy efficient "smart" window coatings.

Edwin H. (Ned) Niccolls, Chevron Energy Technology Company – *Organizing Committee*

Ned is a Senior Consulting Materials Engineer with 35 years experience in refining and petrochemical operations, materials selection, corrosion mitigation, and metallurgy and nonmetallic applications. He is a past chairman of the API Refining Subcommittee on Corrosion and Materials and was appointed a Chevron Fellow in 2007. His current emphasis is to conceive and help establish Advanced Materials/Corrosion/Monitoring R&D programs to improve reliability and operational flexibility. He received his B.S. in Chemical Engineering and M.S. in Materials Science and Engineering from Stanford, with an MBA from St. Mary's College. Prior to Chevron he served two years with the U.S. Army as an ordnance project officer.

David Parekh, Vice President, Research, and Director, United Technologies Research Center – *Co-Chair of Organizing Committee*

Prior to joining UTRC in 2007, Dr. Parekh was Deputy Director of Georgia Tech Research Institute and Associate Vice Provost for Research at the university. His significant contributions included founding Georgia Tech Ireland in 2006 and establishing the university's fuel cell and battery center in 2000. Early in his career, he led various advanced research programs at Boeing Phantom Works. Dr. Parekh holds a doctorate in mechanical engineering and master's degrees in mechanical and electrical engineering from Stanford University, as well as a bachelor's degree in mechanical engineering from Virginia Tech. He is a Fellow of the American Institute of Aeronautics and Astronautics and a member of the Connecticut Academy of Science and Engineering. He serves on the board of the Connecticut Technology Council and the executive board of the Greater Philadelphia Innovation Cluster for Energy-Efficient Buildings.

Julia Phillips, Deputy Chief Technology Officer, Director of Science, Technology and Engineering Innovations and Partnerships at Sandia National Laboratories – *Organizing Committee Member*

Previous positions at Sandia include Director, Nuclear Weapons Science and Technology Programs, Director, Physical, Chemical, and Nano Sciences Center at Sandia National Laboratories, and Director of the DOE Center for Integrated Nanotechnologies (CINT) at Sandia and Los Alamos National Laboratories. After 14 years at AT&T Bell Laboratories, she came to Sandia in 1995. Her research has been in the areas of epitaxial metallic and insulating films on semiconductors, high-temperature superconducting, ferroelectric, and magnetic oxide thin films, and novel transparent conducing materials. Dr. Phillips serves on the Council of the National Academy of Engineering, is past chair of the APS Division of Condensed Matter Physics and served as president of the Materials Research Society. She received the 2008 George E. Pake Prize for outstanding achievements in physics research combined with major success as a manager of research or development. She has served on the editorial boards of "Applied Physics Letters," "Journal of Applied Physics," and "Applied Physics Reviews." She currently chairs the Advisory Review Board for "Journal of Materials Research" and has served as its principal editor. Dr. Phillips holds a Ph.D. in applied physics from Yale University and a B.S. in physics from the College of William and Mary.

Michael Paulus, Director, Technology Transfer, Oak Ridge National Laboratory – *Panelist*

Mike Paulus and the ORNL Technology Transfer Division are responsible for delivering the intellectual property and scientific capabilities of the Oak Ridge National Laboratory to industrial partners to ensure the fullest use of the results of the nation's federal investment in research and development. The technology transfer team fulfills this mission by licensing ORNL intellectual property to industrial partners, negotiating research collaborations (CRADAs) and non-federal Work for Others agreements, and negotiating and managing User Agreements which make ORNL's eleven user facilities available to external partners. Prior to joining the ORNL Partnerships Directorate, Mike served as Vice President of Product Management with Siemens Molecular Imaging, where he and his team were responsible for defining the product portfolio for this world-wide market leader in clinical PET and SPECT diagnostic imaging. He also served as co-founder and CEO of ImTek, Inc, an ORNL spin-out and market leader in laboratory animal x-ray CT imaging before its acquisition by CTI, Inc, and Siemens.

Douglas Ray, Associate Laboratory Director for the Fundamental & Computational Sciences Directorate at the Pacific Northwest National Laboratory (PNNL) – *Organizing Committee*

Dr. Ray is responsible for PNNL's research programs conducted for the Department of Energy's Office of Science and for the National Institutes of Health. He directs more than 700 staff members in four research divisions: Atmospheric Sciences & Global Change, Biological Sciences, Chemical & Materials Science, and Computational Sciences & Mathematics. Dr. Ray joined PNNL in 1990. A laser spectroscopist, Dr. Ray's research interests include the effects of weak intermolecular interactions on chemical phenomena in condensed phases, at interfaces, in clusters and in supramolecular complexes. He earned a B.S. degree in Physics from Kalamazoo College and a Ph.D. in Chemistry from the University of California at Berkeley. Dr. Ray is a member of the American Chemical Society,

American Physical Society, American Geophysical Union, American Association for the Advancement of Science, U.S.-Japan Joint Committee for Cooperation in High Energy Physics, International Advisory Committee for the Dalian National Laboratory for Clean Energy, and the International Energy Agency's Experts Group on Science for Energy.

Horst Simon, Deputy Laboratory Director, Lawrence Berkeley National Laboratory – *Co-Chair of Organizing Committee*

Horst Simon is an internationally recognized expert in computer science and applied mathematics. Simon joined Berkeley Lab in early 1996 as director of the newly formed National Energy Research Scientific Computing Center (NERSC), and was one of the key architects in establishing NERSC at its new location in Berkeley. Simon was also the founding director of Berkeley Lab's Computational Research Division, and served as Associate Lab Director for Computing Sciences. He is also an adjunct professor in the College of Engineering at the University of California, Berkeley. Simon's research interests are in the development of sparse matrix algorithms, algorithms for large-scale eigenvalue problems, and domain decomposition algorithms for unstructured domains for parallel processing. His algorithm research efforts were honored with the 1988 and the 2009 Gordon Bell Prize for parallel processing research. He was also member of the NASA team that developed the NAS Parallel Benchmarks, a widely used standard for evaluating the performance of massively parallel systems. He is co-editor of the biannual TOP500 list that tracks the most powerful supercomputers worldwide, as well as related architecture and technology trends. He holds an undergraduate degree in mathematics from the Technische Universität, in Berlin, Germany, and a Ph.D. in Mathematics from the University of California at Berkeley.

Stefan Wurm, Director of Lithography, SEMATECH – *Panelist*

Dr. rer. nat. Stefan Wurm is the Director of Lithography at SEMATECH. SEMATECH's lithography division is focused on enabling the supporting lithography infrastructure to make future technologies successful. Key program emphasis is on Extreme Ultraviolet Lithography (EUVL) and emerging lithography technologies, with special emphasis on infrastructure development including photoresist and mask technology. Dr. Wurm is at SEMATECH on assignment from GLOBALFOUNDRIES where he is a Principal Member of Technical Staff in the Strategic Lithography Technology Department. Prior to joining GLOBALFOUNDRIES Dr. Wurm held technical and management positions in research and development at AMD, SEMATECH, Qimonda, Infineon, and SIEMENS Semiconductor Group. He has been on prior assignments to SEMATECH in the late 1990's in the International 300mm Initiative (I300I) and at International SEMATECH, where he was responsible for 300mm metrology tool equipment demonstrations. From 2004 to 2008 he served as SEMATECHs EUV Program Manager and from 2008 to 2011 he was the Associate Director of Lithography at SEMATECH. From 2000 to 2003 he was on assignment to the EUV Limited Liability Company in Livermore, CA.

Omar Yaghi, Director, Molecular Foundry, LBNL – *Speaker*

Dr. Yaghi's work encompasses the synthesis, structure and properties of inorganic compounds and the design and construction of new crystalline materials. He is widely known for inventing several extensive classes of new materials termed metal-organic frameworks, zeolitic imidazolate frameworks, and covalent organic frameworks. His early accomplishments in the design and synthesis of new materials have been honored by the Solid State Chemistry Award of the American Chemical Society and Exxon Co. (1998) and the Sacconi Medal of the Italian Chemical Society (1999). His work on hydrogen storage was recognized by Popular Science Magazine, which listed him among the 'Brilliant 10' scientists and engineers in USA (2006), and the US Department of Energy Hydrogen Program Award for outstanding contributions to hydrogen storage (2007). He was the sole recipient of the Materials Research Society Medal for pioneering work in the theory, design, synthesis and applications of metal-organic frameworks and the AAAS Newcomb Cleveland Prize for the best paper published in Science (2007). He is the recipient of the American Chemical Society Chemistry of Materials Award (2009). Dr. Yaghi received his Ph.D. from the University of Illinois-Urbana (1990) with Professor Walter G. Klemperer. He was an NSF Postdoctoral Fellow at Harvard University (1990-92) with Professor Richard H. Holm. He has been on the faculties of Arizona State University (1992-98) and University of Michigan (1999-2006).

EXPLORE AND COLLABORATE
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MATERIALS FOR ENERGY APPLICATIONS

POSTER SESSION **DETAILS**

Chemical: catalysis, materials synthesis

Local Organizers: Frances Houle, FAHoule@lbl.gov; Joseph Satcher, LLNL, satcher1@llnl.gov

1. **National Laboratory Chemical Synthesis Capabilities**
   Presented by Phillip Britt, ORNL, brittpf@ornl.gov
   Contributors: T. Don Tilley, LBNL, TDTilley@lbl.gov; Delia Milliron, LBNL, DMilliron@lbl.gov; Simona Murph, SRNL, simona.murph@srnl.doe.gov; Alex Harris, BNL, AlexH@bnl.gov; Lou Terminello, PNNL, louis.terminello@pnnl.gov; John Mitchell, ANL, mitchell@anl.gov; Daniel Ginosar, INL, daniel.ginosar@inl.gov; Joe Satcher, LLNL, satcher1@llnl.gov; Kevin Ott, LANL, kcott@lanl.gov; Terry Aselage, SNL, tlasela@sandia.gov; Bryan Morreale, NETL, bryan.morreale@netl.doe.gov; Phillip Britt, ORNL, brittpf@ornl.gov

2. **National Laboratory Materials Synthesis Capabilities**
   Presented by Simona Murph, SRNL, simona.murph@srnl.doe.gov
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3. **National Laboratory Catalysis R&D Capabilities**
   Presented by Alex Harris, BNL, alexh@bnl.gov
   Contributors: T. Don Tilley, LBNL, TDTilley@lbl.gov; Alex Harris, BNL, alexh@bnl.gov; Phillip Britt, ORNL, brittpf@ornl.gov; Simona Murph, SRNL, simona.murph@srnl.doe.gov; Lou Terminello, PNNL, louis.terminello@pnnl.gov; John Mitchell, ANL, mitchell@anl.gov; Daniel Ginosar, INL, daniel.ginosar@inl.gov; Joe Satcher, LLNL, satcher1@llnl.gov, Kevin Ott, LANL, kcott@lanl.gov, Terry Aselage, SNL, tlasela@sandia.gov; Britt Hedman, SLAC, bhedman@stanford.edu

4. **National Laboratory Catalysis Solutions**
   Presented by Charles Peden, PNNL, chuck.peden@pnnl.gov
   Contributors: Phillip Britt, ORNL, brittpf@ornl.gov; Alex Harris, BNL, AlexH@bnl.gov; Lou Terminello, PNNL, louis.terminello@pnnl.gov; Daniel Ginosar, daniel.ginosar@inl.gov; Kevin Ott, LANL, kcott@lanl.gov; Bryan Morreale, NETL, bryan.morreale@netl.doe.gov; Britt Hedman, SLAC, bhedman@stanford.edu

Energy: grid, carbon capture/sequestration, combustion

Local Organizers: Ken Goldberg, kagoldberg@lbl.gov, Zahid Hussein, ZHussain@lbl.gov, Curt Oldenburg, CMOldenburg@lbl.gov

5. **Geologic Carbon Dioxide Sequestration**
   Presented by Curt Oldenburg, LBNL, cmoldenburg@lbl.gov
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6. **Carbon Dioxide Capture Research and Development**
   Presented by Charles Freeman, PNNL, Charles.Freeman@pnnl.gov
   Contributors: Berend Smit, LBNL; Madhava Syamlal, NETL; Kathryn Berchtold, LANL; Eric Peterson, INL, Patrick Looney, BNL; Travis McLing, INL; Deb Agarwal, LBNL; Julio Friedmann, LLNL; Melissa Fox, LANL; Geo Richards, NETL; Robin Newmark, NREL; Gernot Rother, ORNL; Tom Brouns, PNNL; Jason Heath, SNL; David Borns, SNL

7. **Clean and Efficient Combustion for Energy Security**
   Presented by Andrew McIlroy, SNL, amcilr@sandia.gov
   Contributors: Stephen R. Leone, LBNL, SRLeone@lbl.gov; George Muntean, PNNL, george.muntean@pnl.gov; Steve Pratt, ANL, stpratt@anl.gov; Bill Pitz, LLNL, pitz1@llnl.gov; George Richards, NETL, George.Richards@NETL.DOE.GOV; Bryan Morreale, NETL, Bryan.Morreale@NETL.DOE.GOV; Wendy Clark, NREL, Wendy.Clark@nrel.gov; David B. Carrington, LANL, dcarring@lanl.gov; Ron Graves, ORNL, gravesrl@ornl.gov; Alex Harris, BNL, alexh@bnl.gov; Steve Ciatti, ANL, SCiatti@anl.gov

8. **Industry Gateway to BES User Facilities**
   Presented by Piero Pianetta, SLAC, pianetta@slac.stanford.edu
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9. **Grid Materials and Superconductivity**
   Presented by Qiang Li, BNL, liqiang@bnl.gov
   Contributors: George Crabtree, ANL Crabtree@anl.gov; Mariappan Parans Paranthaman, paranthamanm@ornl.gov; John Clem, Ames Lab, clem@ameslab.gov

Renewables, emerging energy: photovoltaics, solar fuels, electrical energy storage systems

Local Organizer: Jeff Neaton, jbneaton@lbl.gov

10. **Solar PV/MPV**
    Presented by Elise Fox, SRNL, elise.fox@srnl.doe.gov
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11. **Wind and Water Power: Test Facilities and Industry Partnerships**
    Presented by Ralph Nichols, SRNL, ralph.nichols@srnl.doe.gov
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12. **Biomass**
    Presented by John Holladay, PNNL, john.holladay@pnnl.gov
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13. **Materials for Electrical Energy Storage**
    Presented by Jerry Hunt, ANL, jehunt@anl.gov
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14. **Artificial Photosynthesis Research in the DOE National Laboratories**
    Presented by Joel Ager, LBNL
    Contributors: John Turner, NREL, John.Turner@nrel.gov; Bill Tumas, NREL, bill.tumas@nrel.gov; Mark Hybertsen, BNL, mhyberts@bnl.gov; Alex Harris, BNL, alexh@bnl.gov; Morris Bullock, PNNL, morris.bullock@pnnl.gov; Michael R. Wasielewski, Northwestern University, m-wasielewski@northwestern.edu, Jerry Simons, Sandia, jsimmon@sandia.gov

15. **High-Performance Computing Capabilities Within DOE**
    Presented by Vincenzo Lordi, LLNL, lordi2@llnl.gov
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16. **User Facilities for Materials Characterization**
    Presented by P. James (Jim) Schuck, LBNL, pjschuck@lbl.gov
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Energy Efficiency: buildings, windows, light-weight materials

Local Organizer: Robert Kostecki, r_kostecki@lbl.gov

17. **Energy Efficient Building Envelope**
    Presented by Steve Selkowitz, LBNL, SESelkowitz@lbl.gov

18. **Passive and Active Building Energy Systems**
    Presented by Ron Judkoff, NREL, Ron.Judkoff@nrel.gov,

19. **Indoor Air Quality- Monitoring and Remediation**
    Presented by Bill Fisk, LBNL, WJFisk@lbl.gov
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20. **Lightweight Materials**
    Presented by Dan Thoma, LANL, thoma@lanl.gov

21. **Next Generation Lighting**
    Presented by Jerry Simmons, SNL, jsimmon@sandia.gov

Manufacturing: Scalable Simulation Science

Local Organizer: David Skinner, deskinner@lbl.gov

22. **Partnering in Materials Science and Leadership Computing**
    Presented by Suzy Tichenor, ORNL, tichenorsp@ornl.gov and Jack Wells, ORNL, wellsjc@ornl.gov

23. **Partnering in Renewable Energy**
    Presented by Avi Purkayastha, NREL, avi.purkayastha@nrel.gov

24. **Software Opportunities: Industry, ISVs and SciDAC**
    Presented by David Skinner

25. **Computing and Manufacturing**
    Presented by David Martin, LBNL, deskinner@lbl.gov

Electronics: high voltage, low power

Local Organizer: Jeff Bokor, LBNL, jbokor@lbl.gov

26. **Facilities**
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27. **Smart Systems**
    Presented by Wahid Hermina, SNL, wlhermi@sandia.gov
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28. **Power Systems**
    Presented by Wahid Hermina, SNL, wlhermi@sandia.gov

Technology Transfer

Local Organizer: Shanshan Li, LBNL, shanshanli@lbl.gov

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29. **Sponsored Research – Gaining Benefits from DOE Lab Facilities and Experts**

30. **Licensing – Accessing Breakthrough Technologies**

31. **Collaborative Research (CRADA) – Leveraging Your Research Dollars**

32. **How to Benefit from the DOE User Facilities**

33. **New Initiatives and Alternative Technology Commercialization Programs**

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For contact updates visit the workshop website

HTTP://WWW.LBL.GOV/MFEA/

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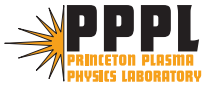

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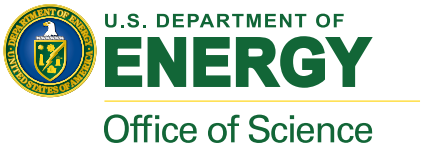

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