

CERAMIC LEADERSHIP SUMMIT

June 21-22, 2010

Baltimore, MD

Hyatt Regency

*Exploring the major trends affecting
the Ceramic Materials Community*

www.ceramics.org/cls

ACerS 2010-2012 Meeting Calendar

July 11–13, 2010

Advances in Cement-based Materials: Characterization, Processing, Modeling and Sensing
Purdue University, West Lafayette, Indiana, USA

October 17–21, 2010

MS&T'10 - Materials Science & Technology 2010 Conference and Expo, combined with ACerS
112th Annual Meeting
George R. Brown Convention Center, Houston, Texas, USA
[Early registration ends September 24, 2010]

November 14–18, 2010

International Congress on Ceramics (ICC3)
Osaka International Convention Center, Osaka, Japan

January 19–21, 2011

Electronic Materials and Applications 2011
Orlando, Florida, USA
[Call for Papers. Abstracts due August 2, 2010]

January 23–28, 2011

35th International Conference & Exposition on Advanced Ceramics & Composites
Hilton Daytona Beach Resort and Ocean Center, Daytona Beach, Florida, USA
[Call for Papers. Abstracts due July 19, 2010]

July 10–14, 2011

PACRIM9 - The 9th International Meeting of Pacific Rim Ceramic Societies
Cairns, Australia
[Call for Papers]

August 1–3, 2011

Ceramic Leadership Summit 2011
Hyatt Regency Baltimore, Baltimore, Maryland, USA

October 16–20, 2011

Materials Science & Technology 2011 Conference and Exhibition - MS&T'11 combined with the
ACerS 113th Annual Meeting
Greater Columbus Convention Center, Columbus, Ohio, USA

November 11–14, 2011

UNITECR 2011
Kyoto, Japan

July 15–19, 2012

International Congress on Ceramics (ICC4)
Sheraton Chicago Hotel & Towers, Chicago, Illinois, USA

Welcome to the Ceramic Leadership Summit. The Summit is different than ACerS' typical technical meetings. Over the course of the next two days, we will focus on some of the most important strategic challenges confronting the ceramic materials and technologies community.

The list of invited speakers includes some of the most respected leaders in our community, and the highly interactive format will also take advantage of the expertise of those in attendance. The Summit is organized into four general sessions and concurrent tracks that cover Energy Innovations, Defense Innovations, Ceramic Frontiers, and the Business & Research Environment

In addition to the top notch speakers and opportunities to network with key decision makers, the Summit features a Young Professionals Program designed to develop future talent within the materials science community.

The Summit would not have been possible without the generous support of our corporate sponsors: **Ceradyne, Inc., Corning Incorporated, Kyocera, and Lux Research.**

We would also like to thank our session moderators, who have provided significant help in getting the quality of speakers you see represented at this meeting:

Defense Innovations Track: Jim McCauley, Army Research Laboratory

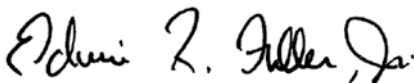
Ceramic Frontier Track (AM Sessions): Ed Fuller, NIST

Ceramic Frontier Track (PM Sessions): David Johnson, Stevens Institute of Technology

New Realities for Materials Research Funding Session: Lynnette Madsen, National Science Foundation Energy Innovations Track and Global Business Climate Session: Peter Wray, ACerS

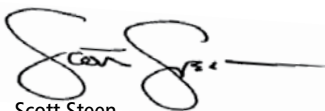
Finally, we would like to thank you for being part of this exciting opportunity to hear from industry leaders on the economic, political, societal, technological and environmental challenges affecting the ceramic materials community in the next five to ten years.

Enjoy the Ceramic Leadership Summit!



Edwin Fuller Jr.

ACerS President



Scott Steen

ACerS Executive Director

MONDAY, JUNE 21, 2010

- 8:00–10:00 A.M. CEO AND SENIOR EXECUTIVE FORUM (invitation only)—Annapolis
FUTURE LEADERS ORIENTATION (invitation only)—Baltimore
- 10:00 A.M.–NOON GENERAL SESSION 1: Emerging Business and Technology Opportunities and Challenges for the Ceramics Community—Constellation Ballroom A & B
- NOON–1:30 P.M. LUNCH AND INFORMAL GROUP DISCUSSIONS—Continue discussions during lunch. Join your peers at one of the tables reserved for specific groups (Large, Corporate Executives, Small Businesses & Entrepreneurs, Education Leaders, Researchers, and Future Leaders) or join a cross-section of people at unreserved tables.—Constellation Ballroom E & F
- 1:30–3:00 P.M. GENERAL SESSION 2: Materials for a Secure and Stable Energy Future—Constellation Ballroom A & B
- 3:00–3:30 P.M. REFRESHMENT BREAK—Foyer
- 3:30–5:00 P.M. GENERAL SESSION 3: The Future of Ceramic Education: Changing Needs, Changing Realities—Constellation Ballroom A & B
- 6:45–7:30 P.M. RECEPTION—Harborview
- 7:30–9:30 P.M. OPENING NIGHT DINNER—Constellation Ballroom A & B

TUESDAY, JUNE 22, 2010

- 7:00–8:30 A.M. FUTURE LEADERS BREAKFAST MEETING (invitation only)—Baltimore
- 7:45–8:30 A.M. CONTINENTAL BREAKFAST—Atrium
- 8:30–10:25 A.M. TRACK 1: ENERGY INNOVATIONS
Constellation Ballroom C
- 8:30–9:25 A.M. Enabling a Nuclear Renaissance
- 8:30–10:25 A.M. TRACK 2: DEFENSE INNOVATIONS
Constellation Ballroom E
- 8:30–9:25 A.M. Meeting Materials Needs for 21st Century Defense
- 8:30–10:25 A.M. TRACK 3: CERAMIC FRONTIERS
Constellation Ballroom F
- 8:30–9:25 A.M. Ceramic Materials for Clean Air Technologies
- 9:30–10:25 A.M. Next Steps for Fuel Cells
- 9:30–10:25 A.M. Multi-spectral Transparent Materials Technologies
- 9:30–10:25 A.M. Designer Materials: Multi-scale Modeling
- 10:30–10:45 A.M. REFRESHMENT BREAK—Foyer
- 10:45–11:40 A.M. TRACK 4: BUSINESS & RESEARCH ENVIRONMENT
- 10:45–11:40 A.M. New Realities for Materials Research Funding—Constellation Ballroom E
- 10:45–11:40 A.M. The Global Business Climate for Ceramic-related Industries—Constellation Ballroom F
- 11:45 A.M.–1:00 P.M. HOSTED LUNCH – Buffet in Atrium
- 1:00–3:00 P.M. TRACK 1: ENERGY INNOVATIONS
Constellation Ballroom C
- 1:00–1:55 P.M. Ceramic Materials for Efficient and Clean Power Generation
- 1:00–3:00 P.M. TRACK 2: DEFENSE INNOVATIONS
Constellation Ballroom E
- 1:00–1:55 P.M. Opaque and Transparent Armor Ceramics
- 1:00–3:00 P.M. TRACK 3: CERAMIC FRONTIERS
Constellation Ballroom F
- 1:00–1:55 P.M. Integration of Ceramics in Advanced Microsystems
- 2:00–2:55 P.M. Materials for Advanced Sodium Metal Halide Batteries
- 2:00–2:55 P.M. High Temperature Ceramics for Military Applications
- 2:00–2:55 P.M. Ceramics for Electronics and Communications
- 3:00–3:15 P.M. REFRESHMENT BREAK—Foyer
- 3:15–5:00 P.M. GENERAL SESSION 4: Ten in Ten: Which Ceramic Technologies Will Transform the World—Constellation Ballroom A & B
- 5:15–10:00 P.M. ACeS VOLUNTEER LEADERSHIP RETREAT OPENING EVENT—All retreat participants invited. Meet in Hyatt lobby to walk to picnic (5:30-7:00 p.m.) followed by Orioles vs. Marlins.—Camden Yards

WEDNESDAY, JUNE 23, 2010

- 8:00 A.M.–NOON ACeS VOLUNTEER LEADERSHIP RETREAT—Constellation Ballroom E
- 1:00–5:00 P.M. ACeS BOARD MEETING—Chesapeake A & B

Hyatt Regency Ballroom Floorplan





Rodney Lanthorne



Joel Moskowitz



David Morse

MONDAY, JUNE 21, 2010

GENERAL SESSION 1

10:00 A.M. TO NOON

Emerging Business and Technology Opportunities and Challenges for the Ceramics Community

Global corporate leaders provide their perspectives on the economic, political, societal, technological, and environmental opportunities and challenges facing the ceramic materials and technologies community during the next five to ten years. The talks will be followed by a facilitated dialogue with Summit participants.

Session Leader: **Rodney Lanthorne**, Vice-Chairman, Kyocera International, Inc.

Session Leader: **Joel Moskowitz**, Chairman of the Board, President & CEO of Ceradyne, Inc.

Session Leader: **David Morse**, Senior Vice President, Director of Research, Corning Inc.

GENERAL SESSION 2

1:30 TO 3:00 P.M.

Materials for a Secure and Stable Energy Future

During the past five years, the Department of Energy's Office of Basic Energy Sciences has engaged thousands of scientists around the world to study the current status, limiting factors and specific fundamental scientific bottlenecks of the widespread implementation of alternate energy technologies. From these efforts, it is clear that the magnitude of the challenge is so immense that existing approaches will not be enough to secure our energy future. During this session, we will explore how meeting these challenges will require scientific breakthroughs in new materials and chemical processes to make possible new energy technologies and performance levels far beyond what is now possible.

Session Leader: **John C. Hemminger**, Chair, Basic Energy Sciences Advisory Committee DOE Office of Science, and Dean, School of Physical Sciences, UC, Irvine

Session Leader: **Patricia M. Dehmer**, Deputy Director for Science Programs for Office of Science, U.S. Department of Energy

At the close of this General Session, Professor Kevin Hemker, Johns Hopkins University, will deliver a short talk entitled "Linking Transformational Materials and Processing for an Energy Efficient and Low-Carbon Economy: Vision Report of the Energy Materials Blue Ribbon Panel."

GENERAL SESSION 3

3:30 TO 5:00 P.M.

The Future of Ceramic Education: Changing Needs, Changing Realities

The ceramic engineering education landscape has changed dramatically during the last 20 years and is continuing to change. During this session, two leading ceramic educators provide their perspectives on these changes, as well as what needs to happen to make ceramic education more relevant for the future. The presenters will also explore the importance of building much stronger and more sustainable relationships between these programs and industry, followed by a lively discussion with Summit participants.

Speaker: **Doreen Edwards**, Dean, Kazuo Inamori School of Engineering, Alfred University

Speaker: **Wayne Huebner**, Chairman, MSE, Missouri University of Science & Technology

TUESDAY, JUNE 22, 2010

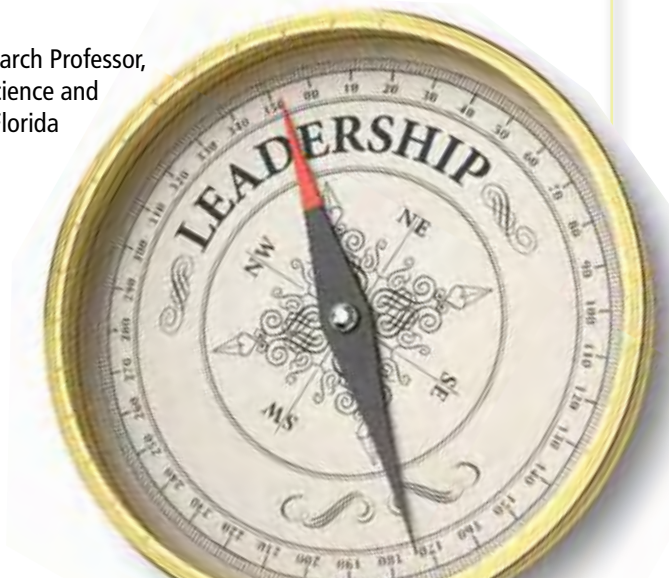
GENERAL SESSION 4

3:15 TO 5:00 P.M.

Ten in Ten: Which Ceramic Technologies Will Transform the World?

Explore the ceramic technologies that are likely to transform the world over the next ten years. Throughout the Ceramic Leadership Summit you will hear the latest thinking from noted scientists, leaders, and colleagues. During this closing session, we will connect the concepts, predictions, and provocations that you've encountered from those thought leaders with input from nearly 400 ACerS members who participated in a survey about ceramic technologies that are most likely to have a significant impact in the future. Working in cross-discipline groups, you will generate guidance on where the science, supporting technologies, and the profession must head to meet the needs of the ever evolving world.

Speaker: **Larry Hensch**, Graduate Research Professor,
Department of Materials Science and
Engineering, University of Florida



TUESDAY, JUNE 22, 2010

TRACK 1: ENERGY INNOVATIONS

8:30 TO 9:25 A.M.

Enabling a Nuclear Renaissance: Better, Faster, Cheaper Using Advanced Ceramics

The nuclear industry is at the eye of a perfect storm with fuel oil and natural gas prices near record highs, worldwide energy demands increasing at an alarming rate, and increased concerns about greenhouse gas emissions that have caused many to look negatively at long-term use of fossil fuels. This convergence of factors has led to a growing interest in revitalization of the nuclear power industry within the United States and around the globe. This session will discuss the critical role that ceramic materials play throughout the entire fuel cycle and the critical role of materials advancements in the 'nuclear renaissance.'

Session Leader: **John Marra**, Associate Laboratory Director, Savannah River National Lab

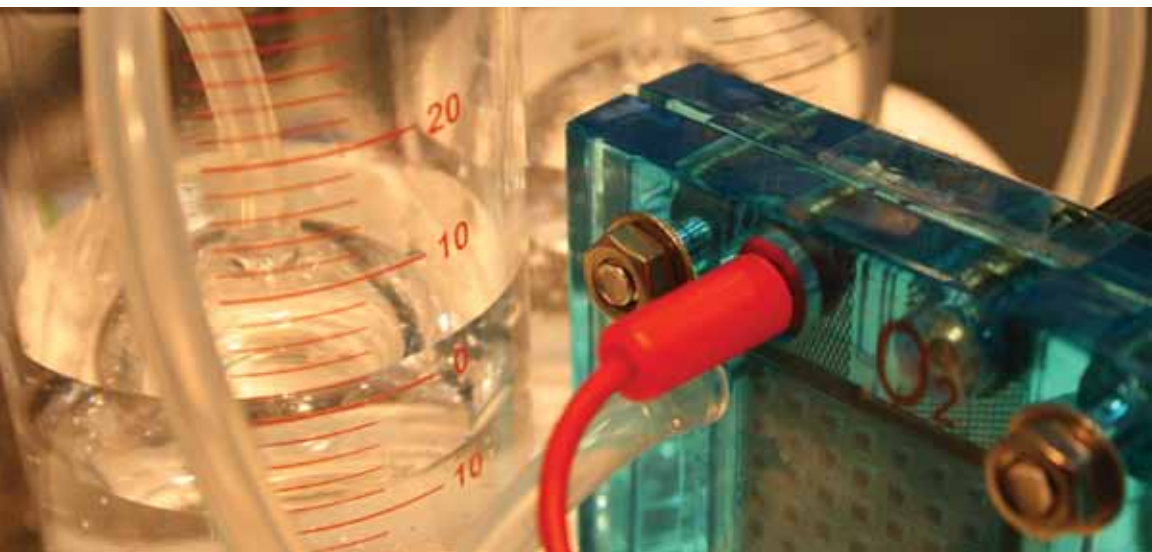
9:30 TO 10:25 A.M.

Next Steps for Fuel Cells

Fuel cells are entering early markets in consumer products, generators of electricity, combined heat and power systems, industrial vehicles, and much more. Solid oxide systems are being developed for many of these markets, and the U.S. DOE envisions SOFC systems as simplifying and reducing the cost of carbon sequestration from coal. This session will discuss the fuel cell vision and the steps needed to make the vision a reality, as well as "Ceramics: The Heart of SOFC Systems."

Session Leader: **Robert Rose**, Senior Advisor and Founder, U.S. Fuel Cell Council

Session Leader: **Claus Peter Kluge**, Manager, R&D, CeramTec AG



1:00 TO 1:55 P.M.

An Industry Perspective: Development and Application of Ceramic Materials for Efficient and Clean Power Generation

Two leaders from United Technologies Research Center will provide their perspective on ceramic materials development and application for efficient and clean power generation. UTRC plays a key role as the innovation engine for United Technologies, focusing on advanced technologies and bringing those technologies to the marketplace. The presentation will share UTRC's experience in materials development, component testing, and system or sub-system demonstration and discuss material needs for near-term efficient and low emission power systems.

Session Leader: **William Tredway**, Group Leader for Ceramics and Deputy Department Leader for the Physical Sciences Department, United Technologies Research Center

Session Leader: **Ellen Sun**, Principal Research Scientist, United Technologies Research Center

2:00 TO 2:55 P.M.

Materials For Advanced Sodium Metal Halide Batteries

The world needs large-scale energy storage devices and systems that are safe, reliable and economical. They can help to manage utility grids, expand adoption of solar and wind power, accelerate adoption of electric motor vehicles, and enable billions of people to come online into the age of electricity. There are currently few economically viable and technically feasible storage solutions that are dispatchable and meet the stringent cost and reliability demands. High energy density sodium metal halide battery technology is emerging as one of the key solutions, and GE is playing a leadership role in addressing the technology challenges and taking it to the manufacturing and commercial stages. This presentation will discuss the critical role that materials, particularly ceramics, play in the performance and life of sodium metal halide batteries.

Session Leader: **Mohamed Rahmane**, Senior Engineer/Project Leader, GE Global Research



TRACK 2: DEFENSE INNOVATIONS

8:30 TO 9:25 A.M.

Meeting Materials Needs for 21st Century Defense

Using the Department of Defense & Engineering Imperatives as a backdrop for strategic planning in materials research, this session will explore recent studies in strategic materials planning and strategic initiative opportunities, relating them to specific needs and opportunities in ceramic and ceramic-hybrid materials. The discussion will emphasize the need for applying contemporary computational techniques to materials design, and development and testing, as well as the importance of curricula and education in materials science and engineering in general, and ceramics in particular.

Session Leader: **Lewis E. Slotter, II**, Associate Director of Materials and Structures, Office of the Director, Defense Research & Engineering, Department of Defense



9:30 TO 10:25 A.M.

Multi-spectral Transparent Materials Technologies

Ceramic windows and domes protect delicate sensors from harsh environments while transmitting electromagnetic radiation in one or more spectral regions. There are no durable materials that transmit both midwave (3-5 microns) and longwave (8-12 microns) infrared radiation. This session will explore current thrusts in window research and development, including the fabrication of nanocomposites with properties not attained by monolithic materials, making conformal shapes that extend the state-of-the-art in machining and metrology, and scaling up transparent ceramics to make meter-class windows.

Session Leader: **Daniel C. Harris**, Senior Scientist and Esteemed Fellow, Naval Air Systems Command, U.S. Navy

1:00 TO 1:55 P.M.

Opaque and Transparent Armor Ceramics

Ceramics were first used extensively in body armor and helicopter seats during the Vietnam era, when work on armor ceramics reached its first peak. Since that time work has been sporadic and it has been hard to sustain the required longer term research activities and critical mass groups. This has changed dramatically over the last several years with the increase in terrorism and the asymmetric conflicts in the Middle East and the Army's plan to undergo a transformation to a more agile, deployable and survivable Future Force. The key issues for armor remain pretty much the same: cost, performance, production capacity and strategic availability. This talk will review some historical information as well as current and future activities, including a new Board of Army Science and Technology/National Materials Advisory Board study committee "To Review Opportunities in Protection Materials Science and Technology for Future Army Applications."

Session Leader: **James W. McCauley**, Chief Scientist in Materials/ARL Fellow, U.S. Army Research Laboratory, APG

Session Leader: **Parimal Patel**, U.S. Army Research Laboratory, APG

2:00 TO 2:55 P.M.

High Temperature Ceramics for Military Applications

Ceramic materials are attractive candidates for use in a variety of defense applications where their high temperature capability offers considerable benefits, including aircraft turbine engines and space vehicle thermal protection. While the opportunities are many, so are the challenges for transitioning these materials from the lab to production in the marketplace. Performance, manufacturing and cost are issues that face the development and customer communities on a daily basis. This session will explore current opportunities and payoffs for high temperature ceramics and the challenges for their transition to military systems.

Session Leader: **Allan Katz**, Senior Program Manager, Ceramics Branch, Materials and Manufacturing Directorate, Air Force Research Laboratory, WPAFB

TUESDAY, JUNE 22, 2010

TRACK 3: CERAMIC FRONTIERS

8:30 TO 9:25 A.M.

An Industry Perspective: Development and Application of Ceramic Materials for Clean Air Technologies

Corning played a key role in inventing cellular ceramics structure for catalytic converters, and is continuing this tradition by focusing on the next generation of substrates and filters for clean air technologies. This session will examine Corning's experience in materials research and reliability testing of components related to emission control, and explore the regulatory requirements demanding improved efficiency and product performance. The implications on the current and future needs for ceramic materials and their requirements will be also be discussed.

Session Leader: **Sujanto Widjaja**, Project Manager, Science & Technology Division, Corning Inc.

9:30 TO 10:25 A.M.

Designer Materials: Multi-scale Modeling

This session will review current computational trends in first-principles design of armor ceramics using multi-scale modeling and the special computational challenges that are required for linking the vast spatiotemporal scales from the quantum to the continuum. The challenge of across-the-scale experimental validation of multi-scale models of brittle ceramic materials for simulating the physics of fragmentation, and how the initiation, growth and coalescence of microcracks in simulations can be concurrently passed across spatiotemporal scales will also be reviewed.

Session Leader: **George A. Gazonas**, Research Physicist, U.S. Army Research Lab



1:00 TO 1:55 P.M.

Integration of Ceramics in Advanced Microsystems

Advanced microsystems are being developed that can sense, think, act and communicate to provide new capabilities for integrated circuits, sensors and rf-systems. Ceramics will play an important role in this revolution. However, integration of new materials into integrated circuit and packaging technologies is a major challenge. New process control strategies are being developed and used to improve the ability to design and integrate multi-material systems into sophisticated devices. New process technologies are also leading to capabilities for producing parts quicker, cheaper and with more functionality. In addition, many of the challenges and opportunities in advanced microsystem technologies will be based on understanding science at the nanoscale. This session will cover these important trends in the microtechnology field and the impact that new ceramic materials and fabrication methods will have in achieving greater miniaturization and functionality. Ewsuk's talk is entitled "Enabling ceramic materials and processing science and technology for microsystems packaging and integration." Shaw's talk is entitled "Ceramic materials for advanced microelectronic applications."

Session Leader: **Kevin Ewsuk**, Manager, Advanced Microsystems Packaging Dept., Sandia National Labs

Session Leader: **Thomas M. Shaw**, Research Staff Member, IBM Thomas J. Watson Research Ctr.

2:00 TO 2:55 P.M.

Ceramics for Electronics and Communications

Materials with non-linear properties were among the first electroceramics used in the industry. Today these materials are widely used in different kinds of applications but are hardly recognized for their importance. They protect electronic circuits from current or voltage overloads, help home appliances to save energy and have become an essential part in today's automotive electronics. The basics of PTCRs, NTCRs and varistors haven't change dramatically but integration and miniaturization have left their marks on these components as well. Increased operation temperature ranges and rising energy densities are just two parameters which drive the development of materials, processes and design. This talk will address the relationship between material development, analytical capabilities, processing, simulation and component design.

Session Leader: **Christian Hoffmann**, Vice President, EPCOS OHG



TUESDAY, JUNE 22, 2010

TRACK 4: BUSINESS & RESEARCH ENVIRONMENT

10:45 TO 11:40 A.M.

New Realities for Materials Research Funding

This session discusses new U.S. Government research funding realities. The Department of Energy's Office of Basic Energy Sciences supports research to understand, predict and control matter and energy. The total FY10 budget appropriation increased by 3%. The Air Force Office of Scientific Research has the responsibility to discover, shape and champion basic research. Over the past five years, AFOSR's core basic research budget has increased approximately \$100M. The Office of Naval Research provides funding across a broad spectrum of technology levels. The ONR budget is approximately \$2B. The National Science Foundation received an increase of 7% over 2008. These numbers point to an anticipated increase in materials research funding, particularly in priority areas.

Session Leader and Moderator: **Lynnette D. Madsen**, Program Director for Ceramics, National Science Foundation

Session Leader: **Linda Horton**, Division Director, Division of Materials Sciences and Engineering, Department of Energy

Session Leader: **Joycelyn Harrison**, Program Manager, Air Force Office of Scientific Research

Session Leader: **Eric Wuchina**, Program Officer, Office of Naval Research

10:45 TO 11:40 A.M.

The Global Business Climate for Ceramic-related Industries

This session will examine market drivers, emerging technology trends and overall dynamics across several areas related to applications of ceramics, such as materials and manufacturing, energy, transportation and water treatment. We will look at trends, successes and failures of venture capitalist financing in these areas, as well as the effect of the recent economic downturn, especially on broad categories of coatings and composites. We will also discuss opportunities and challenges for emerging technology adoption in these areas.

Session Leader: **Evgenia Pekarskaya**, Senior Analyst, Lux Research



Patricia M. Dehmer, Deputy Director for Science Programs, Office of Science, U.S. Department of Energy, Washington DC

Topic: Materials for a Secure and Stable Energy Future

Biography: Dehmer is the Deputy Director for Science Programs in the Office of Science at the DOE. From 1995 to 2007, Dr. Dehmer served as the Director of the Office of Basic Energy Sciences (BES) in the Office of Science. Under her leadership, the BES budget more than doubled in size to \$1.2B annually. She built a world-leading portfolio of work in condensed matter and materials physics, chemistry, and biosciences. A five-year effort to relate fundamental research in these disciplines to real-world problems in energy facilitated greater integration of basic and applied research across DOE. Dr. Dehmer received the Bachelor of Science degree in Chemistry from the University of Illinois in 1967 and the Ph.D. degree in Chemical Physics from the University of Chicago in 1972.

Doreen Edwards, Dean at Kazuo Inamori School of Engineering, Alfred University, Alfred, NY

Topic: The Future of Ceramic Education: Changing Needs, Changing Realities

Biography: Edwards is currently Dean and Professor of Materials Science and Engineering at the Kazuo Inamori School of Engineering at Alfred University. As Dean, Edwards is responsible for the oversight of six engineering programs, including the undergraduate and graduate programs in ceramic engineering and glass science within the New York State College of Ceramics. As an educator, Edwards has won numerous teaching awards, including the SUNY Chancellor's Award for Excellence in Teaching. As a researcher, she has led basic and applied projects, focused mainly on the electrical properties and defect chemistry of oxide ceramics. Edwards holds a B.S. in Chemistry from the South Dakota School of Mines and Technology and a Ph.D. in Material Science and Engineering from Northwestern University.

Kevin Ewsuk, Manager, Advanced Microsystems Packaging Department, Sandia National Laboratories, Albuquerque, NM

Topic: Integration of Ceramics in Advanced Microsystems

Biography: Ewsuk was a technical staff member in the Ceramic Processing and Inorganic Materials Department from 1990-2007. Prior to that he was a technical staff member in the Central Research and Development Department at E. I. du Pont. Ewsuk has a long history of research and development in powder processing, process characterization, and sintering science and technology. Kevin has published more than 75 technical articles. He earned his Ph.D. and M.S. in Ceramic Science from the Pennsylvania State University in 1986 and 1982, respectively; he earned his B.S. from Alfred University in 1980.

George A. Gazonas, U.S. Army Research Laboratory, APG, MD

Topic: Designer Materials: Multi-scale Modeling

Biography: Gazonas is a Research Physicist at the U.S. Army Research Laboratory where he leads several programs in multiscale modeling of materials. He has 25 years experience in the fields of computational mechanics, inverse methods, and wave propagation in solids. As an adjunct Professor in the ME Department at the University of Delaware, he advises doctoral and post-doctoral students, and for the last decade as a senior research advisor for the National Research Council he has stressed communication and outreach to young scientists through mentoring at the ARL. He is a member of the AGU, SES, ASME, USACM and IACM. Gazonas joined the Ballistic Research Laboratory in 1989, after working in the oil & gas industry as Chief Geophysicist for Hunter Geophysics, Santa Clara, CA. George received a B.S. in Geology from the University of Rochester in 1977, M.S. in Geology (Rock Mechanics) in 1980 and a Ph.D. in Geophysics in 1985 from Texas A&M University.

Daniel C. Harris, Naval Air Warfare Center, U.S. Navy, China Lake, CA

Topic: Multi-Spectral Transparent Materials Technologies

Biography: Harris is a Senior Scientist and Esteemed Fellow at the Naval Air Systems Command in China Lake, California, where he manages research and development programs in infrared window materials. He is the author of the monograph "Materials for Infrared Windows and Domes" and holds degrees in chemistry from MIT and Caltech.

Joycelyn Simpson Harrison, Air Force Office of Scientific Research, Arlington, VA

Topic: New Realities for Materials Research Funding

Biography: Harrison is a Program Manager within the Aerospace, Chemical and Material Sciences Directorate of the Air Force Office of Scientific Research in Arlington, VA. She leads the Low Density Materials research portfolio which supports transformative, basic research in materials design and processing. She has authored more than 30 technical papers and holds 12 US patents in the area of electroactive and nanotailored materials. She has been recognized as one of the Top Minority Women in Science, Engineering and Technology by the National Technical Association. She received B.S. in chemistry and in chemical engineering from Spelman College and Georgia Institute of Technology, respectively, then her M.S. and Ph.D. degrees in chemical engineering from Georgia Institute of Technology.

John C. Hemminger, University of California, Irvine, CA

Topic: Materials for a Secure and Stable Energy Future

Biography: Hemminger is Professor of Chemistry and the Dean of the School of Physical Sciences at UC-Irvine. His research has involved a diverse range of fundamental studies of the chemistry and physics occurring at surfaces and interfaces, with applications to the optical properties of nanostructured surfaces, surface reaction chemistry, catalyst performance, and atmospheric chemistry (with a particular emphasis on the liquid/vapor interface). He has published over 180 peer-reviewed papers and mentored over 50 graduate students and 30 postdoctoral researchers. Since 2003 he has served as Chair of the Basic Energy Sciences Advisory Committee of the DOE Office of Science. During this period he has helped to develop and has guided the publication of the influential BESAC reports: "Directing Matter and Energy: Five Challenges for Science and the Imagination" and "New Science for a Secure and Sustainable Energy Future". He received his BS from the UC-Irvine in 1971 and a PhD in Chemical Physics from Harvard University in 1976. Following two years as an NSF funded postdoctoral fellow at UC Berkeley and LBNL, he joined the Chemistry faculty at UC Irvine in 1978. He is a fellow of the American Physical Society, the American Chemical Society, the American Vacuum Society, and the American Association for the Advancement of Science.

Larry Hench, Graduate Research Professor, Department of Materials Science and Engineering at the University of Florida, Fort Myers, FL

Topic: Ten in Ten: Ceramic Technologies that Will Transform the World

Biography: Hench is currently Graduate Research Professor, Department of Materials Science and Engineering at the University of Florida, Professor and Director of Special Projects at the University of Central Florida, Visiting Professor of Materials Science and Engineering at the University of Arizona, and Emeritus Professor of Ceramic Materials in the Department of Materials at Imperial College London. For 10 years he served as Co-Director of the Imperial College Tissue Engineering and Regenerative Medicine Centre. He assumed the Chair of Ceramic Materials at Imperial College in 1995 following 32 years at the University of Florida where he served as Director of the Bioglass Research Centre and Co-Director of the Advanced Materials Research Center. He re-joined the faculty of the MSE Dept. at the University of Florida in 2009. Larry completed his Bachelor of Ceramic Engineering degree at The Ohio State University in 1961 and his PhD in 1964.

Jon Hockman, Consultant, Washington, D.C.

Topic: Ceramic Summit Facilitator

Biography: Hockman is a facilitator, executive coach, and organization development consultant with 20 years experience helping associations and their leaders thrive. Prior to the launch of The d3 Group in 2002, he served as the chief executive of Delta Sigma Phi, a 100,000 member leadership development association, where he led the organization through a successful, comprehensive strategic align-

ment process. Jon works with associations and their leaders on performance, governance, strategic, and career issues. He brought to that work experience gained from his years of fundraising for both the Children's Defense Fund and The American University. Based on a belief that you get what you give, he offers his time and experience for several community and professional associations, including a frequent speaker, coach, and author for the American Society of Association Executives (ASAE).

Christian Hoffmann, Vice President Corporate Materials Research & Development, EPCOS OHG, Deutschlandsberg, Austria

Topic: Ceramics for Electronics and Communications

Biography: Hoffmann studied Physics at Aachen University of Technology (Diploma). He changed to the electrical engineering department to work on electroceramic with Prof. Gottfried Arlt, His Ph.D. thesis with Prof. Rainer Waser was on microwave ceramic. Dr. Hoffman joined Siemens Matsushita (which in 1999 became EPCOS after an IPO) in Austria in 1998 to continue work on microwave materials. For several years, he was responsible for development of LTCC technology and since 2006 he has served as head of the "Materials Research and Development" department for the Ceramic Component Division. In 2008, Dr. Hoffmann was promoted Engineering Fellow in EPCOS. He is a member of ACerS and IMAPS, and has served as technical and general co-chair of CICMT meetings.

Linda Horton, Department of Energy, Washington DC

Topic: New Realities for Materials Research Funding

Biography: Horton has most recently been the Director for the Center for Nanophase Materials Sciences at ORNL. Under her leadership, the CNMS has grown to a strong interdisciplinary scientific program, which hosts a vibrant user community that reached over 400 users last year. She was the Program Director for the ORNL BES Materials and Engineering Physics Program. At ORNL, she has been involved in the implementation of research programs that integrate basic and applied research. Dr. Horton received her Ph.D. from the University of Virginia in Materials Science. She is a frequent reviewer for the DOE and other agencies, including reviews of Office of Science construction projects and user facility operations.

Wayne Huebner, Chairman, MSE, Missouri University of Science & Technology, Rolla, MO

Topic: The Future of Ceramic Education: Changing Needs, Changing Realities

Biography: Huebner is a Professor of Ceramic Engineering, and the Chairman of the Materials Science and Engineering Department at the Missouri University of Science & Technology in Rolla, Missouri. He began his academic career as an Assistant Professor at the Pennsylvania State University, and moved back to S&T in 1991. The author of over 85 papers, monographs and book chapters, he has been actively involved in the preparation and characterization of electronic ceramics. Much of his

research is focused on the use of dielectrics, ionic & mixed conductors, piezoelectrics, electrostrictive materials for multilayer capacitors, solid oxide fuel cells, gas separation membranes, and phased linear array transducers for intravascular imaging. He has graduated 9 Ph.D. students and 14 M.S. students. Huebner has received S&T's Faculty Excellence Award five times, the Outstanding Teacher Award four times, and was named the Outstanding Faculty Member in Ceramic Engineering five consecutive years. He has been a continuous member of the Electronics Division of American Ceramic Society since 1983, serving in many capacities including all offices of the Ceramic Educational Council, an organizer of various symposia, and Associate Editor of the Journal of the ACS.

Allen Katz, Senior Program Manager, Ceramics Branch, Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH

Topic: High Temperature Ceramics for Military Applications

Biography: Katz received his Bachelor's Degree in Metallurgy and Materials Science from MIT and holds a Doctorate in Metallurgical Engineering from The Ohio State University. He entered government service at Wright-Patterson Air Force Base upon completion of his graduate studies. His career has spanned a range of research and management positions. Dr. Katz's work has focused on high temperature ceramics, both monolithic and composite, for structural applications. The former includes research on refractory carbides and nitrides for turbine and rocket propulsion. The latter has focused on development of advanced fibers and fiber-reinforced composites for a variety of air and space applications.

In 2009 he completed a 10-year term as Ceramics Branch Chief. He now leads the Branch's efforts to develop SiC-based composites for application in the hot section of aerospace turbine engines. He is also a champion for international collaboration, engaging in a variety of formal partnerships with organizations outside the United States.

Claus Peter Kluge, Manager, R&D, CeramTec AG

Topics: Next Steps for Fuel Cells

Biography: Kluge studied solid state chemistry at Siegen / Stuttgart University. He worked on the preparation of high temperature superconductors. His Ph.D. thesis was on ternary chalcogenides. In 1995 Dr. Kluge joined Hoechst CeramTec (later in 2004 CeramTec is part of Rockwood Holdings Inc., Princeton, NJ) and was responsible for the development of LTCC ceramics, and the development of a new production line. In 1999 he took over the responsibility for a tape production line and established new strategies to stabilize product quality. Since 2003 Dr. Kluge was head of business development, detecting new market fields, generating networks and developing a new thermal management technology based on ceramic heat sinks. In 2008 he became manager R&D in electronic business division.

Rodney Lanthorne, Director, Kyocera Corporation and Vice-Chairman, Kyocera International, Inc., San Diego, CA

Topic: Emerging Business and Technology Opportunities and Challenges For the Ceramics Community

Biography: Lanthorne serves as a Director of Kyoto, Japan-based Kyocera Corporation, parent company of the worldwide Kyocera group; Vice-Chairman of San Diego-based Kyocera International, Inc., the group's North American holding company. Mr. Lanthorne oversees a group of six wholly-owned Kyocera subsidiaries, including Kyocera Communications, Inc. and Kyocera America, Inc., of San Diego; Kyocera Tycom Corporation, of Costa Mesa, California; Kyocera Solar, Inc., of Scottsdale, Arizona; Kyocera Industrial Ceramics Corporation, of Vancouver, Washington; and Kyocera Mexicana, S.A. de C.V., of Tijuana, Mexico. He now serves on the board of directors of majority-owned AVX Corp. He joined Kyocera International, Inc. in 1979 as Chief Financial Officer and was named President in 1987. He was named as a director of parent company Kyocera Corporation the following year, becoming one of the first Americans to be named as a director of a Japanese public corporation. He is a graduate of the University of Kentucky.

Lynnette Madsen, Program Director for Ceramics, National Science Foundation, Arlington, VA

Topic: New Realities for Materials Research Funding

Biography: Madsen was awarded a Bachelor of Applied Science in Electrical Engineering and a Bachelor of Arts in Psychology from the University of Waterloo, a Master of Engineering in Electronics from Carleton University, and a Doctor of Philosophy in Materials Science and Engineering from McMaster University. She has worked at NSF since 2000 recommending the distribution of now ~\$11M annually as the Program Director for Ceramics; she was recognized with an NSF Director's Award in 2007 for Program Management Excellence. As well, at NSF she has led new co-operative activities with European researchers in materials, and been involved in programs or initiatives on nanotechnology, energy, education, and gender issues. She currently serves as an advisory board member for the Rosalind Franklin Society.

John E. Marra, Associate Laboratory Director, Savannah River National Laboratory (SRNL), Aiken, SC

Topic: Enabling a Nuclear Renaissance: Better, Faster, Cheaper Using Advanced Ceramics

Biography: Marra is Associate Laboratory Director; Strategic Initiative Development at SRNL. He received his B.S. in ceramic science and B.A. in chemistry from the New York State College of Ceramics at Alfred University in 1983, and Ph.D. in ceramic engineering from The Ohio State University in 1987. In his 20+ years service at SRS and SRNL, Dr. Marra has worked in the management and treatment of high-level radioactive waste, development and application of advanced materials, and advanced chemical process applications. He has coauthored numerous publications on the application of ceramic materials in the nuclear industry. Dr. Marra is a Past-President of ACerS, an ACerS Fellow and a past Chair and past Trustee/Director of the Nuclear & Environmental Technology Division.

James W. McCauley, Chief Scientist in Materials/ARL Fellow, U.S. Army Research Laboratory, APG, MD

Topic: Opaque and Transparent Armor Innovations

Biography: McCauley is a Chief Scientist (ST) and an ARL Fellow in the Army Research Laboratory. He earned his B.S. (cum laude) in geology from St. Joseph's College (Indiana), his M.S. in mineralogy and Ph.D. in solid state science, both from the Pennsylvania State University. From 1990 through 1994 he served as Dean (SUNY Chief administrative Officer) of the New York State College of Ceramics at Alfred University; from January 1995 to June 1996 he was Professor of Ceramic Engineering at the same institution. Prior to joining Alfred, he was employed at the Army Materials Technology Laboratory for 22 years, serving as founding chief of the Materials Characterization Division and Materials Science Branch for the last 10 years there, and as Liaison Scientist, Army Research Office, Far East, Tokyo, Japan, during 1988. He also has served as adjunct professor at Boston University. He is the author or co-author of 154 open literature publications and reports, presented 260 oral presentations, the editor/co-editor of eight books and holds five patents. He has served on the Army Science Board, the external review committee for the Materials Science and Technology Division of Los Alamos National Laboratory and on the Visiting Advisory Board of the Department of Materials Science and Engineering of Drexel University. James is a Fellow and Distinguished Life Member of the American Ceramic Society and has won numerous awards all over the world.

David L. Morse, Senior Vice President and Director of Research at Corning Inc, Corning, NY

Topic: Emerging Business and Technology Opportunities and Challenges For the Ceramics Community

Biography: Morse joined Corning in 1976 in glass research. This work led to 19 patents and more than 20 publications. In 1985, he was named senior research associate. He established the Optical Components Research Department in 1985, followed by a number of R&D management positions. He was appointed to his current position in May 2006. He is a member of the National Academy of Engineering and serves on the Massachusetts Institute of Technology Visiting Committee for Chemistry, New York State Center for Renewable Energy Board, the Optoelectronics Industry Development Association (OIDA), McDonnell International Scholars Academy Board at Washington University in St. Louis, the Board of Industry Advisors of International Materials Institute for New Functionality in Glass (MI-NFG) and the Cornell Scientific Advisory Board for the Energy Materials Center. He graduated from Bowdoin College magna cum laude in 1973 and was granted a doctorate from MIT in 1976.

Joel Moskowitz, Chairman of the Board, President & CEO, Ceradyne, Inc., Costa Mesa, CA

Topic: Emerging Business and Technology Opportunities and Challenges For the Ceramics Community

Biography: Moskowitz is currently Chairman of the Board, CEO and principal shareholder of Ceradyne, Inc. Ceradyne has grown from its founding to become an international, publicly-held corporation

with a market cap of over \$500M. After serving as an officer in the U.S. Missile Command and as a Research Engineer for Interpace Corporation, his entire career has been devoted to the development of advanced technical ceramics for a wide range of applications. He obtained a B.S. in Ceramic Engineering from Alfred University in 1961, a MBA from the University of Southern California in 1967, and a Doctor of Science Degree (Honorary) from Alfred University in 2005. He has been a member of the Board of Trustees of Alfred University since 1983. He is a member of several professional organizations, including ACerS and NICE.

Parimal Patel, U.S. Army Research Laboratory, APG, MD

Topic: Opaque and Transparent Armor Ceramics

Biography: Patel received his B.S in Ceramic Engineering from Rutgers University in 1990 with a focus on processing of oxide and non-oxide glasses for optical waveguides. He received his Ph.D. in 2000 at Johns Hopkins University with a dissertation topic was "Processing and Properties of Aluminum Oxynitride Ceramics." He has 20 years of experience in processing and characterization of transparent materials for transparent and opaque armor applications. He is currently focused on two major areas of research: transparent materials and armor technologies to develop lighter and thinner transparent armors for current tactical wheeled vehicles, and the use of glass, glass-ceramic materials and polymers for opaque armor applications. This program leverages technologies developed under the transparent armor materials program to provide multi-threat solutions for current platforms. He has authored over 70 publications including 10 refereed journal papers, 40 symposium papers, 3 patents, 20 restricted access government documents.

Evgenia Pekarskaya, Ph.D., Senior Analyst, Lux Research, New York, NY

Topic: The Global Business Climate for Ceramic-Related Industries

Biography: Pekarskaya is involved in research and consulting on a broad range of issues related to the development and commercialization of emerging technology. Her projects are focused on technology strategy, market assessment, investments and acquisitions in the materials, manufacturing, instrumentation and energy sectors. Her consulting engagements include multinational corporations, start-ups, governments and leading academic institutions. She has 10 years of industrial and academic experience in several areas of materials science that cover structural, defense, electronic and biomedical applications. Her prior affiliations include ExxonMobil, the California Institute of Technology and the Weizmann Institute of Science (Israel). Evgenia holds a Ph.D. in Materials Science from Cambridge University, U.K. and an M.S. in Physics from Tomsk State University, Russia.

Robert Rose, Senior Adviser and Founder, US Fuel cell Council, Washington, D.C.

Topics: Next Steps for Fuel Cells

Biography: Rose is founder and now Senior Adviser to the US Fuel Cell Council, in Washington, D.C. The USFCC is the business association of the fuel cell industry. Established in 1998, the council conducts a

wide variety of technical, safety, educational and policy activities consistent with its mission of commercializing fuel cells for all applications. Rose also founded the Breakthrough Technologies Institute, an independent nonprofit advocate for technologies that carry environmental benefits to society. BTI's fuel cell education program, Fuel Cells 2000, was launched in 1993 and is internationally recognized. Rose came to Washington to serve on the Staff of Senator Edmund Muskie of Maine. In a career spanning more than 30 years, Rose has served in senior communications and policy positions in the U.S. government, provided consulting service and advice to a wide range of public and private sector clients, written or edited several books and dozens of articles, and appeared before Committees of Congress. He has many other writing and speaking credits and is a frequent news source. Rose is the 2004 recipient of the Fuel Cell Seminar Award, the most prestigious of its kind in the U.S.

Mohamed Rahmane, Senior Engineer/Project Leader, GE Global Research, Niskayuna, NY

Topic: Ceramics for Electronics and Communications

Biography: Rahmane is a senior engineer and project leader in the Ceramic and Metallurgy organization at GE Global Research. He joined GE in 2000 and worked on the development of Ceramic Metal Halide (CMH) discharge light sources for general and specially lighting applications. From 2002 to 2007 he managed the CMH program aiming at the development of transparent ceramics, high-temperature seals and high-efficiency discharge chemistries. Since 2007, he has led a multi-disciplinary team at GE, developing materials and processes for high-energy density Sodium Metal Halide Batteries. Prior to GE, Dr. Rahmane was an associate professor at the University Hassan II in Morocco, where he conducted research on thermal plasma technologies for materials processing. He holds a B.S Degree in Physics, a doctorate in Material Science & Engineering from the University Henri-Poincare, France and PhD in Chemical Engineering from the University of Sherbrooke, Canada.

Thomas M. Shaw, Research Staff Member, IBM Thomas J. Watson Research Center

Topic: Integration of Ceramics in Advanced Microsystems

Biography: Shaw joined the physical sciences department at IBM Research in 1984 and currently has a position in the silicon technology department. Dr. Shaw received his Ph.D. in materials science from the University of California at Berkeley in 1981. He was awarded the John E. Dorn Award for his thesis. Previously he had earned a MS in materials science from Berkeley in 1978 and a B. Eng. in metallurgy and materials science from the University of Liverpool in 1975. Prior to joining IBM Dr. Shaw was a member of the technical staff at Rockwell International's science center and a postdoctoral associate at Cornell University. His research interests include, ferroelectric thin films, processing and microstructure control of ceramic materials, microscopy of materials, interfacial energy driven processes, behavior of liquids in porous materials, diffusion in thin films, electrical and mechanical properties materials and the reliability of interconnect structures. His current research is focused understanding the issues that integrating low K dielectrics presents for future generations of semiconductor technology. He was recently guest editor for an Annual Reviews of Materials Research volume focused on materials for next generation CMOS technologies. He is a fellow of the American Ceramics Society and has authored or co-authored more than 175 publications and 50 patents.

Lewis E. Sloter, II, Associate Director of Materials and Structures, Office of the Director,
Defense Research and Engineering, Department of Defense, Washington DC

Topic: Meeting Materials Needs for 21st Century Defense

Biography: As senior materials technologist he is responsible for the technical oversight of DoD science and technology activities in materials, processes, and structures associated with current and future Defense systems and for technical assessments associated with materials, processes, materials manufacturing, and engineering applications. Prior to DoD, Dr. Sloter was a program officer in the Office of Naval Research, materials technology manager and propulsion technology manager at the Naval Air Systems Command, and lead materials engineer and senior specialist for Vought Corporation. His primary academic research interests were in the areas of welding metallurgy, corrosion fatigue, biomaterials, and forensic engineering. He holds a B.S. in Metallurgy and Materials Science and History and a Ph.D. in Metallurgy and Materials Science and Engineering and Public Policy from Carnegie Mellon University and an M.S. in Materials Engineering from Drexel University, and is a registered professional engineer.

Ellen Sun, Principal Research Scientist, United Technologies Research Center, East Hartford, CT

Topic: An Industry Perspective: Development and Application of Ceramic Materials for Efficient and Clean Power Generation

Biography: Sun is a Principal Research Scientist at UTRC where she leads multi-disciplinary teams to develop solid oxide fuel cell technologies including system optimization, component design and fabrication, and cell stack material development. Ellen also has extensive experience in composites, high temperature ceramics and coatings. She organized symposiums and chaired sessions on advanced ceramic coatings at International Conference & Exposition on Advanced Ceramics & Composites and IGTI Turbo Expo. She joined UTRC in 1999 after working at Oak Ridge National Laboratory as a Research Scientist. She received a M.S. in Physics, a Ph.D. in Materials Science and Engineer from Brown University, and a M.S. in Management from Rensselaer Polytechnic Institute.

William Tredway, United Technologies Research Center, East Hartford, CT

Topic: An Industry Perspective: Development and Application of Ceramic Materials for Efficient and Clean Power Generation

Biography: Tredway is the Group Leader for Ceramics and Deputy Department Leader for the Physical Sciences Department at United Technologies Research Center (UTRC). He has been involved in development of ceramic matrix composites, monolithic ceramics, and coatings for gas turbine and aerospace applications for the past 20+ years. Other areas of research have included ceramic body armor and thermoelectric cooling and power generation for advanced soldier systems. He earned a B.S. degree in 1981; a M.S. degree in 1982; and a doctorate in 1986 — all in ceramic engineering from the University of Illinois.

Sujanto Widjaja, Project Leader & Research Associate, Corning Incorporated, Corning, NY

Topic: Environmental Frontiers for Ceramic Materials: New Filtration Solutions

Biography: Widjaja is currently a project manager and principal research scientist at Corning Incorporated where he leads a multi-disciplinary team, across various Corning's locations around the world, to develop enabling technologies aligned with Corporate R&D initiatives. Prior to the current role, he was a business development manager at the Commercial Technology organization of the Corning Environmental Technology, focusing on program management and development of business technology strategy for ceramic substrates for light-duty vehicles. He has extensive experience in mechanics & reliability of glasses and ceramics (and composites), and has been an active member of the Engineering Ceramics Division. He has been a co-organizer of the Porous Ceramics Symposium for the International Conf. on Advanced Ceramics and Composites, and has served as Chairs of Nominating and Awards Committees of ECD. He joined Corning Incorporated in 2001 after working as a post-doctoral research associate at Oak Ridge National Laboratory and as a faculty member at Nanyang Technological University, Singapore. He received his M.S. and Ph.D. in Mechanical Engineering from the University of Massachusetts at Amherst, and is expecting his MBA degree in May 2010 from Cornell University, the Johnson Graduate School of Management.

Eric Wuchina, Program Officer, Office of Naval Research, West Bethesda, MD

Topic: New Realities for Materials Research Funding

Biography: Wuchina currently serves as the Materials Coordinator for the ONR Electromagnetic Railgun (EMRG) Innovative Naval Prototype (INP) program. He has been employed at the Naval Surface Warfare Center Carderock Division since 1988 as a researcher and program manager, and has authored over 25 publications, 80 presentations (12 invited) and 4 patents. He earned a Ph.D. in Materials Engineering Science from Virginia Tech in 1995, and his B.S. and M.S. from Virginia Tech and the University of Maryland, respectively. His primary research interests include thermochemical modeling, phase equilibria, processing, and oxidation behavior of ultra-high temperature ceramics, with special focus on radome, rocket nozzle and leading edge applications. He is the immediate past-chair of the High Temperature Materials Division of the Electrochemical Society. He organized and chaired the conference Ultra High Temperature Ceramics: Materials for Extreme Environment Applications in 2008. He has co-organized the ECS symposium series High Temperature Corrosion and Materials Chemistry since 2004, and the Materials for Extreme Environments/Missile Materials sessions at USACA's annual Conference on Composites, Materials and Structures since 1995. He is a member of The American Ceramic Society, Electrochemical Society, and AIAA.

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