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CONTENTS

ABOUT INNOVATION DAY

The chemical industry faces many challenges and opportunities today, including the rapid emergence of new fields and the maturing of existing methods for research and manufacturing. Only a renewed focus on innovation will harness promising technologies and spur industry growth.

Since 2003 the **Chemical Heritage Foundation (CHF)** and the **Society of Chemical Industry (SCI) America** have jointly organized an annual Innovation Day, consisting of the Warren G. Schlinger Symposium, the SCI Gordon E. Moore Medal, and the SCI Perkin Medal.

The Schlinger Symposium brings together promising young scientists and technology leaders from across the chemical industries with a focus on frontiers of chemical R&D. Plenary and breakout sessions are oriented to areas where the chemical industry interfaces with other emerging business sectors. In combination with the medal ceremonies, the Schlinger Symposium offers participants the opportunity to learn about cutting-edge science and technology, exchange ideas with peer industrial researchers and entrepreneurs, and prepare to be innovation leaders.

This year, as we celebrate the tenth anniversary of Innovation Day, we are reminded that history is always in the making. As trends in innovation emerge and evolve, we will continue our work to recognize early-career innovation and inspire future research leaders.

SCHEDULE

MONDAY, SEPTEMBER 16

2:00–4:00 p.m. **Innovation Day Pre-Session**
Franklin Rooms I & II, CHF Conference Center, 2nd Floor

"New Chemical Engineering Innovations at the University Level"

Moderator: **Ron Reynolds**, Senior Adviser to the President, CHF

Speakers: **Shu Yang**, Professor, Material Science and Engineering, Chemical and Biomolecular Engineering, University of Pennsylvania

"Dynamic Tuning of Nanoparticle Assembly toward Adaptive Building Skins"

Yushan Yan, Distinguished Engineering Professor, Department of Chemical and Biomolecular Engineering, University of Delaware

"Hydroxide Exchange Membranes: Fuel Cells, Electrolyzers, and Flow Batteries"

Rodney D. Priestley, Assistant Professor, Department of Chemical and Biological Engineering, Princeton University

"Overcoming Current Limitations: Processing Polymer Thin Films and Nanoparticles"

4:30–5:30 p.m. **10th Anniversary Recognition**
Recognition of Past Moore Medalists
Franklin Rooms I & II, CHF Conference Center, 2nd Floor

5:30–6:30 p.m. **Opening Reception**
Jacobs Reading Room, 3rd Floor

6:30–9:00 p.m. **Dinner and Evening Plenary Address**
Ullyot Meeting Hall, 1st Floor

"Improving the Biology of Enzyme Fuel Cells"

Wilfred Chen, Gore Professor, Department of Chemical and Biomolecular Engineering, University of Delaware

TUESDAY, SEPTEMBER 17

7:30 a.m. **Speakers' Breakfast**
Jacobs Reading Room, 3rd Floor

8:00 a.m. **Continental Breakfast**
Ullyot North, 1st Floor

8:30–9:25 a.m. **Schlinger Symposium Opening Plenary Address**
Ullyot Meeting Hall, 1st Floor

"Entropy at the Intersection of Innovation and Sustainability"

John Warner, President and Chief Technology Officer, Warner Babcock Institute for Green Chemistry

9:30–11:00 a.m. **Breakout Sessions: Presentations**
Conference Center at CHF, 2nd Floor
CHF Conference Room, 6th Floor

Open Innovation

Moderator: **Hugh Helferty,** ExxonMobil Chemical Company

Speakers: **Hugh Helferty,** Manager, Global Chemical Research, ExxonMobil Chemical Company

Michael Holman, Research Director, Lux Research

High-Performance Polymer Systems

Moderator: **Dave Sikora,** Chemtura Corporation

Speakers: **Todd Emrick,** Professor and Director, NSF Materials Research Science and Engineering Center, University of Massachusetts, Amherst

Oliver Peoples, Chief Technology Officer, Metabolix Incorporated

Advances in Catalysis: Natural-Gas Processing

Moderator: **Ian Shankland,** Honeywell Performance Products

Speakers: **Israel Wachs,** G. Whitney Snyder Professor of Chemical Engineering, Lehigh University

T. Brent Gunnoe, Professor of Chemistry, University of Virginia

Jeffery Bricker, Senior Director of Research, UOP

11:00 a.m.–12:15 p.m. **Poster Session**
Dow Public Square, 3rd Floor

Coordinator: **Gregory W. Nelson,** Eastman Chemical Company

Presenters: Chantal Badre, Solvay
Nathaniel Barney, DuPont
Srijanani Bhaskar, DuPont
Stephen Burkhardt, DuPont
Evan Crocker, Arkema
Michael Dickey, North Carolina State University
Ke Gong, University of Delaware
Tezcan Guney, Iowa State University
Shu-Chien Liang, DuPont
Carlos Lopez-Barron, ExxonMobil
David Norman and Jason Jenkins, Eastman Chemical Company
Simon Thompson, North Carolina State University

12:15–2:15 p.m. **SCI Gordon E. Moore Medal Ceremony and Luncheon**
Ullyot Meeting Hall, 1st Floor

Gordon E. Moore Medal Lecture

Awardee: **Jerzy Klosin,** Research Fellow, The Dow Chemical Company

2:30–4:00 p.m. **Breakout Sessions**
Conference Center at CHF, 2nd Floor
CHF Conference Room, 6th Floor

Innovating for Developing Economies: Lessons from the Front

Moderator: **Nilesh Shah,** The Dow Chemical Company

Speakers: **Peter Gallagher,** Vice President, Skin Care Research and Development, Unilever, Trumbull, CT

David G. Speece, Jr., Global Technical Director, Architectural Coatings, The Dow Chemical Company

Saikat Chaudhuri, Executive Director, Mack Institute for Innovation Management, The Wharton School, University of Pennsylvania

Chemical and Material Solutions to Energy Storage

Moderator: **Carl Bilgrien,** Arizona Chemical Company

Speakers: **Biswajit Choudhury,** Central R&D, DuPont, Advancement of Fuel Cell Membrane Technology.

Paul Burke, Department of Materials Science and Engineering, MIT: Liquid Metal Battery Project

Chemistry and Chemical Engineering Solutions to Climate Change

Moderators: **William Provine,** DuPont

Speakers: **James Bradbury,** Senior Associate, World Resources Institute

Sarah King, Manager, Climate and Sustainability, DuPont

4:00–5:30 p.m. **Closing Reception and Museum Tours**
Overlook Lounge, 2nd Floor

Museum tours will be available at 4:15 p.m. and again at 4:45 p.m.

ABOUT THE BREAKOUT SESSIONS

Each breakout session will explore real-world challenges that can be solved through new materials, processes, or products from R&D labs in the chemical industry. The breakouts will seek to connect industry's innovation push to global-market pull. Each will focus on a specific issue, with speakers presenting perspectives based on their expertise. Open discussions and sharing of experiences or ideas from those in attendance is encouraged. Attendees can participate in two of these sessions.

BREAKOUT 1

Open Innovation

Given tight R&D budgets, companies can find it challenging to balance near-term growth with long-term opportunities that sustain profitability. Even the largest chemical companies cannot develop and own everything themselves. Teaming up with universities, government labs, top technology institutes, public-private partners, and other networks can be one answer to the dilemma. In this session a leading consulting firm will share its studies on best practices in technology scouting and open innovation, and an SCI member company will explain how they are putting open innovation into practice.

BREAKOUT 2

High-Performance Polymer Systems

Polymers remain an important class of materials for the chemical industry, but maintaining that importance requires the continued development of innovative, new products. This session will focus on the research being pursued in leading academic laboratories, as well as how bioscience companies have commercialized cost-effective, "drop-in" replacements for petroleum-based materials.

BREAKOUT 3

Catalysis Advances for Natural-Gas Processing

New production technology has greatly increased the supply of natural gas in the United States, earning the country a competitive edge. How can this "methane advantage" be translated into a similar advantage for chemicals? One answer is new catalytic technology to produce specific base chemicals or liquid fuels. New academic and commercial research will be discussed.

BREAKOUT 4

Innovating for Developing Economies: Lessons from the Front

To effectively compete in developing economies around the world companies must acquire new skills. When adapting U.S. technology to worldwide markets, one size won't fit all. Instead, companies must build local teams or develop local partnerships. In doing so, they face not only technological challenges but sociological ones as well. This session will explore the perspectives of leaders who have successfully met these challenges in chemicals and downstream consumer products.

BREAKOUT 5

Chemical and Engineering Solutions to Energy Storage

Alternative-energy sources present numerous challenges. They are often nonratable, produce energy in smaller amounts than traditional energy sources, and are located away from major centers of demand. To take full advantage of alternative-energy opportunities, innovators must develop new storage technologies to overcome these challenges. In this session experts will discuss the advantages of fuel cells and advances in membrane technology that can lead to higher fuel-cell efficiency and lower cost. An MIT project to develop "liquid metal batteries" will also be examined.

BREAKOUT 6

Chemical and Chemical-Engineering Solutions to Climate Change

Although the public discussion about climate change is often filled with contention, most participants agree that reducing greenhouse gases is in everyone's interest. What chemical and engineering solutions can help reach this goal? A representative from the World Resources Institute will review state and federal policy options for regulating greenhouse-gas emissions from U.S. natural-gas systems, and chemical companies will explore how they can increase revenue from products that help consumers reduce their own greenhouse-gas footprint.

ABOUT THE POSTER SESSION

We are grateful to those Innovation Day participants who have agreed to present posters highlighting innovative work in their laboratories or new products coming to market. This informal session will allow all attendees to get a flavor for developments in the industry and establish networking relationships with their counterparts.

POSTER PRESENTERS

Chantal Badre, Solvay
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David Norman and Jason Jenkins, Eastman Chemical Company
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Simon Thompson, North Carolina State University
stthomp3@ncsu.edu

As of September 6, 2013.

ABOUT THE SPEAKERS AND MODERATORS

Carl Bilgrien joined Arizona Chemical Company in 2010 as the vice president and chief technology officer. He was the vice president of research and development, Materials and Packaging Technologies, for W. R. Grace from 2007 to 2010, where he led the global R&D team. Before joining W. R. Grace, Carl spent two years as vice president of R&D with Aspen Aerogels—a nanotechnology start-up—and 20 years with Dow Corning in a range of technical and business management roles.

Carl has a degree in chemistry from Michigan State University and a Ph.D. in inorganic chemistry from the University of Florida.

James Bradbury is a senior associate in WRI's Climate and Energy Program, conducting research and analysis on U.S. federal and state climate and clean-energy policies. Bradbury leads WRI's work on industrial competitiveness, helping advance cost-effective strategies for increasing energy productivity and reducing greenhouse-gas emissions from energy-intensive U.S. manufacturers. He is also leading WRI's ongoing research into greenhouse-gas emissions from U.S. natural-gas systems, considering state and federal policy options for reducing emissions throughout the natural-gas life cycle.

Bradbury holds a B.A. in geology from Colorado College; a master's degree in hydrology from the University of New Hampshire; and a Ph.D. in geosciences from the University of Massachusetts, Amherst.

Jeffery Bricker is the senior director of research at UOP. He is accountable for UOP's longer-range research programs and capabilities development. Bricker began at UOP as a catalyst scientist working in paraffin dehydrogenation, selective hydrogenations, natural-gas utilization, and selective oxidation. He has held a variety of positions in refining, petrochemical, and separations R&D and has had a key role in development of several UOP technologies and products.

Bricker is a member of the North American Catalysis Society and the American Chemical Society. He has been awarded 55 U.S. patents and has received a number of awards, including the UOP Stine Star, the 2006 Honeywell Growth and Innovation Award, the 2008 Devon Meek Lecturer, and the 2011 ACS National

Award in Creative Invention. He received a B.S. in mathematics and chemistry from Heidelberg University in 1979 and a Ph.D. in chemistry from Ohio State University in 1983.

Paul Burke, a senior postdoctoral associate at the Massachusetts Institute of Technology, has a number of patents and publications to his name. At MIT he acts as lead researcher and project manager for the liquid metal battery project, which seeks to develop a low-cost battery with a long life span for grid-scale stationary energy storage.

Burke received his bachelor's degree and doctorate in materials engineering from Dalhousie University in Halifax, Nova Scotia.

Saikat Chaudhuri, designated a "thought leader" by Cisco Systems, is executive director of the Mack Institute for Innovation Management and an adjunct associate professor of management at the Wharton School, University of Pennsylvania. He has expertise in high-tech mergers and acquisitions, high-end outsourcing, and technological innovation. He has consulted on acquisition, innovation management, and corporate growth strategies for such companies as Agilent Technologies, Microsoft, and Cisco. His current research is focused on the operational drivers of performance in innovation-targeted acquisitions as well as the management of research and development and product development outsourcing projects.

Chaudhuri holds a B.S. and a B.S.E. from the University of Pennsylvania, an M.S.E. from Stanford University, and a D.B.A. from Harvard University.

Wilfred Chen has been the Gore Professor of Chemistry at the University of Delaware since 2011 and before that was a professor of chemical engineering at the University of California, Riverside. His publications are numerous and have appeared in *ACS Synthetic Biology, Chemical Communications,* and *Applied and Environmental Microbiology.* Speaking about his research, he has said, "The complex interactions between humans and the biosphere have created some of our most challenging global problems in human history, such as energy sustainability, environmental pollution, and emergence or reemergence of old and new epidemics and

diseases. Research in my laboratory is focused on development of the next-generation biomolecular tools in addressing these key global problems in viral infection, disease pathogenesis, biofuel production, and separation of protein pharmaceutics."

Chen received his B.S. in chemical engineering from the University of California, Los Angeles, and his Ph.D. in chemical engineering from the California Institute of Technology.

Biswajit Choudhury is a principal investigator with DuPont Central R&D. He joined DuPont in 2002 to work on membrane development and direct methanol fuel cells. His recent activities involve membrane development for the redox flow battery, binder development for the lithium-ion battery, and research on degradation behavior of organic light-emitting diode materials.

Before taking his position at DuPont, Choudhury worked for Ballard Power System in their Fuel Cell Membrane Development Program, where he led the development of the company's BAM grafted membranes for proton-exchange membrane and direct methanol fuel cell applications. He has also served as an adviser and reviewer in several U.S. Department of Energy and U.S. Army and Navy programs. He has authored or coauthored more than 28 patents and publications in the area of alternative energy.

Choudhury holds an undergraduate degree in chemistry from the Indian Institute of Technology in Kanpur and a Ph.D. in organic photovoltaics from the University of Western Ontario, Canada. He also spent two years as a postdoc at Queen's and McMaster universities.

Todd Emrick is a professor of polymer sciences and engineering at the University of Massachusetts, Amherst, as well as director of the National Science Foundation Materials Research Science and Engineering Center. He also acts as coleader of Energy Research Group I of the Department of Energy and leader of the Environmentally Responsible Anti-Flammable Polymer Materials Group. His research program emphasizes the synthesis of new materials, including polymers, particles, and composite materials, that target a variety of applications in materials science and therapeutics.

Emrick received his B.A. from Juniata College and his Ph.D. from the University of Chicago.

Peter Gallagher is currently vice president for skin-care research and development for Unilever's global skin-care business. His focus is delivering the skin-care program's portfolio competitively against multiple unmet consumer needs in a €6.3 billion business.

Gallagher joined Unilever in October 1986, after completing his Ph.D. in chemistry, and he first worked as a manager at Unilever Research Port Sunlight, U.K. He initially worked in hair-care research but soon became a developer through a succession of expatriate moves, including Canada (Cheseborough Pond's); skin- and oral-care marketing (Cheseborough Pond's USA); director, Hair Care Research and Development Innovation Centre (Southeast Asia/China); vice president, Skin Care Research and Development, Europe; vice president, Global Hair Career Research and Development (Chicago); and vice president, Home and Personal Care North America, Research and Development (Trumbull, Connecticut).

T. Brent Gunnoe is a professor of chemistry at the University of Virginia. With a focus on the environmental and economic challenges of developing more efficient synthetic methods, his research interests span the fields of inorganic and organic chemistry. His research group focuses on the preparation and characterization of new transition-metal complexes that are capable of activating organic molecules toward novel reactivity. By concentrating on fundamental aspects of inorganic and organometallic chemistry, his efforts are ultimately directed toward the rational design of single-site catalysts that form the foundation of new homogeneous synthetic methodologies.

Gunnoe's publications are extensive and have appeared in the *Journal of the American Chemical Society, Inorganic Chemistry,* and *Dalton Transactions,* among many others. He received his B.A. from West Virginia University and his Ph.D. from the University of North Carolina at Chapel Hill.

Hugh Helferty is manager of corporate strategic research at ExxonMobil Research and Engineering Company. He is responsible for providing the fundamental scientific base that

supports and drives innovation throughout ExxonMobil. Helferty joined Imperial Oil's Research Department in 1981. After a leave to earn an M.B.A., he moved to the Refining Department in 1985. In 1988 Helferty became supply manager of Imperial's Dartmouth, Nova Scotia, refinery, and in 1991 he was named planning and performance analysis manager for Imperial's Downstream. In 1994 Helferty transferred to Sarnia as technical manager for the Sarnia Refinery and Chemical Plant. In 1997 he moved to Exxon Engineering as manager of the Environmental, Safety, Civil, and Marine Division. In 2000 Helferty joined ExxonMobil Process Research as director of the Fuels Processes Laboratory. In 2005 he became the products research and technology manager for ExxonMobil Research and Engineering Company.

Helferty received a B.S. in chemistry from Queen's University (Ontario, Canada) and a Ph.D. from the University of Toronto.

Michael Holman is a research director at Lux Research. He is responsible for Lux Research's intelligence practices in advanced materials; printed, flexible, and organic electronics; electric vehicles; and energy electronics. He also leads Lux's work on benchmarks and best practices in technology scouting and open innovation, managing the Industrial Research Institute (IRI)–Lux Research Technology Scouting Program, and advising clients on how they can better run and organize their tech scouting programs.

Holman is also involved in public-policy issues in emerging technologies. He has been a member of the President's Council of Advisors on Science and Technology Nanotechnology Technical Advisory Group and the U.S. and E.U. Perspectives on the Future of Science and Technology program, and helped the U.S. Department of Energy run its Nanomanufacturing for Energy Efficiency Workshop and research road map. Holman earned his Ph.D. in chemistry from Columbia University. He also holds a B.A. in chemistry and philosophy from Rice University.

Sarah King is based in Washington, D.C., where she works with DuPont businesses to help them identify and manage climate-related business risks and opportunities. She also leads efforts on a corporate goal to increase annual revenue to $2 billion by 2015 from products that help customers reduce greenhouse-gas emissions.

Before joining DuPont, King was the climate-change program manager for GLOBE USA, a bipartisan network of members of the U.S. Congress interested in energy and environment issues. Before her work with GLOBE USA she was a senior research associate at the Environmental Law Institute, where she focused on international environmental law and governance.

King holds a B.A. in economics, with a minor in environmental policy, from Carleton College and an M.B.A. from the George Washington University School of Business and Public Management.

Gregory W. Nelson has been senior vice president and chief technology officer of Eastman Chemical Company since 2008. He is responsible for technology and R&D, information technology, innovation, and licensing.

Nelson joined Eastman Chemical Company in 1988, conducting research in polymers chemistry and online spectroscopic analysis of polymer processes. After holding a number of posts in R&D, he was appointed to several management positions in both business and technology management. He completed the Harvard Business School Advanced Management program in 2007 and was then appointed vice president of corporate technology. Nelson is a member of the American Chemical Society and the Industrial Research Institute. A native of Birmingham, Alabama, Nelson received a bachelor's degree from the University of Alabama and a Ph.D. in analytical chemistry from Emory University.

Oliver P. Peoples, a cofounder of Metabolix, has served as its chief scientific officer and vice president of research since January 2000. He was previously the director of research and vice president. Before founding Metabolix, Peoples was a research scientist with the Department of Biology at the Massachusetts Institute of Technology, where he emerged as a pioneer in the new field of metabolic pathway engineering and its applications in industrial biotechnology. The research carried out by Peoples at MIT established the fundamental tools and methods for engineering bacteria and plants to produce Mirel.

Peoples has published numerous peer-reviewed academic papers and is named an inventor on over 90 patents and patent

applications worldwide. He received a Ph.D. in molecular biology from the University of Aberdeen, Scotland.

Rodney Priestley, an assistant professor at Princeton University since 2009, is an emerging leader and a scholar of chemical and biological engineering. His research focuses on the physics of polymeric materials and the development of novel polymeric systems as responsive and self-healing materials and membranes.

Awards include the Air Force Office of Scientific Research Young Investigator Award (2013), the National Science Foundation Career Award (2011), the American Chemical Society Young Investigator Award (2009), and the American Physical Society's Frank J. Padden, Jr., Award (2008). Publications of his research have appeared in *Science, Soft Matter,* and the *Journal of Polymer Science.* Priestley received his Ph.D. from Northwestern University in 2008.

William D. Provine is currently the director of Science and Technology External Affairs at DuPont. He is responsible for defining strategic directions for DuPont's science and technology programs with external collaborators and stakeholders, including federal governments, universities, and the public sector. He joined DuPont in 1992 and has served in a variety of research, marketing, business development, and operations leadership roles.

Provine also currently serves on advisory boards for a number of science centers, including those at Oak Ridge National Laboratory; the University of California, Berkeley, Lawrence Berkeley National Laboratory; the University of Delaware; the University of Wisconsin; and Michigan State University. He is a founding member of both the World Council on Industrial Biotechnology and the International Council on Nanotechnology. Provine was nominated, appointed, and currently serves on the U.S. Department of Commerce Bureau of Industry and Security's Emerging Technology and Research Technical Advisory Committee, the U.S. Department of Energy–U.S. Department of Agriculture Biomass R&D Technical Advisory Committee, and a temporary scientific working group of the Organization for the Prohibition of Chemical Weapons focusing on the convergence of biology and chemistry.

Provine received a B.S. in chemical engineering from the University of California, Berkeley, in 1987 and a Ph.D. in chemical engineering from the University of Delaware in 1992.

Ron Reynolds is currently a senior adviser to the president of CHF, where he assists with strategic planning and special projects. Before joining the organization he spent a long career in the refining and chemical industry with a broad range of responsibilities, including research, manufacturing, logistics, and business development.

Reynolds holds a B.S. in chemical engineering from Lafayette College, an M.S. in chemical engineering from the University of Massachusetts, and an M.S. in environmental engineering from Drexel University.

Nilesh Shah has been the global research and development director for the home and personal-care business of The Dow Chemical Company since 2009. He is also the site leader for the Spring House Technical Center.

Shah joined Rohm and Haas Company in 1985, starting as a research scientist in the plastics business. He then held positions of increasing responsibility in research management, leading polymer synthesis and exploratory research. From 1999 to 2002 Shah held commercial roles in the architectural and functional coatings business, with responsibility for strategic planning and marketing, before returning to research in 2003 to become a global technology director. In this role he led the research and regulatory affairs for the consumer and industrial specialties business followed by the process chemicals and biocides business.

Shah graduated with a B.S. in chemical engineering in 1979 from Jadavpur University in Calcutta, India. He received his Ph.D. in chemical engineering from the University of Massachusetts, Amherst.

Ian Shankland is vice president and chief technology officer of Honeywell Specialty Materials. He joined Honeywell 29 years ago and has held a number of positions in R&D and business development. Before taking his current position in 2009 he was director of technology for the Specialty Materials'

Fluorine Products business. While with Fluorine Products, he led technology programs for successful commercialization of a number of environmentally improved fluorocarbon products. In 2008 he was awarded the Perkin Medal by the Society of Chemical Industry for these accomplishments.

Shankland is named as an inventor on 50 patents and has published numerous technical and scientific papers. He earned his doctorate in physical chemistry from Adelaide University in Australia and was awarded a postdoctoral fellowship at Brown University, where he worked for three years with Joseph Kestin before joining Honeywell.

Dave Sikora is vice president of chemical technology for Chemtura Corporation. He joined Chemtura in 1997 after spending 17 years with the Monsanto Company in St. Louis and in Akron, Ohio. His areas of technical experience include homogeneous, heterogeneous, and enzymatic catalysis; alternate route chemistry; petroleum additives; polymer additives; water additives; synthetic lubricants; organometallics; electronic chemicals; and polyurethanes. He is an inventor on 13 patents and an author on 15 publications.

Sikora received a B.S. in chemistry from Fairfield University and a Ph.D in organotransition metal chemistry from the University of Massachusetts, Amherst.

David G. Speece, Jr., has been the global technology director for architectural coatings with The Dow Chemical Company since 2010. He first joined Dow (Rohm and Haas Company) 27 years ago as an R&D scientist in architectural coatings. He held positions with increasing levels of responsibility during his first 13 years with the company. His research focused on many facets of polymer design, including solvent-free technologies, heterogeneous morphologies, ambient cross-linking chemistry, and high-durability coatings.

In 1999 Speece moved to China to build a technical service laboratory, hire a local team, and develop products to meet the needs of the local market. In 2001 he was named Asia Pacific technical services and development manager. Beginning in 2003 Speece built the R&D organization in China and became the Asia

Pacific technical director covering R&D and technical service for architectural and industrial coatings. Speece received B.S. and M.S. degrees with honors from Furman University in Greenville, South Carolina, before joining Dow.

Israel Wachs is the G. Whitney Snyder Professor of Chemical Engineering at Lehigh University and director of the Operando Molecular Spectroscopy and Catalysis Research Laboratory. His research focuses on the complex structures of atomically dispersed surface metal oxides and their implications for catalysis, ceramic materials, pigments, and electronic devices. He is at the forefront in the use of spectroscopic devices to understand reactions in real time. Wachs holds a Ph.D. from Stanford University.

John Warner, after working at the Polaroid Corporation for nearly a decade, served as a tenured full professor at the University of Massachusetts in both Boston and Lowell (in chemistry and plastics engineering). In 2007 he founded the Warner Babcock Institute for Green Chemistry, where he serves as president and chief technology officer, and Beyond Benign (a nonprofit dedicated to sustainability and green-chemistry education). He is one of the founders of the field of green chemistry, coauthoring the defining text, *Green Chemistry: Theory and Practice,* with Paul Anastas. He has published over 200 patents, papers, and books. His recent work in the fields of semiconductor design, biodegradable plastics, personal-care products, solar energy, and polymeric photoresists are examples of how green-chemistry principles can be immediately incorporated into commercially relevant applications.

Warner received the 2004 Presidential Award for Excellence in Science Mentoring, the 2002 American Institute of Chemistry Northeast Division's Distinguished Chemist of the Year award, and the Council of Science Society President's 2008 Leadership Award. Warner was named by ICIS as one of the most influential people affecting the global chemical industries. In 2011 he was elected a fellow of the American Chemical Society and named one of "25 Visionaries Changing the World" by *Utne Reader.*

Warner received his B.S. in chemistry from the University of Massachusetts, Boston, and his Ph.D. in chemistry from Princeton University.

Yushan Yan has been a Distinguished Engineering Professor at the University of Delaware since 2011. From 1988 to 1992 he studied catalysis at the Dalian Institute of Chemical Physics of the Chinese Academy of Sciences. He worked for AlliedSignal as senior staff engineer from 1996 to 1998 before joining the faculty at the University of California, Riverside, where he rose through the academic ranks until being awarded the Presidential Chair in 2010.

He is a fellow of the American Association for the Advancement of Science. In 2010 the International Zeolite Association recognized his zeolite thin-film research with the Donald Breck Award. He was one of 37 awardees in the U.S. Department of Energy's ARPA-E OPEN 2009 for his fuel-cell technology and one of 66 awardees in OPEN 2012 for his redox flow-battery concept. He has been an inventor on a number of issued or pending patents, some of which were licensed to form start-up companies. His research has been widely cited in the scientific community and extensively covered by the media. He received his B.S. in chemical physics in 1988 from the University of Science and Technology of China and a Ph.D. in chemical engineering in 1997 from the California Institute of Technology.

Shu Yang is interested in developing new methodologies for the controlled synthesis, fabrication, and characterization of materials with specific and unique structures and functionalities inspired by biology. Special interests include preparation of functional (co)polymers and investigation of their self-assembled nanostructures; understanding the self-organization process at surfaces and interfaces; development of novel responsive materials and nonconventional approaches for nano- and micropatterning of complex 2-D and 3-D structures; and controlling wetting, adhesion, and biofouling on polymer thin films.

Shu has received the 2006 World's 100 Top Young Innovators from *Technology Review,* both the Unilever Award in Polymer Science and Engineering and the ICI Award in Applied Polymer Science from the American Chemical Society, and the National Science Foundation Career Award, among others. Recent publications have appeared in the *Journal of the Optical Society of America, Chemistry of Materials,* and *NeuroImage.* Shu earned her Ph.D. in chemistry and chemical biology from Cornell University.

ABOUT THE 2013 SCI GORDON E. MOORE MEDALIST

Jerzy Klosin, research fellow at The Dow Chemical Company, will receive the 2013 Society of Chemical Industry (SCI) Gordon E. Moore Medal for his outstanding contributions to the advancement of industrial chemistry in the discovery, scale-up, and commercialization of a new generation of catalysts used in the production of a wide range of important polyolefins, including ELITE, AFFINITY, ENGAGE, INFUSE, and NORDEL.

Klosin's catalysts deliver great control of co-monomer incorporation and termination reactions, thus enabling the creation of wholly new polymer architectures. The resulting "designer polyolefins" can be tailored to help streamline processes and enhance sustainability by significantly improving the energy efficiency of production. Klosin is the third scientist from Dow to receive the Gordon E. Moore Medal since its inception 10 years ago.

Klosin holds 22 U.S. patents related to his areas of research. Respected throughout the industry for his thought leadership, Klosin has authored more than 40 papers that have been published in peer-reviewed journals and has presented more than 25 invited lectures. He holds an M.S. from Adam Mickiewicz University in Poznan, Poland, and a Ph.D. in organic chemistry from the University of Florida in Gainesville.

ABOUT THE SCI GORDON E. MOORE MEDAL

The Society of Chemical Industry (SCI) has established the SCI Gordon E. Moore Medal to recognize early-career success in innovation, as reflected both in market impact and improvement to quality of life. By highlighting extraordinary individuals and their work, SCI aims to promote public understanding of research and development in modern chemical industries, enhance the interest of students in applied chemistry by providing role models, and emphasize the role of creative research in the global economy.

Past SCI Gordon E. Moore Medalists

Dean Rende (2012)

Doron Levin (2011)

Emmett Crawford (2010)

Emma Parmee (2009)

Edmund M. Carnahan (2008)

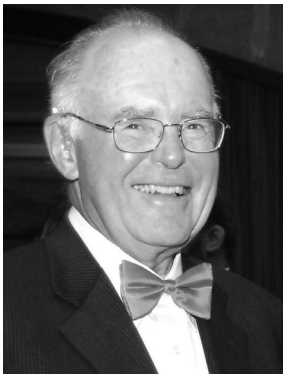
Paul A. Sagel (2007)

Jonathan M. McConnachie (2006)

Jeffrey John Hale (2005)

George Barclay (2004)

ABOUT GORDON E. MOORE



Gordon E. Moore cofounded Intel in 1968. He is widely known for Moore's law, in which in 1965 he predicted that the number of components the industry would be able to place on a computer chip would double every year. In 1975 he updated his prediction to once every two years. Moore earned a B.S. in chemistry from the University of California, Berkeley, and a Ph.D. in chemistry and physics from the California Institute of Technology. He received the Presidential Medal of Freedom, the nation's highest civilian honor, from George W. Bush in 2002. He received the National Medal of Technology from President George H. W. Bush in 1990.

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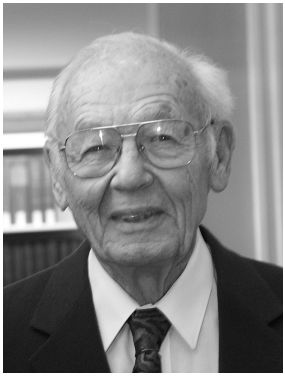

The Schlinger Symposium is named in honor of Warren G. Schlinger, a Ph.D. graduate of the California Institute of Technology with a distinguished career in industrial innovation. In Schlinger's 35 years at Texaco, he was a pioneer in gasification technologies now widely used for production of hydrogen, other chemicals, and power. Among other benchmarks, Schlinger had 15 U.S. patents issued during his career. He has been honored with the AIChE Technical Achievement Award and the Chemical Engineering Practice Award, and by the National Academy of Engineering.

SPONSORING ORGANIZATIONS

About the Chemical Heritage Foundation

The Chemical Heritage Foundation is a collections-based nonprofit organization that preserves the history and heritage of chemistry, chemical engineering, and related sciences and technologies. The collections are used to create a body of original scholarship that illuminates chemistry's role in shaping society. In bridging science with the humanities, arts, and social sciences, CHF is committed to building a vibrant, international community of scholars; creating a rich source of traditional and emerging media; expanding the reach of our museum; and engaging the broader society through inventive public events.

About the Society of Chemical Industry

SCI America, launched in 1894, is part of the Society of Chemical Industry's international organization. It provides a unique networking forum for chemical industry leaders, industrial scientists, and technologists to exchange new business ideas and best practices. It celebrates achievement to promote public awareness of the contributions of industrial chemistry and inspire students to enter technical careers.

SCI America section also offers its members the opportunity to become part of an international network of industry thought leaders and researchers. Through specialized conferences, e-events, and publications, it helps foster best practices in fields as diverse as fine and commodity chemicals, food, pharmaceuticals, biotechnology, agriculture, and environmental protection.

The Perkin Medal was established in 1906 to commemorate the 50th anniversary of the discovery of mauveine. Past recipients include Nobel laureates Glenn T. Seaborg, Carl S. Marvel, and Herbert C. Brown; Donald F. Othmer, chemical engineer; Stephanie Kwolek, inventor of Kevlar; Paul S. Anderson, medicinal chemist; and Gordon E. Moore, the founder of Intel.

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