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Engineering Sustainability 2007

Innovations that Span Boundaries

April 15-18, 2007

Sheraton Station Square Hotel
Pittsburgh, Pa.

Final Program

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University of Pittsburgh**

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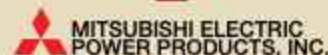


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University of Pittsburgh

*School of Engineering
Mascaro Sustainability Initiative
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Eric J. Beckman
Codirector, Mascaro Sustainability Initiative

LETTER FROM THE CHAIR

First, I would like to take this opportunity to welcome you all to Pittsburgh and to Engineering Sustainability (ES) 2007. I hope that you not only have a rewarding conference experience, but also that you have the opportunity to take advantage of the many amenities that our city has to offer. Our conference has been designed to showcase cutting-edge science and engineering that focuses on greening the built environment and the sustainable use of water. Progress in these areas will require innovations from professionals in a variety of disciplines, and we are grateful to have contributions from researchers in fields ranging from engineering to architecture to public policy to the sciences. Designing more sustainable buildings and water-use technologies is vital to the creation of sustainable global economies, hence our desire to showcase innovation in these areas.

We have arranged the program as a series of topical sessions, allowing you to focus your attention on a specific area or sample from a variety of topics.

This program is your source for comprehensive information about ES 2007, but if you have questions or need help, please visit the registration area, or ask any of the ES 2007 volunteers. If we can do anything to make your time in Pittsburgh more enjoyable and productive, please let us know.

Sincerely,

Eric J. Beckman

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GENERAL INFORMATION

Registration Hours

Sunday Noon–6 p.m.
Monday 7:30 a.m.–5:30 p.m.
Tuesday 7:30 a.m.–5:30 p.m.
Wednesday 7:30 a.m.–10:30 a.m.

Speaker Ready Room (Executive Boardroom)

There will be a computer and printer available during the conference for speakers to check presentations and make small changes if necessary.

Monday and Tuesday 7:30 a.m.– 5:30 p.m.
Wednesday 7:30 a.m.–Noon

Poster Room (Executive Boardroom)

All posters are to be delivered to the Poster Room by noon on Monday. Posters can be picked up in the same room on Tuesday from 7:30 a.m. to 5:30 p.m.

Message Board

As a service to conference registrants, a Message Board will be located in the registration area. Registration staff will man the board from 8 a.m. to 5 p.m., April 16–18. Messages will be retained until the end of each day.

CONFERENCE COSPONSORS

The Mascaro Sustainability Initiative (MSI) at the University of Pittsburgh is a center of excellence in sustainable engineering, specifically focusing on the design of sustainable neighborhoods. MSI was created to encourage and nurture new collaborative projects based on strong and innovative research helping to translate the fundamental science of sustainability into real products and processes. Research conducted under the auspices of MSI includes projects on greening the built environment, more sustainable use of water, and the design of distributed power systems.

The Steinbrenner Institute for Environmental Education and Research (SEER) champions Carnegie Mellon University's commitment to making a difference in the way the world thinks and acts about the environment. In keeping with Carnegie Mellon's distinguished track record in interdisciplinary approaches to education and research, the Steinbrenner Institute facilitates connections between faculty, students, and the outside community; promotes Carnegie Mellon's core academic strengths housed in 15 research centers; and advances emerging and interdisciplinary interests in critical issues related to environmental sustainability.

Transportation Information

Checker Cab: 412-381-5600
Yellow Cab: 412-321-8100

Express Shuttle USA runs from the Pittsburgh International Airport to the Sheraton Station Square Hotel every hour on the hour. Pickup is in the baggage claim area, and the cost is \$19 one way and \$36 round-trip.

Badge Information

Please wear your ES 2007 name badges at all times. Not only is the badge your passport to all conference activities, but it also lists several important local phone numbers on the back. You may be denied access to educational sessions and events if you are not wearing your badge.

Cell Phone Usage

As a courtesy to speakers and fellow attendees, the ES 2007 staff requests that cell phones and pagers be turned off or switched to silent mode in all presentation rooms.



FEATURED PLENARY SPEAKERS

"University Investment in Sustainability: Research, Teaching, and Practice"

Mark A. Nordenberg, Jared L. Cohon, and Jonathan Fink

Monday, April 16, 8:30 a.m.

Grand Station I-II



Mark A. Nordenberg

Mark A. Nordenberg is chancellor and chief executive officer of the University of Pittsburgh. In this role, he heads one of the nation's leading public research universities and one of the oldest institutions of higher learning west of the Allegheny Mountains. Nordenberg is the University's 17th chancellor, and he

marked the 10th anniversary of his move into the chancellor's office in June 2005.

Nordenberg joined the law faculty of the University of Pittsburgh in 1977, with a nine-month appointment as a visiting assistant professor. He served as dean of Pitt's School of Law from 1985 until 1993, and holds the special faculty rank of Distinguished Service Professor of Law. His area of scholarly specialty is civil litigation, and he has served as a member of both the U.S. Supreme Court's Advisory Committee on Civil Rules and the Pennsylvania Supreme Court's Civil Procedural Rules Committee. He also is an award-winning teacher, having been the initial recipient of the Excellence-in-Teaching Award, now presented annually by the graduating class of Pitt's law school, and having been one of the first recipients of the Chancellor's Distinguished Teaching Award recognizing excellence University-wide.

Under Nordenberg's leadership, undergraduate applications have more than doubled, and the academic credentials of enrolled undergraduates have soared. During the past 10 years—and using data from 2004's freshman class, the most recent class for which final numbers are available—the average SAT score rose from 1110 to 1231, the percentage of freshmen who graduated in the top 10 percent of their high school classes increased from 19 percent to 46 percent, and the percentage of freshmen who graduated in the top 20 percent of their high school classes increased from 39 percent to 75 percent.

Chancellor Nordenberg is involved in a wide range of civic activities. He is a founding member of both the Pittsburgh Life Sciences Greenhouse and the Technology Collaborative. Those initiatives—which are dedicated to making this region a leader in information technology, biotechnology, and robotics—have attracted national attention.



Jared L. Cohon

Jared L. Cohon became the eighth president of Carnegie Mellon University in July 1997.

Cohon came to Carnegie Mellon from Yale University, where he was dean of the School of Forestry & Environmental

Studies and professor of environmental systems analysis from 1992 to 1997. He started his teaching and research career in 1973 at Johns Hopkins University, where he was a faculty member in the Department of Geography and Environmental Engineering for 19 years. He also served as assistant and associate dean of engineering and vice provost for research at Johns Hopkins. Cohon earned a BS in civil engineering from the University of Pennsylvania in 1969, and a PhD in civil engineering from the Massachusetts Institute of Technology in 1973.

A national authority on environmental and water resource systems analysis, Cohon authored *Multiobjective Programming and Planning*, published by Academic Press in 1978 and reissued as a Classic of Operations Research by Dover Publications in 2004. In addition, he has authored, coauthored, and edited more than 80 professional publications focusing on this interdisciplinary field that combines engineering, economics, and applied mathematics. He has worked on water resource problems in the United States, South America, and Asia and on energy facility siting, including nuclear waste shipping and storage. In addition to his academic experience, he served in 1977 and 1978 as legislative assistant for energy and the environment to the Honorable Daniel Patrick Moynihan, former U.S. senator from New York.

President Bill Clinton appointed Cohon to the Nuclear Waste Technical Review Board in 1995 and appointed him as chairman in 1997. His term on the board ended in 2002. President George W. Bush appointed Cohon in 2002 to his Homeland Security Advisory Council. He was also appointed as chairman of the council's Senior Advisory Committee on Academia and Policy Research.

Cohon is a member of the Boards of Directors of Mellon Financial Corp. and American Standard, Inc. He also serves on the boards of several national and local nonprofit organizations, including the Health Effects Institute; the H. John Heinz III Center for Science, Economics and the Environment; the Council on Competitiveness; the Carnegie Museums of Pittsburgh; the Pittsburgh Cultural Trust; the Urban League of Pittsburgh, and the Allegheny Conference on Community Development.

Due to an unforeseeable conflict, Michael Crow regrettably is unable to join us for ES 2007.

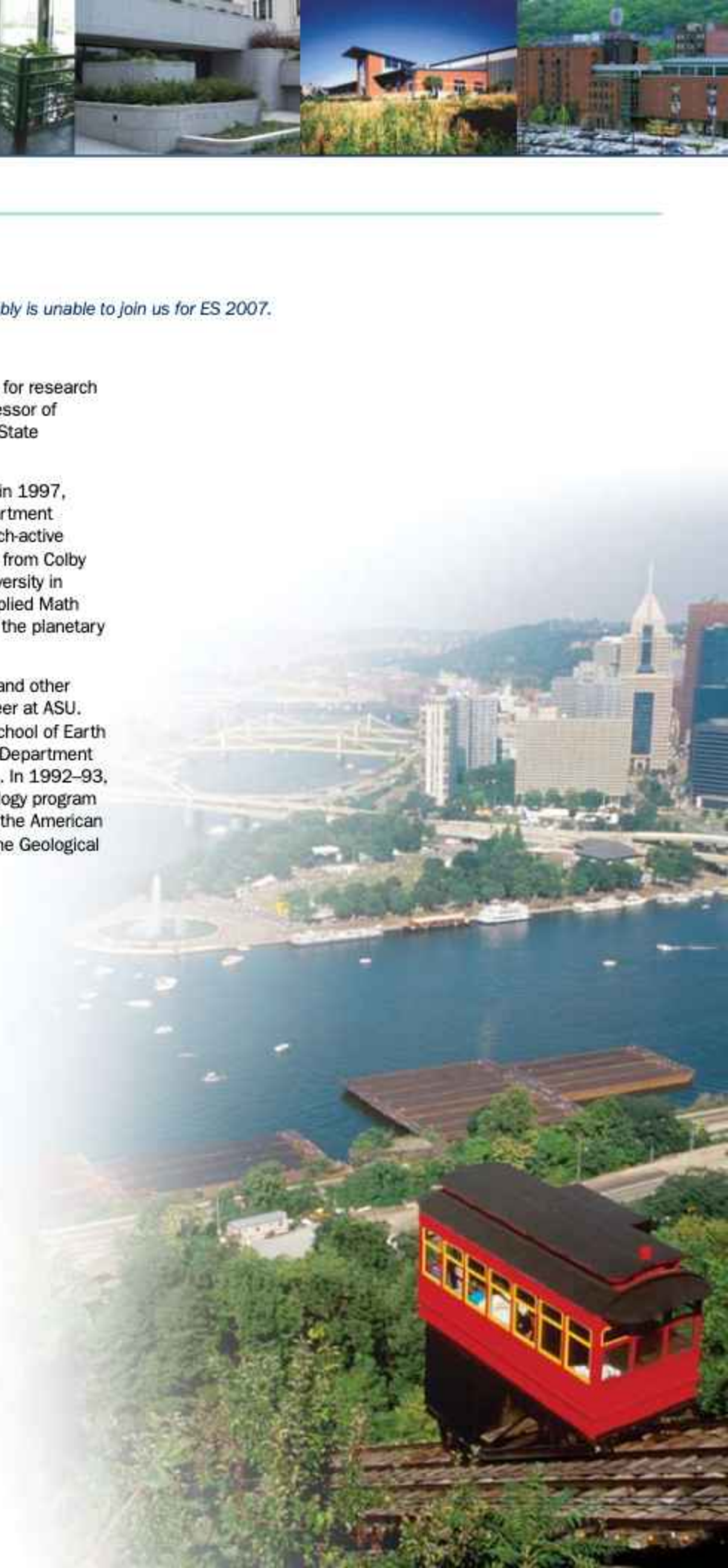


Jonathan Fink

Jonathan Fink is vice president for research and economic affairs and professor of geological sciences at Arizona State University (ASU).

Prior to becoming research VP in 1997, he served as chair of the Department of Geology, ASU's most research-active department. He received a BA in biology and geology from Colby College in 1973, a PhD in geology from Stanford University in 1979, and held postdoctoral appointments in the Applied Math Department at the Weizmann Institute (Israel) and in the planetary geology group at ASU.

A volcano specialist who studies eruptions on earth and other planets, Fink has spent most of his professional career at ASU. He has held visiting appointments in the Research School of Earth Sciences at Australian National University and in the Department of Chemical Engineering at the University of Colorado. In 1992–93, he served as director of the Geochemistry and Petrology program at the National Science Foundation. He is a fellow of the American Association for the Advancement of Science and of the Geological Society of America.





PLENARY SPEAKERS



Heinz Distinguished Lecture

"The Death of Environmentalism and the Birth of a New Aspirational Politics"

Michael Shellenberger

Tuesday, April 17, 8:30 a.m.

Michael Shellenberger is codirector of the Breakthrough Institute, a think tank, and cofounder of American Enviroics, a research and strategy firm. He works on and writes about everything from politics to energy to changing social values. In the fall of 2007, Houghton Mifflin will publish Shellenberger and Ted Nordhaus' *The Death of Environmentalism and the Birth of a New Aspirational Politics*. In October 2004, Shellenberger and Nordhaus published an essay by the same name, creating a major national debate over the future of environmentalism and progressive politics. In 2003, Shellenberger cofounded the Apollo Alliance. Referred to by the *New Yorker* as "an influential umbrella organization of Greens and trade unionists," the Apollo Alliance is advocating a New Apollo Project to create 3 million clean energy jobs, free America from foreign oil, and re-establish America's global economic leadership. Shellenberger has written articles for the *Los Angeles Times*, the *American Prospect*, the *Philadelphia Inquirer*, *Glamour*, and other publications on issues ranging from the New Apollo Project to ethical trade. He is the author of *Race to the Top*, a report on ethical business campaigns for nongovernmental organizations.



"Sustainability—The Next Industrial Revolution"

Paul Westbrook

Tuesday, April 17, 9:15 a.m.

Paul Westbrook is the sustainable development manager for Texas Instruments (TI). He has been with TI since graduating with a BS in mechanical engineering from Louisiana State University in 1982. Westbrook has worked in TI's facilities organization in a variety of roles, including as building facilities manager for two of TI's large semiconductor manufacturing plants. In 2002, he moved to TI's worldwide construction organization and began working on sustainable development ideas and plans, including heading the sustainable effort for TI's new 300 mm semiconductor manufacturing plant in Richardson, Texas. He is a LEED-accredited professional and a member of the group technical staff at TI. Westbrook designed his own passive/active solar home, which won the 1997 National Association of Home Builders EnergyValue Housing Award for Innovative Design. He is also a sprinter and the captain of the TI track and field team. He was inducted into the United States Corporate Athletics Association Hall of Fame in 2002—the same year he was honored to carry the Olympic torch for the Salt Lake City games. In addition, he plays lead alto sax and is president of the TI Jazz Band.



"Solutions for Sustainability"

Ray Lane

Wednesday, April 18, 8:30 a.m.

Ray Lane is general partner at Kleiner Perkins Caufield & Byers (KPCB), focused on helping entrepreneurs with technological and market insight, organizational development, team building, selling, and managing growth. Since joining KPCB, Lane has sponsored several investments for the firm aimed at improving enterprise productivity. He sits on the boards of Elance, MetaMatrix, Visible Path, Xsigo Systems, SpikeSource, and PodShow. He also serves on one public board, Quest Software.

Before joining KPCB, Lane was president and chief operating officer of Oracle Corp., the second-largest software company in the world and the leading enterprise software and services company. During his eight-year tenure, Oracle exhibited phenomenal sales growth, from approximately \$1 billion in 1992 to its current annual revenue of \$10 billion. Lane led Oracle's business expansion beyond its core database technology into enterprise applications and professional services.

Before joining Oracle, Lane was a senior partner with Booz Allen Hamilton, where he pioneered and led the Information Systems Group, a worldwide consulting practice targeted at helping senior management achieve better results from information technology. He also served on Booz Allen Hamilton's Board of Directors and executive management committee. Prior to Booz Allen Hamilton, Lane served as division vice president with Electronic Data Systems Corp. In addition, he spent 10 years with IBM in various product management, sales, and marketing positions.

Lane received a bachelor's degree in mathematics and an honorary PhD in science from West Virginia University (WVU). He was elected to the Academy of Distinguished Graduates of WVU and serves on the WVU Foundation Board of Directors. Recently, WVU honored him by naming the Lane Department of Computer Science and Electrical Engineering. Lane also serves on the Board of Trustees of Carnegie Mellon University. He has been an active campaigner and planner for Carnegie Mellon's establishment of a Silicon Valley campus, and he is cocreator of a High Dependability Computing Consortium with Carnegie Mellon and NASA. Lane serves as vice chairman of the Special Olympics Board of Directors and has served on the international board for several years. He also holds an honorary PhD from Golden Gate University.



"Material Science Solutions for Engineering Sustainability: A Perspective from Bayer MaterialScience LLC"

Gregory S. Babe

Wednesday, April 18, 10 a.m.

Gregory S. Babe is president and CEO of Bayer MaterialScience LLC. As head of the NAFTA region, Babe is responsible for the North American activities of Bayer MaterialScience, which is a member of the worldwide Bayer Group, an international healthcare, nutrition, and innovative materials group based in Leverkusen, Germany. Prior to his current position, Babe was president and CEO of Bayer Corporate & Business Services LLC (BCBS), where he was responsible for providing expertise and support in engineering, information systems, procurement, materials management, human resources, finance, accounting, and other business services to Bayer and its affiliates. Babe joined Bayer in 1980 in the Polyurethanes Group and has held several management positions of increasing responsibility, including manager of the Brunsbuettel, Germany, facility; director and general manager of Hennecke Machinery, then a unit of Bayer's Polymers Division, in Pennsylvania; vice president of corporate quality; and director of a national program to implement Bayer's enterprise resource planning system. He was named senior vice president of information services in 1999, and in 2001, that role was expanded to include the NAFTA region. Babe was named president and CEO of BCBS in 2003, and he continued his role as chief information officer. Babe serves on the Boards of Directors for Bayer MaterialScience LLC, Deerfield Urethane Inc., and Sheffield Plastics. In addition, he serves as the executive sponsor of the Bayer Diversity Advisory Council. He also is a member of the American Plastics Council Operating Board and serves as the finance chair. He is a member of the Boards of Directors for the United Way of Allegheny County, Duquesne University, and the Pittsburgh Technology Council in Pittsburgh. A native of West Virginia, Babe holds a Bachelor of Science degree in mechanical engineering from West Virginia University.

The Heinz Distinguished Lectureship is supported by a gift from the Heinz Endowments for the establishment of a Green Construction and Sustainable Development Program in the Department of Civil and Environmental Engineering at the University of Pittsburgh. The lectureship is an annual event that aims to bring to the University innovative, thought-provoking, and forward-looking concepts appropriate for sustainable infrastructure development. This year's lecture is being presented in conjunction with Engineering Sustainability 2007.





INVITED SPEAKERS

Rajat Ghosh, Senior Project Leader, Sustainable Production Technology Group, Alcoa Inc.

Cyanide Management in Aluminum Industry via Engineered Surface Wetland Systems

Ghosh earned a BS in chemical engineering from Jadavpur University in Kolkata, India, an MS in chemical engineering from the University of Wyoming, and a PhD in civil and environmental engineering from Carnegie Mellon University. At Alcoa, Ghosh is responsible for managing various environmental projects related to sediment, groundwater, and air pollution control. He has authored and coauthored more than 25 internal and external publications, he holds one U.S. patent, and he cowrote *Cyanide in Water and Soil: Chemistry, Risk and Management* (CRC Press/Lewis Publishers, 2006), a comprehensive book on cyanide management. In 2006, Ghosh was appointed a lecturer in the Department of Civil and Environmental Engineering at Carnegie Mellon University. He also is a registered professional engineer with the Commonwealth of Pennsylvania.

Michael Horman, Associate Professor of Architectural Engineering, Director of the Lean and Green Research Initiative, Penn State University

Lean and Green: Process Improvements for Low-Cost Green Buildings

Horman joined Penn State in 2000 after completing his doctorate at the University of Melbourne, Australia. His research and teaching interests relate to construction management, particularly the use of lean production methods to enhance the delivery of high-performance, sustainable buildings. The Lean and Green Research Initiative is working with leading industry owners, including the Pentagon Renovation & Construction Program; Toyota Motor Sales, U.S.A., Inc.; Penn State's Office of Physical Plant; and the University of Pittsburgh Medical Center to understand the delivery process of green buildings. The research spans such industries as automotive sales, military facilities, and educational and healthcare facilities.

Lester B. Lave, University Professor and Higgins Professor of Economics, Carnegie Mellon University

Biofuels in an Oil- and Carbon-Constrained World

Lave has appointments in the business, engineering, and public policy schools at Carnegie Mellon. He earned a BA from Reed College and a PhD from Harvard University. He was elected to the Institute of Medicine of the National Academy of Sciences and is a past president of the Society for Risk Analysis. Lave has acted as a consultant to many government agencies and companies. He has received research support from a wide range of federal and state agencies, as well as foundations, nongovernmental organizations, and companies. With Chris Hendrickson, Lave directs the Green Design Institute at Carnegie Mellon and, with Granger Morgan, he directs the Carnegie Mellon Electricity Industry Center. His research is focused on applying economics to public policy issues, including those related to energy in general and electricity in particular.

H. Scott Matthews, Research Director of the Green Design Institute, Associate Professor in the Departments of Civil and Environmental Engineering and Engineering and Public Policy, Carnegie Mellon University

Sustainable Transportation Fuels and Infrastructure: A Necessary Dialogue

The Green Design Institute is an interdisciplinary research consortium at Carnegie Mellon focused on identifying and assessing the environmental impacts of systems and helping businesses manage their use of resources and toxic materials. Matthews' interests are in the area of valuing the socioeconomic implications of environmental systems and infrastructure using systems analysis tools such as life-cycle assessment.

Susan Murcott, Senior Lecturer, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology

Co-Evolutionary Design for Development: Influences Shaping Engineering Design and Implementation in Nepal and the Global Village

Murcott's work focuses on innovative, low-cost water and wastewater treatment technologies for developing countries. For a decade, she focused on wastewater for megacities and, since 1997, she has been a leader in the emerging field of household drinking water treatment and safe storage, with projects in Mexico, Brazil, China, Haiti, Nicaragua, Peru, Kenya, Ghana, India, Eastern Europe, and elsewhere. At MIT, Murcott teaches Water and Sanitation in Developing Countries and D-Lab III: Disseminating Innovations for the Common Good. At Cambridge University, she has cotaught Sustainable Development for Large Infrastructure Projects and Design for Developing Countries. She is the author of more than 50 professional papers.

Annie Pearce, Assistant Professor, Myers-Lawson School of Construction, Virginia Polytechnic Institute and State University

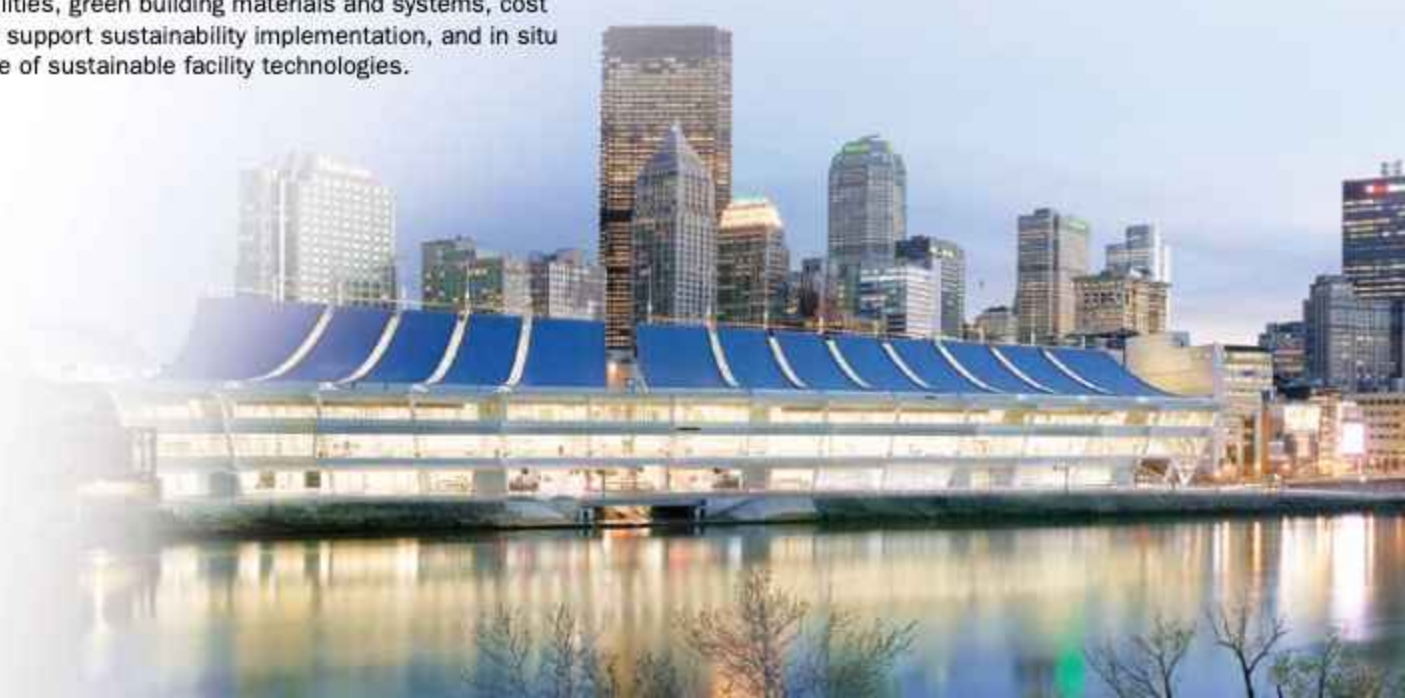
Sustainable Capital Projects: Leapfrogging the First Cost Barrier

Pearce specializes in sustainable facilities and infrastructure systems. Throughout her career, she has worked with practitioners in both the public and private sectors to implement sustainability as part of building planning, design, construction, and operations. As a LEED-accredited professional, Pearce brings the latest in green building methods, technologies, and best practices to the classroom. Her specific areas of interest include metrics of sustainability for built facilities, green building materials and systems, cost modeling to support sustainability implementation, and in situ performance of sustainable facility technologies.

Laura Schaefer, Associate Professor of Mechanical Engineering and Materials Science, Deputy Director of the Mascaro Sustainability Initiative, University of Pittsburgh

Distributed Generation: One Example of Environmental and Economic Implications

Schaefer earned an MS and PhD from Georgia Tech, where she performed research on the Einstein Cycle and environmentally friendly refrigerants. Her current research explores the fundamental fluid and heat transfer issues encountered in energy systems. Her research includes such areas as advanced power cycles, two-phase microchannel flow, solid oxide fuel cells, hydrokinetic generation, and thermoacoustics. For her work, Schaefer was recognized with the National Science Foundation's Faculty Early Career Development (CAREER) award and the ASHRAE New Investigator Award.





CONFERENCE SCHEDULE

Sunday, April 15	Monday, April 16	Tuesday, April 17	Wednesday, April 18
	8:30 a.m.	8:30 a.m.	8:30 a.m.
	Opening Plenary Session "University Investment in Sustainability" Mark A. Nordenberg Chancellor, University of Pittsburgh Jared L. Cohon President, Carnegie Mellon University Jonathan Fink Vice President for Research and Economic Affairs, Arizona State University	Plenary Sessions Michael Shellenberger Codirector, Breakthrough Institute Paul Westbrook Sustainable Development Manager, Texas Instruments	Plenary Sessions Ray Lane General Partner, Kleiner Perkins Caufield & Byers Gregory S. Babe President and CEO, Bayer MaterialScience LLC
	10:30 a.m.	10:30 a.m.	11 a.m.
	Concurrent Sessions Green Building Design and Construction I Design of More Sustainable Transportation Grids Water Solutions for the Developing World	Concurrent Sessions Green Building Design and Construction II The Intersection of Technology and Policy Case Studies from Around the World	Concurrent Sessions Green Building Design and Construction III Sustainable Power for the Built Environment II
Noon	12:30 p.m.	1 p.m.	
Registration Opens	Lunch	Lunch	
	2 p.m.	2:30 p.m.	
	Concurrent Sessions Economics of Sustainability Case Studies from Western Pennsylvania Sustainable Water Use and Industry	Concurrent Sessions Sustainable Power for the Built Environment I Toward the "Zero-Operating-Cost" Building New Education Paradigms	
5:30 p.m.	6 p.m.	6:30 p.m.	
Welcome Reception Sheraton Station Square Hotel	Poster Session and Social Sheraton Station Square Hotel	Banquet Gateway Clipper Fleet	

AGENDA AT-A-GLANCE

Sunday, April 15 Noon Registration Opens Grand Station III Foyer 5:30 p.m. Welcome Reception Reflections Room Cohosted by the Mascaro Sustainability Initiative, Sustainable Pittsburgh, and the Vandergrift Improvement Program	Tuesday, April 17 7:30 a.m. Registration Opens Grand Station III Foyer 8:30–10 a.m. Plenary Session Grand Station I–II Michael Shellenberger , <i>Codirector, Breakthrough Institute</i> Plenary Session Grand Station I–II Paul Westbrook , <i>Sustainable Development Manager,</i> <i>Texas Instruments</i> 10–10:30 a.m. Break 10:30 a.m. Concurrent Sessions Green Building Design and Construction II Ellwood I–II The Intersection of Technology and Policy Woodlawn I Case Studies from Around the World Haselton I–II 1 p.m. Lunch and Networking Break Grand Station I–II 2:30–4:30 p.m. Concurrent Sessions Sustainable Power for the Built Environment I Ellwood I–II Toward the "Zero-Operating-Cost" Building Woodlawn I New Education Paradigms Haselton I–II 6:30 p.m. Banquet Gateway Clipper
Monday, April 16 7:30 a.m. Registration Opens Grand Station III Foyer 8:30 a.m. Conference Welcome Grand Station I–II Eric J. Beckman , <i>Conference Chair</i> Opening Plenary Session University Investment in Sustainability: Research, Teaching, and Practice Mark A. Nordenberg , <i>Chancellor, University of Pittsburgh</i> Jared L. Cohon , <i>President, Carnegie Mellon University</i> Jonathan Fink , <i>Vice President for Research and Economic Affairs, Arizona State University</i> 10–10:30 a.m. Break 10:30 a.m.–12:30 p.m. Concurrent Sessions Green Building Design and Construction I Ellwood I–II Design of More Sustainable Transportation Grids Woodlawn I Water Solutions for the Developing World Haselton I–II 12:30 p.m. Lunch and Networking Break Grand Station I–II 2–4:30 p.m. Concurrent Sessions Economics of Sustainability Ellwood I–II Case Studies from Western Pennsylvania Woodlawn I Sustainable Water Use and Industry Haselton I–II 6 p.m. Poster Session and Social Reflections Room	Wednesday, April 18 7:30 a.m. Registration Opens Grand Station III Foyer 8:30 a.m. Plenary Session Grand Station I–II Ray Lane , <i>General Partner,</i> <i>Kleiner Perkins Caufield & Byers</i> Break Plenary Session Grand Station I–II Greg Babe , <i>President and CEO, Bayer MaterialScience LLC</i> 10–11 a.m. Concurrent Sessions Green Building Design and Construction III Ellwood I–II Sustainable Power for the Built Environment II Woodlawn I 11 a.m.–1 p.m.

* unless otherwise noted, all events are
at the Sheraton Station Square Hotel

Boxed lunches will be available to go.



ORAL PRESENTATIONS

Monday, April 16

10:30 a.m.–12:30 p.m.

Green Building Design and Construction I Ellwood I-II

10:30 a.m. **Lean and Green: Process Improvements for Low-Cost Green Buildings**

***Michael Horman**, Penn State University

11 a.m. **Chloride Ion Penetration in Cover of Steam Cured Concrete**

Gladis Camarini, State University of Campinas

11:30 a.m. **Performance Assessment for Sustainable Building Design**

Joseph Fiksel, The Ohio State University

12 p.m. **Use of Steel-Making Co-Products in the Production of Low-Impact Construction Components**

Vanessa Gomes de Silva, State University of Campinas
Maristela Gomes de Silva, Federal University of Espírito Santo

Design of More Sustainable Transportation Grids Woodlawn I

10:30 a.m. **Including Sustainability in Bridge Management Systems**

Chris A. Gwaltney, Purdue University

11 a.m. **Environmental Life Cycle Assessment for Highway Construction Projects**

Neethi Rajagopalan, Texas A&M University

11:30 a.m. **Plug-In Hybrids for Sustainable Transportation: Environmental, Infrastructure, and Policy Challenges**

Constantine Samaras, Carnegie Mellon University

12 p.m. **Street Patterns in our Cities in Terms of Cost and Environment in Achieving Sustainable Urban Forms as a Control of Air Quality and Improving of Social Intimacy**

Hassan Motea Al-Nakhli, King Faisal University

Water Solutions for the Developing World Haselton I-II

10:30 a.m. **Co-Evolutionary Design for Development: Influences Shaping Engineering Design and Implementation in Nepal and the Global Village**

***Susan Murcott**, Massachusetts Institute of Technology

11 a.m. **Mechanistic Depictions of Plant Water Use in Arid, Salt-Affected Environments: Research for the Developing World**

Xu Liang, University of Pittsburgh

11:30 a.m. **Adapting Life Cycle Thinking to Assess Project Sustainability in International Water Development Work**

Jennifer McConville, Michigan Technological University

12 p.m. **Water Solutions for the Developing World: Arsenic-Hyperaccumulating Ferns for Treatment of Arsenic-Contaminated Water**

Chantal Blake, University of Pittsburgh

Monday, April 16

2–4:30 p.m.

Economics of Sustainability Ellwood I-II

2 p.m. **Biofuels in an Oil and Carbon Constrained World**

***Lester B. Lavo**, Carnegie Mellon University

2:30 p.m. **Probabilistic Economic Analysis of Green Roof Benefits at the Building-Specific and City Scale**

Corrie Clark, University of Michigan

3 p.m. **Realigning Economic Incentives to Achieve Healthier Indoor Environments**

Felicia Wu, University of Pittsburgh

3:30 p.m. **An Integrated Assessment of the Sustainability of Green Roofs**

Helen Muga, Michigan Technological University

4 p.m. **Designing a More Sustainable Construction Process: How Project Delivery Methods Affect Sustainability**

James D. White, LLI Engineering

Case Studies from Western Pennsylvania Woodlawn I

2 p.m. **The Economic Benefits of Green Buildings: A Comprehensive Case Study**

Kim LaScola Needy, University of Pittsburgh

2:30 p.m. **Thinking Outside the Glass Box: New Solutions for Improving Energy Efficiency in Conservatory Design**

Richard V. Piacentini, Phipps Conservatory and Botanical Gardens

3 p.m. **Pittsburgh Residents' Environmental Attitudes and Preferences for Behavior Change Toward Sustainable Development**

Shahzeen Attari and Mary Shoen, Carnegie Mellon University

3:30 p.m. **Making Major Retail Establishments Sustainable: The Case of the Mall at Robinson**

Matthew M. Mehalik, University of Pittsburgh

4 p.m. **Designing, Engineering, and Developing Educational Opportunities around a Sustainable Wastewater Treatment and Recycling System**

Theresa Gay Rohall, Powdermill Nature Reserve

Sustainable Water Use and Industry Haselton I-II

2 p.m. **Cyanide Management in Aluminum Industry via Engineered Surface Wetland Systems**

***Rajat S. Ghosh**, Alcoa Inc.

2:30 p.m. **Beneficial Reuse of Domestic Wastewater**

Charles Blumenschein, N.A. Water Systems

3 p.m. **Development of Bimetallic Catalysts for Nitrate Removal from Drinking Water**

Judith Yang, University of Pittsburgh

3:30 p.m. **Sustainable Design Practices with Wafer Fabrication Facilities**

Pablo E. Ruiz, Texas Instruments

4 p.m. **A New Issue in Sustainable Development—Emerging Micro-pollutants from Human and Agricultural Activities**

Rominder Suri, Villanova University

Tuesday, April 17

10:30 a.m.–1 p.m.

Green Building Design and Construction II Ellwood I-II

10:30 a.m. **The Concept of Sustainability and its Impact on the Building Design Process**

Doris Kowaltowski and Vanessa Gomes de Silva, State University of Campinas

11 a.m. **Input-Output-Based Hybrid Life Cycle Assessment Model for Construction Processes**

Aurora L. Sharrard, Carnegie Mellon University

11:30 a.m. **Enhancement of Ecological Building Design (EBD) through Design for Disassembly (DfD): Moving from Eco-Building to Eco-Service**

Ali Vakili-Ardebili, University of Liverpool

12 p.m. **Standards and Innovations: The Diffusion of Green Buildings in the United States**

Mook Han Kim, Rutgers University

12:30 p.m. **From Blueprints through Red Tape to Green Buildings and All the Colors in Between (and Hopefully Beyond): Practical and Contractual Considerations on Your Road to LEED Certification**

Edward B. Gentilcore, Reed Smith LLP
Steven Shapiro, The Whiting-Turner Contracting Co.

The Intersection of Technology and Policy Woodlawn I

10:30 a.m. **Sustainable Transportation Fuels and Infrastructure: A Necessary Dialogue**

***H. Scott Matthews**, Carnegie Mellon University

11 a.m. **DeSCUSS Denver: Decision Support to Coordinate Urban Systems for Sustainability in Denver, Colo.**

Anu Ramaswami, University of Colorado at Denver and Health Sciences Center

11:30 a.m. **Water Use Reduction and Rainwater Harvesting in a School Campus: An Action Research**

Daisy B. Badilla, University of the Philippines

12 p.m. **Integrated Hydrologic Science and Environmental Engineering Observatory: A Preliminary Program Plan for the WATERS Network**

Jeanne M. VanBriesen, Carnegie Mellon University

12:30 p.m. **Decentralized Water Management Initiatives in Nepal**

Arinita M. Shrestha, Academy for Educational Development

Case Studies from Around the World Haselton I-II

10:30 a.m. **Mor-Sand Filters for Oil-Producing Communities in Nigeria**

Joachim Ibeziako Ezeji, Rural Africa Water Development Project

11 a.m. **Improving the Quality of Sachet-Vended Water in Tamale, Ghana**

Teshamulwa Irene Okloga, Massachusetts Institute of Technology

11:30 a.m. **Integrating Developed and Developing World Knowledge into Global Discussions and Strategies for Sustainability**

Julie B. Zimmerman, Yale Center for Green Chemistry and Green Engineering, Yale University

12 p.m. **Engineering Sustainability: Progress in the Australian Built Environment**

Karlson "Charlie" Hargroves, The Natural Edge Project

Tuesday, April 17

2:30–4:30 p.m.

Sustainable Power for the Built Environment I Ellwood I-II

2:30 p.m. **Micro-Grid Energy Management System (EMS) Technology for Renewable Energy Resource Integration and Applications**

Yasuhiro Kojima, Mitsubishi Electric Power Products Inc.

3 p.m. **Increasing Available Power with Used Petroleum Products**

Marcella J. Gallick, Rhea Engineers & Consultants Inc.

3:30 p.m. **Modeling the Life Cycle Optimization of Energy Use in Commercial Buildings**

Robert Ries, University of Pittsburgh

4 p.m. **Community-Based Strategies for Developing Sustainable Power**

Gregory Reed, KEMA Inc.

Toward the "Zero-Operating-Cost" Building Woodlawn I

2:30 p.m. **Sustainable Capital Projects: Leapfrogging the First Cost Barrier**

***Annie Pearce**, Virginia Polytechnic Institute and State University

3 p.m. **Wireless Sustainable Lighting Control Solutions**

David L. Davidson, Eaton Corp.

3:30 p.m. **Contributions for Development of Sustainability Indicators for School Buildings in the Region of Campinas, Brazil**

Vanessa Gomes da Silva, State University of Campinas

4:30 p.m. **Sustainable Polyurethane and Polyurea Technologies for the Building and Construction Industry**

Joseph Ventura, Bayer MaterialScience LLC

New Education Paradigms Haselton I-II

2:30 p.m. **Responsible Professionals: Sustainability in Engineering and Design Education**

Emilia Rutkowski, State University of Campinas

3 p.m. **10xE: Factor Ten Engineering Advanced Design Integration for Radical Resource Efficiency**

Imran Sheikh, Rocky Mountain Institute

3:30 p.m. **Applying Industrial Ecology to Design a Sustainable Built Environment: The Toronto Portlands Challenge**

Chris Kennedy, University of Toronto

4 p.m. **The Center for Sustainable Engineering: Changing the Way Engineers are Taught**

Cliff Davidson, Carnegie Mellon University

4:30 p.m. **Water Conservation Programs in Buildings and Its Impact on Water Consumption**

Marina S. de Oliveira Ilha, State University of Campinas

Wednesday, April 18

11 a.m.–1 p.m.

Green Building Design and Construction III Ellwood I-II

11 a.m. **Thermal Analysis of a Building Brick Containing a Phase Change Material**

Esam M. Alawadhi, Kuwait University

11:30 a.m. **Sustainable Building Design for Rio de Janeiro, Brazil—Case Study**

André Luiz R. Valladão, Universidade Federal Fluminense

12 p.m. **The Link between Green Building and Health/Productivity Benefits**

Alan Traugott, CJL Engineering

12:30 p.m. **Insulation Concrete Forms in Residential and Commercial Construction**

Bob Niklewicz, Tegrant Corp.

Sustainable Power for the Built Environment II Woodlawn I

11 a.m. **Distributed Generation: One Example of Environmental and Economic Implications**

***Laura Schaefer**, University of Pittsburgh

11:30 a.m. **Next Generation of Geothermal Systems—Radiant Cooling Presentation of the Geothermal Radiant Floor Slab System (GRFS)**

Donald M. Goodman, Hayes Large Architects LLP

12 p.m. **Energy-Efficient Site Planning Using Spatial Analysis and Building Simulation Tools**

Khaled Tarabieh, University of Pennsylvania

12:30 p.m. **The Promise and Status of Solid-State Lighting**

William E. Stanchina, University of Pittsburgh



POSTER PRESENTATIONS Poster Session and Social, **Reflections Room, Monday, April 16, 6–8 p.m.**

1	Rational Use of Integrated Natural Resources: A Household Case	Claudio Marcelo Brunoro	São Paulo University (USP)
2	Just Enough is More	Stephen Coyle	HDR Town Planning
3	Engineering Sustainable Solutions: Best Practices in Education and Implementation	Karlson "Charlie" Hargroves	The Natural Edge Project
4	Self-Sustaining Mine Drainage Treatment through the Passive Production of Marketable Iron Oxide Sludge	Robert S Hedin	Iron Oxide Recovery, Inc.
5	High-Performance Healthcare Facility Lessons for Designing Green Children's Hospitals	Kim LaScola Needy	University of Pittsburgh
6	Participative Architectural Design Study: Sustainability to Foster Social Innovation	Emilia Wanda Rutkowski	University of Campinas
7	Gravity Goods Ropeway an Alternative Sustainable Solution for Rural Transportation	KC Laxman	Forum for Dhading Development
8	Polyurethane Pultruded Composites for Thermally Efficient Window Systems	Mark Witman	Bayer MaterialScience LLC
9	Palladium Nanowire-Based Gas Sensor for Environmental Monitoring	Yushi Hu	University of Pittsburgh
10	High-Power Density Biofuel Cells Based on Nanostructured Materials	Ho Il Park	University of Pittsburgh
11	Sustainable Pittsburgh	Joan Barlow	Sustainable Pittsburgh
12	Vandergrift Improvement Program	Cindi Contle	Vandergrift Improvement Program
13	Conservation Consultants: Responsible Energy Use in Homes and Other Buildings	Indigo Raffel	Conservation Consultants
14	Optimal Design of Integrated Water Networks Operating Under Uncertainty	Ramkumar Karuppiah	Carnegie Mellon University
15	A Green Route for Manufacture of Isocyanates	Nitin Tople	University of Pittsburgh
16	Construction Junction	Michael Gable	Construction Junction
17	Development of a Novel Green Lubricant for Sheet Metal Forming Operation	M.A. Kabir	Carnegie Mellon University
18	Pure Home Water's Dissemination of Household Water Treatment Technologies to Help Prevent Water-Related Disease in the Northern Region of Ghana	Hamdiyah Alhassan	Pure Home Water Project, World Vision Ghana
19	The Role of Social Networks on Engineering Sustainable Small-Scale Water Service Providers	Rebeca Hwang	Stanford University
20	Industrial Symbiosis: Sharing and Recycling Water Resources	Tony Kerzmann, Florian Zink	University of Pittsburgh
21	Rainwater Harvesting as a Part of Urban Water Demand Management: Pilot Case Study from the University of Nairobi, Kenya	Teshamulwa Irene Oklaga	Massachusetts Institute of Technology
22	Green Roofs: Alleviating Urban Stress	Veronica Miller	University of Pittsburgh
23	Life Cycle Based Risk Assessment of Industrial By-Products in Roadway Construction	Alberta Carpenter	University of New Hampshire
24	Factor Ten Engineering (10xE): Advanced Design Integration for Radical Resource Efficiency	Imran Sheikh	Rocky Mountain Institute
25	Predicted Role of Incorporated Artificial Lighting System in Relation to Daylight Contribution	Gon Kim	Kangwon National University
26	Sustainable Road Safety	Gordon Lovegrove	University of British Columbia
27	Superhydrophobicity on Hydrogen-Terminated Silicon Surfaces	Di Gao	University of Pittsburgh
28	Rehabilitation and Conversion of the Monongahela Connecting Railroad	Kathleen Colbert-Gibson	Urban Redevelopment Authority of Pittsburgh
29	Eco.Experience	Lareese Hall	Carnegie Science Center
30	Making Our School Environmentally Responsible (MOUSER)	Jennifer Cramer	Mt. Lebanon (Pa.) School District
31	Classifying Brownfields to Aid Decision-Making	Nik Schruder	University of Toronto
32	Integrating Sustainability Topics into Civil Infrastructure Management Courses	Ben Flath Margaret Garcia	Lafayette College
33	Equipment Cost and Long-Term Energy Savings: The Benefits of Specifying Solarban® 70XL Glass	James J. Bogdan	PPG Industries, Inc.

SPECIAL EVENTS

Welcome Reception Reflections Room
Sunday, April 15
5:30–7:30 p.m.

Sheraton Station Square Hotel

The Mascolo Sustainability Initiative, Vandergrift Improvement Program, and Sustainable Pittsburgh are cohosting the Sunday evening welcome reception. These three organizations are working together to position the town of Vandergrift, an historic Westmoreland County (Pa.) community, for a revitalized and sustainable future by finding ways to incorporate energy savings concepts into historic buildings and by seeking unique solutions for reducing energy costs for both residents and businesses.

Poster Session and Social Reflections Room
Monday, April 16
6–8 p.m.

Sheraton Station Square Hotel

Banquet
Tuesday, April 17
6:30–10 p.m.

Gateway Clipper Fleet

Board at the Station Square dock at 6:30 p.m.; ship sails from 7 to 10 p.m. Enjoy hors d'oeuvres and a buffet dinner with entertainment from a trio band!

HOTEL FLOOR PLANS



