NAE
Grand Challenges
for the 21st Century:
Chicago Summit 2010

April 21–22, 2010

Fairmont Hotel Chicago, Millennium Park
200 North Columbus Drive • Chicago, Illinois 60601
Welcome to the Chicago Summit 2010.

In the year 2000 the National Academy of Engineering issued the result of its survey to identify the 20 most important engineering achievements of the twentieth century. The list includes the basics of life as we know it today—electrification of homes and businesses, clean water, refrigeration, and air conditioning—as well as advances in communications, electronics, materials, medicine, and transportation that have changed the way we live. These 20 achievements are found on the website www.greatachievements.org.

So what are the challenges facing the planet and its inhabitants over this century? In an attempt to answer this question, the NAE, in partnership with the National Science Foundation, recently convened a committee of engineers, scientists, and futurists to solicit ideas related to the “Grand Challenges” facing the global society in the twenty-first century. Their list of 14 Grand Challenges is discussed on the website www.engineeringchallenges.org.

Our partners and we are pleased to sponsor the NAE Grand Challenges for the 21st Century: Chicago Summit 2010, which will focus on four important topics related to the NAE Grand Challenges: clean water; carbon, energy, and climate; urban sustainability; and global health. Our summit is part of a nationwide debate on the Grand Challenges, with symposia on other topics related to the Grand Challenges held across the country (http://summit-grand-challenges.pratt.duke.edu).

Our goals are:

- Enhance interest in engineering and science and highlight their roles in solving major problems facing society
- Increase the visibility and importance of engineering and science to society in general
- Enhance student interest in engineering, science, and technology entrepreneurship
- Emphasize the importance of collaborations of engineers and scientists with professionals in business, government, law, and the humanities and social sciences to address the challenges facing society

The program consists of eight plenary talks over a day and a half, with discussion panels following several of the talks and a wrap-up session at the end of the summit. The panels consist of persons from diverse backgrounds, including technology, policy, and government.

Our objective is not to produce potential solutions to meet the Grand Challenges; rather, it is to produce legacy materials that will further the discussions and stimulate the imagination of our young people who will be invested with the responsibility of meeting the challenges. Following the Chicago Summit, a wrap-up report will be available online at www.iit.edu/grand_challenges. Our experiences here will also be joined with those from the other four regional summits at the Second National Academy of Engineering Grand Challenges Summit on October 6–8, 2010 at the University of Southern California in Los Angeles.

Thank you for being a part of the exciting discussion on how technology can address the major issues of this century.

Sincerely,

John L. Anderson, Co-Chair  
President, Illinois Institute of Technology

Alan Schriesheim, Co-Chair  
President and Founder,  
Chicago Council on Science and Technology, and  
Director Emeritus, Argonne National Laboratory
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Session Locations

Plenary Sessions—International Ballroom
Lunch / Dinner / Student Poster Competition—Imperial Ballroom
Registration / Breaks / Boeing Business Lounge—International Foyer
Breakfasts—Gold Room
Student Session—Gold Room
Exhibits—International Ballroom
Wednesday,
April 21, 2010

Program Agenda

7:30–8:30 a.m. | Registration
                Breakfast Buffet and Networking

8:30–8:35 a.m. | General Welcome Remarks
                **John L. Anderson**, President, Illinois Institute of Technology
                **Alan Schriesheim**, President and Founder, Chicago Council on Science and Technology, and Director Emeritus, Argonne National Laboratory

8:55 a.m. | Introduction Remarks—**Dennis A. Roberson**, Vice Provost for New Initiatives, Illinois Institute of Technology

9–9:30 a.m. | Keynote Speaker—**Lord Ernest Ronald Oxburgh**, Member, House of Lords, and Member, Parliamentary Office of Science and Technology
             “Climate Change, Water, and Energy—Where Science Meets Politics”

9:45–10:30 a.m. | **Clean Water**
                Group Discussion I
                **Moderator**: **Lynn E. Broaddus**, Director, Environment Programs, The Johnson Foundation at Wingspread
                **Panelists**:
                Government: **Lord Ernest Ronald Oxburgh**, Member, House of Lords, and Member, Parliamentary Office of Science and Technology
                Industry: **Manian Ramesh**, Chief Technology Officer, Nalco Company
                Community: **Margaret Osbourne**, Green Coordinator, Environmental Protection Agency Region VI
                Academia: **Paul Brandt-Rauf**, Dean, School of Public Health, University of Illinois at Chicago

10:30–10:45 a.m. | Break

10:50 a.m. | Introduction Remarks—**John W. Rowe**, Chairman and Chief Executive Officer, Exelon Corporation

10:55–11:25 a.m. | Keynote Speaker—**John P. Holdren**, Assistant to the President for Science and Technology, and Director, Office of Science and Technology Policy

11:45 a.m.–12:30 p.m. | **Carbon, Energy, and Climate**
                Group Discussion II
                **Moderator**: **Bill Kurtis**, A&E Host, Producer, and Narrator, “Cold Case Files” and “American Justice”
                **Panelists**:
                Government: **John P. Holdren**, Assistant to the President for Science and Technology, and Director, Office of Science and Technology Policy
                Industry: **Carlos A. Cabrera**, President and Chief Executive Officer, National Institute of Low Carbon and Clean Energy
                Community: **Adele Simmons**, Vice Chair and Senior Executive, Chicago Metropolis 2020
                Academia: **David Archer**, Professor of Geophysical Sciences, University of Chicago
12:30–12:45 p.m.  Attendees move to lunch

12:45–2 p.m.  Lunch
Introduction Remarks—John L. Anderson, President, Illinois Institute of Technology

Keynote Speaker—John W. Rowe, Chairman and Chief Executive Officer, Exelon Corporation

2–2:15 p.m.  Attendees move to panel location

2:20 p.m.  Introduction Remarks—Peter C. Nelson, Professor of Computer Science and Dean of Engineering, University of Illinois at Chicago

2:25–2:55 p.m.  Keynote Speaker—Roger E. Frechette III, President, PositivEnergy Practice
“High-Performance Design and the De-Carbonization of a City”

3:10–3:55 p.m.  Urban Sustainability
Group Discussion III
Moderator: Blair Kamin, Architecture Critic, Chicago Tribune
Panelists:
Government: Antony Wood, Executive Director, Council on Tall Buildings and Urban Habitat, and Associate Professor, Illinois Institute of Technology

Industry: Roger E. Frechette III, President, PositivEnergy Practice

Community: Jeanne Gang, President and Principal, Studio Gang Architects, and Adjunct Associate Professor, Illinois Institute of Technology

Academia: Carol Ross Barney, Founder and Design Principal, Ross Barney Architects, and Adjunct Professor, Illinois Institute of Technology

4–4:15 p.m.  Break for Students

4–5:15 p.m.  Break for General Audience Members

4:15–5 p.m.  Student Session

5:15–6:15 p.m.  Cocktails and Student Poster Presentation

6:30–8:30 p.m.  Dinner
Introduction Remarks—John L. Anderson, President, Illinois Institute of Technology

Keynote Speaker—Charles M. Vest, President, National Academy of Engineering
“The NAE Grand Challenges and Why They Matter”

**Session Locations**

Plenary Sessions—International Ballroom
Lunch / Dinner / Student Poster Competition—Imperial Ballroom
Registration / Breaks / Boeing Business Lounge—International Foyer
Breakfasts—Gold Room
Student Session—Gold Room
Exhibits—International Ballroom
Thursday, April 22, 2010

Program Agenda

7:30–8:15 a.m. Buffet Breakfast and Networking

8:20–8:40 a.m. General Welcome Remarks
Nora Lin, President, Society of Women Engineers
Natacha DePaola, Carol and Ed Kaplan Armour Dean of Engineering and Professor of Biomedical Engineering, Illinois Institute of Technology

8:40 a.m. Introduction Remarks—Joseph Walsh, Vice President for Research, Northwestern University

8:50–9:20 a.m. Keynote Speaker—Tachi Yamada, M.D., President, Global Health Program, Bill & Melinda Gates Foundation
“The Challenge of Global Health”

9:40–10:25 a.m. Global Health
Group Discussion IV
Moderator: Nesita Kwan, Health Reporter and Anchor, NBC 5 Chicago News
Panelists:
Government: Eric E. Whitaker, Executive Vice President, Strategic Affiliations, and Associate Dean, Community-Based Research, University of Chicago Medical Center
Industry: Norbert G. Riedel, Corporate Vice President and Chief Scientific Officer, Baxter International Inc.
Community: Marie Denise Milord, Postdoctoral Fellow, University of Notre Dame
Academia: Father Thomas Streit, Assistant Professor, Department of Biological Sciences, University of Notre Dame

10:30–10:45 a.m. Break

10:50 a.m. Introduction of United States Secretary of Transportation Ray LaHood
Alan Schriesheim, President and Founder, Chicago Council on Science and Technology, and Director Emeritus, Argonne National Laboratory

10:55–11:10 a.m. General Remarks—Ray LaHood, Secretary, United States Department of Transportation


11:30 a.m.–12:20 p.m. Closing Session/Wrap-Up Panel
Chair—Charles M. Vest, President, National Academy of Engineering
Panelists:
Natacha DePaola, Carol and Ed Kaplan Armour Dean of Engineering and Professor of Biomedical Engineering, Illinois Institute of Technology
Nora Lin, President, Society of Women Engineers
Charles O'Melia, Abel Wolman Professor of Environmental Engineering Emeritus, Johns Hopkins University
Lord Ernest Ronald Oxburgh, Member, House of Lords, and Member, Parliamentary Office of Science and Technology

12:20–12:30 p.m. Adjournment Address—Alan Schriesheim, President and Founder, Chicago Council on Science and Technology, and Director Emeritus, Argonne National Laboratory
In business and industry, the biggest challenges often represent the greatest opportunities. That maxim also holds true for the education sector. Through this Summit Series, we hope to galvanize the next generation of engineers to prepare themselves to address Grand Challenge-level issues of societal importance, each of which represents business opportunities. We recognize that developing an engineering workforce that can act on these opportunities is an endeavor that those in education and industry must share in order to achieve success.

In that spirit, we welcome students and educators from The Chicago Community Trust–Baxter International Inc. Cohort and the A. Finkl & Sons Co. High School Cohort to the Chicago Summit. These faculty and graduate, undergraduate, and high school students represent the best and brightest from regional universities and local high schools, and we are pleased to have them in attendance.

Students and educators will attend each of the Summit presentations as well as a special Student Session sponsored by The Chicago Community Trust and Baxter International Inc. The Student Session will provide participants with the opportunity to dialogue with representatives from each of the partnering universities, to network with fellow students, and to begin to discuss, debate, and outline their ideas for addressing the Grand Challenges.

Students will also be showcasing their ideas for addressing the Grand Challenges through a poster competition with the theme “Improving Human Well-being in the Developing World.” Students or teams presenting at the Summit have created a poster that describes a technology, a process, or a product derived from one of the four Chicago Summit Grand Challenges that can be deployed in a low-resourced location where access to power, clean water, protection from the elements, and trained personnel may be limited to nonexistent. In addition to monetary prizes for the first-, second-, and third-place winners, the first-place winner will represent the Chicago Summit and his/her respective university during the Second National Academy of Engineering Grand Challenges Summit Poster Competition at the University of Southern California in Los Angeles on October 6–8, 2010.

We would like to invite all event attendees to view the posters and meet with the poster designers during the cocktail reception.

The Society of Women Engineers, founded in 1950, is a not-for-profit educational and service organization. SWE is the driving force that establishes engineering as a highly desirable career aspiration for women. SWE empowers women to succeed and advance in those aspirations and to be recognized for their life-changing contributions and achievements as engineers and leaders.

SWE has 20,000 collegiate and professional members. SWE’s value is delivered through its strong communities and networking opportunities, professional development events including conferences and seminars, recognition programs, and outreach programs for students in K–12 and their adult influencers.

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Exhibits—International Ballroom
Keynote Speaker and Government Panelist

Lord Ernest Ronald Oxburgh
Member, House of Lords
Member, Parliamentary Office of Science and Technology

“Climate Change, Water, and Energy—Where Science Meets Politics”

Lord Ron Oxburgh has served as Chairman of the Select Committee on Science and Technology in the House of Lords and is an advisor to Climate Change Capital, Deutschebank, and to the Government of Singapore. He is also currently the Honorary President of the Carbon Capture and Storage Association and Chairman of Falck Renewables. Previously, he served as Chairman of Shell Transport and Trading Company, PLC. From 1988–1993, he was Chief Scientific Adviser to the British Ministry of Defence. Throughout his career, Lord Oxburgh has also contributed to numerous journals about geology, defense, and science.

Lord Oxburgh has dedicated much of his career to advancing higher education, serving on the faculties at Oxford University and Cambridge University, and in positions of leadership at academic institutions, which include President of Queens’ College and Rector of Imperial College London. He has been a visiting professor at Cornell, Stanford, and Caltech.

Moderator

Lynn E. Broaddus
Director, Environment Programs,
The Johnson Foundation at Wingspread

Lynn E. Broaddus is responsible for shaping environmental programming at The Johnson Foundation with an emphasis on the freshwater crisis facing the United States. In this role, she has convened national leaders in government, business, and non-governmental organizations to explore the intersections of freshwater and climate change, infrastructure and built environment, agriculture, energy, and public health.

Prior to joining The Johnson Foundation, Broaddus served for six years as executive director of Milwaukee Riverkeeper®, a water advocacy organization. Before joining Riverkeeper, she spent 12 years working for The Nature Conservancy and a related organization, NatureServe, where her role as director of United States network partnerships focused on negotiating data sharing agreements among the nation’s Natural Heritage Programs.

Broaddus holds a bachelor’s degree in environmental sciences from the University of Virginia, a master’s in business administration from the University of Wisconsin at Milwaukee, and a doctorate in botany and genetics from Duke University.

Panelists

Industry Panelist

Manian Ramesh
Chief Technology Officer, Nalco Company

Manian Ramesh has held several positions at Nalco since joining the company in 1990. These include senior chemist in the Corporate Research group, vice president of research.

Submit Your Question

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and development, vice president of water and core technologies, and vice president of process, water, and core technologies, in addition to his current position as CTO.

Ramesh was inducted into the National Hall of Fame for Inventors in 1998. He has served on several executive committees, including the Water Energy Nexus under the United States Senate Committee for Energy, as well as on various selection committees for prestigious awards such as the U.S. Presidential Green Chemistry Award.

He holds 48 U.S. patents and has authored more than 50 peer-reviewed technical publications. Ramesh received a Ph.D. in organic chemistry and was a Welch Fellow at Texas A&M University with Nobel Laureate Sir Derek Barton.

**Community Panelist**

**Margaret Osbourne**
Green Coordinator, Environmental Protection Agency (EPA) Region VI

Since 2006, Margaret Osbourne has worked for the State Revolving Fund programs in the Water Quality Protection Division of EPA Region VI. Her current work focuses on overseeing the construction of federally funded wastewater and drinking water infrastructure in Texas, Oklahoma, Arkansas, Louisiana, and New Mexico. Osbourne is the Region VI green coordinator for the American Recovery and Reinvestment Act SRF funding; in this role she oversees more than $120 million in “green” projects that were funded with Recovery Act money.

Prior to holding this position, Osbourne worked at EPA headquarters in Washington, D.C., writing water quality regulations, working on sustainable infrastructure initiatives, and managing water quality grant programs. She also spent nine months in EPA Region X (Seattle) writing stormwater permits.

Osbourne received her bachelor’s degree in geology from the University of Texas at Arlington and her master’s in geochemistry from Colorado School of Mines.

**Academia Panelist**

**Paul Brandt-Rauf**
Dean, School of Public Health, University of Illinois at Chicago (UIC)

In addition to his role as dean at UIC, Paul Brandt-Rauf holds appointments as professor of several disciplines, including environmental and occupational health sciences, medicine, bioengineering and chemical engineering, earth and environmental sciences, and public administration. His major research interest is environmental carcinogenesis, particularly the molecular biology and the molecular epidemiology of cancer-related proteins. He has also written extensively about ethical issues in occupational/environmental health policy.

Brandt-Rauf was previously professor and chairman of the Department of Environmental Health Sciences at Columbia University, where he was named professor emeritus in 2008.

He received his bachelor’s, master’s, and doctoral degrees in applied chemistry and chemical engineering, his M.D., and his M.P.H. and Dr.P.H. degrees in environmental sciences from Columbia.
Carbon, Energy, and Climate

Speaker, Moderator, and Panelists

Keynote Speaker and Government Panelist

John P. Holdren

Assistant to the President for Science and Technology
Director, Office of Science and Technology Policy

Prior to joining the Obama administration, John P. Holdren was a professor in both the Kennedy School of Government and the Department of Earth and Planetary Sciences at Harvard University, as well as Director of the Woods Hole Research Center. From 1973–1996, he was on the faculty of the University of California, Berkeley, where he co-founded and co-led the interdisciplinary graduate-degree program in energy and resources.

Trained in aerospace engineering and theoretical plasma physics at Massachusetts Institute of Technology and Stanford University, Holdren is a member of the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences, as well as a foreign member of the Royal Society of London and a former President of the American Association for the Advancement of Science.

Moderator

Bill Kurtis

A&E Host, Producer, and Narrator, “Cold Case Files” and “American Justice”

Prior to his current roles at A&E, Bill Kurtis was a reporter and anchor on CBS 2 News Chicago. He later anchored the CBS morning news. Kurtis has hosted and narrated numerous other series and mini-series, including “Inside Story” and “Investigative Reports.”

He started his own production company, Kurtis Productions, in 1990 and produced programs for A&E Network. Kurtis has been recognized for his journalism and broadcasting with more than 20 Emmy Awards along with numerous humanitarian awards.

He has authored a number of books as well as contributed time and resources to countless nonprofit and environmental organizations.

Panelists

Industry Panelist

Carlos A. Cabrera

President and Chief Executive Officer, National Institute of Low Carbon and Clean Energy (NICE)

Carlos A. Cabrera is a distinguished associate of FACTS Global Energy, an oil and gas consulting firm. Prior to his role as the first president and CEO of NICE, he was an advisor to the entities of the Government of China charged with developing the mission and vision of NICE. Before his recent appointments, he retired after 35 years with UOP—a leading international supplier of technology and engineering services to the petroleum refining, petrochemical, and gas processing industries—for which he served as chairman, president, and CEO.

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Cabrera holds seven United States patents and is the author of numerous publications. He serves on the Global Advisory Board of the University of Chicago Booth School of Business. He received honorary membership in the Instrument Society of America and was inducted into the University of Kentucky College of Engineering Hall of Distinction.

Cabrera received a bachelor’s degree in chemical engineering from the University of Kentucky and a master’s degree in business administration from the University of Chicago.

Community Panelist

Adele Simmons
Vice Chair and Senior Executive, Chicago Metropolis 2020

At Chicago Metropolis 2020, Adele Simmons focuses on climate change and early childhood education. She provided leadership in the planning of the 2009 Burnham Plan Centennial, serving as vice chair of the Burnham Centennial Committee. Simmons co-chaired the task force that developed a Climate Action Plan for the City of Chicago, and is a member of the Green Ribbon Committee that oversees its implementation. She also served as a co-chair of the Council on Global Affairs study group on Chicago’s global future.

Simmons is president of the Global Philanthropy Partnership, which promotes global giving and strengthens the infrastructure that assists global donors. She edits a bimonthly newsletter, Global Giving Matters, with the Synergos Institute and is a member of the World Economic Forum’s Global Redesign Initiative.

From 1989–1999, Simmons was president of the John D. and Catherine T. MacArthur Foundation, overseeing grants of more than $1.5 billion.

Simmons graduated from Harvard University and has a doctorate in African history from Oxford University.

Academia Panelist

David Archer
Professor of Geophysical Sciences, University of Chicago

David Archer teaches courses on global warming, environmental chemistry, and global biogeochemical cycles, and is a regular contributor to the climate science blog realclimate.org. He is also a fellow of the American Geophysical Union, publishing on the Earth's carbon cycle and its interaction with global climate.

Archer has written a series of outreach books on climate change, including Global Warming: Understanding the Forecast, a text for non-science major undergraduates; The Long Thaw: How Humans are Changing the Next 100,000 Years of Earth’s Climate; and The Global Carbon Cycle, a primer in climate science.
Urban Sustainability

Speaker, Moderator, and Panelists

Keynote Speaker and Industry Panelist
Roger E. Frechette III
President, PositivEnergy Practice

“High-Performance Design and the De-Carbonization of a City”

Roger E. Frechette III is a registered professional engineer with more than 22 years of experience in sustainable design and high-performance engineering for buildings. He led the engineering team for the Burj Khalifa, the world’s tallest building and manmade structure, as well as for the low-energy, high-performance Pearl River Tower, under construction in Guangzhou, China, which is designed to be the most energy-efficient office tower in the world. His work includes a diverse group of projects ranging from laboratories, airports, hospitals, academic buildings, and corporate offices to government buildings and museums.

Frechette is a senior fellow with the Design Futures Council, a global network of design community professionals, and lectures at major institutions around the world.

Moderator
Blair Kamin
Architecture Critic, Chicago Tribune

Blair Kamin is the recipient of more than 30 awards, including the Pulitzer Prize for Criticism, the George Polk Award for Criticism, and a Presidential Citation from the American Institute of Architects.

Kamin has lectured widely and has discussed architecture on numerous television and radio programs, including ABC’s “Nightline” and NPR’s “All Things Considered.” He is the author of Why Architecture Matters: Lessons from Chicago, a collection of his Chicago Tribune columns.

A graduate of Amherst College and the Yale University School of Architecture, he holds honorary doctorates from Monmouth University and North Central College, where he serves as an adjunct professor of art.

Panelists
Government Panelist
Antony Wood
Executive Director, Council on Tall Buildings and Urban Habitat (CTBUH)
Associate Professor, Illinois Institute of Technology

During his tenure as CTBUH executive director, Antony Wood has helped to revitalize the council and increase output and initiatives across all areas. He was previously CTBUH vice chairman for Europe and head of research.

The CTBUH is based at Illinois Institute of Technology, where Wood serves as an associate professor in IIT College of Architecture. His area of expertise is the design and sustainable design of tall buildings.

Panelists

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buildings. Prior to joining the council and IIT, he was an associate professor/lecturer in architecture at the University of Nottingham in the United Kingdom, where he ran the third- and fifth-year programs and was an active member of various research teams. While at Nottingham, he founded the Tall Buildings Teaching and Research Group.

Wood is the author of numerous books and papers in the field of tall buildings, sustainability, and related areas, including *Tall & Green: Typology for a Sustainable Urban Future*. He is associate editor of both the *CTBUH Journal* and *The Structural Design of Tall and Special Buildings*.

**Community Panelist**

**Jeanne Gang**

President and Principal, Studio Gang Architects
Adjunct Associate Professor, Illinois Institute of Technology

Jeanne Gang leads Studio Gang Architects, an architectural practice noted for its innovation and leadership in design. Her work has staked out new creative territory in materials, technology, and sustainability. Gang’s work with Studio Gang has received national and international awards and recognition, and has been featured at the International Venice Biennale, the National Building Museum, and the Art Institute of Chicago. Her recent projects include the SOS Community Center on Chicago’s South Side, the Columbia College Media Production Center, the award-winning entry for the Ford Calumet Environmental Center, and the Aqua Tower, an 82-story mixed-use high-rise in downtown Chicago.

**Academia Panelist**

**Carol Ross Barney**

Founder and Design Principal, Ross Barney Architects
Adjunct Professor, Illinois Institute of Technology

Carol Ross Barney is a fellow of the American Institute of Architects whose work has an international reputation in the design of institutional and public buildings.

The work of her firm has been published in national and international journals, books, and newspapers and has received numerous honors, including four Institute Honor Awards from the AIA and more than 25 AIA Chicago Design Awards. Her drawings have been widely exhibited and collected by the Art Institute of Chicago, the Chicago Historical Society, the Museum of Contemporary Art Chicago, and the National Building Museum.

Ross Barney received the AIA 2005 Thomas Jefferson Award for Public Architecture. Her firm received an AIA COTE Top Ten Project award for the LEED Platinum, Jewish Reconstructionist Congregation in Evanston, Ill. Her firm’s recently completed projects include the new Commodore John Barry Elementary School in Philadelphia, Alfred P. Murrah Federal Building in Oklahoma City, Swenson Science Building for the University of Minnesota at Duluth, Arts Science and Technology Pavilion for Oakton Community College, and the Chicago River Walk.

Ross Barney is a graduate of the University of Illinois at Urbana-Champaign. She serves on the IIT College of Architecture Board of Overseers.
Global Health

Speaker, Moderator, and Panelists

Keynote Speaker

Tachi Yamada, M.D.
President, Global Health Program,
Bill & Melinda Gates Foundation

“The Challenge of Global Health”

Tachi Yamada leads the Gates Foundation’s efforts to help develop and deliver low-cost, life-saving health tools for the developing world. He oversees Global Health’s grantmaking, which focuses on four major activities: discovery, development, delivery, and advocacy.

Before joining the Gates Foundation, Yamada served as chairman of research and development and was a member of the Board of Directors at GlaxoSmithKline. Prior to that, he was chairman of the Department of Internal Medicine at the University of Michigan Medical School and physician-in-chief at the University of Michigan Medical Center.

Yamada is a past president of the American Gastroenterological Association and the Association of American Physicians, a master of the American College of Physicians, and a member of the Institute of Medicine of the National Academy of Sciences in the United States and the Academy of Medical Sciences in the United Kingdom.

Moderator

Nesita Kwan
Health Reporter and Anchor,
NBC 5 Chicago News

Nesita Kwan is an accomplished author who was honored with a 1999/2000 Chicago Emmy Award for her work as a co-host of “NBC 5 Presents: Millennium 2000.”

Kwan was previously co-anchor of the weekend news for KHOU-TV in Houston, where she also produced and reported a consumer affairs segment for the 10 p.m. news. Prior to that, she was a co-anchor and reporter for WVEC-TV in Norfolk, Va., and an anchor/reporter for WDBJ-TV in Roanoke, Va. Kwan got her start in broadcasting in 1986 as a reporter for WINA-AM in Charlottesville, Va.

Kwan received a bachelor’s degree from the University of Virginia, graduating with distinction.

Panelists

Government Panelist

Eric E. Whitaker
Executive Vice President, Strategic Affiliations, and Associate Dean, Community-Based Research, University of Chicago Medical Center (UCMC)

Eric E. Whitaker is responsible for leading the UCMC’s Urban Health Initiative, linking the medical center’s mission of patient care, teaching, and research for the purpose of improving the health of South Side residents. He was previously director of the Illinois Department of Public Health. In 1991, Whitaker represented the 30,000 members of the American Medical Student Association as its national president, testifying twice before the United States Congress regarding national health insurance and minority health issues.
In 2003, *Crain's Chicago Business* named him as one of its “Forty Under Forty” leaders in business and government.

Whitaker received a bachelor’s degree in chemistry from Grinnell College, a master’s degree in public health from Harvard School of Public Health, and a medical degree from the University of Chicago Pritzker School of Medicine. He also has completed coursework at Northwestern University’s Kellogg School of Management.

**Industry Panelist**

**Norbert G. Riedel**

Corporate Vice President and Chief Scientific Officer, Baxter International Inc.

Before assuming his current role, Norbert G. Riedel served as president of the recombinant proteins business unit and vice president of research and development within Baxter’s BioScience business. Prior to joining Baxter in 1998, he was head of worldwide biotechnology and worldwide core research functions at Hoechst Marion Roussel, now Sanofi-Aventis.

Riedel is on the Board of Directors for Medigene AG. He serves on the advisory boards of Northwestern University’s Kellogg School of Management Center for Biotechnology Management, Northwestern’s McCormick School of Engineering and Applied Science, and the University of Vienna.

Riedel received his Ph.D. in biochemistry from the University of Frankfurt. He was a postdoctoral fellow at Harvard University, assistant professor and associate professor of medicine and biochemistry at Boston University School of Medicine, and a visiting professor at Massachusetts Institute of Technology. He remains affiliated with Boston University as an adjunct professor and also serves as an adjunct professor of medicine at Northwestern’s Feinberg School of Medicine. In 2009, Riedel was elected into the Austrian Academy of Sciences.

Community Panelist

**Marie Denise Milord**

Postdoctoral Fellow, University of Notre Dame

Marie Denise Milord has been active in providing health care to the Haitian population for more than a decade. She has worked in clinics, for local non-governmental organizations, and on research involving locally significant diseases.

Milord is on sabbatical as director of the Malaria and Lymphatic Filariasis Program for the Haitian Ministry of Health. Milord directed a national program, funded by the Bill & Melinda Gates Foundation, that used advancements in lymphatic filariasis treatment and prevention via mass drug administration. The program was successfully piloted at Hopital Sainte Croix in Leogane with funding from the Centers for Disease Control and Prevention.

Milord received her M.D. from Puebla School of Medicine in Puebla, Mexico, and a master’s in public health from the University of South Carolina. She is a past recipient of a Fulbright Fellowship.

Academia Panelist

**Father Thomas Streit**

Assistant Professor, Department of Biological Sciences, University of Notre Dame

Since the early 1990s, Father Thomas Streit has focused his research in neglected diseases on lymphatic filariasis with the goal of eliminating this devastating disease.

As the director of Notre Dame’s Haiti Program, Father Streit devotes much of his time to research and the delivery of medical and health services in Haiti. His work with multidisciplinary collaborators also supports economic development and essential infrastructure projects, which empower the Haitian people. Holy Cross Hospital houses the program’s operations in Haiti.

In 2009, Father Streit was honored with the Reverend William A. Toohey Award for Social Justice.
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Lunch Keynote Address

John W. Rowe
Chairman and Chief Executive Officer, Exelon Corporation

John W. Rowe has led Exelon since its formation in 2000 through the merger of PECO Energy and the parent of Commonwealth Edison. Exelon has the largest market capitalization in the electric utility industry. Its retail affiliates serve 5.4 million customers in Illinois and Pennsylvania, and its generation affiliate operates the largest fleet of nuclear power plants in the nation.

Rowe previously held CEO positions at the New England Electric System and Central Maine Power Company, served as general counsel of Consolidated Rail Corporation, and was a partner in the law firm of Isham, Lincoln and Beale.

Rowe serves on the board and executive committee of the Nuclear Energy Institute (NEI) and is the past chairman of NEI and the Edison Electric Institute. He is also co-chairman of the National Commission on Energy Policy, an industry and environmental organization dealing with climate change. In both 2008 and 2009, Institutional Investor named Rowe the best electric utilities CEO in America.

Rowe holds bachelor’s and J.D. degrees from the University of Wisconsin, where he was elected to Phi Beta Kappa and the Order of the Coif.

Dinner Keynote Address

Charles M. Vest
President, National Academy of Engineering

“The NAE Grand Challenges and Why They Matter”

Charles M. Vest is president emeritus of Massachusetts Institute of Technology. A professor of mechanical engineering at MIT and formerly at the University of Michigan, he served on the United States President’s Council of Advisors on Science and Technology from 1994–2008. Vest chaired the President’s Committee on the Redesign of the Space Station and the Secretary of Energy’s Task Force on the Future of Science at the Department of Energy.

Vest was a member of the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction and the Secretary of Education’s Commission on the Future of Higher Education. He was vice chair of the U.S. Council on Competitiveness for seven years, has served on the boards of DuPont and IBM, and was awarded the 2006 National Medal of Technology.

He is the author of a book on holographic interferometry and two books on higher education. Constant themes throughout his career have included the quality and diversity of the U.S. engineering workforce; sustained excellence of U.S. higher education; global openness to the flow of people, education, and ideas; university-government-industry partnership; and the innovative capacity of the United States.
Ray LaHood
Secretary, United States Department of Transportation

Ray LaHood became the 16th Secretary of Transportation on January 23, 2009. His primary goals in implementing the Obama administration’s priorities for transportation include safety across all modes, restoring economic health and creating jobs, sustainability (shaping the economy of the coming decades by building a new transportation infrastructure), and assuring that transportation policies focus on people who use the transportation system and their communities.

As Secretary of Transportation, LaHood leads an agency with more than 55,000 employees and a $70 billion budget that oversees air, maritime, and surface transportation missions.

Before becoming Secretary of Transportation, LaHood served for 14 years in the United States House of Representatives from the 18th District of Illinois. During that time he served on the House Transportation and Infrastructure Committee and, after that, on the House Appropriations Committee. Prior to his election to the House, he served as chief of staff to U.S. Congressman Robert Michel, whom he succeeded in representing the 18th District, and as district administrative assistant to Congressman Thomas Railsback. He also served in the Illinois State Legislature.

Before his career in government, LaHood was a junior high school teacher, director of the Rock Island County Youth Services Bureau, and chief planner for the Bi-States Metropolitan Planning Commission in Illinois. He received a bachelor’s degree from Bradley University.
Closing Session/
Wrap-Up Panel

Chair and Panelists

**Chair**

Charles M. Vest  
President, National Academy of Engineering  
(*Full bio, page 15*)

**Panelists**

**Natacha DePaola**  
Carol and Ed Kaplan Armour Dean of Engineering and Professor of Biomedical Engineering, Illinois Institute of Technology (IIT)

Prior to joining IIT in 2009, Natacha DePaola was a faculty member and chair of the Department of Biomedical Engineering at Rensselaer Polytechnic University. Before RPI, DePaola was assistant professor of biomedical engineering at Northwestern University.

DePaola is a past recipient of a National Science Foundation Faculty Early Career Development (CAREER) Award. She is a Frontiers Alumna of the National Academy of Engineering and a fellow of the American Institute for Medical and Biological Engineering.

DePaola received a bachelor’s degree in mechanical engineering from Universidad Simon Bolivar and a master’s in mechanical engineering from Massachusetts Institute of Technology. She received a Ph.D. in medical engineering and medical physics from the Harvard-MIT Division of Health Sciences and Technology, and completed postdoctoral training at Columbia University.

**Nora Lin**  
President, Society of Women Engineers (SWE)

Nora Lin is a senior life member of SWE. Prior to her current position as president of the society, she held various SWE leadership positions at local, regional, and national levels. Lin has broad working experience in engineering for more than 26 years in the defense industry. She has held many technical lead and managerial positions in software engineering, advanced technology development, and systems engineering organizations.

Lin is currently the manager of supportability engineering for Northrop Grumman Electronic Systems, in Rolling Meadows, Ill. She was a recipient of the Women of Color in Technology Career Achieve Award in 2008 and Asian American Engineer of the Year Award in 2009. In addition, she has received numerous awards and recognitions from the SWE local section and Heartland Region.

**Charles O’Melia**  
Abel Wolman Professor of Environmental Engineering Emeritus, Johns Hopkins University

Charles O’Melia was named professor of environmental engineering at Johns Hopkins in 1980 and was department chairman from 1990–95 and from 2004–07. In 1998, he was appointed as the Abel Wolman Chair in Environmental Engineering at Johns Hopkins.

He held prior academic positions at Georgia Institute of Technology, Harvard University, California Institute of Technology, and the University of North Carolina at Chapel Hill, where he served as deputy chairman of the Department of Environmental Sciences and Engineering.

O’Melia is a member of the National Academy of Engineering and formerly served on the Water Science and Technology Board. He has served as director, vice president, and president of the Association of Environmental Engineering Professors. He chaired the National Research Council’s Committees on Watershed Management for New York City.

O’Melia received his master’s and Ph.D. degrees in sanitary engineering from the University of Michigan.

**Lord Ernest Ronald Oxburgh**  
Member, House of Lords  
Member, Parliamentary Office of Science and Technology  
(*Full bio, page 6*)
Introduction
Remarks

Peter C. Nelson
Professor of Computer Science and
Dean of Engineering, University of Illinois
at Chicago (UIC)

Peter C. Nelson’s research interests span a broad interdisciplinary spectrum. In 1991, he founded UIC’s Artificial Intelligence Laboratory, which specializes in applied intelligence systems projects in fields such as transportation, manufacturing, bioinformatics, and email spam countermeasures. In 1994–95, his laboratory, sponsored by the Illinois Department of Transportation, developed the first real-time traffic congestion map on the World Wide Web. It now receives more than 500 million hits a year.

Nelson has received more than $20 million in research grants and contracts. Projects carried out at Nelson’s laboratory have been funded by organizations such as the National Institutes of Health, the National Science Foundation, the National Academy of Sciences, the United States Department of Transportation, Argonne National Laboratory, and Motorola, among numerous other corporations. In 2006–07, he served as one of the seven founding members of the joint UIC–University of Chicago–Northwestern University Chicago Biomedical Consortium Proteomics and Informatics Scientific Board.

Nelson received his bachelor’s degree in computer science and mathematics from North Park College in Chicago and earned master’s and Ph.D. degrees in computer science from Northwestern.

Dennis A. Roberson
Vice Provost for New Initiatives,
Illinois Institute of Technology (IIT)

As vice provost, Dennis A. Roberson is responsible for IIT’s relationships with its various corporate partners, including the efforts of IIT’s Career Management Center and technology transfer.

He serves as the focus for the implementation of IIT’s strategic plan and supports the development of new research centers, and the initiation and growth of IIT-related technology-based business ventures. He is also research professor of computer science at IIT.

Roberson is a co-founder of IIT’s Wireless Network and Communications Research Center. His research focus areas include dynamic spectrum-access networks, spectrum occupancy and spectrum management, and wireless interference and its mitigation. He is also the president and chief executive officer of Roberson and Associates, LLC, a consulting firm primarily focused on meeting the technology-based needs of various government organizations and their immediate suppliers.

Prior to IIT, Roberson was executive vice president and chief technology officer of Motorola. His corporate career includes major business and technology responsibilities at IBM, DEC (now part of HP), AT&T, and NCR. He currently serves on the National Advisory Board for Boy Scouts of America and its Information Delivery Committee, on the International Advisory Panel for the Prime Minister of Malaysia, and on the boards of HCJB Global and FIRST Robotics.

Roberson has bachelor’s degrees in electrical engineering and in physics from Washington State University and a master’s degree in electrical engineering from Stanford University.
Joseph Walsh
Vice President for Research, Northwestern University

Joseph Walsh oversees the research infrastructure on Northwestern’s campuses in Evanston, Ill., and Chicago. He develops and helps implement the strategic plan for the university’s research operations.

Walsh is also a professor of biomedical engineering at Northwestern. His research area is the study of light-tissue interactions. He has an approximately 20-year history of investigating the photophysics and photobiology of laser-based ablation. He is currently investigating tissue birefringence feedback systems, the propagation of polarized light in tissue, optically induced stimulation of the auditory system, and nanostructured surfaces for biosensing applications. He has been the principal investigator on several National Science Foundation and National Institutes of Health grants as well as on industry-sponsored translational research. Walsh has been a program chairman for five major conferences in his field, most recently as the program chairman for the 2006 Annual Meeting of the Biomedical Engineering Society. He is a past president of the American Society for Laser Medicine and Surgery.

Walsh conducted his doctoral research in the Wellman Laboratories at Massachusetts General Hospital. He received his Ph.D. from the Harvard-MIT Division of Health Sciences and Technology, and bachelor’s and master’s degrees in electrical engineering from Massachusetts Institute of Technology.
Co-Chairs
John L. Anderson
President, Illinois Institute of Technology

John L. Anderson is a member of the National Academy of Engineering and a fellow of the American Academy of Arts and Sciences. His technical expertise is in chemical engineering, specifically membrane separations, coatings and colloidal suspensions, and polymers.

His previous academic leadership experience includes dean of engineering at Carnegie Mellon University and provost/executive vice president at Case Western Reserve University.

Anderson has chaired several boards and study committees for the National Research Council and has held visiting professorships at Massachusetts Institute of Technology, University of Melbourne (Australia), and Landbouwuniversiteit Wageningen (The Netherlands).

He received a bachelor’s degree from the University of Delaware and a Ph.D. from the University of Illinois at Urbana-Champaign.

Alan Schriesheim
President and Founder, Chicago Council on Science and Technology (C²ST)
Director Emeritus, Argonne National Laboratory

Alan Schriesheim is the founding president of C²ST, an organization devoted to raising the awareness of science and technology in the Chicago area. He is also director emeritus of Argonne National Laboratory, where he served as director from 1983–1996. He joined Argonne after a long career with Exxon Corporation and was the first national laboratory director to be recruited from industry.

Schriesheim is a fellow of the American Association for the Advancement of Science, a member of the United States National Academy of Engineering, and past chairman of the National Conference on the Advancement of Research.

He holds a bachelor’s degree from Brooklyn Polytechnic University and a Ph.D. in chemistry from Pennsylvania State University.

Emcees
Erin Dragotto
Managing Director, Chicago Council on Science and Technology (C²ST)

At C²ST, Erin Dragotto is dedicated to raising the awareness of science and technology among our citizens with the help and strength of the major research institutions in Chicago. She provided leadership in the planning of the Women in Science Symposium 2010: Building An Identity, which brought together academe, industry, and the national laboratories to address opportunities and challenges facing women in science today.

Dragotto is co-founder of the Chicago Teen Museum, which bridges teen creativity and the museum profession to provide a forum for expression of current teen issues that exemplify and preserve teen culture.

Prior to joining C²ST, she was in educational outreach at the Adler Planetarium. Dragotto received a bachelor’s degree in art from Pepperdine University and a master’s degree in art education from the Art Institute of Chicago.

Nora Lin
President
Society of Women Engineers
(Full bio, page 17)
The Chicago Council on Science and Technology (C²ST) is dedicated to raising the awareness of science and technology and related policy issues that will help Chicago become a central part of the scientific landscape throughout the 21st century.

As a friend of science and technology, C²ST invites you to participate in these ongoing, yet critical, discussions.

To find out more about our upcoming programs or how to become a member of C²ST please visit us at: www.c2st.org

Email: info@c2st.org

Call: 312.503.1816

As the premier technology-focused university in Chicago, IIT is educating students who will address tomorrow’s Grand Challenges.

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Marvin Camras
Pioneer of magnetic recording

Martin Cooper
Inventor of the cell phone

Susan Solomon
Nobel Laureate who discovered the cause of ozone layer depletion

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SARGENT & LUNDY is pleased to support this collaborative initiative to enhance the quality of life.

We encourage all young engineers here today to avidly pursue the exciting and satisfying engineering career opportunities that will make a difference in assuring A SUSTAINABLE FUTURE.
NAE Grand Challenges Wrap-Up Report

A wrap-up report of events at the Chicago Summit will be available online at www.iit.edu/grand_challenges following the Summit. The experiences of the Chicago Summit will also be joined with those from the other four regional summits at the Second National Academy of Engineering Grand Challenges Summit on October 6–8, 2010 at the University of Southern California in Los Angeles.

NAE Grand Challenges for Engineering website:

www.engineeringchallenges.org

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Chicago Summit 2010

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www.iit.edu/grand_challenges
NAE Grand Challenges Wrap-Up Report

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www.iit.edu/grand_challenges
A. Finkl & Sons would like to welcome the symposium attendees for the NAE Grand Challenges Chicago Summit 2010

For more than two decades, A. Finkl & Sons Co. has been dedicated to beautifying the environment and promoting cleaner air through the following initiatives:

Forging a Fresher America
In 1989, A. Finkl & Sons Co. began a tree-planting program called “Forging a Fresher America”. This initiative was aimed at offsetting the carbon dioxide generated by Finkl’s facilities. Finkl has currently planted 5 million trees in 7,647 acres of Illinois and Wisconsin state forests and is committed to planting an additional 5 million. It is estimated that the trees already planted will convert 1.9 million metric tons of CO₂ into oxygen over their lifetime.

Helping the Chicago Community
In 1994, Finkl built the first Urban Manufacturing Campus in Chicago. Hundreds of trees, bushes and flowers were planted around the facility making Southport Avenue a place for joggers, bicyclists and walkers. Finkl has also participated in Mayor Daley’s “GreenStreets Program,” which plants trees at schools, parks, and parkways.

Future Initiatives
Finkl believes that solving the Grand Challenges are the key to our quality of life and a sustainable future. Our new state-of-the-art facility will implement many solutions to these challenges from the recycling of process cooling water, re-use of storm water, brown-field development, and the use of the most energy-efficient technologies for the production for forgings to minimize our greenhouse gas emissions. Finkl produces forgings that are vital for the operation of renewable energy production sources such as windmills and hydro-electric plants.

And, Finkl’s new 8000 ton press will enable the world-class production of forgings for the energy exploration market as well as critical components for nuclear generating plants.
Many have spoken out on the need to address climate change. At Exelon, we are acting to reduce, offset or displace more than 15 million metric tons of greenhouse gas emissions annually by 2020. That’s more than our annual current carbon footprint and equivalent to taking nearly 3 million cars off our roads. That’s the kind of vision we believe in: the kind that produces results.

Exelon is proud to be presenting sponsor of the NAE Grand Challenges Chicago Summit and a partner in finding solutions toward a sustainable future.