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Dear Colleagues,

On behalf of the AAAS Board of Directors, it is my distinct honor to invite you to the 176th Meeting of the American Association for the Advancement of Science (AAAS).

The AAAS Annual Meeting has become the most important gathering of the year for the growing segment of scientists and engineers who seek to explore the intersections between disciplines and witness the broad influence of science and technology on society. You will have the opportunity to interact with an exceptional array of scientists, engineers, educators, and policy-makers who will present the latest thinking and developments in the areas of science, technology, engineering, education, and policy-making.

The relevance of science, technology, and engineering as well as scientific literacy to the well-being of society is more profound than ever. The theme of the 2010 AAAS Annual Meeting — Bridging Science and Society — calls on all scientists and engineers to make their work both beneficial and understandable, and on society to discover again the excitement and hope that research and its findings offer. It is a call to action that resonates around the world.

Everyone is welcome at the AAAS Annual Meeting. Those who join us will have the opportunity to choose among a broad range of activities, including plenary and topical lectures by some of the world’s leading scientists and engineers, multidisciplinary symposia, cutting-edge seminars, career development workshops, an international exhibition, and a host of networking opportunities.

The Annual Meeting reflects contributions from the AAAS sections, which I gratefully acknowledge. I also extend a personal thanks to the Scientific Program Committee for assembling this outstanding meeting and to our local co-chairs, Marye Anne Fox, chancellor, University of California, San Diego, and Irwin Jacobs, co-founder, Qualcomm Inc.

I look forward to seeing you in San Diego,

Peter C. Agre, M.D.
AAAS President and 2010 Program Chair

Dr. Peter Agre, AAAS President and Director, Malaria Research Institute, Johns Hopkins Bloomberg School of Public Health
President’s Address

Peter C. Agre, M.D.
AAAS President; Director, Malaria Research Institute, Johns Hopkins Bloomberg School of Public Health

Agre shared the 2003 Nobel Prize in Chemistry with Roderick MacKinnon of Rockefeller University for the discovery of aquaporins, the key proteins that transport water across cell membranes. Not long after receiving the Nobel Prize, Agre began working to extend his studies of aquaporins to malaria, addressing the question of whether or not aquaporins could be exploited as a means of treating or preventing the disease. Initial results led his laboratory to focus on malaria as its primary area of study. As director of the Malaria Research Center, he oversees 19 Hopkins faculty members who concentrate on advancing basic science to develop new methods in malaria prevention and treatment. Agre is a member of the National Academy of Sciences (NAS), chair of the NAS Committee on Human Rights, and a Fellow of AAAS.

Plenary Speakers

Barry C. Barish, Ph.D.
Director, Global Design Effort for the International Linear Collider (ILC); Linde Professor of Physics, emeritus, California Institute of Technology

Lecture Title To Be Determined

Among Barish’s noteworthy experiments were those performed at Fermilab using high-energy neutrino collisions. These experiments were among the first to observe the weak neutral current, a linchpin of electroweak unification theories. Today he directs the ILC, the highest priority future project for particle physics worldwide that promises to complement the Large Hadron Collider at CERN in exploring the TeV energy scale. In the 1980s, Barish initiated an ambitious international effort to build a sophisticated underground detector which provided some key evidence that neutrinos have mass. As director of the Laser Interferometer Gravitational-Wave Observatory Laboratory from 1997 to 2005, he led a team of scientists who built two facilities to detect and study gravitational waves from astrophysical sources. Barish is a member of the National Academy of Sciences and is an AAAS Fellow.

Carol W. Greider, Ph.D.
Daniel Nathans Professor; Director, Department of Molecular Biology and Genetics; Professor of Oncology, Johns Hopkins University School of Medicine

Telomerase and the Consequences of Telomere Dysfunction

Greider, one of the world’s pioneering researchers on the structure of telomeres, was awarded the 2009 Nobel Prize in physiology or medicine by the Royal Swedish Academy of Sciences along with Elizabeth Blackburn and Jack W. Szostak. While a 23-year-old graduate student at the University of California, Berkeley, working together with Blackburn, Greider discovered the enzyme telomerase and later, in her own lab, she cloned its RNA component. This work laid the foundation for studies that have linked telomerase and telomeres to human cancer and age-related degenerative disease. It represents another example of curiosity-driven basic research that has direct medical implications.

Eric S. Lander, Ph.D.
Director, The Broad Institute of MIT and Harvard University; Co-Chair, President’s Council of Advisors on Science and Technology (PCAST)

Science and Technology in the First Year of the New Administration

Lander is widely known as one of the driving forces behind today’s revolution in genomics, the study of all of the genes in an organism and how they function together in health and disease. He also is co-chair of President Obama’s council of science and technology advisers. PCAST is an advisory group of the nation’s leading scientists and engineers who directly advise the President and make policy recommendations in the many areas where understanding of science, technology, and innovation is key to strengthening the economy and forming policy. Lander also was one of the principal leaders of the Human Genome Project and is a member of both the National Academy of Sciences and Institute of Medicine. He is also an AAAS Fellow.

Marcia McNutt, Ph.D.
Director, U.S. Geological Survey; Science Adviser to the Secretary, U.S. Department of the Interior (invited)

Science Below the Sea

McNutt’s appointment in 2009 marked a milestone for USGS — she is the first female director in the agency’s 130-year history. She directs a multi-disciplinary organization that focuses on biology, geography, geology, geospatial information, and water, and is dedicated to studying the landscape, natural resources, and natural hazards. Most recently she served as president and chief executive officer of the Monterey Bay Aquarium Research Institute. Her biography includes a broad range of research interests and numerous honors and awards. She has participated in 15 major oceanographic expeditions and served as chief scientist on more than half of them. She is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and a Fellow of AAAS.

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Topical Lecture Series

Karen Emmorey
Director, Laboratory for Language and Cognitive Neuroscience, and Professor of Speech, Language, and Hearing Sciences, San Diego State University

Neural and Cognitive Underpinnings of Language Across Modalities

Robert T. Fraley
Executive Vice President and Chief Technology Officer of Monsanto Co., St Louis, Missouri

Sustainable Solutions for Doubling Crop Productivity by 2030

Lawrence S. B. Goldstein
Director, Stem Cell Research Program, and Professor of Cellular and Molecular Medicine, University of California, San Diego

The Future of Stem Cell Research

James J. Heckman
Henry Schultz Distinguished Service Professor of Economics, University of Chicago, and Distinguished Chair of Microeconometrics, University College, London and University College, Dublin

Economics, Psychology, and Biology of Early Childhood Development

Kristina M. Johnson

An Integrated Approach to a Low Carbon Energy Future

Thomas Hillman Jordan
Director, Southern California Earthquake Center, and the W. M. Keck Professor of Earth Sciences, University of Southern California

Understanding Earthquakes Through Large-Scale Simulations

Stephen R. Palumbi
Professor of Biological Sciences, Stanford University

How Marine Species React and Adjust to Ocean Acidification and Climate Change

Kellogg Schwab
Associate Professor and Director of the Center for Water and Health, Johns Hopkins University

Bloomberg School of Public Health

Improving Access to Potable Water Throughout The World

Steffanie Stratthdee
Associate Dean of Global Health Sciences, Harold Simon Professor, and Chief of the Division of Global Public Health, School of Medicine, University of California, San Diego

Infectious Diseases Have No Passport: Battling HIV, TB, and STDs on the Mexico-U.S. Border

Jay Vavra
Biology Teacher, The Gary and Jerri-Ann Jacobs High Tech High, San Diego, CA

The Case for Original Research in the High School Science Classroom

2010 GEORGE SARTON MEMORIAL LECTURE

Jed Z. Buchwald
Doris and Henry Dreyfuss Professor of History, California Institute of Technology

Knowledge in the Early Modern Era: The Origins of Experimental Error

Seminar Tracks

Day-long seminars address topics that build bridges between science and society.

Translational and Personalized Medicine

Friday, 19 February

Translational research transforms scientific discoveries from the laboratory bench into practical clinical applications at the patient's bedside. This seminar focuses on the challenges and opportunities in translating the burgeoning science and technology of genomics into a greater understanding of human diseases and personalized treatment.

Evaluating and Funding Translational Research

Organized in cooperation with the journal, Science Translational Medicine

Organized by Maria T. Vassileva, Foundation for the National Institutes of Health; Juli Staiano, AAAS Development; Katrina Kelner, Science Translational Medicine

SPEAKERS

Eric J. Topol, The Scripps Research Institute, La Jolla, CA

Outcomes of the NIH Roadmap: Impact on Translational Medicine

Gail Cassell, Eli Lilly and Co., Indianapolis, IN

The FDA Critical Path Initiative: A Perspective of the First Four Years

Ellen V. Sigal, Friends of Cancer Research, Arlington, VA

Novel Funding Models for Translational Research

DISCUSSANT

Gary Firestein, University of California, San Diego

Genome Analyses and Sequencing To Advance Drug Discovery and Treatment

Organized by William Evans, St. Jude Children's Research Hospital

SPEAKERS

Richard Wilson, Washington University School of Medicine, St. Louis

Discovery of Poly-Geneic Determinants of Diseases Through Whole Genome Sequencing

Mary Relling, St. Jude Children's Research Hospital, Memphis, TN

Genetics of Racial Differences in Drug Response, Disease Risk, and Health Disparities

Dan Roden, Vanderbilt University School of Medicine, Nashville, TN

Challenges and Opportunities in the Assembly of Population Pharmacogenomics

DISCUSSANTS

Scott Weiss, Harvard Medical School, Boston, MA

William Evans, St. Jude Children's Research Hospital, Memphis, TN

The Road to Personalized Medicine

Organized by Donna L. Mendrick, U.S. Food and Drug Administration; Vishal S. Vaidya, Harvard Medical School

SPEAKERS

Ivan Rusyn, University of North Carolina, Chapel Hill

Modeling Toxicity in the Population Using Experimental Models

Vishal S. Vaidya, Harvard Medical School, Boston, MA

Bench to Bedside Detection of Kidney Toxicity

Maryellen de Mars, Critical Path Institute, Tucson, AZ

Using Genetic Information To Predict and Prevent Drug Toxicity

DISCUSSANT

Donna L. Mendrick, U.S. Food and Drug Administration, Silver Spring, MD

Marine Sciences and Society

Saturday, 20 February

The oceans provide us with many economic and aesthetic benefits as well as vital ecosystem services. These include seafood, pharmaceuticals, minerals, recreation, and much of the oxygen we breathe. Evaluating available science and unique aspects of marine systems is critical to successful ocean stewardship.

To browse the program, register, and reserve hotel rooms, visit www.aaas.org/meetings.
Does Size Matter? Rationales for Large Marine Reserves
Organized by Emily Frost and Angela T. Bednarek, The Pew Charitable Trusts; Terry Hughes, James Cook University, Australia
MODERATOR
Jane Lubchenco, National Oceanic and Atmospheric Administration, Washington, DC

SPEAKERS
Stuart L. Pimm, Duke University, Durham, NC
Large Terrestrial Protected Areas and Lessons for the Marine Environment
Stephen R. Palumbi, Stanford University, CA
Spreading the Wealth: Design and Function of Highly Protected Reserve Networks
Terry Hughes, James Cook University, Townsville, Australia
Proving the Benefits of Very Large Marine Reserves

DISCUSSANT

Marine Spatial Planning: A New Approach for Balancing Ocean Uses and Ecosystem Health
Organized by Morgan Gopnik, Nicholas Institute for Environmental Policy Solutions; Mary Turnipseed, Duke University

SPEAKERS
Larry Crowder, Duke University, Beaufort, NC
The Science and Management of Coupled Social-Ecological Systems in the Ocean
Kevin St. Martin, Rutgers, The State University of New Jersey, New Brunswick
Mapping Communities: Linking People to Ocean Spaces
Andrew Rosenberg, University of New Hampshire, Durham
Advancing Ocean Planning in Massachusetts: The Role of a Unique Stakeholder Coalition
Mary Turnipseed, Duke University, Durham, NC
Re-Imagining the Public Trust Doctrine To Inform U.S. Marine Spatial Planning
Jo Foden, University of East Anglia, Norwich, United Kingdom
Evaluating Marine Plans: Lessons Learned from Aquatic Environmental Assessments
Fanny Douvere, UNESCO, Paris
Marine Spatial Planning: A Step-by-Step Approach Toward Ecosystem-Based Management

Arctic Sea-Ice Loss: What This Means for the Conservation of Arctic Marine Ecosystems
Organized by Tara Connelly and Gabriela Chavarria, Natural Resources Defense Council

SPEAKERS
John Walsh, University of Alaska, Fairbanks
Climate Change in the Arctic: What Are the Signs and What Is Predicted?
Jacqueline Grebmeier, University of Tennessee, Knoxville
The Potential Effect of Sea-Ice Loss on Arctic Marine Ecosystems
Frances Beinecke, Natural Resources Defense Council, Washington, DC
Role of the Aspen Institute’s Commission on Arctic Climate Change in the Arctic

DISCUSSANT
Charles Clusen, Natural Resources Defense Council, Washington, DC

History and Future of Laser Technology
Sunday, 21 February

A prominent example of the impact that pure scientific research can have on society is the story of the laser. The 50th anniversary of the first working laser takes place in 2010. From DVD players to eye surgery, the laser is one of the greatest inventions of the 20th century and has revolutionized daily life.

Celebrating the Birth of the Laser: A Look Back After 50 Years
Organized by Alan Chodos, American Physical Society, College Park, MD; Anthony J. Campillo, Optical Society of America, Washington, DC

SPEAKERS
Anthony Siegman, Stanford University, CA
How the Laser Came To Be
William B. Bridges, California Institute of Technology, Pasadena
Gas Lasers: The Early Years
Jeff Hecht, Laser Focus World, Auburndale, MA
Looking Back At How the Laser Evolved

Next Generation of Extreme Optical Tools and Applications
Organized by Christopher Ebbers, Lawrence Livermore National Laboratory

SPEAKERS
Robert L. Byer, Stanford University, CA
Quantum Noise Limited Lasers and the Search for Gravitational Waves
Margaret Murnane, University of Colorado, Boulder
Attosecond Light and Science at the Time-Scale of Electron Motion
Christopher Barty, Lawrence Livermore National Laboratory, Livermore, CA
Revolutionizing ISOLDE Science and Applications with Laser-Like Gamma-Rays
Keith Hodgson, SLAC National Accelerator Laboratory, Menlo Park, CA
Next Generation X-Ray Lasers and Applications
Toshiki Tajima, Max Planck Institute for Quantum Optics, Garching, Germany
Relativistic Optics and Applications with Ultra-Intense Lasers
Wim Leemans, Lawrence Berkeley National Laboratory, Livermore, CA
Laser-Based Particle Acceleration and the Path to TeV Physics

Lasers at the Extreme: Ultra-Cold, Ultra-Fast, and Ultra-Hot Uses
Organized by Thomas M. Baer, Stanford
Symposium Tracks

Beyond the Classroom

Building Bridges Between Ocean Scientists, Educators, and Students
Organized by Gwen Noda, University of California, Los Angeles; Linda Duguyay, University of Southern California, Los Angeles

Civic Scientific Literacy in Developed and Developing Countries
Organized by Jon D. Miller, Michigan State University, East Lansing; Rajesh Shukla, National Council of Applied Economic Research, New Delhi, India

Learning Science in Informal Environments
Organized by Bruce V. Lewenstein, Cornell University, Ithaca, NY

Mind Changes: Can Out-of-School Learning Contribute to Evolution Literacy?
Organized by Martin Weiss, New York Hall of Science, New York City

Reemergence of Science, Technology, and Education as Priorities in the Arab World
Organized by Ashley Dougherty and Cindi Warren Mentz, U.S. Civilian Research Development Foundation, Arlington, VA

Scientific Foundations for Future Physicians
Organized by Jodi Lubetsky and Anthony Mazzaschi, Association of American Medical Colleges, Washington, DC

Strategies for Diaspora To Be Enablers of S&T Capacity-Building in Their Homelands
Organized by Pallavi Prashirt, AAAS Science and Policy Programs, Washington, DC; Lara Campbell, CUBRC Center for International Science and Technology Advancement, Washington

Tomorrow’s Scientists and Engineers
Organized by Jon D. Miller, Michigan State University, East Lansing; Greg Pearson, National Academy of Engineering, Washington, DC

Top-Down or Bottom-Up? Comparing European and U.S. Gender Policies in Science
Organized by Marina Marchetti, European Commission, Directorate General for Research, Brussels, Belgium

Women and Men in the Scientific Work Force: Issues of Networks, Partners, and Ethics
Organized by Julia E. Melkers, Georgia Institute of Technology, Atlanta

Cognitive Function and Development

The Brain on Trial: Neuroscience Evidence in the Courtroom
Organized by Deborah Runke and Mark S. Frankel, AAAS Science and Policy Programs, Washington, DC

From Gene Discovery to Cell Biology in Psychiatry: An Emerging Case
Organized by Tyrone Cannon, University of California, Los Angeles

Language Learning in Deaf Children: Integrating Research on Speech, Gesture, and Sign
Organized by Jenny Saffran, University of Wisconsin, Madison

Language Processing for Science and Society
Organized by Annie Zaenen, Palo Alto Research Center, CA

The Long Reach of Early Childhood Poverty: Pathways and Impacts
Organized by Greg J. Duncan, University of California, Irvine

Music-Language Interactions in the Brain: From the Brainstem to Broca’s Area
Organized by Aniruddh D. Patel, Neurosciences Institute, San Diego, CA

Role of Sleep in Memory from Development to Old Age
Organized by Sara C. Mednick, University of California, San Diego

Stress and the Central Role of the Brain in Health Inequities
Organized by Michael J. Zigmond, University of Pittsburgh, PA; Bruce S. McEwen, Rockefeller University, New York City

Traumatic Brain Injury: The Violent and Silent Epidemic
Organized by Mahlon DeLong and David Wright, Emory University School of Medicine, Atlanta, GA

Unexpected Discoveries on Brain Function and Development from Model Organisms
Organized by S. Lawrence Zipursky, University of California, Los Angeles; Barbara Illman, U.S. Forest Service, Madison, WI

Communicating Science

Communicating Science to the Public: Culture and Social Context in East Asia
Organized by Masataka Watanabe, Japan Science and Technology Agency, Tokyo, Japan; Sook-Kyoungh Cho, Korea Foundation for the Advancement of Science and Creativity, Seoul; Sun Mengxin, China Association for Science and Technology, Beijing

Communicating on the State and Local Level: How Can Scientists Support Policy-Makers?
Organized by Peyton West and Erin Heath, AAAS Science and Policy Programs, Washington, DC

Covering Global Climate Change and Adaptation from the Ground Up
Organized by Cristine Russell, Harvard University, Cambridge, MA; Deborah Blum, University of Wisconsin, Madison; Phillip Hilts, MIT’s Knight Science Journalism Fellowships, Cambridge, MA

Earthquake Science and Advocacy: Helping Californians Live Along the San Andreas Fault
Organized by Mark L. Benthien, Southern California Earthquake Center, Los Angeles

Eyes on Screen: Communicating Science in the New Information Age
Organized by Sharon Dunwoody, University of Wisconsin, Madison; Lynne Friedmann, Friedmann Communications, Solana Beach, CA

Facing the Uncertain Future of International Science Journalism
Organized by Cristine Russell, Harvard University, Cambridge, MA; James Cornell, International Science Writers Association, Tucson, AZ; Donald Kennedy, Stanford University, CA

Genetics and Ethics: Different Views on the Human Condition
Organized by Walter Doerfler, University of Cologne, Erlangen, Germany; Hans G. Ulrich, Erlangen University, Germany

Plato’s Progeny: Academies of Science
Organized by Lynn E. Elfner, Ohio Academy of Science, Columbus; Jay B. Labov, National Research Council, Washington, DC

Science in the Theater
Organized by Vince LiCata, Louisiana State University, Baton Rouge

To browse the program, register, and reserve hotel rooms, visit www.aaas.org/meetings.
Science Meets Society: Walking the Talk
Organized by Viviane Willis-Mazzuchi and Raffaella Di Iorio, European Commission, Joint Research Center, Brussels, Belgium

Watching the Watchmen and Cheering the Heroes: The Science of Superheroes
Organized by Cortney Riese Sloan and Ann Merchant, National Academies, Washington, DC; Jennifer Ouellette, National Academy of Sciences, Los Angeles, CA

Education in the Classroom
Can Singapore Mathematics Enhance Student Learning in the United States?
Organized by Patsy Wang-Iverson, Gabriella and Paul Rosenbaum Foundation, Stockton, NJ

Demonstrating the Legal Sustainability of Effective STEM Diversity Programs
Organized by Daryl E. Chubin, AAAS Education and Human Resources, Washington, DC

Education Research at Minority-Serving Institutions: What Have We Learned?
Organized by Marilyn J. Suiter, National Science Foundation, Arlington, VA

First-Person Solvers? Learning Mathematics in a Video Game
Organized by Keith Devlin, Stanford University, CA

Role of Community Colleges in Increasing Minority Students in the STEM Pipeline
Organized by Anne Jane MacLachlan, University of California, Berkeley

Science Literacy: How To Train Teachers, Engage Students, and Maximize Learning
Organized by Michael W. Klymkowski, University of Colorado, Boulder

Scientific Approaches to Teaching Science in K-16 Education
Organized by Robert E. Fay, Westat, Bethesda, MD

TIMSS 2007: Exploring the Dramatic Improvements in Performance in Two States
Organized by Patsy Wang-Iverson, Gabriella and Paul Rosenbaum Foundation, Stockton, NJ

Visualizations in the Mind and in the World: Implications for STEM Education
Organized by Mary Hegarty, University of California, Santa Barbara

Worlds of Wonder: Can Video Games Teach Science?
Organized by Yasmin Kafai, University of Pennsylvania, Philadelphia; Douglas Clark, Vanderbilt University, Nashville, TN

Energy Today and Tomorrow
Advanced Nuclear Energy Concepts for a Safe, Sustainable, Carbon-Free Future
Organized by Tomas Diaz de la Rubia, Lawrence Livermore National Laboratory, Livermore, CA; Robert Rosner, Argonne National Laboratory, Argonne, IL

Biofuels' Uncertain Future: Unraveling the Science and Politics of Indirect Land Use
Organized by Holly K. Gibbs, Stanford University, CA; Richard Plevin, University of California, Berkeley

Combating Global Emissions: The Urgent Need for a New Strategy in the Asia-Pacific Rim
Organized by Elynn M. Murphy and Yong Wang, Pacific Northwest National Laboratory, Richland, WA

Consequences of Changes in Energy Return on Energy Invested
Organized by Carey King, University of Texas, Austin

Organized by Thomas Casten, Recycled Energy Development, Westmont, IL

Nanotechnology: Will Nanomaterials Revolutionize Energy Applications?
Organized by S. Thomas Picraux, Los Alamos National Laboratory, Los Alamos, NM

Smart and Secure Transmission Grids To Realize U.S. and E.U. Renewable Energy Potentials
Organized by Gianluca Fulli and Giovanni De Santi, European Commission, Joint Research Center, Petten, Netherlands

Societal Strategies for Addressing the Climate and Energy Challenge
Organized by Jane C.S. Long, Lawrence Livermore National Laboratory, Livermore, CA

Nuclear Waste Management: From Public Perception to Industrial Reality
Organized by Didier J. Haas, European Commission, Joint Research Center, Brussels, Belgium

Toward Green Mobility: Integrating Electric Drive Vehicles and Smart Grid Technology

Urban Design and Energy Demand: Transforming Cities for an Eco-Energy Future
Organized by Nancy Levinson, Arizona State University, Tempe

Global Science and Policy
Bottom-of-the-Economic-Pyramid Technological Solutions: Lessons from Success Stories
Organized by William S. Kisaalita, University of Georgia, Athens

Building International Security Through Lab-to-Lab Exchanges
Organized by Benn Tannenbaum, AAAS Center for Science, Technology, and Security Policy, Washington DC

Information Technologies and Remote Sensing for Understanding Human Rights Violations
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