

PRELIMINARY PRESS PROGRAM

# 2013 AAAS ANNUAL MEETING

## THE BEAUTY AND BENEFITS OF SCIENCE

14-18 FEBRUARY • HYNES CONVENTION CENTER • BOSTON

### Join Us in Boston for Science and Good Cheer

There will be symposia, seminars, lectures, and news briefings on topics at the intersection of science and society. Learn about emerging areas of study, gather story ideas for the year ahead, renew contacts with science sources and make new ones. Mingle with colleagues at receptions and social events. It's all available at the world's largest interdisciplinary science forum.

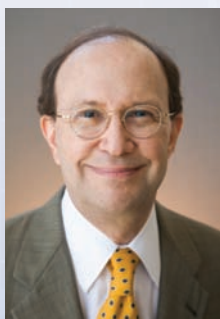


 **AAAS | 2013**  
**ANNUAL MEETING**  
14-18 FEBRUARY • BOSTON

CURRENT AS OF 1 NOVEMBER 2012



HYNES CONVENTION CENTER



Dear Colleagues,

On behalf of the AAAS Board of Directors, it is my honor to invite you to join us in Boston for the 2013 AAAS Annual Meeting, 14-18 February. As you may know, this annual event is one of the most widely recognized global science gatherings, with hundreds of networking opportunities and broad U.S. and international media coverage.

The meeting's theme — *The Beauty and Benefits of Science* — points to the “unreasonable effectiveness” of the scientific enterprise in creating economic growth, solving societal problems, and satisfying the essential human drive to understand the world in which we live.

The phrase “unreasonable effectiveness” was coined in 1960 by physicist Eugene Wigner, who explored the duality of mathematics — both beautiful unto itself, and also eminently practical, often in unexpected ways. The scientific program will highlight the rich and complicated connections between basic and applied research, and how they bring about both practical benefits and the beauty of pure understanding.

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, and an international exhibition. You and your family can also enjoy Family Science Days, a free event open to the general public.

The Annual Meeting reflects tremendous efforts from the AAAS sections, divisions, and committees, which I gratefully acknowledge. I also extend a personal thanks to the members of the Scientific Program Committee who selected and assembled the many excellent ideas and proposals into this outstanding meeting.

Please join us in Boston,

William H. Press  
AAAS President and Program Chair, and  
Warren J. and Viola M. Raymer Professor in  
Computer Science and Integrative Biology  
The University of Texas at Austin

# AAAS Annual Meeting Newsroom

The AAAS Annual Meeting Newsroom, located in Room 101 of the Hynes Convention Center, will provide an array of news opportunities and resources to news reporters and career science communicators who, with appropriate credentials, are eligible for complimentary meeting registration.

News briefings during the meeting will offer newsroom registrants access to some of the world's leading scientists. You are strongly encouraged to register in advance via our online registration site: [www.eurekalert.org/aaasnewsroom](http://www.eurekalert.org/aaasnewsroom). Credentialing criteria and other newsroom information are available via the "Newsroom Links" section of that site.

## PLEASE NOTE FOR PLANNING PURPOSES:

**AAAS news briefings and interview opportunities will begin on the morning of Thursday, 14 February, starting with the AAAS President's Press Breakfast.**

## Virtual Newsroom

EurekAlert! will host the Annual Meeting's virtual newsroom: <http://www.eurekalert.org/aaasnewsroom>.

The schedule of news briefings will be available to newsroom registrants upon their arrival at the meeting. The schedule also will be available online at the virtual newsroom beginning Monday, 11 February, to reporters who have log-in access to the embargoed section of the EurekAlert! website.

You may search for the latest information on symposia at the main Annual Meeting website ([www.aaas.org/meetings](http://www.aaas.org/meetings)) using the "Browse the Program" link.

## Embargo Policy

AAAS Annual Meeting newsroom registrants are required to observe news embargoes, which coincide with the date and time of the scientific session or a related news briefing, whichever comes first. AAAS will schedule daily news briefings on research and policy issues being discussed at the meeting. Attendance at news briefings is restricted to newsroom registrants.

## Note to Public Information Officers

Once again, we will be using the AAAS Annual Meeting Speaker Paper Recruitment System to ask speakers and their public information officers (PIOs) to submit information about presentations and upload supporting materials to our virtual newsroom. Speakers and PIOs will receive instructions by e-mail. Reporters registered for the embargoed section of EurekAlert! will be able to gain access to speaker materials submitted to the virtual newsroom. Speaker papers also will be available to news media on site at our AAAS Papers Room.



## Twitter

Follow the AAAS Annual Meeting on Twitter: [www.twitter.com/AAASMeetings](http://www.twitter.com/AAASMeetings). The Twitter hashtag is #AAASmtg.

## A SPECIAL INVITATION

FRIDAY, 15 FEBRUARY • 7:00PM–10:00PM

AAAS will host a reception at historic **Fenway Park** for all newsroom registrants to honor the winners of the **2012 AAAS Kavli Science Journalism Awards**, endowed by The Kavli Foundation. Shuttle buses will be provided from the Hynes Convention Center beginning at 6:45 PM. **Newsroom badges will be required.**

SPONSORED BY:

THE  KAVLI FOUNDATION

 **AAAS**  
ADVANCING SCIENCE. SERVING SOCIETY



**14 THURSDAY**

## Daytime

**Newsroom Registration**

7:00AM–5:00PM

Hynes Convention Center  
Room 101**Seminar: Communicating Science**

8:30AM–6:00PM

Hynes Convention Center

**Special Session:  
International Teacher-  
Scientist Partnership  
Conference**

8:30AM–6:00PM

Hynes Convention Center

**Special Session: Research Integrity**

8:30AM–6:00PM

Hynes Convention Center

## Evening

**Opening Ceremony and  
AAAS President's Address**

6:00PM

Hynes Convention Center

**President's Reception**

Immediately following

Hynes Convention Center

**International Reporters  
Reception**

8:00PM–10:00PM

Location pending

**Newsroom Badge Required****15 FRIDAY**

## Daytime

**Newsroom Registration**

7:30AM–5:00PM

Hynes Convention Center  
Room 101**European Commission Press  
Breakfast**

7:30AM–9:00AM

Hynes Convention Center  
Room 200**Concurrent Symposia**

8:00AM–9:30AM

8:30AM–11:30AM

10:00AM–11:30AM

Hynes Convention Center

**Seminar**

8:30AM–4:30PM

Hynes Convention Center

**Career Workshops**

8:00AM–5:00PM

Hynes Convention Center

**Exhibitor Workshops**

8:00AM–5:00PM

Hynes Convention Center

**Exhibit Hall**

10:00AM–5:00PM

Hynes Convention Center

**Kavli Foundation Journalism  
Roundtable**

NOON–1:00PM

Hynes Convention Center

**Topical Lectures**

NOON–1:00PM

Hynes Convention Center

**Topical Panel**

NOON–1:30PM

Hynes Convention Center

**American Junior Academy of  
Sciences (AJAS) Poster  
Session**

1:00PM–5:00PM

Hynes Convention Center

**Concurrent Symposia**

1:00PM–2:30PM

1:30PM–4:30PM

3:00PM–4:30PM

Hynes Convention Center

**EurekaAlert! Reception**

2:30PM–4:30PM

Hynes Convention Center  
Room 200

## Evening

**Plenary Lecture**

5:00PM–6:00PM

Hynes Convention Center

**AAAS Kavli Science  
Journalism Awards**

7:00PM–10:00PM

**Newsroom Badge Required****16 SATURDAY**

## Daytime

**Newsroom Registration**

7:30AM–5:00PM

Hynes Convention Center  
Room 101**Helmholtz Association Press  
Breakfast**

7:45AM–9:00AM

Hynes Convention Center  
Room 200**Concurrent Symposia**

8:00AM–9:30AM

8:30AM–11:30AM

10:00AM–11:30AM

Hynes Convention Center

**Seminar**

8:30AM–4:30PM

Hynes Convention Center

**Career Workshops**

8:00AM–5:00PM

Hynes Convention Center

**Exhibitor Workshops**

8:00AM–5:00PM

Hynes Convention Center

**Exhibit Hall**

10:00AM–5:00PM

Hynes Convention Center

**Family Science Days and  
"Meet the Scientists"  
Speaker Series**

11:00AM–5:00PM

Hynes Convention Center

**Student Poster Competition**

11:00AM–5:00PM

Hynes Convention Center

**Topical Lectures**

12:00PM–1:00PM

Hynes Convention Center

**AJAS Oral Presentations**

1:30PM–4:30PM

Sheraton Boston Hotel

**Concurrent Symposia**

1:00PM–2:30PM

1:30PM–4:30PM

3:00PM–4:30PM

Hynes Convention Center

## Evening

**Plenary Lecture**

5:00PM–6:00PM

Hynes Convention Center

**AAAS Awards Ceremony  
and Reception**

6:30PM–8:00PM

Sheraton Boston Hotel

**New England Science  
Writers Party**

7:00PM–11:00PM

Top of the Hub, at the

Prudential Center

**17 SUNDAY**

## Daytime

**Newsroom Registration**

7:30AM–5:00PM

Hynes Convention Center  
Room 101**Canada Press Breakfast**

7:45AM–9:00AM

Hynes Convention Center  
Room 200**Concurrent Symposia**

8:00AM–9:30AM

8:30AM–11:30AM

10:00AM–11:30AM

Hynes Convention Center

**Seminar**

8:30AM–4:30PM

Hynes Convention Center

**Career Workshops**

8:00AM–5:00PM

Hynes Convention Center

**Exhibitor Workshops**

8:30AM–5:00PM

Hynes Convention Center

**Exhibit Hall**

10:00AM–5:00PM

Hynes Convention Center

**Family Science Days and  
"Meet the Scientists"  
Speaker Series**

11:00AM–5:00PM

Hynes Convention Center

**Topical Lectures**

12:00PM–12:45PM

Hynes Convention Center

**General Poster Session**

1:00PM–5:00PM

Hynes Convention Center

**Concurrent Symposia**

1:00PM–2:30PM

1:30PM–4:30PM

3:00PM–4:30PM

Hynes Convention Center

## Evening

**Plenary Lecture**

5:00PM–6:00PM

Hynes Convention Center

**Disclaimers**

Abstracts and synopses of material presented at the AAAS Annual Meeting reflect the individual views of the author and not necessarily those of the AAAS, its Council, Board of Directors, officers, or the views of the institutions with which the authors are affiliated. Presentation of ideas, products, or publications at the AAAS Meeting or the reporting of them in resulting news accounts does not constitute endorsement by AAAS.

# Special Events for Newsroom Registrants

## AAAS President's Breakfast and Briefing

14 February

7:45AM–8:30AM

The breakfast briefing with AAAS President William H. Press will be held in Room 200, Hynes Convention Center. **This event is for reporters only.**

## International Reporters Reception

15 February

8:00PM–10:00PM

AAAS welcomes international reporters with a special reception. Location to be determined. **Newsroom badges are required. All newsroom registrants are welcome.**

## European Commission Breakfast

15 February

7:45 AM–9:00AM

Newsroom registrants are invited to this sponsored breakfast briefing in Room 200, Hynes Convention Center.

## Science Journalism Roundtable

15 February

12:00PM–1:00PM

Winners of the 2012 AAAS Kavli Science Journalism Awards will be invited to a special luncheon in their honor, hosted by The Kavli Foundation, to include a moderated roundtable discussion in Room 200, Hynes Convention Center.

## EurekaAlert! Reception

15 February

2:30PM–4:30PM

Hynes Convention Center, Room 200. All newsroom registrants are invited.

## AAAS Kavli Science Journalism Awards

15 February

7:00PM–10:00PM

All newsroom registrants are invited to the awards reception and ceremony at historic Fenway Park. The awards have been endowed by The Kavli Foundation. Shuttle buses will be provided from the Hynes Convention Center beginning at 6:45 PM. **Newsroom badges are required.**

## Helmholtz Association Press Breakfast

16 February

7:45AM–9:00AM

This networking and information opportunity, sponsored by the Helmholtz Association of German Research Centres, will be held in Room 200, Hynes Convention Center.

## Canada Press Breakfast

17 February

7:45AM–9:00AM

All newsroom registrants are invited to this sponsored breakfast in Room 200, Hynes Convention Center.

## New England Science Writers Party

16 February

7:00PM–11:00PM

The New England Science Writers will host an evening party for Newsroom registrants at the Top of the Hub in the Prudential Center.

## NASW Student Programs and Travel Fellowships

The National Association of Science Writers (NASW) will again sponsor several programs for student journalists at the AAAS meeting. Funding from NASW will provide travel fellowships for up to 10 undergraduate students to attend the meeting and cover a session for the NASW website. Application deadline is Nov. 30. Details will be posted at [www.nasw.org/aaas2013](http://www.nasw.org/aaas2013). NASW also will sponsor its popular mentoring program, pairing undergraduate and graduate students with senior journalists, and an internship fair for summer writing positions with professional editors. All activities require student membership in NASW.

# General Information

## Meeting Location

Meeting events will be held in downtown Boston, MA, at the Hynes Convention Center, the Sheraton Boston, Hilton Back Bay, and Marriott Copley Place hotels.

## On-Site Press Registration

Press registration will be located in the Hynes Convention Center, Level One, Room 101. Hours are as follows:

Thursday	14 February	7:00AM–5:00PM
Friday–Sunday	15–17 February	7:30AM–5:00PM
Monday	18 February	7:30AM–10:30AM

Note: Access to the AAAS Annual Meeting Newsroom requires appropriate press credentials. Valid photo ID is required on site. See details online at [www.eurekalert.org/aaasnewsroom](http://www.eurekalert.org/aaasnewsroom).

For questions about press registration call AAAS Press Registration at (617) 954-2601 or send an e-mail to [media@aaas.org](mailto:media@aaas.org).

## The Newsroom

The Newsroom, located in the Hynes Convention Center, Level One, Room 101, hosts hundreds of print, broadcast, and online reporters from around the world. It offers news briefings, a newsroom equipped with Internet access and computers, a papers room with copies of speaker presentations, a reporters' coffee lounge, and private interview rooms.

## Discount Hotel Rates

AAAS has negotiated special rates for AAAS Meeting attendees at hotels close to the Hynes Convention Center. For details on the hotels and rates, go to [www.aaas.org/meetings](http://www.aaas.org/meetings) and click on “Hotels and Travel” then “Hotel Reservation.” Special room rates are available only through the AAAS Travel Desk. **Please do not contact the hotels directly.** Newsroom registrants will receive a code number for making reservations at official meeting hotels once their online applications for press credentials are approved.

## AAAS Family Science Days and “Meet the Scientists!” Speakers Series

Stop by Exhibit Hall D on Saturday and Sunday to take part in free, fun, hands-on science opportunities and hear a diverse range of scientists describe their amazing explorations. The

2013 Family Science Days will feature exciting, interactive programming for children and will include a series of unique opportunities for young people to speak directly with top scientists who will explain what it takes to succeed in “cool science careers.”

Saturday	16 February	11:00AM–5:00PM
Sunday	17 February	11:00AM–5:00PM

## Exhibition

The Exhibition and poster sessions will be located in Hall C and the Veterans Memorial Auditorium at the Hynes Convention Center. Hours are as follows:

Friday	15 February	10:00 AM–5:00 PM
Saturday	16 February	10:00 AM–5:00 PM
Sunday	17 February	10:00 AM–5:00 PM

## Barrier-Free Environment

Accommodations for people with disabilities will be provided on request at all general lectures and sessions. Services include interpreters or real-time captioning for persons who are deaf or hearing impaired, audio-recorded highlights, and mobility assistance within and outside the conference facilities as needed. In addition, a resource room for people with disabilities will be available off the Main Lobby on Level One at the Hynes Convention Center.

## Discount Travel to Boston

For details about discounts on airfare and rail, visit [www.aaas.org/meetings](http://www.aaas.org/meetings) and click on “Hotel and Travel” then “Travel Discounts.”

## Airport Transportation

For information about transportation to and from the airport, visit [www.aaas.org/meetings](http://www.aaas.org/meetings) and click on “Hotels and Travel,” then “Transportation.”

## Environmental Practices

A CD contains speaker and poster abstracts. Program materials are produced with recycled material. Recycling containers are provided on site.

**Register online:** Save time and register in advance at: [www.eurekalert.org/aaasnewsroom](http://www.eurekalert.org/aaasnewsroom).

# Plenary Lectures

Thursday, 14 February

AAAS PRESIDENT'S ADDRESS



## William H. Press

AAAS President; Warren J. and Viola M. Raymer Professor in Computer Science and Integrative Biology, University of Texas at Austin

Dr. Press is a noted researcher in computer science, genomics, statistical methods, astrophysics, and international security. He is a member of the President's Council of

Advisors on Science and Technology. His current research focus is bioinformatics and whole-genome genetics. He previously served as deputy laboratory director for science and technology at the Los Alamos National Laboratory and as a professor of astronomy and physics at Harvard University. He is a member of the U.S. National Academy of Sciences and a fellow of the American Academy of Arts and Sciences.

Friday, 15 February



## Sherry Turkle

Abby Rockefeller Mauzé Professor of the Social Studies of Science and Technology in the Program in Science, Technology, and Society, Massachusetts Institute of Technology

### *The Robotic Moment: What Do We Forget When We Talk to Machines?*

Dr. Turkle is founder and director of the MIT Initiative on Technology and Self. She received a joint doctorate in sociology and personality psychology from Harvard University and is a licensed clinical psychologist. Her research focuses on the psychology of human relationships with technology, especially in the realm of how people relate to computational objects. She is an expert on mobile technology, social networking, and sociable robotics and a regular media commentator on the social and psychological effects of technology. Her most recent book is *Alone Together: Why We Expect More from Technology and Less from Each Other*.

Saturday, 16 February



## Nathan Myhrvold

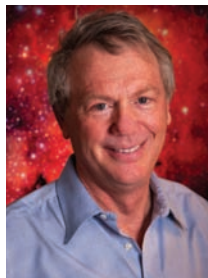
Founder and Chief Executive Officer, Intellectual Ventures

### *Modernist Cuisine: The Art and Science of Cooking*

Dr. Myhrvold founded Intellectual Ventures after retiring as chief strategist and chief technology officer of Microsoft Corporation. At Intellectual Ventures, he is focused on a variety of business interests relating to the funding, creation, and commercialization of inventions. During his tenure at Microsoft, he was responsible for founding Microsoft Research and technology

groups that resulted in many successful products. He has extensive experience linking research to product development and commercialization and holds hundreds of patents. As a postdoctoral fellow in applied mathematics and theoretical physics at Cambridge University, he worked with Stephen Hawking on research in cosmology, quantum field theory in curved space time, and quantum theories of gravitation. He earned a doctorate in theoretical and mathematical physics and a master's degree in mathematical economics from Princeton University. He also has a master's degree in geophysics and space physics and a bachelor's degree in mathematics from UCLA.

Sunday, 17 February



## Robert Kirshner

Clowes Professor of Science, Harvard University

### *The Beauty of the Accelerating Universe*

Dr. Kirshner is an astrophysicist studying the physics of supernovae and observational cosmology. He is a member of the High-z Supernova Search Team that used observations of extragalactic supernovae to discover the accelerating universe, which implied the existence of dark energy. Dr. Kirshner's graduate students Brian Schmidt and Adam Riess shared the 2011 Nobel Prize in Physics with Saul Perlmutter for the discovery of cosmic acceleration. He teaches a popular course for Harvard undergraduates called "The Energetic Universe" and is author of the book *The Extravagant Universe: Exploding Stars, Dark Energy, and the Accelerating Cosmos*. He is a past president of the American Astronomical Society, a member of the National Academy of Sciences, and a 2012 Guggenheim Fellow.

Monday, 18 February



## Cynthia Kenyon

American Cancer Society Professor and Director of the Hillblom Center for the Biology of Aging, University of California, San Francisco

### *Mechanisms for Life Extension in C. elegans*

Dr. Kenyon is a molecular biologist whose discovery with colleagues that a single-gene mutation could double the lifespan of the worm *C. elegans* sparked an intensive study of the molecular biology of aging. Her findings have since led to the discovery that an evolutionarily conserved hormone signaling system controls aging in other organisms as well, including mammals. As a doctoral student at Massachusetts Institute of Technology, she was the first to look for genes on the basis of their expression profiles, discovering that DNA damaging agents activate a battery of DNA repair genes in *E. coli*. She is a member of the U.S. National Academy of Sciences and the Institute of Medicine, a fellow of the American Academy of Arts and Sciences, and a past president of the Genetics Society of America.

# Topical Lecture Series

Attend lectures on prominent topics across a range of disciplines.

## **Richard Alley**

Evan Pugh Professor, Department of Geosciences, and Earth and Environmental Systems Institute, Pennsylvania State University

*Ice Sheets, Sea Level, and Other Surprises: Benefits of Understanding Some Beautiful Places*

## **Karl Deisseroth**

Associate Professor of Bioengineering and Psychiatry, Stanford University

*Optogenetics: Development and Application*

## **Felice Frankel**

Research Scientist, Center for Materials Science and Engineering, Massachusetts Institute of Technology

*More Than Pretty Pictures: How the Process of Making Science Images and Graphics Clarifies Understanding*

## **Nina Jablonski**

Distinguished Professor of Anthropology, Pennsylvania State University

*The Evolution and Meanings of Human Skin Color*

## **Chad Mirkin**

Director of International Institute for Nanotechnology and George B. Rathmann Professor of Chemistry, Northwestern University

*"Artificial Atoms" Formed from Nucleic Acid Nanoparticle Conjugates: The Dawn of a New Periodic Table*

GEORGE SARTON MEMORIAL LECTURE IN THE HISTORY AND PHILOSOPHY OF SCIENCE

## **Silvan Schweber**

Emeritus Professor of Physics and Richard Koret Professor in the History of Ideas, Brandeis University

*Hans Bethe and Physics in the 20th Century*

JOHN P. MCGOVERN LECTURE IN THE BEHAVIORAL SCIENCES

**Lecturer to be announced.**

## Topical Panel: European Science Policy on the Move

### **Paul Boyle**

President, Science Europe; Chief Executive, U.K. Economic and Social Research Council

### **Anne Glover**

Chief Scientific Advisor to European Commission President, European Union

### **Helga Nowotny**

President, European Research Council

### **Robert-Jan Smits**

Director, Directorate-General for Research and Innovation, European Commission

### **William H. Press, Moderator**

AAAS President; Warren J. and Viola M. Raymer Professor in Computer Science and Integrative Biology, University of Texas at Austin

## Special Session

### **John Grotzinger**

Fletcher Jones Professor of Geology, and Project Scientist, Mars Science Laboratory, California Institute of Technology

*Curiosity's Mission at Gale Crater, Mars*



# Seminars

## Communicating Science

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Thursday, 14 February

Scientific and technological issues increasingly trigger societal conflicts whenever they intersect with personal or political views. Particularly amid pressures on research and development budgets, and related concerns about transparency and accountability, today's scientists and engineers are challenged to communicate and engage with the public, reporters, and policymakers. This seminar will share science communication expertise in working with different types of content, across a range of presentation formats, for various audiences.

### Working with Print, Broadcast, and Online Media

8:00AM-9:30AM

This session will encompass tips, cautionary tales, and examples of effective science communication by three leading journalists. Speakers will discuss the challenges of communicating science through print, broadcast, and online formats. What kinds of science news stories interest each journalist and how is journalism changing?

*Organized by:* Cornelia Dean, *The New York Times*, New York City; Dennis Meredith, Science Communication Consultant, Purlear, NC

#### SPEAKERS

Juliet Eilperin, *The Washington Post*, Washington, DC

*Science Reporting at Newspapers in an Age of Tight Budgets, Constant Deadlines, Political Polarization, and Industry Upheaval*

Chris Joyce, National Public Radio, Washington, DC

*Science Journalism: Alive and Kicking*

Alan Boyle, NBCNews.com, Redmond, WA  
*Science Journalism on Internet Time*

### Communicating Science to Policy-Makers

10:00AM-11:30AM

How can scientists and engineers help shape science policy? Is this task becoming increasingly complicated in the current political climate? This session will encompass an overview on the basics of government relations in support of

the scientific enterprise, including do's and don'ts, tips about timing, working individually or with organizations, and how to deal with "pushback."

*Organized by:* Cornelia Dean, *The New York Times*, New York City; Dennis Meredith, Science Communication Consultant, Purlear, NC

#### SPEAKERS

David Goldston, Natural Resources Defense Council, Washington, DC

*Why Can't They Just Do What's Right?: Misperceptions and Barriers to Science Communication*

\*Bill Foster, United States House of Representatives, Washington, DC

*Talk Title to Be Determined*

Arthur Lupia, University of Michigan, Ann Arbor

*Communicating Science in Politicized Environments*

### Visualizing Science

1:00PM-2:30PM

This session will focus on cutting-edge strategies for visualizing science through photography, illustrations, video, and more.

*Organized by:* Cornelia Dean, *The New York Times*, New York City; Dennis Meredith, Science Communication Consultant, Purlear, NC

#### SPEAKERS

Felice Frankel, Massachusetts Institute of Technology, Cambridge

*Tell Me What You See: Understanding Science Images*

Erik Olsen, *The New York Times*, New York City  
*Explaining Science in Video*

Yael Fitzpatrick, AAAS/*Science*, Washington, DC  
*Starting with the Basics, Ending with a Bang*

### Engaging with Social Media

3:00PM-4:30PM

In a constantly changing online landscape, what is the best way for scientists and engineers to engage the public through social media? This session will discuss how people are accessing science information via blogs and social networks and the importance of researchers getting involved directly. Speakers will address the ways that researchers can create meaningful interactions with the public through social media.

*Organized by:* Cornelia Dean, *The New York Times*, Cambridge, MA; Dennis Meredith, Science Communication Consultant, Purlear, NC

#### SPEAKERS

Scicurious, blogger

*Science Blogging for Fun and Profit*

Christie Wilcox, University of Hawaii, Honolulu  
*Science in a Digital Age*

Dominique Brossard, University of Wisconsin, Madison

*Science and the Public in New Information Environments*

## The Biology and Evolution of Human Language

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Friday, 15 February

The human ability to learn and use language is deeply rooted in the biology of our species and processes of cultural evolution. We are biologically equipped for language in general, but inherit the



TED KINSMAN: PHOTORESEARCHERS, INC.

\*Invited

specific cultural form of the languages in which we are socialized. The creation of new languages provides unique perspectives on language acquisition.

## The Language Organ: The Bases of Human Language in Human Biology

8:30AM-11:30AM

The human ability to learn and use natural languages is not simply an incidental outgrowth of more general intellectual capacities, but something deeply rooted in the biology of our species. The fact that our “language organ” is not physiologically localized in the fashion of, say, the kidneys, does not alter the conclusion that our capacity for language is biologically determined in the organization of our body, mind, and brain. This symposium will explore several dimensions of that conclusion, surveying communication in other species to demonstrate that the essential properties of human language are quite different from anything found elsewhere. The structural properties of language suggest an origin like that of any biologically determined trait — evolution through natural selection. We argue that the logical prerequisites for such an account are satisfied in the case of language. Language emerges in the individual as natural growth, not arbitrary learning, and that growth is associated with specific periods in the life of the organism. A nonhuman system showing interesting analogies with important properties of language is birdsong: we present recent work on its neurophysiological bases. The symposium will also survey the brain bases of human language. The signed languages of the deaf have all of the important structural properties of other human languages, and we present evidence that the same neurophysiological and other bases underlie language in both auditory and visual modalities.

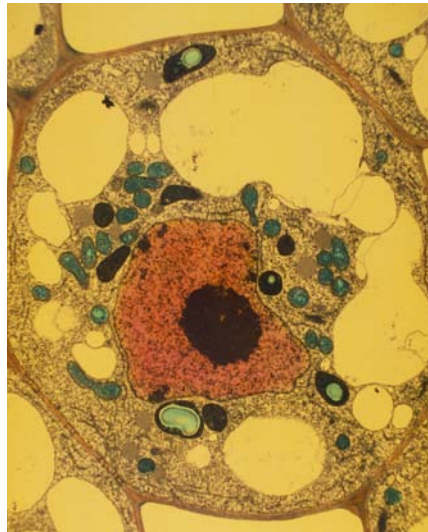
*Organized by:* Stephen Anderson, Yale University, New Haven, CT

### SPEAKERS

Stephen Anderson, Yale University, New Haven, CT

*Human Language in the Broader Biological Context*

Steven Pinker, Harvard University, Cambridge, MA



BIOPHOTO ASSOCIATES / SCIENCE SOURCE

### *Language as an Adaptation to the Cognitive Niche*

Janet F. Werker, University of British Columbia, Vancouver, Canada

### *Infant Speech Perception: Biological Beginnings and Experiential Influences*

Erich Jarvis, Duke University Medical Center, Durham, NC

### *Learned Birdsong and the Neurobiology of Human Language*

David Poeppel, New York University, New York City

### *What We Know About the Brain Bases of Language*

Karen Emmorey, San Diego State University, CA  
*The Generality of the Language Faculty: Biological Bases of Signed Language*

## Historical Syntax

1:00PM-2:30PM

The study of how sentence structure changes over time — historical syntax — is being transformed by new connections to other sciences (e.g., cognitive science and complexity science) and new tools, especially the creation of large datasets. This symposium will consider how changes in syntax can be understood in light of two such innovations: on the one hand, advances in our understanding of first- and second- language acquisition and, on the other, advances in corpus development and the statistical analysis of such data. Core syntactic change takes place during transmission of language from one generation to another. Recent work on phase transitions in language acquisition sheds light on how large syntactic changes take place. The creation of new languages, or creolization, provides unique perspectives on the interplay of first- and second-language

acquisition as a new grammar is built from complex and variable input. A full picture of changes large and small over a broader span of time requires corpora of a size unimaginable only a few years ago. Corpus work allows us to see fine-grained conditioning of change and establish tipping points for larger changes. The focus will be on how these approaches complement one another and how a new synthesis can emerge for the study of syntactic change as a window on human cognition and how the treatment of phase transitions in syntax relate to phase transitions in other areas of science (e.g., evolutionary changes in biology).

*Organized by:* David Lightfoot, Georgetown University, Washington, DC; Joseph Salmons, University of Wisconsin, Madison

### SPEAKERS

David Lightfoot, Georgetown University, Washington, DC

### *Phase Transitions in Language History*

Tony Kroch, University of Pennsylvania, Philadelphia

### *Studying the Diffusion of Syntactic Changes in Historical Corpora*

Michel DeGraff, Massachusetts Institute of Technology, Cambridge

### *A Null Theory of Creole Formation*

### DISCUSSANT

Mark Liberman, University of Pennsylvania, Philadelphia

## Language Evolving: Genes and Culture in Ongoing Language Evolution

3:00PM-4:30PM

The theory of evolution is “unreasonably effective” (in Wigner’s terms) in that it seems to apply to both biological evolution and cultural change — domains that might seem completely unrelated. Nowhere is this parallelism clearer than in the domain of language, where there is both an evolved biological basis for language and processes of cultural evolution that lie behind the diversification of languages. Language is clearly a bio-cultural hybrid — we are biologically equipped for language in general, but inherit the specific cultural form of the languages in which we are socialized. This symposium explores the genetic foundations of language, the phylogenetic patterns of cultural diversification in language, and the ongoing interplay between biological and cultural evolution. Individual papers will address the relation between linguistic



ability, brain, and genes; the biological basis for communicative interaction; the phylogenetic patterns in language diversification both in form and content; the effects of population genetics on language diversification; and the case of village sign languages: the interplay between genetics and language type. The papers suggest that one reason that evolutionary theory applies so well to both biological and cultural phenomena is that the two are intertwined and in ongoing interaction.

*Organized by:* Stephen C. Levinson, Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands; Karen Emmorey, San Diego State University, CA

#### **SPEAKERS**

Simon E. Fisher, Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands  
*Language, Evolution, and the Genomics Revolution*

Russell Gray, University of Auckland, New Zealand  
*Evolutionary Principles and the Diversification of Linguistic Form*

Carol Padden, University of California, La Jolla  
*Culture Before Genes: The Case of a Village Sign Language*

#### **DISCUSSANTS**

Dan Dediu, Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands  
Fiona Jordan, Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands

## **Brain Function and Plasticity**

### **Saturday, 16 February**

Early experience has a lasting impact on our ability to perceive the world. It is widely understood that the brain is initially plastic and that its connections are tuned by early experience to match the environment. Recent evidence indicates that there is also considerable residual plasticity in the adult brain, which has implications for treatment of brain injury and recovery of lost function.

### **The Connectome: From the Synapse to Brain Networks in Health and Disease**

**8:30AM-11:30AM**

A series of innovative studies are being done to map the brain from the molecular to the systems level both structurally and functionally. At the synaptic level, how neurotransmitters, their receptors, and signaling pathways influence neural function and plasticity is becoming much better understood. Integrating neuronal function at the level of single neurons and groups of neurons into larger circuits at the anatomical level in the mammalian brain, while a daunting task, is being studied by advanced imaging techniques requiring vast amounts of information storage and processing. To integrate local circuit function with whole brain function, understanding the structure and processing of brain networks is critical. A major project to accomplish this task,

the Human Connectome Project, is in the process of integrating the structure and function of brain networks using the most advanced imaging and analysis techniques in 1,200 people, including twins and their nontwin siblings. This step will allow for major new insights into not only brain structure and function, but also their genetic underpinnings. Comparing this information in both the normal brain and in different brain disorders such as neurodegenerative diseases is providing novel insights into how understanding brain function from the molecular to the systems level will provide insights into normal brain function and disease pathogenesis as well as provide new treatment strategies.

*Organized by:* David Holtzman, Washington University, St. Louis, MO

#### **SPEAKERS**

Mark F. Bear, Massachusetts Institute of Technology, Cambridge  
*Molecules and Mechanisms Involved in Synaptic Plasticity in Health and Disease*

Jeff Lichtman, Harvard University, Cambridge, MA

*Connectomics: Developing a Wiring Diagram for the Mammalian Brain*

Steve Petersen, Washington University, St. Louis, MO

*The Human Connectome Project*

Marcus E. Raichle, Washington University, St. Louis, MO

*The Brain's Dark Energy and the Default Mode Network*

Nicole Calakos, Duke University, Durham, NC  
*Synaptic Plasticity in the Basal Ganglia in Health and Disease*

William W. Seeley, University of California, San Francisco

*Brain Networks: Linking Structure and Function in Neurodegenerative Diseases*

### **Old Dogs, New Tricks: How Plastic Is the Adult Human Brain?**

**1:00PM-2:30PM**

Early experience has a lasting impact on our ability to perceive the world. When it is missing — because of temporary blindness or deafness — there are seemingly permanent deficits in sensory processing. Comparable deprivation in adulthood has no adverse effects. Similarly, unlike adult stroke, brain damage from a stroke early in life can be largely mitigated by wholesale remapping of the brain. These findings illustrate the well-established principle that the brain is initially plastic and that its connections are tuned by early experience to match the environment.



ISTOCKPHOTO/MJBS



When the experience is missing during a critical period early in life, it appears to be too late to change the brain. However, recent evidence indicates that there is considerable residual plasticity in the adult brain. That evidence will be illustrated by examples from three diverse fields. The first example is that the vision of adults can be improved by training or playing action videogames, even when vision was damaged by abnormal early visual experience (e.g., lazy eye, cataract). The second example is that a variety of interventions lead to successful recovery from adult stroke. The third example is that physical exercise can modify the plasticity of the adult brain and even mitigate the typical cognitive degeneration with aging. In each case, the speakers will consider the mechanisms underlying the plasticity and whether they are best viewed as a reinstatement of childhood plasticity or a different process.

*Organized by:* Daphne Maurer, McMaster University, Hamilton, ON, Canada; Susan M. Fitzpatrick, James S. McDonnell Foundation, St. Louis, MO

#### **SPEAKERS**

Daphne Maurer, McMaster University, Hamilton, ON, Canada

*Improving Vision After the Critical Period*

Alex R. Carter, Washington University School of Medicine, St. Louis, MO

*A "New Trick" for Neuro-Rehabilitation: Treating Networks Not Spots*

Arthur Kramer, University of Illinois, Urbana-Champaign

*Physical Fitness Effects on Brain and Cognition*

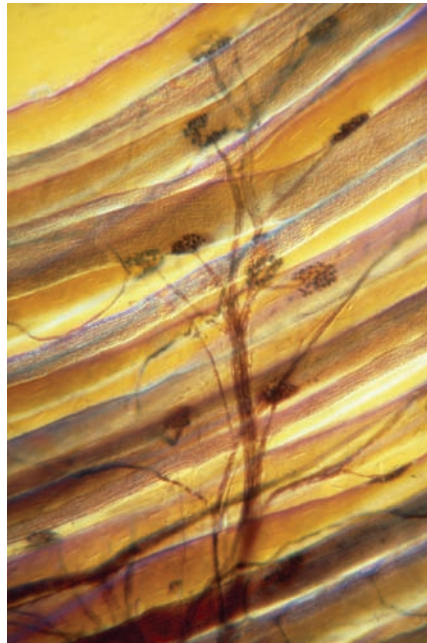
#### **DISCUSSANT**

Susan M. Fitzpatrick, James S. McDonnell Foundation, St. Louis, MO

### **Teaching the Brain to Speak Again: New Frontiers in Trauma and Stroke Recovery**

3:00PM-4:30PM

Loss of language ability (aphasia) after stroke or trauma is devastating. Recovery has been thought to be limited by loss of plasticity in adult brains; chronic impairment is common. This panel addresses new frontiers in the functional restoration of communication skills in people with aphasia and biomarkers of recovery. The first speaker describes new therapies to facilitate language in people with aphasia by using speech entrainment to an audiovisual model.



ERIC GRAVE/SCIENCE SOURCE

Practice with this "app" increases spontaneous speech, even in chronic, severely impaired patients. Critically, improvement generalizes and is reflected in changes in brain activity, showing plasticity potential in the adult brain. Next, we will explore how new eye-tracking techniques can discern subtle problems that underlie language deficits in acquired aphasia. Newer therapies targeting more linguistically complex structures first, not by scaffolding from simpler treatment goals (a more traditional method), result in improved outcomes. The speaker will describe the complex neurological network that supports grammar in healthy adults and how to isolate biomarkers of recovery after language loss. The final speaker will explore how therapy that embeds language targets in melody — and alters the timing of input models to maximize sound contrasts that are often lost in the speech of adults recovering from aphasia — can improve language outcomes. Together, the symposium panel will demonstrate new ways to teach the damaged brain to use language again.

*Organized by:* Nan Ratner, University of Maryland, College Park; Margaret Rogers, American Speech-Language-Hearing Association, Rockville, MD

#### **SPEAKERS**

Julius Fridriksson, University of South Carolina, Columbia

*Real-Time Audiovisual Feedback Enables Stroke Patients to Reacquire Speech*

Cynthia Thompson, Northwestern University, Evanston, IL

*Neurocognitive Mechanisms of Syntactic Recovery in Agrammatism*

Sheila Blumstein, Brown University, Providence, RI

*Auditory Modeling Improves Aphasic Speech Production Recovery*

## **Global Fisheries and Food Supply**

**Sunday, 17 February**

Ecosystem sustainability may be endangered by exploitation. As the rising world population increases demand for food production, the sustainable development of goods and services and the protection of ocean and fisheries environments will be a formidable challenge. Cooperation across scientific disciplines and international borders is crucial to securing the future ocean.

### **Realizing Jacques Cousteau's Vision of Aqua-Farming Replacing Hunting of the Sea**

8:00AM-9:30AM

The world population has now reached 7 billion and is projected to increase to 9 billion by 2050. There is a greater demand for seafood worldwide. Because no further increases from capture fisheries are possible, aquaculture becomes a crucial part of the sustainable solution to meet the global demand for seafood. For the past few decades, the industry has experienced dynamic growth, with an annual rate of 6.6 percent. In 2010, global aquaculture production reached 55 million metric tons and was valued at \$105 billion. The famous French sea explorer Jacques Yves Cousteau once envisioned, "We must plant the sea and herd its animals using the sea as farmers instead of hunters. That is what civilization is all about — farming replacing hunting." Yet, it has become clear that aquaculture itself, in common with all other food production practices, is facing challenges for responsible development. Issues such as preservation of environmental conditions (water, land, and coastal areas), sustainable supply of feed ingredients, and production of high-quality seafood have become serious and must be dealt with in a responsible manner. In this session, a panel of

international experts will highlight issues relating to responsible aquaculture development; discuss how the world is addressing the issues through scientific research, technology development, and improvement in production practices; and provide achievable solutions.

*Organized by:* KeShun Liu, U.S. Department of Agriculture (USDA) Agricultural Research Service, Aberdeen, ID; Jeffery Silverstein, USDA Agricultural Research Service, Beltsville, MD

#### **SPEAKERS**

Margareth Overland, Norwegian University of Life Sciences, Arboretveien  
*Sustainable Ingredient Development for Aquaculture Feed*

Steven Summerfelt, The Conservation Fund Freshwater Institute, Shepherdstown, WV  
*Responsible Aquaculture by Minimizing Environmental Impacts on Land and Water*

Jeffery Silverstein, USDA Agricultural Research Service, Beltsville, MD  
*Responsible Aquaculture Development: A Holistic Approach*

#### **Moving Toward Sustainable Development of Large Marine Ecosystems**

10:00AM-11:30AM

Studies of marine ecosystems indicate that services essential to humans have been diminished and future ecosystem sustainability is endangered by exploitation patterns commonly practiced around the globe. A global effort is underway to strengthen the robustness and resiliency of large marine ecosystems (LMEs). The world's LMEs annually produce 80 percent of the yields from marine fisheries and contribute \$12.6 trillion to the global economy. LMEs are national and regional centers of coastal pollution, acidification, nutrient over-enrichment, overfishing, habitat degradation and biodiversity loss — contributing to the diminished resilience and robustness of coastal ocean services. A five-module, science-based strategy is being applied to enhance the health of LMEs in 110 economically emerging countries in Africa, Asia, Latin America, and Eastern Europe. The countries are implementing projects for protecting ecosystems as they move toward the sustainable development of goods and services in 17 LMEs along the coasts of Africa, Asia, and Latin America. They are being assisted in this effort with \$4.1 billion in financial support mobilized through grants, investments, and co-financing funds from

the Global Environment Facility and the World Bank and focused governance actions predicated on science-based assessments of the changing ecosystem conditions. Participating countries are turning the corner from degradation trends toward sustainable development of LME goods and services.

*Organized by:* Kenneth Sherman, National Oceanic and Atmospheric Administration, Northeast Fishery Science Center, Narragansett, RI

#### **SPEAKERS**

Hashali Hamukuaya, Benguela Current Commission, Windhoek, Namibia  
*The Resilience and Robustness of the Benguela Current Large Marine Ecosystem*

Yihang Jiang, United Nations Development Program/Global Environment Facility Yellow Sea Project, Seoul, South Korea  
*The Resilience and Robustness of the Yellow Sea Large Marine Ecosystem*

Michael Akester, United Nations Office for Project Services, Magdalena del Mar, Lima, Peru  
*The Resilience and Robustness of the Humboldt Current Large Marine Ecosystem*

#### **Weaving the Future Ocean Web Through Collaboration: the Nereus Program**

1:30PM-4:00PM

Life in the global ocean is a complex web of interactions, spun by nature, described by science, and often reshaped by human activities. To understand these often-conflicting mechanisms and their interactions, we rely on scientific disciplines that do not have tradition for interacting. Yet, interdisciplinary cooperation is key if we are to secure a sustainable future ocean. The Nippon Foundation–University of British Columbia “Nereus Predicting the Future Ocean” program develops and supports ocean management policies that enhance resilience to climate change and can help ensure seafood and healthy oceans for future generations. Nereus works across disciplines, using global datasets in a modeling complex framework, to project conditions of and evaluate management options for the future ocean. In doing so, we strive to overcome the inherent differences between scientific disciplines and develop a framework for interdisciplinary collaboration. We base the session on the development of an Earth-system diagram that links our disciplinary work (biogeochemical, ecological, social, and economic). Our

focus is on the interdisciplinary linkages through which we exchange information. This is crucial for the comprehensive modeling and for providing feedback to the individual components of the overall framework. By understanding the interactions, drivers, and impact, we build capacity for how we collectively can shape the future ocean.

*Organized by:* Yoshitaka Ota and Villy Christensen, University of British Columbia, Vancouver, Canada

#### **SPEAKERS**

Henrik Osterblom, Stockholm University, Sweden  
*Weaving the Future Ocean Food Web: The Nereus Diagram*

Ryan Rykaczewski, Princeton University, NJ  
*Linkages Between the Carbon Cycle and Biota in the Global Ocean*

Andre Boustany, Duke University, Durham, NC  
*Habitat and Fisheries Interactions: Spatial Patterns Under Climate Change*

Marc Metian, Stockholm Resilience Center, Sweden  
*Bridging Demand and Supply of Seafood: Sustainable Aquaculture in a Changing World*

Chris McOwen, United Nations Environment Program, World Conservation Monitoring Center, Cambridge, United Kingdom  
*Linking Terrestrial Processes, Coastal Landscapes, and Marine Ecosystems*

#### **DISCUSSANTS**

Claire Nouvian, BLOOM Association, Paris, France

Philippe Cury, Center for Mediterranean and Tropical Fisheries Research, Montpellier, France

# Symposia

## Animal, Plant, and Food Sciences

### Plant Viruses: Mutualists, Modulators, and Manipulators

Friday, 15 February 8:00AM-9:30AM

Organized by: Nilsa A. Bosque-Pérez, University of Idaho, Moscow; Ulrich Melcher, Oklahoma State University, Stillwater

#### SPEAKERS

Marilyn Roossinck, Pennsylvania State University, University Park  
*Viruses as Mutualists*

Carolyn M. Malmstrom, Michigan State University, East Lansing  
*Viruses and Reciprocal Influences Between Natural Ecosystems and Agroecosystems*

Nilsa A. Bosque-Pérez, University of Idaho, Moscow  
*Viruses as Manipulative Agents of Host Plants and Vectors*

### Power of New Generation Biotechnology To Transform Global Food Security

Friday, 15 February 8:30AM-11:30AM

Organized by: Jenny Gu and Larry Beach, U.S. Agency for International Development Bureau for Food Security, Washington, DC

#### SPEAKERS

Robert Bertram, U.S. Agency for International Development, Washington, DC  
*The Feed the Future Research Strategy*

Leena Tripathi, International Institute of Tropical Agriculture, Nairobi, Kenya  
*Genetic Transformation of Bananas for Resistance to Xanthomonas Wilt Disease*

Vic Knauf, Arcadia Biosciences Inc., Davis, CA  
*Optimizing Cereals for Nitrogen Use Efficiency*

Chuck Niblett, Venganza Inc., Raleigh, NC  
*RNAi Approaches to Plant Pest Control*

Judith A. Chambers, International Food Policy Research Institute, Washington, DC  
*Enabling Regulatory Frameworks for Responsible Biotechnology*

### Fixing the Broken Tomato: What We Like and Why We Like It

Friday, 15 February 10:00AM-11:30AM

Organized by: Harry J. Klee and Linda M. Bartoshuk, University of Florida, Gainesville

#### SPEAKERS

Valerie Duffy, University of Connecticut, Storrs  
*Multi-Level Interventions To Improve Vegetable Consumption in Children*

Harry J. Klee, University of Florida, Gainesville  
*Fixing the Broken Tomato: Restoring Flavor to a Cherished Food*

Linda M. Bartoshuk, University of Florida, Gainesville  
*Creating Sweet Taste in the Brain with Volatiles*

### Employing Cutting-Edge Plant Science To Address Global Issues that Threaten Mankind

Saturday, 16 February 1:30PM-4:30PM

Organized by: Melvin J. Oliver, U.S. Department of Agriculture, Agricultural Research Service, Columbia, MO

#### SPEAKERS

William Davies, Lancaster University, United Kingdom  
*Can Plant Science Help Combat "The Perfect Storm"?*

Michelle Watt, Commonwealth Scientific and Industrial Research Organization, Black Mountain, Australia  
*More Food with Less Water on Less Land: Scientists Look Below Ground for Solutions*

Ricardo E. Bressan-Smith, State University of Norte Fluminense Darcy Ribeiro, Campos dos Goytacazes, Brazil  
*How Has Fundamental Science Improved Agriculture in the Neotropics?*

Mary Lou Guerinot, Dartmouth College, Hanover, NH  
*Biofortification: A Powerful Approach for Reducing Micronutrient Malnutrition*

Richard Sayre, Los Alamos National Laboratory, NM  
*Using Microalgae To Produce Biomass, Mitigate Carbon Emissions, and Recycle Nutrients*

### Transforming Productivity and Incomes of Poor Farm Households in the Developing World

Saturday, 16 February 1:30PM-4:30PM

Organized by: Elizabeth Skewgar and Jerry Glover, U.S. Agency for International Development, Washington, DC

#### SPEAKERS

Sieglinde S. Snapp, Michigan State University, Hickory Corners  
*Ecological Intensification Through Farmer-Researcher Partnerships and Beyond*

Patti Kristjanson, World Agroforestry Center, Nairobi, Kenya  
*Targeting Women in Smallholder Households for Better Development Outcomes*

Andrew McDonald, International Maize and Wheat Improvement Center, Kathmandu, Nepal  
*Technologies to Link Smallholder Farmers to Markets and Information*

Stanley Wood, International Food Policy Research Institute, Washington, DC  
*Large-Scale Information Platforms to Enhance Food Security Investments*

Maurice Lado Mogga, Ministry of Agriculture and Forestry, Juba, Sudan  
*Using Agricultural Research and Development To Enhance Food Security in South Sudan*

Tony Cavalieri, The Bill and Melinda Gates Foundation, Seattle, WA  
*Agricultural Research Priorities To Benefit Smallholder Farmers*

### Alternate Paths to Food Security: Making the Right Choices While Feeding the World

Sunday, 17 February 8:30AM-11:30AM

Organized by: Albert G. Medvitz, McCormack Sheep and Grain, Rio Vista, CA

#### SPEAKERS

Kenneth G. Cassman, University of Nebraska, Lincoln  
*Future Cropping Systems To Ensure Global Food Security*

Olivier de Schutter, University of Louvain, Belgium  
*The Right to Food and Social Justice in the Emerging World Food System*

Montague M. Demment, Association of Public and Land-Grant Universities, Washington, DC  
*Ranges of Alternatives for the Future of World Animal Food Production*

Michael Carter, University of California, Davis  
*Small-Scale Farms, Efficiency, and the Need for Massive Amounts of Food*

\*Judi Wakhungu, African Center for Technology Studies, Nairobi, Kenya  
*Local Autonomy, Local Knowledge, and Local Needs in African Food Production*

Albert G. Medvitz, McCormack Sheep and Grain, Rio Vista, CA  
*Farms in the World Food System*

### Advancing Food Safety in a Global Marketplace

Sunday, 17 February 1:30PM-4:30PM

Organized by: Nicola J. Stagg, Dow AgroSciences, Indianapolis, IN; P. Michael Bolger, Retired, Annapolis, MD

#### SPEAKERS

Angelika M. Tritscher, World Health Organization, Geneva, Switzerland  
*New Approaches to Assessing Safety/Risk of Chemical Contaminants in Food*

Daniel M. Wilson, The Dow Chemical Company, Midland, MI  
*Evaluating the Safety of Materials Used in Food Contact Materials*

Alan R. Boobis, Imperial College Medical School, London, United Kingdom  
*Advances in Safety/Risk Assessments of Pesticide Residues on Foods*

Bruce M. Chassy, University of Illinois, Urbana-Champaign  
*Regulating the Safety of Foods and Feeds Derived from Genetically Modified Crops*

\*Invited



Clark D. Carrington, U.S. Food and Drug Administration, College Park, MD  
*Risk Assessment and Management of Chemical Contaminants in a Global Food Supply*

## How Microbes Can Help Feed the World

Sunday, 17 February 1:30PM-4:30PM

Organized by: Ann Reid, American Academy of Microbiology, Washington, DC

### SPEAKERS

Bernard Glick, University of Waterloo, ON, Canada

*Bacteria That Alleviate Plant Stress in High-Salt and Metal-Contaminated Soil*

Gabriel Iturriaga, University of the State of Morelos, Cuernavaca, Mexico

*Role of Trehalose in Improving Drought Tolerance*

Marilyn Roossinck, Pennsylvania State University, University Park

*A Plant, A Fungus, A Virus: What It Takes to Take the Heat*

Linda Thomashow, Washington State University, Pullman

*Biological Control and Plant Growth Promotion by Rhizosphere Bacteria*

Ann Lichens-Park, National Institute of Food and Agriculture, Washington, DC

*Microbes and Food Security at USDA's National Institute of Food and Agriculture*

Ian Sanders, University of Lausanne, Switzerland

*Adapting Mycorrhizal Fungi to Improve Yields of Globally Important Crops*

## Why a Calorie Is Not a Calorie and Why It Matters for Human Diets

Monday, 18 February 9:45AM-12:45PM

Organized by: Rachel N. Carmody and Richard Wrangham, Harvard University, Cambridge, MA

### SPEAKERS

Richard Wrangham, Harvard University, Cambridge, MA

*Calorie Mismeasurement in Past and Present Human Diets*

Klaus Englyst, Englyst Carbohydrates Ltd., Southampton, United Kingdom

*Bioavailability of Dietary Carbohydrates*

Peter J. Turnbaugh, Harvard University, Cambridge, MA

*Taking a Metagenomic View of Human Nutrition*

Stephen M. Secor, University of Alabama, Tuscaloosa

*The Metabolic Cost of Food Digestion and Its Determinants*

Rachel N. Carmody, Harvard University, Cambridge, MA  
*Contributions of Food Processing to Dietary Energy Harvest*

Geoffrey Livesey, Independent Nutrition Logic Ltd., Wymondham, United Kingdom

*Improving the Atwater System: Balancing Accuracy and Practicality*

## Anthropology, Culture, and Language

### The Whole of Culture: Anthropology Back on Track

Friday, 15 February 1:00PM-2:30PM

Organized by: Dwight Read, University of California, Los Angeles; Fadwa El Guindi, Qatar University, Doha

### SPEAKERS

Robert W. Sussman, Washington University, St. Louis, MO

*The Relationship of Human and Non-Human Modes of Social Transmission to Culture*

Dwight Read, University of California, Los Angeles

*The Unreasonable Effectiveness of Mathematics in Anthropology*

Giovanni Bennardo, Northern Illinois University, DeKalb

*Language, Cultural Models, and Mind: Anthropology and Cognitive Science*

### The Scars of Human Evolution

Friday, 15 February 1:30PM-4:30PM

Organized by: Karen Rosenberg, University of Delaware, Newark; Rachel Caspari, Central Michigan University, Mt Pleasant

### SPEAKERS

Rachel Caspari, Central Michigan University, Mt Pleasant

*Recent Longevity and Its Consequences*

Jeremy DeSilva, Boston University, MA

*Starting Off on the Wrong Foot*

Karen Rosenberg, University of Delaware, Newark

*Laboring Humans*

Bruce Latimer, Case Western Reserve University, Cleveland, OH

*A Backache of Longstanding: An Evolutionary Perspective on the Human Vertebral Column*

Alan Mann, Princeton University, NJ

*Wisdom Can Be Painful: The Evolutionary Origins of Third Molar Impaction in Humans*

William Leonard, Northwestern University, Evanston, IL

*Metabolic Challenges of the Modern World: Evolution and Human Nutritional Health*

## Beyond Color: How Human Skin Interacts with Our World

Saturday, 16 February 3:00PM-4:30PM

Organized by: Nina Jablonski, Pennsylvania State University, University Park; Ellen E. Quillen, Texas Biomedical Research Institute, San Antonio

### SPEAKERS

Nathaniel J. Dominy, Dartmouth College, Hanover, NH

*Beyond Vision: Touchy-Feely Primates*

Nina Jablonski, Pennsylvania State University, University Park

*Beyond Fur: Sweating and Barrier Features of Human Skin*

Ellen E. Quillen, Texas Biomedical Research Institute, San Antonio

*Beyond Melanoma: Skin Color and Disease Risk*

## Democratizing Science: Virtualization and Global Natural History Repositories

Saturday, 16 February 3:00PM-4:30PM

Organized by: Herbert D.G. Maschner, Idaho Museum of Natural History, Pocatello; Corey D. Schou, Idaho State University, Pocatello

### SPEAKERS

Herbert D.G. Maschner, Idaho Museum of Natural History, Pocatello

*Democratizing Human and Natural History Science through Virtualization*

Norman MacLeod, The Natural History Museum, London, United Kingdom

*Collections Digitization Projects in Natural History Museums: Learning from Mistakes*

Julie J.C.H. Ryan, George Washington University, Washington, DC

*A Design Model for Effective Security for a Virtual Archeological Data Repository*

## Atmospheric, Hydrospheric, and Oceanic Sciences

### Contributions of Citizen Scientists to Climate Science

Friday, 15 February 8:30AM-11:30AM

Organized by: Imke Durre, National Climatic Data Center, National Oceanic and Atmospheric Administration (NOAA), Asheville, NC

### SPEAKERS

Nolan J. Doesken, Colorado Climate Center, Fort Collins

*Why We Started a Volunteer Rain Gauge Network*

Mark D. Schwartz, University of Wisconsin, Milwaukee  
*U.S. National Phenology Network Citizen Contributions to Atmospheric Science Research*

Philip Brohan, Met Office, Devon, United Kingdom  
*OldWeather.org: Citizen Science for Climate Reconstruction*

Myles R. Allen, University of Oxford, United Kingdom  
*Using Citizen Science for Attribution and Prediction of Climate Change*

Scott E. Stevens, Cooperative Institute for Climate and Satellites, Asheville, NC  
*CycloneCenter: Harnessing the Power of Citizen Science to Analyze Hurricane Imagery*

### U.S. Climate and Weather Extremes: Past, Present, and Future

Friday, 15 February 8:30AM-11:30AM

*Organized by:* Connie Woodhouse, University of Arizona, Tucson; Ester Szein, U.S. National Academies, Washington, DC; Gregory Wiles, The College of Wooster, OH

#### SPEAKERS

Donald J. Wuebbles, University of Illinois, Urbana-Champaign  
*Severe Weather in the United States Under a Changing Climate*

Heidi Cullen, Climate Central, Princeton, NJ  
*Coverage of Extreme Weather/Climate Events in a Changing Media Landscape*

John Nielsen-Gammon, Texas A&M University, College Station  
*What Did the Texas Drought Do?*

Camille Parmesan, University of Texas, Austin  
*Observed Impacts of Extreme Climate Events on Wild Species*

David Stahle, University of Arkansas, Fayetteville  
*The Tree-Ring Record of Drought and Disaster Over North America*

Richard Seager, Columbia University, Palisades, NY  
*A Modeling Perspective on Drought in Southwest North America*

### Electric Oceans: Finding the Space for Marine Renewable Energy in Crowded Waters

Friday, 15 February 3:00PM-4:30PM

*Organized by:* Mary Ruckelshaus and Jodie Toft, Natural Capital Project, Seattle, WA

#### SPEAKERS

Robert Griffin, Natural Capital Project, Stanford, CA  
*Modeling What Matters: Quantifying Trade-Offs for Energy, Transportation, and Fishing*

Sally McGee, The Nature Conservancy, New Haven, CT  
*Making Sense of It All: Reconciling Existing Uses with Emerging Uses*

\*Stephanie Moura, SeaPlan, Boston, MA  
*The Path Forward: Lessons Learned for Marine Planning in Massachusetts and Beyond*

### Can Oceans Help Meet the Century's Looming Food Security Challenges?

Saturday, 16 February 8:30AM-11:30AM

*Organized by:* Steven Gaines, University of California, Santa Barbara

#### SPEAKERS

Matthew Elliott, California Environmental Associates, San Francisco, CA  
*Meeting Global Protein Demand: Weighing the Impacts of Land and Sea Food Production*

Olaf Jensen, Rutgers University, New Brunswick, NJ  
*Role of Large-Scale Industrial Fisheries in Feeding the World*

Sarah Lester, University of California, Santa Barbara  
*Improving Management of Small-Scale Fisheries Holds Potential To Feed More Mouths*

Steven Gaines, University of California, Santa Barbara  
*Land Versus Sea: Do the Oceans Offer the Most Sustainable Way To Feed the World?*

James Anderson, The World Bank, Washington, DC  
*Creating Incentives to Manage the Oceans for Sustainable Food Production*

### Advancing the Frontiers of Understanding the Ocean and Its Role in the Earth System

Saturday, 16 February 1:30PM-4:30PM

*Organized by:* Robert A. Weller, Woods Hole Oceanographic Institution, MA

#### SPEAKERS

G.S. Bhat, Indian Institute of Science, Bangalore  
*Ocean Observations and Monsoon Variability*

John R. Delaney, University of Washington, Seattle  
*Understanding the Planetary Life Support System: Next-Generation Ocean Science*

Scott Doney, Woods Hole Oceanographic Institution, MA  
*Observing Systems for Constraining Ocean Carbon Uptake and Acidification*

James W. Hurrell, National Center for Atmospheric Research, Boulder, CO  
*Decadal Climate Variability, Predictability, and Prediction: Opportunities and Challenges*

Eric Schulz, Bureau of Meteorology, Melbourne, Australia  
*Observations for Understanding Ocean-Atmosphere Interactions*

\*Invited

Edie Widder, Ocean Research and Conservation Association, Fort Pierce, FL  
*Creating Water Pollution Gradient Maps as a Tool for Educating Community Stakeholders*

### Green Dreams, Blue Waves, and Shades of Gray: The Reality of Water

Sunday, 17 February 8:30AM-11:30AM

*Organized by:* E. John Sadler, U.S. Department of Agriculture, Columbia, MO; Fred Vocasek, Servi-Tech Laboratories, Dodge City, KS

#### SPEAKERS

Henry Lin, Pennsylvania State University, University Park  
*World Water Security Begins with an Adequate Blue Water Supply*

B. A. Stewart, West Texas A&M University, Canyon  
*Green Water Supply: The Key Element in World Food Security*

Steel Maloney, Cascade Earth Services, Albany, OR  
*Converting Gray Water to Green Water*

Bill Cox, Coxco Ag Services, Las Cruces, NM  
*Practical Solutions to Agriculture's Water Issues*

John Peck, University of Kansas, Lawrence  
*Legal Challenges in Conserving Water in the United States*

James Pritchett, Colorado State University, Fort Collins  
*Economics: Its Impact on World Water Security*

### The National Climate Assessment: Draft Findings for 2013 and Sustaining the Process

Monday, 18 February 9:45AM-12:45PM

*Organized by:* Emily Therese Cloyd, U.S. Global Change Research Program, Washington, DC; Kathy Jacobs, Office of Science and Technology Policy, Executive Office of the U.S. President, Washington, DC

#### SPEAKERS

Jerry Melillo, Marine Biology Laboratory, Woods Hole, MA  
*The National Climate Assessment: Overview and Key Findings*

Melissa A. Kenney, NOAA, Climate Program Office, Silver Spring, MD  
*Supporting and Informing Decisions Through Assessment*

Rosina Bierbaum, University of Michigan, Ann Arbor  
*Adapting to Climate Change*

Robert Corell, Global Environment and Technology Foundation, Arlington, VA  
*A Research Agenda for Climate Change Science*

# Biological Science and Genomics

## The Architecture of the Cell Nucleus

Friday, 15 February 10:00AM-11:30AM

Organized by: Gary Felsenfeld, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD

### SPEAKERS

Mitzi Kuroda, Harvard Medical School, Boston, MA

*Chromosome-Specific Targeting of Dosage Compensation in Drosophila*

Thomas A. Misteli, National Cancer Institute, Bethesda, MD

*Nuclear Architecture and Disease*

Job Dekker, University of Massachusetts Medical School, Worcester  
*3D Folding of Genomes*

## The Science of Uncertainty in Genomic Medicine

Friday, 15 February 10:00AM-11:30AM

Organized by: Reed E. Pyeritz, University of Pennsylvania, Philadelphia; Shili Lin, Ohio State University, Columbus

### SPEAKERS

Giovanni Parmigiani, Harvard Medical School, Boston, MA

*How Useful Is It to Know Your Genome?*

James P. Evans, University of North Carolina, Chapel Hill

*Genomics in Clinical Medicine: Navigating the Spectrum from Certainty to Uncertainty*

Robert C. Green, Partners Center for Personalized Genetic Medicine, Boston, MA  
*A Data-Driven Pathway to Genomic Medicine*

## Resurrected Ancestral Proteins: Fundamentals and Applications

Friday, 15 February 1:30PM-4:30PM

Organized by: Romas Kazlauskas and Antony Dean, University of Minnesota, Saint Paul

### SPEAKERS

Shozo Yokoyama, Emory University, Atlanta, GA

*Synthesis of Experimental Molecular Biology and Evolutionary Biology*

Joseph Thornton, University of Oregon, Eugene  
*Evolution of Protein Structure and Function in the Steroid Hormone Receptors*

Günter Wagner, Yale University, New Haven, CT  
*Evolution of Transcription Factors and Gene Regulatory Networks*

Steven Benner, Foundation for Applied and Molecular Evolution, Gainesville, FL  
*Paleogenetics and the History of Alcohol in Primates*

John Gerlt, University of Illinois, Urbana-Champaign  
*Sequence Boundaries Between Enzymatic Functions*

Antony Dean, University of Minnesota, Saint Paul

*Molecular Evolution of Enzymes*

## Visualizing Chemistry: Seeing Another Dimension of Plants and Animals

Saturday, 16 February 8:00AM-9:30AM

Organized by: Barbara Illman, U.S. Forest Service, Madison, WI; Janos Kirz, Lawrence Berkeley National Laboratory, CA

### SPEAKERS

Carol Hirschmugl, University of Wisconsin, Milwaukee

*Simultaneous Detection of Organics Leading to Spatial and Temporal Multidimensional Chemical Imaging (MDCI)*

Janos Kirz, Lawrence Berkeley National Laboratory, CA

*Chemical and Elemental Imaging with X-Ray Microscopy*

Richard Ortega, University of Bordeaux, France

*Chemical Imaging with an X-Ray Nano-Probe*

## New Frontiers in Single Molecule Detection and Single Cell Analysis

Saturday, 16 February 8:30AM-11:30AM

Organized by: X. Nancy Xu, Old Dominion University, Norfolk, VA

### SPEAKERS

Robert Singer, Albert Einstein College of Medicine, Bronx, NY

*Following Single mRNA Molecules in Living Cells and Tissues*

George Church, Harvard Medical School, Boston, MA

*In Situ Sequencing*

Linda B. McGown, Rensselaer Polytechnic Institute, Troy, NY

*Investigating Protein Capture at Aptamer Coated Surfaces*

X. Nancy Xu, Old Dominion University, Norfolk, VA

*Nanoparticle Biosensors for Mapping Single Molecule Functions in Single Live Cells*

Scott Fraser, California Institute of Technology, Pasadena

*Imaging of Live Cells in Developing Embryos*

Xiaowei Zhuang, Harvard University, Cambridge, MA

*Single Molecule and Super Resolution Imaging of Cells and Tissues*

## Personal Genetics: An Intersection Between Science, Society, and Policy

Saturday, 16 February 8:30AM-11:30AM

Organized by: Peter Yang, Brenna Krieger, and Kevin Bonham, Harvard University, Boston, MA

### SPEAKERS

Ting Wu, Harvard University, Boston, MA  
*Personal Genetics and Education*

Mary Carmichael, *Boston Globe*, Malden, MA  
*The Media and the Personal Genetics Revolution*

Brian Naughton, 23andMe Inc., New York City  
*Commercialization of Personal Genomics: Promise and Potential Pitfalls*

Mira Irons, Children's Hospital Boston, MA  
*Personal Genomic Medicine: How Physicians Can Adapt to a Genomic World*

Sheila Jasanoff, Harvard University, Cambridge, MA  
*Societal and Ethical Dimensions of the Personal Genomics Revolution*

Jonathan Gitlin, National Human Genome Research Institute, Bethesda, MD  
*Personal Genomics and Science Policy*

## How Symbiosis, Horizontal Gene Transfer, and Virolution Call for an Extended Synthesis

Saturday, 16 February 1:30PM-4:30PM

Organized by: Nathalie L. Gontier, University of Lisbon, Portugal

### SPEAKERS

Douglas Zook, Boston University, MA  
*Symbiosis as a Driving Force of Evolution*

William Martin, Heinrich Heine University, Düsseldorf, Germany  
*The Importance of Horizontal Gene Transfer in the Evolution of Life*

Frédéric Bouchard, University of Montreal, QC, Canada

*How Research on Symbiosis Should Transform Our Understanding of Adaption*

Nathalie L. Gontier, Dutch Free University of Brussels, Belgium  
*Importance of Horizontal Evolution for the Sociocultural Sciences*

Luís Correia, University of Lisbon, Portugal  
*Models of Multi-Species Evolution in Natural and Artificial Societies*

## Innovations in Imaging

Saturday, 16 February 1:30PM-4:30PM

Organized by: Amy S. Gladfelter, Dartmouth College, Hanover, NH

### SPEAKERS

Jennifer Lippincott-Schwartz, National Institutes of Health, Bethesda, MD  
*Navigating the Dynamic Cell*



Eric Betzig, Howard Hughes Medical Institute  
Janelia Farm Research Campus, Ashburn, VA  
*Imaging Three-Dimensional Dynamics in  
Cells and Embryos*

Rainer Heintzmann, King's College, London,  
United Kingdom  
*Structured Illumination and the Analysis of  
Single Molecules in Cells*

Rudolf Oldenbourg, Marine Biological  
Laboratory, Woods Hole, MA  
*New Frontiers in Polarized Light Microscopy  
for Live Cell Imaging*

John Condeelis, Albert Einstein College of  
Medicine, Bronx, NY  
*Imaging Single Cells in the Breast Tumor  
Microenvironment*

Amy S. Gladfelter, Dartmouth College,  
Hanover, NH  
*Single Molecule Imaging in Live Cells*

### **A Decade After "Forensic Science: Oxymoron?": Will There Be Real Change?**

Saturday, 16 February 3:00PM-4:30PM

Organized by: Clifford H. Spiegelman, Texas  
A&M University, College Station

#### **SPEAKERS**

Anne-Marie Mazza, The National Academies,  
Washington, DC  
*The NRC (2009) Report: Why, and What It  
Was Meant To Do*

John H. Laub, National Institute of Justice,  
Washington, DC  
*Strengthening Forensic Science at the  
National Institute of Justice*

Karen Kafadar, Indiana University,  
Bloomington  
*Critical Role of Statistics in Development  
and Validation of Forensic Methods*

### **Interfacing with the Body Using Implants and Prostheses**

Sunday, 17 February 8:00AM-9:30AM

Organized by: Erin Heath, AAAS Office of  
Government Relations, Washington, DC

#### **SPEAKERS**

Leigh Hochberg, Massachusetts General  
Hospital, Boston  
*Restoring Communication and Mobility  
Through Neurotechnology*

\*Hugh Herr, Massachusetts Institute of  
Technology (MIT) Media Lab, Cambridge, MA  
*Perfecting the Prosthetic Limb*

Joseph F. Rizzo III, Harvard Medical School,  
Boston, MA  
*Creating a Retinal Implant*

### **How Macro-Evolutionary Studies Call for an Extended Synthesis**

Sunday, 17 February 8:30AM-11:30AM

Organized by: Nathalie L. Gontier, University of  
Lisbon, Portugal; Emanuele Serrelli, University  
of Milan-Bicocca, Italy

#### **SPEAKERS**

David Sepkoski, Max Planck Institute for the  
History of Science, Berlin, Germany  
*Stephen Jay Gould's Hierarchical Alternative  
to Neodarwinism*

Douglas H. Erwin, Smithsonian Institution,  
Washington, DC  
*The Evolution of Evolution: Changing  
Dynamics in Macroevolution*

Derek Turner, Connecticut College, New  
London  
*Contingency and the Explanation of  
Macroevolutionary Trends*

Folmer Bokma, Umeå University, Sweden  
*Complexity and Limits to Change*

Nathalie L. Gontier, University of Lisbon,  
Portugal  
*Punctuated Equilibria: A Universal Pattern  
in Life and Culture*

Alycia L. Stigall, Ohio University, Athens  
*Expanding the Role of Biogeography and  
Niche Evolution in Macro-Evolutionary  
Theory*

### **The Invisible Revealing the Dangerously Beautiful**

Sunday, 17 February 1:00PM-2:30PM

Organized by: Isabelle Boscaro-Clarke,  
Diamond Light Source, Didcot, United  
Kingdom

#### **SPEAKERS**

John Jenkin, La Trobe University, Melbourne,  
Australia  
*Bragg's Law: 100 Years On and Still Going  
Strong*

Dave Stuart, Diamond Light Source,  
Oxfordshire, United Kingdom  
*Dangerously Beautiful Science at the Heart  
of Global Health*

Filip van Petegem, University of British  
Columbia, Vancouver, Canada  
*How X-Rays Are Shedding Light on Our  
Understanding of Heart Function*

### **Evolution of Giants: The Great Whales**

Sunday, 17 February 1:30PM-4:30PM

Organized by: Jere H. Lipps, Cooper  
Archaeological and Paleontological Center,  
Fullerton, CA; Nicholas D. Pyenson,  
Smithsonian National Museum of Natural  
History, Washington, DC

#### **SPEAKERS**

Nicholas D. Pyenson, Smithsonian National  
Museum of Natural History, Washington, DC  
*What Does the Fossil Record Tell Us About  
the Evolution of Gigantism in Whales?*

Meredith Rivin, Cooper Archaeological and  
Paleontological Center, Fullerton, CA  
*Before They Were Giants: The Fossil Record  
of Toothed Baleen Whales*

Jeremy A. Goldbogen, Cascadia Research,  
Olympia, WA  
*The Ultimate Mouthful: The Evolution of  
Lunge Feeding in Rorqual Whales*

Megan F. McKenna, National Park Service, Fort  
Collins, CO  
*Singing in a Crowded Ocean: Acoustic  
Adaptations of Great Whales and Human  
Impacts*

Daniel Palacios, Joint Institute for Marine and  
Atmospheric Research, Pacific Grove, CA  
*Where Do Giants Go in the Deep Blue Sea?  
Ecology Using Satellite Tags*

D. Graham Burnett, Princeton University,  
Princeton, NJ  
*Into the Belly of the Beast: Antarctic  
Whaling in the 20th Century*

### **Dragons of the East: China's Paleontological Riches**

Monday, 18 February 9:45AM-11:15AM

Organized by: Richard A. Stone, AAAS/  
Science, Washington, DC

#### **SPEAKERS**

Shu-zhong Shen, Nanjing Institute of Geology  
and Paleontology, Nanjing, China  
*The Permian Period's Catastrophic End*

Olivier Rieppel, The Field Museum, Chicago, IL  
*China: A Hotbed for Fossils of Marine  
Reptiles*

Xing Xu, Institute of Vertebrate Paleontology  
and Paleanthropology, Beijing, China  
*China's Fabulous Feathered Dinosaurs*

### **Confluence of Streams of Knowledge: Biotechnology and Nanotechnology**

Monday, 18 February 9:45AM-12:45PM

Organized by: Elicia M.A. Maine, Simon Fraser  
University, Vancouver, BC, Canada; James M.  
Utterback, MIT, Cambridge, MA

#### **SPEAKERS**

Robert S. Langer, MIT, Cambridge, MA  
*Challenges and Opportunities at the  
Confluence of Biotechnology and  
Nanomaterials*

Nathan Lewis, California Institute of  
Technology, Pasadena  
*Clean Energy Innovation from the  
Confluence of Technologies*

Sarah Kaplan, University of Toronto, ON,  
Canada  
*The Process and Practice of Interdisciplinary  
Research*

Elicia M.A. Maine, Simon Fraser University,  
Vancouver, BC, Canada  
*Global Bio-Nano Firms: Exploiting the  
Confluence of Technologies*

Han Cao, BioNano Genomics Inc., San Diego, CA  
*Commercializing Innovation: Applying  
Nanotechnology to Genomics*

## Cognitive, Neural, and Social Sciences

### Breakthroughs in Our Understanding of Primate Cognition and Psychopathology

Friday, 15 February 1:00PM-2:30PM

Organized by: Neal D. Barnard, George Washington University, Washington, DC

#### SPEAKERS

Tetsuro Matsuzawa, Kyoto University, Inuyama, Aichi, Japan

*Pan Troglodytes and Homo Sapiens: Neuroanatomical Comparison of Cognitive Development*

Victoria Wobber, Harvard University, Cambridge, MA

*Recent Findings from Comparative Cognition Research with Chimpanzees and Bonobos*

Martin Brüne, University of Bochum, Germany  
*Psychopathology in Hominoids: Do Apes Present Treatable Psychiatric Conditions?*

### The Economic Costs of Crime and Justice in the United States

Saturday, 16 February 8:00AM-9:30AM

Organized by: William Alex Pridemore, Indiana University, Bloomington

#### SPEAKERS

Jens Ludwig, University of Chicago, IL

*The Economic Costs of Youth Violence (and the Value of Small Effects)*

Philip J. Cook, Duke University, Durham, NC  
*Reducing Public Costs of Crime via Private Action: Business Improvement Districts*

Mark A. Cohen, Vanderbilt University, Nashville, TN

*Economic Costs of White-Collar Versus Street Crime*

### Why is Living Healthily So Difficult?

Saturday, 16 February 1:00PM-2:30PM

Organized by: Benedikt Herrmann, Joint Research Center, European Commission, Ispra, Italy; Geraldine Barry, Joint Research Center, European Commission, Brussels, Belgium

#### SPEAKERS

David Laibson, Harvard University, Cambridge, MA

*Behavioral Economics and Health Behaviors*

Todd Hare, University of Zürich, Switzerland  
*Neurobiological Mechanisms of Self-Control in Value-Based Choices*

Benedikt Herrmann, Joint Research Center, European Commission, Ispra, Italy  
*How Much Do Social Norms Influence Our Ambitions To Live Healthily?*

### Computation, Computational Efficiency, and Cognitive Science

Saturday, 16 February 1:30PM-4:30PM

Organized by: Anna Maria Di Sciullo, University of Quebec, Montreal, Canada; Robert C. Berwick, MIT, Cambridge, MA

#### SPEAKERS

Randy Gallistel, Rutgers University, Piscataway, NJ

*Using Bayes' Rule to Shave with Einstein's Razor*

Shimon Ullman, Weizmann Institute of Science, Rehovot, Israel

*Efficient Extraction of Visually Meaningful Information*

Leslie Valiant, Harvard University, Cambridge, MA

*Biological Evolution as a Form of Learning*

Charles Yang, University of Pennsylvania, Philadelphia

*Optimization in the Evolution of Language*

Roland Friedrich, Humboldt University, Berlin, Germany

*Mathematics and Linguistics*

Anna Maria Di Sciullo, University of Quebec, Montreal, Canada

*Computational Efficiency in Naming Big Numbers*

### Advances in Brain-Machine Interfaces: Applications and Implications

Sunday, 17 February 8:30AM-11:30AM

Organized by: Peyton West and Jennifer Wiseman, AAAS Center for Science, Policy, and Society Programs, Washington, DC

#### SPEAKERS

Miguel Nicolelis, Duke University, Durham, NC  
*Brain Machine Brain Interfaces for Virtual Tactile Exploration*

Todd Coleman, University of California, La Jolla  
*Wireless Tattoo Electronics*

Nicolas Nova, Near Future Laboratory, Geneva, Switzerland

*Brain-Machine Interfaces in the Real World*

Martha J. Farah, University of Pennsylvania, Philadelphia

*Ethical and Societal Implications of Brain Machine Interfaces*

Brent Waters, Garrett-Evangelical Theological Seminary, Evanston, IL

*Brain-Machine Interfaces and Personhood*

### The Elusive Common Good: What Moral Psychology and Neuroscience Now Tell Us

Sunday, 17 February 1:00PM-2:30PM

Organized by: Robert E. Fay, Westat, Bethesda, MD

#### SPEAKERS

Jonathan Haidt, New York University, New York City

*The Righteous Mind: The Multiple, Conflicting Dimensions of Moral Goodness*

Joshua D. Greene, Harvard University, Cambridge, MA

*Beyond Point-and-Shoot Morality: How the Moral Brain Works and How It Can Work Better*

Rebecca R. Saxe, MIT, Cambridge

*Mens Rea: Moral Thinking About Other Minds*

### Evidence from Music, Fiction, and Visual Arts: Transfer of Learning from the Arts?

Sunday, 17 February 1:30PM-4:30PM

Organized by: Ellen Winner, Boston College, Chestnut Hill, MA

#### SPEAKERS

Daniel Levitin, McGill University, Montreal, QC, Canada

*Defining the Musical Phenotype: A Precursor to the Study of Cognitive Transfer*

Aaron Kozbelt, Brooklyn College, NY

*Skilled Drawing as a "Non-Artificial" and Thus Transferable Domain of Expertise*

E. Glenn Schellenberg, University of Toronto at Mississauga, ON, Canada

*Transfer from Music: A Critical Examination of the Evidence*

Keith Oatley, University of Toronto, ON, Canada

*Effects of Literature: Understanding Others, Transforming Oneself*

Ellen Winner, Boston College, Chestnut Hill, MA  
*Relationship Between Visual Arts Learning and Understanding Geometry*

### Understanding Memory: The Legacy of Case H.M.

Monday, 18 February 9:45AM-12:45PM

Organized by: Howard Eichenbaum, Boston University, MA

#### SPEAKERS

Howard Eichenbaum, Boston University, MA  
*Models of Memory Processing by the Hippocampus*

Brenda Milner, Montreal Neurological Institute and Hospital, Montréal, QC, Canada

*Background to H.M.*

Suzanne Corkin, MIT, Cambridge, MA

*The Nature of Amnesia*

Jean Augustinack, Massachusetts General Hospital, Charlestown

*Postmortem Examination of H.M.'s Brain: Autopsied Brain, In Situ MRI, and Ex Vivo MRI*

Li-Huei Tsai, MIT, Cambridge, MA

*Mechanisms of Memory and Memory Loss*

## Communication and Public Programs

### Engaging Lay Publics in Museums on Provocative Societal Questions Related to Science

Friday, 15 February 8:00AM-9:30AM

Organized by: Larry Bell, Museum of Science, Boston, MA

#### SPEAKERS

Dan M. Kahan, Yale Law School, New Haven, CT  
*Deepening Public Engagement Through a Two-Channel Strategy of Science Communication*

Lucy Kirshner, Museum of Science, Boston, MA  
*Provocative Questions: Supporting Dialogue About Societal Issues in a Changing World*

Elizabeth Kunz Kollmann, Museum of Science, Boston, MA  
*Research and Formative Evaluation Suggest Support for Dialogue and Argumentation*

### Artful Science

Friday, 15 February 8:30AM-11:30AM

Organized by: John R. Jungck, Beloit College, WI

#### SPEAKERS

Maura Flannery, St. John's University, Jamaica, NY  
*The Herbarium as Muse: Plant Specimens as Inspiration*

Robert J. Krawczyk, Illinois Institute of Technology, Chicago  
*Dimension of Time in Strange Attractors*

Jo Ellis-Monaghan, Saint Michael's College, Colchester, VT  
*DNA Nanostructures, Virtual Seashells, and Crocheted Hyperbolic Corals*

George W. Hart, Independent Sculptor, Stony Brook, NY  
*Sand Dollars, Echinodermata, and Radiolaria: Sculptural Forms from Hyperbolic Tessella*

John R. Jungck, Beloit College, WI  
*Fostering Figuring and Fascination: Engagement in Aesthetic Appreciation of Science*

### New Tools to Engage Publics and Assess the Impact of Science Communication

Friday, 15 February 8:30AM-11:30AM

Organized by: David Herring, NOAA, Silver Spring, MD

#### SPEAKERS

Margaret Mooney, University of Wisconsin, Madison  
*Measuring Climate.gov's Quality of Relationship with Its Four Audiences*

Rachel Connolly, NOVA/WGBH, Boston, MA  
*Dialogues To Promote Ecological Literacy Among the American Public*

Martin Storksdieck, National Research Council, Washington, DC  
*Evaluating the Use of Hands-on Materials in Science Museums*

Arno Scharl, MODUL University, Vienna, Austria

*News and Social Media Monitoring To Assess the Impact of Science Communication*

### A New Social (Media) Contract for Science

Friday, 15 February 1:30PM-4:30PM

Organized by: Elizabeth Neeley, COMPASS, Seattle, WA

#### SPEAKERS

Spencer Wood, Stanford University, CA  
*Social Media as Data on the Recreational Value of Coastal Areas*

\*Seth Cooper, University of Washington, Seattle  
*People, Puzzles, Prizes: Using Computer Gaming To Predict Protein Structures*

Dario Taraborelli, Wikimedia Foundation, San Francisco, CA

*Experts as Contributors and Contributors as Experts: Bridging the Gap Between Wikipedia and Academia*

Jai Ranganathan, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA

*It's Not (Just) About the Money: Crowd-Funding for Science*

Jason Priem, University of North Carolina, Carrboro

*Altmetrics: Measuring Scholarly Impact over the Social Web*

\*Karyn Traphagen, ScienceOnline, Durham, NC  
*ScienceOnline: A Global Conversation*

### The Beauty and Benefits of Escaping the Ivory Tower

Saturday, 16 February 10:00AM-11:30AM

Organized by: Dawn J. Wright, Environmental Systems Research Institute, Redlands, CA; Elizabeth Hadly, Stanford University, CA

#### SPEAKERS

Dawn J. Wright, Environmental Systems Research Institute, Redlands, CA  
*"Story Mapping" the Geographical and Knowledge Networks of Science*

Leah Gerber, Arizona State University, Tempe  
*Overcoming Institutional Barriers to Science Communication*

Jessica Hellmann, University of Notre Dame, IN  
*Strategies for Engaging Outside the Ivory Tower and How to Find the Time to Do It*

\*Invited

### Synthetic Biology and Public Perceptions: Communication and Engagement

Saturday, 16 February 1:00PM-2:30PM

Organized by: Peyton West, AAAS Center for Science, Policy, and Society Programs, Washington, DC; Tiffany Lohwater, AAAS Office of Public Programs, Washington, DC

#### SPEAKERS

Drew Endy, Stanford University, CA  
*Synthetic Biology: New Findings and Implications*

Eléonore Pauwels, Woodrow Wilson International Center for Scholars, Washington, DC

*Synthetic Biology: Political and Policy Challenges*

Ronald Cole-Turner, Pittsburgh Theological Seminary, PA

*Synthetic Biology: Ethical and Theological Implications*

### Wild Weather, Climate Change, and Media: Communicating Science, Uncertainty, and Impact

Saturday, 16 February 3:00PM-4:30PM

Organized by: Cristine Russell and James McCarthy, Harvard University, Cambridge, MA

#### SPEAKERS

Chris Field, Carnegie Institution for Science and Stanford University, Stanford, CA  
*Weather Extremes: Coping with the Changing Risks*

Heidi Cullen, Climate Central, Princeton, NJ  
*From Climate Scientist to Climate Communicator*

Seth Borenstein, Associated Press, Washington, DC  
*When Weather Goes Wild, So Does the Media*

### Scientists' Understanding of the Public

Sunday, 17 February 8:00AM-9:30AM

Organized by: John C. Besley, Michigan State University, East Lansing

#### SPEAKERS

John Durant, MIT Museum, Cambridge, MA  
*Patterns of Outreach Participation by Scientists*

Hans Peter Peters, Ethics in Neurosciences Research Center, Jülich, Germany, and Sharon Dunwoody, University of Wisconsin, Madison

*Understanding Scientists' Beliefs about the Public and Public Communication*

John C. Besley, Michigan State University, East Lansing

*Key Factors Underlying Scientists' Willingness to Engage*



## Writing About Science for the Public

Sunday, 17 February 8:30AM-11:30AM

Organized by: Daniel Levitin, McGill University, Montreal, QC, Canada

### SPEAKERS

Pam Belluck, *The New York Times*, New York City  
*Science and Health Reporting at The New York Times*

Daniel Levitin, McGill University, Montreal, QC, Canada  
*Music and the Brain: A Launching Pad for an Overall Public Awareness of Neuroscience*

Michael Gazzaniga, University of California, Santa Barbara  
*Ethics, Neuroscience, and Cognition: The Decade of the Brain and Beyond*

Lisa Randall, Harvard University, Cambridge, MA  
*Knocking on Heaven's Door: How Physics and Scientific Thinking Illuminate the Universe*

Eric Kaplan, *The Big Bang Theory*, Studio City, CA  
*Writing for The Big Bang Theory: How Sheldon Cooper Became the New Carl Sagan*

## Creative and Participatory Methods in Climate Communication

Sunday, 17 February 1:30PM-4:30PM

Organized by: Eli Kintisch, AAAS/Science, Washington, DC; Juliette N. Rooney-Varga, University of Massachusetts, Lowell

### SPEAKERS

Maxwell T. Boykoff, University of Colorado, Boulder  
*Inside the Greenhouse: Utilizing Media to Communicate Climate Challenges*

Juliette N. Rooney-Varga, University of Massachusetts, Lowell  
*Simulations and Media Production for Transformative, Experiential Learning*

Janot Mendler de Suarez, Boston University Pardee Center for the Study of the Longer-Range Future, Wayland, MA  
*"Serious Fun" and Learning in Developing Countries: A Participatory Game*

Eli Kintisch, AAAS/Science, Washington, DC  
*Bay in Flux: Designing Tablet Apps on Climate Impacts on Marine Ecosystems*

## In the Eye of the Beholder: Engaging the Public in Societal Implications of Science

Sunday, 17 February 3:00PM-4:30PM

Organized by: Larry Bell and David Sittenfeld, Museum of Science, Boston, MA

### SPEAKERS

Rae Ostman, Sciencenter, Ithaca, NY  
*Building Societal and Ethical Implications of Nanotechnology into Informal Education*

Gretchen Gano, Amherst College, MA  
*World Wide Views on Biodiversity International Citizen Consultation*

Natalie Kuldell, MIT, Cambridge, MA  
*Planning Public Engagement with Synthetic Biology*

## Science Festivals: Grand Experiments in Public Outreach

Monday, 18 February 9:45AM-11:15AM

Organized by: Ben Wiehe, MIT Museum, Cambridge

### SPEAKERS

Colleen Manning, Goodman Research Group Inc., Cambridge, MA  
*Results of the Grand Experiments*

Kishore Hari, University of California, San Francisco  
*Adaptation and Innovation by Science Festivals*

John Durant, MIT Museum, Cambridge, MA  
*When There Is a Science Festival in Every Community*

## Education and Human Resources

### For Scientists and Society: A New Vision of Chemistry Graduate Education

Friday, 15 February 8:30AM-11:30AM

Organized by: Bassam Shakhshiri, University of Wisconsin, Madison

### SPEAKERS

Larry Faulkner, University of Texas, Austin  
*Vision and Recommendations of the ACS Presidential Commission on Graduate Education in the Chemical Sciences*

Paul Houston, Georgia Institute of Technology, Atlanta  
*The ACS Commission on Graduate Education in the Chemical Sciences: Recommendations of the Working Groups*

Geraldine Richmond, University of Oregon, Eugene  
*Graduate Education in the Chemical Sciences: The Graduate Student Profile*

George Whitesides, Harvard University, Cambridge, MA  
*Changing Graduate Education to Meet the Needs of Students and Society, Part 1*

Shirley M. Malcom, AAAS Education and Human Resources, Washington, DC  
*Changing Graduate Education To Meet the Needs of Students and Society, Part 2*

Gary Calabrese, Corning, Inc., NY  
*Changing Graduate Education to Meet the Needs of Students and Society, Part 3*

## How K-12 Curriculum Reform Can and Will Affect University Studies

Friday, 15 February 8:30AM-11:30AM

Organized by: Arthur Eisenkraft, University of Massachusetts, Boston

### SPEAKERS

Gordon E. Uno, University of Oklahoma, Norman  
*Game-Changing Revisions in AP Science Courses*

Susan Singer, Carleton College, Northfield, MN  
*Re-Visioning Lab Learning*

James Pellegrino, University of Illinois, Chicago  
*Defining What Matters: The Processes and Products of the AP Science Redesign*

Stephen Pruitt, Achieve Inc., Washington, DC  
*Next-Generation Science Standards*

## Preparing Our Future Scientific Work Force to Ensure the Success of Science

Friday, 15 February 1:00PM-2:30PM

Organized by: Bruce M. Alberts, AAAS/Science, San Francisco, CA; Cynthia N. Fuhrmann, University of Massachusetts Medical School, Worcester; Bill Lindstaedt, University of California, San Francisco

### SPEAKERS

Paula Stephan, Georgia State University, Atlanta  
*Where Are They Going? Economic Trends of the Scientific Work Force*

Gregory A. Petsko, Brandeis University, Waltham, MA  
*Improving the Career Preparation of Postdoctoral Trainees*

Keith Yamamoto, University of California, San Francisco  
*Next Step Recommendations of the NIH Biomedical Work Force Committee*

## Accelerating School Readiness and Cumulative Academic Performance: Birth to Age 10

Friday, 15 February 3:00PM-4:30PM

Organized by: David L. Featherman, University of Michigan, Ann Arbor

### SPEAKERS

Frederick J. Morrison, University of Michigan, Ann Arbor  
*Executive Functioning and Self-Regulation in Early School Outcomes*

Stephanie M. Jones, Harvard University, Cambridge, MA  
*SECURE: Social-Emotional Learning and Literacy, Pre-K to Grade 3*

Lisa Gennetian, ideas42, New York City  
*Incentivizing Parent-Child Interactions for School Readiness, Birth to Age 3*

## Where and How Are Research and Innovation Fostering Job Creation?

Friday, 15 February 3:00PM-4:30PM

Organized by: Florent Bernard, European Commission Directorate General for Research and Innovation, Brussels, Belgium

### SPEAKERS

Maria da Graça Carvalho, European Parliament, Brussels, Belgium

*Innovating Out of the Crisis: The Role of Political Leaders in Fostering Job Creation*

Luc Soete, Maastricht University, United Nations University, Netherlands

*Innovating Out of the Crisis: On the Need for Radical Institutional Change*

Barbara Haering, Econcept, Zurich, Switzerland

*Innovating Out of the Crisis: Bridging Research, Demand, and Job Creation*

## Animals on Exhibit

Saturday, 16 February 8:00AM-9:30AM

Organized by: Joe Zammit-Lucia, Artist and Independent Scholar, Sag Harbor, NY; Linda Kalof, Michigan State University, Okemos

### SPEAKERS

John Fraser, New Knowledge Organization, New York City

*The Untapped Potential of Zoos in Conservation Science*

Karen Rader, Virginia Commonwealth University, Richmond

*Live Animals and Interactive Education in Museums*

Anita Guerrini, Oregon State University, Corvallis

*Natural History and the Ecology of Display*

## Undergraduate Science Education at a Crossroad: Responding to Research Findings

Saturday, 16 February 8:30AM-11:30AM

Organized by: Martin Storksdieck, National Research Council, Washington, DC; Jay B. Labov, U.S. National Academy of Sciences, Washington, DC; Susan Singer, Carleton College, Northfield, MN

### SPEAKERS

Susan Singer, Carleton College, Northfield, MN  
*Consensus Emerging from Research About Effective Undergraduate Science Education*

Jo Handelsman, Yale University, New Haven, CT  
*How Undergraduate Teaching Practice Influences Student Pathways in STEM*

Ann Austin, Michigan State University, East Lansing

*Promoting Evidence-Based Change in Undergraduate Science Education*

Carl E. Wieman, Office of Science and Technology Policy, Executive Office of the U.S. President, Washington, DC

*Transforming Undergraduate Science Education: A Policy Perspective*

## Increasing Diversity in Science: Learning from Successful Program Models

Saturday, 16 February 10:00AM-11:30AM

Organized by: Rebecca L. Smith, University of California, San Francisco

### SPEAKERS

Chrysanthe Demetry, Worcester Polytechnic Institute, MA

*Starting Early: Developing an Interest in Engineering Among Middle School Girls*

Jean T. MacCormack, University of California, San Francisco

*Getting to College: Research Internships to Build Students' Academic Identities*

Carlos Castillo-Chavez, Arizona State University, Tempe

*From College to Careers in Science: Increasing the Pool of Minority Researchers*

## The 25th Anniversary of the First Collection in the History of Women in Science

Saturday, 16 February 1:30PM-4:30PM

Organized by: Pnina G. Abir-Am, Brandeis University, Waltham, MA; Joy Harvey, Independent Scholar, Somerville, MA

### SPEAKERS

Margaret Walsh Rossiter, Cornell University, Ithaca, NY

*Thirty Women Who Changed American Science, 1970-2010*

Sue V. Rosser, San Francisco State University, CA  
*Policy-Making for Women in Science: From NSF Visiting Professorship for Women to ADVANCE*

Nancy G. Slack, The Sage Colleges, Troy, NY  
*Writings on Creative Couples in Science by a Member of a Dual Career Scientific Couple*

Pnina G. Abir-Am, Brandeis University, Waltham, MA

*Women Scientists in the 1970s: An Ego-Histoire of a Lost Generation*

## Science After School: Scientists Inspire the Next Generation Outside of the Classroom

Sunday, 17 February 8:30AM-11:30AM

Organized by: Carol M. Tang, Coalition for Science After School, Berkeley, CA; Elizabeth Stage, University of California, Berkeley

### SPEAKERS

Alan Friedman, Independent Consultant, New York City

*Importance of Out-of-School Science Learning*

Mariette DiChristina, Scientific American, New York City

*Recruiting Scientists for Public Education*

Rebecca L. Smith, University of California, San Francisco

*Challenges and Opportunities for Scientists in After School Settings*

Carol M. Tang, Coalition for Science After School, Berkeley, CA

*Scientists in After School Programs: Models, Lessons, and Measurable Outcomes*

## Engaging Students in Complex Science Learning via Games and Simulations

Sunday, 17 February 1:00PM-2:30PM

Organized by: Susannah Gordon-Messer, MIT, Cambridge; Jody Clarke Midura, Harvard Graduate School of Education, Cambridge, MA

### SPEAKERS

Shari Metcalf, Harvard Graduate School of Education, Cambridge, MA

*Using Blending Immersive Learning Environments To Teach Complex Causality*

Susannah Gordon-Messer, MIT, Cambridge  
*Engaging Students While Addressing Science Standards in a Multiplayer Online Game*

Jody Clarke Midura, Harvard Graduate School of Education, Cambridge, MA

*Assessing Science Problem-Solving and Inquiry Skills in a Game-Like Environment*

## Creating Interdisciplinary Competency-Based Curricula for Undergraduate Students

Sunday, 17 February 1:30PM-4:30PM

Organized by: Dee U. Silverthorn, University of Texas, Austin; William R. Galey, Howard Hughes Medical Institute, Chevy Chase, MD

### SPEAKERS

Catherine L. Drennan, MIT, Cambridge  
*Simple Strategies for Bringing Biology and Medicine into Introductory Chemistry*

Claudia Neuhauser, University of Minnesota, Rochester  
*Mathematics and Statistics in an Integrated Curriculum for Future Health Professionals*

E.F. Joe Redish, University of Maryland, College Park

*Rethinking Physics for Biologists and Pre-Meds: The NEXUS Project*

Dee U. Silverthorn, University of Texas, Austin  
*Competency Mapping for Integrated Curriculum*

## Overcoming Dualisms and Promoting Minority Inclusion in Science Networks and Pipelines

Sunday, 17 February 1:30PM-4:30PM

Organized by: Roberta Spalter-Roth, American Sociological Association, Washington, DC

### SPEAKERS

Eduardo Bonilla-Silva, Duke University, Durham, NC

*The Real Race Problem: The Power of White Rule*

Rashawn Ray, University of Maryland, College Park

*Systematic Disadvantage in Mentorship: Graduate Students' Perceptions of Advisors*

Denise Segura, University of California, Santa Barbara

*Perceptions of Inequality Among PhD Students*

Crystal Bedley, Rutgers University, New Brunswick, NJ

*Supporting the Promotion and Retention of Women of Color Faculty*

Roberta Spalter-Roth, American Sociological Association, Washington, DC

*Impact of Cross-Race Mentoring for "Ideal" and "Alternative" PhD Careers*

## Benefits Beyond Beauty: Integration of Art into STEM Education and Research

Monday, 18 February 9:45AM-12:45PM

*Organized by:* Rieko Yajima, AAAS Center of Science, Policy, and Society Programs, Washington, DC; Gunalan Nadarajan, Maryland Institute College of Art, Baltimore

### SPEAKERS

Gunalan Nadarajan, Maryland Institute College of Art, Baltimore

*A National Network to Support Science, Engineering, Art, and Design Collaboration*

Brian K. Smith, Rhode Island School of Design, Providence

*STEM to STEAM: Developing New Frameworks for Art-Science Pedagogy*

J.D. Talasek, National Academy of Sciences, Washington, DC

*D.C. Art Science Evening Rendezvous*

Marina McDougall, Exploratorium, San Francisco, CA

*Art as a Way of Knowing*

## Environment and Ecology

### A Science and Art Interface: Geographic Information Systems and Remotely Sensed Images

Friday, 15 February 8:00AM-9:30AM

*Organized by:* Daniel Griffith, University of Texas, Richardson; Ren Vasiliev, State University of New York, Geneseo

### SPEAKERS

Daniel Griffith, University of Texas, Richardson  
*Art and Spatial Statistics: Seeing Abstract Spatial Patterns Using GIS Visualization*

Stephen Young, Salem State University, MA  
*Remote Sensing: The Art and Science of Seeing Our World, from the Micro to the Macro*

Kim Yasuda, University of California, Santa Barbara

*Experimental Geography: Mapping and Contemporary Art*

### Indigenous and Western Science: Collaborating for Better Research and Education

Friday, 15 February 10:00AM-11:30AM

*Organized by:* Patricia B. Campbell, Campbell-Kibler Associates, Groton, MA

### SPEAKERS

Sean Chandler, Aaniiih Nakoda College, Harlem, MT

*Using Indigenous Knowledge To Improve Undergraduate STEM Education*

Linda S. Different Cloud, Sitting Bull College, Fort Yates, ND

*Restoring Plants, Restoring Culture: Ethnobotany and Restoration Ecology*

Terry Tatsey, Blackfeet Community College, Browning, MT

*Traditional Blackfeet II-NII (WA) Bison Harvest Methods*

### Partners for the Earth: Scientists and Religious Groups Working for the Environment

Friday, 15 February 3:00PM-4:30PM

*Organized by:* Jennifer Wiseman and Peyton West, AAAS Center of Science, Policy, and Society Programs, Washington, DC

### SPEAKERS

Calvin DeWitt, Au Sable Institute of Environmental Studies, Mancelona, MI  
*Science, Christian Communities, and Creation Care*

Bandana Kaur, EcoSikh, Washington, DC  
*Sikhs Mobilizing to Protect the Living Planet*

Dayna Gibbons, Environmental Protection Agency, Washington, DC  
*The EPA's Faith-Based and Neighborhood Partnerships Initiative*

### Converging on Climate Change: From Middens to Models, the Savannah to Snæfellsjökull

Saturday, 16 February 8:00AM-9:30AM

*Organized by:* Samantha Christey, European Research Council, Brussels, Belgium

### SPEAKERS

Brian McKee Chase, Institute of Evolutionary Sciences, University of Montpellier, France  
*Rock Hyrax Middens and Climate Change in Southern Africa During the Last 50,000 Years*

Maja Schlüter, Stockholm Resilience Center, Stockholm, Sweden  
*Impact of Social-Ecological Linkages on Human-Environment Systems*

Siwan Manon Davies, Swansea University, United Kingdom  
*Tephra Constraints on Rapid Climatic Events*

### The Toxicological Impact of the Gulf of Mexico Oil Spill on Human and Wildlife Health

Saturday, 16 February 8:30AM-11:30AM

*Organized by:* John Pierce Wise Sr., University of Southern Maine, Portland; R. Joseph Griffitt, University of Southern Mississippi, Ocean Springs

### SPEAKERS

Iain Kerr, Ocean Alliance, Gloucester, MA  
*Introduction to the Deepwater Horizon Accident*

Samantha B. Joye, University of Georgia, Athens  
*Impact of the Gulf Oil Crisis on the Sea Floor*

Carys Mitchelmore, University of Maryland Center for Environmental Science, Solomons, MD

*Laboratory Studies to Assess the Effects of Oil Spill Chemical Dispersants on Corals*

R. Joseph Griffitt, University of Southern Mississippi, Ocean Springs  
*Effects of Dispersed Oil on Larval Sheepshead Minnows*

Greg Mayer, Texas Tech University, Lubbock  
*Weathering and Dispersion of Crude Oil Alter Its Toxicity in Fundulus Grandis*

John Pierce Wise Sr., University of Southern Maine, Portland, ME  
*The Gulf of Mexico Offshore Toxicology Study*

### New Dimensions of Biodiversity Science and Application

Saturday, 16 February 1:00PM-2:30PM

*Organized by:* Julia K. Parrish, University of Washington, Seattle; Sandy J. Andelman, Conservation International, Santa Barbara, CA

### SPEAKERS

Selina Heppell, Oregon State University, Corvallis  
*Scale Matters: Linking Biodiversity Pattern and Process in Exploited Marine Systems*

Samantha Davis, University of California, Santa Barbara  
*Global Partners, Local Data, and the Paradox of Biodiversity and Human Well-Being*

Ailene K. Ettinger, University of Washington, Seattle  
*Public Engagement in Biodiversity Research*

### Finding the Fault: Sampling the Source of the M<sub>9.0</sub> Tohoku Earthquake

Sunday, 17 February 8:00AM-9:30AM

*Organized by:* Charna Meth, Consortium for Ocean Leadership, Washington, DC

### SPEAKERS

Frederick Chester, Texas A&M University, College Station  
*Defining the Structure of the Earthquake Fault by Geophysical Logging and Coring*



Patrick Fulton, University of Texas, Austin  
*Borehole Observatory and Geophysical Measurements*

Shuichi Kodaira, Japan Agency for Marine-Earth Science and Technology, Yokosuka  
*Overview of the Tohoku Earthquake: 50-m Fault Slip Reaching the Deep Sea Trench*

## Building Resilience of Coastal Communities to Environmental and Institutional Shocks

Sunday, 17 February 8:30AM-11:30AM

Organized by: Richard Pollnac, University of Rhode Island, Kingston; Joshua E. Cinner, James Cook University, Townsville, Australia

### SPEAKERS

Lisa L. Colburn, NOAA, Narragansett, RI  
*Healthy Oceans, Healthy Communities: Indicators of Coastal Vulnerability and Resilience*

Theresa L. Goedeke, NOAA, National Ocean Service National Centers for Coastal Ocean Science, Silver Spring, MD  
*Developing Indicators of Well-Being and Ecosystem Condition in Gulf Coast Counties*

Dawn Kotowicz, University of Hawaii Joint Institute for Marine and Atmospheric Research, Honolulu  
*Shifting Perceptions of Resilience in the Wake of the Indian Ocean Tsunami*

Maria K. Dillard, NOAA, Hollings Marine Laboratory, Charleston, SC  
*Integrating Social and Ecological Resilience Indicators for Small Island Communities*

Leila Sievanen, Brown University, Providence, RI  
*Adapting to Climate Variability in the Gulf of California, Mexico*

Robert S. Pomeroy, University of Connecticut, Groton, CT  
*Community Resilience in a Changing Environment: Lessons from the Caribbean and Beyond*

## Spatially Distributed Environmental Factors and Health Effects

Sunday, 17 February 8:30AM-11:30AM

Organized by: Katherine B. Ensor, Rice University, Houston, TX

### SPEAKERS

Stephan Sain, Institute for Mathematics Applied to Geosciences, Boulder, CO  
*Climate Health and Vulnerability in Urban Populations*

Francesca Dominici, Harvard School of Public Health, Boston, MA  
*Estimating Relative Risk of Mortality Associated with Heat Waves in 105 U.S. Cities*

Lance A. Waller, Emory University, Atlanta, GA  
*Spatial Uncertainty Estimation and Public Health Data*

Dan Cohan, Rice University, Houston, TX  
*Uncertainties Influencing Health-Based Prioritization of Ozone Abatement Options*

Katherine B. Ensor, Rice University, Houston, TX  
*Association Between Ambient Ozone and Cardiac Arrest*

## A 50 Year Legacy: Why does Rachel Carson Matter?

Sunday, 17 February 10:00AM-11:30AM

Organized by: Jane Maienschein and Gregg Zachary, Arizona State University, Tempe, AZ

### SPEAKERS

Sharon Kingsland, Johns Hopkins University, Baltimore, MD  
*Bridging Two Cultures: Rachel Carson as Scientist and Humanist*

Gregg Zachary, Arizona State University, Tempe, AZ  
*Back to the Future: The Rachel Carson "Model" as a Response to the Crisis in Science*

Jane Lubchenco, NOAA, Washington, DC  
*Rachel Carson and Responsible Science Policy*

## Environmental Challenges and Adaptation in Cities

Sunday, 17 February 3:00PM-4:30PM

Organized by: Matthias Ruth, University of Maryland, College Park

### SPEAKERS

Porter Hoagland, Marine Policy Center, Woods Hole, MA  
*Potential for Human Adaptations to Shoreline Change in Urban Settings*

April Gu, Northeastern University, Boston, MA  
*Water Sustainability at the Interplay of Technology, Regulation, and Human Rights*

Paul H. Kirshen, University of New Hampshire, Durham  
*Coastal Adaptation Planning for Vulnerable Communities: A Case Study in East Boston*

## Global Perspectives and Issues

### The Invisible Beauty: How Security Research Helped in Real Life, but Nobody Noticed

Friday, 15 February 8:00AM-9:30AM

Organized by: Stephan Lechner, Joint Research Center, Institute for the Protection and Security of the Citizen, Ispra, Italy

### SPEAKERS

Stephan Lechner, Joint Research Center, Institute for the Protection and Security of the Citizen, Ispra, Italy  
*European Success Stories: The Best Tools Worldwide*

Scott Borg, U.S. Cyber Consequences Unit, Norwich, VT  
*The Truth About Cyber Consequences*

Suvi Sundquist, Finnish Funding Agency for Research and Innovation, Helsinki, Finland  
*From Research to the Market: Security Technologies That Made It*

## Global Food Security in Relation to Climate, Population, Technology, and Earth Changes

Friday, 15 February 1:30PM-4:30PM

Organized by: Felix Kogan and Alfred M. Powell, NOAA, Camp Springs, MD

### SPEAKERS

Thomas R. Karl, NOAA National Climatic Data Center, Asheville, NC  
*Extreme Weather and Climate Events*

Paul R. Ehrlich, Stanford University, CA  
*Feeding All While Avoiding a Collapse of Civilization: Science's Greatest Challenge*

Cynthia Rosenzweig, Goddard Institute for Space Studies, New York City  
*Improving Projections of Climate Impacts on Agriculture and Food Security*

Felix Kogan, NOAA, Camp Springs, MD  
*Climate Constraints, Grain Production Trend, and Crop Losses*

## Lead: The Global Poison — Humans, Animals, and the Environment

Saturday, 16 February 8:30AM-11:30AM

Organized by: Mark A. Pokras, Tufts University, N. Grafton, MA; Ronnie Levin, U.S. Environmental Protection Agency, Boston, MA

### SPEAKERS

A. Russell Flegal, University of California, Santa Cruz  
*The History of Industrial Lead Contamination: Why Won't It Go Away?*

Joel Schwartz, Harvard School of Public Health, Boston, MA  
*Health Effects of Lead: What Is Known and What Is Coming*

Mark A. Pokras, Tufts University, North Grafton, MA  
*Lead in Wildlife and Domestic Animals: Sources, Risks, and Pathology*

Samantha Langley-Turnbaugh, University of Southern Maine, Gorham  
*Cycling of Lead in Soils: The Environment and Health*

Jessica Wolpaw Reyes, Amherst College, MA  
*Economic Implications of Lead Contamination*

Mary Jean Brown, Centers for Disease Control and Prevention, Atlanta, GA  
*Non-Essential Uses of Lead and Primary Prevention of Lead Poisoning*

David E. Jacobs, National Center for Healthy Housing, Washington, DC  
*Lead Paint in Housing*

Howard Mielke, Tulane University School of Medicine, New Orleans, LA  
*Lead In Soil*

Michael R. Schock, U.S. Environmental Protection Agency, Cincinnati, OH  
*Lead in Drinking Water*

## Measurement of Economic and Social Impacts of Science and Technology Investments

Friday, 15 February 8:30AM-11:30AM

*Organized by:* Yuko Ito and Aska Takeshiro, National Institute of Science and Technology Policy, Tokyo, Japan

### SPEAKERS

Stephen Merrill, National Academy of Sciences, Washington, DC  
*The Search for a Research ROI (Return on Investment)*

Terutaka Kuwahara, National Institute of Science and Technology Policy, Tokyo, Japan

*S&T Policy Research for Advancing Evidence-Based Policy-Making*

Alison Allden, Higher Education Statistics Agency, Cheltenham, United Kingdom  
*Evidence Base for Impact of Research and Innovation in the U.K.: New Approaches*

Rongping Mu, Chinese Academy of Sciences, Beijing  
*Index of Innovation Development and Its Implementation for Policy-Making in China*

June Seung Lee, Korea Institute of Science and Technology Evaluation and Planning, Seoul  
*Impacts of S&T Investment as an Innovation Tool in Korea*

Takashi Shiraishi, National Graduate Institute for Policy Studies, Tokyo, Japan  
*Achieving Sustainable Growth and Societal Development in Future Japan*

## A Tale of Two Networks: Connecting the African Drylands, Rio de Janeiro, and Women

Saturday, 16 February 10:00AM-11:30AM

*Organized by:* Gillian Bowser, Colorado State University, Fort Collins; Marcelo Vinces, National Science Foundation, Arlington, VA; Riju Srimal, National Institutes of Health, Bethesda, MD

### SPEAKERS

Noshir Contractor, Northwestern University, Evanston, IL  
*3DWomen: Exploring the Network Dynamics of Three Decades of Women Involved in Sustainable Development*

Arno Scharl, MODUL University, Vienna, Austria  
*3DWomen: Exploring the Network Dynamics of Three Decades of Women Involved in Sustainable Development*

Jesse Njoka, University of Nairobi, Kenya  
*African Drylands Center: A Higher Education Development Collaboration to Build Scientific Capacity*

\*Cardinal Warde, MIT, Cambridge  
*Building a Science Foundation: A Caribbean Model*

\*Invited

## Bridging the Gap Between Global Environmental Change Research and Development

Saturday, 16 February 10:00AM-11:30AM

*Organized by:* Erika von Schneidemesser, National Science Foundation, Arlington, VA; Timothy L. Killeen, National Science Foundation, Arlington, VA

### SPEAKERS

Robert Watson, Department of Environment, Food and Rural Affairs, London, United Kingdom  
*Co-Design: Why Broader Engagement Is Crucial for Global Change and Development Science*

Alex Dehgan, U.S. Agency for International Development, Washington, DC  
*Catalyzing Global Action To Address Wicked Environmental and Development Challenges*

Bonizella Biagini, The Global Environment Facility, Washington, DC  
*Global Environmental Change and What It Means for Development*

## The Role of Higher Education in Science Diplomacy: Possibilities and Potential Pitfalls

Saturday, 16 February 1:00PM-2:30PM

*Organized by:* Elizabeth E. Lyons, U.S. Department of State, Washington, DC

### SPEAKERS

E. William Colglazier, U.S. Department of State, Washington, DC  
*Higher Education and United States Science Diplomacy*

Jason E. Lane, State University of New York, Albany  
*Impact of International Branch Campuses on Science Diplomacy*

Susan Buck Sutton, Bryn Mawr College, PA  
*Unintentional Diplomats: The Increasing Internationalization of American Scientists*

## Future Earth: International Coordination of Research for Global Sustainability

Saturday, 16 February 1:30PM-4:30PM

*Organized by:* Roberta Quadrelli, Julie DeMeester, and Anne-Sophie Stevance, International Council for Science, Paris, France

### SPEAKERS

Carthage Smith, International Council for Science, Paris, France  
*Coordinating International Science and Policy Efforts*

Diana Liverman, University of Arizona, Tucson  
*The Future Earth Research Agenda, Including Scaling from Global to Regional Issues*

Albert Van Jaarsveld, South Africa National Research Foundation, Pretoria  
*International Funding Coordination and Co-Designing Research with Funders*

Walter V. Reid, David and Lucile Packard Foundation, Los Altos, CA  
*Bridging Science to Policy*

## Smart Phones, Smart Devices, Social Networks, and Smart Health Care

Saturday, 16 February 1:30PM-4:30PM

*Organized by:* Vinton Cerf, Google Inc., Reston, VA; Ram Sriram, National Institute of Standards and Technology, Gaithersburg, MD

### SPEAKERS

Ramesh Jain, University of California, Irvine  
*Mobile Social Life Networks in Health Care*

Deborah Estrin, Cornell Tech, New York City  
*Transforming Health Care Through Mobile Platforms*

Aydogan Ozcan, University of California, Los Angeles  
*Photonics-Based Telemedicine Technologies Toward Smart Global Health Systems*

Julian Goldman, Massachusetts General Hospital, Boston  
*Transforming Health Care Through Medical System Integration: From Architecture to Apps*

Kyoung-Sook Kim, National Institute of Information and Communications Technology, Kyoto, Japan  
*Cyber Physical Data Cloud: An Event Processing System for Real-World Awareness*

Vinton Cerf, Google Inc., Reston, VA  
*Smart Communications, Security, and Strong Authentication*

## Unreasonable Usefulness of Test-Ban Verification for Disaster Warning and Science

Sunday, 17 February 10:00AM-11:30AM

*Organized by:* Annika Thunborg, Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, Vienna, Austria

### SPEAKERS

David W. Strangway, Quest University, Kelowna, BC, Canada  
*Test-Ban Verification at the Intersection of Basic and Applied Science and Innovation*

Miaki Ishii, Harvard University, Cambridge, MA  
*Examples of the Uses of Comprehensive Nuclear-Test-Ban Treaty Verification Data for Advancing Earth Sciences*

Raymond Jeanloz, University of California, Berkeley  
*How Advances in Earth Sciences Help Detect Nuclear Explosions*

## Networks of Discovery: Delivering Unsurpassed Insight into Changing Global Ecosystems

Sunday, 17 February 1:30PM-4:30PM

Organized by: Joe A. Tyburczy and Kristen Milligan, Oregon State University, Corvallis

### SPEAKERS

Steven Gaines, University of California, Santa Barbara

*Ecological Research Networks: A Powerful Paradigm for Understanding Global Changes*

Bruce Menge, Oregon State University, Corvallis

*PISCO: Research that Spans an Entire Large Marine Ecosystem Yields Valuable Insight*

Stuart J. Davies, Smithsonian Institution Global Earth Observatory, Washington, DC  
*Seeing the Forest for the Trees: SIGEO Is Revolutionizing Understanding of Forests*

Nancy Knowlton, Smithsonian Institution, Washington, DC

*Smithsonian MarineGEO: Understanding Biodiversity of Coastal Oceans Across the Globe*

Elizabeth Borer, University of Minnesota, St. Paul

*The Nutrient Network: Grassroots Science to Address Global-Scale Environmental Change*

Barbara Block, Stanford University, Pacific Grove, CA

*Building A Wired Ocean With Electronic Tagged Animals and Mobile Gliders*

## Science from the International Space Station

Monday, 18 February 9:45AM-12:45PM

Organized by: Christopher L. Martin, Oberlin College, OH; Julie A. Robinson, NASA Johnson Space Center, Houston, TX

### SPEAKERS

Cheryl Nickerson, Arizona State University, Tempe

*Microgravity: A Novel Tool for Advances in Biomedical Research*

Samuel C.C. Ting, MIT, Cambridge, MA

*The Alpha Magnetic Spectrometer*

\*Mark Weislogel, Portland State University, OR  
*Capillary Fluidics in Space*

Michael Barratt, NASA Johnson Space Center, Houston, TX

*Space Medicine*

Elizabeth R. Cantwell, Lawrence Livermore

National Laboratory, CA  
*Recapturing a Future for Space Exploration: Research for a New Era*

\*Invited

## Health and Pharmaceutical Science

### Multi-Scale Study of Cancer

Friday, 15 February 8:00AM-9:30AM

Organized by: Mark Alber, University of Notre Dame, IN; Jill P. Mesirov, Broad Institute of MIT and Harvard University, Cambridge, MA

### SPEAKERS

Philip Maini, University of Oxford, United Kingdom

*Hybrid Approach to Multi-Scale Modeling of Cancer*

Martin Nowak, Harvard University, Cambridge, MA

*Dynamics of Targeted Cancer Therapy*

Kathleen Wilkie, Tufts University School of Medicine, Boston, MA

*Modeling in Cancer Immunology*

### Monitoring and Assuring the Quality of Essential Medicines

Friday, 15 February 1:00PM-2:30PM

Organized by: Joel Breman and Gaurvika Nayyar, National Institutes of Health, Bethesda, MD

### SPEAKERS

Facundo Fernandez, Georgia Institute of Technology, Atlanta

*Field Technologies for Testing Poor Quality Medicines*

John Clark, Pfizer Global Security, Groton, CT  
*Steps That Industry Is Taking To Protect Patients Against Counterfeit Medicines*

Amir Attaran, University of Ottawa, ON, Canada

*Trade in Fake Medicines Is Impossible to Stop Without Globalized Laws and Governance*

### The Benefits of Randomized Experiments for Science and Society

Friday, 15 February 1:00PM-2:30PM

Organized by: Daniel McCaffrey, RAND Corp., Pittsburgh, PA

### SPEAKERS

Arthur Lupia, University of Michigan, Ann Arbor  
*Experimenting with Politics*

Michael Kremer, Harvard University, Cambridge, MA

*Experimenting with Public Health and Education in the Developing World*

Susan Murphy, University of Michigan, Ann Arbor  
*Experimenting to Improve Clinical Practice*

### Scientific Advances and New Strategies for Reconstruction of Oral and Facial Tissues

Friday, 15 February 1:30PM-4:30PM

Organized by: Barbara D. Boyan, Georgia Institute of Technology, Atlanta; Paul Krebsbach, University of Michigan, Ann Arbor

### SPEAKERS

Robert G. Hale, U.S. Army Institute for Surgical Research, Fort Sam, Houston, TX

*Challenges in Craniofacial Reconstruction Following Trauma*

Thomas Barker, Georgia Institute of Technology, Atlanta

*Novel Approaches for Controlling Fibrin Matrices to Mitigate Scar Formation*

Stephen E. Feinberg, University of Michigan, Ann Arbor

*Regenerating Human Oral Mucosa*

David L. Cochran, University of Texas, San Antonio

*Tissue-Engineered Gingival Augmentation*

Kacey G. Marra, University of Pittsburgh, PA

*Use of Adipose Stem Cells To Restore Subdermal Fat*

### Stroke Research: New Concepts and Innovative Solutions

Friday, 15 February 3:00PM-4:30PM

Organized by: Virginija Dambauskaite and Ruxandra Draghia-Akli, European Commission, Directorate General for Research and Innovation, Brussels, Belgium

### SPEAKERS

Costantino Iadecola, Weill Cornell Medical College, New York City

*Great Expectations: The Promise of the Neurovascular Unit for Stroke Therapy*

Molly Shoichet, University of Toronto, ON, Canada

*Engineering Meets Medicine: Innovative Strategies To Overcome Stroke*

Stephen Meairs, University Medical Center Mannheim, University of Heidelberg, Germany  
*The European Stroke Network: A Platform for Overcoming the Translational Roadblock*

### Cultivating the Science and Scientists for 21st Century Drug Discovery and Development

Sunday, 17 February 8:00AM-9:30AM

Organized by: Alice Clark, University of Mississippi, University

### SPEAKERS

Kip Guy, St. Jude Children's Research Hospital, Memphis, TN

*Innovative Approaches to Identifying the Next Generation of Drugs*

Alice Clark, University of Mississippi, University

*New Models for Education and Training of Pharmaceutical Scientists*

Garrett FitzGerald, University of Pennsylvania, Philadelphia

*A New Paradigm for Therapeutics Discovery*



## Pathways to Health Equity for Aboriginal Peoples

Sunday, 17 February 10:00AM-11:30AM

Organized by: Danièle St-Jean, Canadian Institutes of Health Research, Ottawa, ON

### SPEAKERS

Malcolm King, Canadian Institutes of Health Research's Institute of Aging, Edmonton, AB  
*CIHR's Signature Roadmap Initiative Pathways to Health Equity for Aboriginal Peoples*

Jeff Henderson, Black Hills Center for American Indian Health, Rapid City, SD  
*Collaborative Efforts and Best Practices as It Relates to Aboriginal People's Health*

Jennie R. Joe, University of Arizona College of Medicine, Tucson  
*Making Room in the Allopathic Arena for Native Practitioners: The Navajo Example*

## Engineering the Nervous System: Solutions to Restore Sight, Hearing, and Mobility

Sunday, 17 February 1:30PM-4:30PM

Organized by: Sanna Fowler, Ecole Polytechnique Fédérale de Lausanne, Switzerland

### SPEAKERS

Stephanie P. Lacour, Ecole Polytechnique Fédérale de Lausanne, Switzerland  
*Flexible Electronics for Interfacing with the Nervous System*

Silvestro Micera, Ecole Polytechnique Fédérale de Lausanne, Switzerland  
*Controlling a Prosthetic Hand with Peripheral Neural Interfaces*

Grégoire Courtine, Ecole Polytechnique Fédérale de Lausanne, Switzerland  
*Walking Again After Spinal Cord Injury*

Konstantina M. Stankovic, Harvard Medical School, Boston, MA  
*Reversing Infant Deafness Through Genetic Engineering*

Joan Miller, Harvard Medical School, Boston, MA  
*Saving Sight in Retinal Disease*

## Clinical Trial and Error: Beauty and the Beast

Sunday, 17 February 3:00PM-4:30PM

Organized by: Aidan Gilligan, SciCom-Making Sense of Science, Brussels, Belgium; Thomas Hartung, Johns Hopkins University, Baltimore, MD

### SPEAKERS

Thomas Hartung, Johns Hopkins University, Baltimore, MD  
*Look Back in Anger? What Clinical Trials Tell Us About Preclinical Research*

Jay Siegel, Janssen Research and Development, Raritan, NJ  
*Product-Oriented Versus Health Care-Oriented Clinical Trials*

Paul J. Kenny, The Scripps Research Institute, Jupiter, FL  
*The Latest Clinical Trial Research on Brain Reward Systems*

## Control Engineering of Brain in Health and Disease

Sunday, 17 February 3:00PM-4:30PM

Organized by: Alok Sinha, Steven J. Schiff, and Mauricio Terrones, Pennsylvania State University, University Park

### SPEAKERS

Albert-Laszlo Barabasi, Northeastern University, Boston, MA  
*Taming Complexity: Controlling Networks*

Jeffrey G. Ojemann, University of Washington, Seattle  
*Dynamics of Human Learning of a Brain-Computer Interface*

Steven J. Schiff, Pennsylvania State University, University Park  
*Towards Model-Based Observation and Control of Brain Networks*

## Stem Cell-Based Bioartificial Tissues and Organs

Monday, 18 February 9:45AM-11:15AM

Organized by: Sabina Bossi, Karolinska Institute, Stockholm, Sweden

### SPEAKERS

Paolo Macchiarini, University of Barcelona and Karolinska Institute, Stockholm, Sweden  
*Regenerative Biotechnological Treatment*

Ola Hermanson, Karolinska Institute, Stockholm, Sweden  
*Molecular and Cellular Effects of Transplanting Artificial Organs*

Philipp Jungebluth, The Cardiothoracic Surgery Network and Karolinska Institute, Stockholm, Sweden  
*Clinical Transplantation of a Tissue-Engineered Airway*

## Materials Science and Chemistry

### Quantum Sensors: Toward the Ultimate Limits

Friday, 15 February 8:00AM-9:30AM

Organized by: Martin Laforest, University of Waterloo, ON, Canada

### SPEAKERS

Raffi Budakian, University of Illinois, Urbana-Champaign  
*The Ultimate MRI: Magnetic Resonance Force Microscopy*

Amir Yacoby, Harvard University, Cambridge, MA  
*Another Use for Diamond: Improved Scanning Probe Microscopy*

David G. Cory, University of Waterloo, ON, Canada  
*Reinventing Neutron Interferometry Using Quantum Information Theory*

## Watching Atoms Move: From Structures to Dynamics to Mesoscale Processes

Friday, 15 February 10:00AM-11:30AM

Organized by: Donald Baer, Pacific Northwest National Laboratory, Richland, WA; Eric Stach, Brookhaven National Laboratory, Upton, NY

### SPEAKERS

Stephen J. Pennycook, Oak Ridge National Laboratory, TN  
*Direct Imaging of Atomic Structures*

R. J. Dwayne Miller, University of Hamburg, Germany  
*Making the Molecular Movie*

Nigel Browning, Pacific Northwest National Laboratory, Richland, WA  
*Observing Dynamic Processes in Real Time*

## Translation of Mussel Adhesion to Beneficial New Concepts and Materials

Saturday, 16 February 8:30AM-11:30AM

Organized by: Herbert Waite and Alison Butler, University of California, Santa Barbara

### SPEAKERS

Emily Carrington, University of Washington, Friday Harbor  
*Mussel Attachment in Changing Climates: An Ecomaterial Approach*

Herbert Waite, University of California, Santa Barbara  
*Wet Adhesion: Learning How from Mussels*

Phillip Messersmith, Northwestern University, Evanston, IL  
*Mussel-Inspired Materials for Surgical Repair and Drug Delivery*

Marcus Textor, ETH Zürich, Switzerland  
*Biomedical Applications of Ultra-Small Magnetic Nanoparticles*

## Attosecond Science in Chemical, Molecular Imaging, Spintronics, and Energy Science

Sunday, 17 February 8:30AM-11:30AM

Organized by: Andre D. Bandrauk, University of Sherbrooke, QC, Canada; Margaret M. Murnane, University of Colorado, Boulder

### SPEAKERS

Tenio Popmintchev, University of Colorado, Boulder  
*Attosecond Pulse Generation and Intense Ultrafast Laser Technology*

Ali Belkacem, Lawrence Berkeley National Laboratory, CA  
*Attosecond Science for Steering Chemical Reactions*

Paul B. Corkum, University of Ottawa, ON, Canada  
*Attosecond Pulse Technology: Generation and Characterization*

Stefan Mathias, University of Kaiserslautern, Germany  
*The Power of Ultrafast X Rays for Materials Science*

Mark I. Stockman, Georgia State University, Atlanta  
*Attosecond Science in Plasmonics*

Anthony F. Starace, University of Nebraska, Lincoln  
*High-Order Harmonic Generation, Attosecond Science, and Control of Electron Motion*

## Surprises at the Frontier of the Periodic Table: Novel Paradigms in Actinide Science

Sunday, 17 February 10:00AM-11:30AM  
*Organized by:* Roberto Caciuffo, Joint Research Center, European Commission, Eggenstein-Leopoldshafen, Germany; Geraldine Barry, Joint Research Center, European Commission, Brussels, Belgium

### SPEAKERS

David L. Clark, Los Alamos National Laboratory, NM  
*Covalency and the Relative Roles of 5f and 6d Orbitals in Actinide Metal-Ligand Bonds*

Piers Coleman, Rutgers University, Piscataway, NJ  
*Frontiers in Correlated Electronic Matter*

Robin Grimes, Imperial College London, United Kingdom  
*Generating the Option of a Two-Stage Nuclear Renaissance*

## Nucleic Acid Nanotechnology

Sunday, 17 February 1:30PM-4:30PM  
*Organized by:* Andrew D. Ellington, University of Texas, Austin

### SPEAKERS

Nadrian C. Seeman, New York University, New York City  
*Controlling the Structure of Matter Using the Information in DNA*

William M. Shih, Harvard University, Boston, MA  
*Self-Assembled DNA Nanostructure Tools for Molecular Biophysics*

Erik Winfree, California Institute of Technology, Pasadena  
*Chemistry as a New Information Technology*

Greg F. Heath, Illumina, Inc., San Diego, CA  
*Improving Health Care: The Role of Next-Generation Sequencing*

Hanadi Sleiman, McGill University, Montreal, QC, Canada  
*DNA Cages and Nanotubes: Simple, DNA Minimal Synthesis and Biological Properties*

## Remembering Galileo: Lithium Ion Batteries, Atomic Clocks, and Other Stories

Monday, 18 February 9:45AM-11:15AM  
*Organized by:* Carlos Saraiva Martins, European Commission, Brussels, Belgium

### SPEAKERS

Jean-Marie Tarascon, University of Picardie Jules Verne, Amiens, France  
*Li-Ion Batteries: From the Spacecraft Galileo to Our Cars and Grid*

Mildred Dresselhaus, MIT, Cambridge  
*From Galileo to Nanotechnologies*

Peter Whibberley, National Physical Laboratory, Middlesex, United Kingdom  
*Precision Time for Satellite Clocks Characterization and Monitoring*

## Physical Sciences

### Is Beauty Truth? Mathematics in Physics from Dirac to the Higgs Boson and Beyond

Friday, 15 February 8:00AM-9:30AM  
*Organized by:* Thomas J. Kelleher III, Basic Books, New York City

### SPEAKERS

Graham Farmelo, Science Museum, London, United Kingdom  
*Paul Dirac and the Religion of Mathematical Beauty*

Frank Close, University of Oxford, United Kingdom  
*Hidden Symmetry and the Birth of Quantum Electroweak Dynamics*

Chris Quigg, Fermi National Accelerator Laboratory, Batavia, IL  
*Particle Physics in a Season of Change*

### Mathematics of Tipping Points: Framework, Applications, and Prediction

Friday, 15 February 1:00PM-2:30PM  
*Organized by:* Mary Lou Zeeman, Bowdoin College, Brunswick, ME; Mary Silber, Northwestern University, Evanston, IL

### SPEAKERS

Mary Silber, Northwestern University, Evanston, IL  
*Tipping Points: Overview and Challenges*

Sebastian Wieczorek, University of Exeter, United Kingdom  
*Rate Induced Tipping Points: The Compost Bomb Instability*

Marten Scheffer, Wageningen University, Netherlands  
*Foreseeing Critical Transitions*

## Exploring Other Worlds and Seeing Our Own Anew

Friday, 15 February 1:30PM-4:30PM  
*Organized by:* Samuel P. Kounaves, Tufts University, Medford, MA

### SPEAKERS

Samuel P. Kounaves, Tufts University, Medford, MA  
*Forty Years of Martian Chronicles: A Very Familiar Yet Alien World*

Sanjay S. Limaye, University of Wisconsin, Madison  
*Venus: The Hot Sister of Earth*

Robert T. Pappalardo, NASA Jet Propulsion Laboratory, Pasadena, CA  
*The Icy But Warm Moons of Jupiter*

Bethany L. Ehlmann, California Institute of Technology, Pasadena  
*The Earliest Aqueous, Habitable Environments on Mars: A View from Orbit*

Amanda R. Hendrix, Planetary Science Institute, Tucson, AZ  
*The Organic Lakes of Titan and Other Moons of Saturn*

David T. Blewett, Johns Hopkins University, Laurel, MD  
*Reconsidering Our Ideas of Mercury*

## The Beauty and Utility of Scientific Images

Friday, 15 February 1:30PM-4:30PM  
*Organized by:* Kartik Sheth, National Radio Astronomy Observatory, Charlottesville, VA; Margaret Meixner, Space Telescope Science Institute, Baltimore, MD

### SPEAKERS

Stefi Baum, Rochester Institute of Technology, NY  
*From Star to Shining Galaxy: The Impact of Astronomical Imaging*

Tom Kirchhausen, Harvard Medical School, Boston, MA  
*Clathrin Coats: Now You See It, Now You Don't*

David Yousem, Johns Hopkins Medical Institution, Baltimore, MD  
*The Beauty of the Brain and the Mind*

Alfred McEwen, University of Arizona, Tucson  
*Imaging of Planetary Surfaces*

Claudia Ford, Antioch University, Providence, RI  
*Beautiful Theory: Development of the Ecological Resilience Adaptive Cycle as a Model*

## Tiny But Mighty: Neutrinos and the New Frontiers of Science

Friday, 15 February 3:00PM-4:30PM  
*Organized by:* Katie Yurkewicz, Fermi National Accelerator Laboratory, Batavia, IL

### SPEAKERS

Sam Zeller, Fermi National Accelerator Laboratory, Batavia, IL  
*Nature's Mysterious Messengers*

Christian Spiering, DESY, Zeuthen, Germany  
*Underground, Underwater, Under Ice:  
Capturing Cosmic Neutrinos*

Chang Kee Jung, State University of New York,  
Stony Brook  
*The Challenging Art of Creating and  
Catching Human-Made Neutrinos*

## Compressive Sensing: Sensing Sparse Phenomena in Theory and Practice

Saturday, 16 February 8:30AM-11:30AM

Organized by: Mark Davenport, Georgia  
Institute of Technology, Atlanta; Emmanuel  
Candès, Stanford University, CA

### SPEAKERS

Mark Davenport, Georgia Institute of  
Technology, Atlanta  
*A Compressive Introduction to Compressive  
Sensing*

David Brady, Duke University, Durham, NC  
*Compressive Tomography*

Anna Gilbert, University of Michigan, Ann Arbor  
*Applications of Sparse Signal Recovery in  
Biological Testing*

Justin Romberg, Georgia Institute of  
Technology, Atlanta  
*Blind Deconvolution Using Convex  
Programming*

Rachel Ward, University of Texas, Austin  
*Restricted Isometries and Johnson-  
Lindenstrauss Mappings: Equivalent with a  
Few Flips*

## Neutrinos: Nature's Smallest Surprises

Saturday, 16 February 8:30AM-11:30AM

Organized by: Janet Conrad, MIT, Cambridge

### SPEAKERS

Boris Kayser, Fermi National Accelerator  
Laboratory, Batavia, IL  
*Overview and Open Questions*

Janet Conrad, MIT, Cambridge, MA  
*Neutrino Detectors*

Ryan Patterson, California Institute of  
Technology, Pasadena  
*Neutrino Oscillations and the Search for CP-  
Symmetry Violation*

Giorgio Gratta, Stanford University, CA  
*Are Neutrinos Their Own Antiparticles?*

Mark Vagins, Kavli Institute for the Physics and  
Mathematics of the Universe, Kashiwa, Japan  
*Astrophysical Neutrinos*

Nikolai Tolich, University of Washington, Seattle  
*Geoneutrinos*

## Predictability: From Physical to Data Sciences

Saturday, 16 February 8:30AM-11:30AM

Organized by: Albert-Laszlo Barabasi,  
Northeastern University, Boston, MA

### SPEAKERS

Dirk Helbing, Swiss Federal Institute of  
Technology, Zurich, Switzerland  
*Towards Simulating the Foundations of  
Society*

Chaoming Song, Northeastern University,  
Boston, MA  
*Limits of Predictability in Human Mobility*

Marta Gonzalez, MIT, Cambridge  
*Understanding Road Usage Patterns in  
Urban Areas*

Alessandro Vespignani, Northeastern  
University, Boston, MA  
*From Human Mobility to Real Time  
Numerical Forecasts of Global Epidemic  
Spreading*

Dirk Brockmann, Northwestern University,  
Evanston, IL  
*Are Pandemics Predictable?*

Boleslaw Szymanski, Rensselaer Polytechnic  
Institute, Troy, NY  
*On the Influence of Committed Minorities  
on Social Consensus*

## Worldwide Progress Toward Fusion Energy

Saturday, 16 February 8:30AM-11:30AM

Organized by: Ned R. Sauthoff, Oak Ridge  
National Laboratory, TN

### SPEAKERS

Richard J. Hawryluk, ITER Organization, St.  
Paul Lez Durance, France  
*ITER: A Magnetically Confined Burning  
Plasma*

Debra A. Callahan, Lawrence Livermore  
National Laboratory, CA  
*The National Ignition Facility and the  
Ignition Campaign*

Amanda Hubbard, MIT, Cambridge  
*Advances in Burning Plasma-Related  
Physics and Technology in Magnetic Fusion*

Robert L. McCrory, University of Rochester, NY  
*Alternate Approaches/Direct Drive in  
Inertial-Confinement Fusion*

G.H. "Hutch" Neilson, Princeton Plasma  
Physics Laboratory, NJ  
*Issues and Paths to Magnetic Confinement  
Fusion Energy*

Mike Dunne, Lawrence Livermore National  
Laboratory, CA  
*The Pathway to Laser Inertial Fusion Energy  
(LIFE)*

## How Fundamental Computing Research Touches Everyday Lives

Saturday, 16 February 10:00AM-11:30AM

Organized by: Erwin P. Gianchandani and  
Andrew Bernat, Computing Research  
Association, Washington, DC

### SPEAKERS

Jeannette M. Wing, Carnegie Mellon University,  
Pittsburgh, PA  
*A Day in Your Life*

Kevin Knight, University of Southern California,  
Marina del Rey  
*Human Language Technology: What  
Machines Do with Text and Speech*

Andrew W. Lo, MIT, Cambridge  
*Measuring and Managing the Complexity of  
the Financial System*

## Predictive Model of the Internal Combustion Engine

Saturday, 16 February 1:30PM-4:30PM

Organized by: Ahren Jasper and Nils Hansen,  
Sandia National Laboratories, Livermore, CA

### SPEAKERS

Nils Hansen, Sandia National Laboratories,  
Livermore, CA  
*Exploring Combustion Chemistry in  
Laboratory-Based Flames*

Stephen Klippenstein, Argonne National  
Laboratory, IL  
*Current Challenges in Computational  
Kinetics for Predictive Modeling*

William Green, MIT, Cambridge, MA  
*Chemical Kinetics and Modeling of  
Combustion*

\*Katharina Kohse-Höinghaus, University of  
Bielefeld, Germany  
*Combustion Chemistry*

\*Alison Tomlin, University of Leeds, United  
Kingdom  
*Chemical Models for Combustion*

Sibendu Som, Argonne National Laboratory, IL  
*Simulations of Compression Ignition Engines  
with Detailed Chemistry and Spray Models*

## Understanding the Universe Through Images of the Cosmic Microwave Background

Saturday, 16 February 1:30PM-4:30PM

Organized by: Asantha Cooray, University of  
California, Irvine

### SPEAKERS

Marc Kamionkowski, Johns Hopkins University,  
Baltimore, MD  
*Theoretical Overview of Cosmic Microwave  
Background Studies*

Lyman Page, Princeton University, NJ  
*Results from the Wilkinson Microwave  
Anisotropy Probe*

Bruce Partridge, Haverford College, PA  
*Results from the Planck Mission*

Mark Devlin, University of Pennsylvania,  
Philadelphia  
*Atacama Cosmology Telescope: Status and  
Results*

John Carlstrom, University of Chicago, IL  
*The South Pole Telescope: Status and New  
Results*

James Bock, California Institute of Technology,  
Pasadena  
*Technology Developments and Applications  
in the CMB Studies*

\*Invited



## What's Hot in Cold

Sunday, 17 February 8:30AM-11:30AM

Organized by: Charles W. Clark, Joint Quantum Institute, Gaithersburg, MD

### SPEAKERS

Markus Greiner, Harvard University, Cambridge, MA

*Quantum Simulation: A Microscopic View of Quantum Matter*

Ana Maria Rey, University of Colorado, Boulder  
*Atomic Clocks: From Precise Timekeepers to Quantum Simulators*

Daniel Greif, ETH Zurich, Switzerland  
*Exploring Dirac Points with Ultracold Fermions in a Tunable Honeycomb Lattice*

Gretchen Campbell, Joint Quantum Institute, Gaithersburg, MD  
*Superflow in Bose-Einstein Condensate Rings: Tunable Weak Links in Atom Circuits*

Benjamin Lev, Stanford University, CA  
*New Physics in Strongly Magnetic Ultracold Gases*

## Beauty and the Beast: Supersymmetry and the Dark Matter in the Universe

Sunday, 17 February 1:30PM-4:30PM

Organized by: Maria Spiropulu, California Institute of Technology, Pasadena

### SPEAKERS

Lisa Randall, Harvard University, Cambridge, MA  
*Particle Physics Models with Dark Matter*

Claudio Campagnari, University of California, Santa Barbara  
*Supersymmetry at the Compact Muon Solenoid Experiment of the CERN LHC*

Dan Tovey, University of Sheffield, England  
*Supersymmetry at the ATLAS Experiment of the CERN LHC*

Jonathan Feng, University of California, Irvine  
*The WIMP Miracle and Other Dark Matter Ideas*

Neal Weiner, New York University, New York City  
*The Dynamics of Dark Matter*

## The Mirror World of Antiatoms and Antimolecules

Sunday, 17 February 1:30PM-4:30PM

Organized by: Charles W. Clark, Joint Quantum Institute, Gaithersburg, MD; Michael J. Brunger, Flinders University, Adelaide, Australia

### SPEAKERS

Eun-suk Seo, University of Maryland, College Park  
*Searching the Cosmos for Antihelium*

Michael Charlton, Swansea University, Swansea, Wales  
*Resonant Quantum Transitions in Trapped Antihydrogen Atoms*

Eric A. Hessels, York University, Toronto, ON, Canada

*Trapped Antihydrogen in Its Ground State*

David Cassidy, University of California, Riverside

*Positronium and Its Molecules*

Masaki Hori, Max Planck Institute for Quantum Optics, Garching, Germany  
*Laser Spectroscopy of Antiprotonic Helium*

## The Higgs Boson: Past, Present, and Future

Monday, 18 February 9:45AM-11:15AM

Organized by: James Gillies, European Organization for Nuclear Research (CERN), Geneva, Switzerland

### SPEAKERS

Joseph Lykken, Fermi National Accelerator Laboratory, Batavia, IL  
*What the Latest Results on the Higgs Tell Us*

Howard Gordon, Brookhaven National Laboratory, Upton, NY  
*The LHC Experiments and Their Physics Accomplishments*

Joseph Incandela, University of California, Santa Barbara  
*The Hunt for the Higgs: Has the Origin of Mass Been Found?*

## Public Policy

### Promoting Collaborative, Policy-Relevant Science: Learning from Fulbright

Friday, 15 February 8:30AM-11:30AM

Organized by: Patrick Feng, University of Calgary, AB, Canada; Walter E. Baethgen, Columbia University, Palisades, NY

### SPEAKERS

Walter E. Baethgen, Columbia University, Palisades, NY  
*Building Linkages Between Science and Policy*

Ana Maria Loboguerrero, Government of Columbia, Bogotá  
*Engaging Policy-Makers on Climate Change: Experiences from Latin America*

Roderick King, Massachusetts General Hospital, Boston  
*Using International Collaborations to Tackle Global Health*

Suzanne Pierce, University of Texas, Austin  
*How Collaboration Platforms Can Benefit Science and Advance Research*

Rodrigo Patiño, Cinvestav-Unidad Mérida, Mexico  
*Influence of Local Context on Energy Policy and Innovation*

Laura Forlano, Illinois Institute of Technology, Chicago  
*Fostering Collaborative and Policy-Relevant Science: Lessons from Fulbright*

## Predicting Major Events and Planning for Hazards: An Art or Science?

Friday, 15 February 10:00AM-11:30AM

Organized by: Julia Wilson, Sense About Science, London, United Kingdom; Albert Yuan, *San Lian Life Weekly*, Beijing, China

### SPEAKERS

Kelin Wang, Geological Survey of Canada, Sidney, BC  
*Operational Earthquake Prediction: Castles in the Air*

Azra Ghani, MRC Center for Outbreak Analysis and Modeling, London, United Kingdom  
*Disease Scares: Predicting and Preparing for Outbreaks*

Peter Webster, Georgia Institute of Technology, Atlanta  
*Assessing Risk from Climate Change: Scenario Generation Versus Prediction*

## Tales of the Unexpected: How Science Advisers Manage Uncertainty

Friday, 15 February 10:00AM-11:30AM

Organized by: Geraldine Barry, Joint Research Center, European Commission, Brussels, Belgium

### SPEAKERS

Anne Glover, European Commission, Brussels, Belgium  
*Uncertainty: Perception Is Reality*

John P. Holdren, Office of Science and Technology Policy, Washington, DC  
*Uncertainty in Policy Advice: A U.S. Perspective*

Miles Parker, Department for Environment, Food, and Rural Affairs, London, United Kingdom  
*Uncertainty, Ignorance and Open Policy-Making*

## Getting What We Pay For: Incentives, Peer Review, and Conservatism in Science

Friday, 15 February 1:00PM-2:30PM

Organized by: P. Kyle Stanford, University of California, Irvine

### SPEAKERS

P. Kyle Stanford, University of California, Irvine  
*Changing Incentives and the Closing of the Scientific Mind*

Carole J. Lee, University of Washington, Seattle  
*Double-Speak in Science: Scientific Standards Versus Peer-Review Practices*

Kevin J.S. Zollman, Carnegie Mellon University, Pittsburgh, PA  
*Understanding the Reward System of Science: An Economic Approach*

## Convergence of Physical, Engineering, and Life Sciences: Next Innovation Economy

Friday, 15 February 1:30PM-4:30PM

Organized by: Larry A. Nagahara, National Cancer Institute, Bethesda, MD

### SPEAKERS

Tyler Jacks, MIT, Cambridge  
*Conquering Cancer Through the Convergence of Science and Engineering*

Chad Mirkin, Northwestern University, Evanston, IL  
*Nanostructures in Biology and Medicine*

Franziska Michor, Dana Farber Cancer Institute, Boston, MA  
*Beauty of Evolutionary Dynamics and Applied Mathematics for the Benefit of Oncology*

Robert Austin, Princeton University, NJ  
*Physics of Cancer: The Impact of Heterogeneity*

David Agus, University of Southern California, Los Angeles  
*End of Illness*

## The Science of Politics

Friday, 15 February 1:30PM-4:30PM

Organized by: David Lazer, Northeastern University, Boston, MA; Barbara Jasny, AAAS/Science, Washington, DC

### SPEAKERS

Donald Green, Yale University, New Haven, CT  
*Field Experiments in Political Science: An Overview of Advances*

Susan Hyde, Yale University, New Haven, CT  
*The Diffusion of Democratic Norms*

David Lazer, Northeastern University, Boston, MA  
*Network Science Meets Political Science*

Rose McDermott, Brown University, Providence, RI  
*Biological Influences on Political Outcomes*

Daniel Diermeier, Northwestern University, Evanston, IL  
*Modeling Politics: Promise and Limits of Formal Models in Political Science*

## Understanding and Communicating Uncertainty in Climate Change Science

Friday, 15 February 3:00PM-4:30PM

Organized by: Richard L. Smith, University of North Carolina, Chapel Hill

### SPEAKERS

Murali Haran, Pennsylvania State University, University Park  
*Using Models and Data to Learn About the Future of the Climate*

Mark Berliner, Ohio State University, Columbus  
*Informing Climate Policy-Makers*

Leonard A. Smith, London School of Economics and Political Science, United Kingdom

*Two-Way Communication with Decision-Makers on Uncertainties of Climate Science*

## Capturing “Complicated Duality”: Evaluating the Outcomes and Impacts of Science

Saturday, 16 February 1:00PM-2:30PM

Organized by: Julia E. Melkers, Georgia Institute of Technology, Atlanta

### SPEAKERS

Kaye Fealing, University of Minnesota, Minneapolis  
*What Science Policy Questions Can We Really Answer?*

Julia Lane, American Institutes for Research, Washington, DC  
*Using Topic Modeling To Describe Science: International Experiences*

Julia E. Melkers, Georgia Institute of Technology, Atlanta  
*Beauty or Beast? Evaluation of Science in an Age of Accountability*

## Can Exposure Science Quell the Furor over Environmental Endocrine Disruption?

Saturday, 16 February 1:30PM-4:30PM

Organized by: Justin G. Teeguarden, Pacific Northwest National Laboratory, Richland, WA

### SPEAKERS

Russ Hauser, Harvard School of Public Health, Boston, MA  
*BPA and Human Health: Epidemiologic Evidence and Its Interpretation*

K. Barry Delclos, National Center for Toxicological Research, U.S. Food and Drug Administration, Jefferson, AR  
*Relating Internal BPA Doses to Adverse Effects in Rodent Toxicity Studies*

Daniel R. Doerge, National Center for Toxicological Research, U.S. Food and Drug Administration, Jefferson, AR  
*BPA Pharmacokinetics in the Adult and Perinatal Periods in Experimental Animals*

Justin G. Teeguarden, Pacific Northwest National Laboratory, Richland, WA  
*Estrogen Receptor Activation Potential of Internal Concentrations of BPA in Humans*

Jeffrey Fisher, National Center for Toxicological Research, U.S. Food and Drug Administration, Jefferson, AR

*Estimating Infant and Adult Human Serum Levels of Unconjugated Bisphenol A*

Richard M. Sharpe, University of Edinburgh, United Kingdom  
*Are Causal Associations in Epidemiological Studies of BPA Exposure Plausible?*

## Advanced Manufacturing: Today, Tomorrow, and Beyond

Sunday, 17 February 8:30AM-11:30AM

Organized by: Stephanie Shipp, Science and Technology Policy Institute, Washington, DC

### SPEAKERS

Kent Hughes, Woodrow Wilson Center, Washington, DC

*The Past and Future of Advanced Manufacturing Partnerships*

Sanjay E. Sarma, MIT, Cambridge  
*Advancing to Advanced Manufacturing: Avoiding the Tyranny of Bulk*

Dieter Ernst, East-West Center, Honolulu, HI  
*Indigenous Innovation and Its Effect on China's Semiconductor Industry*

Nayane Gupta, Science and Technology Policy Institute, Washington, DC  
*Future Global Trends in Advanced Manufacturing*

Stephen Ezell, Information Technology and Innovation Foundation, Washington, DC  
*A Strategy for Revitalizing American Manufacturing and Traded Sector Competitiveness*

Christopher Hill, SRI International, Knoxville, TN  
*The Role of Advanced Manufacturing in the Post-Scientific Society*

## Effective Science for Community Adaptation to Climate Change

Sunday, 17 February 8:30AM-11:30AM

Organized by: Thomas Webler, Social and Environmental Research Institute, Greenfield, MA

### SPEAKERS

JoAnn Carmin, MIT, Cambridge, MA  
*Knowledge Needs and Applications in Urban Climate Adaptation*

Kirstin Dow, University of South Carolina, Columbia  
*Understanding Local Adaptation Concerns and Challenges in South Carolina*

Paul H. Kirshen, University of New Hampshire, Durham  
*Water Infrastructure Management Under a Changing Climate*

Susanne C. Moser, Susanne Moser Research and Consulting, Santa Cruz, CA  
*Defining Adaptation Success: Views from Science and Coastal Management*

William Solecki, CUNY Institute for Sustainable Cities, Hunter College, New York City  
*Connections Between Climate Change Science and Adaptation Planning in New York City*

Thomas Webler, Social and Environmental Research Institute, Greenfield, MA  
*Progress in New Tools for Participatory Vulnerability Analysis to Climate Stressors*

## Role of Science in the American Democracy: Roots, Tensions, and Paths Forward

Sunday, 17 February 8:30AM-11:30AM

Organized by: Peter Frumhoff and Pallavi Phartiyal, Union of Concerned Scientists, Cambridge, MA; James McCarthy, Harvard University, Cambridge, MA

## SPEAKERS

Sheila Jasanoff, Harvard University, Cambridge, MA  
*Citizenship and the Personal Genomics Revolution*

Dan M. Kahan, Yale Law School, New Haven, CT  
*Democracy, Cultural Cognition, and the Science Communication Environment*

Francesca T. Grifo, Union of Concerned Scientists, Washington, DC  
*Tools for Strengthening Scientific Integrity in Federal Decision-Making*

\*Olympia Snowe, U.S. Senate, Washington, DC  
*Restoring Evidence-Based Decision-Making to the U.S. Congress*

## Toward Bridging the Duality of Science: Seed-Push, Issue-Driven, or “Encounter”?

Sunday, 17 February 8:30AM-11:30AM

*Organized by:* Tateo Arimoto, National Graduate School for Policy Studies, Tokyo, Japan; Yuko Harayama, Organization for Economic Cooperation and Development, Paris, France; Chikako Maeda, Japan Science and Technology Agency, Tokyo, Japan

## SPEAKERS

Kumi Okuwada, National Institute of Science and Technology Policy, Tokyo, Japan  
*Transformation of Foresight Activities Toward Science, Technology, and Innovation Policy*

Daniel Sarewitz, Arizona State University, Tempe  
*Outcome-Oriented Research and Development Strategy*

Nobuhide Kasagi, Japan Science and Technology Agency, Tokyo  
*How We Can Direct and Link Scientific Research to Social Wishes*

Barbara J. Sahakian, University of Cambridge, United Kingdom  
*A Vision for Excelling in Mental Health and Well-Being*

Frans Brom, Rathenau Institute, The Hague, Netherlands  
*Research and Development Response to Societal Needs in the Information Technology Area*

## Coal, Communities, Commerce, and China: A Nexus for the Sciences and Public Policy

Sunday, 17 February 1:30PM-4:30PM

*Organized by:* Donna Gerardi Riordan, DGR Strategies, Eastsound, WA

## SPEAKERS

Dan Kammen, University of California, Berkeley  
*Energy and the Coal Economy*

Melissa Ahern, Washington State University, Spokane  
*Impact of Exposure to Coal Dust on Animal and Human Health*

Pamela Campos, Environmental Defense Fund, Boulder, CO  
*Timely Science To Inform Laws and Public Policy*

David Schlissel, Institute for Energy Economics and Financial Analysis, Belmont, MA  
*Beyond the Hype: The Full Economic Impacts of Using Coal*

Deborah Brosnan, University of California, Davis  
*Scientists and Policy: A Place at the Table in Public Policy Decision-Making*

## The Beauty, Benefits, and Challenges of Transformative Research

Monday, 18 February 9:45AM-11:15AM

*Organized by:* Bhavya Lal, Science and Technology Policy Institute, Washington, DC; Edward J. Hackett, Arizona State University, Tempe

## SPEAKERS

Helga Nowotny, European Research Council, Brussels, Belgium  
*Designing Transformative Research Programs: The European Experience*

John N. Parker, Arizona State University, Tempe  
*Ecology Transformed: NCEAS and Organizing for Synthesis*

Stephanie E. Hampton, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA  
*Ecology Transformed: NCEAS and Organizing for Synthesis*

Terttu Luukkonen, Research Institute of the Finnish Economy, Helsinki, Finland  
*Role of Peer Review in Supporting Transformative Research*

## Sustainability and Resource Management

### Socio-Hydrology: Co-Evolution and Future of Human-Water Resource Systems

Friday, 15 February 8:00AM-9:30AM

*Organized by:* Veena Srinivasan, Pacific Institute, Oakland, CA

## SPEAKERS

James Wescoat, MIT, Cambridge, MA  
*Rethinking the “Duty of Water” Concept in Socio-Hydrology*

Ignacio Rodriguez-Iturbe, Princeton University, NJ  
*Observed and Potential Global Pathways of Virtual Water Trade*

Christopher Scott, University of Arizona, Tucson  
*Resource-Use Efficiency, Once Paradigm Now Paradox: The Socio-Hydrology of Waste*

## Getting to Global Ecological Sustainability: Climate and Small-Planet Ethics

Friday, 15 February 8:30AM-11:30AM

*Organized by:* Kai Ming A. Chan and Paige Olmsted, University of British Columbia, Vancouver, Canada

## SPEAKERS

Jonathan A. Foley, University of Minnesota, St. Paul  
*Meeting Global Needs of Food, Fiber, Fuel, and Freshwater: All from One Planet*

David Wilcove, Princeton University, NJ  
*Prognosis for and Relevance of Biodiversity on Our New Small Planet*

Benjamin S. Halpern, University of California, Santa Barbara  
*Managing the Ocean Portfolio: Regional Applications of the Ocean Health Index*

Simon A. Levin, Princeton University, NJ  
*Mission Impossible: “Proof-First” Management of Complex Adaptive Systems*

Kai Ming A. Chan, University of British Columbia, Vancouver, Canada  
*Toward Integrative Science-Inspired Solution-Structures for Sustainability: e.g., C3*

Jane M. Lubchenco, Oregon State University, Corvallis  
*Meeting the Monumental Challenges of Climate Change and Other Drivers*

## Global Health and Environmental Impacts of E-Waste Recycling

Friday, 15 February 3:00PM-4:30PM

*Organized by:* Erica L. Dahl, SafeBridge Consultants Inc., New York City; Bruce A. Fowler, ICF International, Fairfax, VA

## SPEAKERS

Sanmi Areola, Environmental Health Services, Metro Public Health Department, Nashville, TN  
*The Scope of the Problem: International Regulation and the Basel Treaty*

Myrto Petreas, California Department of Toxic Substances Control, Berkeley  
*Regulated and Unregulated Contaminants in California Waste Streams*

Aimin Chen, University of Cincinnati Department of Environmental Health, OH  
*E-Waste Recycling in Developing Countries: Concerns of Developmental Toxicity*

## Sustainable Chemical Manufacturing in a Resource-Limited World

Saturday, 16 February 8:00AM-9:30AM

*Organized by:* Susannah Scott, University of California, Santa Barbara

## SPEAKERS

Paul J. Chirik, Princeton University, NJ  
*Modern Alchemy for Industrial Commodity Chemical and Pharmaceutical Synthesis*

\*Invited



Stephen A. Miller, University of Florida, Gainesville  
*Redesigning Petroleum-Based Plastics with Renewable Feedstocks*

Theresa G. Kotanchek, The Dow Chemical Company, Midland, MI  
*Sustainable Chemical Manufacturing Is a Competitive Advantage*

### **From Promise to Proof: How Ecosystem Service Science Is Transforming Real Decisions**

Saturday, 16 February  
8:30AM-11:30AM

*Organized by:* Karen L. McLeod, COMPASS, Corvallis, OR; Heather Tallis, The Natural Capital Project, Stanford, CA; Erica Goldman, COMPASS, Silver Spring, MD

#### **SPEAKERS**

Neil Hawkins, The Dow Chemical Company, Midland, MI  
*Nature Meets the Bottom Line: A Collaboration Between Dow and The Nature Conservancy*

Heather Tallis, The Natural Capital Project, Stanford, CA  
*Redeeming Sins of Omission: Accounting for People in Mitigation*

Glenn-Marie Lange, The World Bank, Washington, DC  
*Transforming Economic Policy Through Natural Capital Accounting*

Belinda Reyers, Council for Scientific and Industrial Research, Stellenbosch, South Africa  
*From Bedlam to Bedfellows: Reducing Risk Through Ecosystem Service Partnerships*

Elena Bennett, McGill University, Ste-Anne-de-Bellevue, QC, Canada  
*Reconnecting People to Nature: Planning for Multi-Functional Agricultural Landscapes*

Anne Guerry, Natural Capital Project, Seattle, WA  
*Battle Scars and Kumbaya Moments: Stories from the Frontlines of Coastal Decisions*

### **Water Purification and Monitoring Under Minimal Resource Setting**

Saturday, 16 February  
1:30PM-4:30PM

*Organized by:* Sushanta Mitra and Thomas Thundat, University of Alberta, Edmonton, Canada; Ni-Bin Chang, University of Central Florida, Orlando

#### **SPEAKERS**

Alexander Zehnder, Nanyang Technological University, Singapore  
*Solar Disinfection of Drinking Water*

Hauke Harms, Helmholtz Center for Environmental Research, Leipzig, Germany

*Arsenic Monitoring in Drinking Water*

Jamie Bartram, University of North Carolina, Chapel Hill  
*Technology for Water and Health in Rural Setting*

Greg Goss, University of Alberta Water Initiative, Edmonton, Canada  
*Meeting the Challenges of Clean Water Delivery to Small and Remote Communities*

Bharat Lal, Center for Science and Environment, New Delhi, India  
*Excreta Matters: Paradigm Shift in Waste-Water Management*

### **Is the Future of Conservation at a Crossroads?**

Saturday, 16 February  
3:00PM-4:30PM

*Organized by:* Colin F. Quinn, NOAA, Washington, DC; Jennifer Howard, NOAA, Silver Spring, MD

#### **SPEAKERS**

Peter Kareiva, The Nature Conservancy, Seattle, WA  
*Next-Generation Conservation Science: Corporations, Human Needs, and Escaping the Bubble*

Alan Thornhill, U.S. Department of the Interior, Washington, DC  
*Better Integration of Scientists into Leadership and Science into Policy: The Future of Conservation*

John Robinson, Wildlife Conservation Society, Bronx, NY  
*Conservation and Sustainability in a Human-Dominated World*

### **What Are the Roles of Knowledge Institutions in Sustainability?**

Monday, 18 February  
9:45AM-12:45PM

*Organized by:* David D. Hart, University of Maine, Orono; Lewis Gilbert, University of Minnesota, Saint Paul; Margaret A. Palmer, National Socio-Environmental Synthesis Center, Annapolis, MD

#### **SPEAKERS**

James Buizer, University of Arizona, Tucson  
*Institutional Whiplash: Challenges and Critical Ingredients for Rapid Change at Arizona State University*

Jonathan A. Foley, University of Minnesota, St. Paul  
*Moving the Needle: Designing Institutions To Make a Difference in Global Issues*

Lisa J. Graumlich, University of Washington, Seattle  
*Stakeholders, Social Capital, and Sustainability*

David D. Hart, University of Maine, Orono  
*Wicked Problems, Wicked Good Solutions: Maine as a Sustainability Science Laboratory*

Anne R. Kapuscinski, Dartmouth College, Hanover, NH  
*Shared Learning Systems for Sustainability*

Margaret A. Palmer, National Socio-Environmental Synthesis Center, Annapolis, MD  
*Boundary-Crossing Knowledge on Socio-Environmental Systems: Can It Be Fostered?*

### **What Is Science's Role in Developing Aquaculture as a Sustainable Use of the Ocean?**

Monday, 18 February  
9:45AM-12:45PM

*Organized by:* Michael Rust, NOAA Office of Aquaculture, Silver Spring, MD; Paul A. Sandifer, NOAA, Washington, DC; Barry Costa-Pierce, University of New England, Biddeford, ME

#### **SPEAKERS**

Barry Costa-Pierce, University of New England, Biddeford, ME  
*A Framework for Assessing Sustainability of Marine Aquaculture Operations*

John Forster, Forster Consulting Inc., Port Angeles, WA  
*The Potential for Seaweed Culture To Provide Ecosystem Services and Useful Products*

Betsy Peabody, Puget Sound Restoration Fund, Bainbridge Island, WA  
*Shellfish Culture: High-Quality Seafood and a Means of Enhancing Ecosystem Services*

Ole Torrissen, Institute of Marine Research, Bergen, Norway  
*Marine Finfish: Super-Chickens of the Sea?*

Michael Rust, NOAA Office of Aquaculture, Silver Spring, MD  
*Reducing the Fish in Fish Feed: Sciences' Rush to Develop Alternative Ingredients*

# A SPECIAL INVITATION FOR ALL NEWSROOM REGISTRANTS

**FRIDAY, 15 FEBRUARY • 7:00PM–10:00PM**

AAAS will host a reception at historic **Fenway Park** in Boston, to honor the winners of the **2012 AAAS Kavli Science Journalism Awards**.

All Newsroom registrants are welcome. Shuttle buses will be provided from the Hynes Convention Center starting at 6:45 PM. **Newsroom badges required.**



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