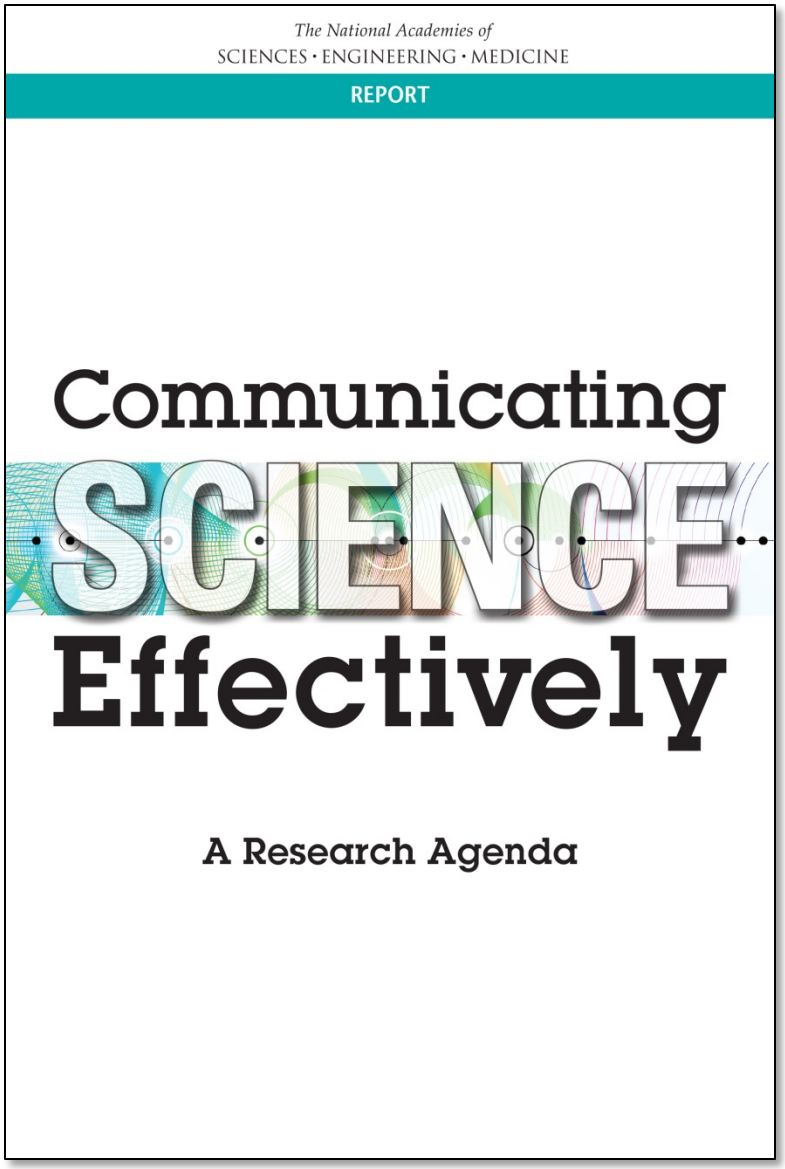

Public Discussion

January 10, 2017

11:00 a.m. to 1:15 p.m. EST

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Division of Behavioral and Social Sciences and Education

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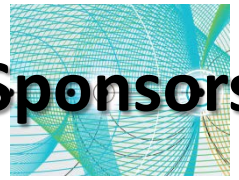

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Committee on the Science of Science Communication: A Research Agenda

- **Alan Leshner** (NAM, *Chair*), American Association for the Advancement of Science (retired)
- **Dietram Scheufele** (*Vice Chair*), University of Wisconsin-Madison
- **Ann Bostrom**, University of Washington
- **Wändi Bruine de Bruin**, University of Leeds, UK; Carnegie Mellon University
- **Karen Cook** (NAS), Stanford University
- **Thomas Dietz**, Michigan State University
- **William Hallman**, Rutgers University
- **Jeffrey R. Henig**, Teachers College, Columbia University
- **Robert Hornik**, University of Pennsylvania
- **Andrew Maynard**, Arizona State University
- **Matthew Nisbet**, Northeastern University
- **Ellen Peters**, Ohio State University
- **Sylvia Rowe**, SR Strategy, Washington, DC; Tufts University

Committee on the Science of Science Communication: A Research Agenda

- **Melissa Welch-Ross**, *Study Director*
- **Holly Rhodes**, *Program Officer*
- **Emily Backes**, *Research Associate*
- **Leticia Garcilazo Green**, *Program Assistant*

The need for this report

- Society's need for science communication has never been greater.

  Science is a factor in virtually every issue of modern life.

  There are many controversial science issues right now

  Science controversy is not new (think evolution in schools)

Examples of current science-related contentious issues

- climate change
- stem cells
- nanotechnology
- vaccines
- hydraulic fracturing
- genetically modified organisms
- nuclear energy
- education policy
- obesity

The need for this report

- Society's need for science communication has never been greater.
- Effective science communication is complex and learned

  Especially when the science relates to controversial issues.

Charge to the Committee

To identify

- what is now known about effective science communication
- what additional research might make science communication more effective, particularly when the issues are contentious.

Cross-cutting themes

Align communication approaches with goals (Know what you're trying to accomplish)

- share the findings and excitement of science
- increase appreciation for science as a useful way of understanding and navigating the modern world
- increase knowledge and understanding of the science related to a specific issue.
- influence opinions, behavior, and policy preferences
- engage with diverse groups so that their perspectives about science related to important social issues can be considered

Recognize diversity of science communicators and audiences ("Know before whom you stand")

- scientists
- media
- advocacy organizations
- think tanks
- corporations
- nonprofit research organizations
- health professionals
- government agencies
- amateur science enthusiasts
- policymakers
- political commentators
- individual activists

Ethical issues in science communication

- What science should be communicated, when, how and to whom?
- Should science communicators engage in advocacy?
- Should science communicators actively try to influence opinions or actions?

Moving beyond the "deficit model" (It doesn't hold)

Many people believe: If science communication were only done "better", people would make choices more consistent with the scientific evidence.

However, people rarely make decisions based only on science

They also take into account their own goals and needs, knowledge, values and beliefs.

Major Challenges for Science Communicators and Researchers

Complexities of Communicating science

Individual and social factors:

- the scientific information itself, which can be both complex and uncertain
- the ways in which people process information
- social influences, such as social networks, communities, norms, group members, and loyalties

Complexities of Communicating Science

Research need:

- Better understand the importance of individual and social factors for different audiences, and the way they **interact** in various contexts.

Engaging formally with the public

Public engagement can help foster exchange of information and find common ground, but it is difficult to do well.

Engaging formally with the public

Important research questions:

- What particular structures and processes for public engagement best enable science to be communicated effectively?
- To what degree and how do these approaches generalize or need to be tailored according to the diversity of the participants, the decisions to be made, and the nature of the topic?

The special case of policymaker audiences

- Evidence about effective approaches is sparse

Important research questions:

- How is scientific information accessed, encountered, and used by policy makers in formal policy processes?
- How can science communication affect policy processes?
- How are policy processes affected by science communication when science is involved in public controversy?
- What are the conditions for success in communicating science?
  - Does it matter who the communicator is?

The Added Complexity of Public Controversy

Three key factors that require more research

- Whether conflicts over **beliefs, values, and interests** are central to the debate.
- Whether there is or if the public perceives **uncertainty** about the science
- The voices of **organized interests and influential individuals can be amplified** in public discourse.

The Added Complexity of Public Controversy

Important questions for research include:

- How can science be communicated effectively amid conflicts over beliefs and values?
- What are effective ways of communicating scientific consensus, as well as degrees or types of uncertainty?
- How can trusted and authoritative voices from science can be heard?

The Complex and Competitive Media Environment

- Communication takes place in a fast-changing environment.
- Social networks can affect beliefs, attitudes, and behaviors.
- Social media are increasingly being used to spread both accurate and inaccurate scientific information.

The Complex and Competitive Media Environment

Important questions for research include:

- How can accurate information about the state of the science be heard among competing messages and sources of information?
- How best to communicate science through social media platforms, blogs, etc.?

Strengthening the Research Enterprise

A Systems Approach to Research

Science communication is a complex system of **many interrelated parts**

- the **content** and **format** of information,
- the diverse **organizations** and **individuals** involved,
- the **channels** of communication,
- the political, social and cultural **contexts** in which communication takes place,
- many (sometimes competing) **voices** offer (sometimes conflicting) information.

These elements **and the way they interact** need to be better understood

Categories of Research Needs

- randomized controlled field experiments to assess impact
- research that simulates real-world communication environments
- analyses of large data sets, such as those derived from social media
- aggregation and sharing of evidence across disciplines, such as through the creation of registries of effectiveness studies

Building the Science Communication Research Enterprise

- support and engage in researcher-practitioner partnerships
- foster more interdisciplinary work and dialogue
- recruit more researchers from neighboring disciplines
- develop policy mechanisms for rapid review and funding of science communication when needed

Individual and Social Influences on Science Communication

Use what we know from the science of science communication

For example:

Apply knowledge of how people *find, filter, and figure out the meaning* of scientific information

Use the science of science communication to design, implement, and evaluate communications involving science, scientific information, and its potential implications

Needs for systematic research

- test and expand principles beyond specific issues, disciplines, and audiences
- extend the principles of the science of science communication to new platforms for communicating about science
- take into account the complex social networks, norms, group memberships, and loyalties that influence people's beliefs, decisions, and behaviors

Mental Models Matter

When interpreting new information, people:

- draw on their beliefs about ***how*** the world works, and ***why*** it works in the way that it does.
- use analogies, metaphors, prior experiences
- rely on familiar narratives
- assess the communicator's values and motivations
- and a take variety of other well-known shortcuts.

Communicators need:

- much greater understanding of people's starting points

Facts matter . . . but they aren't enough

- Research is needed to improve making complex information from science accessible to diverse audiences

- However, many scientists continue to believe facts *alone* are persuasive.

Communicating science amid science-related controversy

How and when the public thinks about science

- Most don’t think much about science unless it impinges on decisions they have to make.
- People tend to use shortcuts, don’t deal with uncertainty the way scientists are trained to and tend to accept information consistent with what they already believe.

Science-related controversy

Science-related controversies have three key features that make communication especially challenging:

- **conflicts over beliefs, values, and interests** are central to the debate
- the public perceives **uncertainty**,
- the voices of **organized interests** and **influential individuals** are amplified

It is important to remember that these conflicts are only partially about facts; **they nearly always involve differences in values and interests** as well.

Formal public engagement

- Formal engagement of the public with science can be beneficial if done well, but it is difficult.
- Research provides a basis for diagnostic questions to determine when, where, and how best to communicate.
- Formal public engagement can occur at the local to international levels.

A Complex, Dynamic, and Competitive Communication Media Environment

Today's media ecosystem

- fragmented and faster paced
- voices competing for attention
- changes in news coverage
- new online modalities (lower cost, fewer gatekeepers to establish facts)

Themes from research to date

- How individual preferences and other characteristics of audiences shape the selection of media, media sources, and science content online
- How social interactions and norms of online communities affect people's engagement with and views of scientific information
- How media create and spread misinformation or accurate scientific information

Research generally needs to:

- Keep pace with change in the media landscape
- Devise more comprehensive models of news and social media
- Glean more information about news-sharing networks
- Empirically evaluate new opportunities for communicating science and engaging the public

Examples of important research questions

How can accurate information about science be heard among many competing messages and sources of information?

What are effective ways of communicating science on social media platforms, online games, and blogs?

What impact do social media have on understanding and perceptions of science and use in decision-making?

Are some forms of media better than others for achieving certain science communication goals?