

Science Communication Research: What's the Big Idea?

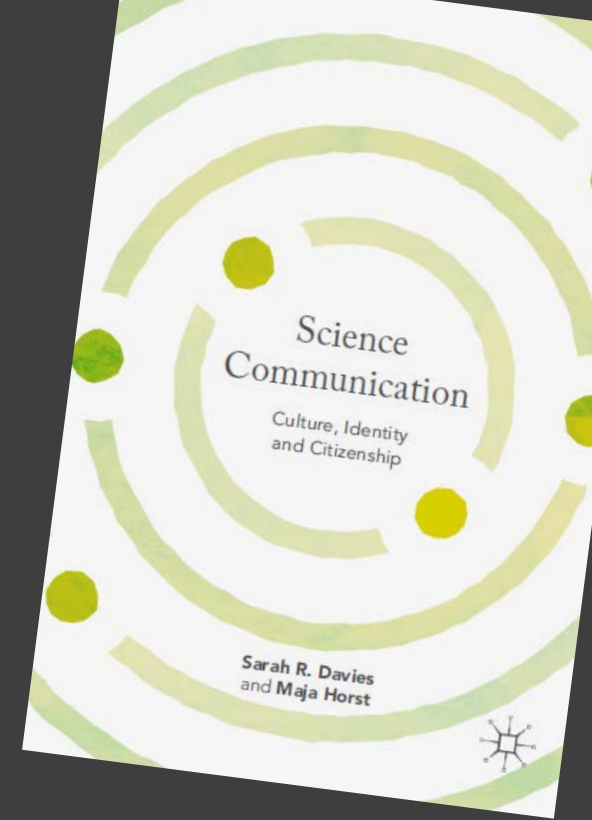
BRIAN TRENCH, PCST NETWORK; DUBLIN CITY UNIVERSITY³

PARI WORKSHOP, GARCHING, MAY 2017



Science communication is not simply about making difficult things more simple, and it is something more than the exchange of scientific knowledge from those who know it to those who do not. It is an integral part of society which has huge impacts on welfare, democracy and culture.

Science communication ... is tied to organisations, identities, spaces, emotions, careers, futures, and many other aspects of social life.



The image shows the cover of a book titled 'Forschungsfeld Wissenschaftskommunikation'. The top half of the cover features a photograph of a satellite in space, with the Earth's horizon and atmosphere visible below. The bottom half of the cover is a solid yellow color. The authors' names are listed in a dark red font: Heinz Bonfadelli · Birte Fähnrich, Corinna Lüthje · Jutta Milde, and Markus Rhomberg · Mike S. Schäfer Hrsg. The title 'Forschungsfeld Wissenschaftskommunikation' is written in a large, bold, dark red font, with 'Forschungsfeld' on the first line, 'Wissenschafts-' on the second, and 'kommunikation' on the third.

Heinz Bonfadelli · Birte Fähnrich
Corinna Lüthje · Jutta Milde
Markus Rhomberg · Mike S. Schäfer *Hrsg.*

Forschungsfeld Wissenschafts- kommunikation

Historical and theoretical
foundations

Communication within science

Communication out of science

Communication about science

Thematic areas of science
communication

Practice and research perspectives



Object of science communication research is not limited to mass media

All forms of communication within / about / from science can be considered, including parts of risk, environmental and health communication

Actors, channels, forms and themes of science communication are diverse, and diversifying

Science communication research is being institutionalised through professional networks, universities, academic publishing

Science Communication and Science in Society: A Conceptual Review in Ten Keywords

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Dublin City University (IR)

Abstract: Originating in science outreach and influenced by social studies of science, science communication is now an established field of graduate education, of empirical and applied studies and of theoretical reflection. The establishment of this field has been marked inter alia by the publication of dedicated journals, reference books and handbooks, and the organisation of regular international conferences and professional networks. The process reflects developments in science-society relations as expressed, for example, in notions of post-academic, post-normal, or mode-2 science, all of which posit the permeability of the previously conceived boundaries, leading to more communication between institutions and between the cultures of science and of institutions and the culture of the wider society. In this article we have selected ten terms that are frequently used in the public, professional and policy discussions about questions of science in society.

- ❑ Popularisation
- ❑ Deficit
- ❑ Model
- ❑ Dialogue
- ❑ Engagement
- ❑ Participation
- ❑ Publics
- ❑ Expertise
- ❑ Visible / public scientists
- ❑ Scientific culture

Uses of 'dialogue' in PCST conference papers

near-synonym for communication, e.g. between science and society / art / tradition / public / young; between disciplines / generations

difficult aim of sci-comm, e.g. in British GM consultations

distinct from forms of one-way communication

something to be evaluated / assessed / qualified, e.g. as real, deliberative, informal

widely practised, e.g. in science cafés, science centres, science theatre

Uses of 'dialogue'

Robert Logan, 1991

Scientific as well as journalistic credibility will be enhanced by a new dialogue between scientists and the public that helps the public adapt to scientific and technological change rather than current efforts to improve the public's knowledge about science, or boost science literacy.

Ekkehard Winter, Stifterverband für die Deutsche Wissenschaft, 2002

There has been much confusion as to goals and target groups of the initiative "Science in Dialogue" that started in Germany in 1999 ... this vagueness has left much room for experiments in science communication and dialogue which can now be analysed for further action.

Uses of 'engagement'

'Conceptual key' in sci-comm, early 2000s

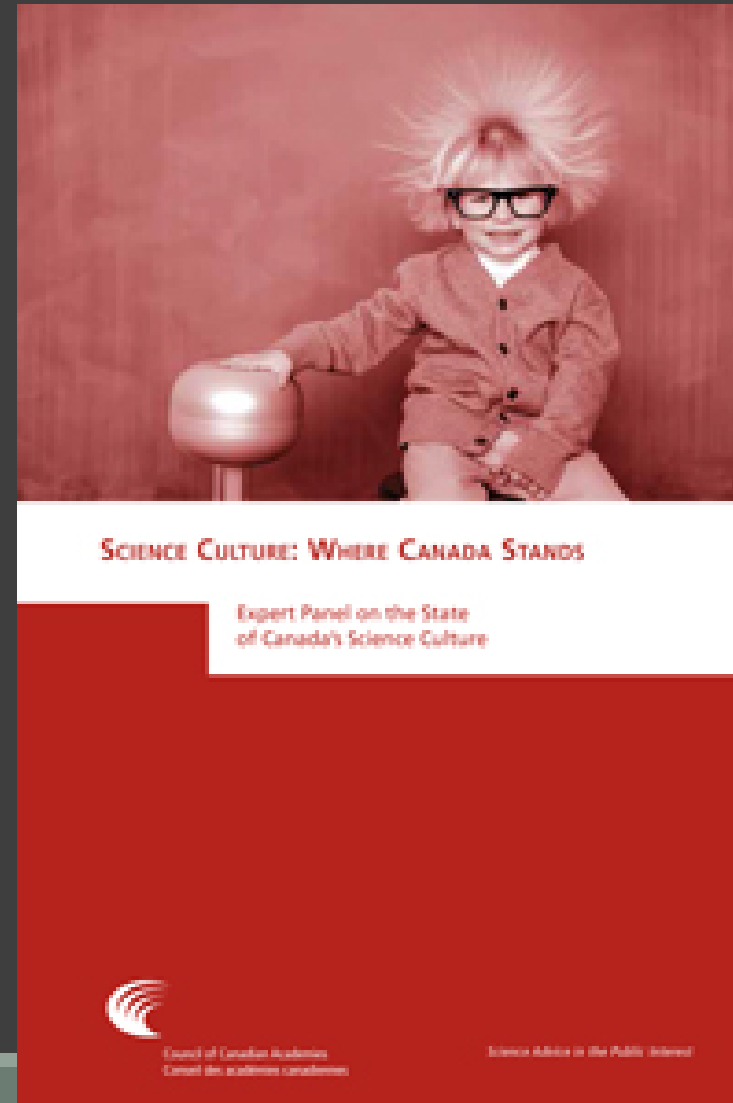
New strategic orientation or "fashion", mid-2000s

Evaluated / typologised / interrogated, 2010s

Variously interchangeable with consultation / dialogue / communication

Refers both to scientists' / institutions' activities, and to audience / involvement / attention

Scientific culture / science culture / culture of science



Uses of 'scientific culture'

culture of the scientific communities

near-synonym for scientific literacy (in public culture)

perception of science (and technology) in society

standing and image of science in society

antonym of traditional culture

THE PUBLIC COMMUNICATION OF SCIENCE

Edited by
Massimiano Bucchi and Brian Trench

CRITICAL CONCEPTS IN
SOCIOLOGY



The Public Communication of Science

Edited by **Massimiano Bucchi, Brian Trench**

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1,508 pages | 75 B/W Illus.

*Name some authors you
expect to find here*

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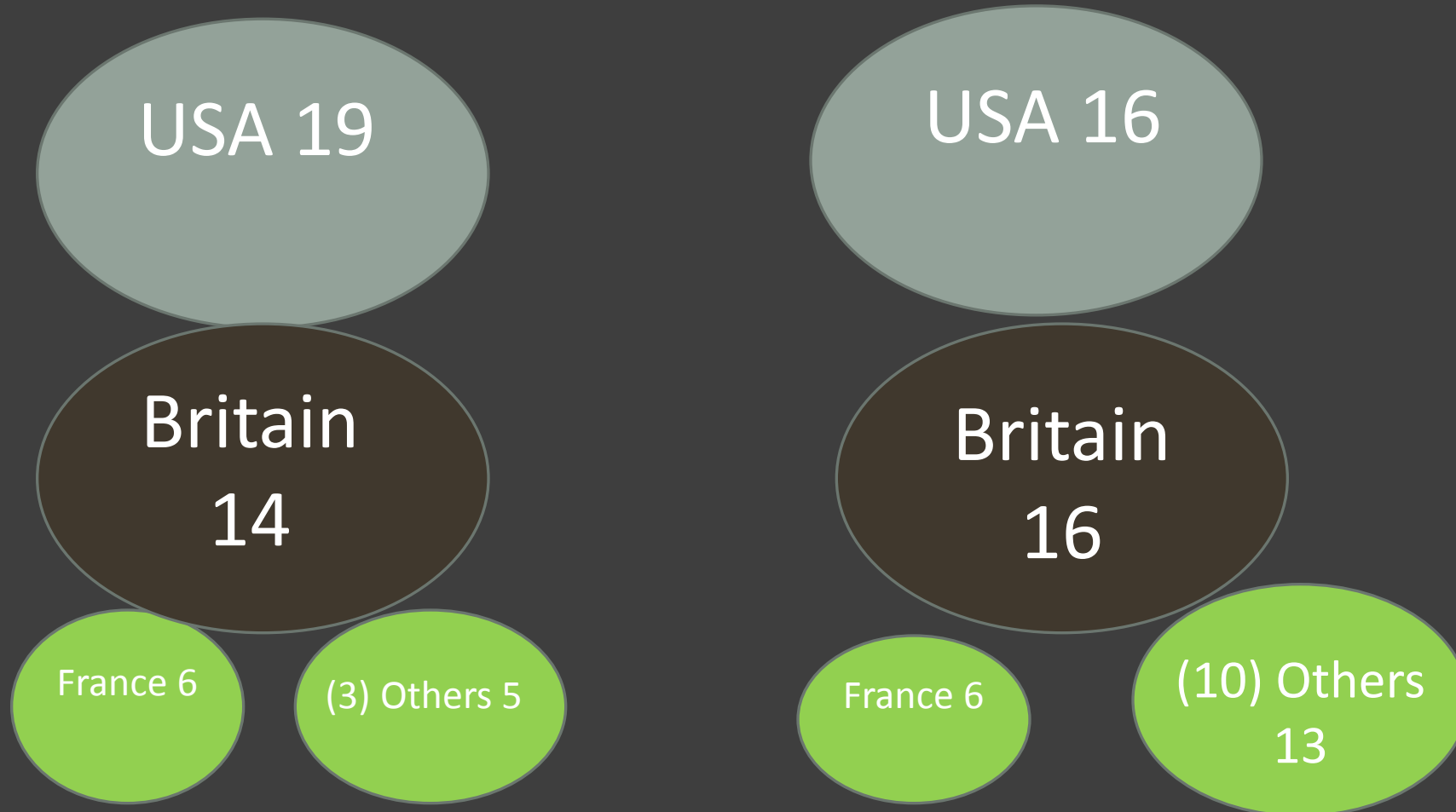
*Richard Dawkins?
Stephen Jay Gould?
Bill Bryson?
Carl Sagan?
Thomas Kuhn?
Rachel Carson?
Sheila Jasanoff?
Isaac Asimov?*

Naming 'science communication' (-1994, 1995-)

2
papers

19 papers

Authors' countries (- 1994, 1995-)



Single or multiple authors (- 1994, 1995-)

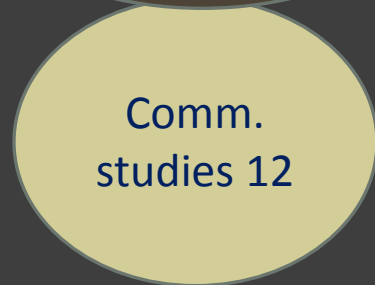
33
papers

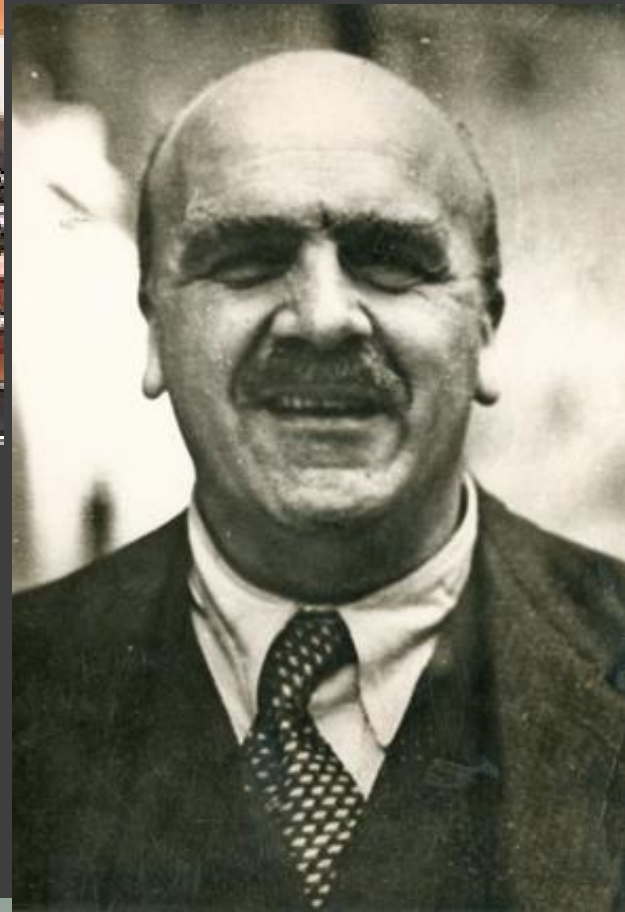
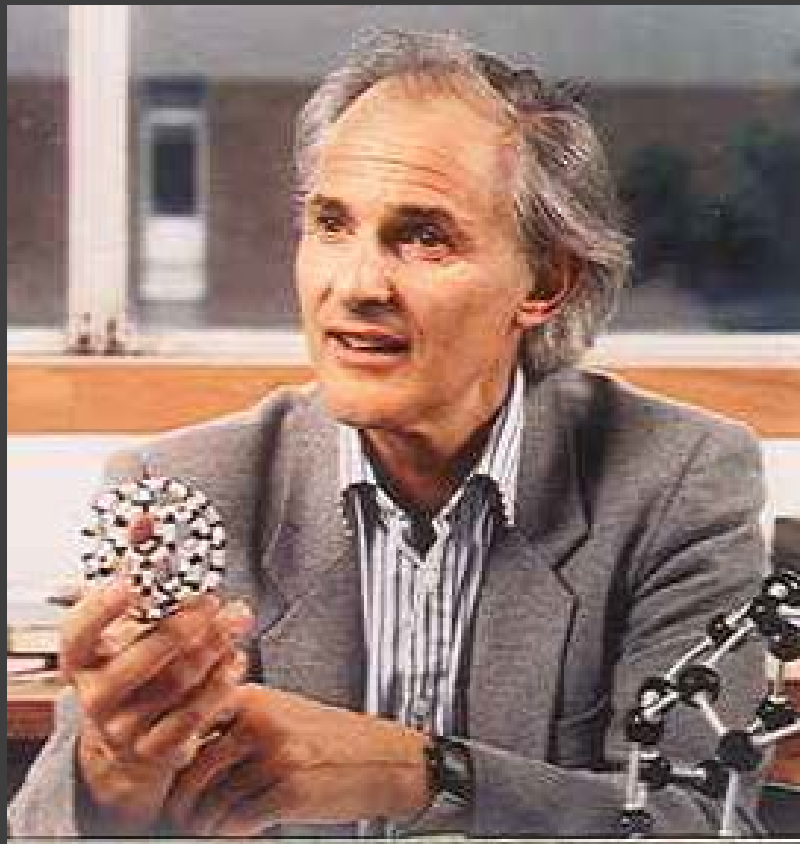
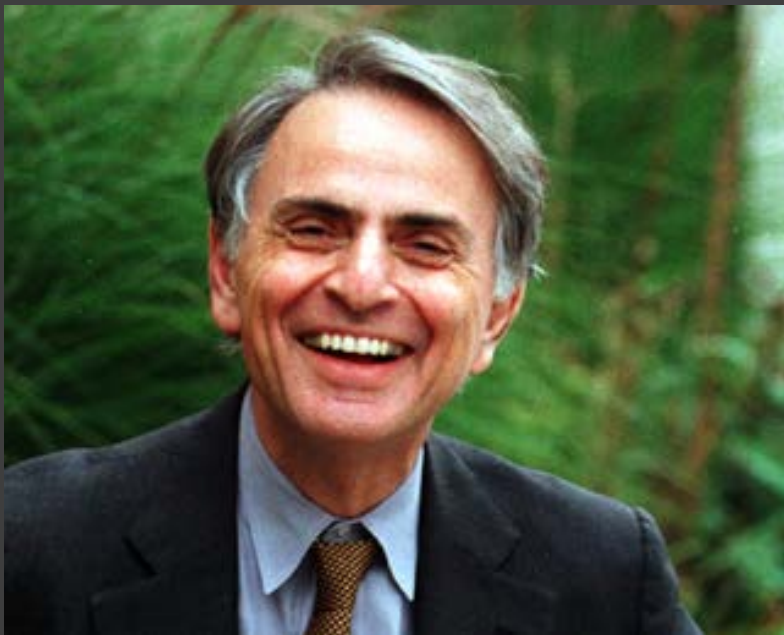
4

30
papers

12

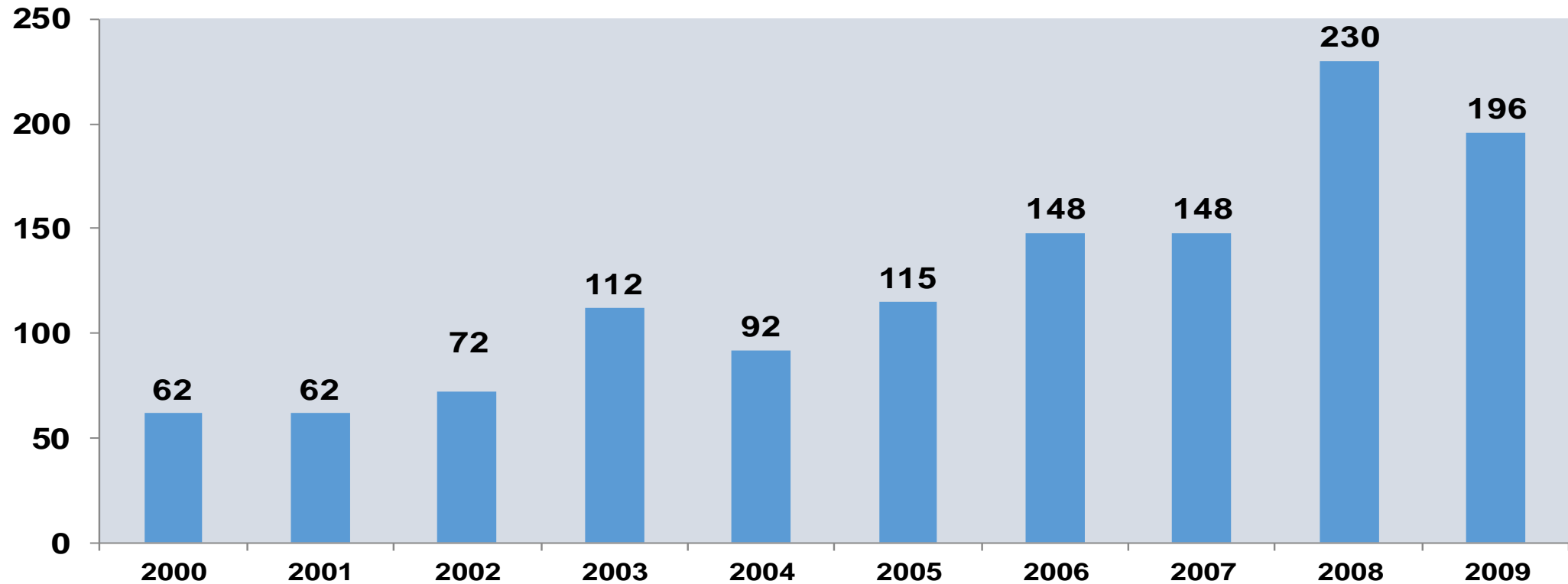
Authors' disciplines (- 1994, 1995-)



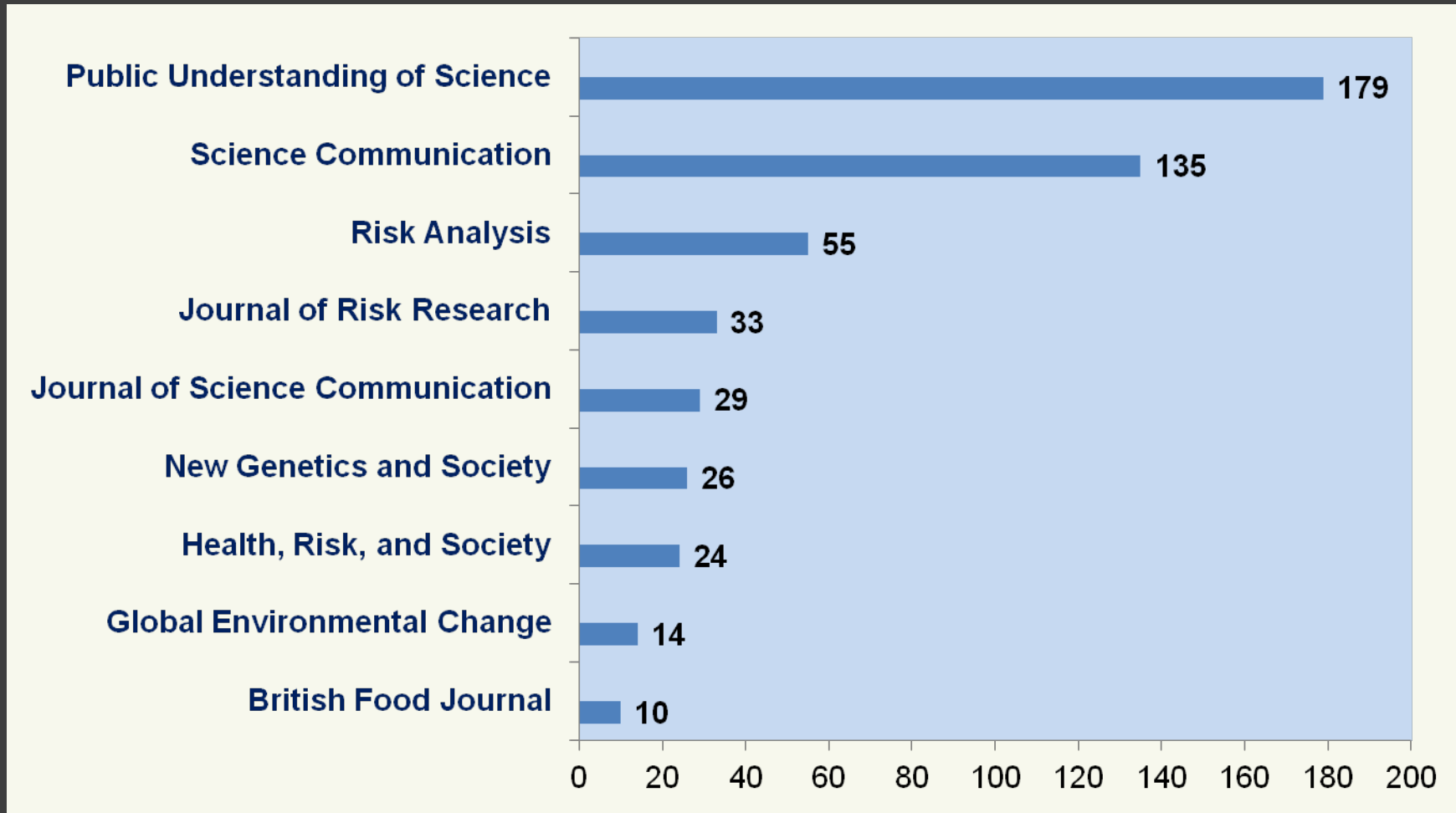




Sci-comm articles published per year based on keywords search



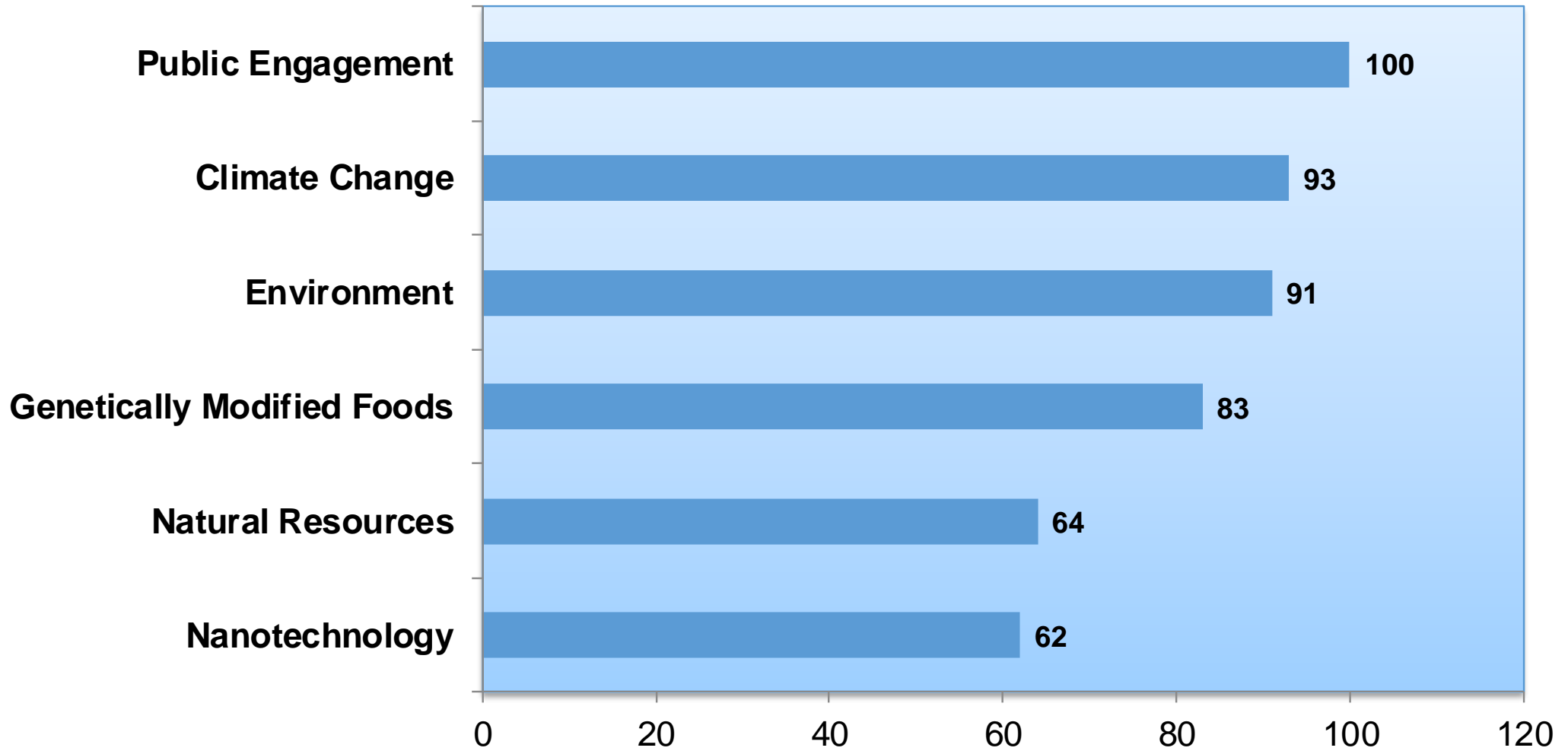
Source: R. Borchelt (2012) presentation to PCST conference, Florence



Top 10 journals accounted for 518 of 1,237 papers (42%)

Source: R. Borchelt (2012) presentation to PCST conference, Florence

Frequency of Publications on Selected Topics, 2000-2009



Research Method	Total Articles Using This Method
Surveys or Questionnaires	331
Content Analysis	290
Interviews	159
Case Studies	149
Secondary Analysis of Surveys	78
Focus Groups	72
Evaluation Studies	56

Country	Counts [per cent]
USA	1 401 [39.0%]
UK	569 [15.8%]
Canada	192 [5.3%]
Netherlands	164 [4.6%]
Australia	154 [4.3%]
Germany	128 [3.6%]
Spain	90 [2.5%]
Italy	89 [2.5%]
Japan	63 [1.8%]
Brazil	56 [1.6%]

1803 papers, 1979-2016

2680 authors

28 authors with ≥ 6 papers

40 papers published 1996

116 papers published 2016

Lars Guenther and Marina Joubert: Science communication as a field of research – identifying trends, challenges and gaps by analysing research papers, JCOM, vol 16, no 2, 2017

PhD theses 2000-2010 (N = 57)

- ❑ Attention given (in descending order) to
 - ❑ media/journalism
 - ❑ means of communication
 - ❑ engagement and dialogue
 - ❑ role of scientists
 - ❑ role of stakeholders
- ❑ Top 4 methods: media analysis, survey, interview and case study
- ❑ No clear common set of research aims; multiple theories

Topics of PhD theses (2014)

How does CERN's research become public?

Science communication and chemistry literacy through Manga comics

Effective theory-based communication practice

Potential of science clubs network for public understanding of S&T

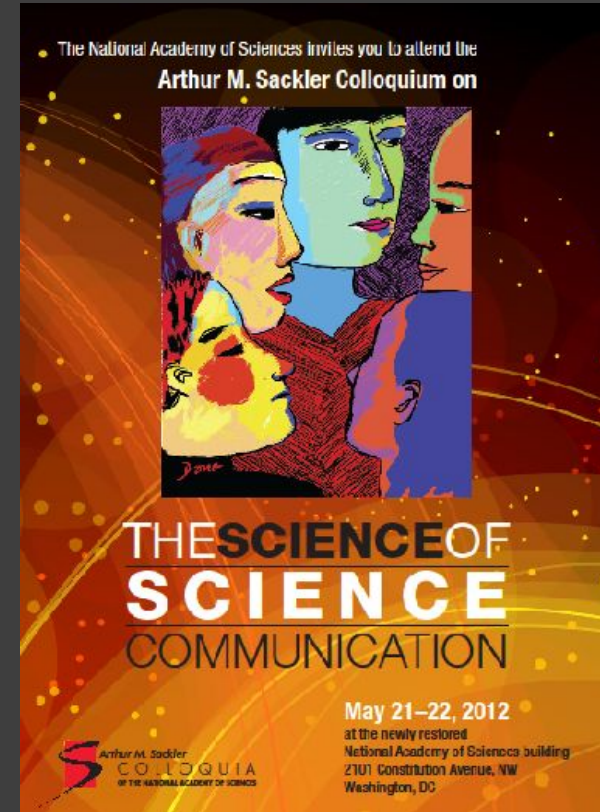
Strategic science communication from universities

Science museums, controversies and public engagement

Practices and values of science journalism

Proposition for Science of Science Communication

This [2012] colloquium will survey the state of the art of empirical social science research in science communication and will focus on research in psychology, decision science, mass communication, risk communication, health communication, political science, sociology, and related fields on the communication dynamics surrounding issues in science, engineering, technology, and medicine



What is 'science of science communication'?

One could easily define it with reference to some set of signature methods and aims ... But more compelling is simply to do the science of science communication — to show what it means to approach the science communication paradox scientifically.

- Dan Kahan, JCOM, 2015

The Science of Science Communication III

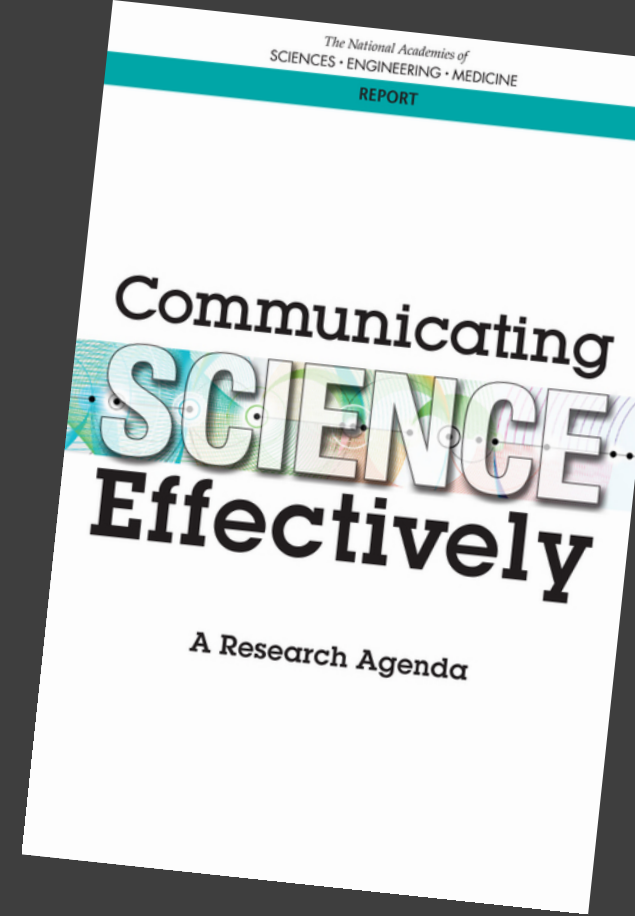
Inspiring Novel Collaborations and Building Capacity

Washington, DC, November 16–17, 2017

The colloquium will explore ways to build capacity for and foster the use of evidence-based strategies for engaging the public with science.

The colloquium will tackle the organizational and infrastructure changes needed to make research-based communication the norm.

The National Academy of Sciences will support with grants two collaborative research projects that align with the report, *Communicating Science Effectively*.



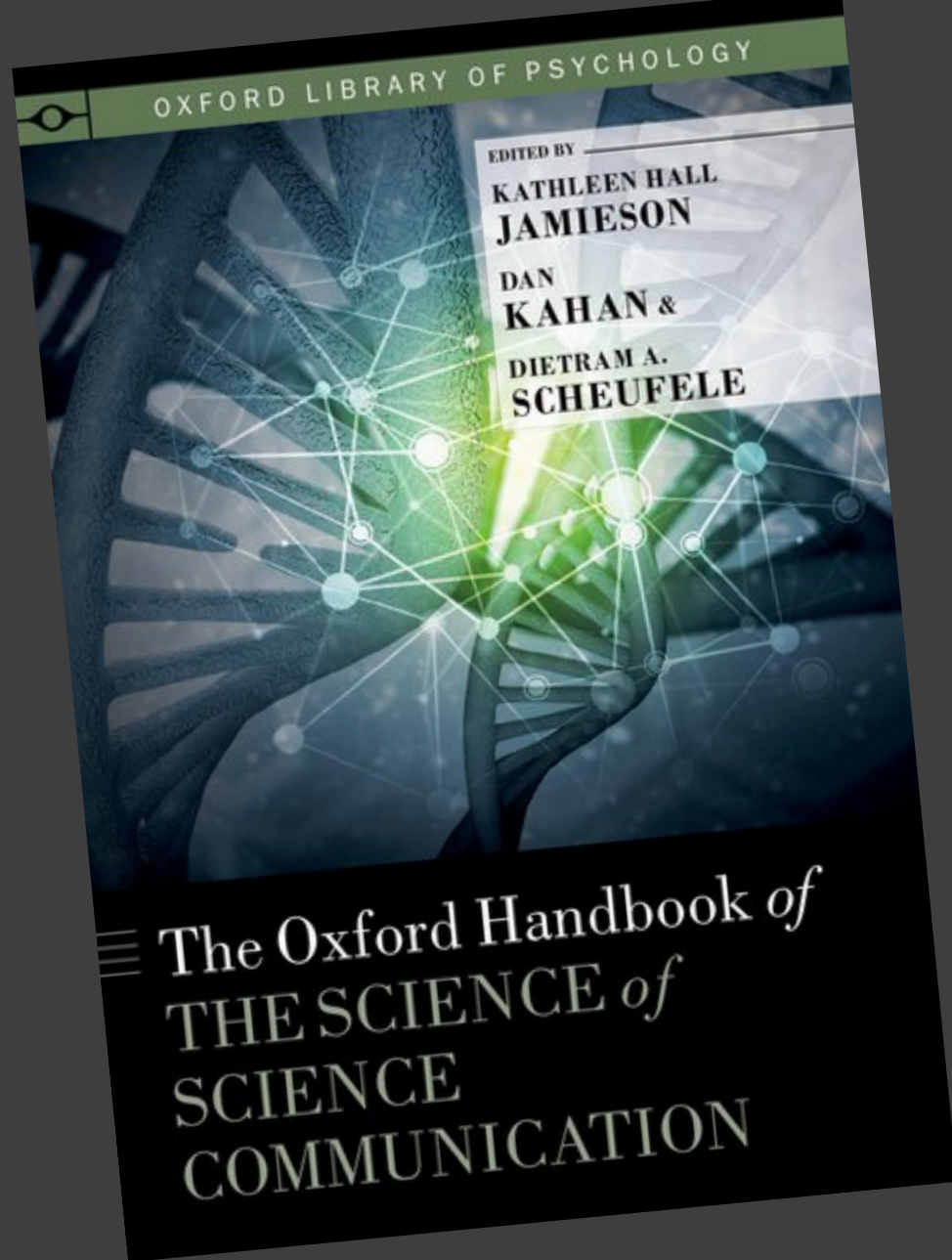
Recommendations from NAS Report

Researchers and practitioners of science communication need to form partnerships to develop detailed research agendas for testing hypotheses about how to communicate science.

Researchers in the diverse disciplines need opportunities to develop more unified theories, concepts, and definitions of the factors that matter to communicating science.

More scientists need to be recruited to this field from neighboring disciplines, particularly the social and behavioral sciences.

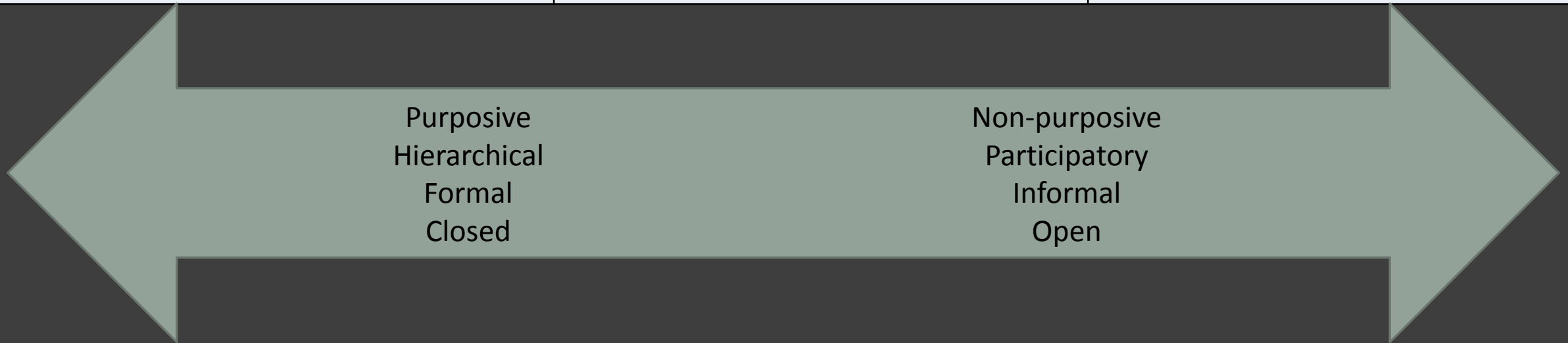




- Topical essays from leading science of science communication scholars.
- Lessons from case studies learned from communication failures and successes.
- Integrates theory with practice on a broad range of scientific topics, such as evolution and vaccines.
- Identifies ways to overcome biases (e.g., end point bias, availability heuristic, selective exposure) that interfere with the processing of scientific findings.

Models of science communication

Dissemination					Dialogue				Participation			
Deficit	Defence	Promotion	Popularisation	Outreach	Contextual	Consultation	Engagement	Interactive	Deliberation	Citizen science	Cultural	Conversation
Findings Finished knowledge					Issues Applications and implications of knowledge				Process, agendas Interpreting and co-constructing knowledge			



Science communication is

SOCIETY TALKING ABOUT SCIENCE

Science communication research examines

**HOW SOCIETY TALKS ABOUT
SCIENCE**