

**Written Testimony of
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Hearing on:
Understanding, Forecasting, and Communicating Extreme Weather in a Changing Climate
before the United States House of Representatives Committee
on Science, Space, and Technology

September 26, 2019

Thank you Chairwoman Johnson and Ranking Member Lucas for your invitation to testify on the urgent matter of extreme weather events and climate change. I am Ann Bostrom, Weyerhaeuser Endowed Professor of Environmental Policy in the Daniel J. Evans School of Public Policy at the University of Washington. I study risk perception, communication, and decision making under uncertainty in applied contexts like climate change and extreme weather, usually with interdisciplinary teams. In addition to climate change and extreme weather events, my research investigates other hazards, and the perception and communication of what we know and can do about the risks they pose, as well as scientific and management uncertainties. I also teach research methods, decision making, and environmental policy, with the aim of informing and improving the analysis and management of environmental and health risks. Achieving this requires advances in social and behavioral sciences along with advances in other sciences, and bridging science and society to ensure that investments in basic sciences are benefitting our communities. I have also contributed to National Academies reports that pertain to this hearing,

including *Communicating Science Effectively: A research agenda*¹, and I had the pleasure of co-chairing with the eminent William Hooke the National Academies 2018 report *Integrating Social and Behavioral Sciences Within the Weather Enterprise*.²

Changing perceptions, yet still unanticipated extremes

Thirty years ago in my first studies of climate change risk perception, communication and decision making, scientists and lay people voiced their expectations of more extreme weather as CO₂ emissions from our fossil fuel use warm the planet.³ Our survey respondents in the early 1990's thought that a rise in mean sea level from climate change would increase the severity of storm surge incursions into coastal areas, but they did not anticipate that New York might flood.⁴ When we replicated this survey a decade ago (2009), almost half (42%) of our respondents thought it was true or possibly true that global warming would cause the ocean to flood all of the city of New York.⁵ Seven years ago this October, superstorm Sandy flooded New York streets and subways, with climate change at least partly to blame.⁶ The scientific evidence is now overwhelming that anthropogenic climate change has contributed to extreme weather events in

¹ National Academies of Sciences, Engineering, and Medicine. 2017. *Communicating Science Effectively: A Research Agenda*. Washington, DC: The National Academies Press. doi: <https://doi.org/10.17226/23674>

² National Academies of Sciences, Engineering, and Medicine. 2018. *Integrating Social and Behavioral Sciences Within the Weather Enterprise*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24865>

³ Bostrom, A., Morgan, M.G., Fischhoff, B. and Read, D. "What do people know about global climate change?: 1. Mental models." *Risk Analysis*, 14(6), 959-970, 1994

⁴ Read, D., Bostrom, A., Morgan, M.G., Fischhoff, B. and Smuts, T. "What do people know about global climate change?: 2. Survey studies of educated laypeople." *Risk Analysis*, 14(6), 971-982, 1994.

⁵ Reynolds T.W., Bostrom, A., Read, D. and Morgan, M.G. "Now What Do People Know About Global Climate Change? Survey Studies of Educated Laypeople." *Risk Analysis*, 30(10), 1520-1538, 2010.

⁶ Trenberth, K. E., Fasullo, J. T., & Shepherd, T. G. (2015). Attribution of climate extreme events. *Nature Climate Change*, 5(8), 725.

recent years, increasing their severity and frequency.^{7,8} Yet as suggested by the flooding in New York, the weather extremities climate change is bringing are still likely to exceed many plans and expectations.

Failures to forestall catastrophe: social and behavioral sciences insights and opportunities

Despite the phenomenally improved forecasts that government research investments have enabled over recent decades, we have failed to forestall catastrophic damages to many of our communities from hurricanes, floods, heatwaves, droughts, and wildfires. There is no single reason for this:

- Interdisciplinary policy research by economists and atmospheric scientists has estimated that hurricanes striking the U.S. cause over ten times the damage that would be caused by an equivalent storm striking another OECD country, due to lack of adaptation in the U.S.⁹ In other developed countries, higher income tends to be associated with decreased damages, but not in the U.S.
- In a 2013 survey of U.S. residents in fire-prone areas who had faced fire events (including in Chelan County, WA, Horry County, SC, and Montgomery County, TX) most reported that they had decided to wait and see (65%), rather than evacuate early (24%); 11% had decided to stay and defend.¹⁰ In this study, as in others, receiving an

⁷ National Academies of Sciences, Engineering, and Medicine. 2016. *Attribution of Extreme Weather Events in the Context of Climate Change*. Washington, DC: The National Academies Press. doi: 10.17226/21852.

⁸ According to Munich Re, the [number of extreme weather events globally](https://natcatservice.munichre.com/events/1) has more than tripled since the 1980s (<https://natcatservice.munichre.com/events/1>).

⁹ Bakkensen, L.A. and Mendelsohn, R.O., 2016. Risk and Adaptation: Evidence from Global Hurricane Damages and Fatalities. *Journal of the Association of Environmental and Resource Economists* 3(3): 555-587

¹⁰ McCaffrey, S., Wilson, R., & Konar, A. (2018). Should I stay or should I go now? Or should I wait and see? Influences on wildfire evacuation decisions. *Risk analysis*, 38(7), 1390-1404.

official cue, such as a voluntary or mandatory government evacuation notification, increased the odds of having evacuated. In the Camp fire, many Paradise residents never received an official evacuation order; 84 people died.

- In superstorm Sandy, despite accurate forecasts, 72% of the 240,000 residents living in mandatory evacuation zones in New Jersey decided to stay in their homes. Across the northeastern U.S. coastline, 117 people died in Sandy, with the most common cause of death being drowning. Half of these drownings were in flooded homes where mandatory evacuation orders were in place a day before the storm's landfall. Red Cross volunteers also noted about the superstorm Sandy drownings that people were "afraid of looters," "thought Hurricane Irene was mild," and "unable to leave because did not have transportation."¹¹
- Despite the demonstrably increased influence of online and social media in this era,^{12,13} police and fire were largely absent from online media during superstorm Sandy, and government largely absent from Twitter. ¹³
- More than five million car crashes happen each year in the U.S., and weather contributes to over a fifth of them. Almost six thousand people are killed annually due to weather-related vehicle accidents, which is almost ten times the 600 adverse weather fatalities that are not related to vehicle accidents. While impressive advances have been made in

¹¹ CDC. (2013). Deaths associated with Hurricane Sandy—October-November 2012. *Morbidity and Mortality Weekly Report*, 62(20), 393. See the discussion in NASEM

¹² Demuth, J. L., Morss, R. E., Palen, L., Anderson, K. M., Anderson, J., Kogan, M., ... & Henderson, J. (2018). "Sometimes da# beachlife ain't always da wave": Understanding People's Evolving Hurricane Risk Communication, Risk Assessments, and Responses Using Twitter Narratives. *Weather, climate, and society*, 10(3), 537-560.

¹³ Lachlan, K. A., Spence, P. R., Lin, X., & Del Greco, M. (2014). Screaming into the wind: Examining the volume and content of tweets associated with Hurricane Sandy. *Communication Studies*, 65(5), 500-518.

traveler information systems, these vary widely from state to state, suggesting the need for research on how best to convey the impact and risks of extreme weather events in these systems. Further, while there have been advances in crowd-sourced data and use of citizen reporting about road conditions, little is known about how drivers value and use them.¹⁴

- Decades of warning studies show that when a storm, heatwave or wildfire threatens people need to know what to do to be safe, how to do it, and the time until impact of the event. Should they evacuate? If so, how, and when? Where is it safe for them to drive? In addition to key content, the social and environmental contexts affect warning effectiveness, as do the source of the warning, characteristics of the person receiving the warning, and the message delivery method.¹⁵ Although there is a substantial body of knowledge about what makes warnings effective, new challenges have emerged with Wireless Emergency Alerts (WEA), social media, and the entire rapidly evolving ecosystem of information and communication technologies and practices.
- People intuitively understand that there are uncertainties in weather forecasting. Further, the careful experimental research that has been conducted to date shows that people can make better decisions if they are given explicit uncertainty information based on the best scientific forecasts, and tailored to their decision context. They do not, however, always interpret visual and other forecast uncertainty information in the way that forecasters and emergency managers wish or expect.¹⁶ Numerous studies and editorials have highlighted

¹⁴ Chapter 4 in National Academies of Sciences, Engineering, and Medicine. 2018. Integrating Social and Behavioral Sciences Within the Weather Enterprise. Washington, DC: The National Academies Press.

¹⁵ National Academies of Sciences, Engineering, and Medicine. 2018. Emergency Alert and Warning Systems: Current Knowledge and Future Research Directions. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24935>

¹⁶ Savelli S and Joslyn S. 2013. The advantages of predictive interval forecasts for non-expert users and the impact of visualizations. *Appl Cognitive Psych* 27:527–41. See the discussion in: Bostrom, A., Joslyn,

misinterpretations of the cone of uncertainty that the National Hurricane Center uses to show the probable track of the center of a tropical cyclone. For example, sometimes it is interpreted as the area likely to be affected. But less has been said about how specific misinterpretations influence decisions, which is as or more important to study and understand. There have been suggestions that it might be better to present a spaghetti-type diagram of multiple possible paths for the hurricane center. Presenting an ensemble of paths, that is, a suite of possible future paths, may reduce the tendency for people to see the cone itself as a spatial representation, for example of the size or intensity of the storm. But related research suggests an ensemble graphic could pose other challenges, such as people putting too much weight on a specific possible path.¹⁷

These examples illustrate a few of the ways that social and behavioral sciences can help identify where there are opportunities to save lives and property, and how to best realize those opportunities. To protect lives and property, and to realize the full value of the investments we've made in the physical sciences, we need to invest in the social and behavioral sciences of extreme weather and climate change.

S., Pavia, R. Hayward Walker, A., Starbird, K., & Leschine, T.M. (2015) Methods for Communicating the Complexity and Uncertainty of Oil Spill Response Actions and Tradeoffs, *Human and Ecological Risk Assessment: An International Journal*, 21:3, 631-645, DOI: 10.1080/10807039.2014.947867

¹⁷ K. Broad, A. Leiserowitz, J. Weinkle, M. Steketee, Misinterpretations of the Cone of Uncertainty in Florida During the 2004 Hurricane Season, 88 *Bulletin of the American Meteorological Society*, 2007, pp. 651–667.

Ian T. Ruginski, Alexander P. Boone, Lace M. Padilla, Le Liu, Nahal Heydari, Heidi S. Kramer, Mary Hegarty, William B. Thompson, Donald H. House & Sarah H. Creem-Regehr (2016) Non-expert interpretations of hurricane forecast uncertainty visualizations, *Spatial Cognition & Computation*, 16:2, 154-172, DOI:10.1080/13875868.2015.1137577.

Wu, H. C., Lindell, M. K., & Prater, C. S. (2015). Strike probability judgments and protective action recommendations in a dynamic hurricane tracking task. *Natural Hazards*, 79(1), 355-380.

Beyond messaging individuals: integrating social and behavioral sciences throughout the weather enterprise

This research is needed to inform not only personal decisions and behaviors, like evacuation, but also the decisions of emergency management and planning organizations, and of the professionals who develop and operate our forecast and warning systems, and the professionals and volunteers who oversee and assist with response and recovery. Such research opportunities are illustrated in Figure 1, which is suggestive rather than comprehensive.



Figure 1. From the National Academies of Science, Engineering and Medicine report, *Integrating social and Behavioral Sciences in the Weather Enterprise*, Figure 2.1.¹⁸ Stages of communication and decision support that must be addressed under the Weather Ready Nation paradigm, with examples of how social and behavioral sciences (SBS) research can provide critical insights and understanding in each of these stages.

¹⁸ National Academies of Sciences, Engineering, and Medicine. 2018. *Integrating Social and Behavioral Sciences Within the Weather Enterprise*. Washington, DC: The National Academies Press.

People tend to be more prepared for an event when they have prior experience of it, but the type of experience they've had makes a difference.¹⁹ While a plurality of people in the U.S. have long thought climate change will lead to more extreme weather events, their experiences may not be predictive of the weather extremities climate changes will bring. In my home state of Washington, the Climate Impacts Group has highlighted 2015 as a year that may presage climate change. In 2015 snowpack was 70% below normal, leaving the state with irrigation shortages, agricultural losses, fish die-offs, and problems stemming from the state's reliance on hydropower. More shocking for residents was the wildfire, as 2015 was the most severe wildfire season on record for the state.²⁰ In a more recent example of unexpected extremes, in Texas, tropical depression Imelda dumped three feet of rain in 24 hours, which caught people by surprise, despite Harvey.

Much remains to learn about how best to communicate forecasts and forecast uncertainties in these circumstances. There is a very large need for additional empirical research on communicating uncertainty for different decision contexts, research that brings social, behavioral, and other scientists together to determine how climate and weather information can

¹⁹ E.g., Lazo, J. K., Bostrom, A., Morss, R. E., Demuth, J. L. and Lazrus, H. (2015). Factors Affecting Hurricane Evacuation Intentions. *Risk Analysis*, 35:10, 1837–1857. doi: 10.1111/risa.12407

²⁰ Engel, R. A., Marlier, M. E., & Lettenmaier, D. P. (2019). On the causes of the summer 2015 Eastern Washington wildfires. *Environmental Research Communications*, 1(1), 011009.

Snover, A.K., C.L. Raymond, H.A. Roop, H. Morgan, 2019. "No Time to Waste. The Intergovernmental Panel on Climate Change's Special Report on Global Warming of 1.5°C and Implications for Washington State." Briefing paper prepared by the Climate Impacts Group, University of Washington, Seattle. Updated 02/2019

May C., C. Luce, J. Casola, M. Chang, J. Cuhaciyan, M. Dalton, S. Lowe, G. Morishima, P. Mote, A. Petersen, G. Roesch-McNally, and E. York, 2018: Northwest. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1036–1100. doi: 10.7930/NCA4.2018.CH24

most effectively be integrated, analyzed and delivered to help forecasters, emergency managers, planners, drivers—indeed, all of us—make better decisions.

Building leadership and capacity

The *Weather Research and Forecasting Innovation Act of 2017* (Pub.L. 115-25) as amended by the *National Integrated Drought Information System Reauthorization Act of 2018* (Pub. L. 115-423) is a big step in the right direction, including, for example, specific attention to “Improving the understanding of how the public receives, interprets, and responds to warnings and forecasts of high impact weather events that endanger life and property” [Section 102(b)(2)]; incorporating risk communication research to create more effective hurricane watch and warning products [Section 104(b)(3)]; and mandating collaboration between the public and private sectors to identify the research necessary to enhance the integration of social science knowledge into weather forecast and warning processes, in Section 105(4)).

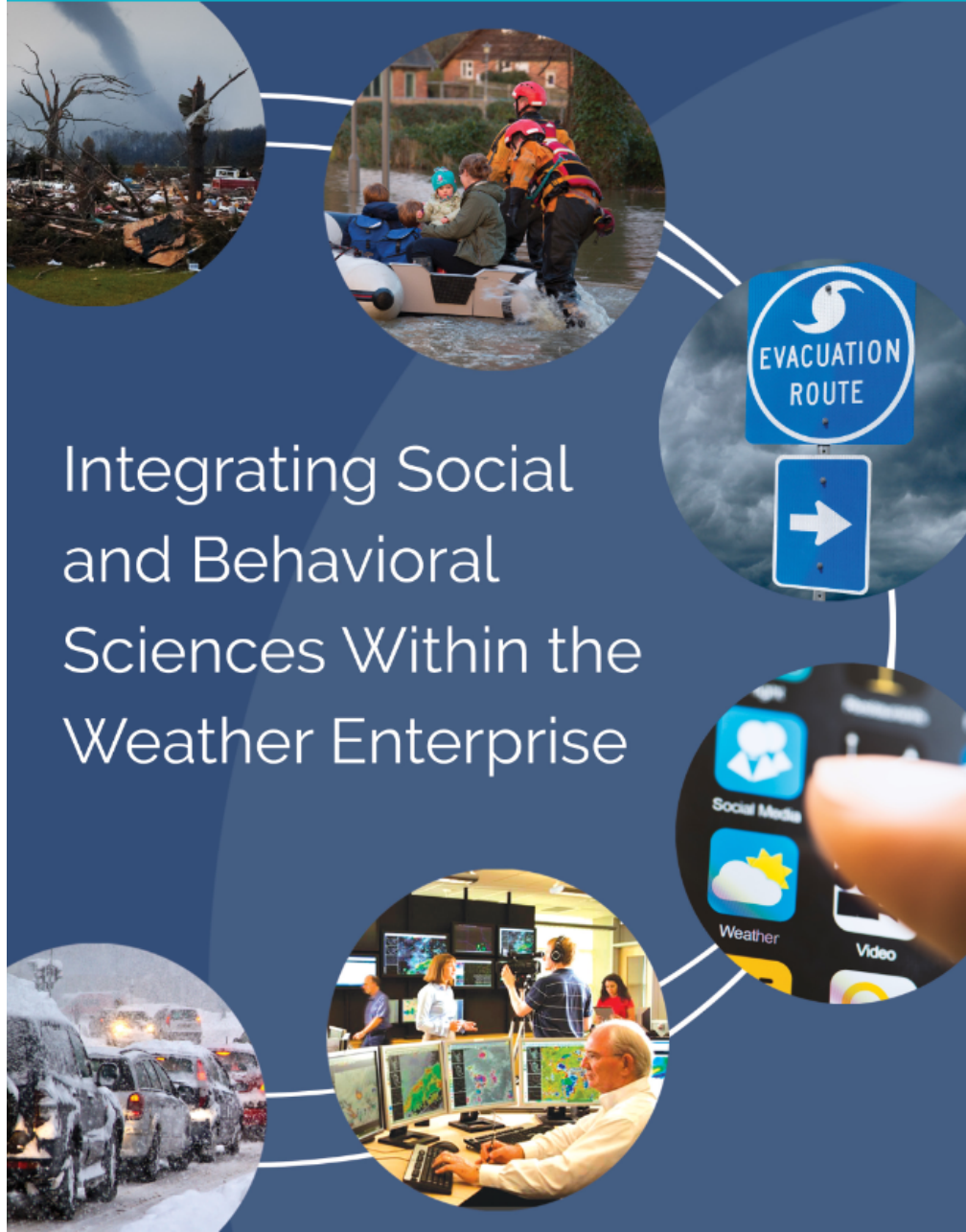
The National Science Foundation, the National Oceanic and Atmospheric Administration, and other agencies appear to have increased their investments in social and behavioral sciences addressing weather hazards over the last decade, but these investments have been highly variable, and have constituted only a very small proportion – on the order of less than 10% -- of their weather-related research investments to date. Such investments have funded pilot programs like the Collaborative Adaptive Sensing of the Atmosphere (CASA) Dallas-Fort Worth Living Lab program, which provides timely, tailored, human-scale forecasts on personal devices, and collects input from users to achieve continuous improvement. While recent initiatives such as *Convergence*, and *Coastlines and People (CoPe)*, at the National Science Foundation appear promising, other more obviously closely related funding initiatives, such as Hazards Science, Engineering and Education for Sustainability (SEES), have ended. The

investments to date have not comprised the sustained resources required to achieve the advances our nation needs from the social and behavioral sciences in the interdisciplinary domain of weather and climate hazards and risks, or to encourage newly trained scholars to commit to work in it.

In order to fully realize these and other life-saving advances nationally and to achieve international leadership on understanding, forecasting and communicating extreme weather and climate will require **scientific leadership** and **capacity building** in the social and behavioral sciences across the public and private sectors, as well. Congressional support is essential. Successfully integrating social and behavioral sciences into an agency or other organization requires senior-level agency leadership,²¹ high-level staff to coordinate top-down, bottom-up staff-led working groups, and a commitment to building and sustaining social and behavioral science capacity, through both professional development as well as education, training, and hiring. Detailed suggestions on each of these points can be found in the National Academies 2018 report on Integrating Social and Behavioral Sciences in the Weather Enterprise.

²¹ Fischhoff, B. (2017). Breaking ground for psychological science: The US Food and Drug Administration. *American Psychologist*, 72(2), 118.

CONSENSUS STUDY REPORT



Integrating Social
and Behavioral
Sciences Within the
Weather Enterprise



September 8, 2017



Bryan Woolston / Reuters

When Hurricane Warnings Are Lost in Translation

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Texans Won't Leave Pets Behind

The massive storm has also disrupted the lives of thousands of pets.



Home » Economic Development » Climate Change » Disasters and Populations at Risk: Lack of Vehicle Makes Evacuation Difficult

Disasters and Populations at Risk: Lack of Vehicle Makes Evacuation Difficult



Business owners in Port Aransas, Texas, board up in expectation of Hurricane Harvey.

Eric Gay / AP

Why Do Some People Decide to Ride Out Hurricanes?

"I can't say that this is a totally safe thing to do, because it's not. But it's



The Washington Post

National

As Irma approaches, fear is in the water, spreading with new and viral efficiency



The Washington Post

PostEverything • Perspective

We can't leave Florida, but we can't stay either. Help us!

There are no good options for the millions trapped by the storm.



By Darlena Cunha September 8 Follow @parentwin

Darlena Cunha is a former television producer turned stay-at-home mom to twin girls.

Extreme  **Weather**

Houston knew it was at risk of flooding, so why didn't the city evacuate?

By Dakin Andone, CNN

🕒 Updated 12:57 AM ET, Tue August 29, 2017



The New York Times | <https://nyti.ms/2vEac54>

U.S.

Houston Mayor's No-Win Dilemma: Whether to Tell Residents to Stay or Go

By MANNY FERNANDEZ and RICHARD FAUSSET AUG. 28, 2017

The Washington Post

Outlook • Perspective

**We already knew how to
reduce damage from floods.
We just didn't do it.**

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AFTER HURRICANE HARVEY



Development and Disasters — A Deadly Combination Well Beyond Houston

Scientists warn of more and expanding “bull’s-eyes” as Americans build in parts of the country at ever greater risk because of climate change and severe weather.

QUARTZ

WET LAND NEEDS WETLANDS

**Houston's flooding shows what happens
when you ignore science and let
developers run rampant**

Study Charge

Develop a framework for generating and applying social and behavioral science research within the context of meteorology, weather forecasting, and weather preparedness and response.

- **Assess current SBS activities** and applications within the weather enterprise
- Describe the **value of improved integration** and identify **barriers to better integration**.
- Develop a **research agenda** for advancing the application of social and behavioral sciences
- Identify **infrastructural and institutional arrangements** necessary to successfully pursue SBS weather research and the transfer of relevant findings to operational setting.

Committee Members

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**Motivation for
Integrating Social and
Behavioral Sciences
within the Weather Enterprise**

Why integrate SBS within the weather enterprise

Weather is shaped by physical processes; its impacts are shaped by how individuals, households, organizations, communities, respond to weather information, and how it informs decisions and behaviors.

Finding: Realizing the greatest return on investment from advancing meteorological research and numerical weather prediction requires fully engaging the social and behavioral sciences across the weather enterprise.

Why now

- NOAA- and NSF-funded research has seeded a research community
- *Weather Research and Forecasting Innovation Act of 2017* : “enhance the integration of social science knowledge into weather forecast and warning processes”
- Initiatives like *Weather Ready Nation* and *Impact Based Decision Support* create new demand for SBS

Other developments that increase the need for SBS research

[Proliferation of Weather Information Sources](#). e.g., How people are affected by differing information from NWS, TV news, social media, websites, apps?

[Warn-on-Forecast](#). e.g., How do longer hazard lead times affect the ways that people react to warnings? How should probabilistic information be displayed for the public ?

[GOES-R Satellite Information](#) e.g., How does a new influx of information affect forecasters' decision-making? What is the most useful mix of displays to aid the forecaster?

[Hydrometeorological Modeling / Forecasting Advances](#). e.g. How to best use National Water Model output to create useful products for decision makers?

[Automated / Connected Vehicles](#). e.g. What is the right balance between providing real-time alerts to drivers and encouraging drivers to focus on the road instead of a screen?

[Climate Change and Extreme Weather Risks](#). e.g. How does communication about weather hazards need to adapt when historical weather patterns are changing?



Preparedness and mitigation

- Identify effective strategies for enabling and motivating individuals and households to prepare for possible hazards
- Elucidate the forces that constrain local governments from pursuing measures that reduce vulnerability to weather hazards



Monitoring, assessment, forecasting

- Help forecasters design effective data visualization
- Guide forecasters in the design and selection of risk/action thresholds
- Aid the translation of standard data visualizations to tailored information for specific users



Dissemination of warnings, recommended actions

- Improve design and evaluation of warning messages and products
- Understand how social and cultural factors affect people's response to warnings
- Better understand what recommended actions are effective and feasible to implement



Emergency management and response actions

- Identify ways of improving communication and cooperation among different actors in response efforts
- Help identify vulnerable subpopulations and their needs



Recovery

- Design post-disaster surveys and processes that help us understand the social dynamics that led to deaths and injuries
- Study how households, communities, and regions can rebuild in ways that reduce vulnerability to similar future events

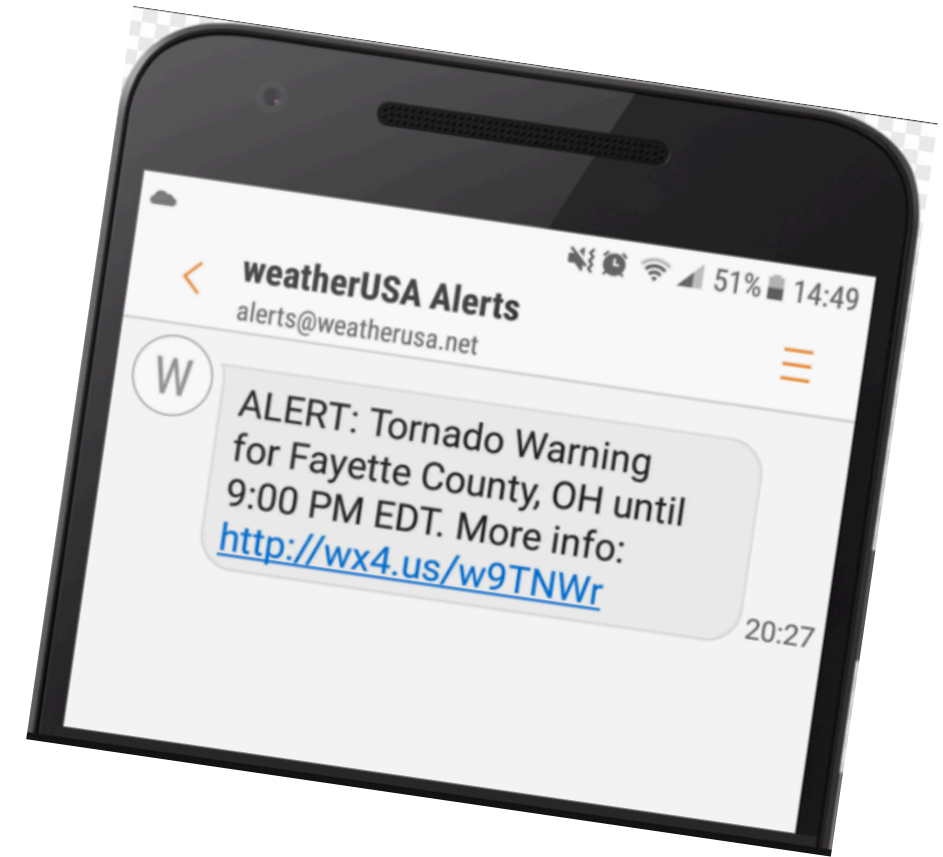
Examples of how SBS research can provide critical insights and understanding in all the stages of action associated with hazardous weather

Finding: SBS research offers great potential for improving:

- preparedness and mitigation for weather risks;
- hazard monitoring, assessment, and forecasting processes;
- communications of hazardous weather warnings;
- emergency management and response
- long-term recovery efforts.

Example of SBS Research Impacts: Improving hazard alerts on mobile devices

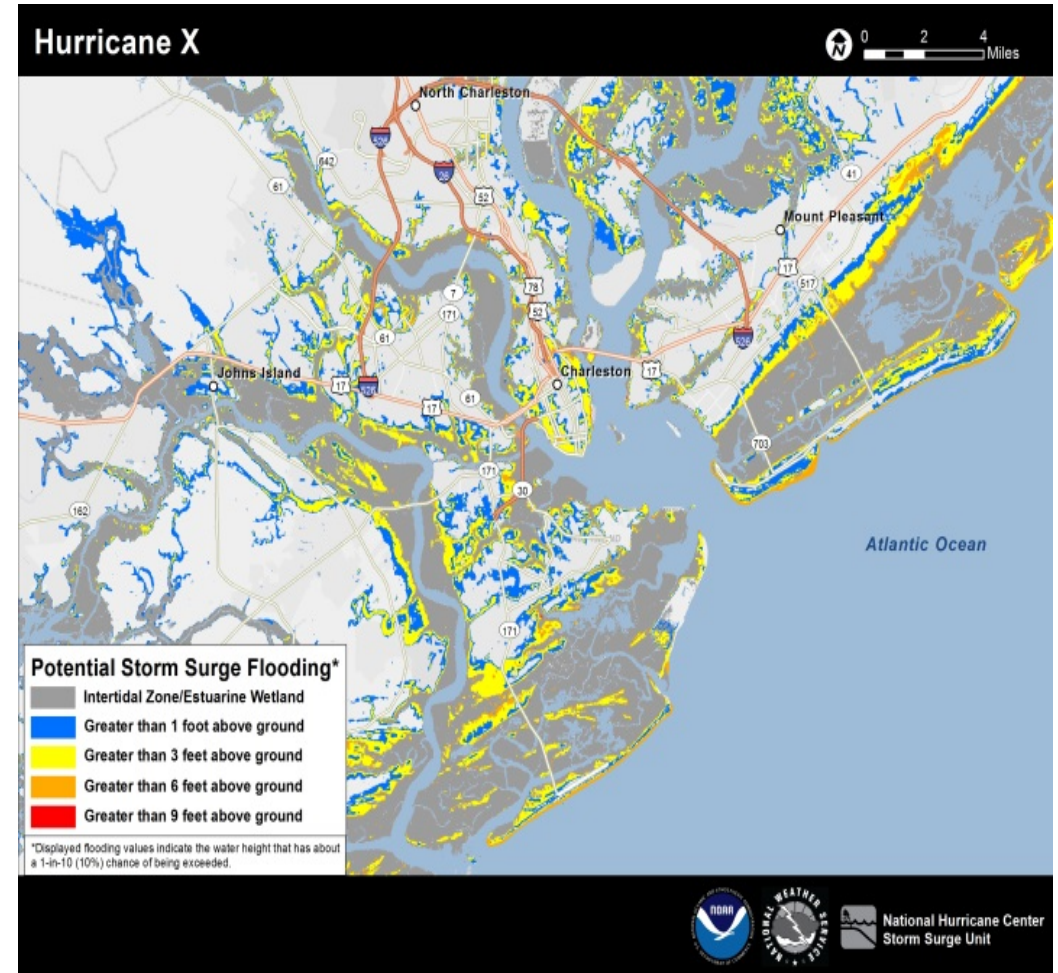
- A 2014 DHS-funded study* looked at ways to optimize Wireless Emergency Alerts (WEA) mobile text messages.
- Key finding: longer messages are more effective at motivating protective actions.
- Result: the FCC updated rules for WEA messages, by lengthening the character limit and adopting other features identified in the study.



Example of SBS Research Impacts: Guiding development of storm surge mapping

- And NWS effort to provide more accurate real-time forecast guidance; to communicate information in a way that people can act upon
- Input from emergency managers, broadcast meteorologists, an interdisciplinary team including a sociologist, economist, meteorologist, and engineer
- Studied stakeholders' reactions, interpretations, and preferences

*Morrow et al., 2015. Improving storm surge risk communication: Stakeholder perspectives. *BAMS*. January 2015



A woman with short blonde hair, wearing a black t-shirt with a yellow logo, stands in a large, rusted metal container. She is looking towards the right. The background is a vast field of debris, including twisted metal, wood, and trash, under a cloudy sky. An American flag is visible in the distance.

Current State of Social and Behavioral Sciences within Weather Enterprise

Research Activities

Diverse research conducted to date on:

- weather professionals and the weather enterprise system
- social vulnerability to hazards and disasters
- design, interpretations, and effects of forecast and warning messages

Relevant reviews and syntheses, for example:

- risk communication of hazard warnings,
- the scientific base for protective actions
- team science and team performance
- judgment and decision making under uncertainty.



SBS-related Activities in the Private Sector

Focused primarily on expanding viewership and market share [audience surveys, marketing research, product R&D]

Some aspects can contribute to new SBS insights, but insights considered proprietary unlikely to be shared.

Some companies open to **new public-private partnerships**

- supporting certain types of SBS research
- advancing research agenda-setting, community- and capacity-building, and information-sharing activities.



Examples of SBS-weather agenda setting activities

- NOAA Flash Flood Summit
- Living With Extreme Weather workshop



Examples of community- and capacity-building activities

- WAS*IS (Weather and Society*Integrated Studies)
- Social Science Woven into Meteorology (SSWIM)

Examples of information-sharing venues

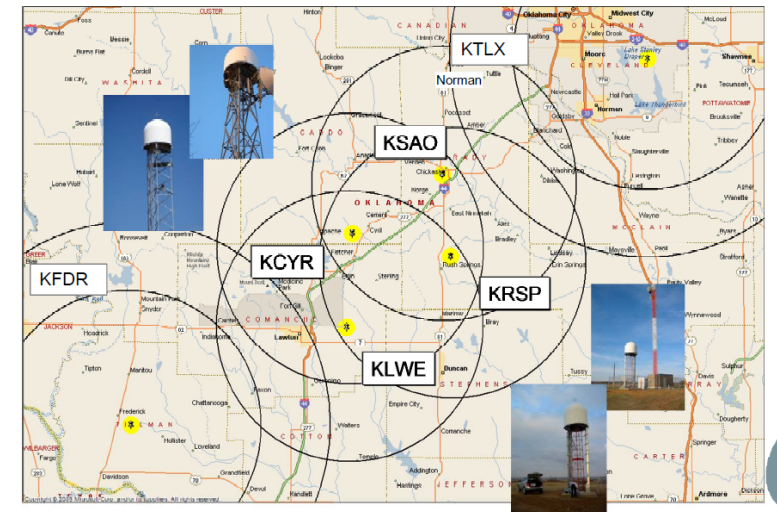
- AMS journals, symposia, conferences
- Natural Hazards Center's *Research and Applications Workshop*



Research to Operations

Examples where notable progress is being made:

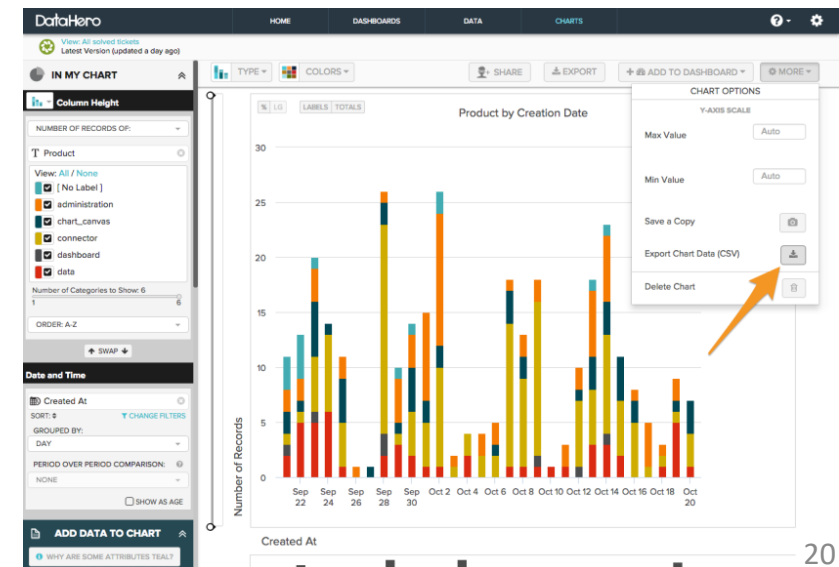
- **NOAA testbeds** offer great potential for applying SBS research to investigate how originators and mediators of forecasts and warnings can access, interpret, and utilize new technologies and information.
- **“Living Labs”** for testing new systems to collect observations and disseminate forecast information, and for studying the dynamics of Integrated Warning Teams in real-world settings (e.g., the CASA Dallas - Ft. Worth Urban Demonstration Network).



Data Collection Activities

Existing government data collection activities provide opportunities to collect valuable information for SBS-weather research, for example:

- NOAA/NWS Service Assessments
- NOAA Natural Hazard Statistics
- FEMA Mitigation Assessment Team Program
- FEMA National Household Survey
- CDC Public Health Surveillance during Disasters
- CDC Community Assessment for Public Health Emergency Response
- CDC National Center for Health Statistics Mortality and Injury Data



Data Collection Activities *(cont.)*

- More uniform standards for SBS disaster reconnaissance data collection would facilitate inter-comparison among studies, but might compromise the ability to tailor studies to social contexts. Need more transparency and documentation of research.
- Need to advance diverse research methods, from ethnographic to survey research.
- Personal vehicle event data recorders have the potential to be used as a rich source of research information on driving behavior and road weather [*modeling on FAA's use of flight data recorder info*]
- Big Data increasing in SBS weather research, in studies of crowdsourcing of weather reports, social media traffic during weather hazards. Great potential for growth in interdisciplinary *crisis informatics* research.

Funding Support of SBS in the Weather Enterprise

Drew upon information provided by sponsors (for NOAA) and searches of awards in public databases (for NSF and DHS). Found that:

- much SBS weather research is part of interdisciplinary research projects.
- much relevant SBS research is part of broader studies of hazard risk perceptions, attitudes, and behaviors—applicable but not specific to weather.

SBS-related investments:

- highly variable
- relatively small part of overall portfolio of weather related research (~10%)
- increasing trend over the past decade
- with support for a growing variety of subject matter and types of projects.

Examples of Barriers to Progress

- Challenges of interdisciplinary research (e.g., differing languages and research methods; professional reward structures that encourage disciplinary stove-piping)
- Identification and framing of research needs driven by physical scientists
- Limited understanding, misconceptions of SBS research by the weather community
- Constrained, inconsistent funding, and a focus on short-term projects, which inhibits high-quality SBS data collection and analysis

FINDINGS

- Innovative SBS research activities have already contributed both to the social and behavioral sciences and to meteorology. Exciting opportunities exist for advancing this research to address important societal needs.
- Existing federal agency data collection activities could, with modest additions and greater interagency coordination, significantly expand our understanding of the social context of hazardous weather.
- The accumulation of knowledge has been hampered by the relatively small scale, intermittency, and inconsistency of investments.
- Meteorologists and others in the weather enterprise need a more realistic understanding of:
 - the diverse disciplines, theories, research methodologies used within SBS;
 - the time and resources needed for robust SBS research; and
 - the inherent limitations in providing simple, universally applicable answers to complex social science questions.

Social and Behavioral Sciences for Road Weather Concerns



The motivation for a special focus on road weather

- Road weather is a particularly suitable case study for profiling the contributions that SBS can make to the weather enterprise.
- Mobility by personal vehicle is a fundamental element of life and of our economy.
- ~445,000 people are injured and ~6,000 are killed annually due to vehicle accidents associated with adverse weather [over 9x the number of all other weather fatalities].
- When drivers encounter dangerous conditions, safe response actions may be limited or unclear, decisions can endanger both the driver and many other people.
- Forecasters and highway operations managers must have good communication and understanding of each other's information needs and response capabilities.

Technological advances in providing road weather information to transportation managers (e.g., Road Weather Information Systems), and to motorists (e.g. Wireless Emergency Alerts; connected vehicles; crowd sourcing and other mobile weather apps.)

But are these developments contributing to road safety as much as they could? With all these advances, why have injuries/deaths not decreased more?

Need studies of motivations, risk perceptions, and decision processes of motorists in adverse weather; and of the working relationships among NWS forecasters, private meteorological companies, and road maintenance managers.

Research Needs and Knowledge Gaps



Previously identified research suggestions reviewed by the Committee

- Bean et al. (2015). *The study of mobile public warning messages: A research review and agenda.*
- Carbin et al. (2013). *Current challenges in tornado forecast and warning.*
- Daipha (2015). *Masters of uncertainty: Weather forecasters and the quest for ground truth*
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- Sorensen (2000). *Hazard warning systems: Review of 20 years of progress.*
- Sullivan (2013). *Vision and strategies for a Weather-Ready Nation.*

Types and scope of SBS-Weather research needed

- Disciplinarily-focused, interdisciplinary within SBS, and interdisciplinary between social, physical, and engineering sciences.
- Basic, applied, and developmental studies that encompass different scopes and scale (large interdisciplinary projects vs small proof-of-concept studies).
- Studies that examine a given topic or event from multiple methodological, disciplinary, conceptual, sampling perspectives.
- Research that looks across multiple events, populations, or time vs focusing on an immediate problem at hand.
- Research that examines “end to end” dynamics reaching across forecast offices, weather companies, media outlets, public officials and managers, the general public.
- Build on methods and concepts from non-weather research on risks, hazards, and disasters.

Knowledge gaps:

(I) Weather enterprise system-focused research

- How forecasters, broadcast media, emergency and transportation managers, and private weather companies create information and interact and communicate among themselves;
- Forecaster decision making (e.g., what observations and numerical weather prediction guidance forecasters use, and how they use them);
- Assessing the economic value of weather services;
- Team performance and organizational behavior within weather forecast offices and other parts of the weather enterprise.

Knowledge gaps:

(II) Risk assessments and responses, and factors influencing these processes

- How to better reach and inform special-interest populations that have unique needs (e.g., vehicle drivers or others who are particularly vulnerable to hazardous weather due to their location, resources, or capabilities)
- How people's interest in, access to, interpretation of, decisions and actions in response to weather information are affected by their specific social or physical context, prior experiences, cultural background, and personal values.

Knowledge gaps:

(III) Message design, delivery, interpretation, and use

- How communicating forecast uncertainties in different formats influences understanding and action;
- How to balance consistency in messaging with needs for flexibility to suit different geographical, cultural, and use contexts, including warning specificity and impact-based warnings;
- How new communication and information technologies—including the proliferation of different sources, content, and channels of weather information—interact with message design and are changing people’s weather information access, interpretations, preparedness, and response.



**A Framework to Sustainably
Support and Effectively Use Social
and Behavioral Science Research in
the Weather Enterprise**

Key actors:



Foundations for a robust, sustained research enterprise:



Mechanisms for Federal Support of SBS-Weather research

- Create an interdisciplinary research program supported by NOAA and NSF for support of larger-scale proposals.
- Establish a NOAA/OAR Laboratory or Cooperative Institute dedicated to SBS-weather research.
- Develop strong social science programs within one or more existing NOAA Cooperative Institutes.
- Build more connections between NWS Weather Forecast Offices and SBS-related campus departments.
- Develop a UCAR-based program, operating in a distributed fashion across some or all of the member campuses.
- Strengthen SBS research capacity at an existing FFRDC (like UCAR/NCAR), or establish a new FFRDC focused specifically on the application of social sciences.
- Establish a Center of Excellence as a mechanism to directly link research to operational actors.

Public-Private Partnerships for SBS-Weather Research

- Some companies interested to explore cooperative SBS of a general nature that does not delve into the competitive dynamics of any particular market.
- Possible mechanism: Cooperative Research and Development Agreement (CRADA). *NOAA's existing CRADA with IBM [owner of the Weather Channel] presents a great opportunity to gather and mine data of relevance to SBS-weather research.*
- Possible models for joint public/private research planning and funding on issues of importance to public safety [e.g., The Health Effects Institute; The Insurance Institute for Business & Home Safety]

Platforms for Intersectoral Planning and Engagement

- Existing professional society platforms (e.g. *AMS Commission on the Weather, Water and Climate Enterprise; NWA societal impacts committee*)
- For road weather: AASHTO, the TRB standing committee structure
- The new “Alliance for Integrative Approaches to Extreme Environmental Events”

Platforms for Interagency Planning and Engagement

- National Science and Technology Council (NSTC)
 - Committee on Science: Subcommittee on Social & Behavioral Science
 - Committee on the Environment, Natural Resources, and Sustainability: Subcommittee on Disaster Reduction
- Congressionally-authorized interagency working groups (e.g., *The National Windstorm Impact Reduction Program*)

Education and Training

For future professionals:

- university courses focused on study of the social dimensions of weather
- joint degree programs spanning meteorological sciences and SBS disciplines
- Internship opportunities for students in SBS disciplines to work in the weather enterprise

For current professionals:

- Mid-career training opportunities such as semester research sabbaticals
- Short training courses for weather professionals that provide: Basic understanding of SBS disciplines, concepts, and research methods, and of how these can be applied in the weather enterprise [*NOAA's currently-developing educational modules are a good start*]
- And likewise: short courses to introduce social scientists to the basics of weather forecasting and the weather enterprise

FINDINGS

- Organizations across the weather enterprise—federal agencies, private sector weather companies, academic institutions, professional societies—have shared motivations for actively contributing to the integration of SBS within the weather enterprise.
- Numerous previous reports going back many years have highlighted needs and challenges similar to those noted here—yet many of the same challenges remain today. Overcoming these challenges and making progress is not idea limited, but rather, is resource limited.

Recommendations



Invest in
leadership to
build
awareness

Recommendation:

Leaders of the weather enterprise should take steps to accelerate the paradigm shift by underscoring the importance of SBS contributions in fulfilling their organizational missions and achieving operational and research goals, by bringing SBS expertise into their leadership teams, and by establishing relevant policies to effect necessary organizational changes.

**Invest in
leadership to
build
awareness**

This creates the
appetite to



**Invest in
leadership to
build
awareness**

This creates the
appetite to

**Build capacity
throughout the weather
enterprise to support and
utilize SBS-weather
research**

Recommendation:

Federal agencies and private sector weather companies should, together with leading SBS scholars with diverse expertise, immediately begin a planning process to identify specific investments and activities that collectively advance research at the SBS-weather interface. This planning process should also address critical supporting activities (research assessment, agenda setting, community building, information sharing) and the development of methods to collectively track funding support for activities at the SBS-weather interface.

Build capacity
throughout the weather
enterprise to support and
utilize SBS-weather
research

Recommendation (continued):

NOAA should build more sustainable institutional capacity for research and operations at the SBS-weather interface and should advance cooperative planning to expand SBS research among other federal agencies that play critical roles in weather-related research operations.

In particular, this should include leadership from:

- **NSF** for a strong standing program that supports interdisciplinary research at the SBS-weather interface;
- **FHWA** for research related to weather impacts on driver choices and behaviors; and
- **FEMA** for research on the social and human factors that affect weather readiness, including decisions and actions by individuals, communities and emergency management to prepare for, prevent, respond to, mitigate, and recover from weather hazards.

All parties in the weather enterprise should continue to develop training programs for current and next generation workforces, in order to expand capacity for SBS-weather research and applications in the weather enterprise.

Build capacity
throughout the weather
enterprise to support and
utilize SBS-weather
research

Which makes it
possible to

Build capacity
throughout the weather
enterprise to support and
utilize SBS-weather
research

**Focus on critical
knowledge gaps**

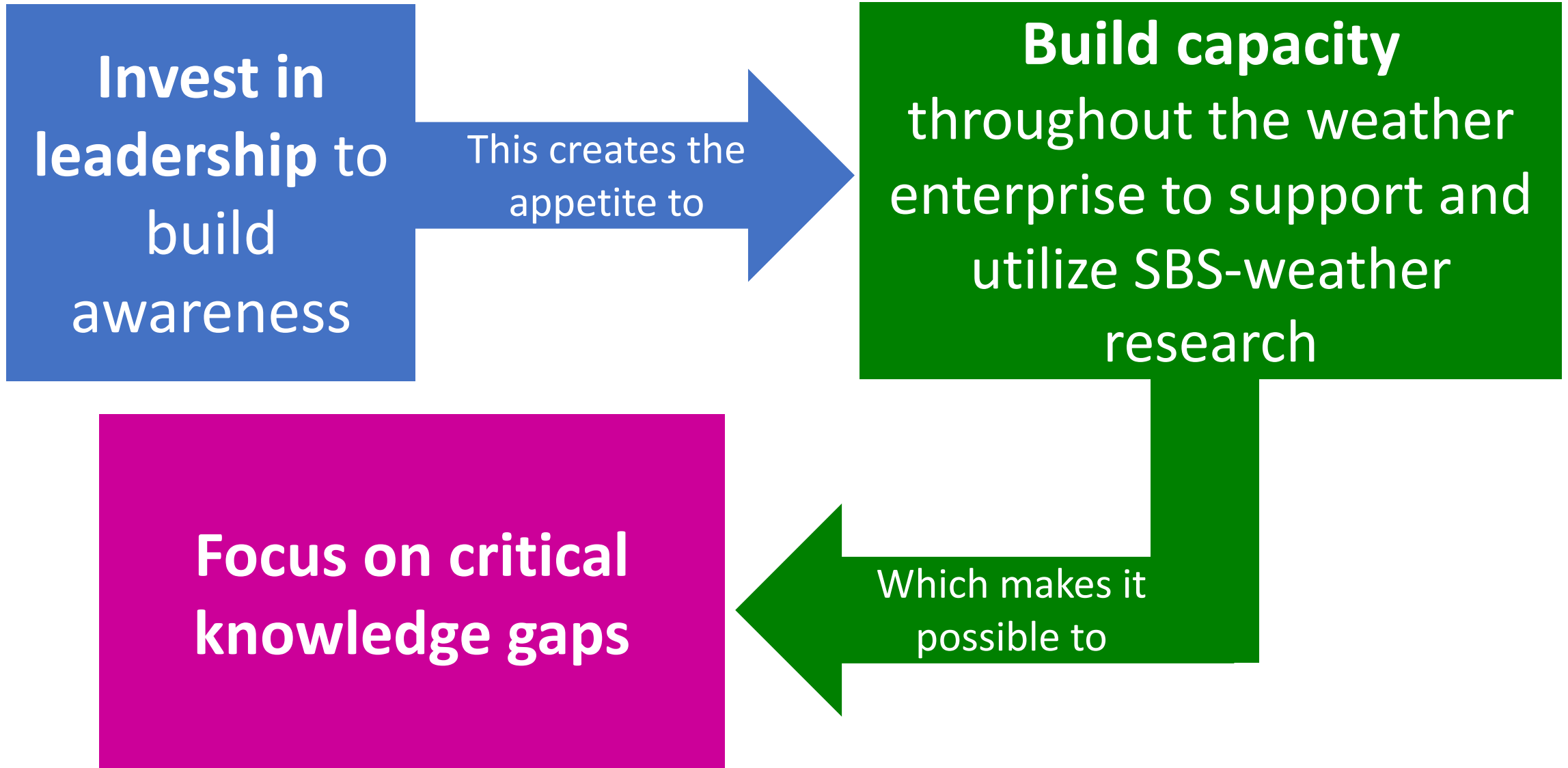
Which makes it
possible to

**Focus on critical
knowledge gaps**

Recommendation:

The weather enterprise should support research efforts in the following areas:

- **Weather enterprise system-focused research**
- **Risk assessments and responses, and factors influencing these processes**
- **Message design, delivery, interpretation, and use**



A man wearing a green jacket, black hat, and gloves is shoveling a large pile of snow. He is using a black shovel to lift a large chunk of snow. The background shows a residential building and trees, suggesting a winter setting.

**THANK YOU to NOAA and FHWA
for support of this project.**

Questions?

Extra Slides

Report Outline

1. Introduction
2. The Motivation for Integrating Social and Behavioral Sciences within the Weather Enterprise
3. Assessing the Current State of Social and Behavioral Sciences within Weather Enterprise
4. Social and Behavioral Sciences for Road Weather Concerns
5. Research Needs for Improving the Nation's Weather Readiness and Advancing Fundamental Social and Behavioral Science Knowledge
6. A Framework to Sustainably Support and Effectively Use Social and Behavioral Science Research in the Weather Enterprise
7. Summary of Key Findings and Recommendation

Definitions: **The Weather Enterprise**

The set of public, private and academic organizations, institutions and individuals that observe, predict, communicate and provide decision support information related to weather and associated environmental phenomena.

Definitions: Social and Behavioral Sciences (SBS)

- Including but not limited to anthropology, communication, decision sciences, demography, economics, geography, political science, psychology, and sociology.
- Encompasses the systematic study of society at all levels, from influences on individual behaviors, to the roles and dynamics of institutions, cultures, and social movements.
- Focal topics can include beliefs, perceptions, attitudes, emotions, decisions, and actions, as well as interactions with the physical environment and other people, across diverse social and institutional contexts.
- Social and behavioral scientists rely on a variety of rigorous quantitative and qualitative methods such as participant observations, experiments, surveys, individual and focus group interviews, and content analysis to collect data. They use a variety of methods to derive and test general theories and model the behaviors being studied.
- Several other fields of study that may not conventionally be defined as SBS also have important knowledge and methods that can be brought to bear in SBS studies of the weather enterprise, such as human-centered design and engineering, urban planning and public administration, science and technology studies, and the computational and informational sciences.

Participants at the committee meetings

- **J.Cortinas, K.Klockow, J.Sprague, V.Brown**, NOAA
- **Roemer Alfelor** DOT/ FHWA
- **Robert O'Connor**, NSF,
- **Patrick Harr**, NSF
- **Michael Hand**, White House SBS Team
- **Gina Eosco**, Eastern Research Group, Inc.
- **William Gail**, Global Weather Corporation
- **Baruch Fischhoff**, Carnegie Mellon University
- **Rebecca Morss**, NCAR
- **Jeff Lazo**, NCAR
- **Eve Gruntfest**, Resilient Communities Institute
- **Kathleen Tierney**, CU Boulder
- **Deb Thomas**, CU Denver
- **Heather Lazrus**, NCAR
- **Olga Wilhelmi**, NCAR
- **Liesel Ritchie**, CU Boulder
- **Greg Guibert**, Boulder's Chief Resilience Officer
- **Leysia Palen**, CU Boulder
- **Kate Starbird**, University of Washington
- **Russ Schumacher**, CSU
- **Dave Gochis**, NCAR
- **Kelly Mahoney**, NOAA
- **Mike Chard**, Boulder Emergency Management
- **Bob Glancy**, NWS/ Denver-Boulder WFO
- **Mike Lewis**, Colorado DOT
- **Lori Peek**, CU Boulder
- **Paty Romero-Lankao**, CU Boulder
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- **Jen Henderson**, Virginia Tech.
- **Steven Zubrick**, LWX Weather Forecast Office
- **Kenneth Wall**, FEMA National Capital Region
- **Nate Johnson**, WRAL-tv. N. Carolina
- **Brenda Philips**, Univ. of MA, Amherst
- **Michael Hinson** , Howard County Emergency Management
- **David Call**, Ball State Univ, Dept. of Geography
- **Greg Carbin**, NWS Forecast Operations Branch
- **Sandra Hawthorn**, OPM, Emergency Management
- **Steve Lund**, Minnesota DOT
- **Eli Jacks**, NWS, Forecast Services Division
- **Bob Ryan**, ret
- **Barry Myers**, Accuweather
- **Krista Rouse**, The Weather Channel
- **Chris Albrecht**, Narwhal Group
- **Keri Lubell**, CDC Office of Public Health Preparedness and Response
- **Brooke Liu**, National Consortium for the Study of Terrorism and Responses to Terrorism
- **Irina Feygina**, Climate Central
- **Edward Maibach**, GMU Center for Climate Change Communication

Others who provided written input to the Committee

Private Sector representatives

- **Barry Lee Meyers**, Accuweather, Chief Executive Officer
- **James Spann**, television meteorologist, Alabama Weather Blog:
- **Bob Baron**, President and CEO, Baron: Critical Weather Intelligence:
- **Brandon Miller**, CNN Meteorologist and Supervising Weather Producer
- **Dave Hennen**, CNN Senior Meteorologist and Executive Producer
- **William Callahan**, Vice President, Federal Programs and **Mark Hoekzema**, Chief Meteorologist, Director of Meteorological Operations. Earth Networks:
- **Kevin Keeshan**, Senior VP, News, Content & Standards, NBC Owned Television Stations:
- **Chris Samsury**, Vice President of Talent, The Weather Channel,
- **Krista Rouse**, The Weather Company:
- **JT Johnson**, Chief Technology Officer, Weather Decision Technologies, Inc

Broadcast Meteorologists

- **Jay Prater**, Managing Meteorologist KAKE, Wichita, Kansas
- **Ryan Phillips**, Morning Meteorologist, Miami / Fort Lauderdale, NBCUniversal, WTVJ
- **Steve Weagle**, Chief Meteorologist, WPTV West Palm Beach FL
- **Jim Gandy** Chief Meteorologist Columbia, SC. WLTX
- **Jay Trobec**, Chief Meteorologist, KELO-TV Sioux Falls, SD
- **Doug Kammerer**, Chief Meteorologist NBCUniversal. Washington, DC

Examples of road weather SBS questions to be explored

- How do motorists evaluate the perceived urgency or desire to make a trip during adverse weather conditions versus the risks? What decision processes take place when someone decides whether to take a trip, and how?
- How realistically do drivers view the capabilities of their vehicles, and their own abilities and skills, in adverse weather conditions?
- How do we most effectively educate drivers about safe driving practices during hazardous weather?
- What are most effective ways to communicate complex risks of road weather impacts to travelers?
- What organizational and cultural barriers impact relationships between forecasters and road maintenance managers?
- Why do some operational personnel such as maintenance managers continue to distrust forecasts that are based on sound science?

Assessing the value of SBS research

Success comes in many forms:

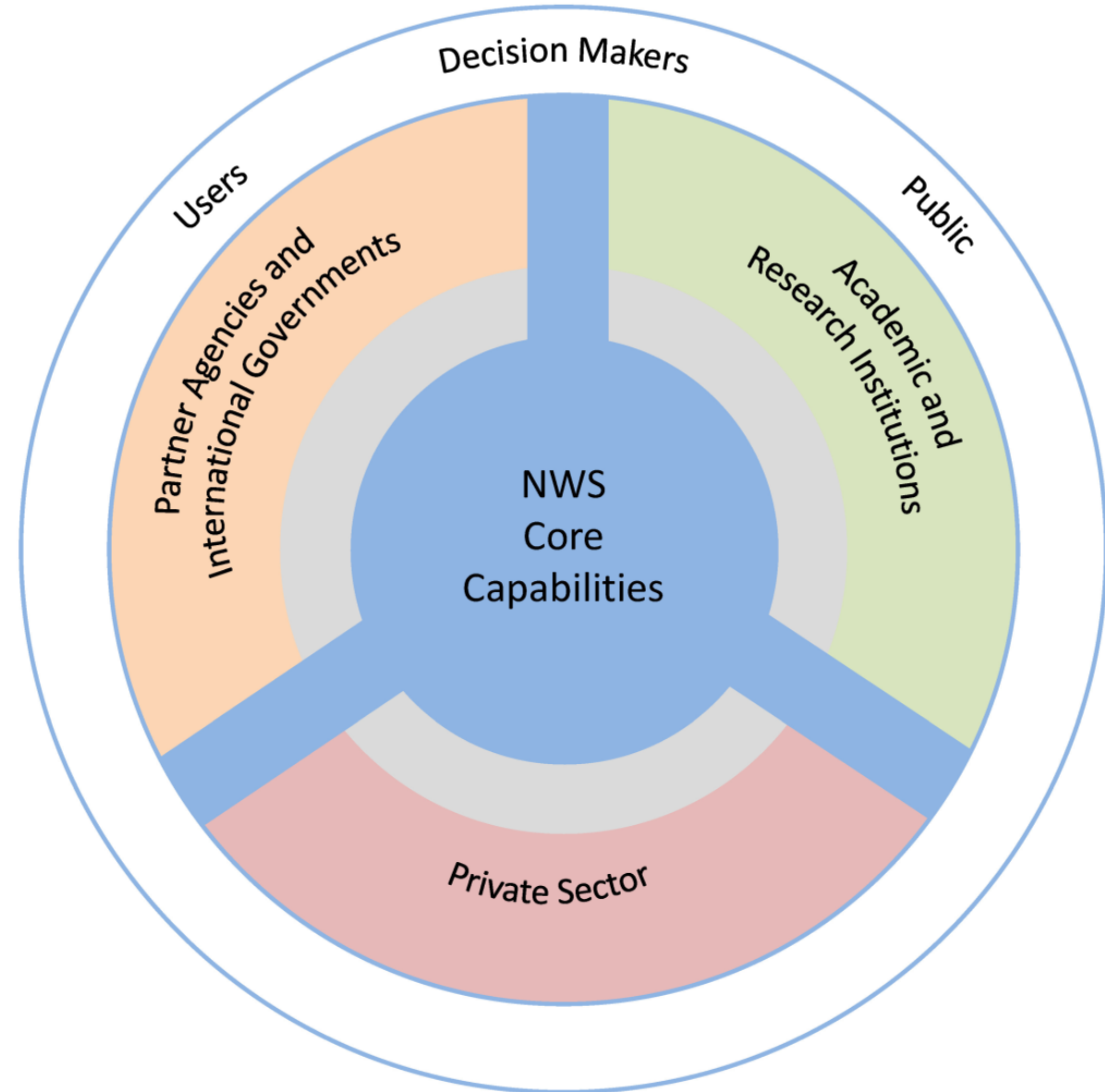
- Saving money, lives, protecting property, enhancing welfare or economic prosperity.
- Developing a new product, display, tool, algorithm, or approach that is developed and transitioned for use in the operational environment.
- Developing new understanding about human cognition, behavior, and culture pertaining to weather.

Weather Services for the Nation: Becoming Second to None (2012)

“Leverage the entire enterprise.”

Fair Weather: Effective Partnerships in Weather and Climate Services (2003)

“It is counterproductive and diversionary to establish detailed and rigid boundaries for each sector.... Instead, efforts should focus on improving the processes by which the public and private providers of weather services interact.”



Study Process

- 5 committee meetings, including one public workshop and participation at 2017 AMS meeting.
- Input to the committee (in person, written) from more than 40 people, including representatives from federal agencies, academia, private sector weather companies, broadcasters, others.
- Examination of dozens of previous reports from the Academies, NOAA, the research community.
- Rigorous peer review by 15 diverse experts

Lessons learned beyond the weather enterprise

Leadership from senior-level agency officials

- set policies and goals
- help others see the importance of SBS research to the agency's mission
- Congressional interest and support
- High-level SBS coordinating staff
- Engaged core of in-house social scientists
 - grassroots champions
 - provide peer-level support
- Funding support for
 - coordination
 - recruitment
 - professional development



other related Academies studies

[released July 2017]

Emergency Alert and Warning Systems

Current Knowledge and Future Research Directions

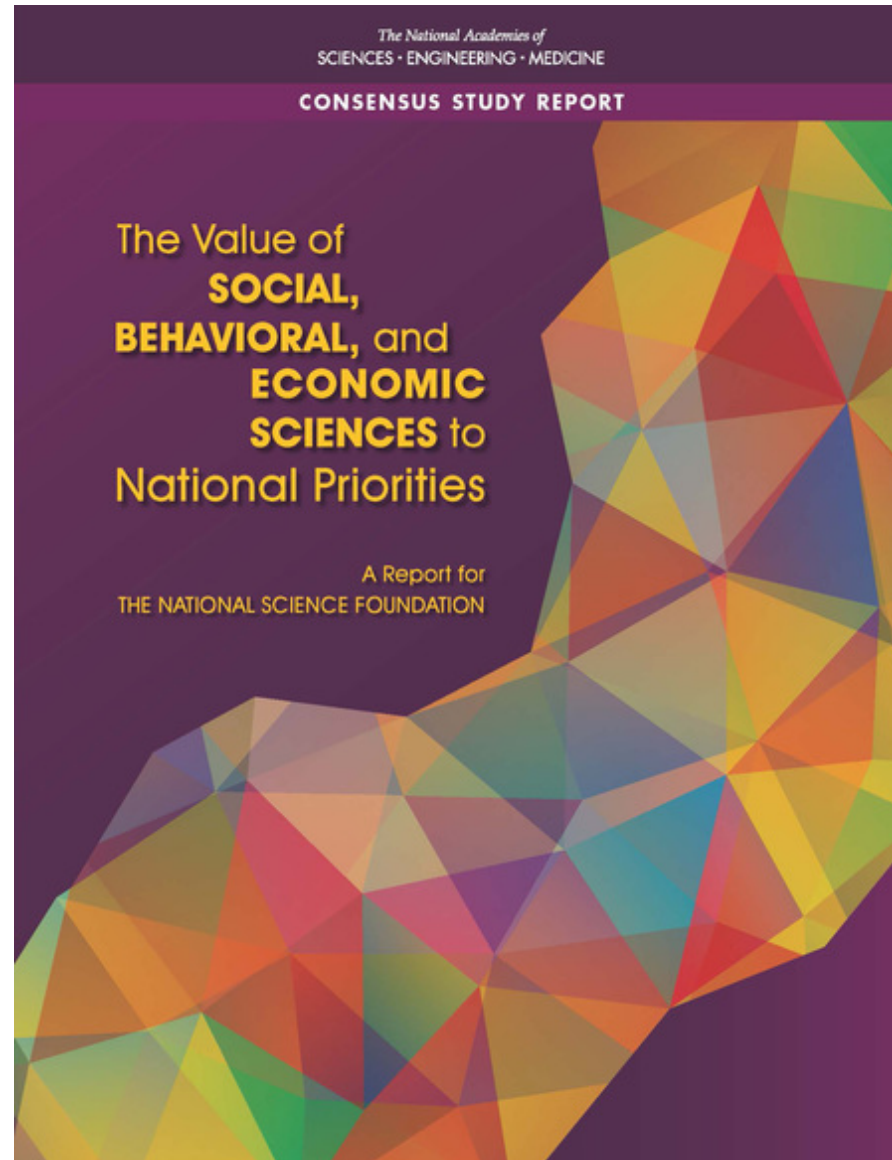
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MEDICINE

[released July 2017]



[ongoing]

Social and Behavioral Sciences for National Security: A Decadal Survey

Board on Behavioral, Cognitive, and Sensory Sciences (BBCSS)

Intelligence Community Studies Board (ICSB)

Unclassified **decadal survey** sponsored by the Office of the Director of National Intelligence, to identify opportunities in the social and behavioral sciences that can contribute to the analytic responsibilities of the intelligence community.

- Issued calls for white papers and held public workshops in 2016-2017
- Committee meetings planned throughout 2018.

http://sites.nationalacademies.org/dbasse/bbcss/sbs_for_national_security-decadal_survey/index.htm

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Ph.D.	1990	Carnegie Mellon University	Public Policy Analysis
M.B.A.	1986	Western Washington University <i>Transfer credits from: Stockholm School of Economics</i>	Emphasis in Statistics and Information Systems
B.A.	1983	University of Washington <i>Transfer credits from: Brandeis University, La Sorbonne, University of Stockholm</i>	English, Creative Writing

EMPLOYMENT

Weyerhaeuser Endowed Professor in Environmental Policy, Daniel J. Evans School of Public Policy and Governance, University of Washington	2013-present
Professor, Daniel J. Evans School of Public Affairs, University of Washington	2009-present
Visiting Professor, University of Bergen, DICE Lab, Department of Psychology	Spring 2014
Associate Dean of Research, Daniel J. Evans School of Public Affairs, University of Washington	2007-2011
Associate Professor, Daniel J. Evans School of Public Affairs, University of Washington	2007-2009
Adjunct Professor, School of Public Policy, Georgia Institute of Technology	2007-2010
Professor, School of Public Policy, Georgia Institute of Technology	2007
Associate Dean for Research, Ivan Allen College, Georgia Institute of Technology	2004-2007
Director, Decision Risk and Management Science Program, National Science Foundation	1999-2001
Associate Professor, School of Public Policy, Georgia Institute of Technology	1998-2007
Assistant Professor, School of Public Policy, Georgia Institute of Technology	1992-98
ASA/NSF/BLS Research Associate, Bureau of Labor Statistics	1991-92
Post-doctoral Research Fellow, Carnegie Mellon University	1990-91
Fulbright Scholar, Department of Psychology, University of Stockholm	1989-90
Head Teaching Assistant/Graduate Teaching Assistant, Carnegie Mellon University	1987-90
Statistician (summer internship), Census Bureau	1986
Graduate Research Assistant, Western Washington University	1985-86

SCHOLARSHIP

PUBLISHED BOOKS

Bostrom, A., French, S.P. and Gottlieb, S.J. (Editors), Risk Assessment, Modeling and Decision Support: Strategic Directions. Springer-Verlag, Berlin, 2008.

Morgan, M.G., Fischhoff, B., Bostrom, A. and Atman, C.J. Risk Communication: A Mental Models Approach. Cambridge University Press, 2002.

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Science Advisory Board, U.S. Environmental Protection Agency. "An SAB Report: Review of EPA's approach to screening for radioactive waste materials at a superfund site in Uniontown, Ohio." Prepared by the *ad hoc* Industrial Excess Landfill Panel of the Science Advisory Board. Panel Members: Jan

Stolwijk (Chair), Ann Bostrom, Norman H. Cutshall, Robert Morrison, Oddvar Nygaard, Mitchell Small, Michael Stein, and Myint Thein. Robert J. Huggett originally served as chair. EPA-SAB-EC-94-010, US EPA SAB, Washington D.C., September 1994.

CONFERENCE AND SEMINAR PRESENTATIONS

Invited and Keynote address

- Bostrom, A. (invited speaker and mentor). Concepts in Risk Communication and Decision-making Under Uncertainty. National Center for Atmospheric Research (NCAR)/University Consortium for Atmospheric Research (UCAR) 2019 Advanced Studies Program Colloquium: Quantifying and communicating uncertainty in high-impact weather prediction, July 15-26. Mesa Lab, NCAR, July 18, 2019.
- Bostrom, A.*, Hayes, A.L. , Crosman, K, Joslyn, S, “Climate Change Risk Perceptions and Feelings: Results from a Construal Experiment.” * Warwick Business School Behavioural Science Group 7th Summer School: Climate Change and Behaviour, 25-28 June 2019 University of Warwick, Coventry, UK. *Invited speaker, June 28, 2019.
- Bostrom, A.*, Crosman, K. and Hayes, A.L. “How to slow or stop climate change: Perceptions and policy preferences.” Warwick Business School Behavioural Science Group 7th Summer School: Climate Change and Behaviour, 25-28 June 2019, University of Warwick, Coventry, UK, June 28, 2019. *Invited speaker, June 26, 2019.
- Bostrom, A. (invited speaker). “Social and behavioural science strategies for energy transition.” Perspectives from the social sciences and humanities on pathways to energy transition. University of Bergen, Litteraturhuset, Bergen Norway, 13 May 2019.
- Bostrom, A. (invited Distinguished Lecture). “How to slow or stop climate change: Perceptions and policy preferences.” National Science Foundation Social, Behavioral and Economic Sciences Distinguished Lecture Series. NSF, Alexandria VA, May 1, 2019.
- Bostrom, A. (invited keynote). “Enhancing Food Safety.” 2018 International Symposium of Food Safety Policy and Technology, Taipei, Taiwan, October 11-12, 2018.
- Bostrom, A. (invited speaker and participant). “An International Agenda for Risk Interpretation and Action research, with an application to Earthquake Early Warning.” University of Washington-Tohoku University Academic Open Space workshop on Natural Disaster Management focusing on public health. Organized by The Consulate General of Japan in Seattle. Petersen room, Allen Library, University of Washington, February 23, 2018.
- Bostrom, A. (invited speaker/panelist), Presidential Town Hall on *Integrating Social and Behavioral Sciences Within the Weather Enterprise*. American Meteorological Society annual meetings, Austin, Texas, January 9, 2018
- Bostrom, A. (invited speaker). “Communicating Science Effectively.” Conference session on Informal STEM Learning and Science Communication: Overlaps, Tensions, and Opportunities Association of Science-Technology Centers (ASTC) annual conference, San Jose, California, October 23, 2017

- Bostrom, A. (invited speaker). “Does thinking concretely about climate change promote support for carbon emissions reductions? Results from a national survey.” Monster Seminar Jam session, NOAA’s Northwest Fisheries Science Center (NWFSC), Seattle, WA, Oct 19, 2017.
- Bostrom, A. (invited speaker) “Putting Science & Technology Information into Context.” Science & Technology for Washington Legislature Workshop, co-sponsored by the Washington State Academy of Sciences and the William D. Ruckelshaus Center (organizer Melanie Roberts). October 4, 2017, SeaTac Airport.
- Bostrom, A. (invited plenary speaker) “Toward improving forecast and warning systems.” AFAC 2017 research conference plenary , bushfire & natural HAZARDS Collaborative Research Centre, Sydney Convention Center, Sydney Australia, September 4, 2017.
- Bostrom, A. (invited plenary speaker). “Does thinking concretely about climate change reduce perceived uncertainties?” Cambridge Risk and Uncertainty Conference, Churchill College, Cambridge, UK June 12-14, 2017.
- Bostrom, A. (interviewed for President’s video – one of several interviewees), American Meteorological Society (AMS) President’s video on “Observations lead the way” shown at kick-off plenary, 17th Presidential Forum: Earth System Observations in Service to Society, Monday 23 January 2017 9am, 97th AMS Annual meeting, Seattle.
- Bostrom, A. (panelist and presenter, co-authors Alicia Ahn and John Vidale), “Early Insights into Earthquake Early Warning in the Pacific Northwest.” Public Use of Earthquake Early Warning Panel (plenary), Friday September 5th 9am. 3rd International Conference on Earthquake Early Warning: Implementing Earthquake Alerts. University of California, Berkeley, September 3-5, 2014.
- Bostrom, A. “Uncertain Perceptions and Certain Preferences Regarding the Use of Chemical Dispersants in Oil Spill Response” in session on Public and Policy Feedback: S&T Communication and Engagement, Science & Technology Policy Gordon Research Conference: Systems Approaches to Research and Practice. Waterville Valley Resort, Waterville Valley, NH, August 10-15, 2014 (presentation August 14).
- Bostrom, A. (invited speaker). "Expressions of scientific certainties and uncertainties in an applied example" at the DICE-Laboratory for the study of Decision, Intuition, Consciousness, and Emotion-sponsored symposium: “The Role of Uncertainty in the Perception and Communication of Climate Change” Christiesgate 12, Auditorium 130, University of Bergen, Norway, February 25, 2014.
- Bostrom, A. (invited speaker) “Setting the Stage for Early Earthquake Alerts and Warnings.” *Shah Family Fund Distinguished Lecture* John A. Blume Earthquake Engineering Center, Stanford University, Palo Alto, California, February 5, 2014
- Bostrom, A. (invited speaker) “Opportunities for conveying scientific certainties and uncertainties in risk communication: an applied example.” Symposium on “Communicating risks and uncertainties concerning environmental hazards: What the public needs from policy and science.” Sponsored by VU Medical Center and Rijksinstituut voor Volksgezondheid en Milieu at De Veranda, Amsterdam, the Netherlands, December 13, 2013.
- Bostrom, A. (invited plenary discussant). Comments on Douglas Medin’s talk on Lay Narratives and Epistemologies, Sackler Colloquium on *The Science of Science Communication II*, National Academy of Sciences, September 23, 2013. Discussion summarized in National Academies workshop report, <http://www.nap.edu/catalog/18478/the-science-of-science-communication-ii-summary-of-a-colloquium>

- Bostrom, A. (invited plenary speaker). Setting the Stage for Early Earthquake Alerts and Warnings. (prepared with John Vidale, presented by Bostrom). 2013 Southern California Earthquake Center Annual Meeting, Palm Springs, California, September 11, 2013.
- Bostrom, A. (invited plenary speaker). A mental models study of hurricane forecast and warning production, interpretation and decision making (collaborators Rebecca E. Morss, Jeff K. Lazo, Julie L. Demuth, Rebecca Hudson, Heather Lazrus and Keisha Childers. Society for Risk Analysis Europe, June 17-19, 2013.
- Bostrom, A. (invited plenary speaker). Risk interpretation and action funding: trends, strategies and opportunities. Disaster Risk Communication: Dialogues For Reducing Extensive Risk. Risk Interpretation and Action workshop May 2013 hosted at King's College London, and coordinated by the Risk Interpretation and Action working group of the Integrated Research on Disaster Risk, the Global Network of Civil Society Organisations for Disaster Reduction and the Humanitarian Futures Programme/ UK Natural Environment Research Council Knowledge Exchange Fellowship..
- Bostrom, A. Risk Communication and the Future of Risk Analysis, Risk Communication – Communicating the (un)expected. Sponsored by the Risk and Crisis Research Center, Åre, Sweden, 13-15 March, 2012.
- Bostrom, A. (invited plenary speaker). Popular Perceptions of Nanotechnology and its Risks. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies (S.NET), November 9, 2011, Tempe Mission Palms Resort and Hotel, Tempe, Arizona.
- Bostrom, A (invited plenary speaker). Public Perspectives: Trust, Engagement, and Engineering Expertise. Workshop on Climate, Society, and Technology, Beckman Center of the National Academies, June 7, 2011
- Bostrom, A. (invited keynote speaker). Communicating about Weather Risks. Workshop on Risk Communications for Natural Hazards sponsored by the National Science Foundation and the National Oceans and Atmospheric Administration, April 11-12, 2011, NOAA National Hurricane Center, Miami, Florida.
- Bostrom, A. (invited speaker) Recommendations to Enhance the FDA's Food Safety Program: a report of The National Academies. FDA's Role in Enhancing Food Safety: Forum Discussion, Keck Building, National Academies, Washington DC, January 28, 2011.
- Bostrom, A. (invited speaker). 21st century challenges in communicating weather and climate: Communicating Risk. U.S. National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) International Sessions on Communicating Weather and Climate Information Saturday, January 22, 2011, 91st American Meteorological Society (AMS) Annual Meeting, Seattle, Washington.
- Bostrom, A. (invited speaker). Seismic Risk Perception, Planning, and Management at North American Seaports, Panel on Ports and Harbors. (based on paper co-authored with Tim Scharke, Lori Reimann-Garretson and Glenn Rix). Quake Summit 2010, NEES and PEER Annual Meeting. Marriott Marquis, San Francisco, October 8, 2010.
- Bostrom, A. Invited participant and speaker. Construing Climate Change. Climate Change Perceptions, Risk Communication and Public Engagement Workshop sponsored by UK Economic and Social Research

Council through a Climate Leader Fellowship to Nick Pidgeon. Cumberland Lodge, Windsor Great Park, UK, 20-22nd July 2010.

Bostrom A. (invited speaker) Characterizing mental models of emerging nanotechnologies: A nano sunscreen study. Nanotechnology Risk Perception Specialist Meeting, Center for Nanotechnology in Society, University of California, Santa Barbara, January 29-30, 2010.

Bostrom, A. The potential to apply methods from psychology and risk assessment to the valuation of cultural ecosystem services. The National Center for Ecological Analysis and Synthesis "Cultural Ecosystem Services" group workshop: Cultural ecosystem services from marine and coastal systems: Counting the intangibles (working group member). Santa Barbara, CA, August 25, 2009.

Bostrom, A. (invited speaker), "Local Global Warming: The media, NGO's and decision making." Plenary Roundtable on the Role of Politics, Media and NGOs, Bergen Summer Research School: Global Development Challenges, hosted by the City of Bergen at VilVite, Bergen, Norway, June 29, 2009.

Bostrom, A. (invited speaker) "Now what do people know about Climate Change?" Emerging Research Agendas Seminar, February 27, 2009, Urban Planning and Design, University of Washington.

Bostrom, A. Invited speaker – panel on Paths to Earthquake Risk Reduction, Earthquake Engineering Research Institute-Western States Seismic Policy Council 2009 annual meeting "Earthquake Risk Reduction: Are Voluntary Actions the Key?", "Making Earthquake Risk Perceptions and Decisions More Effective." February 12, 2009, Salt Lake City, Utah.

Bostrom, A. (invited speaker) plenary session on The Need for More Effective Risk Communication. Workshop on "Assessing, Managing and Communicating Environmental Risk: A Call to Action," Center for Science, Technology, Hubert H. Humphrey Institute for Public Affairs, University of Minnesota. December 3, 2008.

Bostrom, A. (invited paper presenter). "Nanotechnology Risk Communication." NanoRisk Analysis: Advancing the science for nanomaterial risk management. Workshop September 10-11, 2008. Washington D.C. Paper co-authored by Ragnar Löfstedt.

Bostrom, A. (invited seminar speaker), "What do we know now about climate change?" Institute for the Study of Society and Environment Risk & Uncertainty Seminar, National Center for Atmospheric Research, Boulder, Colorado, July 17, 2008. Paper co-authored by Travis Reynolds.

Bostrom, A. "Weather it's climate change," Urban Ecology Laboratory seminar series, University of Washington, Seattle, WA. March 19, 2008.

Bostrom, A. "Parental Mental Models of Lead Paint Hazards: Toward Improved Communications About Environmental Health Risks to Children," Southern Center for Communication, Health and Poverty, (invited seminar presentation; funded seminar series), University of Georgia. April 26, 2007

Bostrom, A. Invited speaker, "Informing earthquake risk mitigation decisions: dynamic decision support" Inter-Jurisdictional Regulatory Collaboration Committee (www.ircc.gov.au/) meeting on risk in building regulations, San Francisco, CA, October 17, 2006.

Bostrom, A. Invited plenary speaker, "Lead is like mercury: risk comparisons, analogies and mental models." New Perspectives on Risk Communication: Uncertainty in a Complex Society, A Multi-Disciplinary

International Research Conference (RiskCom Göteborg 2006), The Centre for Public Sector Research, Göteborg University, Göteborg, Sweden, August 31-September 2, 2006.

Bostrom, A. Invited speaker, "Mental models, risk perception, and communication." National Science Foundation- and Society for Risk Analysis-sponsored workshop on Strategies for Risk Communication: Evolution, Evidence and Experience May 15-17, 2006, Montauk, Long Island, New York.

Bostrom, A. and D. Lashof, "*Weather it's climate change.*" Invited presentation (by Bostrom), session on Communicating Climate Change Science: Conundrum or Creative Challenge? III, American Geophysical Union meetings, San Francisco, December 15, 2004.

Bostrom, A. Invited speaker and participant, workshop on Communicating Urgency, Facilitating Social Change (organizers Lisa Dilling and Susi Moser), National Center for Atmospheric Research (NCAR/ESIG) workshop, June 8-11, 2004.

Bostrom, A. Invited presentation: *Risk Perception and Vaccination Acceptability*. (in one of a few special sessions on vaccines and vaccination sponsored by the Gates Foundation). American Association for the Advancement of Science meetings, *Seattle, February 14, 2004*.

Bostrom, A. Invited speaker and participant. "Cognitive/psychometric aspects of risk perception and communication." Spatial Analysis of Health Risk Perception workshop, Center for Spatially Integrated Social Science, University of California, Santa Barbara, October 14-17, 2003.

Invited speaker and participant, Management of Risk and Trust: Implications for Business and Society, an International conference initiated and organised by Rüsclikon and the University of Zurich. Paper: "Trust and Risk in Smallpox Vaccination, by A. Bostrom and E. Atkinson (GT Undergraduate Research Experience advisee) September 17-20, 2003, Rüsclikon, Zurich, Switzerland.

Invited speaker (to represent the National Science Foundation), Forum on Risk Management and Assessments of Natural Hazards: Toward a Safer America: Building Natural Hazard Resistant Communities Through Risk Management and Assessments. Monday, February 5, 2001, Washington D.C.

Bostrom, A. Invited presentation: "Science and Technology Transform Future Risk Communication." "E-risk?" conference, co-sponsored by The Swedish ICT Commission and the Swedish Council for Planning and Coordination of Research (FRN), Stockholm, Sweden, November 20, 2000. *The Swedish ICT Commission is appointed by the Swedish Government as its advisory body in the field of Information Technology.

Invited speaker, "A mental models approach to vaccine risk communication." Vaccine Communication Workshop, sponsored by The National Vaccine Advisory Committee, the Inter-Agency Vaccine Communications Group and the National Vaccine Program Office of the Centers for Disease Control and Prevention. October 5-6, 2000. Key Bridge Marriott Hotel, Arlington, VA.

Invited presentation at the National Center for Environmental Decision Making Research: "Characterizations of mental models of risk: New tool for policy makers" Knoxville, Tennessee, April 17, 1998.

Invited presentation at the Cummings Colloquium, "Experts versus Laypeople." November 1996, Duke University, Durham, North Carolina.

Co-moderator and invited speaker, Institute of Medicine workshop on Risk Communication and Vaccination, Vaccine Safety Forum. "An overview of risk communication," May 13, 1996, Washington, DC.

Bostrom, A. and Fischhoff, B. (1995). "Communicating Health Risks of Global Climate Change." Invited white paper prepared for and distributed to all participants at the National Science and Technology Council and National Institute of Medicine Conference on Human Health and Climate Change, Breakout Session 6: Public Outreach and Risk Communication, September, 1995, Washington, DC. (Invited participant also, but the paper was sent in advance of the Conference - not in proceedings - and was not presented orally. Only some dozen invited papers were so distributed).

Bostrom, A. "Lay Perceptions of Global Climate Change" Presentation at the First Open Meeting of the Human Dimensions of Global Environmental Change Community, Duke University, Durham, NC June 1-3, 1995 (Invited).

Bostrom, A. "Radon Risk Communication" EPA Region IV States Radon Meeting, Biloxi Mississippi, April 26, 1995 (Invited keynote).

Bostrom, A. "Risk Perception, Communication, and Management" Paper included in Risk Modeling in Agriculture: Retrospective and Prospective, Program Proceedings for the annual meeting of Technical Committee of S-232, March 24-26, 1994, Gulf Shores State Park, Alabama, pp 133-147, 1994. (Invited speaker, proceedings non-refereed)

Bostrom, A. and Robinson, J.P. "The overestimated workweek: Alternative approaches to estimating hours at work." Invited keynote presentation at the Washington Statistical Society monthly meeting, Bureau of Labor Statistics, Washington D.C., February, 1993.

Conference Presentations with Proceedings

Bostrom, A., Ahn, A., Vidale, J.E. Policy, Early Warning and Planning: Earthquake Experiences, Preparedness & Expectations in Washington State. 11th National Conference on Earthquake Engineering: integrating science, engineering, and policy. Los Angeles, CA, June 25-29, 2018. (refereed)

Walker, A. H., & Bostrom, A. (2014, May). Stakeholder engagement and survey tools for oil spill response options. In *International Oil Spill Conference Proceedings* (Vol. 2014, No. 1, pp. 1149-1162). American Petroleum Institute. (refereed)

Bostrom, Ann, Sandra Hoffmann, Alan Krupnick and Wictor Adamowicz. "Parental Decision-Making and Children's Health." U.S. EPA NCER/NCEE Workshop Morbidity and Mortality: How Do We Value the Risk of Illness and Death? May 2006. Paper submitted to conference proceedings; paper presented by Sandra Hoffmann and Alan Krupnick. (refereed)

Bostrom, A., Craig, J., Goodno, B. and Park, J. " *Selection and Application of Decision Models for Seismic Rehabilitation of Building Structures.*" 8th National Conference on Earthquake Engineering in San Francisco, CA, April 19, 2006 (poster session presented by J. Park; paper published in peer-reviewed proceedings).

Bostrom, A., and Turaga, R.M. " *Acceptable Consequences in Earthquake Engineering Decisions.*" 13th World Congress on Earthquake Engineering, Vancouver B.C., August 5, 2004 (poster session; paper published in peer-reviewed proceedings).

Pond, R., J.H. Kucklick, A.H. Walker, A. Bostrom, P. Fischbeck, and D. Aurand. 1997. Bridging the Gap for Effective Dispersant Decisions Through Risk Communication. In: Proceedings of the 1997 International Oil Spill Conference, April 7-10, Ft. Lauderdale, FL. American Petroleum Institute, Washington, DC. pp. 753-759 (presented by Bob Pond).

Conference Presentations without Proceedings¹

Bostrom, A. (presenter and session organizer). "Climate change risk perceptions and feelings: Results from a construal experiment." Society for Risk Analysis annual meetings, December 3, 2018, New Orleans, LA.

Bostrom, A. Panelist, "Earthquake Early Warning Perceptions and Preparedness," Risk Perception and Communication Panel, Closing the Gap on Natural Disaster Risk Reduction: Linking Research and Practice, Wharton Risk Management and Decision Processes Center, University of Pennsylvania, November 9, 2018.

Bostrom, A. (presenter) with Kate Crosman, Travis Reynolds, Max Mossler, M. Granger Morgan, Whitney Fleming, The social evolution of mental models of a contested risk: climate change. Amsterdam Conference on Risk & Uncertainty, 12-14 June 2018 (CEDM and NSF support acknowledged).

Bostrom, A. (presenter) Ahn A, Vidale J. Earthquake Risk Experiences, Expectations, Early Warnings, Planning, and Preparedness in Washington State. Society for Risk Analysis Annual Meetings 2017, Crystal Gateway Marriott, Crystal City, VA, December 11, 2017.

Dryden, Rachel, M. Granger Morgan, Ann Bostrom (presenter), Wändi Bruine de Bruin. Failure to discriminate how long air pollution and carbon dioxide remain in the atmosphere. Symposium on Public perceptions of climate change and its impacts. Society for Risk Analysis Europe, (June 19), June 19-22, 2017, Museu Calouste Gulbenkian, Lisbon, Portugal.

Bostrom, A. (invited panelist). Where We Go From Here: Observational Needs to Support a Thriving Weather and Climate Enterprise Special Symposium on Individual, Social, and Cultural Observations in Weather and Climate Contexts; the 12th Symposium on Societal Applications: Policy, Research and Practice; and the Fifth Symposium on Building a Weather-Ready Nation: Enhancing Our Nation's Readiness, Responsiveness, and Resilience to High Impact Weather Events. Tuesday 24 January 2017 10:30am-Noon, 97th American Meteorological Society Annual meeting, Seattle.

Crosman, K., Bostrom A. (presenter). Perceived efficacy, action, and support for climate change risk reduction. Society for Risk Analysis Annual Meeting 2016, Sheraton San Diego, CA, Tuesday December 13, 2016.

Bostrom, A. (presenter), Kate Crosman, M. Granger Morgan, Max Mossler. Got gas? Emissions, pollution and abatement in mental models of climate change. Society for Risk Analysis Europe Conference 2016, Monday 13:30-15:00, 21 June 2016, Bath, UK.

¹ *Note: Except where specified above, Bostrom prepared and made the presentation.*

- Bostrom, A. (presenter), Peter Dunn, John Vidale and Alicia Ahn. Earthquake experiences, risk perceptions and Early Warnings on the U.S. West Coast. Society for Risk Analysis Annual meetings December 6-10, 2015, Crystal City Marriott, Arlington VA. Presentation December 8, 2015.
- Bostrom, A. (presenter), Peter Dunn (presenter), Alicia Ahn and John Vidale. Perceptions of Earthquake Early Warnings on the U.S. West Coast. IRCD Meeting (The Natural Hazards Center and International Sociological Association's International Research Committee on Disasters meeting), Broomfield, Colorado, July 23, 2015.
- Bostrom, Ann (presenter), Mindsets and climate change risk perceptions and action intentions. Authors: Gisela Böhm, Ann Bostrom^{2*}, Daniel Hanss, Robert E. O'Connor, Tim Scharks, with assistance from Alicia Ahn. Symposium on Interdisciplinary perspectives on Climate Change. Society for Risk Analysis Annual meetings, Denver CO Dec 7-10, 2014 (presentation Dec 8).
- Bostrom, Ann (presenter; co-authors Alicia Ahn and John Vidale). "Anticipating Interpretations and Reactions to Earthquake Early Warnings." Presented June 7th in a Risk Interpretation and Action session at the Integrated Risk Science: A Tool for Sustainability. IRDR Conference 2014, 7-9 June 2014, Beijing International Conference Center, Beijing, China. [Integrated Research on Disaster Risk (IRDR) is sponsored by the International Science Council, the International Social Science Council, and the United Nations Office for Disaster Risk Reduction (UNISDR)].
- Bostrom, A. (presenter), Rebecca E. Morss, Jeff K. Lazo, Julie L. Demuth, Rebecca Hudson, Heather Lazrus (collaborators). "Every single summer" Mental models of hurricane risks, forecasts and warnings in Miami, FL. Society for Risk Analysis 2013 Annual meetings, Baltimore MD, December 9, 2013.
- Bostrom, A., (presenter) Rebecca E. Morss, Jeff K. Lazo, Julie L. Demuth, Rebecca Hudson, and Heather Lazrus. Warning Decisions in Extreme Weather Events: Perceptions and Perspectives on Hurricane Forecasts, Warnings, Decisions and Risks. 38th Annual Natural Hazards Research and Applications Workshop, Boulder, Colorado, July 13-16, 2013.
- Bostrom, A., (panelist) Risk Communication and Decision Making. 38th Annual Natural Hazards Research and Applications Workshop, Boulder, Colorado, July 13-16, 2013.
- Bostrom A. (presenter) Tim Scharks, Lori Reimann-Garretson and Glenn Rix (collaborators). Seismic Risk Interpretation and Action in Port Systems. Society for Risk Analysis-Europe Trondheim, Norway, June 17-19, 2013.
- Bostrom, A., J Lazo, R Morss, J. Demuth, K Childers, Forecasts and Warning Decisions for Hurricanes: Public Perceptions. 2012 World Congress on Risk (Society for Risk Analysis). July 18-20, 2012—Sydney, Australia
- O'Connor, R. A. Bostrom, G. Böhm, D. Hanss, Risk Perceptions, Causal Thinking, and Policy Preferences for Climate Change: A Six Nation Survey. 2012 World Congress on Risk (Society for Risk Analysis). July 18-20, 2012—Sydney, Australia.
- Bostrom A. Discussant, session on Vaccines and Risk Perception chaired by R. Goble. 2012 World Congress on Risk (Society for Risk Analysis). July 18-20, 2012—Sydney, Australia.
- Bostrom, A. Learning from labels on nanotechnology products . Society for Risk Analysis-Europe Annual meeting, Zurich, Switzerland June 18, 2012.

- Claassen, Liesbeth (presenter), Ann Bostrom, Daniëlle Timmermans. Assessing focal points for adjusting information about exposure to electromagnetic fields and health risks: a mental models approach. Society for Risk Analysis-Europe Annual meeting, Zurich, Switzerland June 18, 2012.
- Böhm, Gisela (presenter), Ann Bostrom, Robert O'Connor, Daniel Hanss A cross-national comparison of causal beliefs, risk perceptions, and policy preferences with respect to climate change. Society for Risk Analysis-Europe Annual meeting, Zurich, Switzerland June 20, 2012.
- Bostrom A (presenter), Hudson R, Lazo J, Morss R, DeMuth J. Warning Decisions in Extreme Weather Events: Forecasters' perceptions and perspectives on hurricane forecasts, warnings, decisions and risks Society for Risk Analysis Annual meeting, Charleston South Carolina, December 7, 2011.
- Bostrom, A. Panel participant, Competing Frames for Climate Change: Benefit-Cost Analysis vs. Risk Management. Association for Public Policy Analysis and Management fall conference, Westin, Washington DC, Nov 3, 2011.
- Bostrom A. (co-authors Gisela Böhm, Robert O'Connor, Daniel Hanss, Otto Bodi, Frida Ekström, Pradipta Halder, Sven Jeschke, Birgit Mack, Mei Qu, Lynn Rosentrater, Anethe Sandve, and Ingrid Sælensminde). Mental Models, Causal Thinking, and Public Support for Climate-Change Policies: International Findings from an International Survey. Session on Subsidies, Incentives and Perceptions: Shaping Climate and Renewable Energy. Association for Public Policy Analysis and Management fall conference, Marriott, Washington DC, Nov 5, 2011.
- Bostrom A (poster presentation), Reynolds TW, Hudson R Now What Do People Know About Global Climate Change? A mental models study in Seattle, Washington. 2nd Annual Pacific Northwest Climate Science Conference, University of Washington, Kane Hall, September 13-14, 2011,
- Böhm, Gisela, Ann Bostrom, Robert O'Connor, Daniel Hanss (first three authors presented). The role of causal beliefs in climate change perceptions and preferences for policy actions. 23rd Subjective Probability, Utility, and Decision Making conference poster presentation, 23 August, 2011 Kingston Penrhyn campus of Kingston University, Kingston upon Thames, United Kingdom.
- Morss, Rebecca E. (NCAR, presenter), J. K. Lazo, K. Mulder, J. L. Demuth, and A. Bostrom, How do people perceive and respond to flash flood risk and warnings? Risk Communication of Weather and Climate Information (Themed Joint Session), 91st American Meteorological Society Annual Meeting, 26 January 2011, Sheraton, Seattle, Washington.
- Bostrom A., T. W. Reynolds (presenter) and R. Hudson. Now what do people know about global climate change? A mental models approach. Risk Communication of Weather and Climate Information (Themed Joint Session), 91st American Meteorological Society Annual Meeting, 26 January 2011, Sheraton, Seattle, Washington.
- Bostrom A., Hudson R, Scharks T and Gilliland R, Characterizing mental models of emerging nanotechnologies: A nano sunscreen study. Society for Risk Analysis Annual Meeting Dec 5-8, 2010, oral presentation December 7, 2010, Salt Lake City, Utah.
- Scharks T, Bostrom A (presenter), Reimann-Garretson L, Rix G, Seismic risk perception, planning, and management in North American seaports. Society for Risk Analysis Annual Meeting Dec 5-8, 2010, poster, December 6, 2010, Salt Lake City, Utah.

- Lazo, J. (presenter), Morss, R., Demuth, J. and Bostrom, A. Forecasters' mental models of flash flood forecasts and warnings. American Meteorological Society annual meetings, Atlanta, GA January 25, 2010.
- Bostrom A. (presenter), Reynolds T., Hudson R., Read, D. Now What Do People Know About Global Climate Change? A Mental Models Approach. Society for Risk Analysis annual meetings, Baltimore, Maryland, December 7, 2009.
- Bostrom, A. (presenter), Lofstedt, R.E. "Nanotechnology risk communication: Big risk communication challenges from small things" Society for Risk Analysis annual meetings, Boston, Massachusetts, December 8, 2008.
- Butte, G., Thorne, S. (presenter) and Bostrom, A. "Are we safe? can we trust you: Expert Model/Mental Models Approach Applied." Society for Risk Analysis annual meetings, Boston, Massachusetts, December 8, 2008.
- Bostrom, A. (presenter), Turaga, R.M., Catrambone, R., Gane, B. and Wood, S.K. "Effects of viewing seismic risk maps on subjective probabilities and risk perceptions." Presentation at the Foundations and Applications of Risk, Utility and Decision Theory (FUR XIII) international conference, Barcelona, Spain, July 5, 2008 (online proceedings accessible only to participants).
- Bostrom, A. "Probabilities and Panic." Invited presentation at the Public Communication of Science and Technology (PCST-10) conference, session on Numbers, Pictures and Words: Communication of risk and Uncertainty. Malmö, Sweden, June 27, 2008.
- Gane, B., Bostrom, A. (presenter), Catrambone, R. and Turaga, R.M. "Investigating how seismic maps affect risk perception." Poster presentation at the 2nd World Risk Congress, Guadalajara, Mexico, June 8-11, 2008.
- Bostrom, A., Gane, B. D., Wood, S. K., Catrambone, R., Samanci, O., DiSalvo, C., & Gunter, G. "Visualizing seismic risks and losses: Can maps change perceptions?" Poster presented at the 2008 National Earthquake Conference, Seattle, Washington, April 22-26, 2008.
- Bostrom, A. (presenter), Catrambone, R., Murray, J., Riggieri, A., Wood, K., Gane, B., Samanci, O., Gunter, G., Ng, M. Society for Risk Analysis Annual Meetings, "The Effects of Risk Maps on Risk Perceptions and Decisions: Evidence from an Earthquake Map Experiment," San Antonio, Texas. December 11, 2007.
- Gane, Brian D., Turaga, Rama Mohana R, Bostrom, Ann, Catrambone, Richard, Riggieri, Alison, Wood, Sara K. "Manipulating Maps to Affect Risk Perception: The Effects of Landmarks and Dimensionality." Poster presentation at the Society for Judgment and Decision Making annual meetings, Long Beach, CA, November 18, 2007.
- Bostrom A, Hoffmann S, Krupnick A, Adamowicz V; "Parental mental models of lead paint hazards: Toward improved communications about environmental health risks to children." Oral presentation at the Society for Risk Analysis annual meetings, Baltimore MD, December 6, 2006.
- Hoffmann S, Bostrom A, Krupnick A, Adamowicz V (Sandra Hoffmann lead) "Parental decision making about children's health: Using mental models research to inform contingent valuation surveys. " Poster presentation at the Society for Risk Analysis annual meetings, Baltimore MD, December 4, 2006.

- Turaga, Rama Mohana R, R. A. Gesser, M. E. Chang, A. G. Russell, and A. Bostrom. (presentation made by Turaga) “*The Partnership for Environmental Research and Community Health (PERCH) Phase III, Part 1: Community-scale risk assessment in greater Pensacola, Florida.*” American Meteorological Society annual meeting, Atlanta, January 31, 2006.
- Anselin, L. Bostrom, A. Galvez, L. and Gao, J. Poster-Platform Presentation (made by Bostrom), “*Visual Communication of Risk and Uncertainty for Spatial Data.*” Society for Risk Analysis annual meetings, Orlando Florida Dec 4-7, 2005.
- Turaga, R.M. and A. Bostrom, “*Assessment Endpoints and Comparative Risk Analysis: The Case of Air Pollution.*” Oral presentation, (by Mohan Turaga). Association for Public Policy Analysis and Management meetings, Atlanta, October 30, 2004.
- Burns, S. and Bostrom, A., 2004, “*Barriers to implementation of performance based engineering: Lessons from the Tennessee 2003 international building code hearings.*” 2004 ANCER Annual Meeting, Honolulu, HI, July 28-30. (presentation made by Steve Burns).
- Bostrom, A. and Atkinson, E. Poster presentation session, “Smallpox Vaccine mental models and risk perceptions.” Society for Risk Analysis annual meetings, Dec 7-10, 2003 (was not present due to illness, but a colleague posted the poster and introduced it orally).
- Invited discussant, session on risk comparisons, Annual meetings of the Society for Risk Analysis, December 5-7, 2002, New Orleans, LA.
- Invited discussant, session on Simulation Modeling and Decision Making, Annual meetings of the Association for Public Policy, Analysis and Management, November 7-9, 2002, Dallas, TX.
- Bostrom, A. (with Branco Ponomariov) Presentation on "Acceptable Risk" at the Mid-America Earthquake Center coordination meetings, June, 2002, UIUC.
- Bostrom, A. (with Brown, N.R., Hibbs, B., Chen, R.) Does the Community Risk Scale Improve Probability Estimates? Presentation at the Society for Risk Analysis, Annual meetings, Tuesday December 4, 2001, Westin Hotel, Seattle, Washington.
- Bostrom, A (with contributions from Stephanie Byram), "Testing for BRCA1/2" Brief talk about work in progress, at the symposium "Celebrating the Research of Stephanie Byram." November 10, 2001, Carnegie Mellon University, Pittsburgh, PA .
- Bostrom, A. (invited speaker), "Vaccine and Disease Risk Communications," American Public Health Association 129th annual meeting, Atlanta, GA, October 22, 2001.
- Bostrom, A. "Measuring Mental Models", International conference on "Model-Based Reasoning: Scientific Discovery, Technological Innovation, Values," Pavia, Italy, May 18, 2001. Co-authored with Stephanie Byram.
- “Decision-makers’ mental models of ecological issues associated with marine oil spills: Guidelines for risk communication on chemical dispersant use.” Co-authors Paul Fischbeck, Ann-Hayward Walker, Jan Kucklick and Bob Pond. Prepared and presented by Bostrom at the Annual Meeting of the Society for Risk Analysis, December 4, 2000, Crystal Gateway Marriott, Arlington, Virginia.

- Bostrom, A, presenter in session on "What's New in Vaccine Risk Communication" at the 34th National Immunization Conference, July 7, 2000, Washington, DC. (Invited)
- Bostrom, A. "Does Trust Affect Judgments of Risk Acceptability? A Survey-Based Case Study from Burgas, Bulgaria." Collaborators: Kobi Ako Abayomi, Richard Barke, Sheldon Gen, Shira Kapplin, Krassimira Paskaleva, and Poli Roukova. International Symposium on Society & Resource Management 2000 Bellingham, WA June 19, 2000.
- Bostrom, A. "Evaluation of a Risk Communication on Vaccine-Related Misperceptions." Presented in session on "Vaccine Risk Communication and Management for the Next Century" which I organized. Society for Risk Analysis annual meetings, Atlanta, GA, December 8, 1999.
- Bostrom, A. "Vaccine policy in practice: Doctors' beliefs and experiences." Association for Public Policy, Analysis and Management annual meetings, Washington DC November 6, 1999.
- Bostrom, A. "Communicating health effects of global environmental change with policy makers: the example of cryptosporidium in drinking water." Society for Risk Analysis annual meetings, Phoenix, Arizona, December 9, 1998.
- Bostrom, A., R. Barke and K. Paskaleva, "Trust, the economy, and environmental risk: an exploratory study of risk perceptions in Bourgas, Bulgaria." Society for Risk Analysis annual meetings, Phoenix, Arizona, December 8, 1998.
- Bostrom, A. "Risk perceptions and decision making: A case for "thick" descriptions in risk policy. Annual Association for Public Policy, Analysis and Management Research Conference, New York City, October 31, 1998.
- Bostrom, A. "Characterizing mental models to inform policy design" SOGR meeting in Le Lavandou, France, June 14-17, 1998.
- Bostrom, A. "Trust in a Changing Society: A preliminary study of environmental risk and management in Burgas, Bulgaria." The second Bellingham International Conference on Social Trust in Risk Management, Bellingham, Washington, July 13-15, 1997.
- Bostrom, A. "Local Perceptions of Local Environmental Risks." Society for Risk Analysis annual meetings, New Orleans, Louisiana, December 10, 1996.
- Bostrom, A. "Who calls the shots?: Credible vaccine risk communication." Bellingham International Conference on Social Trust in Risk Management, Bellingham, Washington, July 14-16, 1996.
- Bostrom, A. "Vaccine Risk Communication." National Immunization Conference, Washington, D.C. April 9, 1996. (Invited)
- Bostrom, A. "Correcting Misconceptions with Risk Communication Texts: Is a Myth-Fact box a good idea?" Paper presented at the Society for Risk Analysis and the Japan Section of SRA annual meetings in Honolulu, Hawaii, December 3-6, 1995.
- Bostrom, A. "Global Environmental Risk: A brief history of perceptions." Paper presented at the 17th Annual Association for Public Policy and Management Research Conference, Washington, D.C., November 2-4, 1995.

- Bostrom, A. Presentation on how junior faculty can obtain funding, Academy of Management Workshop, Vancouver BC, August 5, 1995. (Invited).
- Bostrom, A. "Warming up to Decisions about Risk: A Mental Models Study on Correcting Misconceptions about Global Climate Change." Poster presentation at the Society for Risk Analysis annual meetings in Baltimore, Maryland, December 4-7, 1994.
- Bostrom, A. "A Public View of Risk." Presentation at the Society of Environmental Toxicology and Chemistry 15th annual meeting in Denver, Colorado, special symposium on risk communication. October 30-November 3, 1994 (Invited).
- Bostrom, A. "Decision making about global climate change: the role of risk perceptions in risk control." Poster presentation at the Society for Probability, Utility and Decision Making (SPUDM-14), Aix-en-Provence, France, August, 1994.
- Bostrom, A. "Cognitive Strategies for Estimating Hours at Work," Presentation at the Third Practical Aspects of Memory (PAM) conference in College Park, Maryland, July 30-August 5, 1994 (Invited by session organizer).
- Bostrom, A. "Will mental models based risk communications affect attitudes and decision making about environmental risks?" Presentation at the Foundations of Utility theory, Decision making and Risk (FUR) VII conference in Oslo, Norway, June 28-July 3, 1994.
- Bostrom, A. "Research on efforts to provide the public with the information they need to make decisions about exposure to risks." Presentation at the Department of Energy National Low-Level Waste Management Program Communication Working Session in Atlanta, Georgia, March 9-10, 1994 (Invited).
- Bostrom, A. "Addressing public perceptions and misconceptions about Electric and Magnetic Fields," Presentation at the 1993 Annual Meetings of the Society for Risk Analysis in Savannah, Georgia, December 5-8, 1993.
- Bostrom, A. and Atman, C.J. "Risk Communication Evaluation." Paper presented at the 1992 Annual meeting of the Society for Risk Analysis, San Diego, California, December, 1992.
- Bostrom, A. "Some Lay Perceptions of Global Climate Change." Presentation at Oak Ridge National Laboratories, Oak Ridge, Tennessee, October, 1992. (Invited).
- Bostrom, A. "Validity and Accuracy in Estimates of Hours at Work." Paper presented at the Joint Statistical Meetings, Boston, Massachusetts, August, 1992.
- Bostrom, A., "Response Errors in Hours at Work: Remembering what happened week after next." Presentation at the U.S. Bureau of the Census, Suitland, Maryland, research seminar series February, 1992. (Invited). Also presented at the 1992 Annual meeting of the American Association for Public Opinion Research, St. Petersburg Beach, Florida, May, 1992.
- Bostrom, A., "Lay Mental Models of Risk Control: What about hairspray, styrofoam cups and global warming?" Paper presented at the 1991 Annual meeting of the Society for Risk Analysis, Baltimore, Maryland, December 8, 1991.

- Bostrom, A.. "Assessing Risk Communication Documents: Completing and Correcting Mental Models of Hazardous Processes." Paper presented at the Society for Probability, Utility and Decision Making (SPUDM-13), Fribourg, Switzerland, August, 1991.
- Bostrom, A., "Mental Models of Hazardous Processes." Presentation at the National Institute for Occupational Safety and Health, Division of Surveillance, Hazard Evaluation and Field Studies, Cincinnati, Ohio, April 26, 1991. (Invited)
- Bostrom, A. "A Mental Models Approach to Exploring Perceptions of Hazardous Processes." Presentation at Battelle Pacific Northwest Laboratories, Richland, Washington April 23, 1991. (Invited)
- Bostrom, A. Moderator for panel session at the 1991 EPA International Symposium on Radon and Radon Reduction Technology, Philadelphia, Pennsylvania, "Risk Communication." April 2, 1991. (Invited)
- Bostrom, A., and Atman, C.J. "Public Knowledge About Indoor Radon: The Effects of Risk Communication." (Revised version) presented at the annual ORSA/TIMS conference, Philadelphia, October 29-31, 1990.
- Bostrom, A. "Mental Models of Hazardous Processes." Presentation at HSFR (Swedish Social Science Research Council: Area meeting for cognition and decision-making), Umeå, Sweden, May 21-22, 1990.
- Bostrom, A. "Risk Perception and Decision Making" Guest lecture, University of Stockholm, Stockholm, Sweden, May 3, 1990. (Invited)
- Bostrom, A. "Applying a mental models methodology to perceptions of indoor radon." Presentation at the Cognition Seminar, University of Lund, Lund, Sweden, March 21, 1990. (Invited)
- Bostrom, A. "Mental Models theory from an applied perspective." Presentation at the Cognition Seminar, University of Stockholm, Stockholm, Sweden, January 12, 1990. (Invited)
- Bostrom, A. "On Communicating the Risk of Indoor Radon," Proceedings of the 1993 Annual Meeting of the National Council on Radiation Protection and Measurements, Crystal City, Virginia, April 7-8, 1993 (Invited speaker, Case study panel on radon).

TEACHING: COURSES TAUGHT *Note Course evaluations available separately

Term	Course No.	Course Title	No. enrolled
Spring 2019	PPM500AB	Proseminar for 1 st and 2 nd year Evans PhD students	9
Winter 2019	PUBPOL582A	Climate Change Communication	25
Winter 2019	PPM500B	Proseminar for 2 nd year Evans PhD students	5
Winter 2019	PPM500A	Proseminar for 1 st year Evans PhD students	4
Fall 2018	PAEX502	Executive Decision Making	34
Fall 2018	PPM502	Research Design	4
Fall 2018	PPM500B	Proseminar for 2 nd year Evans PhD students	6
Fall 2018	PPM500A	Proseminar for 1 st year Evans PhD students	4
Spr 2018	PPM500AB	Proseminar for 1 st and 2 nd year Evans PhD students	7
Winter 2018	PUBPOL582A	Climate Change Communication	20
Winter 2018	PPM500A	Proseminar for 1 st year Evans PhD students	5
Winter 2018	PPM500B	Proseminar for 2 nd year Evans PhD students	3
Fall 2017	PPM502	Research Design	10
Fall 2017	PA EX 502	Decision Making for Leaders	40
Fall 2017	PPM500A	Proseminar for 1 st year Evans PhD students	5
Fall 2017	PPM500B	Proseminar for 2 nd year Evans PhD students	2
Spr 2017	PPM500A	Proseminar for 1 st and 2 nd year Evans PhD students	8
Winter 2017	PPM500B	Proseminar for 2 nd year Evans PhD students	5
Winter 2017	PPM500A	Proseminar for 1 st year Evans PhD students	3
Fall 2016	PPM500B	Proseminar for 2 nd year Evans PhD students	5
Fall 2016	PPM500A	Proseminar for 1 st year Evans PhD students	4
Fall 2016	PAEX502	Executive Decision Making	37
Fall 2016	PPM502	Research Design	7
Spr 2016	PPM500A	Proseminar	9
Win 2016	PBAF608i	Deep Dive Capstone Seminar on Time of Emergence	13
Win 2016	PBAF595A	Ethics and Practice of Climate Change Communication and Community Engagement Strategies	21
Win 2016	PPM500A	Proseminar for 1 st year Evans PhD students	5
Win 2016	PPM500B	Proseminar for 2 nd year Evans PhD students	4
Fall 2015	PAEX502	Executive Decision Making	40
Fall 2015	PPM500B	Proseminar for 2 nd year Evans PhD students	4
Fall 2015	PPM500A	Proseminar for 1 st year Evans PhD students	5
Fall 2015	PBAF599D	Surviving Disaster seminar (co-taught with David Schmidt, ESS, and cross-listed with ESS & Built Environment)	18
Fall 2015	PPM502A	Research Design (doctoral course)	7
Spr 2015	PPM500A&B	Proseminar for 1 st and 2 nd year Evans PhD students	8
Spr 2015	PBAF608E	Capstone Seminar	8
Win 2015	PPM500A	Proseminar for 1 st year Evans PhD students	4
Win 2015	PPM500B	Proseminar for 2 nd year Evans PhD students	4

Win 2015	PBAF595A	Ethics and Practice of Climate Change Communication and Community Engagement Strategies	30
Win 2015	PBAF608E	Capstone Seminar	8
Fall 2014	PPM500A	Proseminar for 1 st year Evans Doctoral students	4
Fall 2014	PPM500B	Proseminar for 2 nd year Evans Doctoral students	4
Fall 2014	PPM502	Research Design	5
Spring 2014	University of Bergen	Survey Methodology (co-taught, with Gisela Böhm, Torbjörn Torsheim)	17
Fall 2013	PAEX502	Guest session on behavioral decision making	37
Fall 2013	PPM502	Research Design	5
Spr 2013	PBAF528A	Quantitative Analysis II	62
Win 2013	PBAF599D	Prize Philanthropy: Gaming for Global Development, co-taught with Howard McCurdy	9
Win 2013	PBAF595A	Ethics and Practice of Climate Change Communication and Public Engagement Strategies	29
Fall 2012	PAEX502	Decision Making	42
Fall 2012	PPM502	Research Design	8
Spr 2012	PBAF528A	Quantitative Analysis II	62
Win-Spr 2012	PBAF599D/A	Prize Philanthropy: Gaming for Global Development, co-taught with Erika Wagner	29/9
Win 2012	PBAF595A/B	Communicating Climate Change	24
Fall 2011	EMPA502	Decision Making	36
Spring 2011	PBAF528C	Quantitative Analysis II	49
Winter 2011	PBAF595A	Communicating Climate Change	15
Win-Spr 2011	PBAF599	Prize Philanthropy, co-taught with Kevin DeSouza, Sandra Archibald	6
Fall 2010	PAEX502	Decision Making	42
Winter 2010	PBAF608	DP (degree project) Environment Seminar	13
Fall 2009	EMPA502	Decision Making	43
Fall 2009	PBAF595A	Communicating Climate Change	19
Fall 2008	EMPA502	Decision Making	37
Spring 2008	PBAF597	The Role of Science in Environmental Decision	25
Winter 2008	PBAF527	Quantitative Analysis I	39
Spring 2007	PUBP8500	Research Seminar	9
Fall 2006	PUBP4113	Statistical Analysis in Public Policy	14
Spring 2006	PUBP3600	Sustainability, Technology & Policy	28
Spring 2005	PUBP8803	Qualitative Research Methods	5
Fall 2004	PUBP6324	Environmental & Technological Risk Management	8
Spring 2004	PUBP8500	Research Seminar	7
Spring 2004	PUBP6114	Applied Policy Methods and Data Analysis	25
Spring 2003	PUBP8813	Risk Assessment, Perception and Communication	2
Fall 2002	PUBP8803	Qualitative Research Methods (co-taught)	8
Fall 2002	PUBP4113	Statistical Analysis in Public Policy	27

Spring 2002	PUBP8500	Research Seminar	9
Spring 2002	PUBP6114	Applied Policy Methods and Data Analysis	15
Fall 2001	PUBP4113	Statistical Analysis in Public Policy	18
Fall 1999	PUBP8600 (8803)	Qualitative Research Methods (co-taught w/Kingsley)	16
Spring 1999	PUBP8170	Risk Perception, Communication and Management	6
Spring 1999	PUBP4314	Environmental Regulation	16
Winter 1999	PUBP6114	Data Analysis in Policy Science	17
Fall 1998	PUBP6110	Statistical Analysis	17
Spring 1998	PUBP4314	Environmental Regulation	23
Spring 1998	PUBP6114	Data Analysis in Policy Science	16
Winter 1998	PUBP6110	Statistical Analysis	15
Fall 1997	PUBP6114	Data Analysis in Policy Science	18
Spring 1997	PUBP8120	Risk Communication	4
Fall 1996	PUBP8600	Quantitative Thinking and Policy Problems	5
Spring 1996	PUBP6114	Data Analysis in Policy Science	16
Winter 1996	PUBP6310	Environmental Issues	8
Winter 1996	PUBP8160	Risk Communication	6
Fall 1995	PUBP6110	Statistical Analysis	19
Spring 1995	PUBP6114	Data Analysis in Policy Science	13
Spring 1995	PUBP 6218	Quantitative Modeling	3
Winter 1995	PUBP 6310	Environmental Issues (co-taught w/Rodgers)	6
Fall 1994	PUBP8100/LCC620	Risk Communication (co-taught w/Bill Evans/LCC)	4
Fall 1994	PUBP6110	Statistical Analysis	19
Spring 1994	PUBP6324	Environmental and Technological Risk Management	5
Spring 1994	PUBP6114	Data Analysis in Policy Science	16
Winter 1994	PUBP6310	Environmental Issues (co-taught w/ Norton)	12
Fall 1993	PUBP6110	Statistical Analysis	11
Spring 1993	PUBP6114	Data Analysis in Policy Science	14
Fall 1992	PUBP6110/CP6215	Statistical Analysis	28
Fall 1992	PUBP6114	Data Analysis in Policy Science	14

INDIVIDUAL STUDENT GUIDANCE

Ph.D. students (Thesis committee Chair or Co-Chair):

Alicia Ahn, Prospectus “Natural hazard preparedness decisions of households under uncertainty” defended successfully June 7, 2017. Advisory Committee: A. Bostrom (chair), Dave Layton, Michael Lindell (Urban Design and Planning), and Darryl Holman (GSR, Anthropology).

Katherine Marshall (Kate) Crosman, Ph.D. *Stakeholder Buy-In to Marine and Coastal Resource Management Under Conditions of Complex Governance*. Defended August, 2019. Prospectus "How do international non-governmental organizations affect stakeholder buy-in to marine and coastal resource management?" defended successfully March 9, 2017. Advisory committee: A. Bostrom (chair), Eddie Allison (Marine & Environmental Affairs, co-chair), Sabine Lang (Jackson School), Evelyn Lessard (GSR, Oceanography), and Craig Thomas.

Timothy E. Scharks, Ph.D. *Threatening Messages in Climate Change Communication*. Defended May, 2016. Awarded UW Best Dissertation in the Social Sciences, 2015-2016. General exam/proposal “Threatening Messages in Climate Change Advertisements Causing Concern or a Cause for Concern?” defended February 7, 2014 (committee: Ann Bostrom (chair), Alison Cullen, Craig Thomas, J. Patrick Dobel, Stuart Tolnay). Major Area Paper completed April, 2012 (also advised by Alison Cullen). Currently employed as faculty at Green River College, WA.

Pradeep Singh, *Essays in Intertemporal Choice under Uncertainty: A Behavioral Approach* Dissertation defended March 20, 2014; Proposal defended March 16, 2012 (committee: Ann Bostrom (chair), Leigh Anderson, Mark Long, Thomas Richardson (previously included Chris Parker).

Rama Mohana Turaga, Public Policy (Chair Bostrom, co-chair Douglas Noonan), *Spatial Resolution, Costs, and Equity in Air Toxics Regulation*. Defended successfully June 28, 2007. Associate Professor, Public Systems Group, Indian Institute of Management, Ahmenabad, India.

Joonam Park, Civil and Environmental Engineering (Co-Chair with Barry Goodno, CEE, Chair, and Jim Craig, AE Co-Chair). *Development and Application of a Probabilistic Decision Support Framework for Seismic Rehabilitation of Structural Systems*. Defended successfully August 19, 2004. Currently employed as faculty at Wonkwang University, Korea.

Nicole Fehrenbach, Joint GSU-GT Public Policy program (ABD; advised 2003-2007).

Ph.D. and M.S. Special Problems students:

Supervised Megan McPhaden in an independent study on statistical analyses to assess best management practices for agricultural drainage ditches, Winter 2013.

Supervised (with Alison Cullen) Filip Ehrle Elveling in an independent study on voluntary regulation of greenhouse gas emissions from energy production, Spring 2011.

Supervised Tim Scharks (PhD student, Evans School) in independent study of qualitative research methods, Fall, 2009.

Supervised Travis Reynolds (PhD student, Evans School) in independent study on analyses of climate change risk perceptions, communication, management and policy, Fall 2008, Spring 2009.

Supervised an MS student in Management, PhD and undergraduate students from ISYE in a readings course version of Survey Research Methods (PUBP4120), Spring 2006.

Supervised MSPP student Liam Klein in an independent reading of The Risk of Air Pollution for Athletes, PUBP8900, Fall 2005.

Supervised MSPP student MegAnn Powell in an independent reading of Applied Policy Analysis, Summer 2004.

Supervised a Ph.D. student in Chemical Engineering (Ibrahim Ozkan) for an independent graduate studies course in Environmental and Technological Risk Management, Spring 2002.

Supervised a Ph.D. student in Public Policy (Kathy Bass) for a one credit independent graduate studies course in survey research methods, Spring quarter 2002 (finished Fall 02).

Supervised joint Ph.D. student Craig Gordon in a readings course on risk and political communications, Fall quarter 1998.

Supervised a Ph.D. student in Architecture (Craig Piper) for an independent graduate studies course in Nonparametric Statistics, Winter quarter 1994.

M.A. Degree Projects supervised (University of Washington)

Fleming, Whitney MPA Mar 2017, Misconceptions About the Causes of Climate Change and Their Relation to Concern and Support for Policies (independent capstone project). Best Environmental Policy capstone Award, Evans School 2016-17.

Silva, Catherine (Cat) Marie Caverly, MPA and MUP 2015, Bicyclists' Stopping Behaviors: An Observational Study of Bicyclists' Patterns and Practices (Evans School of Public Affairs advisor for Master of Urban Planning thesis in College of Built Environment)

Hudson, Rebecca, MPA (independent capstone project).

Ip, Angel, MPA 2012/Public Health – Environmental and Occupational Health Sciences (MS committee chaired by Richard Fenske) Spring 2013. Methodology to Assess Forest Fire Impacts on Air Quality and Human Health in Washington State: A Case Study on the 2006 Tripod Wildfires.

Brody, Daniel , MPA Spring 2012/MS Forestry (MS committee chaired by Claire Ryan) Spr 2012 Citizen Involvement in Environmental Bureaucratic Decision-making: Communicative Action in Forest Service NEPA Projects.

Abbey, Rebecca C. MPA Spring 2011. An Analytical Study of the Costs & Benefits of Eliminating Adult Medicaid Preventive and Routine Dental Care in Washington State.

Iglesias, Niki. MPA/MPH Spring 2011. Reducing 30-Day Readmission Rates for Heart Failure Patients: Recommendations for Improving Care at Swedish-Cherry Hill.

Papendick, Hilary MPA Spring 2011/MS Forestry Spr 2011 (DP supervisor at Evans School; member of MS committee, chaired by John Perez-Garcia), Preparing for rising tides: sea level rise adaptation in Washington State.

Gillis, Edith M. MPA Spring 2011. Communicating Change: What the Literature and Comparisons Say about Best Practices for Communicating Strategic Plans & How the Washington State Department of Natural Resources can use Communication Planning Best Practices to meet the Goals of their Strategic Plan.

Hirsch, Ananda Dunne. MPA Spring 2011. Establishing a National Energy Strategy Board: Form and Function.

Adams, Jason D. MPA Spring 2010. Life-Cycle Costing at Seattle Parks and Recreation. Public Service Clinic client: Seattle Department of Parks and Recreation.

- Buick, Adam. MPA Spring 2010. Incorporating Climate into State Environmental Policy Act Review Process in King County. Public Service Clinic client: King County of Transportation and Roads.
- Cortese, Dianna Lynn. MPA Spring 2010. Mapping Children's Health: Using Data Sources to Locate Children at Risk from Environmental Exposure. Public Service Clinic client: US Environmental Protection Agency Region 10.
- Goldstein, Allyson. MPA Spring 2010. Land tenure implications of the UN REDD program and progress in Mozambique and Liberia. For the Rural Development Institute.
- Humphries, Eleanore C. MPA Spring 2010. Seattle Public Utilities and the Greening of Immigrant and Refugee Businesses. Public Service Clinic client: Seattle Public Utilities.
- Kinsella, Ryan Christopher. MPA Spring 2010. Surveying the Public Value of Seattle's Parks and Recreation Centers. Public Service Clinic client: Seattle Department of Parks and Recreation.
- Lisiewski, Jessica A. MPA Spring 2010. Incorporating Climate into State Environmental Policy Act Review Process in King County. Public Service Clinic client: King County of Transportation and Roads.
- Makhija, Neena K, MPA Spring 2010. Capturing the Impact of Gathering Places & Community-Based Planning Projects: Creating an Evaluation Guide for Pomegranate Center. Public Service Clinic client: Pomegranate Center.
- Miccio, Claire E, MPA Spring 2010. Barriers to Implementing Low Impact Development Approaches in Washington State Roadways and Highways. Public Service Clinic client: Washington State Department of Transportation.
- Pond, Christian D, MPA Spring 2010. An Evaluation of the city of Lake Forest Park's Automated Traffic Safety Camera Program.
- Prothman, Jana E, MPA Spring 2010. Housing: Health and Code Enforcement. Public Service Clinic client: Columbia Legal Services.
- Zimmer, Elizabeth A, MPA Spring 2010. Seattle Public Utilities and the Greening of Immigrant and Refugee Businesses. Public Service Clinic client: Seattle Public Utilities.
- Zimmerly, Elizabeth (Liz) C, MPA Spring 2010. Strategies for Preventing Elemental Mercury Exposure in Homes and Schools. Public Service Clinic client: US Environmental Protection Agency Region 10.
- Albert Chang, MPA Spring 2009.
- Joanna Ekrem, MPA Spring 2008. Sustainable Biofuels?: Innovative Policy Approaches and Scientific Assessment in the U.S. and the U.K. (now employed by Washington Department of Ecology)

M.S. Thesis Students supervised (Georgia Institute of Technology)

- Francisco Dòñez (1996). "Sustainability indicators for rural industrialization in Latin America." Mr. Dòñez worked for several years on policy issues for the U.S. EPA, and is now a doctoral student at UC Berkeley.

Rob Cleveland, (1995). “The Role of Communication in the Policy Dilution of ASHRAE Standard 62-89 ‘Ventilation for Acceptable Indoor Air Quality.’” Mr. Cleveland was for many years a control systems engineer for HI Solutions, on indoor air quality control issues, but is now a computer systems analyst.

Supervised professional papers for MS students (Georgia Institute of Technology)

Margaret Ann Herston-Powell (2005 graduate) now working for a California water utility.

Kristen Adkins (2003 graduate) now at University of Texas, Austin.

Shira Kapplin (2000 graduate) Kirkland & Ellis LLP, Chicago.

Lisa Novak (1999 graduate).

Emily Fort (1999 graduate, double MS degrees in Public Policy and Health Physics), now working at the National Science Foundation. Ms. Fort completed both a professional paper under my supervision in Public Policy and a Masters thesis in Health Physics, which Nolan Hertel advised, and another ME faculty member and I co-advised.

Tina Nagpaul (1998 graduate), now at Citibank, Los Angeles.

Rebecca Morley (1997 graduate) Executive Director of the National Center for Healthy Housing.

Anna Williams (1997 graduate).

Eric Meyer (1995 graduate) Georgia Conservancy, then S.C. Conservation League.

Undergraduate students

Supervised (Ellen Short) POE capstone experience with Cascadia Climate Action (contact: Mary Manous) on improving Climate Science on Tap, Winter 2018.

Supervised (Amber Sonka) POE capstone experience with US EPA on valuing the protection of ecological systems, Spring 2017.

Supervised Emily Brittain Wegeleben, Program on the environment capstone experience with the USGS on climate change education, Summer 2011

Supervised Heather Walker in her Program on the Environment capstone experience with the City of Seattle (Car-free Days and Environmental Management Systems), Winter 2009.

OTHER TEACHING ACTIVITIES

- | | |
|------|---|
| 2009 | Contributed to development of X Prize collaboration on prize philanthropy and innovation courses for the Evans School. |
| 2006 | Redesigned and ran PUBP3600 Sustainability as a GT project-based course, with input from GT top administrators and ISTD Director. |
| 2001 | Redesigned PUBP4113 (applied statistics) to incorporate internet-based text |

- 1999 Developed new Ph.D. course in Qualitative Research methods (PUBP8210) together with Gordon Kingsley. Co-taught the course, though I was on leave from Georgia Tech at the National Science Foundation that term. (Took the lead in 2002).
- 1998 Developed new course in Environmental Regulation (PUBP4314). Active participant in semester conversion - proposed undergraduate course in Survey Design, helped redesign several MSPP courses.
- 1996 Revised the Risk Communication and Environmental Issues courses completely. (Both largely case-based, developed new cases). Developed new course in Quantitative Thinking and Policy Problems (PUBP 8600).
- 1995 Developed new course in Quantitative Modeling (PUBP6218) with an emphasis on quantitative decision models. Revised Environmental Issues (PUBP 6310) with Mike Rodgers.
- 1994-95 Contributed to developing the methods sequence descriptions for the proposals for Bachelor of Science and Ph.D. in Public Policy.
- 1994-95 Participated extensively in the Program on the Information Revolution and its Consequences. Participated in brown bag series (brown bag talk, summer 1995), in the fall seminar (panel participant multiple times, gave one lecture, co-authored two of the papers), and in the distinguished lecture series (panel participant, March 5, 1996).
- 1994 Revised Environmental Issues (PUBP 6310) with Bryan Norton in 1994. Developed the course on Environmental and Technological Risk Management (PUBP6324). Took lead in developing Risk Communication (PUBP8100/LCC6204) (with Bill Evans, LCC).
- 1993 Developed new computer labs (on Excel) for Statistical Analysis (PUBP 6110).
- 1992-93 Developed Data Analysis (PUBP 6114) in 1992, revised the course in 1993, developed a set of computer labs to be taught with the course.

SERVICE

PROFESSIONAL CONTRIBUTIONS

Editorial and Reviewer Work for Technical Journals and Funding Agencies

Area editor for risk communication, Risk Analysis, April 2008 to April 2011. Member of editorial board 1998 to present. Reviewer 1992- present.

Associate Editor for the Journal of Risk Research, Fall 2005 to present. Member of editorial board 1997 to present.

Editorial board member, Environmental Hazards, Taylor & Francis, Spring 2015 to present

Chair of review panel for the Mistra Foundation (Swedish nonprofit), Spring, 2019. Chaired international panel evaluating Environmental Communication proposals from Swedish researchers, May 6-8, 2019, Stockholm.

Reviewer for Australasian Journal of Disaster and Trauma Studies, Global Environmental Change, MIT Press, National Academies of Science, Engineering and Medicine, National Science Foundation, Natural Hazards Review, Journal of Environmental Psychology, Journal of Policy Analysis and Management, Journal of Public Administration Research and Theory, Proceedings of the National Academies of Science, International Journal of Disaster Risk Reduction, Weather Climate and Society, 2011-present.

Reviewer of proposals to Decision, Risk and Management Science program, National Science Foundation, 1992-present. Review panel member, Decision Risk and Management Science Program, National Science Foundation, Fall 2005 to Spring 2007.

Senior editor for risk communication, Journal of Human and Ecological Risk Assessment, Fall 2006 to Spring 2015.

Reviewer for the Institute of Medicine, National Academy of Sciences, Spring 2001 to 2015.

Site reviewer, National Science Foundation site review team member for DCDC, Arizona State University, Decision Making Under Uncertainty research center, 2014.

Reviewer for European Science Foundation, Institute of Medicine, Journal of Environmental Policy, Water Resources Research, 2010.

Site reviewer, National Science Foundation competition for Decision Making Under Uncertainty research centers under the Climate Change Research Initiative, December, 2009.

Reviewer for the National Science Foundation-National Oceans and Atmospheric Administration program on communicating uncertainty in hurricane forecasts, Summer 2008.

Reviewer for the Journal of Risk Management, Fall 2007.

Reviewer for the National Institutes of Health, Spring 2007.

Reviewer for the Journal of the American Planning Association (JAPA), 2006-present.

Reviewed for the National Research Council, "Analysis of Global Change Assessments: Lessons learned" Fall 2006 [report published February 23, 2007]

Reviewed for Psychological Science, 2006.

Reviewed for Earthquake Spectra, 2004, 2005.

Reviewed for Health Psychology, special issue on communications, 2004.

National Science Foundation, Human and Social Dynamics panelist, Spring 2004, Spring 2005.

Special editor, special issue of Risk Analysis on risk communication, April 2003; special associate editor special Best Paper issue of Risk Analysis, December 2003

Reviewer for Journal of the National Medical Association, Spring 2002.

Reviewer for Environmental Science & Technology, Summer 2002, Fall 2004, summer 2005.

Reviewer for Risk: Health, Safety and Environment , 1995 to 1999

Reviewer for the Journal of Risk and Uncertainty, Spring 1998.

Reviewer for Transportation Research Board annual conference, Fall 1998.

Reviewer for National Political Science Review (NPSR), January/February 1995, March 1996

Reviewer for Ethics and Values Studies program, National Science Foundation, 1996

Reviewer for Division of International Programs, National Science Foundation, 1996

Reviewer for American Journal of Public Health, 1996, 2005.

Reviewed two grant proposals for the Environmental Institute of the University of Illinois, May 1992, two in June/July, 1995

Reviewer for a North-Holland volume of selected papers from the 14th Research Conference on Subjective Probability, Utility, and Decision Making (SPUDM-14) held in Aix-en-Provence, France, August 23-26, 1993

Reviewer for Child Development, September, 1993

Reviewer (consulting editor) for the Annals of the American Association of Geographers, September 1993

Science Advisory Boards and National Research Council work

Member, National Science Foundation Advisory Committee for the Social, Behavioral and Economic Sciences, and Advisory Committee for Environmental Research and Education (May 2017 appointment, July 2019 reappointment)

Member, National Center for Atmospheric Research Mesoscale and Microscale Meteorology Laboratory Divisional Advisory Panel. Letter of appointment March 26, 2015 (from Chris Davis).

Member, National Oceanic and Atmospheric Administration (NOAA) Science Advisory Board Environmental Information Services Working Group (EISWG) Appointment effective May 2012, continued to the present (as of 2019).

Co-Chair (with William Hooke), National Academies Committee on Advancing Social and Behavioral Science Research and Application within the Weather Enterprise. 2016-2017.

Member, Integrated Research on Disaster Risk (IRDR) programme Scientific Committee. Programme is cosponsored by the International Council for Science, the International Social Science Council (ISSC) and the UN International Strategy for Disaster Reduction (UN-ISDR). Effective May 2012 through December 2018.

Member, National Academies Committee on the Science of Science Communication: A Research Agenda, 2015-2016.

Member, National Research Council's Committee to Review the EPA IRIS Process, 2012 to 2014.

Member, Advisory Board, Center for Climate and Energy Decision Making, Carnegie Mellon University, 2011 to 2015.

Member, National Academies Standing Committee on Use of Emerging Science for Environmental Health Decisions, 2009 to 2012.

Member, Committee on the Role of FDA in Food Safety, National Academies of Science, Institute of Medicine, appointed January, 2008-2010.

Member, Applied Technology Council 58-1 Project Steering Committee (ATC-58 program for development of next-generation performance-based seismic design guidelines, phase 3 on development of seismic performance assessment). Fall 2008 to September 2011.

Member, Committee on the Review of NOAA's Tsunami Warning and Forecast System and the Nation's Tsunami Preparedness, National Academies of Science, Ocean Studies Board, appointed May 15, 2008-December 31, 2009.

Member, Center for Nanotechnology in Society National Advisory Board, (NSF-Funded) 2006-present, co-Chair Fall 2009 to present.

Member, National Center for Atmospheric Research (NCAR) Institute for the Study of Society and Environment Advisory Board, Fall 2005 to 2008.

Member, Collaborative Large-Scale Engineering Analysis Network for Environmental Research (CLEANER) Advisory Board, 2005 to 2007.

Member, Science Advisory Board Committee on Valuing the Protection of Ecosystems and Ecoservices, U.S. Environmental Protection Agency, Fall 2003 to present.

Member, Committee on Nutrient Relationships In Seafood: Selections To Balance Benefits And Risks, Institute of Medicine, Spring 2005 to Fall 2006.

Member, Executive Committee, Board of Scientific Counselors, advisory to the Office of Research and Development, U.S. EPA, Spring 1999 to May 2004.

Member, Committee on Optimizing the Characterization and Transportation of Transuranic Waste Destined for the Waste Isolation Pilot Plant, National Research Council, October 2002 to April 2004.

Member, Motor Vehicle Rollover Rating System Study Committee, National Academy of Sciences Transportation Research Board, April 2001 to February 2002.

Member, Advisory Committee for the HRSA/Association of Teachers of Preventive Medicine Vaccine Risk/Benefit Communication Project, 1999.

Member, Risk Reduction Options Subcommittee of the Integrated Risk Project for the U.S. EPA Science Advisory Board, June 1996 to 1998.

Member of Advisory Committee for the Harvard Center for Risk Analysis, 1996-1998.

Consultant to the Radiation Advisory Committee of the Science Advisory Board for the U.S. EPA, on the Radon Science Initiative Subcommittee, February, intermittently, 1993 to 1996.

Member, Committee on the Study of Consumer Automotive Safety Information (CASI), Transportation Research Board, National Research Council, February 1995 to July 1996.

Consultant to the Industrial Excess Landfill Ad hoc committee of the Science Advisory Board for the U.S. EPA, May, 1993 to September 1994.

Consultant to the Radiation Subcommittee of the Science Advisory Board to the U.S. Environmental Protection Agency (EPA), on the topic of the EPA's revisions of the Citizen's Guide, September, 1991.

Participant in the U.S. Environmental Protection Agency's Radon Review Panel, October 8, 1991.

Professional membership, guest lectures, and other professional contributions

Member, Society for Judgment and Decision Making, 1988 to present. Student poster judge at annual meetings, annually 2003-2006, 2008-2010. Hillel Einhorn award review committee member 2007-2009 (Committee Chair 2009).

Member, Association for Public Policy Analysis and Management, 1990 to present. Member of Annual meeting planning committee 2000, 2004, 2005, 2011. Appointed to APPAM Policy Council Fall 2009 (served for one year).

Member, Society for Risk Analysis, 1991 to present. Past President and Awards Committee Chair, 2015. Past President and Nominations Committee Chair 2014. Past President and Publications Committee Chair, 2013. President, 2012. President-elect, 2011. Nominations committee member 1996, 2006; Annual meeting planning committee 1997 (and other years), Awards committee member 2000. Councilor, 2001-2004 (elected). Chair, Risk Communication Specialty Group, 2000-2001. Chair-elect, Risk Communication Specialty Group, Society for Risk Analysis, 1999-2000. Secretary-Treasurer of Risk Communication Specialty group, Society for Risk Analysis, 1993-1999, 2006-2008 (elected). Bostrom has helped organize the risk communication track and chaired multiple sessions at annual meetings.

Member, American Association for the Advancement of Science (AAAS), 1995 to present. Elected to Board of Directors, 2018-2022. Member at large, Section K (Social, Political and Economic Sciences), 2018-19. Retiring Chair of Section K and Electorate Nominating Committee for Section K, Feb 2017-Feb 2018. Chair of Section K, Feb 2016 to Feb 2017. Elected as chair-elect of Section K, effective February 2015. Elected to Nominating Committee for AAAS Section on Societal Impacts of Science and Engineering, Section X, October 2006-2008.

Member, American Association of Public Opinion Research, 2009 to present.

Member, American Statistical Association, 1991 to (membership lapsed).

Bostrom, A. Invited speaker, co-presenting (with co-chair Bill Hooke) the NASEM report Integrating Social and Behavioral Sciences within the Weather Enterprise: National Academies (to sponsors) October 31, 2017; National Science Foundation SBE and ERE Advisory Committees (Oct 31 and Nov 3 2017), NASEM Board on Atmospheric Sciences Nov 2017, NSTC Subcommittee on Disaster Reduction

December 7, 2017, NSTC Social, Behavioral and Economic sciences subcommittee January 17, 2018, FEMA Lunch and Learn Webinar, January 30 2018.

Reviewed promotion and tenure packages for Carnegie Mellon University, University of Arizona, 2019.

Reviewed promotion and tenure packages for Iowa State University of Science & Technology, Indiana University, the Ohio State University, and University of North Carolina at Chapel Hill, 2018.

External examiner, Ph.D. Thesis, Kieran Findlater, “Explaining Climate-Sensitive Decision-Making: On the Relationship Between Cognitive Logic and Climate-Adaptive Behaviour” University of British Columbia. March, 2017.

Reviewed tenure and promotion packages for Carnegie Mellon University, Cornell University, and University of Maine, 2017.

Bostrom, A. (invited plenary panelist). “Personal Environmental Exposure Measurements: Making Sense and Making Use of Emerging Capabilities” workshop held by the National Academies Standing Committee on Emerging Science for Environmental Health Decisions on November 16-17, 2016, Washington D.C. Keck Center Workshop materials available at: <http://nas-sites.org/emergingscience/personal-exposure-measurement/>

Bostrom, A. "Sell-by dates for local climate impacts: will time of emergence reduce perceived uncertainties?," Provence workshop on “State of the Art Uncertainty: Lessons from Europe and North America.” Sponsored by King's Centre for Risk Management, Journal of Risk Research, 14-15 June 2016, Le Lavandou, France.

Bostrom, A. (invited speaker and participant) Climate Change Perception Workshop – U. Bergen DICE Lab, April 2015.

Bostrom, A. (invited speaker and participant) Operational Earthquake Forecasting Workshop – USGS Powell Center, Fort Collins, CO. March 16-18, 2015.

Bostrom, Ann (with Alicia Ahn and John Vidale) Early insights and expectations for Earthquake Early Warning, Pacific Northwest Seismic Network (PNSN) Presentation at stakeholder workshop, University of Washington, Seattle, February 17, 2015.

External examiner, Ph.D. Thesis, Diana van Dongen, "Understanding Perceived Risk: Perceptions and responses to different sources of electromagnetic fields." Department of Public and Occupational Health, VU University Medical Center, Amsterdam NL, September 2014.

Bostrom, A. (invited participant). Presentation on: “Does explicitly communicating uncertainty contribute to or decrease transparency?” Provence Workshop: State of the Art Transparency: Lessons from Europe and North America. Supported by Journal of Risk Research and publisher Taylor and Francis. (Organizers Raganar Löfstedt and Dominic Way). Le Lavandou, France, June 19-20, 2014.

Bostrom A. (participant). Workshop on Solar Radiation Management Geoengineering Governance, Sponsors: Bipartisan Policy Center, Environmental Defense Fund, Carnegie Mellon University and U.C. Berkeley. (Organizers Jane C.S. Long, Steve Hamburg, Granger Morgan and David Winickoff). San Francisco California, March 31-April 1, 2014.

Reviewed tenure and promotion packages for North Carolina State University, and for the National Center for Atmospheric Research, 2014.

Reviewed tenure and promotion packages for Cornell University, University of Manitoba, University of North Carolina and University of Michigan, 2013.

Bostrom, Ann (research conducted with Tim Scharks Lori Reimann-Garretson and Glenn Rix). “Stakeholder mental models of port seismic risk: A case study of two high-hazard ports.” Invited participant, Corsica risk workshop 24th-27th June, 2012, organized by Ragnar Löfstedt.

Reviewed tenure and promotion package for University of Wisconsin-Madison, 2012.

Reviewed tenure and promotion package for Arizona State University, 2012.

Reviewed promotion package for University of California Santa Barbara, 2011.

Reviewed tenure package for University of British Columbia, Vancouver, British Columbia CA, 2011.

Invited participant, Developing a National Water Survey Conference, The Johnson Foundation at Wingspread, Racine, WI, October 6-8, 2011.

Invited participant, Risk Interpretation and Action (RIA) working group, Integrated Research on Disaster Risk, April 27-29, 2011 workshop at the International Council for Science Secretariat, Paris, France.

Reviewed a report for the Foresight International Dimensions of Climate Change in the UK, 2010.

Reviewed tenure package for Colorado State University, Fort Collins, 2010.

External examiner, Ph.D. thesis by Holly Ann Longstaff, “Linking risk communication and biomedical ethics: the case of pre-implantation genetic diagnosis.” University of British Columbia, graduated September 18, 2009.

Reviewed promotion package for Northern Illinois University Department of Political Science, 2009.

Reviewed promotion package for Texas A&M, 2008.

Invited participant, Workshop for the Identification of Missing Elements in Current Plans for the Development and Implementation of Performance-Based Seismic Design, sponsored by Project Management Committee, Building Seismic Safety Council (BSSC), National Institute of Building Sciences. San Francisco, June 5, 2008.

Member, Steering Committee for EERI’s online Earthquake Mitigation Center, Fall 2006 to 2008.

Reviewed tenure package for Resources for the Future, Washington DC, 2007.

Invited participant, Disaster Reduction—Theory and Practice. Workshop Sponsored by the National Science Foundation, May 24-25, 2007, Columbia, South Carolina. Hosted by Professor Susan Cutter, the Hazards Vulnerability & Research Institute, Department of Geography, University of South Carolina.

"Parental mental models of lead paint hazards: Toward improved communications about environmental health risks to children." Invited presentation at the Southern Center for Communication, Health and Poverty, University of Georgia, April 26, 2007.

"Parental valuation of children's environmental health: Does it matter who you ask?" Invited presentation at the Daniel J. Evans School of Public Affairs, University of Washington, January 31, 2007.

Invited discussant, Joint AAPOR/WAPOR session on Public Opinion and the Environment, World and American Associations for Public Opinion Research annual meetings, Montreal, Canada, Thursday May 18, 2006.

Invited external examiner for W.G.B. Smith, "Metaphors and Mental Models of Risk Expert Thinking about Ecosystems." Doctor of Philosophy, University of British Columbia, Resource Management and Environmental Studies, Dr. Timothy McDaniels. Research Supervisor (Oral exam passed February 9, 2006).

Invited discussant for session on adolescent risk-taking, Annual Meetings of the Association for Public Policy and Management Nov 3-5, 2005, Washington D.C.

Invited discussant for session on "Risk as Behaviour: Connecting the Individual with the Social" Society for Risk Analysis annual meetings, Orlando Florida, Dec 4-7, 2005.

Invited chair, plenary session on "Risk Analysis: As other see us" Society for Risk Analysis annual meetings, Palm Springs, California, December 7, 2004.

Annual Meeting Program Committee member and co-organizer of Science and Technology Policy track, Association for Public Policy Analysis and Management, for 2004 annual meeting in Atlanta, October 2004. Also chaired an environmental policy session at the meeting.

Lead organizer for Association for Public Policy Analysis and Management opening night reception (Atlanta Botanical Garden, October 28, 2004), co-hosted by local APPAM meeting hosts Georgia Tech (Ivan Allen College, School of Public Policy), Georgia State (Andrew Young School of Policy Studies), UGA (ISPEA) and Emory University (Rollins School of Public Health, Dept of Health Policy and Management). [Additional committee members: Barry Bozeman, Greg Lewis, Larry O'Toole and Ken Thorpe].

External examiner, Ph.D. thesis, Cynthia Jardine, University of Alberta, Edmonton, Fall, 2002.

Invited speaker on 'Evaluation of the Science to Achieve Results program of the National Center for Environmental Research,' Committee to Review EPA's Research Grants Program, Board on Environmental Studies and Toxicology, National Academy of Sciences, March 18, 2002, Washington D.C.

Reviewed tenure packages for Carnegie Mellon University in 2001 and 2002.

Invited speaker, " Why use decision analysis and mental models to design risk communications? University of Washington Bothell, Interdisciplinary Arts and Sciences, May 24, 2001, Bothell, Washington.

Reviewed a tenure package for Wake Forest University in 2000.

Invited participant, Practical Strategies for Achieving Excellence in Health Communications Conference, sponsored by the Centers for Disease Control and Prevention (CDC), the Agency for Toxic Substances and Disease Registry (ATSDR), and the National Cancer Institute (NCI) at the National Institute of Health, July 11-12, 2000, Washington D.C.

Invited panelist, workshop on Behavioral Science Research in Diabetes, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, November 18-19, 1999.

Presentation at the National Science Foundation, Directorate for Social, Behavioral and Economic Science. Brownbag on communicating increased risks of cryptosporidium in drinking water attributable to climate change, February 12, 1999.

Presentation at Food Safety Initiative workshop at the Food and Drug Administration, "Practical theories for food risk communication." Washington, DC., July 28, 1998. (Invited).

Guest lecturer for the Rollins School of Public Health of Emory University course EOH591, Risk Assessment, "Risk Perception and Communication." May, 1996 (Invited).

Guest lecturer for the Rollins School of Public Health of Emory University course EOH591, Risk Assessment, "Risk Perception and Communication." April 5, 1995 (Invited).

Discussant at the American Association for the Advancement of Science (AAAS) annual meetings in Atlanta, Georgia, session on "Risk Assessment for Unavoidable Exposures." February 20, 1995 (Invited).

Participant, Addressing Agencies' Risk Communication Needs: A Symposium to Discuss Next Steps, Annapolis, Maryland, June 6-8, 1994 (Invited).

Organized the Atlanta Health and Risk Communication Symposium, 1994-95. The Agency for Toxic Substances and Disease Registry (ATSDR) committed \$5,000 to this symposium, based on Bostrom's proposal for the series. Dr. Tim Tinker of ATSDR was co-organizer. It was co-sponsored by ATSDR, several entities at Georgia Tech including the School of Public Policy, as well as by the School of Public Health at Emory University.

Presentation at the Department of Energy National Low-Level Waste Management Program Communication Working Session in Atlanta, Georgia, "Research on efforts to provide the public with the information they need to make decisions about exposure to risks," March 9-10, 1994 (Invited).

Participant, Institute of Medicine workshop, "Health Risk Communication and Health Professionals, Washington, D.C., November 4-5, 1993 (Invited).

Bostrom, A. "Risk Perceptions and Communications," Invited guest lecture at the School of Public Health, Division of Environmental Sciences, Columbia University, October 12, 1993.

Guest lecture at the School of Public Health, Division of Environmental Sciences, Columbia University, "Risk Perceptions and Communications," October 12, 1993 (Invited).

Campus contributions at the University of Washington

Primary Research Area Chair for Environments and Populations, UW Center for Studies in Demography and Ecology, Fall 2017 to present.

Faculty Coordinator, Evans School Ph.D. Program in Public Policy and Management, and Chair, Evans School Ph.D. Committee, September 2014-present.

Executive Committee member, EarthLab (and co-director, EarthLab Center for Natural Hazards and Resilience until summer 2018), appointed by Dean Graumlich, College of the Environment, 2016 to present.

Member, Steering Committee, UW Ph.D. Program in Urban Design and Planning, 2013-present.

Member, Program on Climate Change (PCC) Steering Committee Spring 2017 to present (also Member, search committee for PCC Director, Spring 2017).

Bostrom, A. (invited plenary presentation). "The pernicious persistence of climate change uncertainty and apathy." Presented September 12th at the 2018 UW Program on Climate Change Summer Institute, "Sources of Uncertainty in Long-Term Climate Projections." September 12-14, Friday Harbor Labs, San Juan Island, WA.

Member, Search Committee, Earth and Space Sciences and Pacific Northwest Seismic Network Director search, Fall 2017 to Winter 2018.

Member, Evans School Research Committee AY 2017-2018.

Invited speaker, "Are We Ready for the Really Big One? Local Earthquake Risk Perceptions and Preparedness" Environmental Health Seminar, Department of Environmental and Occupational Health, School of Public Health, UW, April 12, 2018.

Panelist, Global Leadership Forum, Environmental Policy Panel, April 4, Dempsey Hall, Foster School. 2018.

Member, UW Committee for the performance review of Dean Sandra Archibald, AY2016-17.

Bostrom, A. (invited guest lecture), PUBPOL608 Evans Capstone seminars (Instructors Carlos Cuevas and Scott Fritzen), Winter 2017

Co-Chair, Evans School Faculty Search committee (dual search), (June-December) 2016.

Reviewer, Royalty Research Fund proposal, 2016.

Member, Foreign Language Area Studies (FLAS) review committee, March 2016.

Chair, Graduate School Program Review Committee for the Information School, 2015 (site visit October 26-27, 2015).

Chair, Promotion Review Committee for Crystal Hall, 2015.

Bostrom, A. (invited guest lecture). ESS 544 Applied Tsunami Hazard Science Win 2015 (Instructor Frank Gonzalez), JHN 127, March 6, 2015.

Bostrom, A. (invited seminar speaker), "How mindsets affect people's representations of and judgments about climate change." UW Urban Design and Planning PhD Seminar series, October 7, 2014.

Chair, Promotion Review Committee for Crystal Hall, 2014.

Member, Evans School Ad hoc Undergraduate program committee, 2014-2015.

Bostrom, A. (invited plenary presentation). "How mindsets affect people's representations of and judgments about climate change." Presented September 16th at the 2014 PCC Summer Institute "Climate Variability and Uncertainty," September 15-17, Friday Harbor Labs, San Juan Island, WA.

Panelist, Environmental Management Strategies for the 21st Century Roundtable, Sponsored by the Evans School and the Jackson Foundation, UW Seattle, Kane Hall 220, April 10, 2014.

Invited speaker, "Ocean Change: Information for action" UW IGERT Program on Ocean Change Winter 2014 Seminar Series, Ocean Change: Proactive Approaches. February 19, 4pm, SAFS Auditorium.

Chair, Evans School Faculty Affairs Committee, 2012-2013.

Member (Chair-elect), Evans School Faculty Council, 2012-2013.

Guest lecturer, Innovation Strategy class (Prof Sonali Shah), session on prize philanthropy, June 5, 2013.

Chair, Promotion Review Committee for Marieka Klawitter, 2012.

Royalty Research Fund reviewer (one proposal), Fall 2012.

Guest lectures in University of Washington classes: Qualitative Research methods (Prof Sara Curran) May 14, 2012, Scientific and subjective risk assessments of climate change, Ocean/ESS/ATM Current Research in Climate Change: Vulnerability, (Prof LuAnne Thompson) November 27, 2012.

Member, School of Social Work Dean Uehara review committee, 2011-2012.

Member, Evans School PhD Committee 2011-2012.

Member, Evans School Curriculum committee 2011-2012.

Evans faculty research seminar presenter, Causal Thinking and Support for Climate Change Policies. (co-authors Gisela Böhm, Robert O'Connor, Daniel Hanss, with Otto Bodi, Frida Ekström, Pradipta Halder, Sven Jeschke, Birgit Mack, Mei Qu, Lynn Rosentrater, Anethe Sandve, and Ingrid Sælensminde), January 11, 2012.

Fulbright applicant interviewer, Fall 2011.

Royalty Research Fund reviewer (one proposal), Fall 2011.

Guest lectures in University of Washington classes: Now what do people know about global climate change?, Framing Environmental Issues (Profs Alison Cullen and Mike Wallace) Feb 24, 2011. Causal Thinking and Support for Climate Change Policies, Governmental Responses to Climate Change (Prof Nives Dolsak) October 17, 2011. Ecological Effects of Chemical Dispersant Use on Marine Oil Spills: A mental models approach. Arctic Oil Development (Profs Tom Leschine, Mary Baker, Bob Pavia), Nov 23, 2011. Risk and Uncertainty in Policy Analysis, Policy Analysis (Prof Maureen Pirog) March 10, 2011, Risk and Uncertainty in Policy Analysis, Policy Analysis May 10, 2011(Prof Marieka Klawitter), May 10, 2011.

Member, Re-appointment review committee for Justin Marlowe, 2011.

Co-Chair, Faculty Search Committee for senior faculty member, Fall 2010.

Member, Re-appointment review committee for Crystal Hall, 2010.

Chair, Re-appointment review committee for Joe Cook, 2009.

Chair, Program review committee, UW School of Social Work 2009-2010.

Member, MPA Admissions Committee, 2008-2010.

Member, Faculty Search Committee, Fall 2008.

Member, PhD Financial Aid committee, March 2008-2009.

Participated in drafting the white paper on the role of the social sciences in the College on the Environment, Spring 2008.

Member, Ph.D. Committee, 2007-2008.

Member (ex-officio), Faculty Council, 2007-2011.

Committee Chair, Research Committee, 2007-2010 (ex-officio), ex-officio member fall 2010 to 2011.

Campus contributions at Georgia Institute of Technology

Reader, Ph.D. committee for Jamie E. Padgett (CEE, Chair Reginald DesRoches), "Seismic Vulnerability Assessment of Retrofitted Bridges Using Probabilistic Methods." May, 2007.

Member, Georgia Tech Faculty Research Awards Committee, January, 2007.

Member, Faculty search committee, School of Public Policy, Fall 2006-Spring 2007.

Member, promotion and tenure specialty reading committee for third year critical review for Marco Castillo, School of Public Policy, Fall 2006.

Member, GT Women's Resource Center advisory board, January-June 2007.

Reader, Ph.D. committee for Michelle Bergin (CEE, Chair Armistead Russell), "Regional Air Quality: Photochemical Modeling for Policy Development and Regulatory Support" Defended successfully November, 2006.

Reader, Ph.D. comprehensive exam committee (passed fall 2007) and dissertation committee for Andy Mienaltowski (passed spring 2008), "Age Differences in Interpersonal Problem Solving: Examining Interpersonal Conflict in an Iterated Prisoner's Dilemma Game." Psychology (Advisor Fredda Blanchard-Fields), 2006-2008.

Member, Energy Policy Chair search committee, School of Public Policy, Fall 2005-Spring 2006.

Member, Health Systems Institute Steering Committee, 2005 to present.

Member, Institute Nominations committee for faculty elections, Fall 2005.

Member, Strategic Energy Initiative council, 2005 to 2006.

Reader, Ph.D. committee for Leonardo Dueñas-Osorio (Chairs James Craig and Barry Goodno),
“Interdependent Response of Networked Systems to Natural Hazards and Intentional Disruptions.”
Defended successfully November 23, 2005.

Reader, Ph.D. committee for Eliesh Lane (Chair Richard Barke). “Decision-making in the human subjects review system.” (defended successfully in January 2005)

Reader, Ph.D. committee for Thitima Kongnakorn (ISYE, Chair Francois Sainfort). “Development and Test of a New Method for Preference Measurement for Multistate Health Profiles.” Defended successfully October 11, 2004.

Reader, Ph.D. committee for Sharon Mills (Chair Bryan Norton). Proposal defended Fall 2004.

Reader, Ph.D. committee for Debajyoti Pati (Architecture, Chair Craig Zimring). “Maximizing the benefits of courtroom POEs in design decision support and academic inquiry through a unified conceptual model.” Defended successfully Fall 2004 (minor revisions in progress, dissertation to be submitted spring 2005).

Reader, M.S. committee for Michelle Horhata (Psychology, Chair Fredda Blanchard-Fields), “Age Differences in the Correspondence Bias: An Examination of the Influence of Personal Belief.” Defended successfully November 15, 2004.

Organized and ran Evaluation Research workshop for joint doctoral program students and faculty, June 24, 2004, Wardlaw Center Gordy Room, speakers Barry Bozeman and Gary Henry (funded by GTF – proposed and funding awarded when I was Doctoral program director, fall 2004).

Chair, School of Public Policy Promotion & Tenure Reading committee for Douglas Noonan’s 3rd year review, Fall 2004.

Member, School of Public Policy Promotion & Tenure teaching evaluation committees for Douglas Noonan, Monica Gaughan, Fall 2004.

Member, School of Public Policy Graduate Committee, 2004-present (also participated in grading comprehensive exams 2004-2006, chaired the environmental policy comprehensive exam in spring 2004, and was responsible for the posting the environmental policy reading list for doctoral students to the School’s website in 2004).

IAC-ADVANCE grants workshops April 2004, January 2005, February 3, 2006 organized and ran workshop (with Mary Frank Fox, assistant Karyn Lu 2004-2005, Allison Saul 2006).

Chair, Committee on IAC Center Guidelines – convened and chaired committee, submitted report to IAC Dean Rosser Fall 2004.

Member, School of Public Policy faculty search committee (quantitative methods), Spring 2004.

Member, School of Public Policy faculty search committee (environmental politics and policy), Fall 2004.

Member, GSU/Tech Admissions and Coordinating committee for the joint Ph.D. in Public Policy, Spring 1998 to present (was ex-officio while director of the program in 2001-2002)

Member (elected), Faculty Senate's Institute Graduate Curriculum committee, Fall 1998 to present.

Reader, Ph.D. committee for Craig S. Gordon (Joint GT-GSU PhD, Chair Gary Henry) "Mediating and Moderating the Agenda-Setting Process: Three Studies of the Air Quality Issue." Defended successfully January 10, 2004.

Representative for the School of Public Policy on the Ivan Allen College Promotion and Tenure Committee, Fall 2001 to 2004.

Member, School of Public Policy faculty search committee, Fall 2003 to Spring 2004.

Director, School of Public Policy doctoral programs, Fall 2001 to Fall 2003.

Co-Chair, School of Public Policy Graduate Committee, Fall 2001-Spring 2002. Chair 2002-2003.

Reader, Ph.D. committee for Angela Blair-Hutchinson. Defended successfully May, 2003.

Chair, School of Public Policy School Chair Search Committee, Fall 2002 to Spring 2003.

Member, School of Public Policy environmental policy Ph.D. comprehensive exam committee, Spring 2000, Fall 2000, Spring 2001, Fall 2002.

Chair, Environmental Policy faculty search committee, Fall 2001 to Spring 2002.

Reader, Ph.D. committee for Elizabeth Corley, Public Policy, Defended successfully May, 2002.

Member, Ivan Allen College founder's day committee, Fall 2002.

Member, School of Public Policy Methods and Environmental Policy faculty search committee, Fall 2000-Spring 2001.

Reader, Ph.D. committee for Saif Ul-Haq, Architecture, "Expectation of Exploration: Evaluating the Effects of Environmental Variables on Wayfinding." Defended April 9, 2001.

Member, School of Public Policy information committee, Spring 1998 to Fall 1999.

Member, School of Public Policy undergraduate and graduate committees, Fall 1998 to Summer 1999.

Member, Ph.D. comprehensive exam committee, and specialty exam committee for Leisha Dehart-Davis, Spring 1999.

Member, Ivan Allen College Undergraduate Committee, Spring 1999.

Chair, Information Resources Committee, School of Public Policy, Summer 1995 to 1998.

Member, Institute Undergraduate Curriculum Committee, Fall 1995 to 1998.

Co-Chair, School of Public Policy Strategic Planning Committee, Spring 1997 to Spring 1998.

Member, Ivan Allen College Dean's search committee, Fall 1997-Winter 1998.

Member, MSPP curriculum review Committee, School of Public Policy, Summer 1995 to March 1997.

Member, Faculty Executive committee, School of Public Policy, Spring 1994 to Spring 1996.

Chair, School of Public Policy committee for GSU/Tech proposal for joint Ph.D. in Public Policy, Fall 1996 (program approved by Board of Regents Summer, 1997).

Member, Institute-wide Taskforce on Semester Conversion, Fall 1996.

Member, Ivan Allen College Diversity Task Force, Spring 1994 to 1995.

Reader, Ph.D. committee for John Roach, Psychology, "Beliefs about Racial Differences." Defended successfully February 13, 1995.

Presentation for the AAAS-NATO Advanced Research Workshop at the Environmental Resources Center, Georgia Tech, "Public Participation and Risk Management." February 18, 1995 (Invited).

Member, Ivan Allen College Computer Task Force, Spring 1993 to Fall 1994.

Member, Search committee for position in Environmental Economics, School of Public Policy, Fall 1993 to Spring 1994.

Member, Admissions committee, School of Public Policy, Spring 1994.

Participant, Lilly Endowment workshop on the Liberal Arts, Colorado Springs, Colorado, June 11-25, 1994 (and co-author of Report on Assessment of General Education). Bostrom was one of four faculty to attend this workshop as representatives of Georgia Tech. All four reported to the Institute-wide Assessment Seminar in the Fall of 1994.

Reader, Ph.D. committee for Showline Yi-Yun Chang, Psychology, "Personality Trait as a moderator in the Relationship Between Gender Stereotype and Gender bias in Initial Selection Decisions: A Cross-Cultural Study." Defended successfully August 17, 1994.

Guest lecturer for the Georgia Institute of Technology Nuclear Engineering Seminar (NE 4011 and 8011), "From Alpha to X-rays: Risk Perceptions of Radiations." September 30, 1994 (Invited).

Co-chair (with Phil Shapira) student recruitment committee, School of Public Policy, Fall 1993.

Member, Search committee for Smith Chair in Entrepreneurship, School of Management, Fall 1993.

Currently reader on committees for the following doctoral students: Sharon Mills (Public Policy), and Jamie Padgett (CEE).

Note: Bostrom also contributed to the development of the proposals for the BSPP, Ph.D. and Joint Ph.D. in Public Policy at Georgia Institute of Technology..

OTHER CONTRIBUTIONS

Consulting

Consultant to Pfizer, December 2006.

Consultant to CARA, Penn State University (PI Ann Fisher) in May, 2004 (rapporteur for climate change workshop, funded by U.S. EPA).

Consultant to Scientific Environmental Associates, Inc, SC. Research on the implementation of Incident Command System at PSE&G. Summer and Fall 2002.

Consultant to Scientific Environmental Associates, Inc., SC.. Continuation of research on risk perception and risk communication of ecological issues associated with chemical dispersant use on marine oil spills, 1998-99.

Consultant to Jenner & Block, Chicago IL, 1996-97 (for General Dynamics) on issues related to estimation of past overtime hours.

Consultant to Gibson, Dunn & Crutcher, Los Angeles, CA, October 1994 (for General Dynamics). Prepared "Comment on estimated overtime hours for Albert N. Sena, et al., v. General Dynamics Corporation, Case No. 91-0965-B (M).

Videotaped presentation for Kentucky Educational Television Radon in Schools Broadcasts, "*Risk Communication*." May, 1991. (Invited)

Consultant to the Department of Justice on the Exxon Valdez case, through Walcoff & Associates (research on the use of contingent valuation in assessing the value of environmental damages), 1991.

Other Science Policy Contributions

While at NSF 1999-2001 Bostrom participated in and made presentations at national and international meetings on research and science policy, including but not limited to the Subcommittee on Natural Disaster Reduction (a subcommittee of the Committee on Environment and Natural Resources of the National Science and Technology Council), the National Earthquake Hazard Reduction Program, and the US Weather Research Initiative. Bostrom also helped organized several meetings, including a workshop on Community Based Environmental Decision Making that was co-sponsored by NSF and the U.S. EPA, and two workshops on potential research collaboration between the Engineering Directorate and the Directorate for Social, Behavioral and Economic Sciences.

Civic Activities

Member, University of Washington Robinson Center Advisory Board, December 2013 to present.

Parent volunteer to support Nathan Hale First Team Robotics club, 2011-2012.

Parent volunteer for Seattle Country Day School, Fall 2007-2010 (auction, book fair).

Participant in 4K-5K Atlanta International School Science Fair (demonstration 2003-2004) and volunteer with AIS parents organization, 2003-2006.

Participant in VARICO, a VAccine RiSk COmmunication group affiliated with the National Immunization Program, meeting at the Centers for Disease Control and via teleconference, Fall 1995-Spring 2003.

Environmental Equity subcommittee member, Atlanta Environmental Priorities Project, Spr 1993-Fall 1994.

Information systems consultant (volunteer) to the Greater Pittsburgh Literacy Council, 1988-1989

RESEARCH PROPOSALS AND GRANTS

PI, National Oceanic and Atmospheric Administration (NOAA). Minding the gap: Modernizing the Tropical Cyclone (TC) product suite by evaluating NWS partner information needs. This project is in partnership with the National Center for Atmospheric Research (Lead PI Rebecca Morss, co-PI Heather Lazrus), which has a separate grant. \$48,285 to UW, August 1, 2019 to July 31, 2021.

Investigator, National Science Foundation Cooperative Agreement # 1611820. (Wartman, J. PI; Berman, J. Co-PI; Irish, Jennifer, Co-PI; Miles, S. Co-PI; Olsen, M. Co-PI; Tucker, Troy, Co-PI; Lowes, L. Investigator). Natural Hazards Engineering Research Infrastructure: Post-Disaster, Rapid Response Research (RAPID) Facility. Fall 2016 to 2021 (Bostrom 2016-18).

PI, on UW subcontract to "Center for Climate and Energy Decision Making (CEDM)," Sponsored by Carnegie Mellon University. The Center for Climate and Energy Decision Making (CEDM) is a distributed NSF-supported center anchored at Carnegie Mellon University (NSF Cooperative Agreement 1463492, PI I. Azevedo, Co-PI M.G. Morgan). Fall 2015 to present.

AS PRINCIPAL AND CO-PRINCIPAL INVESTIGATOR

Co-PI, National Science Foundation Award # 192004, CoPe EAGER: Coastal Hazard Planning in Time. (PI Daniel Abramson, co-PIs Bo Zhao, Ann Bostrom, Harold J. Tobin and Jeffrey W. Berman), \$297,288. January 1, 2020-December 31, 2021.

PI, National Science Foundation Award # 1757000 Doctoral Dissertation Research in DRMS: Assessing international non-governmental organization influences on coastal resource management by communities and users (Co-PI Katherine M. Crosman). (\$30,913) awarded to the University of Washington, 2018-2019.

Co-PI, National Science Foundation Award #1430781, Perception of Climate Change. (PI Susan Joslyn, co-PI Bostrom (\$638,187 awarded to the University of Washington, September 2014 to August 2018).

Co-PI, National Science Foundation Award #1331412 Hazards SEES Type 2: Magnitude 9 Earthquake Scenarios - Probabilistic Modeling, Warnings, Response and Resilience in the Pacific Northwest. (PI, John Vidale, other co-PIs Dan Abramson, Jeffrey Berman, Alison Duvall). \$2,937,478.00 awarded to the University of Washington. September 15, 2013 to August 31, 2019.

PI, National Science Foundation Award #1449627, Proposal for a Japan-U.S. Symposium on Risk Communication" (\$40,246 awarded; "International Symposium on Risk Communication." Sokairo Hall,

National Graduate Institute for Policy Studies, Tokyo, October 16, 2014, co-sponsored by the U.S. National Science Foundation and the Japan Science and Technology Agency. http://www.prime-pco.com/rcsymposium2014/index_en.html)

Co-PI, National Ocean and Atmospheric Administration Coastal Response Research Center award (NOAA Grant Number: NA07NOS4630143. Contract: 13-003) to Scientific and Environmental Associates, Inc (PI Ann Hayward Walker, total award \$179k) (subcontract for \$30,750 to University of Washington for research by Bostrom), “Response Risk Communication Tools for Dispersants and Oil Spills.” December 2012-January 2014.

PI, National Science Foundation Doctoral Dissertation Research award for Pradeep Singh, Discounting the Future in Strategic Interactions in a Heterogeneous Population, \$14,534, 9/15/12-8/31/13.

PI, Subaward No. 00001908 to the UW from Princeton University under Robert Wood Johnson Foundation Prime, 2011. Supervising doctoral student Anne Buffardi who is surveying managers to assess the economic impact of foundation giving (to RWJF) and managing Phase II of the RWJF Impact Evaluation. (\$35k)

PI, National Nanotechnology Infrastructure Network (NNIN) SEI Seed Grant “Mental Models of Nanotechnology: A Sunscreen Case Study.” Supplemental NNIN award from Cornell University to the University of Washington, 2010-2014. The NNIN is funded through NSF Award 0335765. (\$19k)

Co-PI on “Warning Decisions in Extreme Weather Events: An integrated multidisciplinary approach” (National Science Foundation, award to UW \$145,850 (of \$750k total), April 1, 2008 – 2011, collaborative with lead PI Jeff Lazo, Julie Demuth and Rebecca Morss at NCAR; and with Co-PI Kathleen Tierney at U. Colorado at Boulder).

Co-PI on “Seismic Risk Mitigation in Port Systems” NEES Research Grand Challenge award, National Science Foundation. Other Principal investigators: PI Glenn Rix) Co-PIs Reginald DesRoches, Alan Erera, Stu Werner. Funding level: \$3.7 million total; \$1.35 million to date for 2005-2007. Expected project performance period is Oct 1, 2005-Sep 30, 2009 (subaward to University of Washington September 2007-August 2011, \$167,908) .

PI on “Risk Perception and Decision Analysis” Mid-America Earthquake Center, National Science Foundation (through University of Illinois Urbana-Champaign), and co-director of Social Sciences for the Center (on Leadership Team). Center Renewal awarded October 2004, for 2004-2008. Total funding for this subproject to GT in 2004-2007 is ~\$150k (exclusive of matching funds). Total funding awarded for the MAE Center is \$6million for 2004-2007, PI Amr Elnashai at UIUC.

PI on “Risk Assessment Workshop” Mid-America Earthquake Center, National Science Foundation (through University of Illinois Urbana-Champaign). Funded 2004-2006. Total funding to GT for workshop 2004-2006 \$50,000 (exclusive of matching funds).

PI, Subcontract to Resources for the Future for mental models research on “Family Decision Making and the Value of Preventing Childhood Developmental Impairment” U.S. Environmental Protection Agency. Submitted in 2001, resubmitted in 2002. Funded for 2003-2007 (Total award to Resources for the Future \$344,698, to PI Alan Krupnick. Subcontract from RFF to GT \$44k).

Co-PI on “PERCH Air Quality Study, Phases I and II” Partnership for Environmental Research and Community Health (subcontract through University of West Florida), U.S. Environmental Protection Agency. (Michael Chang, EAS lead PI) Funded 2002-2003 ~\$300k. \$150k in continuation funding awarded for 2004-2007.

Co-PI on "Consequence Minimization: Decision Support Systems". Mid-America Earthquake Center, National Science Foundation. Funded for 2002-2004 (MAE Center is a multi-year multi-million dollar center. Project funds are ~\$80k annually, excluding matching funds from GT, continuation funding awarded for 2004-2005 in October, 2004).

IPA, Director, Decision, Risk and Management Science Program, National Science Foundation, Funded for August 1999-August 2001, ~\$220k.

Co-PI on "Follow-up Study of Reports of Autism Spectrum Disorder to VAERS: Clinical Description of Adverse Events and Characterization of Vaccine Risk Perception of Parents." Principal Investigators are Miles Braun and Robert Ball. Amount requested: None (due to my position at NSF). Result: Funded, 2000-2001.

PI on "Improving vaccine risk information: metrics and mappings for probabilities." Seed grant from the Centers for Disease Control and Prevention and Georgia Tech, subcontract awarded to Norman Brown, University of Alberta, Edmonton CA. Result: Funded for June 2000 to May 2001. (\$15k, no money for PI due to NSF position)

Co-PI on "Economic and environmental risk perceptions in transitional societies: Survey research" (Revision of Item 9 above, remaining research, PI Richard Barke). National Science Foundation, Decision, Risk and Management Science. Submitted August, 1997. Amount requested: \$ 226,075 Result: Funded (summer 1998).

Proposal for subcontract on grant through Research Triangle Institute to the National Cancer Institute/National Institutes of Health for risk communication research on informed consent statements "Evaluating informed consent for BRCA1/2 screening." Submitted March, 1997. Amount requested: ~\$50k Result: Funded.

IPA with the Centers for Disease Control (~ \$15,000) for 2 months, summer 1996. Result: Funded (summer 1996).

Proposal for subcontract to Johns Hopkins for "Integrated Assessment of the Public Health Effects of Climate Change for the U.S.: Risk Characterization and Communication." Submitted to Johns Hopkins University for inclusion in proposal to the US EPA, submitted March 15, 1996. (Subcontract for ~\$128,000). Result: \$58k awarded (funding for 1996-98).

"Economic and Environmental Risk Perceptions: Determinants of environmental policy in transitional societies." Revision of proposal listed in (8) with Krassimira Paskaleva and Richard Barke (co-principal investigators). Submitted to Decision, Risk and Mng. Science, National Science Foundation.. Amount requested: \$280,000, February, 1996. Result: \$84k awarded, partial funding for first year.

IPA with the Centers for Disease Control (~ \$4000) for a month, summer 1995. Result: Funded (summer 1995).

"Risk Communication of Ecological Issues Related to Dispersant Use" Marine Spill Response Corporation, Washington DC (through Scientific and Environmental Associates, Inc. (SEA), Alexandria VA. Amount requested: Approximately \$22,000 (SEA received the award based on a proposal in which Bostrom is one of the key investigators named), March 1995 Result: Funded (1995-1996).

"Assessing the Risk Perceptions and Priorities of the Atlanta Public." City of Atlanta. Amount requested: \$5,000, September 1993. Result: Funded (1994-1995).

“ORAU Junior Faculty Enhancement Award 1993” (Perceptions of risks from cellular phones) Oak Ridge Associated Universities. Amount requested: \$5,000 Result: Designated as “runner-up.”

"Risk Communication Evaluation: Focusing on the Readers' Needs." National Science Foundation and the Electric Power Research Institute. Requested: \$102,000 January 1992 (approx.. amount, including 2 REU supplemental grants and supplemental grant for GRA requested at later dates, as well as a later reduction in funding from EPRI after the initial award). Result: Awarded for 1992-94, extended to June, 1995.

Honors and Awards

American Association for the Advancement of Science Fellow, 2014. Chair-elect of AAAS Section K (Political, Economic and Social Sciences) 2015, Chair of Section K 2016, Retiring Chair of Section K 2017, Member at Large of Section K, 2018 to 2019. Elected to AAAS Board of Directors, effective 2019.

Washington State Academy of Sciences, elected 2014.

University of Washington-University of Bergen Faculty Exchange Fellowship awarded for Spring 2014.

President, Society for Risk Analysis, elected President-elect December 2011, served as President in 2012, as Past-President and chair of publications committee in 2013, chair of nominations committee in 2014, chair of awards committee in 2015.

Fellow of the Society for Risk Analysis, awarded December 2007.

Chauncey Starr award for a young risk analyst, from the Society for Risk Analysis. Awarded December, 1997.

American Statistical Association/National Science Foundation/Bureau of Labor Statistics Research Associateship, 1991-92 (listed under employment also).

Fulbright Graduate Research Fellowship and Lois Roth Endowment Fund grant, Carnegie Mellon University/University of Stockholm, 1989-90 (listed under employment also).

Patricia Roberts Harris Fellowship, Carnegie Mellon University, 1988-89.

Wall Street Journal Student Achievement Award, Master of Business Administration program, College of Business and Economics, Western Washington University, 1986

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