

Engaging Researchers and Decision Makers to Develop Usable Climate Information

Denise Lach

Director of the School of Public Policy
Oregon State University
Corvallis, OR USA
01-541-737-5471

denise.lach@oregonstate.edu

Judith Cushing

Member of the Faculty
The Evergreen State College
Olympia WA
01-360-701-6450

judyc@evergreen.edu

ABSTRACT

In this plenary panel, speakers from academia and government present their past efforts to engage researchers and decision makers in determining and delivering information needed for climate change action. The primary goal of the panel presentations and discussion is to envision new ways for decision makers, scientists and information technology developers to work together to define and carry out public policy. After moderators present some background about the role of science in approaching wicked problems that face governments and society, scientists and decision makers who have worked together on these issues, as well as software developers engaged in delivering the desired information technology, will present their experiences with ongoing projects. The panel session concludes with questions and comments from the audience, and discussion among panel members.

Categories and Subject Descriptors

E. Data; K.4 Computers and Society; H. Information Systems; I. Computing Methodologies; J.4. [Computer Applications]: Social and Behavioral Sciences

General Terms

Management, Documentation, Design, Human Factors.

Keywords

Scientific Visualization, Visual Analytics, Wicked Problems, Climate Change, Post-Normal Science, Information Systems Design.

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1. INTRODUCTION

Climate change is one of several wicked problems now facing society (and government). While it is clear that climate change solutions are inherently complicated from a scientific point of view, research in science and public policy has shown that policy decisions for wicked problems are not driven by science alone [2, 4]. Thus, it is critical to envision new ways for decision makers (at all levels of government) and scientists to work together to define and carry out public policy. We believe that one way to accomplish this is to involve those outside the scientific specialties, i.e., decision makers and the public, relatively early in the scientific process. Involving decision makers early not only helps assure their buy-in to or acceptance of the results, but also brings to the fore stakeholder questions that don't cross the minds of the scientists and thus can influence the framing of scientific questions pursued by researchers.

This panel brings together decision makers and scientists whose goal is to co-produce climate information that can be used to develop policy for adapting to the changing climate. Scientists will talk about their work with potential users of the science to frame the questions, identify and collect the needed data, develop appropriate models, and interpret results. The potential users of climate science will describe their experiences working on those projects—how their roles shifted over time, expectations they had for the project, and lessons learned about the production and use of climate science. The panel will begin with a brief presentation by the organizers to introduce the concept of wicked problems as it applies to climate change adaptation. We will also present the concept of knowledge coproduction as one strategy to involve researchers and decision makers in developing information to be used in making decisions about climate adaptation [3] and introduce the *Regional Integrated Sciences and Assessments program (RISA)*, which is sponsored by the US National Oceanic and Atmospheric Administration (NOAA). RISA “supports research teams that help expand and build the nation’s capacity to prepare for and adapt to climate variability and change” [5].

Two case studies from different RISA programs will then be co-presented by a researcher and decision-maker who have worked together on developing needed information and/or information technology (such as a decision support tool) to enable climate change science or adaptation. Because this is a digital

government conference, the panel will focus on cases where new information and/or information technology is jointly produced for use by the decision maker.

A lead software engineer will also describe his experience working with scientists to produce visualization tools that serve scientists in their research related to climate change and in the presentation of that research to stakeholders. He will offer observations from the software engineer perspective on challenges and opportunities of implementing the tools and information resources needed for his work creating software for scientists facing wicked problems [1].

The panel will conclude with questions from the audience and discussion among panel members. We are particularly interested in discussing the role of researchers in framing policy questions vs. role of policy makers in framing research questions, tools used or developed during the project, and lessons learned from working together. We hope that all panel participants and the conference audience will leave the session with new ideas for how decision makers, scientists and information technology developers can better work together to define and carry out public policy for wicked problems in general and climate change in particular.

2. Panelist Questions

Researcher and government panelists will have been asked to address the following questions in their remarks:

1. Briefly describe the climate change issue you are working on with your science/decision maker colleague. Would you characterize that work as fundamental climate change science, or mitigation, or adaptation?
2. Scientists: briefly describe how you have engaged the public in past projects; please focus on how differed from the project you're discussing today.
Decision maker: briefly describe how you have used climate science in the past (if you have); where did you get climate information? How was it integrated into decisions?
3. Scientists: How did involving decision makers early in the process change the way you approached the science?
Decision makers: How did getting involved early in the process change the way you think about and/or use the resulting information?
4. For both: What tools (group process, technology, funding) are needed to make this type of approach successful?
5. What one piece of advice might you give to other efforts similar to yours?

The software engineer will offer his observations from the software development perspective on challenges and opportunities of implementing the tools and information resources needed for the kind of co-production of knowledge described by other panelists. He will address the following questions:

1. Briefly describe the climate change issue(s) relevant to your work as a software engineer.
2. How do you engage scientists and their stakeholders in the development process?
3. How does involving scientists and their stakeholders in the process change the way you approached development?

4. What tools (group process, technology, funding) are needed to make this type of approach successful?
5. What one piece of advice might you give to other efforts similar to yours?

3. PANEL PARTICIPANTS

3.1 Moderators

Denise Lach

Director of the School of Public Policy
Oregon State University

Judith B. Cushing

Member of the Faculty (Computer Science and Ecology Informatics), The Evergreen State College

3.2 Participants

Tamara Wall

Assistant Research Professor
Desert Research Institute
Reno, Nevada.

Tom Rolinski

Predictive Services Program Manager
USDA Forest Service Meteorologist

Allison Marshall Inouye

Water Resource Specialist
City of Hillsboro, Oregon.

Lawrence Schoen

Blaine County Commissioner
Hailey, Idaho.

Nik Stevenson-Molnar

Software Engineer
Conservation Biology Institute
Corvallis, Oregon.

4. BIOGRAPHICAL INFORMATION

Dr. Denise Lach is Professor of the Sociology Program and Director of the School of Public Policy at Oregon State University, Corvallis, Oregon. Her areas of interest include environmental natural resource sociology, social impact assessment, program evaluation, and organizational development. She is involved in several projects relevant to this panel, including the examination of changing roles and expectations for science and scientists in natural resource decision making, institutional resistance to changes in the water sector, and transformation of water resources governance structures. She holds a Ph.D. and M.S. in Sociology from the University of Oregon.

Prof. Judith B. Cushing taught software engineering, database systems, and ecology informatics at The Evergreen State College before her retirement from teaching in December 2014. She continues to conduct research in ecology informatics and is Principle Investigator on the NSF VISTAS (Visualization for Terrestrial and Aquatic Systems) project. VISTAS is a joint project among environmental scientists, computer scientists, and social scientists to develop visualizations for better understanding research results of projects relating to climate change. Prof. Cushing holds a Ph.D. in Computer Science and Engineering from the Oregon Graduate Institute.

Dr. Tamara Wall is an assistant research professor at the Desert Research Institute and works with the Western Regional Climate Center, the Center for Climate, Ecosystems, and Fire Applications, and the California-Nevada Applications Program (part of the national NOAA-sponsored Regional Integrated Sciences and Assessments network). Current projects include (1) a co-PI on a USDA AFRI sponsored project using a participatory modeling approach in the Tahoe Basin, (2) Working with agencies and organizations in southern California to develop the Santa Ana Wind Threat Index (3) as lead PI on the Fire Extremes project with the USFS Wildfire RD&A group and (4) Working with BLM Nevada and the Great Basin Landscape Conservation Cooperative in developing climate change adaptation scenario planning approaches for the Great Basin Region. Dr. Wall holds a Ph.D. in interdisciplinary studies with an emphasis in geography from The University of Montana.

Tom Rolinski is the Predictive Services Program Manager for the Southern California Geographic Area Coordination Center in Riverside. He has been a fire weather meteorologist in southern California for 20 years, first with the National Weather Service, then with the Bureau of Land Management, and now with the Forest Service. Tom has been researching large fire potential for over 10 years, and has worked with UCLA and San Diego Gas and Electric (SDG&E) over the last 4 years to help create the Santa Ana Wildfire Threat Index. Tom earned a Bachelor of Science in Meteorology from Saint Louis University in 1991.

Allison Marshall Inouye is a Water Resource Specialist for the city of Hillsboro, Oregon. While a Water Resources Engineering graduate student at Oregon State University, Ms. Inouye worked with the Pacific Northwest Climate Impacts Research Consortium (CIRC) to produce a stakeholder-informed, coupled human and natural systems model that explored potential impacts of climate change on a watershed in central Idaho. Ms. Inouye holds an M.S. in Water Resources Engineering from Oregon State University.

Lawrence Schoen has served as a Blaine County Commissioner in Hailey, Idaho since 2006. Mr. Schoen collaborated with Ms. Inouye and others from the Pacific Northwest Climate Impacts Research Consortium (CIRC) on the climate change impacts study for central Idaho.

Nik Stevenson-Molnar is a software engineer with the Conservation Biology Institute in Corvallis, Oregon. Mr. Molnar is interested in the challenges of collecting, organizing, and communicating scientific data, and the roles that software

and technology can play in addressing these needs. In addition to his work at CBI, Mr. Molnar is also the lead software engineer on the Visualization of Terrestrial and Aquatic Systems project; VISTAS works with environmental scientists whose research contributes to climate change science, impacts and adaptation, to develop visualizations for environmental scientists to use in improving their own research and presenting their work to a wide audience. Mr. Molnar holds a B.A. degree in computer science and multimedia studies from The Evergreen State College.

5. ACKNOWLEDGMENTS

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6. REFERENCES

- [1] Cushing, J.B., K. Winters, and D. Lach. 2015. Software for Scientists facing Wicked Problems—Lessons from the VISTAS Project. Digital Government Conference, 2015, to appear.
- [2] Funtowicz, S. and J.R. Ravetz. 1993. Science for a Post-Normal Age. *Futures* 25: 735-755.
- [3] Kennel, C. and S. Daultrey. 2010. Knowledge Action Networks: Connecting Regional Climate Change Assessments to Local Action. University of California San Diego Sustainable Solutions Institute Series. Available at: <http://escholarship.org/uc/item/8gd6j0k5>. Last accessed May 2014
- [4] Lach, D. and S. Sanford. 2010. Public understanding of science and technology embedded in complex institutional settings. *Public Understanding of Science* 19(2): 130-146
- [5] NOAA Climate Program Office. 2015. Regional Integrated Sciences and Assessments program. <http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram.aspx>