Workshop Report | Enhancing Scientific and Technical Expertise for the Washington State Legislature

Workshop Report

Enhancing Scientific and Technical Expertise for the Washington State Legislature

SeaTac Conference Center October 4, 2017 8:00 am – 6:00 pm



Table of Contents

Executive Summary	1
About the Workshop	2
Background Information on S&T for Policy	4
Legislative Needs	5
Summary of Workshop Presentations	9
Collaborative Proposals	18
Appendices	22
Agenda	23
Participants	25
Workshop Survey Results	27

Executive Summary

On Wednesday, October 4, 2017, thirty-eight people representing the legislature, scientists and engineers from multiple institutions, and those who work in "bridge" roles between the two gathered at the SeaTac Conference Center to discuss how to ensure that the Washington Legislature has the scientific and technical expertise it needs to effectively address complex issues in a time of rapid scientific and technological advancement. Twenty-three of the participants gave short presentations to establish a common information base about opportunities for science and technology to inform policy. This workshop report contains highlights from presentation on the following topics:

- Legislative needs
- Internal and external resources for the legislature
- Mechanisms for S&T input for government
- Policy issues of big data and emerging technologies
- How to make scientific information useful for decision making

After these and several "getting to know you" sessions, participants worked in small groups to develop proposals for enhancing scientific and technical capacity for the Washington State Legislature. The result was four interdependent proposals which would require collaboration among legislators from both parties, legislative staff, scientists and engineers from multiple institutions, and a range of knowledge brokers: science and technology policy fellows, state policy professionals, translators of complex S&T information for multiple audiences. The final four proposals were:

- 1. Annual "Science, Technology, and the Legislature" Summit
- 2. External "Matchmaking" and Research Resource
- 3. Internal Science & Technology Caucus
- 4. Scientific and Technical Review of Draft Legislation

This workshop was supported by a one-time planning grant from the California Council of Science and Technology Policy, with funding from the Moore and Simons Foundation. Building upon the momentum created at this workshop will require the commitment of organizations represented at the workshop, backing of additional legislators across parties, and funding for additional staff time and educational and planning events.

About the Workshop

Purpose of Workshop

Rapid advances in technology, data collection and analysis, and scientific understanding present new opportunities for addressing issues like transportation, land management, public health, and economic development. Harnessing these advances for public benefit requires a laws and regulations that are informed by science and consider potential applications of technology.

Washington state is home to the most scientific and technical workers per capita in the United States¹, and to companies and research institutions that change the way we work and live. Therefore, Washington can and should be a national leader in scientifically and technically savvy policy making. This workshop examined how the Washington State Legislature currently gets scientific and technical (S&T) information, what needs it may have now or in the future, and how scientists and engineers can help meet those needs.

Participation in the workshop was by invitation only, based on referrals from those committed to bipartisan approaches for utilizing scientific and technical information to inform public policy.

Workshop Objectives

- Every person makes useful new connections
- Identify opportunities for S&T expertise to inform issues in Washington state
- Increase awareness of existing S&T policy mechanisms and resources in Washington and beyond
- Increase awareness of how information informs decision making
- Generate collaborative proposals to help meet legislative needs identified at this workshop

History of this Project

This workshop was part of a national effort to create opportunities for scientists and engineers in state policy initiated and overseen by the *California Council on Science and Technology (CCST)*, with funding from the *Gordon and Betty Moore Foundation* and *Simons Foundation*. The CCST is interested in replicating legislative policy fellowships like those they organize in California and issued call for planning grant proposals from other states in the summer of 2016.

Melanie Roberts, a science policy professional and owner of ST4S Consulting, conducted a landscape analysis to determine the opportunities and barriers for a science and technology fellowship program, like those run by professional societies for the U.S. Congress and by CCST for the California Legislature, in the Washington State Legislature. While most legislators were open to the idea, there wasn't a clear demand or vision for what a scientist or engineer on staff might do. Therefore, Roberts determined that a first step for enhancing S&T expertise was not a fellowship program, but seeding a network that is dedicated to engaging scientists, engineers, and technologists in the policy process in order to understand complex issues and inform policy options, whether through a fellowship program or other mechanism. She submitted a planning grant request for this workshop to CCST, which was awarded along with planning grants in nine other states: Alaska, Idaho, Colorado, Michigan, North Carolina, Pennsylvania, Massachusetts, Connecticut, and New Jersey.

¹ According to BLS Occupational Employment Statistics (2014), 9.2% of employment in Washington are STEM-related.

Organizers

In addition to those listed below, dozens of people shared perspectives and background information to shape the workshop agenda and a more systems-level understanding about resources for Washington State Legislators. Thanks to all for your participation and collaboration

Workshop Designer and Facilitator:

Melanie Roberts Owner, ST4S Consulting <u>melanie@st4sconsulting.com</u>

Advisory Committee

- Anjan Bose, President, Washington State Academy of Sciences
- Donna Gerardi Riordan, Executive Director, Washington State Academy of Sciences
- Michael Kern, Director, William D. Ruckelshaus Center

Event Planning

- Maria Anguiano, Operations Manager, William D. Ruckelshaus Center
- Devon Thorsell, Program Coordinator, Washington State Academy of Sciences

Additional Facilitators

- Shane Carnohan, Project Coordinator, William D. Ruckelshaus Center
- Jennifer Davison, Program Manager, Urban@UW
- Renske Erion, Consultant for William D. Ruckelshaus Center
- Bish Paul, CCST Policy Fellow

SPONSORS

A planning grant from the California Council on Science and Technology, with funding from the Gordon and Betty Moore Foundation and Simons Foundation, provided primary support for planning, facilitating, and reporting on this workshop. The Washington State Academy of Sciences and William D. Ruckelshaus Center sponsored food, space, and participant travel costs and donated staff time.



Academy of Sciences Science in the Service of Washington State



William D. Ruckelshaus Center

Background Information on S&T for Policy

Prior to the Workshop, participants received the following pre-reading on mechanisms for scientific and technical input for government, and how to design processes that work. These and other references can help to inform the design of new mechanisms for Washington State.

- <u>The Art of Science Advice to Government</u> Suggestions from a science advisor to other science advisors
- <u>The U.S. Congress Needs Advice About Science and Technology</u> (pdf downoad) Reviews mechanisms for S&T input to Congress, pros and cons of each, and gaps.
- <u>Use Experts Wisely</u> How to minimize bias in expert advisory committees
- <u>Science and Technology Advice for Congress, Chapter 1: The Need for Better Institutional Arrangements</u> Overview of the usefulness and limits of S&T input in a democracy, and history of S&T input for Congress (Caution: Long! I include it in case you really want to geek out.)

Legislative Needs

A bipartisan group of legislators shared their insights on what issues might require S&T input, how S&T information impacts their decisions, what barriers they see to making information useful, and tips for scientists and engineers who want to help.

Participating Legislators

- District Rep. Brian Blake (not able to attend), D-Aberdeen
- Sen. Sharon Brown, R-Kennewick
- Sen. Karen Fraser (retired 2016), D-Thurston County
- Rep. Paul Graves, R-Fall City
- Sen. John McCoy, D- Tulalip
- Rep. Ed Orcutt, R-Kalama
- Rep. Vandana Slatter, D- Bellevue
- Rep. Norma Smith R-Clinton
- Rep. Derek Stanford, D-Bothell
- Sen. Hans Zeiger, R- Puyallup

Legislators received the following questions in advance:

- Where do you turn for S&T advice?
- What are the barriers to finding or using S&T information?
- What upcoming issues might benefit from S&T input?
- What advice do you have for scientists and engineers who want to inform policy?
- Tell a story about how S&T information changed your thinking.

Summary of key points from legislator comments:

- Can we use the scientific method in policy making: Observe Generate Hypothesis Test Revise?
- Need greater transparency about how data is used in policy development and implementation
- Interest in involving students
- Legislators wants to learn about potential public policy implications of emerging technologies
- More interaction is needed between scientists and policy makers:
 - o to identify and dive into issues the legislators need to know.
 - o For S&T experts to learn more about the Legislature and how to help
- In order to promote more interaction,
 - o Scientists can contact the Legislature to share what they know
 - Legislators and their staff need improved and more comprehensive mechanisms to find particular expertise on a timely basis
- It is important to frame research questions so they aren't biased toward a certain outcome.
- Legislators need more opportunities to-deep dive into particular issues
 - Perhaps through a joint science and technology committee
 - Or advisory committees, such as those established for the federal government, government, and executive branch
- Data alone isn't enough. Process matters.
 - Are the relevant stakeholders at the table?
 - Do they trust the credibility, legitimacy, and relevance of the data?
 - How to evaluate the credibility of data when information is presented by "dueling PhDs?"

Individual Legislator Comments (in alphabetical order)

Representative Brian Blake

• Unable to attend

Senator Sharon Brown

- Legislature needs to become involved in science and technology policy when S&T is applied is applied to real issues.
- Issues of interest: Geothermal bill looking at alternative resources for energy.
- Story: She recently learned from scientist that researchers can extract minerals from geothermal sites. Wish she had known that a year ago when she was putting together her bill!

Senator Karen Fraser

- A better understanding of probability and statistics is a particularly big need.
- Testimony presented at legislative public hearings too frequently includes S&T "experts" presenting conflicting data. It is very difficult for legislators to judge the arguments and understand what data is credible.
- There is a vast array of inputs to legislation: data, constituents, politics, etc.
- Lack of time and very short deadlines are a standard feature of the legislative process.
- Need to protect from political attack the ability of agencies, scientists, and universities to share results of their research.
- Need to improve transparency and understanding of how science is used to inform legislation.

Representative Paul Graves

- Legislature is really good at coming up with hypotheses but bad at getting data back and testing those hypotheses. Can they learn from scientists?
- Humility is cornerstone of science in the sense that your idea may be good but it might not pan out. A program may sound great but may not be so great when actually implemented or may not pan out how one intended.
- Need the courage to say that some programs that aren't working should be cut or changed.

Senator John McCoy

- Leaves design of studies and reports to scientists
- Likes to work with students on projects because they are open to many ideas.
- Areas of interest include: the internet (was on the team that launched ARPA Net), water, and, more recently, juvenile justice issues.

Representative Ed Orcutt

- The most important factor in using science is trust. When a study is done, he wants to know who did it, why, how, and its limitations.
- It helps to be part of study commissioning / review process in order make sure relevant stakeholders are consulted, know what data is used and its limitations, whether it answers legislators' questions, and applies to local circumstances.

Representative Vandana Slatter

- Has worked in biotechnology, and sees challenge of balancing the use of genetics and genetics testing for personalized medicine, with privacy and other ethical concerns.
- Prefers to see the raw data.
- Looks at how questions are being asked. Are they biased or leading?
- Tips for scientists in policy: Understand that applying science and technology to policy issues might be a 'messy' process!

Representative Norma Smith

- Concerned about our nation's dependency on rare earth and other potential conflict materials needed in multiple sectors, including renewable energy, transportation, and technology.
- Researched this issue for several years, with the help of non-partisan legislative staff
- Partnered with scientists at PNNL, UW, and WSU to create The Joint Center for Deployment and Research in Earth Abundant Materials (JCDREAM), the first state-sponsored initiative in the nation to look for earth abundant materials as alternatives to rare earth materials.
- Worked closely with six scientists to create a collaborative framework for JCDREAM. They donated their time, were available by phone and email, gave honest and constructive guidance, and shared technical knowledge.

Representative Derek Stanford

- Is a Ph.D. statistician, but doesn't do stats in his legislative work! Legislative staff have connections to get answers to these types of questions.
- Toughest part of being legislator is that you are dealing with difficult, contentious issues.
- Can be difficult to be proactive in an area that you don't know much about.
- How can we be more proactive on S&T issues? If we knew more 10 years ago, could we have better cybersecurity?
- Need to know what technology experts are already thinking about for 5, 10 years out.
- Agrees with Sen. Zeiger that a joint committee for S&T issues is a great idea.

Senator Hans Zeiger

- Scientific topics coming up more often and require deeper level of investigation then the Legislature has given those issues in the past.
- Legislators are generalists. Takes time to become an expert on an issue
- Serving on joint committees (like JLARC, transportation) allow for deeper dives on issues. You can have interim meetings, research on the topic.
- Idea: Create Science and Technology Joint Committee
- Question: Is it possible to get someone in private sector to invest in government systems, and private sector benefit?

Audience Question: How do we get involved?

Slatter: How can legislators know/access their scientists who are also constituents? Is there a way to create a place where there can be exchange between scientist constituents and legislators?

McCoy: Contact non-partisan legislative staff to let them know your expertise if you think it would be useful. Just be careful how information is presented so that it doesn't become political.

Zeiger: Can you tell us about different aspects of an issue, like cybersecurity? Where should they invest? What policies are needed? What are the emerging threats?

Stanford: Hard to have communication between amorphous groups of scientists, legislators, and staffers. At the federal level there are more formal advisory groups. There is some of that in state government on the executive side but not really on legislative side. They need scientists to come to them, but the Legislature also need to find scientists somehow. He wants to know what keeps people in this audience up at night?

Brown: It's important to be able to respond to short timelines. If data comes too late, it's hard to incorporate it into the policy making process.

Orcutt: Ideally, do background work in off-session. But sometimes it's hard to do because things will come up rapidly in real time and the session takes on a life of its own.

Slatter: There is a lot more that we have in common than we have that is different. We need your courage and curiosity. Everyone's opinion matters.

Fraser: Legislators need more background on science in order to be able to judge issues and data presented to them. Suggests that group similar to this should reconvene in a year to evaluate how we are doing to improve the use of science and technology in the legislative process.

Zeiger: Washington does have a lot of good structures in place to have data input into the legislative process.

Orcutt: He needs credible science that is replicable. If he has credible science and makes bad decision, then shame on him. But if you give me bad information and I make a bad decision, shame on you.

OTHER AUDIENCE QUESTIONS TO LEGISLATORS

We didn't have time to answer these, so they would be good starting points for future conversations.

- Do you think it is important to have studies that have broad focus and more long term as opposed to very narrow, short-term questions?
- What type of information or work product do you find most useful?
- What can we do to help you communicate to your constituents about these issues?
- Would you be willing to identify one particular area where they have a question they think science could answer?
- Faculty members are asked from time to comment on draft legislation. However, these questions don't really come from Olympia. Is there a mechanism for scientists to comment on policy?
- If we are thinking about building capacity in Washington state, to what extent can we utilize scientists in the state versus outside?
- How do we develop mechanisms to better utilize state resources and avoid agencies working in silos?
- What specific issues do you think the Legislature is in most need for input from scientists?
- What is the most effective way to bring long-range issues to the Legislature's attention?

Summary of Workshop Presentations

Below are summaries of key points from all presentations of non-legislators

See slide presentations in Appendix (p. 29) for full remarks.

I. Washington State Legislature 101

Susan Howson Staff Director, Senate Committee Services Keenan Konopaski Director, Joint Legislative Audit and Review Committee John Wooley Deputy Director, Joint Legislative Audit and Review Committee

Overview of the Legislature

- Washington has a part-time Legislature, starting the second week of January each year and lasting 105 days in odd years and 60 in even years. However, special sessions frequently extend this time substantially. In 2017, three special sessions extended the session to 193 days.
- The Legislature has nearly equal numbers of Republicans and Democrats. At the time of the presentation, the Democrats were in the majority in the House (50 D : 48 R) and the Majority Coalition (24 Republicans + 1 Democrat) controlled the Senate. One month after this presentation, the Senate picked up an additional Democratic seat, giving Democrats a one vote majority in the Senate.
- Susan Howson stressed that most of the deliberation and debate about issues is done in committees. Learn more: <u>http://leg.wa.gov/legislature/Pages/CommitteeListing.aspx</u>
- Three resources for tracking issues:
 - o Track Bills at <u>www.leg.wa.gov</u>
 - o Budget information <u>www.fiscal.wa.gov</u>
 - o Watch hearings <u>www.tvw.org</u>

Internal Resources for the Legislature

- The <u>Senate Committee Services</u> and the <u>House Office of Program Research</u> are nonpartisan offices in the Senate and House, respectively, that help legislators and their staff understand issues and draft bills.
- The Republicans and Democrats also each have partisan caucus staff in the House and Senate to advise legislators on the politics of issues.
- The <u>Joint Legislative and Review Committee</u> (JLARC) is a non-partisan legislative office that provides independent, evidence-informed answers to legislators' questions about how government programs are working and what they might do to improve upon them.
 - JLARC doesn't focus on many issues in the hard sciences, but does have some PhDs in political sciences
 - JLARC and WSIPP have a similar function to understand how government programs wok. JLARC focuses more on implementation and management of programs, while WSIPP approaches problems with academic methodology, meta-analysis.
 - o Sample JLARC Projects:
 - 1. How effective are the Puget Sound Partnership's efforts on restoring Puget Sound?

- 2. Is there bias in how the Department of Labor and Industries settles workers' compensation claims?
- 3. How do public lands impact economic development?
- 4. Is WSDOT using best practices to determine the condition of highway bridges?
- 5. Do regulations protect habitat for endangered species?
- 6. (Upcoming) Does the current program for evaluating the condition of underground storage tanks work?
- 7. (Upcoming) Does allowing emergency medical technicians to provide some primary care services reduce hospitalizations?
- 8. (Upcoming) What is the most cost-effective means of providing low income housing?
- LEAP (Legislative Evaluation and Accountability Program) is the Legislature's own information and technology source for developing and communicating budgets, tracking state expenditures, and other (typically fiscal) related information. They are seen as a reliable and understandable source of lots of information (revenues, staffing activity, etc.) but do not undertake program evaluation efforts like many academics might think about when they see the word "evaluation" in their title.

How do non-partisan staff get scientific and technical information?

- They are data-driven, and partner with researchers and organizations throughout the state (and beyond) to inform issues.
- Subject matter experts (SME) testify in committee work sessions to inform issues, whereas public input is invited at public hearing. Sometimes they invite remote testimony at colleges and universities.
- JLARC partners with researchers for particular studies. To find them, they go through a lengthy scoping process, and often issue a request for proposals.
- They talk to a variety of different scientists, and ask them about alternate views and what is most debated. They often hire scientists to peer review others. They do tell the Legislature when there isn't scientific consensus on an issue.
- Challenges:
 - Balancing rigor and speed. JLARC studies typically take 12-14 months, and many researchers want even more time.
 - Balancing neutrality with what the Legislature wants to happen.

II. External Resources for the Legislature

Presentations (10 mins each):

- A. Washington State Academy of Sciences <u>Anjan Bose</u>, President
- B. William D. Ruckelshaus Center <u>Michael Kern</u>, Director
- C. Washington Institute for Public Policy Stephanie Lee, Associate Director

A. Washington State Academy of Sciences

Anjan Bose, WSAS President and Professor of Engineering at Washington State University

- <u>Washington State Academy of Sciences</u> is a 501(c)3 organization that advises Washington State on policy issues involving science and technology. Their **mission** is to provide expert scientific and engineering analyses to inform public policy making and work to increase the role and visibility of science in Washington State.
- **History**: Authorized by <u>ESB 5381</u> in 2005, at the request of Governor Gregoire and incorporated as a non-profit in 2007. It is administratively housed in the Washington State University and located in downtown Seattle.
- **Members**: They have 270 members from across the state. Many of WSAS members are also part of the National Academies of Sciences, Engineering, and Medicine, the nation's premiere resource for independent, expert advice for government. They have all volunteered to be available as a resource to the state.
- Areas of interest: Members represent all disciplines social, biological, physical, and health sciences and engineering and technology. Members also self-select into three working groups: Environmental Quality, Sustainability and Climate Change; Jobs, Infrastructure and Economic Environment; Quality of Life, Health, Education and Workforce Preparedness.
- Activities: WSAS educates and advises, but doesn't advocate. They host annual symposiums, support the Washington State Junior Academy of sciences for exceptional high school students, and respond to government requests.

B. William D. Ruckelshaus Center

Michael Kern, Executive Director

- The mission of the <u>William D. Ruckelshaus Center</u> is to help parties involved in complex public policy challenges in State of Washington and Pacific Northwest tap university expertise to develop collaborative, durable, effective solutions. The Center envisions a future in which government leaders, policy makers, and citizens routinely employ tools of collaborative decision making to design, conduct, and implement successful public policy processes.
- **Governance.** The Center is hosted and administered by WSU Extension and hosted at UW by the Daniel J. Evans School of Public Policy and Governance, and located in downtown Seattle. The Center's Advisory Board represents some of Washington's most esteemed leaders in government and business, and bi-partisan, bi-cameral representation from the Legislature.
- Services include consultation, situation assessment, collaborative process design, facilitating and management, establishing a common information base, and applied learning opportunities.
- **Projects.** Many projects come from Legislature. The Center thinks about how to get "upstream" and ahead of conflict and design the project to avoid conflict and involve the

Legislature during the process. They are currently leading a look at the state's growth planning framework.

C. Washington State Institute for Public Policy

Stephanie Lee, Deputy Director

- <u>Washington State Institute for Public Policy</u> (WSIPP) carries out practical, non-partisan and bipartisan research – at legislative direction – on issues of importance to Washington State. It is a 501(c)3 organization administratively housed at Evergreen State College.
- **History.** WSIPP was created by the Legislature in 1983. Their board of directors is comprised of members of the Legislature, legislative staff directors, universities, and the Governor's office.
- Approach. Major project types:
 - 1. What offers a positive return on investment?
 - Use meta-analysis and benefit-cost analysis
 - 2. Was a particular program effective?
 - o Impact evaluation, usually with administrative data
 - 3. What else does the Legislature want to know?
 - o Between-state comparisons, ad-hoc economic analysis, and more
- **Projects.** WSIPP does major cost-benefit and meta-analyses of topics including criminal justice, health care, substance abuse, and K-12 education policy. <u>See their website for a list of an access to reports.</u>

D. Other Organizations

Other participants who offer legislative support on technical issues:

- <u>UW Evidence Based Practice Institute</u> Eric Trupin, Director (invited)
- <u>Climate Impacts Group, UW</u> Amy Snover, Director
- Pacific Northwest National Laboratory Ryan Eddy, Policy Advisor
- <u>Water Research Center, WSU</u> Jonathan Yoder, Director
- <u>Technology Law and Public Policy Clinic, UW</u> William Covington, Director
- <u>Washington Technology Industry Association</u> Ian Griswold, Legislative Aide
- <u>TechNet</u> Bish Paul, State Policy Manager

III. Opportunities for Science and Technology in Policy

Session Goal: Create a shared understanding of opportunities and challenges for science and technology to inform policy.

Presentations (10 mins each):

- D. S&T Policy Overview <u>Melanie Roberts</u>, ST4S Consulting
- E. Mechanisms of S&T Policy Input Donna Gerardi Riordan, WSAS
- F. Opportunities in Big Data and Open Data Bill Howe, UW eSciences Institute
- G. Technology Policy Issues for States <u>William Covington</u>, UW Technology Policy Lab

A. S&T Policy for State Legislatures: Overview Melanie Roberts, Owner, ST4S Consulting

- Definition of Science: Systematic study of the natural world that can be used to make predictions.
- Definition of Technology: Products or processes created by engineers, which often apply scientific discoveries for practical ends.
- Science is most helpful for informing policy when used to help understand the causes and effects underlying problems or predict impacts of different interventions. Using science only to promote a pre-determined course of action undermines the power of science to inform effective policy.
- Policy makers need to pay attention to how technologies are deployed for the public good. Technology can be used to collect input on policy options (e.g., via "report a pothole" app) or to address particular problems (e.g., energy efficiency).
- Scientists and engineers can contribute to policy in a number of different role beyond subject matter expert. They can also be analysts, generalist advisors, advocates, or even elected officials. Scientists and engineers are valuable in policy because they approach problem solving differently their first inclination is to think "how do you know that's true?" whereas a politician may think "how can I convince you?"
- Most states don't have robust scientific and technical input, but they will need it as societal challenges become more complex and dynamic and science and technology shapes public policy issues more than ever before.
- Given the strength of the STEM workforce in Washington and Washington State's #1 ranking for evidence-based policy making² *Washington State could build a reputation as a leader in policy innovation for complex challenges in a rapidly changing world.*

B. Mechanisms for S&T Policy Input

Donna Gerardi Riordan, Executive Director, WSAS

- Two types of policy advice:
 - Policy for science (generally funding of science)
 - Science for policy (generally what's the best available science to inform policy decisions).

² <u>http://www.pewtrusts.org/en/research-and-analysis/analysis/2017/02/07/washington-state-leads-in-evidence-based-policymaking</u>

- National Mechanisms for Science and Technology Advice ³
 - o Legislative
 - Office of Technology Assessment (closed in 1994. Download a review)
 - o Executive
 - Office of Science & Technology Policy
 - <u>President's Council of Advisors on Science & Technology</u>
 - o Both branches
 - National Academies of Science, Engineering, and Medicine (since 1863)
 - <u>Science and Technology Policy Fellows Program</u>, run by professional societies
- State Level Mechanisms for Science and Technology Advice
 - o State Academies that respond to legislative needs (other than WSAS!)
 - <u>Connecticut Academy of Sciences</u>
 - Texas Academy of Medicine, Engineering, & Science
 - <u>California State Academy of Sciences</u>
 - o <u>California Science & Technology Policy Fellowships</u>
- Local Mechanisms for Science and Technology Advice
 - o Committees, Boards, and Commissions
 - Example: Marine Resources Committees
- C. Opportunities in Big Data and Open Data

Bill Howe, Director, eSciences Institute and Associate Professor, Information School, UW

- University research is trending towards being more applied and relevant to public/legislation. Students very interested in working on problems that help social good.
- Data Science for Social Good. Students from many fields participate, not just computer science. Students in quarter-long, on-side projects for capstone projects or commissioned research. Partner with policy project lead and a university mentor. Example: <u>Predictors of Permanent Housing for Homeless Families</u>.
- **His Mission:** Make it easier to work with large, noisy, heterogeneous datasets
- **Future of data science:** First decade of data science is sort of what can we do, but the next 10 years will be about what we *should* do with data science.
- **Challenge:** Some tools used to analyze large data sets in natural/physical sciences can't be translated for social, health, public issues because of privacy concerns
- **Challenge:** Fairness and accountability in algorithms. Gave multiple examples of racist and discriminatory computer algorithms.
- **Opportunity:** Washington State can play a leadership in legislation around algorithmic bias, fairness, accountability, transparency.
- D. Technology Policy Issues for States William Covington, Director, Technology Law and Public Policy Clinic, University of Washington
 - Agrees that students want to contribute. In the <u>Technology Law and Public Policy Clinic</u>, 2nd and 3rd year public policy students study a technology policy issue, and create white paper or proposed legislation.
 - Speed of technology adoption is faster and faster, requiring more technical expertise and nimble policy making.
 - Key Issues requiring input from legislators

³ See also, <u>The U.S. Congress Needs Advice About Science and Technology</u>

- *Highly Automated Vehicles:* Liability, privacy, infrastructure, rules of the road, labor concerns
- Drones: ownership, privacy, accidents, law enforcement, deliveries
- o Cryptocurrencies and Blockchain: Consumer protection, regulation, use in commerce
- Digital Divide: Rural availability, digital literacy, affordability
- Deployment of new services (5G): permitting rules, pole attachments
- *Energy:* Alternative forms of generation, distributed energy, efficiency, electric vehicles

IV. Making Sense of Data for Decision Making

Session Goal: Provide background about how data can be presented in a way that is useful for decision makers and how human psychology affects how people interpret data.

Presentations (10 mins each):

- A. Making Sense of Data for Decision Making Dan Cory, Tableau Software
- B. Putting S&T Information into Context <u>Ann Bostrom</u>, Evans School of Public Policy & Governance, University of Washington

A. Making Sense of Data for Decision Making: Visualization Dan Cory, Principal Technical Advisor, Tableau Software

- **Cycle of Visual Analysis:** Find data -> Visualize -> Develop Insight. Data insights often lead to additional questions, leading to new data needs and analysis.
- Finding Data. Lots of places. Here are some:
 - o <u>Data.wa.gov</u> run by Socrata (a Seattle company)
 - o <u>Enigma.io</u> mines government data and repackages it for analysis
 - o <u>Data.world</u> is a website for publishing data and sharing socially
- Visualizing Data: Goal is to help people see patterns without having to think about them. Need to understand visual perception.
- **Developing Insight**. Need to find appropriate level of granularity and scale to develop insight that get to underlying causes of data trends.
 - Example: Earthquakes. Data show large increase in earthquakes between 1960 and 2013. However, if you look at earthquakes by magnitude, it turns out that the increase can be attributed to increased sensitivity of sensors for lower magnitude earthquakes.

B. Putting S&T Information into Context

Ann Bostrom, Professor, Evans School of Public Policy & Governance, University of Washington

- Scientists have useful analytic methods and mindsets, but are usually naïve about decision makers' needs and decision processes
- Science is useful when: it is relevant for specific decisions, credible, and accessible
- Scientists and decision makers need to work together to:
 - Understand decision and how they are made
 - o Assess and apply decision-relevant science from multiple disciplines
 - o Assess knowledge, belief, and expectations compared to decision analysis
 - Produce accessible communications and decision support tools
- Tip for scientists: Start communication with the bottom line, rather than background information. Nix jargon.
- **Communicating uncertainty**. Frame uncertainty within a meaningful context. For example, compare these two different ways to describe uncertainty of the same "100-year flood":

- A flood that has 1% chance of exceeding a particular level in a given year and place, or
- A flood that has more than 1-in-4 chance of occurring during time of a 30-year mortgage.
- Beliefs affect how we interpret data. We pay attention to data that reaffirms pre-existing beliefs

• For example, people with the strongest opinions about climate change on both left and right are those with highest scientific literacy

• See <u>Communicating Science Effectively: A Research Agenda. National Academies of</u> <u>Science, Engineering, and Medicine, 2017</u>

V. Developing Productive Collaborations

Session Goal: Provide background on the approaches that help S&T experts and policy makers to work together to advance more effective policy.

Presentations (10 mins each):

- A. Creating a Common Information Base <u>Michael Kern</u>, Director, William D. Ruckelshaus Center,
- B. Collaborative Research to Support Policy Decisions <u>Amy Snover</u>, Director, Climate Impacts Group, University of Washington

A. Creating a Common Information Base

Michael Kern, Director, William D. Ruckelshaus Center

- **Stages of a Collaborative Process:** Convene (assess, plan, organize), seek agreement (educate, negotiate, resolve), and implement (roll out, monitor/evaluate, adaptively manage)
- Process of developing a common information base of facts is important for finding consensus that meets multiple needs and builds social capital. Need to understand multiple perspectives.
- Ruckelshaus Center helps to facilitate involvement of university researchers in fact finding.
 - Faculty, staff, and students conducted applied research and drafted white papers to inform planning and implementation for <u>a number of different issues.</u>
- **Comments from Chairman,** <u>Bill Ruckelshaus</u>. He wanted to be here because integrating science into policy is a topic he cares about deeply. He passed along some comments to share:
 - Science for risk management and policy judgements should be taught in schools as part of effort to develop intelligent citizenry
 - Scientists help to understand the nature of a risk, and policy makers decide what, if anything, to do about it.
 - It is critical that politicians never interfere with science, scientific method.
 - Use rigorous peer-reviewed science whenever possible
 - Make scientific process and findings fully transparent. This is really important.
 - Encourage scientists to speak out publicly and defend their conclusions, but do not overstate or understate.

B. Collaborative Research to Support Policy Decisions

Amy Snover, Director, Climate Impacts Group, University of Washington

• Setting the agenda: Traditionally, scientists "pushed out" information and hoped people would use it. More recently, potential users have requested information from scientists and engineers ("demand pull"). But sometimes policy makers don't know what is possible; so two-way collaboration to frame research questions and approaches is often most effective.

- **Process of collaboration:** Generally, research is more useful when there is consultation between researchers, policy makers, and other key stakeholders throughout the project, rather than only at the beginning or end.
- **Problem framing** among practitioners, scientists, and policy makers is important to create a problem statement and process that is salient, credible, and legitimate.

Collaborative Proposals

How might we ensure that the Washington State Legislature has the scientific and technical input required to address complex issues in a time of rapid change and technological progress?

PROPOSAL DEVELOPMENT PROCESS

After morning sessions to learn about legislative needs, current mechanisms for scientific and technical input, emerging issues, and elements of design for successful collaborations between scientific and technical experts and policy makers, those who could stay participated in a collaborative proposal development process. The steps were:

- 1. Participants pitched individual ideas about improving S&T capacity
- 2. Participants signed up for the proposals they wished to work on. Those with three or more advanced to Breakout Group #1
- 3. Breakout 1: Facilitators for each group led a discussion on the vision and goals for a proposal, which they presented to the rest of the attendees.
- 4. Breakout 2: Participants "voted with their feet" to help further develop a project and business plan for their favorite proposal. Some groups merged into others and some brought ideas from Breakout #1 to a different group

The result was four collaborative proposals that could all be part of a mutually reinforcing portfolio of activities to enhance scientific and technical input for the Legislature. Each group pitched their ideas to on flip-chart pages. While we didn't have time for extended conversation about the proposals, but participants were invited to submit comments and questions to be addressed in follow-up conversations.

SUMMARY OF PROPOSALS

- 1. Annual Legislative & Science Summit to strengthen networks, identify legislative needs, highlight emerging S&T policy issues, and potentially offer training for S&T fellows and others. Co-organized by entities proposed in #2 and #3 (below).
- 2. **External S&T resource** to help with matchmaking between legislators and subject matter experts, a source for high-quality information and relevant research, and training for scientists and technologists in communication & policy. Collaborates closely with internal caucus/office in #3.
- 3. Internal S&T caucus or office that serves as the touch-point for S&T issues in the legislature, offers educational activities for legislators, and collaborates closely with the external resource in #2.
- 4. Scientific and technical review of proposed legislation. Could be organized by external resource in #2, in collaboration with non-partisan staff.

1. Annual "Science & The Legislature" Summit

Participants: Michael Kern, Ryan Eddy, Alvin Kwiram, Shane Carnohan, Devon Thorsell

• Need / Opportunity: Increase communication among scientists and legislators about both long-term and short-term issues and concerns

- Activity: An annual or bi-annual gathering where legislators share near-term needs, scientists/technologists share near-term and evolving (future) issues.
 - Hold while legislature is out-of-session
 - Write a synopsis report
- Vision (5-10 yr)
 - o Summit is still occurring, sustainable, and seen as an important event to attend
 - Has resulted in science meeting legislative needs
 - Led to proposed and adopted legislation
 - Is emulated in other states
 - A joint legislative S&T committee exists & hosts
 - o A S&T policy fellows program exists and participates
- **Project Plan:** WSAS would lead in collaboration with a legislative body... perhaps a new S&T caucus or Committee?
 - o A steering committee (perhaps with retired D and R co-chairs) would set agenda
 - o Hold a listening session with legislators to determine useful content for the summit
 - o Perhaps begin with annual meeting in late Sept / early October
- Business Plan
 - o Budget similar amount from this workshop
 - o Ask legislature for an allocation. Also get sponsors: UW, WSU, Private Labs, Foundations
- Next Steps:
 - o Follow up with legislators from this workshop
 - Discuss w/ Melanie what went into this workshop
 - o WSAS explores/develops this, in collaboration with advocates in the legislature
- Comments and questions for future discussions:
 - Is this a substitute or new vision for existing WSAS annual symposium?
 - How to gather ideas for science that would be presented at the summit?
 - o The Ruckelshaus Center could offer facilitation services
 - Need advocates from other communities (industry, environmental), not just legislature and science, to recognize need and advocate for summit. One metric of success would be that these communities want to attend, too.
 - Perhaps use industry conference space (Microsoft, Adobe, Tableau, Amazon, etc.)
 - Legislative S&T fellows are bridges between S&T community and legislature. So outgoing fellows could be a key part of steering and implementation committee.
 - This could also be part of new S&T policy fellows' orientation, and perhaps an opportunity to find placements.

2. External Science & Technology Information Services

Participants: Donna Gerardi Riordan, Ron Thom, Allison Coffin, Dan Cory, Chen-Ching Liu

- Need / Opportunity: Need a way to get information from S&T subject matter experts to legislature on demand
 - o Must minimize bias and conflicts of interest
 - o Maximize quality of information
- Activities:
 - o Matchmaking
 - Provide access to S&T experts, within and outside of universities

- Hotline or website
- Directory of scientists willing to help
- White papers on topics of interest
- Design:
 - Need bipartisan legislative champions
 - o Need support from science leaders
 - Need safe spaces for legislature and scientists to engage
 - o Address reward systems for scientists & engineers to engage
 - o A legislative office would liaise with universities / WSAS
 - Could add university "S&T for policy" liaison to supplement existing "policy for S&T" expertise
 - Need vetting & professional development for experts
 - Communication skills
 - o Use collaborative mechanism, Ruckelshaus can help
 - Build upon existing models WSAS, WSIPP, Ruckelshaus
- Vision:
 - o Other states emulate the Great State of Washington.
 - o New partnerships between scientists and policymakers
 - \circ $\;$ A set of "common facts" around which policy decisions are made
 - Shared awareness of the existence of this program
- Project Plan: WSAS leads. Works with universities, and other existing orgs
 - 1 yr expert list, communication training, collaboration model
 - 2 yr issue identification + expert matchmaking, summary report of meeting, outreach to WSAS, legislature, other orgs
- Funding
 - 0 0.5 FTE + consultants + travel and other direct costs
- Next Steps
 - Pitch to legislators, 1-page write-up to pitch
- Comments and questions for future discussions:
 - Developing an "agreed upon set of facts" requires joint construction of those facts by interested parties, not just experts. How to do this?
 - o Someone likes the idea of directory of scientists who can help
 - o Explore the use of social media to do match-making, like scientific crowdsourcing
 - Are scientists are expected to do this for free?
 - o What are rules governing involvement of state employees (at WSU, UW)
 - Might we use a "policy challenge" mechanism like <u>Innocentive</u>? The challenge approach has been <u>used by cities</u>. Winners receive monetary prizes, which is one way to incentivize/reward work.

3. S&T Caucus in the Legislature

Participants: Sen Karen Fraser, Ron Thom, Larry Dalton, Alvin Kwiram, Anjan Bose, Jonathan Yoder, Jen Davison, Chris Mulick, Ann Bostrom, Amy Snover, Don Baer

- Need / Opportunity: Conduit for science communication between scientific community and the legislature
- Solution: A legislative Science & Tech Caucus inside the legislature, working with

- o S&T Advisory Council ("staffed" by WSAS?)
- o Office of Science Information, to connect/liaise
- Who: The caucus would be bipartisan group of legislators
 - Invite staff, executive branch agencies, WSIPP, etc.
 - Staffed by legislative fellows and interns, under staff director for non-partisan staff from each chamber
 - o Caucus could invite staff leadership to participate
 - o MODEL: <u>Heritage Caucus</u>
- Activities:
 - o Serve as co-host for the science summit with WSAS
 - Work with external resource (see proposal #2) to select issues for "deep dive" explorations, which can be featured at the legislative summit (see proposal #1)
 - o "Y-all come" seminars / brown bags for legislative staff
- Planning:
 - o Might need more capacity / funding
 - Next steps: Donna & Chris -> Reach out to legislators
 - WSAS could give presentation about itself and/or S&T resources for legislature
- Comments and questions for future discussions:
 - How to ensure that the caucus is bi-partisan? Who could join and what would their responsibilities and/or benefits be?
 - What is your "vision of success"?
 - What are the pros/cons to this approach to a caucus vs. a committee?

4. Review of Legislation by Scientific and Technical Experts

Participants: Sen John McCoy, Bish Paul, Amy Snover, Anjan Bose, Chen-Ching Liu

- **Problem:** Legislation can move through review process with errors in scientific or technical information
- Activities
 - Introduce a bill early, solicit input during interim, get response within 30 days
 - Scientists and technologists participate in Work sessions
- Program Plan
 - Run by WSAS + legislative learning house (e.g., senate committee services)
- Business Plan
 - o Need to cover cost of staff. Get some funding from legislature
 - Could review of bills be part of university service?
 - o Note: Negotiation journal has a special issue on service
- Next Steps
 - Senator McCoy asks non-partisan staff about feasibility. And speaker, majority leader about desirability.
- Comments and questions from others
 - o What are some examples of bills that got introduced with inaccurate S&T information?
 - o How many bills per year would you expect to need review, and on what topics?

Appendices

- 1. Agenda
- 2. List of Participants
- 3. Workshop Survey Results

A WORKSHOP Science and Technology for Washington State: Assisting the State Legislature

October 4, 2017 8:30 AM – 6:00 PM

agenda

8:30 AM	Continental Breakfast & Mingling		
9:00 AM	Making New Connections		
9:15 AM	Welcome, Overview, and Goals		
9:30 AM	 Overview of the Legislative Process & Support Structure Susan Howson – Senate Committee Services Keenan Konopaski – Joint Legislative Audit and Review Committee John Wooley – Joint Legislative Audit and Review Committee 		
10:00 AM	 ide Resources for the Legislature Anjan Bose – Washington State Academy of Sciences Michael Kern – William D. Ruckelshaus Center Stephanie Lee – Washington State Institute of Public Policy Eric Trupin – UW Evidence Based Practice Institute and others 		
10:30 AM	Break		
10:40 AM	Legislative Needs A bipartisan group of legislators will share their insights on what issues might require S&T input, how S&T information impacts their decisions, what barriers they see to making information useful, and tips for scientists and engineers who want to help. • Rep. Brian Blake • Rep. Norma Smith • Rep. Paul Graves • Son Karon Fracer (retired) • Son Haps Zeiger		
	Sen. John McCoy Rep. Derek Stanford		
11:40 AM	 Issues in Science & Technology Policy I: Opportunities Mechanisms of S&T Policy Input – Donna Gerardi Riordan, WA State Acad. of Sciences 		

• Technology Policy Issues for States - William Covington, UW Technology Policy Lab

	Opportunities in Big Data and Open Data – Bill Howe, UW eSciences Institute	
12:15 PM	Lunch	
1:00 PM	 Issues in Science & Technology Policy II: Making Sense of Information Making Sense of Data for Decision Making – Daniel Cory, Tableau Foundation Making Information Useful – Ann Bostrom, UW Evans School of Public Policy 	
1:25 PM	 Issues in Science & Technology Policy III: Productive Relationships Creating a Common Information Base – Michael Kern, William D. Ruckelshaus Center Building Productive Collaborations – Amy Snover, UW Climate Impacts Group 	
1:50 PM	Proposal Development Develop initial proposals for improving S&T support for the WA State Legislature	
2:05 PM	Pitch Proposals	
2:20 PM	Break	
2:30 PM	Breakout: Workgroup I Develop project title, goals, and activities	
3:10 PM	Report Out and Provide Feedback	
3:40 PM	Breakout: Workgroup II Develop business plan, project plan, and next steps	
4:20 PM	Requests to Group	
4:40 PM	Closing	
5:00 PM	Reception	
6:00 PM	End	

Participants

Participants found a colored dot on their nametag that assisted in networking and breaking out into groups with people in similar or different types of positions:

YELLOW = Legislators or staff

GREEN = Practicing scientists and engineers

BLUE = Staff at organizations that translate research for policy

PURPLE = Other science policy "connectors"

FIRST	ORGANIZATION	DEPT
Don Baer	Washington State Academy of Sciences	Pacific Northwest National Labs
Anjan Bose	Washington State Academy of Sciences	Washington State University
Ann Bostrom	University of Washington	Evans School of Public Policy
Sen. Sharon Brown	WA State Senate	8th District
Shane Carnohan	William D. Ruckelshaus Center	
Allison Coffin	Washington State University	Science Talk Northwest
Jim Cook	Washington State University (retired)	Dept. of Crop & Soil Sciences
Dan Cory	Tableau Software	
William Covington	University of Washington	Technology Policy Lab
Joe Dacca	University of Washington	Office of Government Affairs
Larry Dalton	Washington State Academy of Sciences	UW Dept. of Chemistry
Jennifer Davison	University of Washington	Urban@UW
Renske Dyedov	Consultant	William D. Ruckelshaus Center
Ryan Eddy	Pacific Northwest National Labs	Office of Government Affairs
Sen. Karen Fraser	WA State Senate (retired)	
Rep. Paul Graves	WA State House of Representatives	5th District
lan Griswold	Washington Technology Industry Org.	
Heather Hansen	Washington Friends of Farms and Forests	
Bill Howe	University of Washington	Dept. of Computer Sciences
Susan Howson	WA Senate Committee Services	
Michael Kern	William D. Ruckelshaus Center	
Keenan Konopaski	Joint Legislative Audit and Review Comm.	
Alvin Kwiram	Washington State Academy of Sciences	UW Dept. of Chemistry
Stephanie Lee	Washington State Institute for Public Policy	
Chen-Ching Liu	Washington State Academy of Sciences	WSU Energy Systems Center
Sen. John McCoy	WA State Senate	30th District
Chris Mulick	Washington State University	Office of State Relations
Neal Myrick	Tableau Foundation	
Rep. Ed Orcutt	WA State House of Representatives	20th District
Ben Packard	University of Washington	EarthLab

Biswajit Paul	TechNet	
Donna Gerardi Riordan	Washington State Academy of Sciences	
Melanie Roberts	ST4S Consulting	
Rep. Vandana Slatter	WA State House of Representatives	48th District
Rep. Norma Smith	WA State House of Representatives	10th District
Amy Snover	University of Washington	Climate Impacts Group
Rep. Derek Stanford	WA State House of Representatives	1st District
Ron Thom	Washington State Academy of Sciences	Pacific Northwest National Lab
Devon Emily Thorsell	Washington State Academy of Sciences	
John Woolley	Joint Legislative Audit and Review Comm.	
Jonathan Yoder	Washington State University	WA Water Research Center
Sen. Hans Zeiger	WA State Senate	25th District

Workshop Survey Results

After the workshop, participants received an email link to a 10-question survey that took an average of 3.5 minutes to complete. Multiple choice questions used a 5-point Likert scale. 22 of 37 participants responded: 9 scientists and engineers; 11 bridging S&T with policy; and 1 working in the legislature.

Participants found the workshop worthwhile.

- 100% were satisfied
- 95% would come to related events in the future

Participants appreciated meeting and learning from one another.

- 85% knew less than a quarter of fellow participants before the workshop
- 86% said they intended to follow up with people they met at the workshop
 Number of intended contacts: 2-30; Median: 5; Average:7
- Half of respondents said their favorite part of the day was hearing from legislators, and the one respondent from the legislature said their favorite part of the day was talking with scientists.
- 73% said the workshop increased their impression of legislators
- 54% of non-scientists said the workshop improved their impression of scientists

The workshop increased interest in science and technology for good governance, even among a group who we invited because we believed they already shared an interest in, and commitment to this topic

- 82% aid it increased their belief that additional scientific and technical capacity would be useful for the legislature.
- 86% said the workshop increased their personal interest in enhancing scientific and technical capacity for the legislature.

People learned things they didn't know.

- 73% increased understanding of legislative process
- 86% increased understanding about legislative information needs
- 91% increased understanding of resources available for the legislature
- 91% increased understanding of how science and technology can inform policy

Suggestions Improvement

- By far, the most often cited suggestion for improvement is to involve more legislators and legislative staff in collaborative sessions and give them even more time to share their needs.
- Others wished we had more time for presentations, for questions, and discussions while recognizing our time limitations.
- Include a greater diversity of scientists.