

# Update on the Science of Science & Innovation Policy

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# Overview

- Program Status
- Current Context
- Scientific Challenges and Approach
- Research and Findings
- Visibility
- Next Steps



# **Program Status**

#### Background

- program established in 2005, \$8-10 million/year
- Explicitly interdisciplinary economists, sociologists, psychologists, political scientists, anthropologists, computer scientists, domain scientists
- Goals: Understanding (theories); measurement (models, metrics, datasets); community of practice (academics, practitioners)

#### Current status

- 75 awards made in three solicitations since 2007
- Active engagement with Science of Science Policy Interagency group



# Current Context: Very High Profile

- Investment in Science
  - American Recovery and Reinvestment Act
  - The National Academy of Sciences Speech, April 2009
- Openness and transparency
  - data.gov; open.gov; etc.
- Evidence based policy
  - Joint memo on "Science and Technology Priorities for the FY2011 Budget":
     Science of Science Policy (is the only program listed by name)
- Accountability
  - ARRA Reporting Guidelines
  - Putting Performance First: Replacing PART with a new performance improvement and analysis framework





# Why this program is important for Science of Team Science Methods Used

- Qualitative/ Case Studies
  - Describe complex processes
  - Formulate hypotheses
- Quantitative and Statistical Methods
  - Build new linked datasets on researchers, grants, patents, publications, citations and firms and workers
  - Develop new tools for describing complex outcomes
  - Develop new models to tease out marginal impact of funding
- Computational approaches
  - Cyberinfrastructure => vast amounts of heterogeneous data on individuals
  - Visual analytics



# Why this program is important for Science of Team Science

- Science Policy
  - Data Infrastructure
    - Science agencies have proposal and award administration systems => no systematic frame of individuals "touched" by science funding (New STAR METRICS)
    - Heterogeneous sources of outcomes
  - Scientific Attribution
    - Name disambiguation
    - Global enterprise
- Innovation Policy
  - Data Infrastructure
    - Innovation within organizations
  - Scientific Frame



# **Examples of Research**

#### **Economics**

- Azoulay/Graff-Zivin Superstar Scientists
- Hobijn/Comin Technology Adoption and Diffusion Sociology
- Woody Powell and others Networks
- Zucker/Darby Large scale data infrastructure

#### **Psychology**

- Schunn Analysis of team interactions
- Gero Situated cognition views of innovation

#### Visualization

- Thomas: Visual Analytics
- Borner: Mapping



Executive Office of the President

Borner, Katv

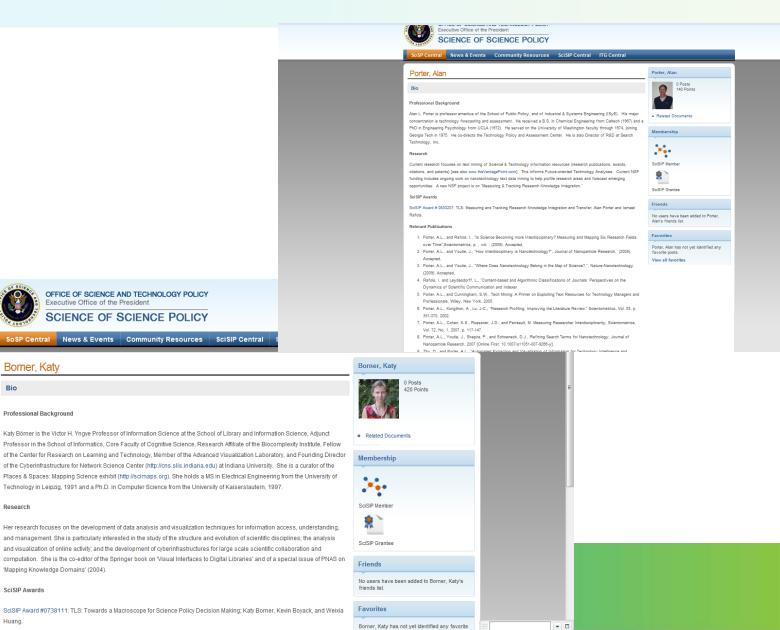
Professional Background

'Mapping Knowledge Domains' (2004).

Research

SciSIP Awards

# Website: Features Researchers



Nation



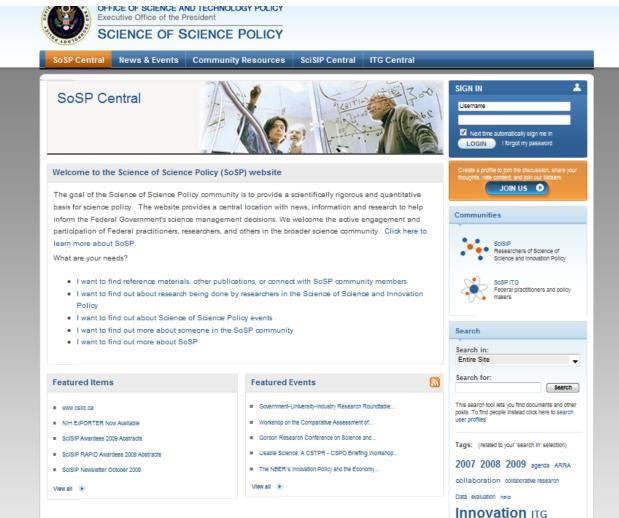
### Website: Features Research Areas





# Website: Features Events, Research Findings

. . .



meeting Metrics minutes Models OSTP

Policy R&D research science
science policy SoSP technology workshop



# Next Steps: Interagency SOSP Linkages

 Feedback from the 2008 SoSP Workshop: shaped interagency research priorities for SOSP:

Developing a Data Infrastructure for Science and Innovation Policy; Modeling; Creating an Innovation Framework; Informing and Assessing R&D Investments; Conducting Outreach to Underrepresented Populations

 Feedback from 2009 SoSP Workshop: Best Practices in Research and Development Prioritization, Management, and Evaluation

Building community of practice; Focus on link to research coming out of NSF SciSIP program

2010 SoSP Workshop: Metrics

Economic Benefits (led by NSF); Social Benefits (led by NIH); Workforce Development (led by DOE); Technology Deployment (led by NIST). The topic of Diversity will be integrated into each of these modules (led by NOAA).



# Next Steps: International

- International Emulation
  - Brazil?
  - Japan
  - UK
  - European Union
- Changing the Conduct of Science in the Information Age
  - EuroHORCS
- Center of Excellence in Middle East

- ★ STAR METRICS (Science and Technology for America's Reinvestment: Measuring the Effect of Research on Innovation, Competitiveness and Science), is the first national federal and university partnership to document the outcomes of science investments to the public.
- ★ Initially, we will develop a transparent way of calculating the initial impact of federal science spending on job creation.
- ★ Subsequently we will measure the impact of federal science investment on economic growth (through patents, firm start ups and other measures), on scientific knowledge (such as publications and citations) and, later, on social outcomes (such as health and environment)



### More Information

- Email Julia Lane (<u>ilane@nsf.gov</u>)
- Go to website <a href="http://scienceofsciencepolicy.net">http://scienceofsciencepolicy.net</a>
- Join listserv (<u>scisip@lists.nsf.gov</u>)
- Submit a proposal: Annual Deadline Sept 9.
- Note that next solicitation due date is Sept 9, 2010
- http://www.nsf.gov/funding/pgm\_summ.jsp?pims\_id=501084&org=S
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