NIH and Science of Science

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Council of Councils Meeting

April 21, 2025

National Institutes of Health
Office of Evaluation, Performance, and Reporting

Science

- What works?
- How does it work?
- How do we make it better?

Science of Science:

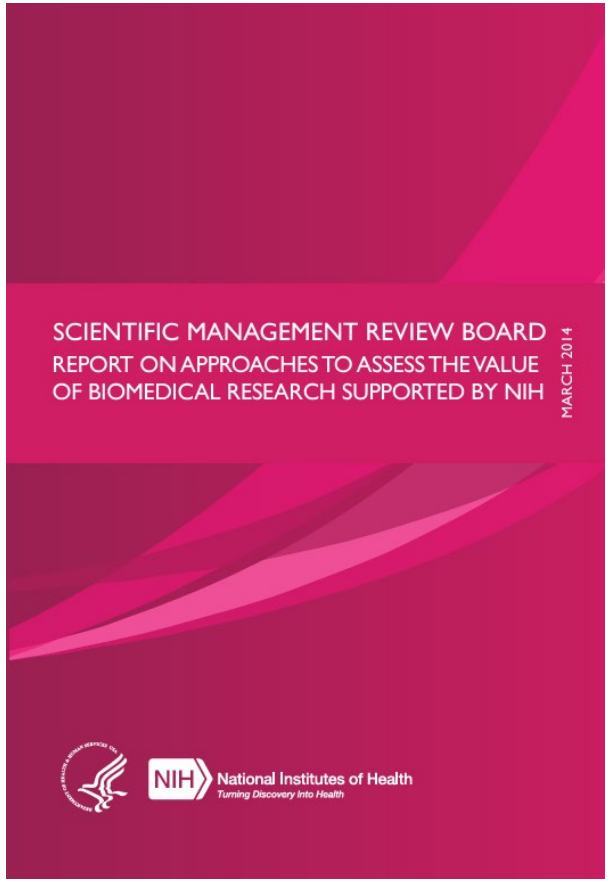
Research on the scientific process

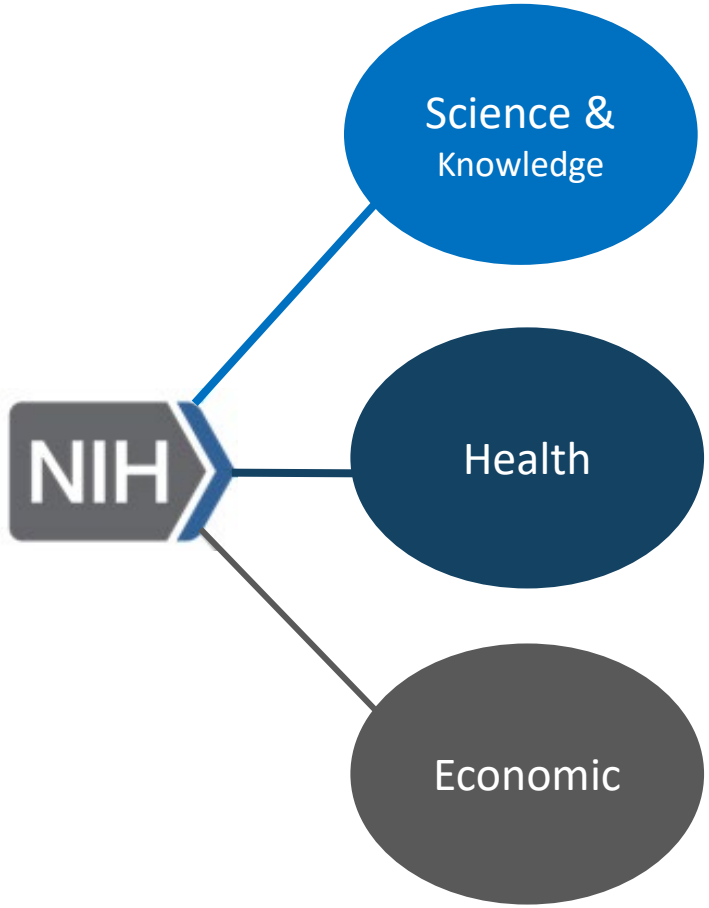
to understand who, what, and how we are funding research

Why should we study NIH processes, programs, policies, and impacts?

- How do we know that we are **funding** the best science?
- How do we support more **breakthrough** research?
- How do we speed up **discovery and interventions**?
- How do we know that NIH is achieving its **mission**?

Scientific Management Review Board: Value of Biomedical Research Report, 2014





- New knowledge
- Increased methodological and technological capabilities
- Growth/emergence of new fields
- "Spillovers" to other lines of research

- Influence on health practice and policy
- Changes in incidence/prevalence
- Lives saved
- Quality of life improvements

- Cost savings from improved interventions and health outcomes
- Industrial/commercial activity from medical products and technologies
- New businesses/start-ups created
- Highly skilled workforce

External influences

Foundation of Evidence-Based Policymaking Act of 2018 (Evidence Act)

- Title 1 - Federal Evidence-Building Activities
  - Requires Evidence-Building Plans, Evaluation Plans, and Capacity Assessments

GAO-23-105656: Better Data Will Improve Understanding of Federal Contributions to Drug Development

- allow researchers to “access NIH microdata”

2018 Advisory Committee to the NIH Dir WG on the Next Generation Research Initiative:

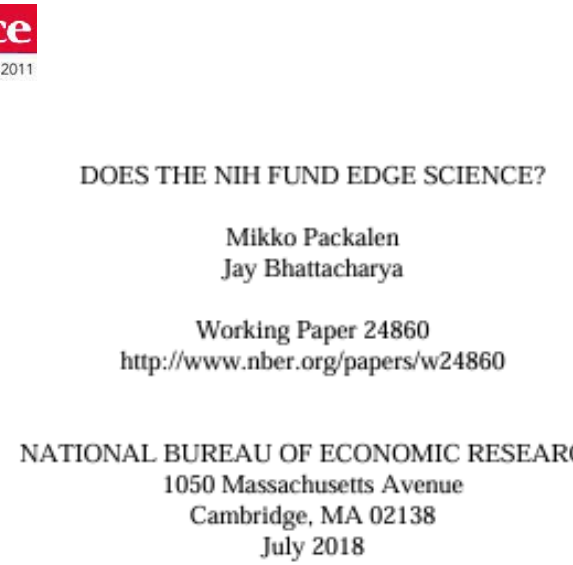
- increase access to NIH administrative data on the biomedical workforce

Researchers studying NIH

Science
VOL 333 19 AUGUST 2011

Race, Ethnicity, and NIH Research Awards

Donna K. Ginther,[1]* Walter T. Schaffer,[2] Joshua Schnell,[3] Beth Masimore,[3] Fa
Laurel L. Haak,[3] Raynard Kington[2]†

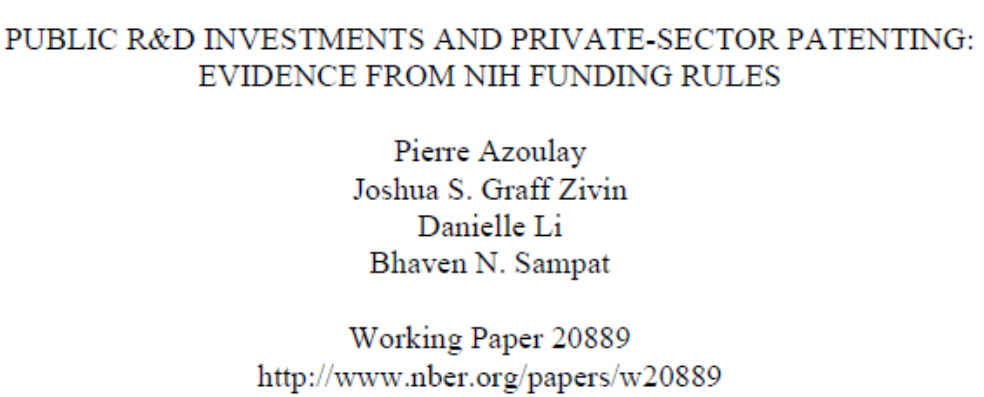


DOES THE NIH FUND EDGE SCIENCE?

Mikko Packalen
Jay Bhattacharya

Working Paper 24860
http://www.nber.org/papers/w24860

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
July 2018



PUBLIC R&D INVESTMENTS AND PRIVATE-SECTOR PATENTING:
EVIDENCE FROM NIH FUNDING RULES

Pierre Azoulay
Joshua S. Graff Zivin
Danielle Li
Bhaven N. Sampat

Working Paper 20889
http://www.nber.org/papers/w20889

eLife. 2016 Feb 16;5:e13323. doi: 10.7554/eLife.13323

NIH peer review percentile scores are poorly predictive of grant productivity

Ferric C Fang [1,*], Anthony Bowen [2,*], Arturo Casadevall [3,*]

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PMCID: PMC4769156 PMID: 26880623

RESEARCH ARTICLE | SOCIAL SCIENCES

Contribution of NIH funding to new drug approvals 2010–2016

Ekaterina Galkina Cleary, Jennifer M. Beierlein, Navleen Surjit Khanuja, +1, and Fred D. Ledley Authors Info & Affiliations

Edited by Solomon H. Snyder, Johns Hopkins University School of Medicine, Baltimore, MD, and approved December 27, 2017 (received for review September 1, 2017)

February 12, 2018 | 115 (10) 2329-2334 | https://doi.org/10.1073/pnas.1715368115

NSF Science of Science: Discovery, Communication and Impact (SoS:DCI)

U.S. National Science Foundation

- Formerly Science of Science and Innovation Policy (SciSIP) program
- Established in 2006 to fund basic and applied research that bears on and can help guide public- and private-sector policy making for science innovation
- Funds empirical research to advance theory and knowledge on:
  - Social and structural mechanisms of scientific discovery
  - Theories, frameworks, models, and data that improve understanding of scientific communications and outcomes
  - Societal benefits of scientific activity and how science advances evidence-based policy making and creation of public value
- Includes solicitation for the Science of Science Approach to Analyzing and Innovating the Biomedical Research Enterprise (SoS:BIO) program

Science of Science Approach to Analyzing and Innovating the Biomedical Research Enterprise (SoS:BIO)

- Established in 2019
- Jointly supported by NIGMS
- Supports research to provide scientific analysis of important aspects of the biomedical research enterprise
- Supports efforts to foster a diverse, innovative, productive and efficient workforce
- Applications reviewed by a joint NSF/NIGMS panel

Examples of SoS:BIO funded work

Project	Title	PI
1R01GM155913-01	Assessing U.S. Biosafety and Biosecurity Compliance for Potential Pandemic Pathogen Research and **Dual Use Research of Concern**	VOGEL, KATHLEEN
1R01GM158813-01	Evaluating **the Impact of Biomedical Tools** and Methods	BARABASI, ALBERT-LASZLO
5R01GM152543-02	Maximizing **rigor and reproducibility** when considering Sex as a Biological Variable in research	MANEY, DONNA L
5R01GM140281-04	Invisible Collaborators: Underrepresentation, **Research Networks**, and Outcomes of Biomedical Researchers	WEINBERG, BRUCE A
1R01GM158694-01	Identifying and Encouraging Connections among **Data Reuse**, Scientific Innovation, and Scientific Careers	HEMPHILL, LIBBY

Engagements with science of science researchers

- Science of Science Management Meeting October 2-3, 2008
- NIH and the Science of Science and Innovation Policy: A Joint NIH-NSF Workshop April 7th & 8th, 2016
- A Joint NIH-NSF SciSIP Workshop on the Value of Data Sharing October 13, 2017
- NIH Open Opportunity on the OMB Evidence Project Portal
- NIH Science of Science Scholars Pilot Program (NOT-OD-25-060)
  - OEPR in collaboration with OER, launched in 2024
  - Unique opportunity for researchers to study NIH's programs, policies and impacts
- Many others…

NIH Data Sharing Index (S-index) Challenge

- Developing a robust metric to reward exemplary data sharers (inspired by the h-index)
- Will measure how effective a researcher is in sharing their research data in a way that has utility for future study
- Led by the National Eye Institute, with several Institute, Center, and Office contributors
- Phase 1: Proof of Concept applications due June 2, 2025
- Phase 2: Refinement and Implementation applications due February 13, 2026

What is next?

- How does NIH generate evidence to improve processes?
- What information does NIH need?
- How can NIH engage the science of science research community more effectively?
- These questions and more could be answered by a Council of Councils working group