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On the Spirit and Institutional Structures for Societal Impact of Science and Scholarship

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Institutional Structures for Societal Impact of Science
AESIS
May 24, 2022

ON THE SPIRIT AND THE ORGANISATIONAL FRAMEWORK OF INTELLECTUAL INSTITUTIONS IN BERLIN [3]

The idea of disciplined intellectual activity, embodied in institutions, is the most valuable element of the moral culture of the nation. These intellectual institutions [4] have as their task the cultivation of science and

I am speaking to you today from Lenapehoking, the traditional territory of the Lenni-Lenape. What follows is a quote from the standard Land Acknowledgement of the Nanticoke Lenni-Lenape Tribal Nation.

> The Lenape People lived in harmony with one another upon this territory for thousands of years. During the colonial era and early federal period, many were removed west and north, but some also remain among the continuing historical tribal communities of the region…. We acknowledge the Lenni-Lenape as the original people of this land and their continuing relationship with their territory. In our acknowledgment of the continued presence of Lenape people in their homeland, we affirm the aspiration of the great Lenape Chief Tamanend, that there be harmony between the indigenous people of this land and the descendants of the immigrants to this land, “as long as the rivers and creeks flow, and the sun, moon, and stars shine.”

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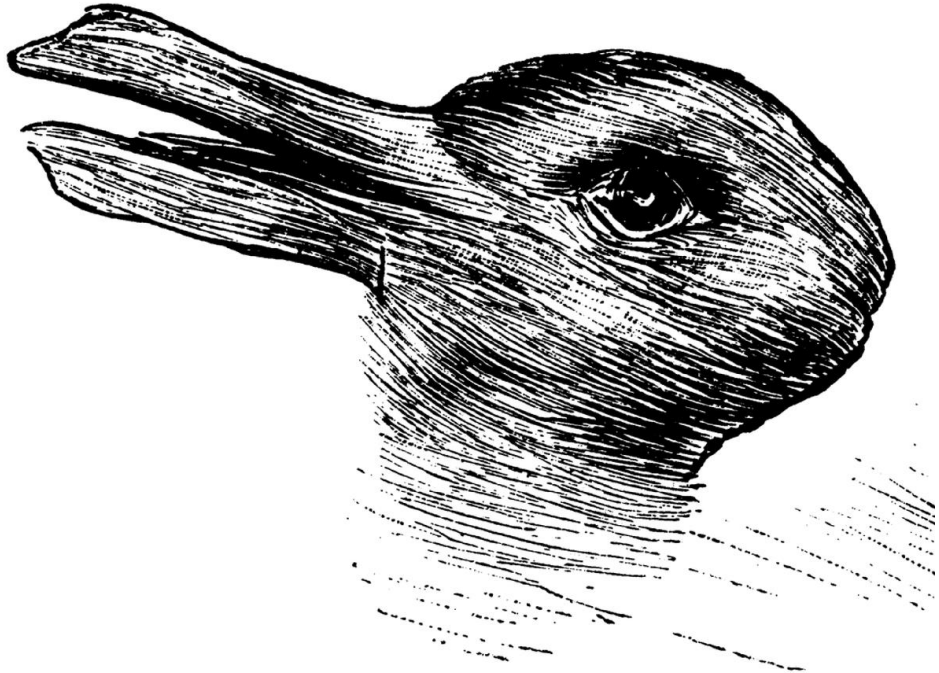

A very brief history of impact at NSF

NSF Merit Review Criteria (1997 - 2012)

- What is the intellectual merit of the proposed activity?
- What are the broader impacts of the proposed activity?

ELSEVIER

Technology in Society 27 (2005) 437–451

Technology In Society

www.elsevier.com/locate/techsoc

Assessing the science–society relation: The case of the US National Science Foundation's second merit review criterion

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Abstract

Making Sense of the "Broader Impacts" of Science and Technology

General Research Lab, Rm 201
Colorado School of Mines
Golden, CO

August 5th - 7th

2007

UNIVERSITY OF NORTH·TEXAS

NEW DIRECTIONS

AAAS
ADVANCING SCIENCE, SERVING SOCIETY

Preliminary Report

Click here for a preliminary report from the workshop (PDF opens in a new window).

Workshop Themes

The National Science Foundation merit review process requires scientists to address the broader impacts as well as the intellectual merit of the research being proposed. The aim of this research workshop is to reflect on *why* (rather than how) scientists and engineers ought to address the broader impacts of their research.

- Why did NSF change its merit review criteria in the first place?
- How much freedom should the scientific and engineering community be granted to set the terms of its research?
- Why is "the integration of research and education" an important value scientists and engineers ought to uphold? What would such integration actually entail?
- Why should scientists and engineers seek to expand the participation of underrepresented groups?
- What are the links between science and politics?
- Why should scientists and engineers worry about the broader impacts of their research? Do scientists and engineers have a responsibility to pursue research directed toward pressing societal needs when their research is publicly funded?
- Is basic research in science and engineering value-neutral?
- Do other funding agencies ask applicants to talk about societal

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Special Issue: US National Science Foundation's Broader Impacts Criterion
Guest Editor: J. Britt Holbrook

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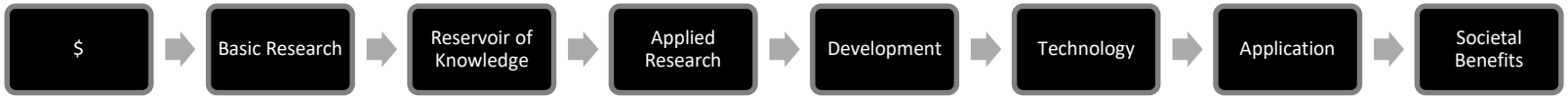
Linear-reservoir model



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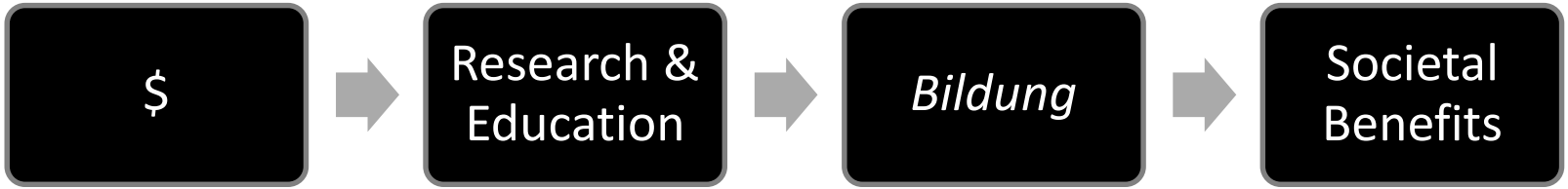
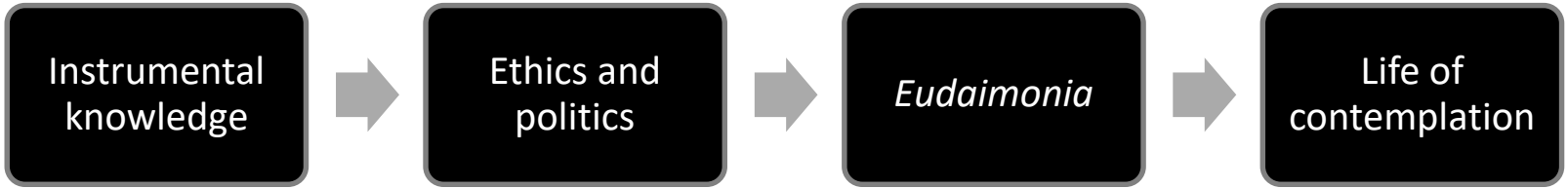
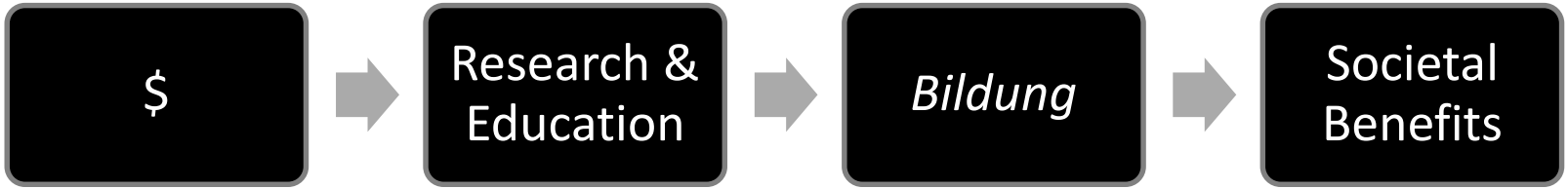
Humboldt's linear model



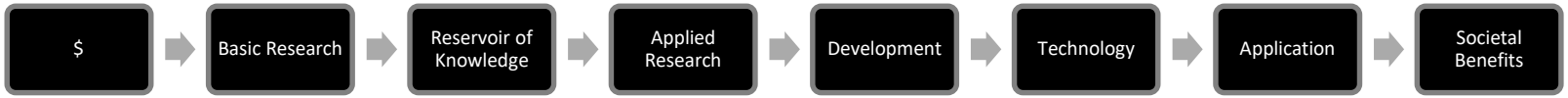
Aristotle's linear model



Humboldt's linear model



Linear-reservoir model



A very brief history of impact at NSF

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Peer review and the *ex ante* assessment of societal impacts

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J Britt Holbrook, Robert Frodeman

Research Evaluation, Volume 20, Issue 3, September 2011, Pages 239–246,
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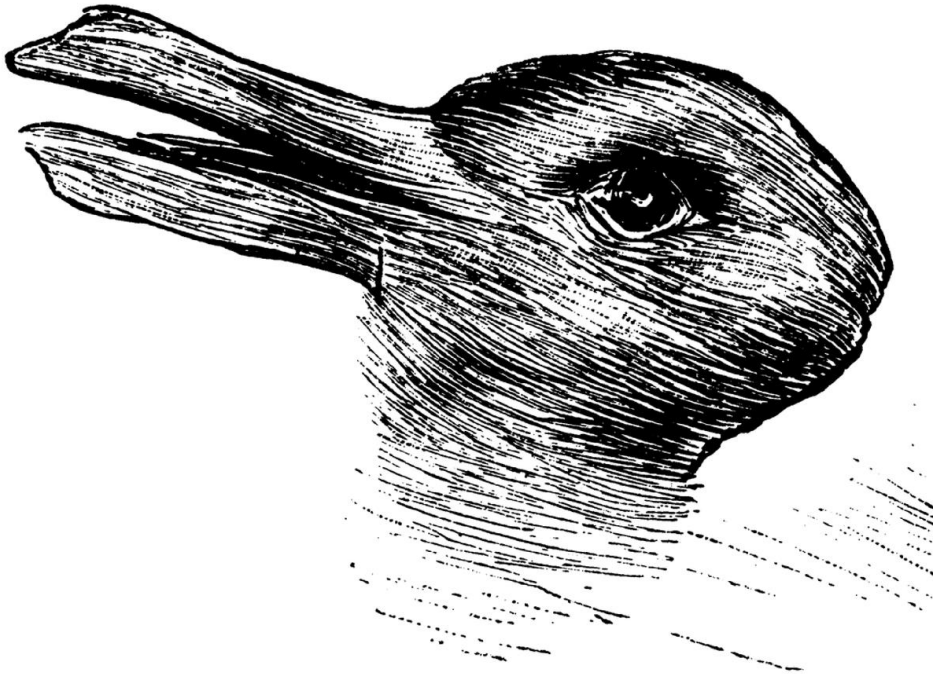
Published: 01 September 2011

Holbrook-Jastrow model



A very brief history of impact at NSF

NSF Merit Review Criteria (2013 - present)

- What is the intellectual merit of the proposed activity?
- What are the broader impacts of the proposed activity?

A very brief history of impact at NSF

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit**: The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts**: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:

> a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
>
> b. Benefit society or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or organization to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

A very brief history of impact at NSF

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary Federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These broader impacts may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

A very brief history of impact at NSF

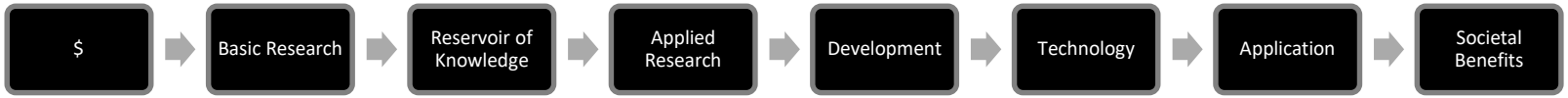
With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

To what extent is impact history?

- Missions
- Open Science

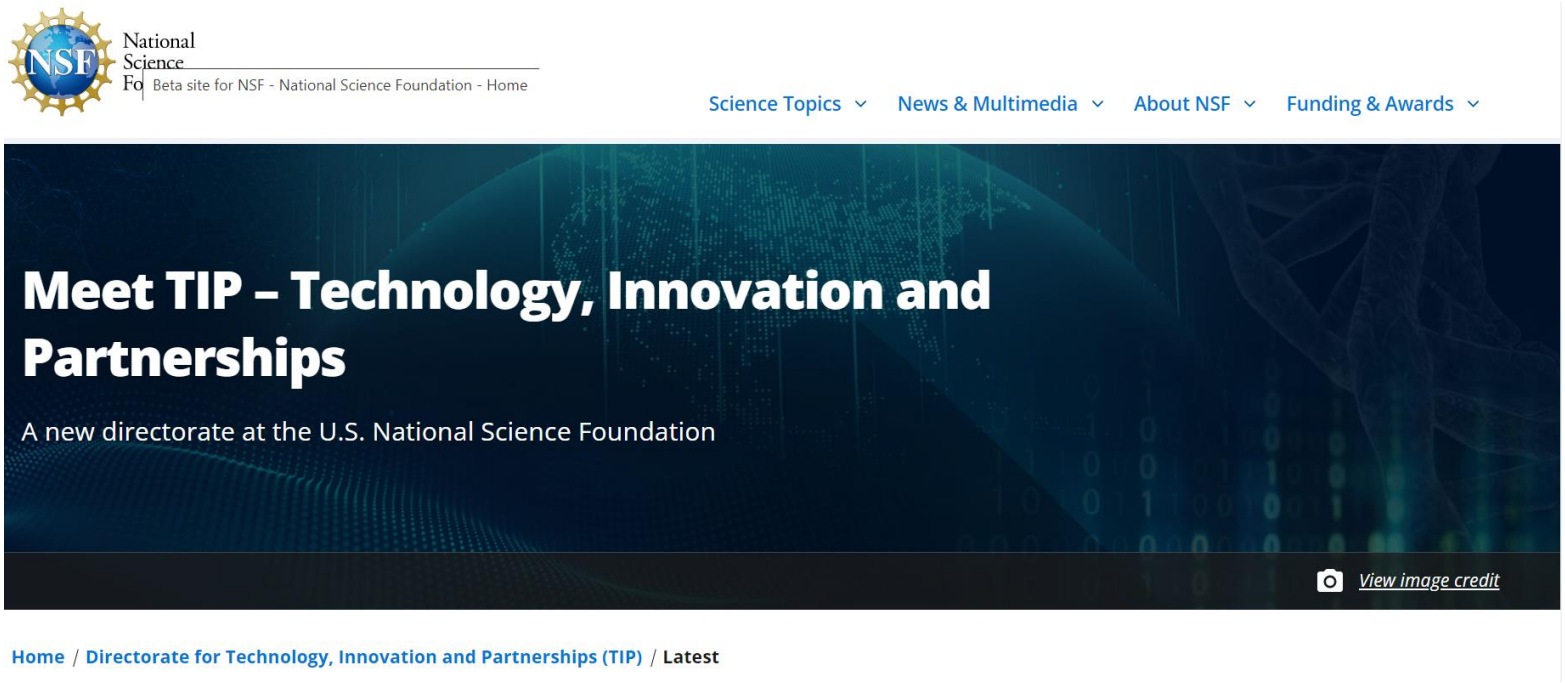
Linear-reservoir model



To what extent is impact history?

- Missions
- Open Science
- New Technology Directorate at NSF

To what extent is impact history?



To what extent is impact history?

For more than seven decades, the U.S. National Science Foundation has been at the forefront of the research, innovation and education that has transformed American lives, powered the economy, and elevated the nation's competitiveness on the global stage. NSF investments have given the world Doppler radar, bar codes, the modern internet, web browsers, magnetic resonance imaging, laser eye surgery, DNA analysis and synthetic biology.

But imagine what would be possible if we could speed the development and deployment of the next generation of these technological marvels with an eye toward addressing the foremost challenges that society and the economy face today.

Enter "**TIP**," **Technology, Innovation and Partnerships** — a new NSF directorate that creates breakthrough technologies; meets societal and economic needs; leads to new, high-wage jobs; and empowers all Americans to participate in the U.S. research and innovation enterprise. TIP is a unique opportunity that engages the nation's diverse talent in strengthening and scaling the use-inspired and translational research that will drive tomorrow's technologies and solutions.

Impact: Promises and Perils

- Institutional support for impact
  - Measurement
  - Competitive edge in funding
  - Reward system reform
- Ways for researchers to avoid impact
  - Aggregate level of measurement
  - Practicing open science
  - Just publish, baby!

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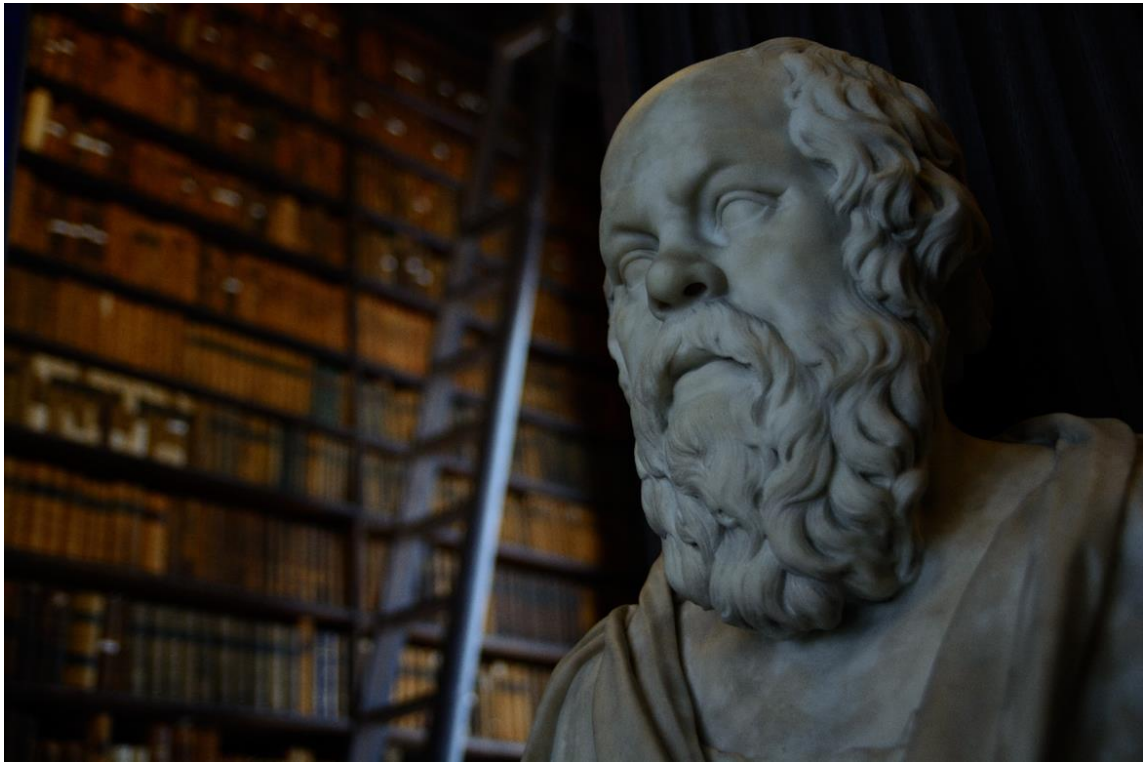
Impact: Promises and Perils



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