How open science practices increase the public value and legitimacy of scientific research

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Today’s Priorities

- GRATITUDE
- COMMUNITY
- HEALTH
Today’s Priorities

GRATITUDE  COMMUNITY  HEALTH
Thank you for your service to others.
Science as service
Science as a basis of innovation
• Why should we pay for what you do?

• Why should we trust what you do?
Open Science

1. Access to research workflows.
2. Access to research products
Access to workflows
What is the value of our work?
Decisions rely on evaluations of past actions.
evaluations
Which evaluations do people believe?
Evaluation Criteria

• CREDIBLE
  • the quality of being believable or trustworthy

• LEGITIMATE
  • in accordance with recognized or accepted standards or principles
What is the value of our work?

It is a potential source of credible and legitimate evaluations.
• Richard Feynman (1974 – Caltech Commencement Address)

“[Scientific integrity] corresponds to a kind of utter honesty—a kind of leaning over backwards....
“...the idea is to give all of the information to help others judge the value of your contribution; not just the information that leads to judgment in one particular direction...”

• Richard Feynman (1974 – Caltech Commencement Address)
Is the potential realized?
Today, many researchers have...

• Strong incentives to discover and publish

• **Weak** incentives to explain how the discoveries emerged.
Academic Advancement Ecosystem

- Salary
- Health Insurance
- Grants
- Offices
- Air Conditioning
- Buildings
- Scholarships
- Money for Conferences
- Money for field work

- Prestige
- Bragging rights
- “publications”
- And so much more…
Current practices threaten...

• the meaning of individual studies

• the meaning of scientific consensus
Rigor Mortis: How Sloppy Science Creates Worthless Cures, Crushes Hope, and Wastes Billions

Richard Harris
Greater Transparency Means Clarity about

- How we chose what to observe.
- How we chose to record what we observed.
- How we chose to categorize what we recorded.
- How we chose to analyze what we categorized.
- How we chose to interpret what we analyzed.
- How we could be wrong.
What is the value of our work?

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Access to products
Objective

• Can we increase the public value of research through greater availability of...
  • Publications
  • Data
  • Code
  • Related materials
Make it FAIR

- Findability
- Accessibility
- Interoperability
- Reusability
NSF Access to Products

• Public Access Repository (PAR)
  • 75k articles deposited
  • 93% available without embargo
  • Deposit rates up 230%/year for last four years.

• March ‘20 pilot: Make PAR 2.0 more responsive & easier to use.

• Dear Colleague Letter: Effective Practices for Data
  • Persistent IDs for Data
  • Machine-Readable DMPs
US Agencies are Coordinating on…

- Desired Repository Standards
- Desired Metadata Characteristics
- Desired Data Management Plan Characteristics
- Desired Attributes of Digital Identifiers
- Shared principles for data access
The Role of Informatics

Evidence and causal analysis: What works best to increase the public value of research?

Infrastructure: Can we make it easy for people to access and use?
It’s Up to Us

• Open science can help us create legitimacy and public value.

• Achieving these outcomes requires incentives and infrastructure.
Thank you for your service to science & society.

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