Improving Openness and Reproducibility of Scientific Research

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Believe it or not: how much can we rely on published data on potential drug targets?

Florian Prinz, Thomas Schlange and Khusru Asadullah

Many landmark findings in preclinical oncology research are not reproducible, in part because of inadequate cell lines and animal models.

Raise standards for preclinical cancer research

C. **Glenn Begley** and **Lee M. Ellis** propose how methods, publications and incentives must change if patients are to benefit.

New Problems?

Low power

Overabundance of positive results

Ignoring null results

Questionable research practices

Lack of replication

Limitations of NHST

Sterling, 1959; Cohen, 1962; Lykken, 1968; Tukey, 1969; Greenwald, 1975; Meehl, 1978; Rosenthal, 1979

New Solutions?

Transparency

Confirmatory v. Exploratory

Replication

Sterling, 1959; Cohen, 1962; Lykken, 1968; Tukey, 1969; Greenwald, 1975; Meehl, 1978; Rosenthal, 1979

Incentives for individual success are focused on getting it published, not getting it right

Challenges

1. Perceived norms (Anderson, Martinson, & DeVries, 2007)

Norms

Communality

Open sharing

Counternorms

Secrecy

Closed

Norms

Communality

Open sharing

Universalism

Evaluate research on own merit

Counternorms

Secrecy

Closed

Particularlism

Evaluate research by reputation

Norms	Counternorms
Communality	**Secrecy**
Open sharing	Closed
Universalism	**Particularlism**
Evaluate research on own merit	Evaluate research by reputation
Disinterestedness	**Self-interestedness**
Motivated by knowledge and discovery	Treat science as a competition

Norms	Counternorms
Communality Open sharing	**Secrecy** Closed
Universalism Evaluate research on own merit	**Particularlism** Evaluate research by reputation
Disinterestedness Motivated by knowledge and discovery	**Self-interestedness** Treat science as a competition
Organized skepticism Consider all new evidence, even against one's prior work	**Organized dogmatism** Invest career promoting one's own theories, findings

Norms	Counternorms
Communality	**Secrecy**
Open sharing	Closed
Universalism	**Particularlism**
Evaluate research on own merit	Evaluate research by reputation
Disinterestedness	**Self-interestedness**
Motivated by knowledge and discovery	Treat science as a competition
Organized skepticism	**Organized dogmatism**
Consider all new evidence, even against one's prior work	Invest career promoting one's own theories, findings
Quality	**Quantity**

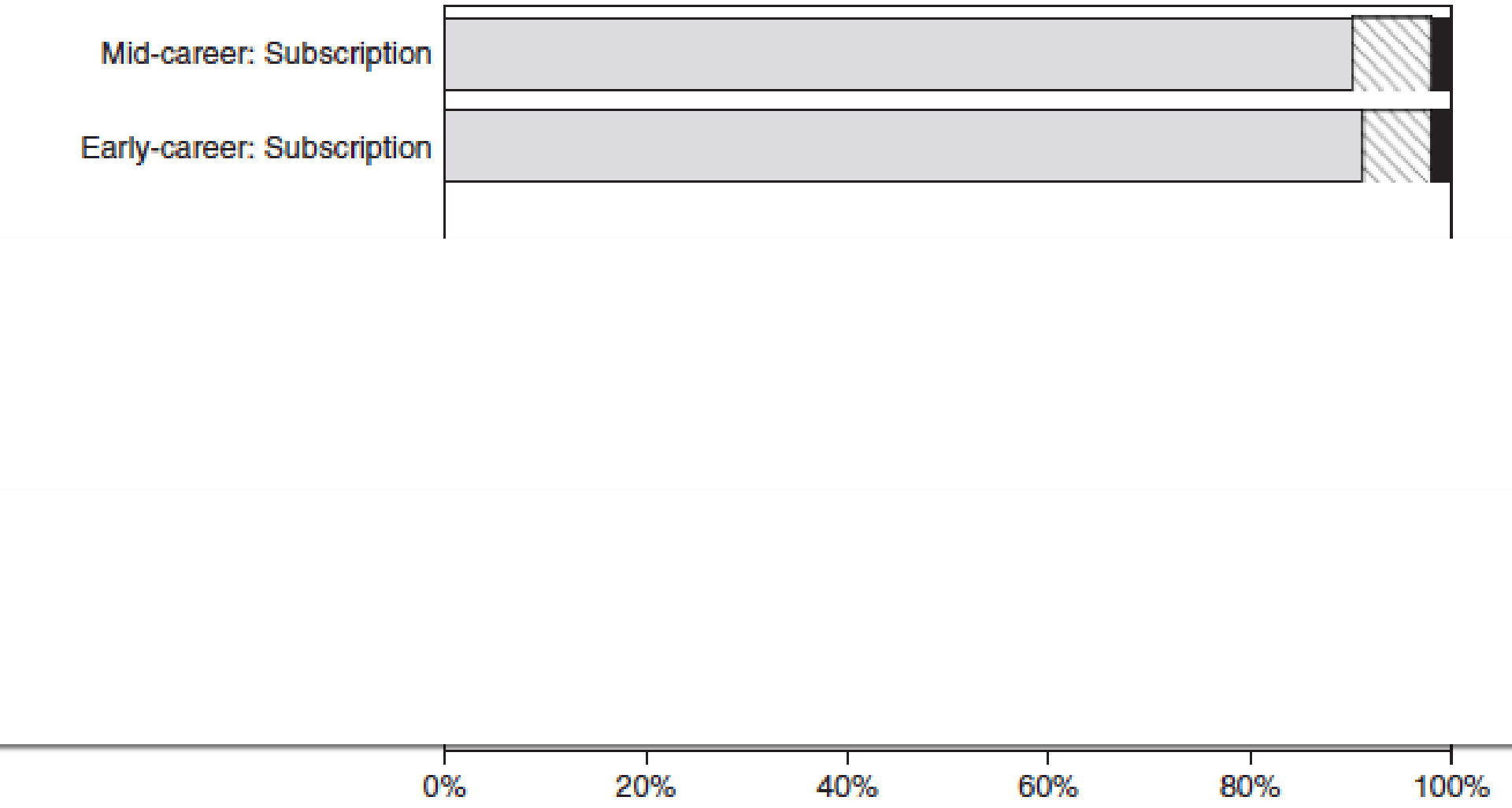
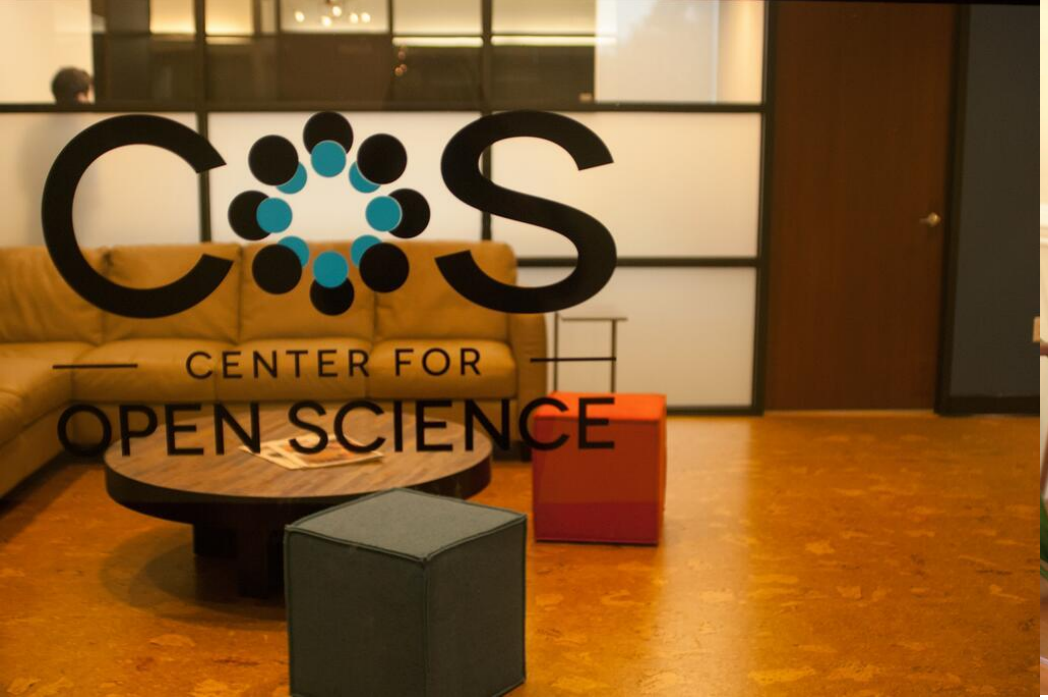


FIG. 3. Norm versus Counternorm Scores: Percent with Norm > Counternorm (dotted), Norm = Counternorm (striped), Norm < Counternorm (solid).

Anderson, Martinson, & DeVries, 2007



Infrastructure

Community

Metascience

Mission: Improve openness, integrity, and reproducibility of scientific research

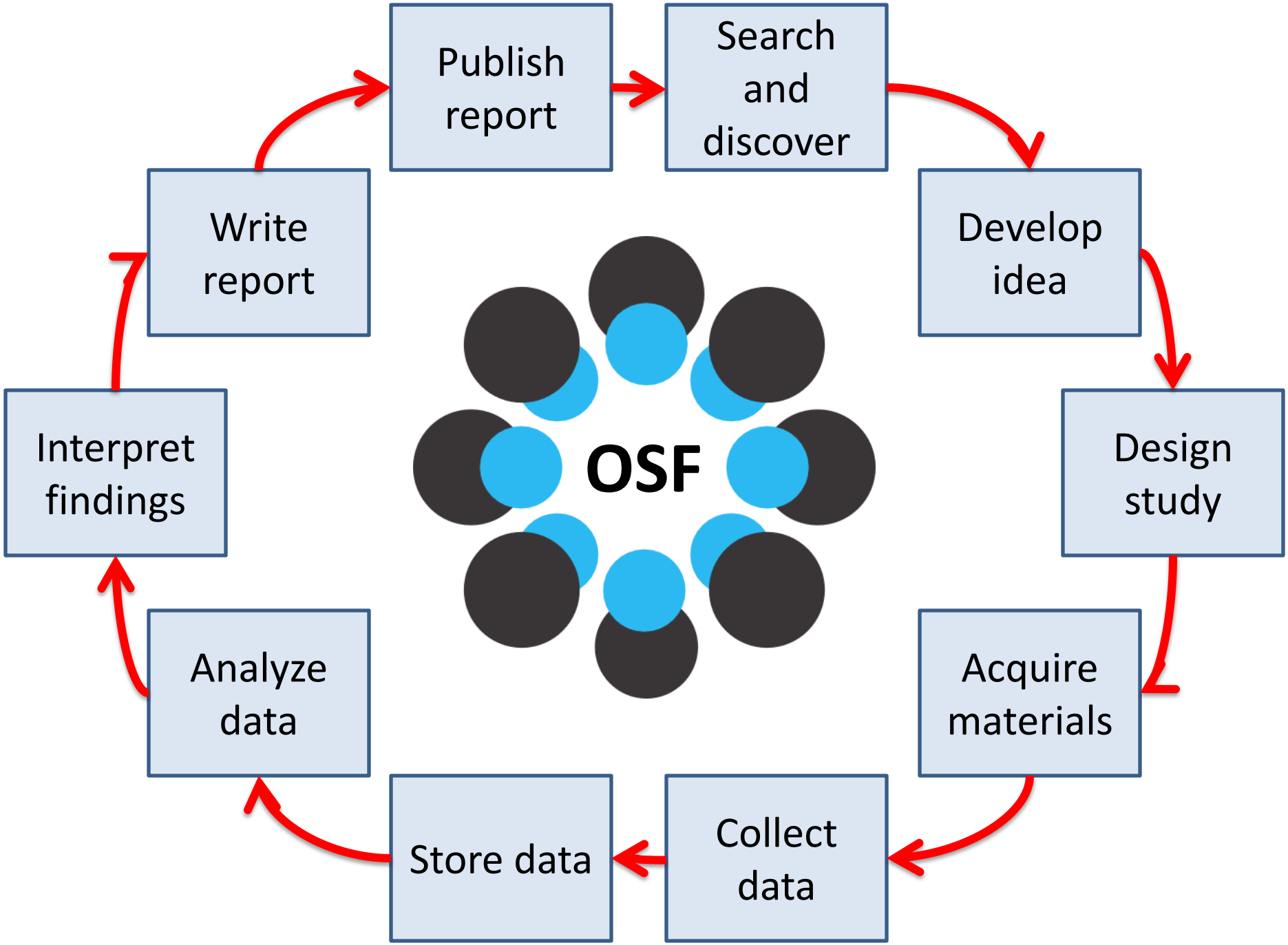
Challenges

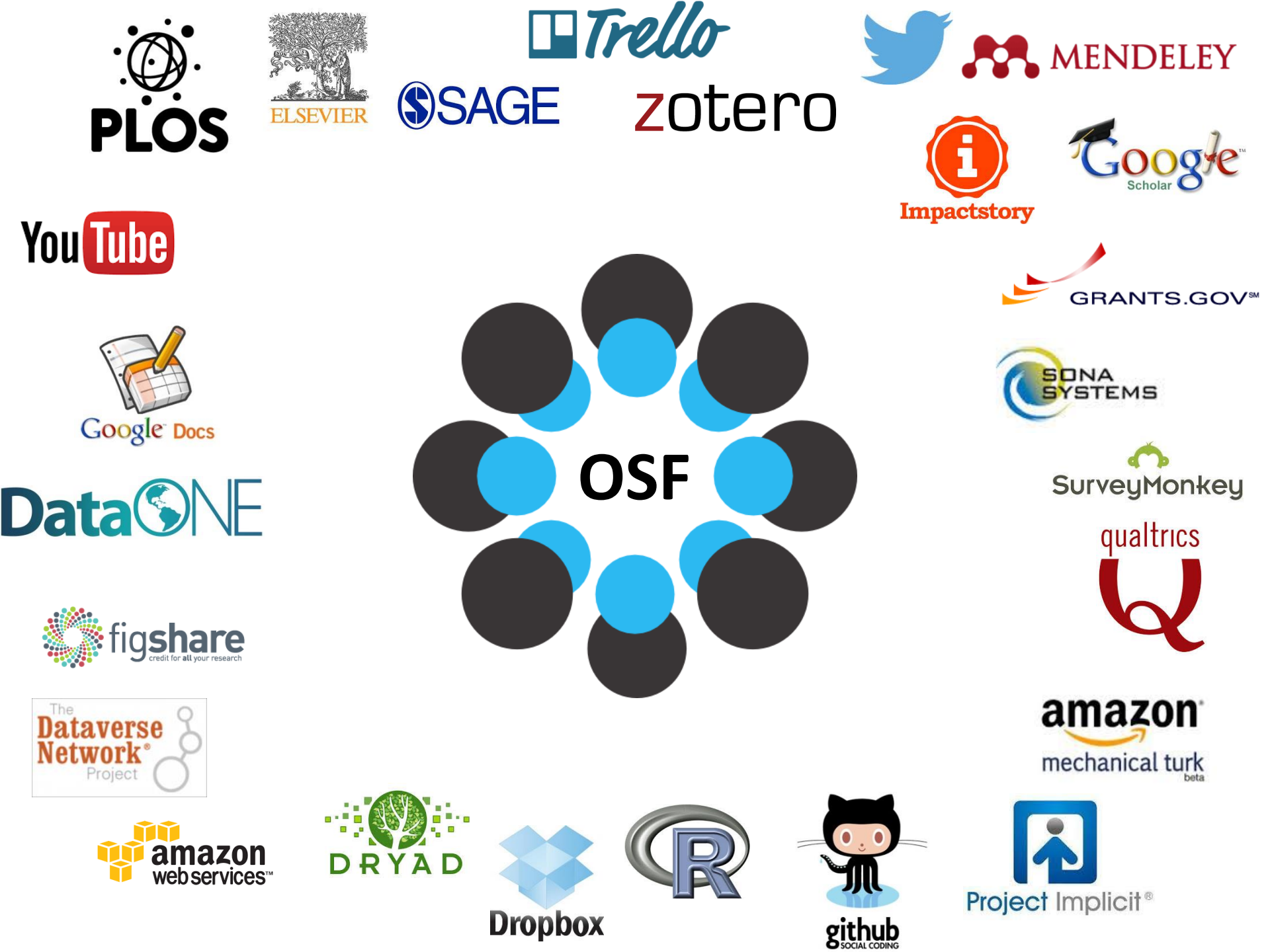
1. Perceived norms (Anderson, Martinson, & DeVries, 2007)
2. Motivated reasoning (Kunda, 1990)
3. Minimal accountability (Lerner & Tetlock, 1999)
4. I am busy (Me & You, 2014)

Technology to *enable* change

Training to *enact* change

Incentives to *embrace* change


Publish report
Search and discover
Develop idea
Design study
Acquire materials
Collect data
Store data
Analyze data
Interpret findings
Write report
OSF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The Dataverse Network Project
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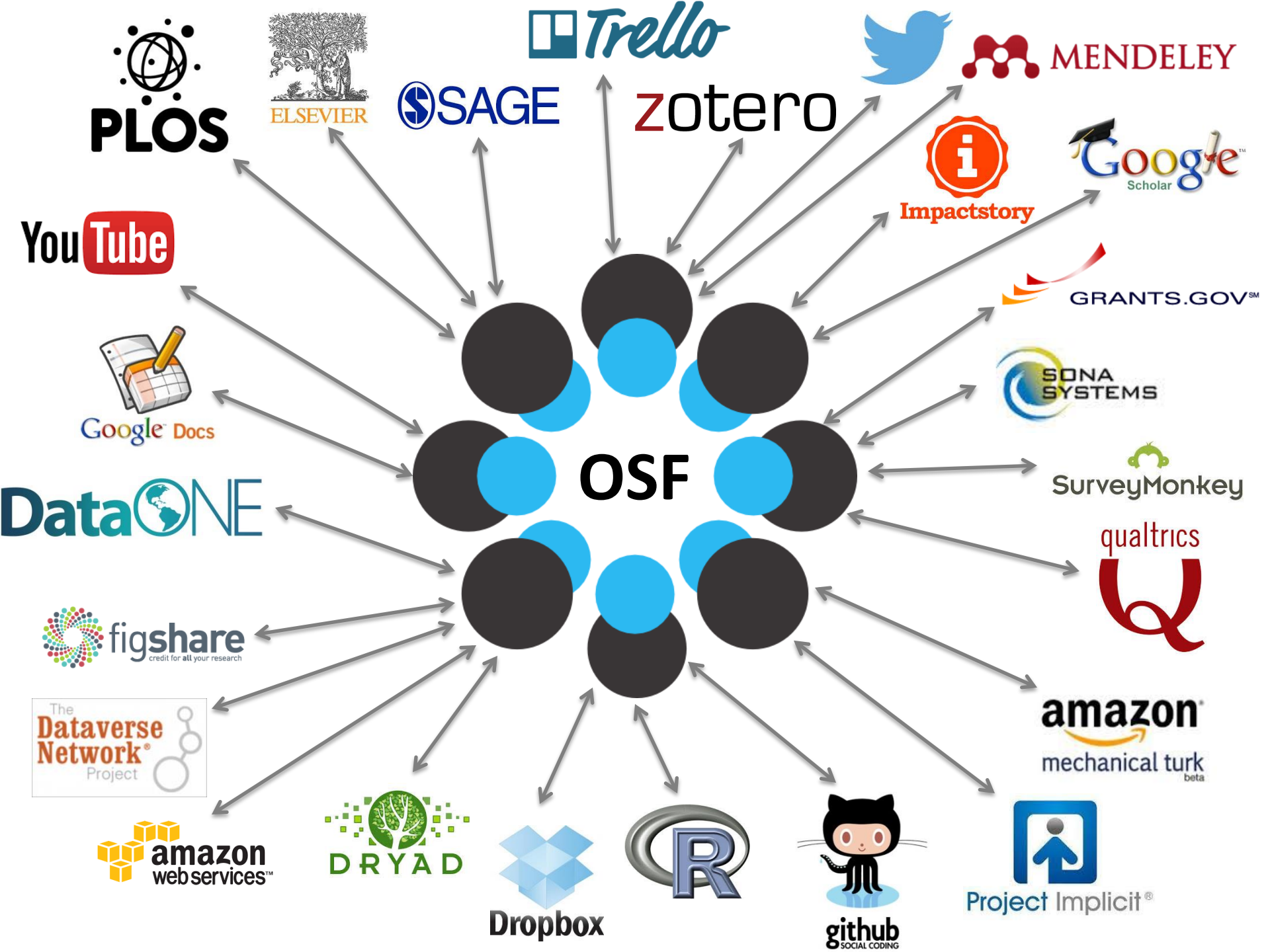
github SOCIAL CODING
Project Implicit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SurveyMonkey
qualtrics
figshare
credit for all your research
The Dataverse Network Project
amazon mechanical turk beta
amazon web services
DRYAD
Dropbox
github SOCIAL CODING
Project Implicit

Training

Tools & Computation (e.g., Github, R)

Methods & Stats (e.g., power analysis, meta-analysis)

Workflow (e.g., OSF, pre-registration)

Free!

Stats-consulting@cos.io

http://cos.io/stat_consulting

Making Behaviors Visible Promotes Adoption

Open Data
Open Materials
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2014 APS Convention

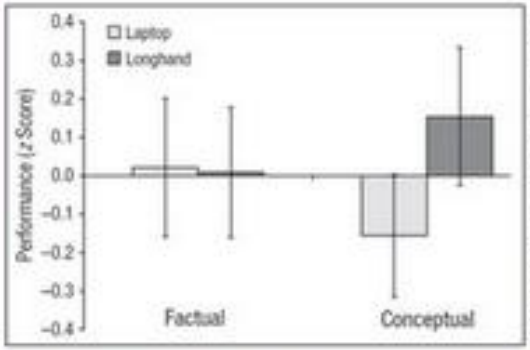
This Week in *Psychological Science* (TWiPS)

The links below take you to the journal via the APS website. If not already logged in, you will be redirected to log-in using your last name **(Nosek)** and Member ID **(16341)**.

Call for Editor Nominations
Psychological Science in the Public Interest

The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking

Pam A. Mueller and Daniel M. Oppenheimer



It's becoming more and more common for students to type their notes on laptops rather than writing them out in longhand. In the first of several studies, the authors examined the effects of laptop note taking by having participants take notes on a TED talk using a laptop computer or a notepad. Thirty minutes later, the participants answered factual-recall and conceptual-application questions about the lecture. Those who took notes on laptops performed worse on conceptual-application questions -- but not on factual-recall questions. Follow-up studies indicated that although people with laptops take more notes, they tend to copy the information verbatim and therefore process the information less than do longhand note takers.

Gratitude: A Tool for Reducing Economic Impatience

David DeSteno, Ye Li, Leah Dickens, and Jennifer S. Lerner

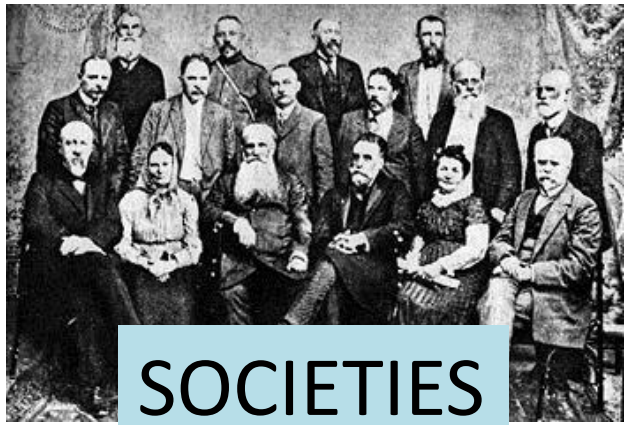
It is well-known that people are generally impatient and prefer immediate rewards to future rewards. To examine whether certain emotions could reduce people's economic impatience, researchers asked participants to recall events that made them feel

UNIVERSITIES

PUBLISHING

ecosystem

FUNDERS



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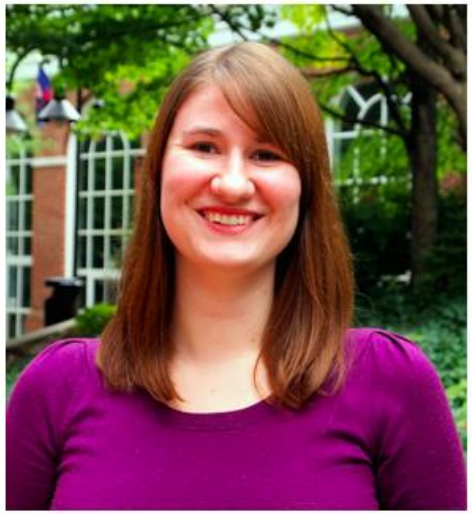

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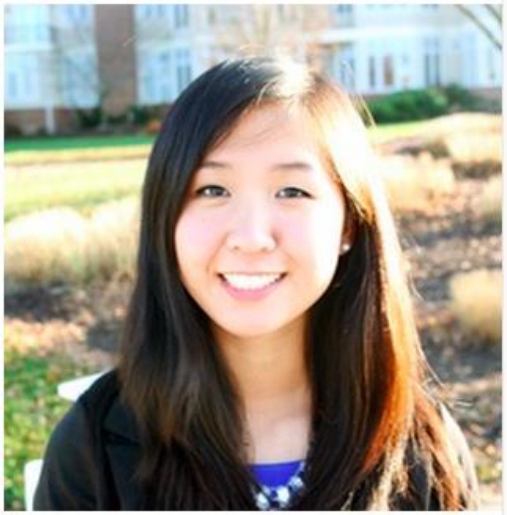

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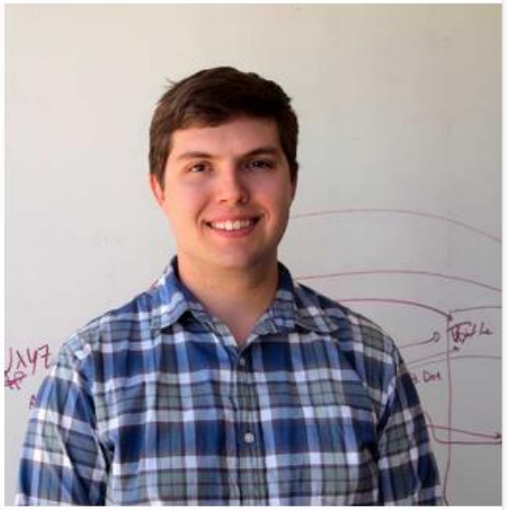

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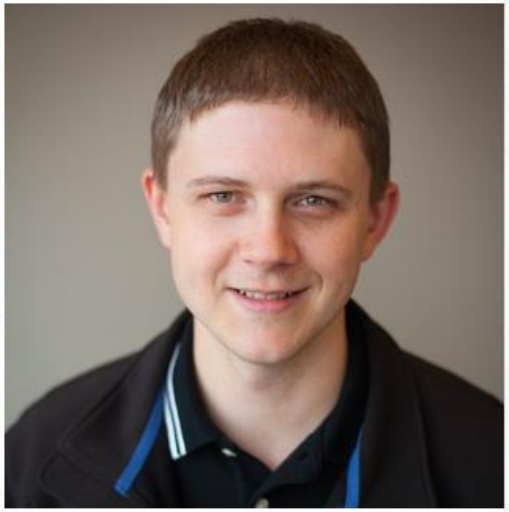

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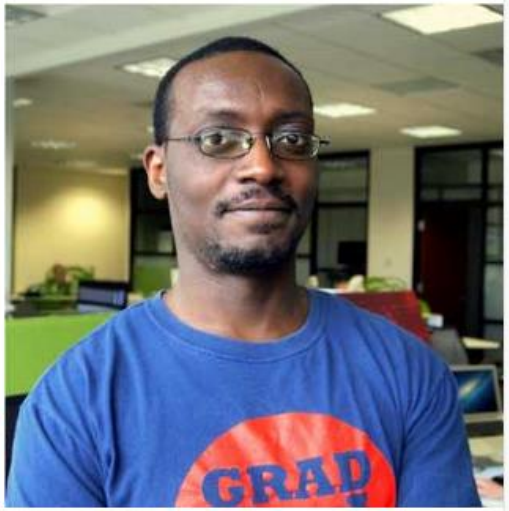

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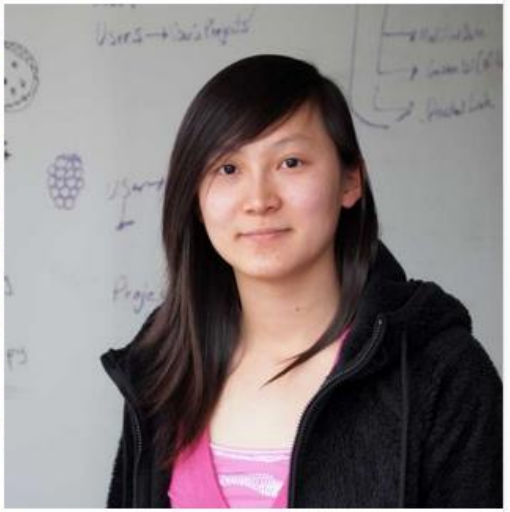

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