Teaching Reproducible Research in the Classroom

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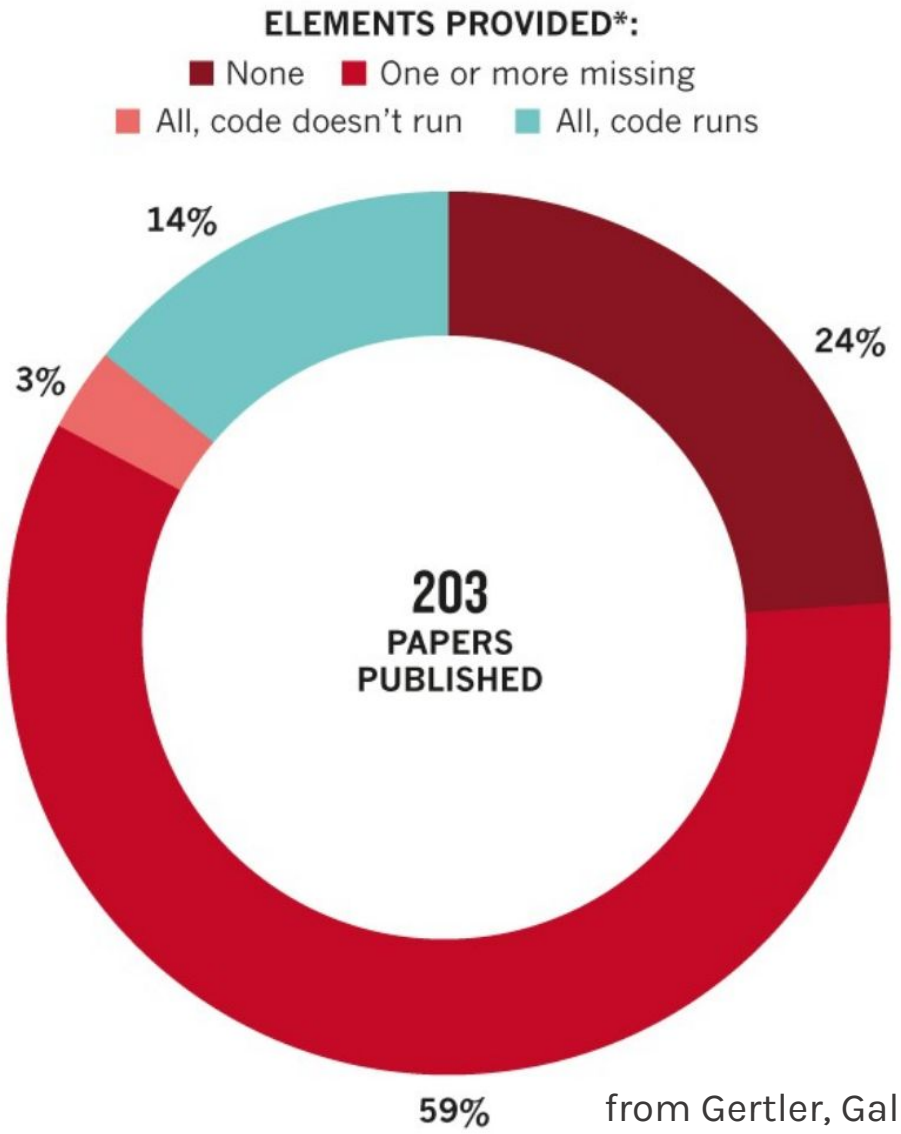
Problems with reproducibility and replication in Economics research

(fraction of studies that reproduce/replicate)

Replication in Social Sciences (same method, different sample)	Reproduction in Economics (same data and methods)
OSC (2015): 30%-60%	Chang & Li (2015): 43%
Camerer et. al. (2016): ~60%	Gertler et. al. (2017): 14%
Nosek & Camerer et. al. (2018): ~60%	Kingi et. al. (2018): 43%
Klein et. al. (2018): 50%	Wood et. al. (2018): 25%

Why don’t findings reproduce?



from Gertler, Galiani, and Romero (2019)

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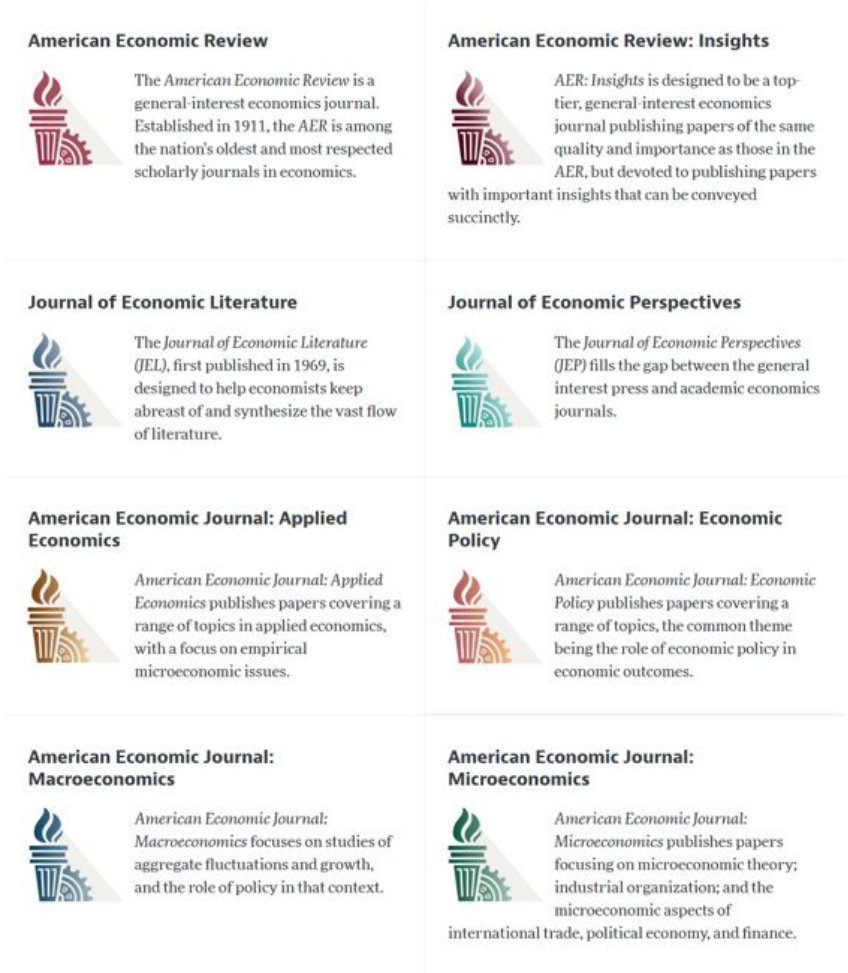
The American Economic Association



American Economic Review

The *American Economic Review* is a general-interest economics journal. Established in 1911, the *AER* is among the nation's oldest and most respected scholarly journals in economics.

American Economic Review: Insights

AER: Insights is designed to be a top-tier, general-interest economics journal publishing papers of the same quality and importance as those in the *AER*, but devoted to publishing papers with important insights that can be conveyed succinctly.

Journal of Economic Literature

The *Journal of Economic Literature (JEL)*, first published in 1969, is designed to help economists keep abreast of and synthesize the vast flow of literature.

Journal of Economic Perspectives

The *Journal of Economic Perspectives (JEP)* fills the gap between the general interest press and academic economics journals.

American Economic Journal: Applied Economics

American Economic Journal: Applied Economics publishes papers covering a range of topics in applied economics, with a focus on empirical microeconomic issues.

American Economic Journal: Economic Policy

American Economic Journal: Economic Policy publishes papers covering a range of topics, the common theme being the role of economic policy in economic outcomes.

American Economic Journal: Macroeconomics

American Economic Journal: Macroeconomics focuses on studies of aggregate fluctuations and growth, and the role of policy in that context.

American Economic Journal: Microeconomics

American Economic Journal: Microeconomics publishes papers focusing on microeconomic theory; industrial organization; and the microeconomic aspects of international trade, political economy, and finance.

Data and Code Availability Policy (2019)

- It is the policy of the American Economic Association to publish papers only if the data used in the analysis are **clearly and precisely** documented and **access to the data and code is clearly and precisely documented and is non-exclusive to the authors.**
- Authors of accepted papers that contain empirical work, simulations, or experimental work must **provide**, **prior to acceptance**, the data, programs, and other details of the computations **sufficient to permit replication**, as well as **information about access to data and programs.**

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Ongoing efforts at the AEA

- **Pre-emptively improve code archives by**
  - Conducting reproducibility checks when we can, or working with groups that do this when we can't
- **Better archives**
  - Greater transparency of the code and data archives
- **Better provenance tracking**
  - Leave code where it is when appropriate
  - Leave data where it is almost always
  - Display that information

Continuing challenges: Researchers are not trained to document provenance well, or to deposit data and code.

The American Economic Association

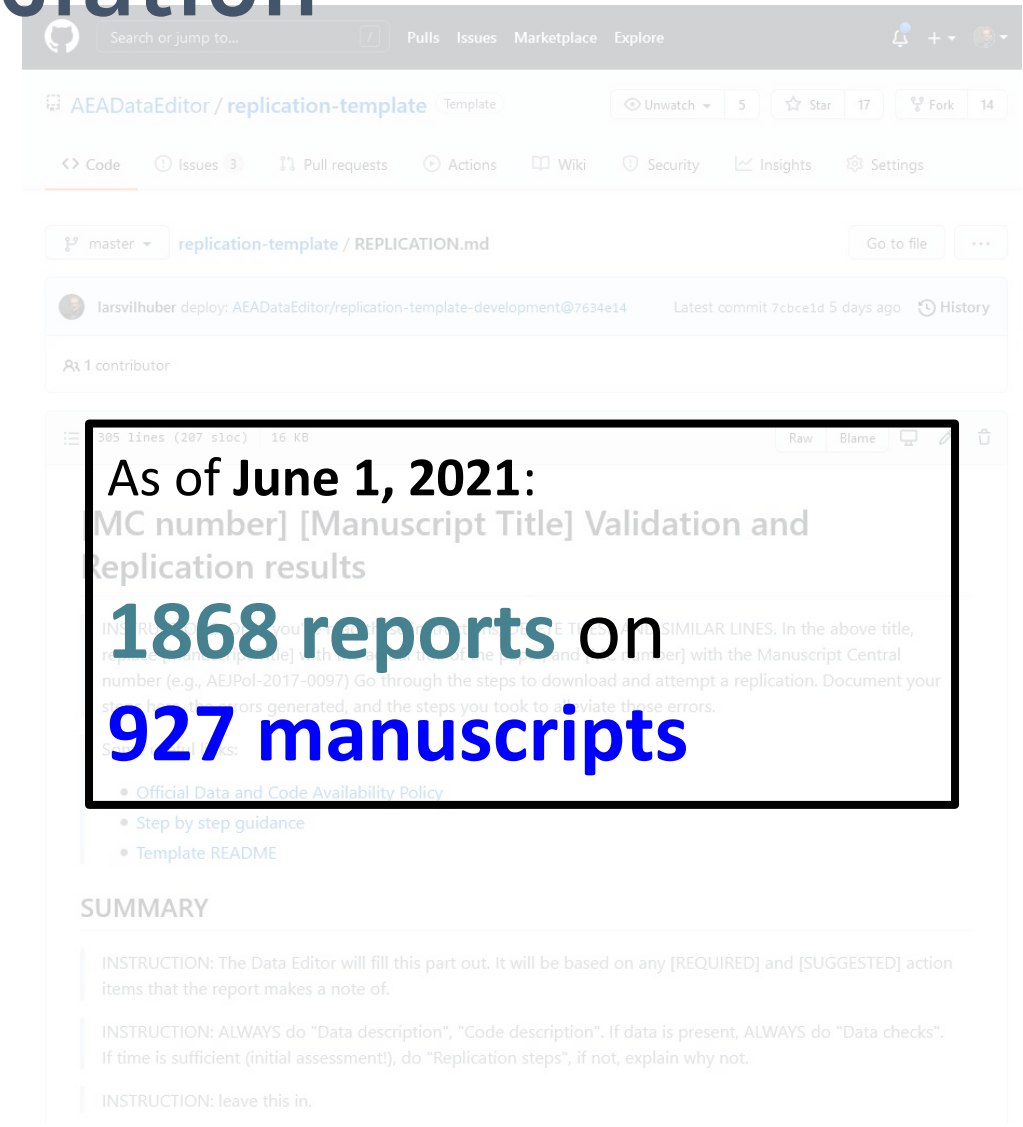
•Assistant: Michael Darisse

•Current lead graduate student: **Harry Song** (since Aug 2020)

•Current and past **undergraduate students**: Alexia Ge, Anthony Peraza, Craig Schulman, Elijah B. Ruiz, Gabriel Bond, Jason S. Katz, Jeong Hyun Lee, Jiayin Song, John Park, Joshua Passel, Kirubeal T. Wondimu, Linchen Zhang, Louis Liu, Luis Lopez Cabrera, Luke O'Leary, Mary-Jo Ajiduah, Naomi Li, Nicholas Swan, Nishat Peuly, Ryan Ali, Samuel Frey, Siyang (Elaine) Yu, Steve Yeh, Weilun Shi, William Hernandez, Yanyun (Iris) Chen, Yuan-Hsuan (Sharon) Lin, Zebang Xu, Xing Su, Jiazhen Tan , Xueshi Su, Vendela Norman, Anderson Park, Nehedin Juarez, Rubal Mistry, Syon Verma, William Silverman, Zechariah Karsana, Franklin Omullo, Liam P. Cushen, Ololade Omotoba, Lydia Reiner, Xiangru Li, Melanie Chen, Peter Rafael Sanchez, Jill Crosby, Matthew H. Wang, Daniella Pena, Julia Zimmerman, Kate Hofer, Tarangana Thapa

•Former graduate students: **David Wasser, Meredith Welch,** Aviv Caspi, Leah Kim

•Earlier reproducibility work: **Flavio Stanchi** (now at AirBnb), **Sylverie Herbert** (Banque de France), **Hautahi Kingi** (Impaq)



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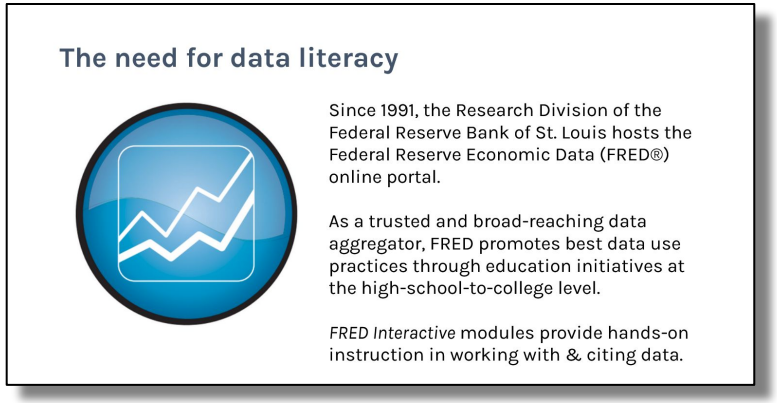

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The need for data literacy

Since 1991, the Research Division of the Federal Reserve Bank of St. Louis hosts the Federal Reserve Economic Data (FRED®) online portal.

As a trusted and broad-reaching data aggregator, FRED promotes best data use practices through education initiatives at the high-school-to-college level.

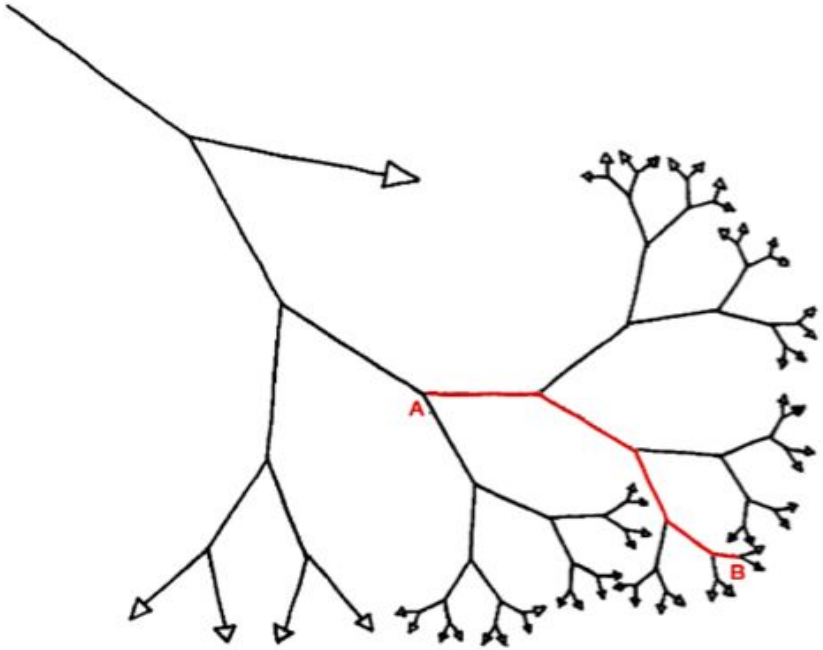
FRED Interactive modules provide hands-on instruction in working with & citing data.

What is “scholarship?”

“An article about computational results is advertising, not scholarship. The actual scholarship is the full software environment, code and data, that produced the result.”

– Buckheit and Donoho (1995) paraphrasing Claerbout and Karrenbach (1992)

- Accelerating understanding
- Supporting learning
- Improving inclusion and participation



^^ From Jorge Luis Borges’s “El jardín de senderos que se bifurcan”

The **Berkeley Initiative for Transparency in the Social Sciences** (BITSS) promotes ethical, transparent and reproducible research practices to improve the integrity of science and inspire better public policy.

Generate evidence
Increase access to open science education
Strengthen the scientific ecosystem

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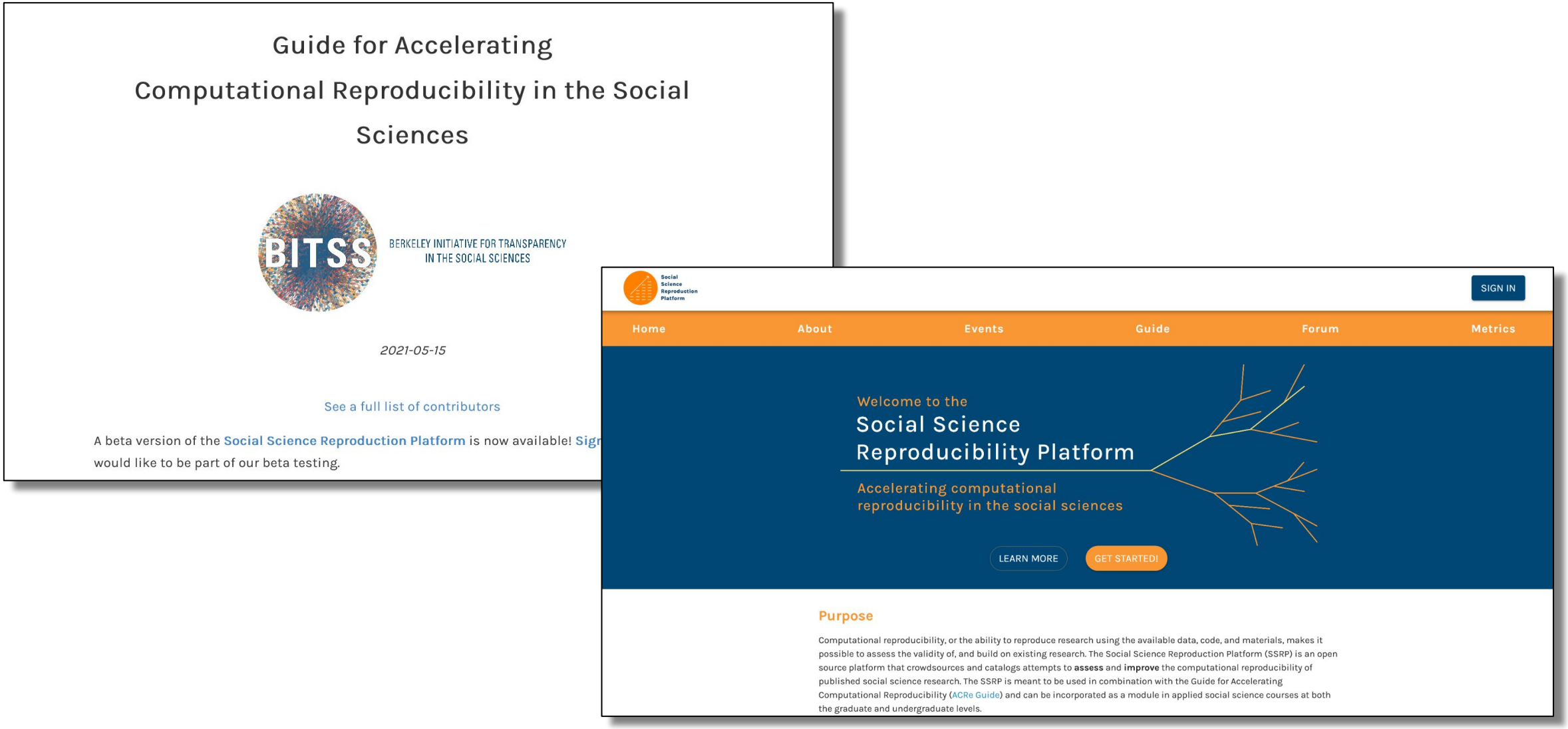

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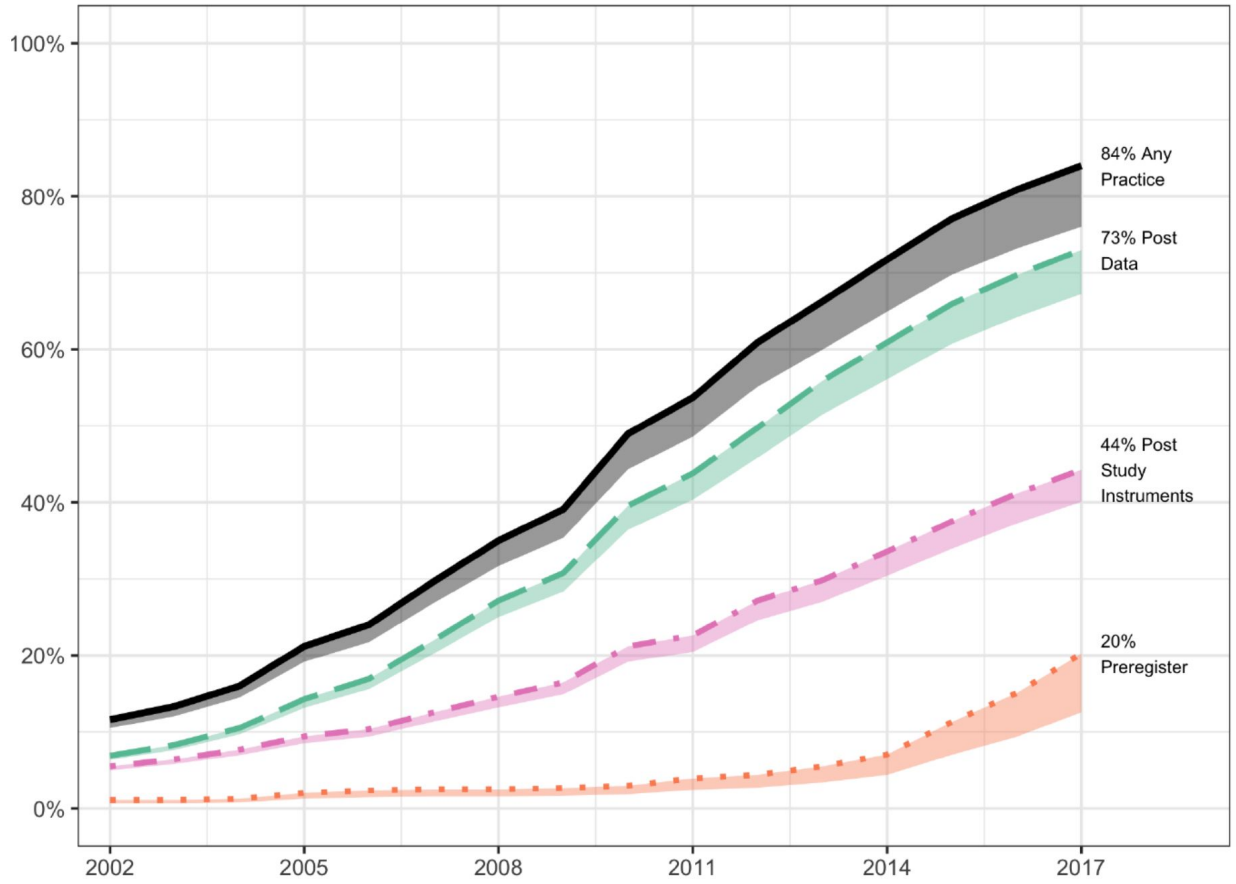
The rest of this workshop

- **Building skills for reproducibility: FRED Interactives on Data Literacy**
  Diego Mendez-Carbajo, Federal Reserve Bank of St. Louis (40 min.)
- ***Break*** (5 min.)
- **How to Teach Reproducibility in Classwork**
  Fernando Hoces de la Guardia, BITSS (40 min.)
- **Open Discussion, where to go from here** (20-25 min.)

^^ from Christensen, et al. (2019)

The need for reproducibility education



^^ from Christensen, et al. (2019)

- Norms and perspectives are changing, but uptake of transparency and reproducibility practices is slow among the majority of social scientists.
- Trainings are becoming more common, but participants often self-select into them.
- Who is left out?