2018

Mini Symposium on Reproducibility

The problem and potential solutions

Hosted by:
The Harvard GSAS Science Policy Group
with Support from Addgene,
the nonprofit plasmid repository
May 2018

2018 Minisymposium on Reproducibility

Program Overview

Opportunities in Reproducibility

Even though research is advancing at a rapid pace, there are still many opportunities for innovation within the research process itself. In particular, PIs, funders, publishers, and companies are actively working to make research results more reproducible and robust. These stakeholders have developed creative tools and techniques to enhance the quality of the research enterprise, including best lab practices, electronic notebooks, reagent sharing and storage in repositories, public sharing of code, new reagent development, and much more. Today we will discuss the landscape of reproducible research from these diverse perspectives, highlighting the new tools and techniques available to improve reproducibility.

In this booklet you'll find introductions to organizations working to promote reproducibility. We hope you use what you learn today to start conversations in your own lab and gain the tools you need to make your research robust, replicable, and ultimately, impactful.

Program

3:10 - 3:30
Reproducibility Overview - Jeffrey S. Flier, Researcher at Harvard Medical School, former dean of Harvard Medical School

3:35 - 3:55
Reagent Sharing - Susanna Bachle, Addgene the nonprofit plasmid repository

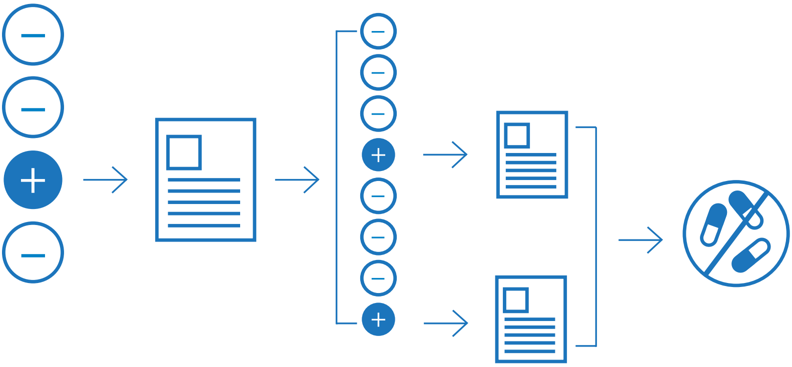
4:00 - 4:20
Reagent Development - Steven C. Almo, Institute for Protein Innovation

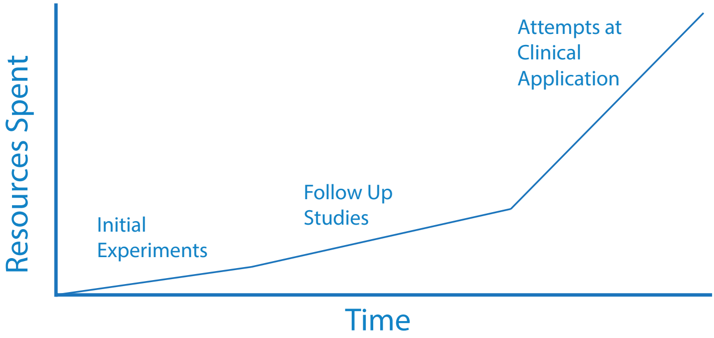
4:25 - 4:55
Panel

5:00 - 6:00
The Harvard GSAS Science Policy Group Invites you to a networking beer hour in the same room as the minisymposium

Program Overview

The Workflow of Irreproducible Results





As shown above, even with good research practices, the drive toward "positive" results can lead to the publication of less robust research. Although attempts to publish further work based on this data will be largely unsuccessful, further work can lead to rare additional "positive" results and publications. This faulty foundation may lead companies to pursue commercial avenues (such as drug development) that are destined to fail. The resources spent attempting to repeat and apply irreproducible results are ultimately wasted. At this minisymposium, we'll discuss ways you can make your work more reproducible and robust, providing a strong foundation of data for future discovery.

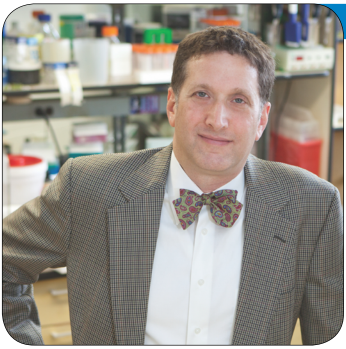
Speakers

Jeffrey S. Flier

Jeffrey S. Flier was previously Dean of the Faculty of Medicine at Harvard University and is a renowned obesity and diabetes researcher.

Susanna Bachle

Susanna Bachle is an Outreach Scientist at Addgene, the nonprofit plasmid repository.



Steven C. Almo

Steven C. Almo is President of the Institute for Protein Innovation, Professor and Chair of the Department of Biochemistry and Professor of Physiology & Biophysics at Albert Einstein College of Medicine.

Alex Tucker

Alex Tucker is a Program Lead at Ginkgo Bioworks Inc.

Pamela J. Hines

Pamela J. Hines is a Senior Editor at Science magazine, published by the American Association for the Advancement of Science.

Edward J. Hall

Edward J. Hall is the Norman E. Vuilleumier Professor of Philosophy at Harvard University working on many topics surrounding the philosophy of science.

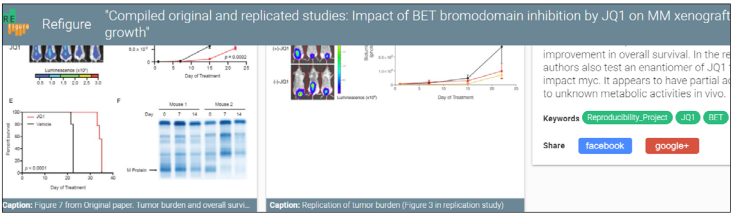
Tony Cijsouw

Tony Cijsouw is a neuroscience postdoc at Tufts University, and a 'concerned scientist' regarding science reproducibility.

Program Supporters

Have you tried to replicate a published experiment? Do you know of studies that test the same hypothesis? REFIGURE reveals this knowledge to improve science reproducibility. ReFigure is a 1-click tool that enables researchers to save and connect figures of interest as editable metapublications on ReFigure.org.

You can embed your unpublished replication experiments next to published literature to make your work discoverable. Save time, get credit and make sure that each experiment you read, or conduct makes an impact. ReFigure beta development was supported by eLife Sciences. Download ReFigure extension: https://chrome.google.com/webstore/search/refigure to get started.



"Compiled original and replicated studies: Impact of BET bromodomain inhibition by JQ1 on MM xenograft growth"

improvement in overall survival. In the re
authors also test an enantiomer of JQ1
impact myc. It appears to have partial a
to unknown metabolic activities in vivo.

Keywords Reproducibility_Project JQ1 BET

Share facebook google+

Caption: Figure 7 from Original paper. Tumor burden and overall survi...

Caption: Replication of tumor burden (Figure 3 in replication study)

Code Ocean is a cloud-based computational reproducibility platform that provides researchers an easy way to share, discover, and run code published in academic journals and conferences.

Researchers and scientists can link executable code and data to articles published in academic journals and conference proceedings while retaining copyright. Code Ocean assigns Digital Object Identifiers (DOIs) to support citable attribution and partners with publishers to add working code to the research outputs readily available from research articles. Code Ocean was founded in 2015 with the goal of saving researchers time and advancing science by making scientific code more reusable and reproducible.

The International Cell Line Authentication Committee (ICLAC) is a voluntary scientific committee that aims to make cell line misidentification more visible and promote awareness and authentication testing as effective ways to combat the problem.

A misidentified cell line no longer corresponds to the individual from whom it was first established. Instead, it incorrectly corresponds to a cell line from a different individual. More than 400 misidentified cell lines are known and many continue to be used. Misidentified cell lines can be detected by authentication, using a genotype-based test method such as short tandem repeat (STR) profiling.

International Cell Line Authentication Committee

To reduce the impact of misidentified cell lines:

1. Check our register of misidentified cell lines before you start work
http;//iclac.org/database/cross-contaminations/
2. Incorporate authentication testing into everyday cell culture practice
http://iclac.org/resources/advice-scientists/
3. Report testing as an essential part of publications and grant applications
http://iclac.org/resources/cell-line-checklist/

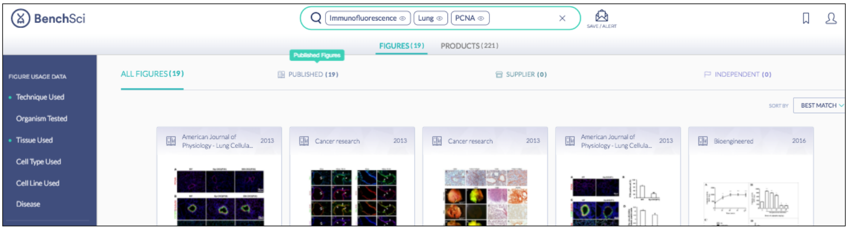
Figshare is a web-based platform to help researchers and academic institutions manage, disseminate and measure the public attention of all their research outputs. The light-touch and user-friendly approach focuses on four key areas: research data management, reporting and statistics, research data dissemination, and administrative control. Figshare works with researchers in North America and internationally to help them meet key funder recommendations and to provide world-leading tools to support an open culture of data sharing and collaboration. For more information, please visit http://figshare.com and follow @figshare on Twitter.

Program Supporters

BenchSci

BenchSci is a free online platform designed to help scientists find antibodies from publications. Our machine-learning algorithm was trained by PhD-level scientists to identify and understand the usage of commercial antibodies in the research literature.

When searching for a specific protein target, BenchSci curates published data in the form of figures to simplify the literature search process. The figures can then be filtered by specific experimental contexts cited in the paper such as techniques, tissue, cell lines, and more, to help users pinpoint antibodies that have been published under experimental conditions matching their study interest.



bio-protocol

In 2011 a group of Stanford scientists formed Bio-protocol to improve the rigor and reproducibility of life science research. Bio-protocols are peer-reviewed, step-by-step methods that have been experimentally validated in a published research report and are written with enough detail for the reader to reproduce the result(s). Our articles utilize the flexibility of an online platform not only to include complex visuals (e.g. videos) but also to foster direct communication between scientists. We encourage readers to post their feedback and start a dialog with authors. Bio-protocol is a free resource - no publishing fee, no access fee.

protocols.io

Protocols.io is an open access online platform developed for sharing, discovering, and discussing research methods. It allows scientists to describe the details of protocols upon publication of results and provides a way to correct and optimize these protocols in a collaborative fashion after the paper is published. Similarly to GitHub for software developers, protocols.io supports versioning, forking, and discussion of public and privately-shared protocols.

Making science
more reproducible

OPEN SCIENCE FRAMEWORK

OSF is a free and open source web application built by the Center for Open Science, a non-profit dedicated to improving the alignment between scientific values and scientific practices. OSF is part collaboration tool, part version control software, and part data archive. It is designed to connect to popular tools researchers already use, like Dropbox, Box, Github, and Mendeley, to streamline workflows and increase efficiency.

Program Supporters

SCINOTE
ELECTRONIC LAB NOTEBOOK

Researchers can use the sciNote electronic lab notebook for record-keeping as well as project, data, and inventory management. Besides enabling researchers to organize all their data in one place, the sciNote electronic lab notebook supports team collaboration on projects and two of its key features are the ability to automatically generate reports and the ability to create experiment work flows. These functionalities give sciNote users deep insights into the details of their experiments for future sharing or troubleshooting. sciNote user data is organized, searchable, and accessible through just a couple of a clicks. Additionally sciNote uses strong security protocols to ensure that user data is safe and secure. To start with sciNote, visit https://scinote.net.

Future of Research

Future of Research wants to champion, engage and empower early career scientists with evidence-based resources to improve the scientific research endeavor.

DRYAD

The Dryad Digital Repository (https://datadryad.org) is a curated resource that makes the data underlying scientific and medical publications discoverable, freely reusable, and citable.

addgene

The nonprofit plasmid repository

Addgene is a nonprofit plasmid repository whose mission is to accelerate research and discovery by improving access to useful research materials and information. Addgene currently distributes plasmids and ready-to-use viral preps to academic and nonprofit researchers.

ASAPbio

ASAPbio is a biologist-driven nonprofit working to promote transparency and innovation in life sciences communication, specifically through the productive use of preprints.

Many thanks to the following organizations for their monetary contributions to this event

Figshare

BenchSci

Bio-protocol

The Harvard
GSAS Science
Policy Group

Finally we'd like to thank
Stephanie Guerra, Kayla Davis,
and Tyler Ford for the time and
effort they've put into organizing
and coordinating this event.

Hosted by the Harvard GSAS Science Policy Group with Support from Addgene.