Lessons learned from teaching a hands-on *Publish My Protocol* course

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Why do we need a culture of open methods sharing?

We can't reproduce findings if we don't know what was done

There are large communities for open data and open code, but open methods have attracted very little attention

Researchers may be more likely to reuse or adapt methods than data
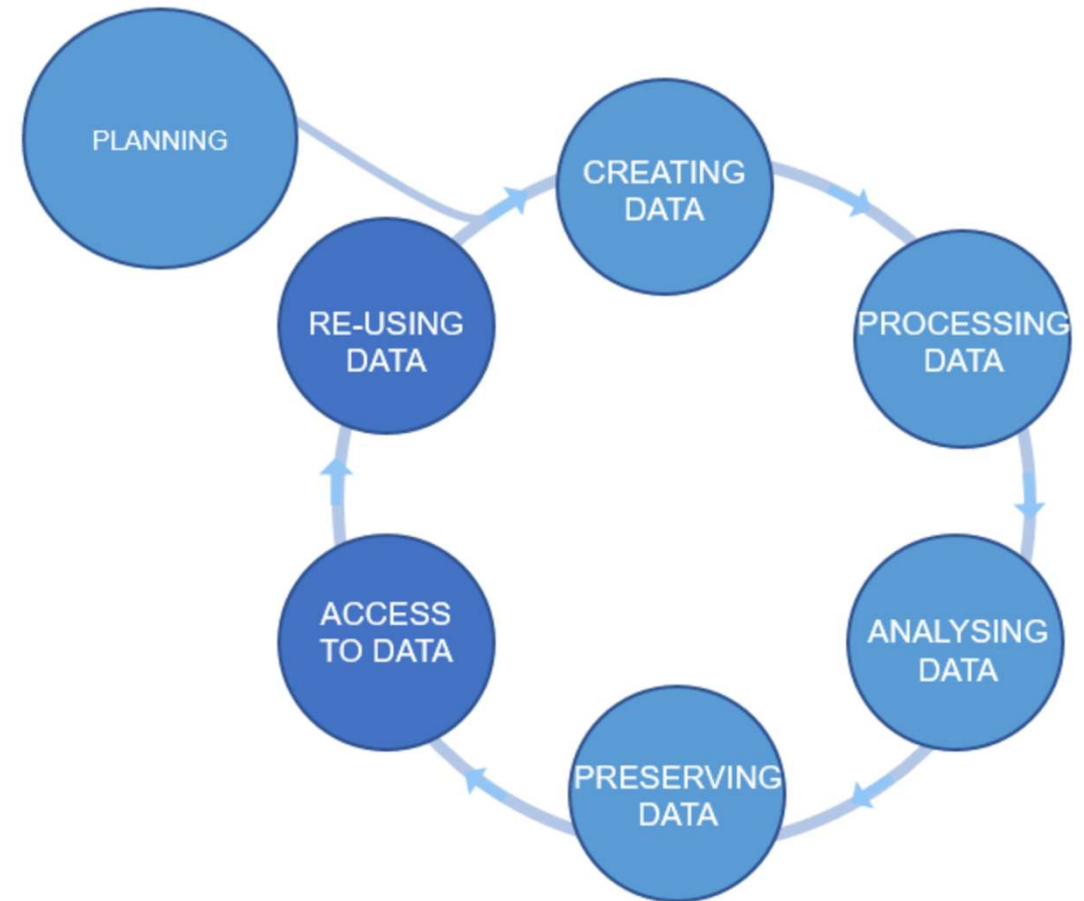
Where are the methods...?

Plan to replicate 50 high-impact cancer papers shrinks to just 18

By Jocelyn Kaiser | Jul. 31, 2018, 5:45 PM

REPRODUCIBILITY PROJECT
Cancer Biology

Overview   Contributors & Supporters   Press & News   Get Involved   Papers on eLife   Data & Code on OSF

2%
experiments with open data

70%
of experiments required asking for key reagents

69%
of experiments needing a key reagent original authors were willing to share
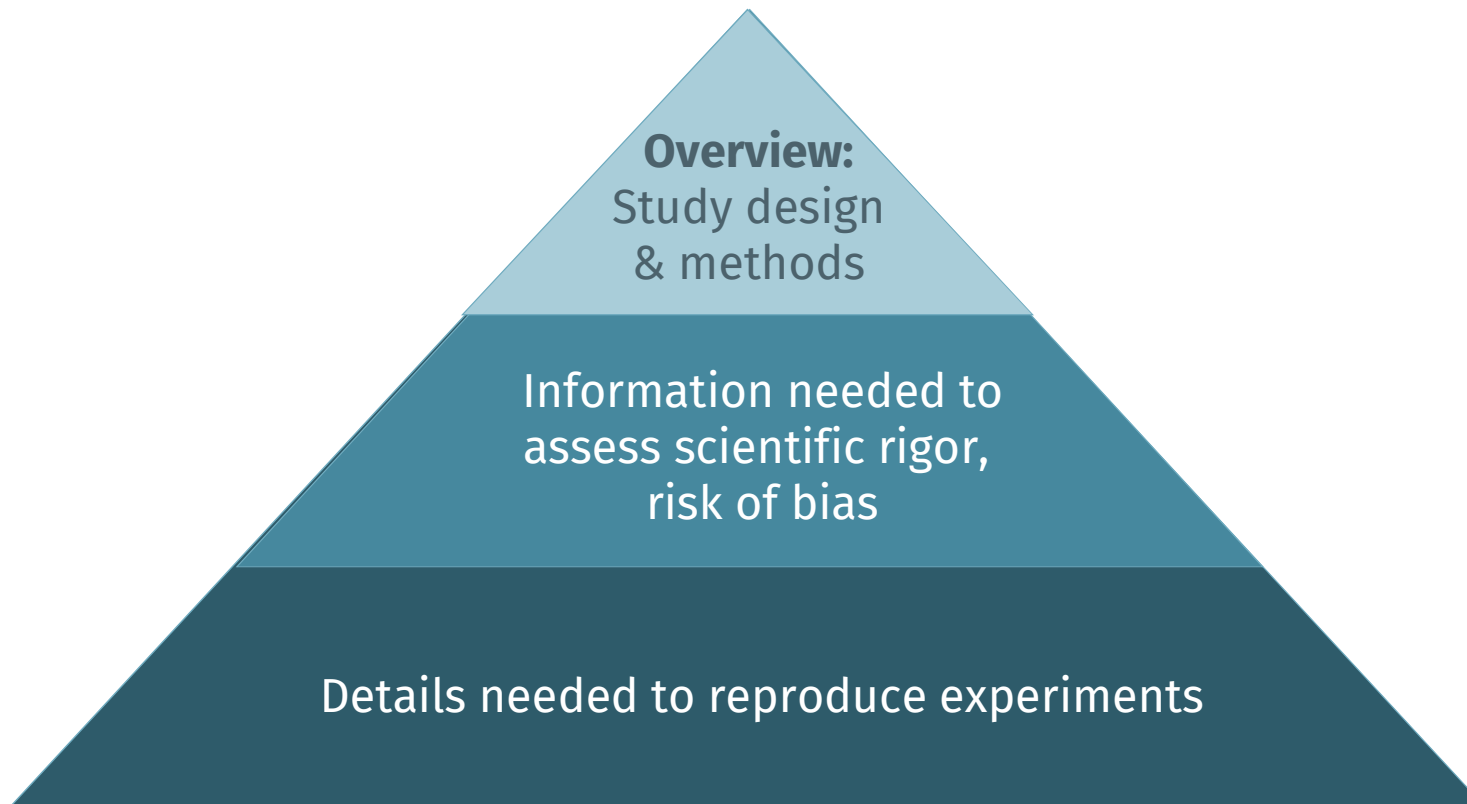
0%
of protocols completely described

32%
of experiments the original authors were not helpful (or unresponsive)

41%
of experiments the original authors were very helpful

Different readers have different needs

	Readers	Location
Overview: Study design & methods	All	Methods section of the paper
Information needed to assess scientific rigor, risk of bias	All	Methods section of the paper
Details needed to reproduce experiments	Some	Protocol repository or methods paper

Standvoss et al, bioRxiv, DOI: 10.1101/2022.08.08.503174

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Challenge: How can we encourage Berlin scientists to deposit protocols?

Rene's ideas

1. Deposit protocols and eat chili on a rainy day in Berlin

2. PLOS One Lab Protocols article

We decided to try option 2

The Experiment: Publish My Protocol Course

Goal: Participants deposit a protocol on protocols.io & prepare an accompanying Lab Protocols article to submit to PLOS One
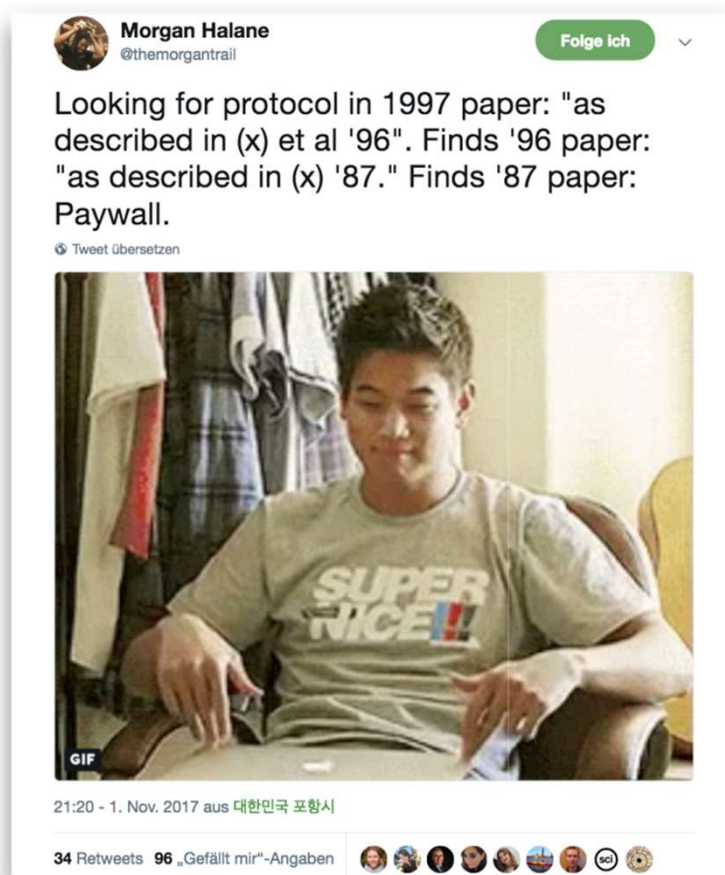
Why protocols.io?

- Allows authors to create an open, living protocol that can be versioned or forked to track the evolution of methods over time, both within and across labs
- Protocols are high quality, OA methodological shortcut citations
- Authors get credit for their methods development work in the form of a peer reviewed publication

Why PLOS One?

- PLOS One is the only journal that offers this format

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Sidebar: See our preprint to learn how to use methodological shortcut citations responsibly

Taking shortcuts: Great for travel, but not for reproducible methods sections

Kai Standvoss, Vartan Kazezian, Britta R. Lewke, Kathleen Bastian, Shambhavi Chidambaram, Subhi Arafat, Ubai Alsharif, Ana Herrera-Melendez, Anna-Delia Knipper, Bruna M. S. Seco, Nina Nitzan Soto, Orestis Rakitzis, Isa Steinecker, Philipp van Kronenberg Till, Fereshteh Zarebidaki, Tracey L. Weissgerber

doi: https://doi.org/10.1101/2022.08.08.503174

Registration: Lessons learned

Scope

- Some registrants wanted to publish clinical study protocols (different format)
- A few were writing systematic review protocols (should be on PROSPERO, not protocols.io)
- The "Lab protocols" title is misleading, as some participants had re-usable, step-by-step protocols that weren't lab based

Misaligned incentives: At least one participant withdrew after their supervisor advised them not to take the course because the paper wouldn't count for their thesis

The protocols...some examples

The Lab

- Organoids
- Surgical protocol for live neuron imaging in mouse brains

The Field

- Isolating fly eggs from horse manure

The Clinic

- Using laughter as an intervention in COPD patients

Some participants were depositing protocol collections, rather than single protocols

Course structure

The Plan

Jan 6: Introducting & planning, RRIDs

Jan 13: Deposit protocols

Jan 20: Prepare the Lab Protocols article

Jan 27: Integrate feedback

Feb 3: Unfinished business

Course structure

The Plan

Jan 6: Introducting & planning, RRIDs

Jan 13: Deposit protocols

Jan 20: Prepare the Lab Protocols article

Jan 27: Integrate feedback

Feb 3: Unfinished business

The Reality

Jan 6: Introducting & planning, RRIDs

Jan 13: Deposit protocols

Jan 20: Deposit protocols

Jan 27: Deposit protocols

Feb 3: Deposit protocols

Feb 24: Extra class to get feeback on everything before the Feb 28 deadline for the Lab Protocols article special collection

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Expectation vs. reality...?

Expectation: Participants would start with complete protocols; upload them to protocols.io in a week

Reality

- Some participants were still developing their protocols
- Many participants who came in with complete protocols realized that there were gaps which would be difficult for others to follow -> used time between classes to further develop & clarify their methods, take pictures, etc.

Conclusion: Many scientists may be working with pseudoprotocols

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Conversations with PIs/supervisors were an obstacle for almost every participant

Participants

- Early career researchers who were passionate about doing rigorous & reproducible science

PIs

- Many were unaware of protocol repositories, didn't understand the advantages compared to traditional methods papers
- Fear that sharing previously undisclosed methods would leave them exposed or place them at a competitive disadvantage
- Had reservations about PLOS One

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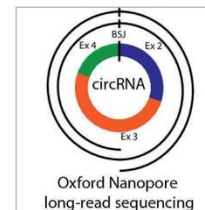
Published protocols

PLOS ONE

LAB PROTOCOL

Generation of full-length circular RNA libraries for Oxford Nanopore long-read sequencing

Steffen Fuchs ✉, Loélia Babin, Elissa Andraos, Chloé Bessiere, Semjon Willier, Johannes H. Schulte, Christine Gaspin, Fabienne Meggetto ✉

Published: September 7, 2022 • https://doi.org/10.1371/journal.pone.0273253

See the protocol
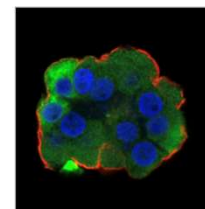
LAB PROTOCOL

State-of-the-art analytical methods of viral infections in human lung organoids

Morris Baumgardt 🆔, Maren Hülsemann 🆔, Anna Löwa, Diana Fatykhova, Karen Hoffmann, Mirjana Kessler, Maren Mieth, Katharina Hellwig, Doris Frey, Alina Langenhagen, Anne Voss, Benedikt Obermayer, Emanuel Wyler, [...], Katja Hönzke ✉
[view all]

Published: December 20, 2022 • https://doi.org/10.1371/journal.pone.0276115

See the protocol

protocols.io

🌐 Generation of full-length circRNA libraries for Oxford Nanopore long-read sequencing V.2

🔲 PLOS One ✔ Peer-reviewed method

In 1 collection

DOI
dx.doi.org/10.17504/protocols.io.cbs9snh6

Steffen Fuchs[1,2,3,4,5,6], Loélia Babin[5,6], Elissa Andraos[5,6], Chloé Bessiere[5,6], Semjon Willier[7], Johannes H. Schulte[1,2,3,8], Christine Gaspin[9], Fabienne Meggetto[5,6]

[1]Charité - Universitätsmedizin Berlin, Department of Pediatric Oncology and Hematology, 13353 Berlin, Germany;
[2]German Cancer Consortium (DKTK), Partner Site Berlin, 10117 Berlin, Germany;
[3]German Cancer Research Center (DKFZ), 69120 Heidelberg,

VERSION 2 ⌄
AUG 10, 2022

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COMMENTS 0

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MORE ↓

🌐 Collection: State-of-the-Art Analytical Methods of Viral Infections in Human Lung Organoids V.2

🔲 PLOS One ✔ Peer-reviewed method

In 1 collection

DOI
dx.doi.org/10.17504/protocols.io.5jyl89pw6v2w/v2

Morris Baumgardt[1], Maren Hülsemann[2], Anna Löwa[1], Diana Fatykhova[1], Karen Hoffmann[1], Mirjana Kessler[3], Maren Mieth[4], Katharina Hellwig[1], Doris Frey[1], Alina Langenhagen[5], Anne Voss[5], Benedikt Obermayer[6], Emanuel Wyler[7], Simon Dökel[5], Achim D. Gruber[5], Ulf Tölch[2], Stefan Hippenstiel[1], Andreas C. Hocke[1], Katja Hönzke[1]

[1]Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt Universität zu Berlin, Department

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DEC 21, 2022

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Refining our approach: The plan (starting soon...)

1. **Add "Write My Protocol":** Train participants to write reusable step-by-step protocols
2. **Working group format**
   - Combine "Write my protocol" and "Publish my protocol" participants
   - Onboarding 2-3 times per year
3. **Flipped classroom**
   - YouTube videos: Learn the basics
   - Biweekly virtual work sessions: Ask questions, get feedback, work on protocols
   - Teams channel: Asynchronous discussion

BIH/Charité users now have premium access to protocols.io, sponsored by QUEST

What else can we do?

Reward methods development work

- List deposited protocols on CVs
- Give graduate students credit for deposited protocols
- Adapt reward systems to incentivize protocol depositing

Convince additional OA journals to offer the "Lab Protocols" article format

Protocol hackathon event

Ask PIs to designate an early career researcher (ECR) to deposit an established protocol

- ECRs using methods previously established in the lab may not have enough ownership over these methods to deposit them. More senior people who developed the methods may not have time to deposit the methods.

We need a better understanding of what makes protocols reusable

Soliciting input (coming soon)...

PRO-MaP: Promoting Reusable and Open Methods And Protocols

Aim: Recommend actions that 4 stakeholder groups can take to facilitate reporting of detailed methods and reusable step-by-step protocols in life sciences publications

- Researchers
- Institutions
- Funders
- Publishers & editors

Preprint and consultation sessions coming soon: Solicit input on draft recommendations

Thank you!

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