



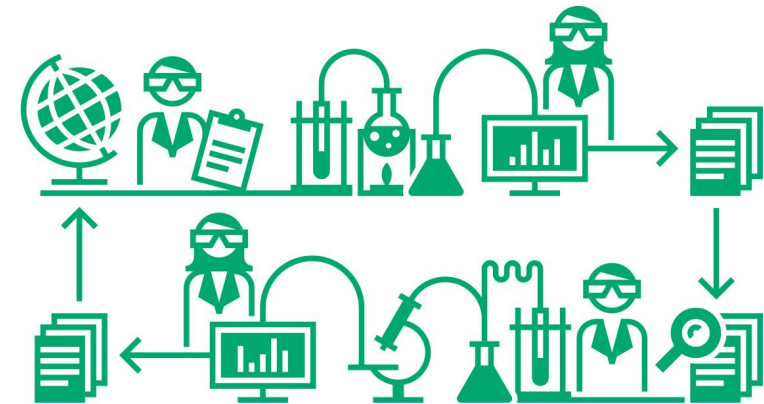
# Training at the Center for Reproducible Science (CRS)

Presentation at the Journées du Réseau National de la Recherche Reproductible

Eva Furrer, University of Zurich

March 26, 2024

Slides at <https://osf.io/drthk>



# What is the CRS?

The CRS was founded in 2018 as a **Center of Competence** of the University of Zurich (UZH):

Centers of Competence are **interdisciplinary cross-faculty scholarly networks** in which researchers and research groups of the University of Zurich coordinate their work according to strategic objectives.

Funding for centers of competence is only available for a start-up period.

# UZH centers of competence

Most competence centers focus on a specific scientific field and approach it in an interdisciplinary perspective.

CRS, in contrast, has a **transversal focus across all fields** and aims to exploit synergies in a methodological perspective.

⇒ Finding funding is more difficult

[Complete list of centers](#)



Ancient World Studies →

Zurich Center for the Study of the Ancient World (ZAZH)



Arts and Cultural Theories →

Zentrum Künste und Kulturtheorie (ZKK)



Biotechnology / Molecular Medicine →

Center for Applied Biotechnology and Molecular Medicine (CABMM)



Blockchain Center →

UZH Blockchain Center (BCC)



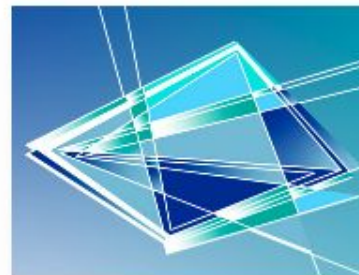
Citizen Science →

Competence Center Citizen Science (CC-CS)



Crisis Competence →

UZH Center for Crisis Competence (CCC)



Developmental Science →

Developmental Science Network Zurich (DSN-ZH)



Ethics →

Center of Ethics (EZEN)



Gerontology →

Center for Gerontology (ZfG)

# Mission of CRS

**Improve overall reproducibility and quality of empirical research**



- Good research practice courses
- Workshops
- Lectures

**Promote original research in reproducibility and methodology**



- Methodology related to reproducibility
- Replication studies
- Meta-research

# Training by CRS

**Improve overall reproducibility and quality of empirical research**



- Good research practice courses
- Workshops
- Lectures

How to provide training for the entire university?



# Faculties of UZH



**Faculty of Law** →  
Law and Legislation



**Faculty of Business, Economics and Informatics** →  
How the Markets Work



**Faculty of Medicine** →  
In the Service of Health



**Vetsuisse Faculty** →  
Medicine for Animals and Humans



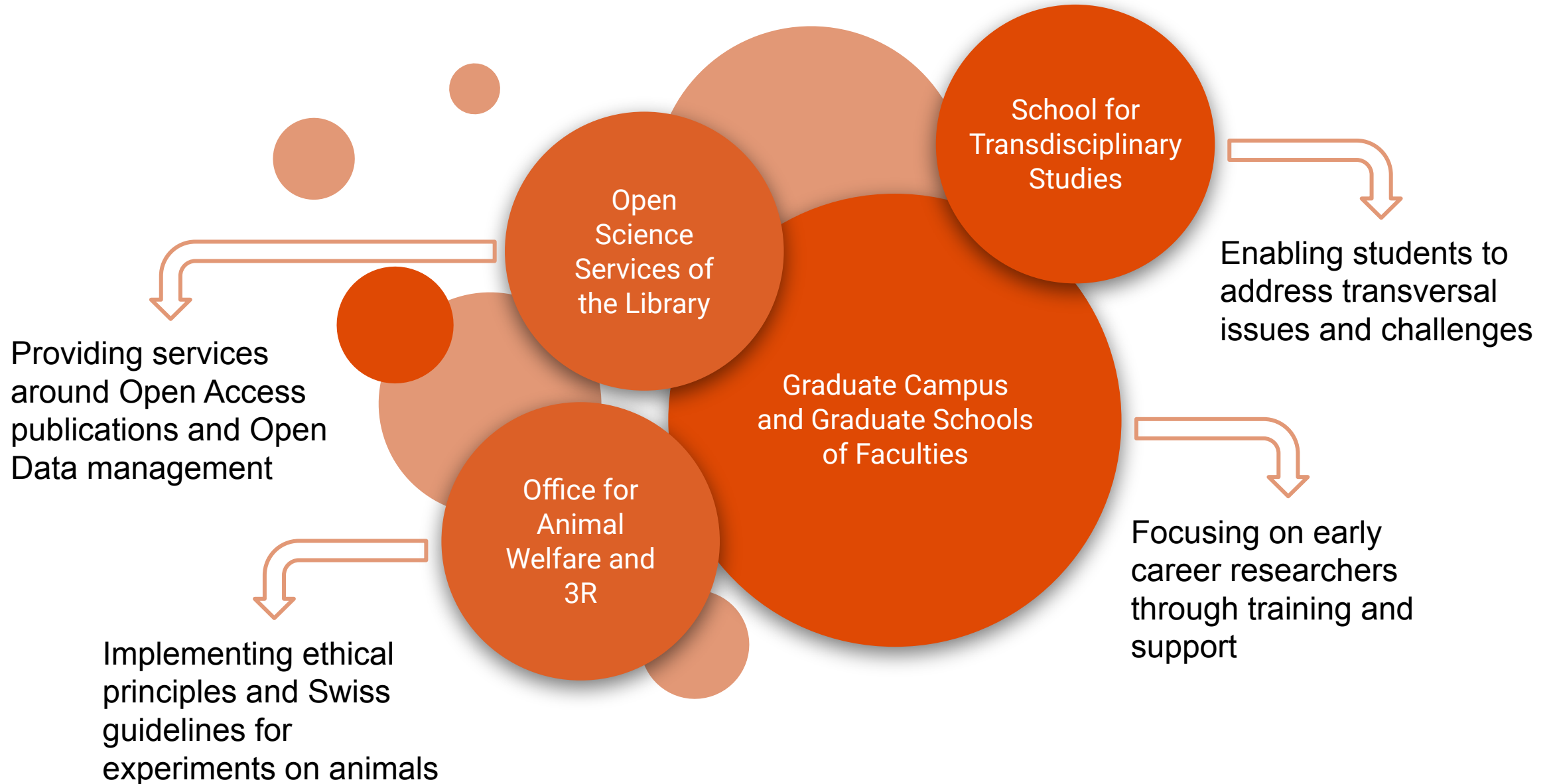
**Faculty of Arts and Social Sciences** →  
People, Culture and Society



**Faculty of Science** →  
What is Life, What is Matter

Not formally part of CRS:  
Faculty of Theology and  
the Study of Religion

# Partners at UZH for disseminating training







# Good Research Practice

Two day course across all disciplines through **Graduate Campus**:

- once per semester for about 20 participants
- mix of lecture-like talks and hands-on sessions
- preparation: read a paper, fill in a survey
- one small homework (currently on meta data)
- 1 ECTS

# Participants

UZH Graduate Campus advertises among PhD students and Postdocs of all faculties.

Since 2019-2022 we had registrations from:

<b>Discipline</b>	<b>PhD students</b>	<b>Postdoc</b>
Veterinary medicine	7	3
Medical sciences	20	4
Biology and Biomedicine	28	12
Natural Sciences	10	4
Psychology	12	4
Social Sciences	11	3
Arts	3	0
Computer Science	16	0
Economics	4	2
Law	1	1

# Program Day 1

- Reproducible and transparent research
- Open science principles: quick introduction
- Best practice in planning and design of studies
- Effective statistical practice: discussion of Kaas et al. (2016)
- Study protocols and registration
- Statistical analysis plans and data management plans
- How good metadata improves your research outputs
- Reproducibility clinic Q & A

## Program Day 2

- Reproducibility and replicability
- Discussion: Data definition and metadata checklist
- A taste of git
- Dynamic Reporting in R (part I)
- Dynamic Reporting in R (part II)
- Reporting guidelines
- From theory to practice: a clinical case study
- Reproducibility clinic Q & A

# Ten simple rules for good research practice



## Planning

1. Specify your research question
2. Write and register a study protocol
3. Justify your sample size
4. Write a data management plan
5. Reduce bias

## Execution

6. Avoid questionable research practices
7. Be cautious with interpretations of statistical significance
8. Make your research open

## Reporting

9. Report all findings
10. Follow reporting guidelines



# From Design to Paper: Make Your Research Fully Reproducible

Three day course for the **Graduate School of Faculty of Arts and Social Sciences**. Additional themes compared to GRP

- Open Science in qualitative research
  - Intensive workshops on version control and R markdown
  - Containerization
  - Publication bias in Social Sciences
- 
- More individual work, 2 ECTS

# More training for Graduate Schools and Programs

- The limits and biases of published literature: From questionable research practices to publication bias, *PhD program in psychology*
- Keep calm and plan well, *Summer school EPFL*
- Reproducibility and Scientific Integrity, *SSPH+, IKMZ*
- Simple Rules for Good Research Practice, *Biomed PhD Day, USI Lugano*
- Open Science: Transparent and Reproducible, *UZH Open Science summer school*

[Link to dates and material](#)



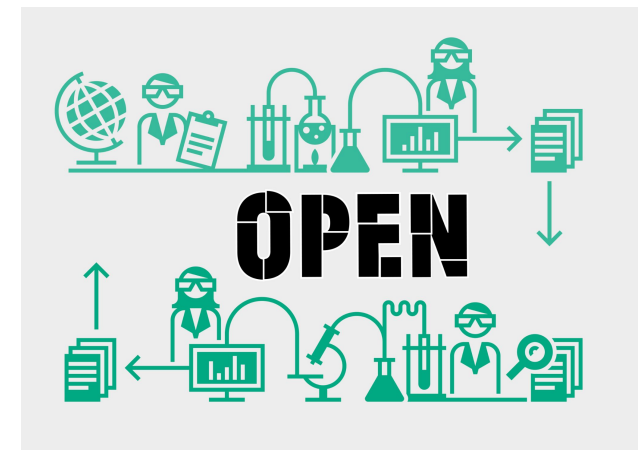
# 5 Steps to Good Data Science Practice in R

Master and bachelor students of **all disciplines**

- who work at least in part **empirically**.
- who have gained **first experience with research**
- who are active users of the **scientific literature**
- who had an **introduction to statistics**
- who have **good computer knowledge** is expected including **experience in R** (e.g. be comfortable in manipulating data and objects and know how to use existing functions and packages).

Within the **School of Transdisciplinary Studies**

[www.sts.uzh.ch](http://www.sts.uzh.ch)



# Learning goals: 5 Steps to Good Data Science Practice in R

Participants who successfully passed the module

- know how to use a **version control** system such as Gitlab and have practiced using it for the duration of the module
- are able to **write functions in R and use unit tests** as well as other advanced R **programming techniques**
- understand how to **avoid questionable research practices**
- know key principles of **good statistical practice** and are able to apply them

Flipped learning course with online preparation and 2 hour on-site practice every other Tuesday, 1 ECTS



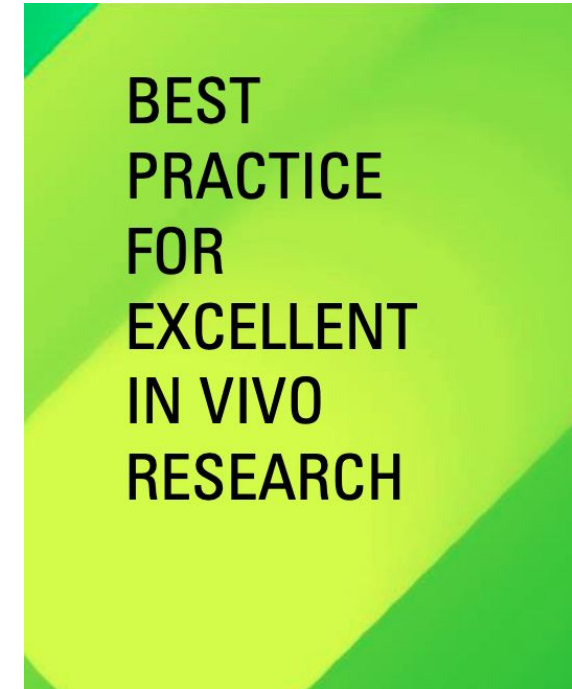


# Mandatory continuous education for animal researchers

Parts of full-day modules:

- What does that mean "doing research well"?
- What is publication bias? What is fiddle?
- Reproducibility and Replication

[Link to dates and material](#)



---

Join us for our in-person and interactive workshop at Irchel and discuss with us about improving animal research, preregistration, reproducibility and Open Science!

## More training for animal researchers

- Animal experimentation and alternative methods in biomedical research: two lectures for master students in biology and biomedicine
- Reproducibility - where to start? VetSuisse information event
- Presentations at Swiss Laboratory Animal Science Association meeting

**Project within SwissRN:** Establishing preregistration among animal researchers in Switzerland

**Planned:** Reproducibility Hackathon and Prize in collaboration with the Swiss 3R competence center

# CAMARADES Zurich

CAMARADES: The Collaborative Approach to Meta Analysis and Review of Animal Data from Experimental Studies

Started 2004 in Edinburgh, in Zurich since 2023

Systematic reviews of animal studies: fostering evidence-based and reproducible preclinical research

STRIDE Lab Summer School

## Date

August 28th – 31st 2023 - 9am to 3pm

## Location

Universitat Zurich  
CH-8001 Zurich (room tbd)

## Organizers

Benjamin Victor Ineichen  
Marianna Rosso  
Rachel Heyard  
Simona Doneva

## More Information

[www.camarades.ch/news](http://www.camarades.ch/news)

## Accreditation

2 ECTS recommended

## Registration

Please fill out the form [here](#)

*Free of charge*

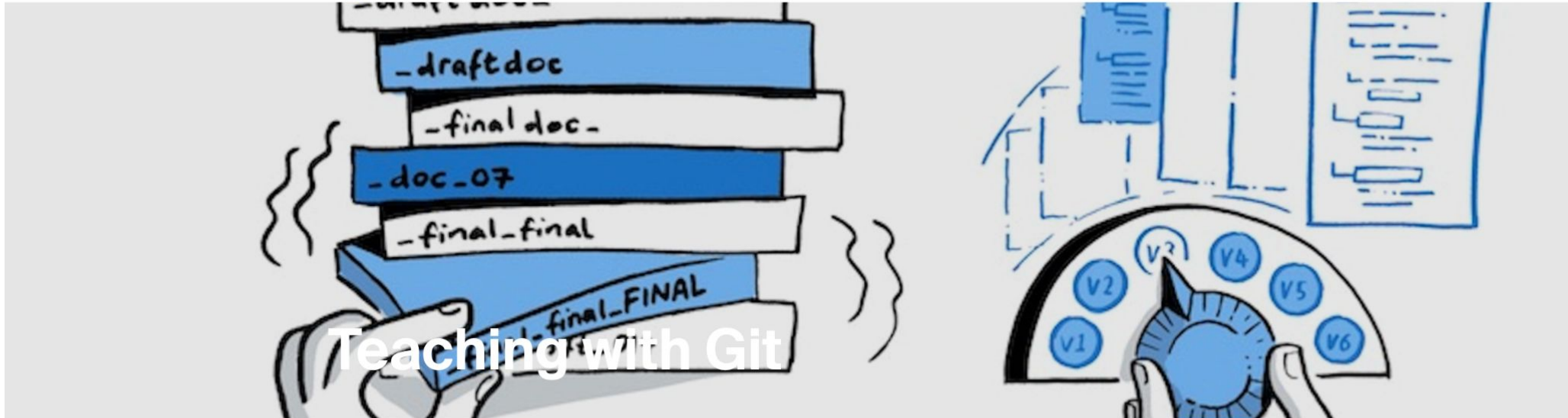






# Training related to Open Research Data

- Publishing personal and sensitive data: anonymization in R
- Lunch and learn series: p-values, replication, meta data, FAIR data
- Presentations on reproducibility and similar topics at Open Access Days
- Teaching tools for UZH teaching staff: Open Science, Gitlab, Containerization, see <https://teachingtools.uzh.ch/>



# Teaching with Git

**Time Required** Depends on skill level, for proficient users approx. 1 hour initial setup and 30 minutes per homework assignment

**Number of People** 3-30 students

**Material** Git, Docker, R and Latex

### Materialien

Download Git

## How to utilize the continuous integration functionalities of Gitlab to automatically check homework submitted to Gitlab?

This tool was written by Eva Furrer and Reto Gerber.

Git is a version control system for text-based files such as files containing programming code, providing a fail-safe backup (if used with a remote copy). The University of Zurich provides a Gitlab instance through <https://gitlab.uzh.ch> (more prominent but commercial instances of a Git system are Github and Bitbucket).



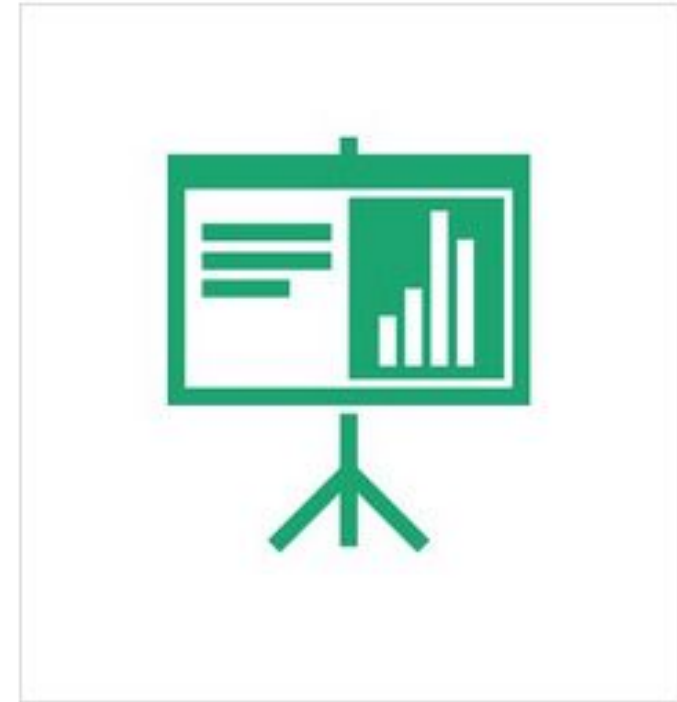
# Group training in research groups

## Reproducibility Lab Pitch

Reproducibility Lab pitches are workshops held by members of the CRS. They cover methodological topics regarding reproducibility and good research practice tailored towards the specific situation of the lab.

Former CRS postdoc Simon Schwab established statistical lab pitches with the → [biostatistics consulting team](#) for clinics at USZ or institutes of the Faculty of Medicine. Examples of such workshops can be found ↗ [here](#) .

The CRS promotes Reproducibility Lab Pitches in a wider context and is looking for collaborators with pertinent expertise. Please → [contact us](#) if you are interested.



<https://www.crs.uzh.ch/en/training/ReproLabPitch.html>

# CRS Primers

- Analysis of replication studies
- File naming conventions
- Principles of Data Visualizations
- Digital Collaboration
- Observational Studies in Clinical Research
- Systematic Reviews
- Cross-Over Trials
- Dynamic Reporting

November 15, 2023 (v1) Report Open

## Primer: Analysis of Replication Studies

Charlotte, Micheloud; Held, Leonhard

This primer explains what replication studies are and presents several replication success criteria used in practice. Original and replication studies from large-scale replication projects are used to illustrate the properties of the different criteria.

Part of Center for Reproducible Science, University of Zurich

Uploaded on November 15, 2023

64 42

November 9, 2023 (v1) Report Open

## Primer: File Naming Conventions

van de Wiel, Hester; Fraga Gonzalez, Gorka; Furrer, Eva; and 1 other

This primer discusses file naming conventions (FNC) which help to achieve an organized and accessible collection of files. Implementing an effective FNC from the outset of a research project ensures better data organization, accessibility, and reproducibility, aligning with the FAIR principles for data management and facilitating collaboration a...

Part of Center for Reproducible Science, University of Zurich

Uploaded on November 9, 2023

114 92

[CRS Zenodo community](#)







University of  
Zurich <sup>UZH</sup>

# UZH Reproducibility Day February 9, 2023

**10:00 – 12:00** KOL-F-101

Keynote by President of the National Research Council at SNSF  
**Prof. Dr. Matthias Egger**

Welcome address by Vice President Research  
**Prof. Dr. Elisabeth Stark**

Introduction by Director of the CRS  
**Prof. Dr. Leonhard Held**

**14:00 – 16:30** KOL-F-101 / 109 / 123

**Hands-on workshops on**

- Sample size planning
- Dynamic reporting
- Containerization
- Design of replication studies
- Preregistration
- Open data

**16:30 Apéro**



Registration required for workshops and apéro.  
For more information and registration see  
[www.reprozurich.org](http://www.reprozurich.org)

Organized by CRS  
[www.crs.uzh.ch](http://www.crs.uzh.ch)

# Scientifica<sup>23</sup>

Zürcher Wissenschaftsfestival



12:00 Uhr

## Gute Forschung erkennen

Dr. Rachel Heyard, PD Dr. Dr. Benjamin Victor Ineichen, UZH

**ETH** zürich



Universität  
Zürich<sup>UZH</sup>

Veranstaltungspartnerin



Stadt Zürich  
Stadtentwicklung

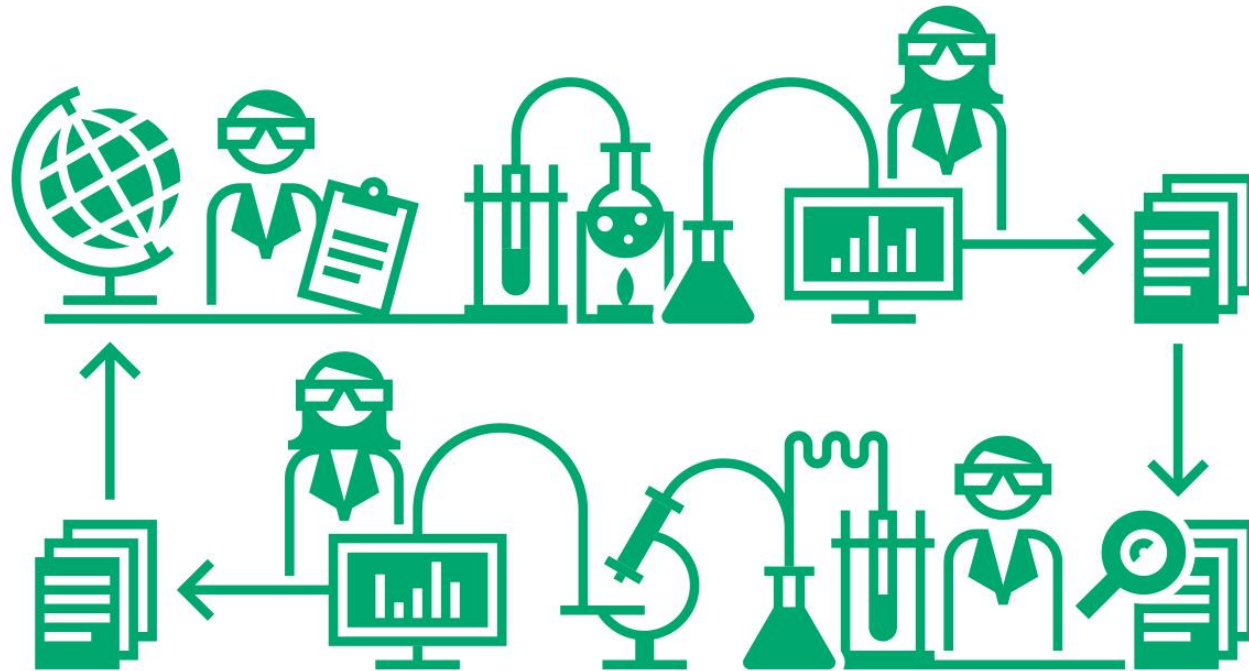
- 2021: Covid-19 vaccines – from laboratory to regulatory approval
- 2019: More facts, less fiction



# Thank you very much!

Visit our website: [www.crs.uzh.ch](http://www.crs.uzh.ch)

Follow us on [LinkedIn](#)



# License



This presentation is licensed with a CC-BY international license 4.0  
<https://creativecommons.org/licenses/by/4.0/>

Please cite as: Eva Furrer, University of Zurich, Training at the Center for Reproducible Science, March 26, 2024