Good Research Practice

Course offered at UniDistance by the Center for Reproducible Science and Research Synthesis (CRS) of the University of Zurich

Instructors:
- Gorka Fraga Gonzalez, CRS
- Rachel Heyard, CRS
- Fabio Molo, CRS

Language: English

ECTS: 1 or 2

Max. number of students: 20 (details see below)

Dates: 12 June and 19 June 2026

Link to course website: to be announced

Content

Many seemingly established scientific results cannot be reproduced. Issues include lack of transparency, poor study design and methodology, and questionable research practices. As part of an ongoing reckoning with poor levels of reproducibility, it is becoming normative to 'follow open and reproducible research practices' in various research fields. But implementing reproducible research processes is not always easy.

In this course you learn the necessary concepts, techniques and best practices to make your research reproducible. We begin with a fundamental point of view on reproducibility and with considerations during study design. You learn how to avoid typical biases, how to effectively write an analysis plan, and use pre-registration and registered reports to your advantage.

The course also covers techniques to improve computational reproducibility: versioning with git and dynamic reporting with R and Quarto, and software containerization with Docker. Participants will bring their laptops, and together we set them up to produce a minimal reproducible manuscript.

We discuss open science practices and techniques to manage and share your data effectively. The course concludes with a journal club on different 'failure modes' of science (e.g. publication bias or questionable research practices) and how to consider them in your own research.

Learning objectives

- Understand concepts and different aspects of reproducibility;
- Understand principles of the design, pre-registration, and reporting of a study
- Practice computational reproducibility techniques, including git and dynamic reporting
- Know about 'failure modes' of science (e.g. publication bias, questionable research practices) and understand how to avoid them in your own research

Target audience, pre-requisites

The course is primarily aimed at PhD students in empirical research.

Students will need to bring a laptop to class (where they have admin or equivalent privileges).

Evaluation

The course is evaluated on a pass/fail basis. It can be followed in one of two tracks:

1 ECTS track: We expect course attendance and active participation

2 ECTS track: In addition to attendance and active participation, the course participants have to:

- Submit an analysis plan for one of their (planned or ongoing) research projects until Wednesday 17 June 2026. Instructions will be given during the first course day.
- Hold a presentation of 12 minutes (including discussion) on one article from the course literature list.

Minimum and maximum attendance

The course will be given with a minimum of 6 students. It is intended for a maximum of 12 students in the "2 ECTS track" and can accommodate a total maximum of 20 students.

Preliminary Program

Day 1, 12 June 2026

Time	Session
09.00-09.45	Session 1 (Lecture) **Introduction: "Reproducible and transparent research"** Fabio Molo
09.45-10.30	Session 2 (Workshop) **Reproducibility in my own field and in my own work** Fabio Molo and Gorka Fraga Gonzalez
10.30-10.45	Break
10.45-11.45	Session 3 (Workshop) **Computational reproducibility 1: version control with Git** Gorka Fraga Gonzalez
11.45-12.30	Session 4 (Lecture) **Computational reproducibility 2: reproducible reporting with R and Quarto** Fabio Molo
12.30-13.30	Lunch break
13.30-14.15	Session 4 (Workshop) **Computational reproducibility 2: reproducible reporting with R and Quarto** Gorka Fraga Gonzalez
14.15-15.00	Session 4 (Lecture) **Best practices in planning and registration of studies** Fabio Molo
15.00-15.20	Break
15.20-16.20	Session 6 (Lecture) **Computational reproducibility 3: software containers and demo of advanced workflow** Fabio Molo and Gorka Fraga Gonzalez
16.20-17.00	Session 7 (Workshop) **Preparation for homework** Fabio Molo

Day 2, 19 June 2026

Time	Session
09.00-09.30	Session 1 **Review and discussion of homework** Rachel Heyard
09.30-10.30	Session 2 (Lecture) **Best practices in reporting of studies** Fabio Molo
10.30–11.00	Coffee Break
11.00-11.45	Session 3 (Lecture) **Open science principles: a quick introduction** Rachel Heyard
11.45-12.30	Session 4 (Lecture) **Data management plans and metadata for research outputs** Rachel Heyard
12.30–13.30	Lunch Break
13.30-14.30	Session 3 (Workshop) **Journal club presentations and discussion (1)** Rachel Heyard and Fabio Molo
14.30-15.15	Session 4 (Workshop) **Recent research on reproducibility and in meta-science** Rachel Heyard
15.15-15.45	Coffee break
15.45–17.00	Session 8 (Lecture) **Journal club presentations and discussion (2)** Rachel Heyard and Fabio Molo

Bonus topics (on demand and depending on the number of presenting "2 ECTS track" students):
- Metrics in research assessment
- From theory to practice: a clinical case study

Resources

All content will be available on the course website: to be announced

Preliminary literature list for the journal club:

[1]

The Brazilian Reproducibility Initiative *et al.*, "Estimating the replicability of Brazilian biomedical science," Apr. 03, 2025, *Scientific Communication and Education*. doi: 10.1101/2025.04.02.645026.

[2]

J. Jerke, A. Velicu, F. Winter, and H. Rauhut, "Publication bias in the social sciences since 1959: Application of a regression discontinuity framework," *PLoS ONE*, vol. 20, no. 2, p. e0305666, Feb. 2025, doi: 10.1371/journal.pone.0305666.

[3]

H. H. Choi, "Preregistration and predictivism," *Synthese*, vol. 204, no. 6, p. 173, Dec. 2024, doi: 10.1007/s11229-024-04827-1.

[4]

F. Bartoš *et al.*, "Footprint of publication selection bias on meta-analyses in medicine, environmental sciences, psychology, and economics," *Research Synthesis Methods*, vol. 15, no. 3, pp. 500–511, May 2024, doi: 10.1002/jrsm.1703.

[5]

S. Vazire and A. O. Holcombe, "Where Are the Self-Correcting Mechanisms in Science?," *Review of General Psychology*, vol. 26, no. 2, pp. 212–223, Jun. 2022, doi: 10.1177/10892680211033912.

[6]

M. Rubin, "The Costs of HARKing," *The British Journal for the Philosophy of Science*, vol. 73, no. 2, pp. 535–560, Jun. 2022, doi: 10.1093/bjps/axz050.

[7]

A. C. Chang and P. Li, "Is Economics Research Replicable? Sixty Published Papers From Thirteen Journals Say 'Often Not,'" *CFR*, vol. 11, no. 1, pp. 185–206, 2022, doi: 10.1561/104.00000053.

[8]

N. Breznau *et al.*, "Observing many researchers using the same data and hypothesis reveals a hidden universe of uncertainty," *Proceedings of the National Academy of Sciences*, vol. 119, no. 44, p. e2203150119, Nov. 2022, doi: 10.1073/pnas.2203150119.

[9]

U.-K. Kathawalla, P. Silverstein, and M. Syed, "Easing Into Open Science: A Guide for Graduate Students and Their Advisors," *Collabra: Psychology*, vol. 7, no. 1, p. 18684, Jan. 2021, doi: 10.1525/collabra.18684.

[10]

N. Huntington-Klein *et al.*, "The influence of hidden researcher decisions in applied microeconomics," *Economic Inquiry*, vol. 59, no. 3, pp. 944–960, 2021, doi: 10.1111/ecin.12992.

[11]

T. M. Errington *et al.*, "Investigating the replicability of preclinical cancer biology," *eLife*, vol. 10, p. e71601, Dec. 2021, doi: 10.7554/eLife.71601.

[12]

M. Becker, "Qualitative Replication as a Pedagogical Approach to Teaching Research Methods," *APSC*, vol. 53, no. 4, pp. 802–806, Oct. 2020, doi: 10.1017/S1049096520000864.

[13]

P. Walter and D. Mullins, "From symbiont to parasite: the evolution of for-profit science publishing," *MBoC*, vol. 30, no. 20, pp. 2537–2542, Sep. 2019, doi: 10.1091/mbc.E19-03-0147.

[14]

R. Peels, "Replicability and replication in the humanities," *Res Integr Peer Rev*, vol. 4, no. 1, p. 2, Dec. 2019, doi: 10.1186/s41073-018-0060-4.

[15]

A. C. Tsai *et al.*, "Promises and pitfalls of data sharing in qualitative research," *Social Science & Medicine*, vol. 169, pp. 191–198, Nov. 2016, doi: 10.1016/j.socscimed.2016.08.004.

[16]

Open Science Collaboration, "Estimating the reproducibility of psychological science," *Science*, vol. 349, no. 6251, p. aac4716, Aug. 2015, doi: 10.1126/science.aac4716.

[17]

A. Franco, N. Malhotra, and G. Simonovits, "Publication bias in the social sciences: Unlocking the file drawer," *Science*, vol. 345, no. 6203, pp. 1502–1505, Sep. 2014, doi: 10.1126/science.1255484.

[18]

J. P. Simmons, L. D. Nelson, and U. Simonsohn, "False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant," *Psychol Sci*, vol. 22, no. 11, pp. 1359–1366, Nov. 2011, doi: 10.1177/0956797611417632.

[19]

N. L. Kerr, "HARKing: Hypothesizing After the Results are Known," *Pers Soc Psychol Rev*, vol. 2, no. 3, pp. 196–217, Aug. 1998, doi: 10.1207/s15327957pspr0203_4.