REPRODUCIBILITY RESOURCES & TOOLS

Reagents

Addgene https://www.addgene.org/ (nonprofit plasmid repository)
CiteAb https://www.citeab.com/ (antibody search engine with results sorted by citations)
ICLAC http://iclac.org/ (registry of false or misidentified cell lines)
Quartzy https://www.quartzy.com/ (manage lab inventory)

Electronic Lab Notebooks

Benchling https://benchling.com/ (free)
Evernote https://evernote.com/ (most popular with biologists but not designed as an ELN)
Labguru https://www.labguru.com/ ($)
sciNote https://scinote.net/ (open source, free)
OSF https://osf.io/ (Open Science Framework, free)

Methods

Bio-Protocol https://bio-protocol.org/ (A peer-reviewed protocol journal; free to read & publish)
protocols.io http://protocols.io/ (an open access repository of science methods; free to read & publish)

Code

Github https://github.com/ (code repository; free for public repos)
Jupyter Notebooks http://jupyter.org/ (open source web-app for creating & sharing live code, equations, and more)
Code Ocean https://codeocean.com/ (computational reproducibility platform; free to upload, share & publish executable code with DOI; pay for more computing time over freemium limit)

Data

DataDryad http://datadryad.org/ (curated digital repository; free to access, $120 to publish dataset up to 20GB)
Figshare http://datadryad.org/ (free digital repository, 5GB per file limit)
Zenodo https://zenodo.org/ (free digital repository; 50GB per dataset limit)

addgene
The nonprofit plasmid repository
@Addgene

protocols.io
@ProtocolsIO

CODE OCEAN
@CodeOceanHQ

REPRODUCIBILITY RESOURCES & TOOLS

1.Plan for reproducibility before you start

a. **Write a study plan or protocol** and track new versions.

b. **Set-up a reproducible project** using an electronic lab notebook to organize and track your work. Avoid saving proprietary file formats.

2. Keep track of things

a. **Preregister** important study design and analysis information. Free tools to help you make your first registration include AsPredicted, Open Science Framework, and Registered Reports. Clinical trials use Clinicaltrials.gov.

b. **Track changes** to your files using version control.

c. **Document** everything done by hand in a README file and data dictionary. **Karl Broman's Data Organization module:** http://kbroman.org/dataorg/pages/dictionary.html

3. Report your research transparently

a. **Share your protocols and interventions** explicitly and transparently.

b. **Write a transparent report.** Guidelines from the Equator Network or processes like Registered Reports can help.

4. Archive + share your materials

a. **Share and licence your research**

i. Data

1. Avoid supplementary files, licence, and share your data using a repository. **How to License Research Data:** http://www.dcc.ac.uk/resources/how-guides/license-research-data.

ii. Materials & reagents

1. Licence your published materials so they can be reused. **Creative Commons License Picker:** https://creativecommons.org/choose/

2. Deposit reagents with repositories like Addgene, The Bloomington Drosophila Stock Center, and ATCC to make them easily accessible to other researchers.

iii. Software

1. Licence your code using Code Ocean or Github. **Open Source Initiative: About Open Source Licences:** https://opensource.org/licenses.

5. Further reading:

- **Ten Simple Rules for Reproducible Computational Research:** http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1003285
- **Reproducibility in Science:** http://ropensci.github.io/reproducibility-guide/
- **Open Science MOOC:** https://opensciencemooc.eu/

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