Piazza Lab Handbook

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Welcome to the lab!

If you're a new lab member, we're excited to have you! This lab handbook contains important information such as the expectations and responsibilities of people who play various roles in the lab, our code of conduct and ways to improve diversity and inclusivity, and guidelines for conducting reproducible, ethical, and equitable science.

This handbook is a work in progress, co-written by members of the Piazza Lab at the University of Rochester, and we welcome any feedback for how to continue to improve it. Please tell me (Elise) if you have any suggestions, or if I'm not fulfilling my responsibilities as stated below. The template and some of the content was heavily inspired by Mariam Aly's excellent lab manual.

1. Expectations and Responsibilities

1.1 Everyone

Our research lab is a team: when one of us succeeds, we all succeed. When we publish our first papers together, it will be due to a joint effort of many individuals, playing many roles--reading and discussing the literature, doodling the study design on whiteboards, recruiting the participants, collecting the data, writing and debugging code, tossing the manuscript back and forth, sharing the findings everywhere from conferences to outreach events--and each of these roles is equally important. Therefore, we will strive toward a democratic environment in which each person's opinion and role is respected, we support each other, we share our diverse talents with each other, and we communicate with each other when problems arise. It's also equally important that each of these roles is conducted with integrity. A few general guidelines are as follows:

-Respect and support your lab mates. This means being aware of how much space you're taking up in the room, pausing to listen to others' opinions, respecting others' need for space, being open to feedback, and acknowledging that we come to the lab with different strengths and weaknesses, as well as cultural/racial/gender/sexual/religious identities, which can impact how we approach science and work in general.

-Share your skills, time, and eyes/ears with others. On the road to scientific independence, we all critically rely on mentors of different kinds to uplift us. Give someone a fresh look on their draft, help them check for bugs in their code, or just listen if they're going through a rough time or need to vent.

-Open communication is the best way to solve problems. Please feel free to come to me with any issues when they arise, from a conflict with a colleague to finding a mistake in your code that affects your results. Science is hard and various types of problems will inevitably occur, but it's better to address these as soon as they come up. If you're going through a rough time for any reason, I'm here to listen and help, however I can. To facilitate communication among lab members, everyone is encouraged to regularly use Slack as a home base for discussion about specific projects and more general lab happenings.

-Use the various communication platforms (Slack, e-mail, Google docs) that will help us stay connected, especially when working remotely. Try to check Slack daily and respond in a timely manner to keep things running smoothly. However, if I happen to send you a message via e-mail or Slack late at night (which may happen because I'm a night owl), please don't feel pressured to respond immediately! If you ever feel uncomfortable posting something in the Slack or Zoom chat, feel free to send me a private email.

-At the end of the day, our main goal as scientists should be to seek the truth (and hopefully have some fun doing it!). No matter what competitive pressures we're under,

we need to stay honest, and it's never ok to plagiarize or fudge data or results. But even ethical, well-meaning scientists *do* make mistakes, so try to incorporate checks into your workflow to prevent and correct these. This can include thoroughly commenting your code to remind yourself and others of your intentions at each step of the way, using debugging tools (e.g., iPython), and implementing a buddy system to double-check each other's code.

-And even beyond the issue of explicit "mistakes", many of the well-reasoned analysis decisions we make along the way (preprocessing parameters, statistical thresholds, etc.) can impact our results dramatically. This is ok and is an inevitable aspect of the scientific process, but we should strive to make our full set of analysis steps and decisions as clear and reproducible as possible, and choose them early on in the scientific process before we've become biased by the data. Section 3.2 has suggestions for how to do that, such as submitting registered reports and using version control systems like GitHub and DataLad.

-As soon as they join the lab, everyone is expected to complete human subjects CITI training (preferably the Biomedical module) and e-mail Elise the resulting completion report. Also ask to be added to relevant IRB protocols.

-When dealing with data from human subjects, there are several important ethical guidelines to follow (many of which were addressed in your CITI training). For example, the IRB protocol for each study dictates how the data can be used, accessed, and distributed. In general, don't record (audio or video) anyone without their explicit, written consent, don't discuss or share any identifying details about subjects' data that could compromise their anonymity, don't share raw data with anyone who hasn't been added to the relevant IRB protocol.

-Communicating our science with the public and our community is important, and everyone in the lab is encouraged to contribute to this effort, including through outreach activities in the Rochester area and online.

1.2 Principal Investigator

The PI's job is to guide trainees through their individual scientific journeys. I pledge to:

-support you as a whole person and prioritize your well-being above all else

-be available, both immediately during office hour slots and within a reasonable amount of time via e-mail or Slack

-provide feedback and guidance on everything from experimental design to conference posters to manuscript revision to professional development

-help you set deadlines and establish time frames for completing different aspects of a project

-help connect you with others in the field as collaborators, mentors, and/or additions to your professional network, often so that they can provide expertise and support that is complementary to mine

-help you to move forward in your career (either within or outside of academia) by writing you recommendations, promoting your work, and providing job market advice

-continue to develop my mentorship skills by seeking guidance from my own mentors, reading relevant literature on mentorship, attending workshops, etc.

1.3-1.4 Postdocs + PhD students

I've combined these because there are some broad similarities between the expectations of both groups of trainees within the lab, even though they have different levels of experience and independence. Both postdocs and PhD students should:

-develop an independent line of research which encompasses several experiments (of course, postdocs will work more independently than grad students)

-help train and mentor more junior lab members

-present your work at our lab meetings, at other labs and departmental events, and at conferences

-apply for funding (see the docs on postdoc and grad student grants/fellowships for suggestions); this is beneficial for your own career + the lab

-contribute your voice to discussions, including when you disagree with me or the group

-meet with me on a weekly basis

-discuss your career goals with me (in or outside of academia) so I can help you plan for those

In addition to these general expectations, grad students in particular should prioritize research above coursework and TA responsibilities (which I acknowledge is often hard), keep track of departmental deadlines/requirements and communicate them to me early on, and form connections to other faculty in the department by building committees and, often, collaborations.

1.5 Undergraduate students

Undergraduate students are expected to:

-contribute to research projects in the lab in one of several ways. You may be involved in helping more senior lab members with subject recruitment, data collection, coding (e.g., annotating videos), or analysis. You may at some point want to develop an independent project (for example, a senior honors thesis) which you would lead with my (and other lab members') feedback.

-meet ~weekly (at pre-established times) with your primary project mentor

-meet on a ~bi-weekly basis with Elise to discuss general progress on your project

-If you are earning course credit for research (e.g., enrolled in BCSC 395), you will be expected to attend as many lab meetings as your schedule allows, present at one of these meetings per semester (it doesn't have to be a polished talk--could be on an analysis you've been working on, a study design idea, or a relevant paper), and submit a 10-page write-up of your research by the end of the semester

-Even if you're not earning course credit for research, you are encouraged to attend most lab meetings, which will provide some important aspects of your training (e.g., reading and analyzing literature, brainstorming study ideas, etc.)

2. Code of Conduct

2.1 Statement of Principles

The Piazza Lab strives to be a welcoming and inclusive space for all of its members, collaborators, participants, and guests. We are all passionate about doing creative, rigorous, groundbreaking science, and fulfilling our scientific potential involves respecting and supporting each other's diverse interests, backgrounds, strengths, and limitations. We commit to giving each other constructive feedback that targets the work rather than the person, to giving our time to help others improve, to respecting each other through our words, tone, and actions, to communicating when we're struggling, to anticipating challenges throughout the scientific process and being open to learning from them. We also commit to working to make the lab more inclusive by regularly discussing anti-racist literature, participating in diverse conferences and talk series, and enacting more equitable citation practices.

2.2 Basic policies

The lab should be a safe, welcoming, and respectful environment for everyone. We will not tolerate any form of harassment or discrimination based on gender or gender

expression, sexual orientation, disability, physical appearance, race, cultural identity, religion, or any other basis. Lab members and visitors should familiarize themselves with and abide by the University of Rochester's code of values and related policies regarding equity, diversity, and inclusion, including a new whistleblower policy.

2.3 Equity and inclusion

The lab's Zotero account includes a collection of articles about bias in academia, and how to work toward fixing it. We devote a portion of our lab meetings to discussing these articles and how we can continue to apply more inclusive practices to our recruitment of new trainees and participants, our experimental approaches, our reference lists, and our outreach activities.

U of R's Office of Equity and Inclusion

Resources for supporting LGBTQ+ colleagues here and here

Compiled anti-racism resources for academics here, here, and here

Organizations devoted to amplifying the voices of underrepresented scientists: SPARK society, Black in Neuro, Anne's List, Women in Neuro, Graduate Women in Science, BiasWatchNeuro, Neuroscience Scholars Program

2.4 Authorship guidelines

In general, the student/postdoc who takes the lead role on a project and is primarily responsible for writing the manuscript will be first author and Elise will be last author (unless the project is in collaboration with another PI and Elise is a secondary advisor). Others who contribute to the project at various points (including people who contribute design/analysis ideas, code/algorithms, data, editing, and who may or may not be involved in regular project meetings) can be added to the author list, and their authorship role will be discussed with all parties involved in the paper. If someone is involved in subject recruitment, data collection, data organization, and/or coding (e.g., annotating text, labeling videos) *only*, but not data analysis or writing of the paper, this is likely not enough to merit authorship. If someone hands over their project to someone else, they will most likely lose first-authorship, unless co-first-authorship is appropriate. All of these issues should be openly discussed early on in a project and re-visited as questions arise. Undergraduate students involved mainly in infrastructural aspects of the lab (e.g., recruitment, communication with families, data collection) will not be considered for authorship roles unless they have explicitly joined a specific project that will lead to a paper (and if they have, then the above guidelines apply).

Following the APA's guidelines below will ensure fair distribution of credit and help prevent conflicts (more info here):

Authorship credit should reflect the individual's contribution to the study. An author is considered anyone involved with initial research design, data collection and analysis, manuscript drafting, or final approval. However, the following do not necessarily qualify for authorship: providing funding or resources, mentorship, or contributing research but not helping with the publication itself. The primary author assumes responsibility for the publication, making sure that the data are accurate, that all deserving authors have been credited, that all authors have given their approval to the final draft; and handles responses to inquiries after the manuscript is published.

2.5 Human subjects research

After (and only after) you've completed your mandatory CITI training and have been added to the relevant IRB protocol for your project(s), make sure you're familiar with the protocol's guidelines. It's critical that we follow these guidelines; if we don't adhere to them, we may have to shut down our research entirely. For example, our protocols require subjects' consent to take video/audio recordings. After an experiment is complete, if you want to share these images online (social media, websites, press releases), it's critical to reach back out to the subject to get their consent a second time. If a participant reports any issues to you (discomfort, illness) during an experimental session, please tell me ASAP. It's also very important not to share or discuss participants' identifying info with others (and in most cases, our IRBs state that this info should be destroyed and replaced with de-identified subject IDs early on in the study anyway). Do not leave consent forms or subject logs lying around where personal info might be visible to others.

3. Resources

3.1 Tips for finding and citing articles

On setting up an RSS feed:

-Google Scholar:
While logged into your Google Scholar account, go to the menu at the top left and click "Alerts". Enter a search term (e.g., "music cognition") and you'll start receiving a daily digest of relevant papers (including un-reviewed preprints).

On combating bias in citation practices:

Dani Bassett's lab at Penn has been doing some important work uncovering systematic biases in citation practices (e.g., here). The gist is that papers by women* and URM authors are relatively under-cited (after considering several variables relating to impact), papers by white male authors are relatively over-cited, white male authors tend to drive this bias, and the gap is widening over time. Her lab has several new tools for helping

us all be more equitable, transparent, and conscious in our practices of finding and citing papers, and I encourage you to try these out:

Chrome extension that adds probabilistic gender info to Google Scholar and PubMed searches

Script that probabilistically estimates the race + gender of 1st and last authors of all papers in your citation list, so you can check your own bias

How to write a Citation Diversity Statement

*For now, these tools are limited in their inclusion of non-binary/transgender authors

3.2 Guidelines for reproducible science

In my humble opinion, there has never been a more exciting time to be a neuroscientist. The community of people advocating and building tools for open neuroscience has exploded in the past few years, and it's becoming easier and easier to design and analyze experiments that are reproducible. That said, the number of tools can be overwhelming, so I've tried to highlight a few that I'd highly recommend to get you started:

Registered reports
To prevent letting bias affect your results, it's good practice to decide which analyses you plan to run, which exclusion criteria you'll use, and which hypotheses are important to explore *before* you've collected and peeked at your data. To this end, many people are now submitting registered reports, which allow you to get feedback on your study plans early on and reduce bias in the scientific method that can lead to Type I errors and reduce reproducibility.

Preprints
The peer review process (from submission to publication) can take months to years, and it's a shame not to be able to share our (mostly completed) work with the scientific community before an article finally appears in a journal. To create a time-stamped record of your paper while it's under review, you can publish a preprint in a repository of un-peer-reviewed manuscripts (psyArXiv, bioRxiv). Most journals allow you to do this, but it's good to double-check.

Storage + version control
Git/GitHub allows you to save past versions of your code (or other files) and collaboratively contribute to projects. Tutorials here and here (start at 1:46:00).

OpenNeuro is a great repository of neuroimaging data. You can add your own data here for the community to use and also explore other people's data!

OSF is another great place to store data and code.

Tools for standardizing fMRI datasets, preprocessing, and analysis

Many of these tools (Git, BIDS, ReproIn, DataLad, fMRIprep) are explained very clearly in the awesome Princeton Handbook for Reproducible Neuroscience, which also includes a workshop series with video tutorials (see section 3.3 below).

BIDS is a neuroimaging (fMRI) data format that allows for standardization of preprocessing. Basically, when you first design an fMRI experiment, you should set up your program card (at the scanner) according to this naming system and it will make your data compatible with reproducible pipelines. Tutorials here (start at 2:40:45) and here.

ReproNim is an initiative to improve the reproducibility of neuroimaging studies.

DataLad is a system for "content tracking" (keeps track of versions of code AND data). Tutorial here (start at 4:30:50). See also: "YODA" principles for reproducible data analysis.

fMRIprep is a state-of-the art pipeline that combines the best of well-known preprocessing pipelines and provides highly reproducible, easy-to-interpret output.

BrainIAK is an open-source Python-based package of analysis tools, designed with naturalistic neuroimaging studies in mind. These include RSA, MVPA, ISC/ISFC, SRM, HMM, and other machine learning approaches to analyzing fMRI data.

Other open-source tools

librosa is an excellent Python package for extracting audio/musical features.

Neuroscout is a platform for flexible analysis of naturalistic studies. Has lots of fun machine learning tools (see pliers) for extracting (for example) musical features from videos.

Neuropipe is a framework for reproducible fMRI analysis with FSL, including recommended directory structures.

NeuroLibre is a series of analysis tools and free server space for anyone to use.

This is another new set of tutorials and tools for researchers working with naturalistic data. More info here.

The Turing Way is a handbook for reproducible data science.

3.3 Bootcamps and training courses

General neuro
Kavli Summer Institute ("Brain Camp")

Neuromatch Academy

fMRI
Princeton Handbook for Reproducible Neuroimaging Workshop (has tutorials on BIDS, setting up directories, fMRIprep, and more)

Neurohackademy (U Washington)

MIND (Dartmouth; includes slides, code, tutorials)

Workshop on neuro analysis on open datasets (specifically, the longitudinal developmental ABCD project)

University of Michigan course

Yale course

fNIRS
BU course

MGH course

Pittsburgh course

Coding/stats/machine learning/data science:
MATLAB course
Psychtoolbox courses here and here
R course
Python for Data Science course
Intro to ML course
Summer Institutes in Computational Social Science (data science training for all career levels)