Lab Manual Template (Version 0.1)

About this template:

This template was developed for lab heads or research groups who are interested in developing a lab manual. In this context, a **lab manual** or **lab handbook** refers to documentation that lays out the mission statement of the lab, expectations for lab members, standard operating procedures, and the details of a lab's culture and philosophy. This is a less than amazing comparison maybe, but it is kind of like a user manual for the lab.

A lab manual does not explain how to perform specific experimental procedures, but may link to research protocols, workflow specifications, and other technical documents.

The contents of a lab manual will obviously differ from group to group. The sections and subsections included in this template may not be relevant for every group. The goal is not to be prescriptive per se, but rather to provide a starting point for the development of a document that works for you and your group.

Though responsibility ultimately falls to the lab head, it is recommended that the development of a lab manual be a collaborative effort involving contributions from the research group as a whole.

In practice, a lab manual like this should be a living document, updated over time to reflect current information, practices, and viewpoints.

This template was created by John Borghi. Please send any questions, comments, or feedback to jborghi@stanford.edu.

Introduction to the Lab

This section of the manual provides a very brief overview of what the lab is about. Sometimes this section includes a welcome message from the primary investigator(s) or a mission statement. But the purpose is mainly to set broad context for the more specific details that will be outlined in later sections.

About the lab

This subsection provides basic information about the lab.

For example:
- *Who the PIs are and their departmental affiliation(s)*
- *Where the lab is located*
- *A high-level overview of the lab's philosophy/ethos*

About the lab's work

This subsection provides an overview of the type of work the lab does

For example:
- *The specific questions the lab is addressing at present*
- *The techniques the lab uses while conducting research*
- *The populations, model organisms, etc that are involved in the research*

Important Information and Links

This subsection provides an easy to find place for important information and links that may also be shared and/or discussed in more detail later in the lab manual.

For example:
- *Links to commonly used resources, tools, and services*
- *Links to any lab wikis, repositories, environments, etc*
- *Contact information for lab members (as appropriate) and local resources*
- *Answers to frequently asked questions*

Culture and Conduct within the Lab

This section of the manual articulates the values of the lab as an organization. Expectations related to scientific roles and responsibilities are outlined in a later section.

Exactly what this looks like (and what values are emphasized explicitly) will likely vary from lab to lab, but certain policies will be set by the institution (i.e. Stanford Medicine) or other parties (e.g. NIH, etc).

Culture of the lab

This subsection covers the lab's ethos as it applies to engaging with the broader social, cultural, and institutional contexts within which science is situated.

For example:

- *Emphasizing the wellbeing of lab members*
- *Addressing work-life balance/work-life integration*
- *Fostering diversity, equity, and inclusion*
- *Acknowledging impostor syndrome and power differences within academic science*

Conduct within the lab

This subsection details expectations for lab members in their interactions with one another as professionals.

For example:

- *Being respectful, responsible, and making space for others*
- *Promoting teamwork and collaboration*
- *Maintaining a safe working environment for all*
- *Policies related to conflict, harassment, etc*

Where to go for help

This subsection provides information and resources to lab members who may need assistance for issues not necessarily related to the content of their scientific work.

For example:
- *Reporting issues to the PI, Reporting issues potentially related to the PI*
- *Links to university health/mental health resources*
- *Links to university ombuds office, postdoc office, and other relevant parties*

Starting in the lab

This section outlines the onboarding procedures, training, tutorials, administrative work, and any other steps a lab member needs to complete as they begin their time in the lab. The section also lays out important logistical information and essential skills for new lab members.

Before Doing Anything Else

This subsection describes the steps a lab member should take immediately upon joining the lab (i.e. before they collect or analyze any data).

For example:
- *Acquiring necessary equipment, software, accounts, etc*
- *Completing relevant administrative steps*
- *Completing training necessary to conduct research (CITI Training, HIPAA Training, etc)*

Logistical information

This subsection provides logistical details about working in the lab.

For example:
- *How to access the lab's physical spaces*
- *Expectations related to working hours, meeting with supervisors, sick days and absences, etc*
- *Policies and procedures related to managing incidental findings, research participants, lab security, etc*

Essential Skills

This subsection includes information about any essential skills needed to work in the lab, including information about relevant tutorials, classes, etc. Standard operating procedures are outlined in another section.

For example:
- *Practices and procedures related to lab safety*
- *Proper use of lab hardware (e.g. microscopes, sequencers, etc)*
- *Recommended software tools and workflows (e.g. Git)*

Scientific Roles and Responsibilities

This section covers the lab's ethos as it applies to practicing science as well as the related responsibilities and expectations that apply to lab members.

This section may include subsections devoted to expectations for specific roles within the lab (e.g. students, fellows, the PI) as well as a delineation of how these roles work together within the structure of the lab.

Good Scientific Citizenship

This subsection covers the role and responsibility of the lab as a whole as a part of the broader scientific research community.

For example:
- *Conducting rigorous research, ensuring research integrity*
- *Applying open science practices (e.g. preprints, data sharing, etc)*
- *Fostering professional development and growth*

For all lab members

This subsection covers responsibilities and expectations that apply to every member of the lab.

For example:
- *Using specific communication channels (e.g. Slack, E-mail, Trello, Github, etc)*
- *Participating in lab meetings*
- *Protecting secure information*

For specific personnel

This subsection, which could be split into its own sub-subsections (e.g. Expectations for the PI, Expectations for Graduate Students, Expectations for Rotation Students, etc), but the purpose is to outline expectations that are specific for different positions within the group.

For example:
- *Frequency of meetings with PI (or other supervisor)*
- *Making intellectual contributions to research projects*
- *Completing lab chores (cleaning, organizing, etc)*

Standard Operating Procedures

This section covers standard operating procedures (SOPs) (i.e. practices and/or workflows that should be applied consistently) that lab members are expected to adhere to.

Highly technical procedures (experimental protocols, analytical pipelines, etc) may be documented elsewhere, but links or instructions on how to access such materials should be provided in this section. The subsections provided here are given as examples. Depending on the lab, the contents of this section could be much broader than data management.

If possible, everyone in the lab should be following the same SOPs.

Managing Data, Code, and other Materials

This section covers standard practices related to how data and other materials should be saved, organized, and described.

For example
- *File naming conventions for project-related files*
- *Storage and backing procedures*
- *Creating data-level documentation (e.g. data dictionaries)*

Documenting Decisions and Processes

This subsection covers standard practices related to how decisions, workflows, analytical pipelines, and other processes are developed and documented.

For example:
- *Using of lab notebooks/electronic lab notebooks (ELNs)*
- *Managing of project-level documentation (e.g. protocols)*
- *Developing and documenting code and scripts.*

Communications, Contributions, and Authorship

Science is a collaborative process, this section deals with the interrelated issues of communicating scientific findings and appropriately recognizing lab members, collaborators, and anyone else who provided contributions to a research effort.

Communicating Research Findings

This subsection covers the lab's standard practices related to the dissemination of scientific findings (e.g. presentations, preprints, publications, etc) and research-related materials (data, code, reagents, etc).

For example:
- *Practicing presentations and circulating drafts of posters.*
- *Posting preprints and acknowledging comments from the community (e.g. PubPeer).*
- *Complying with open access mandates (i.e. NIH's Public Access Policy)*
- *Sharing research data and other materials.*

Authorship and Acknowledgment

This subsection covers the lab's standard practices for determining authorship as well as the expectations that come from being an author.

For Example:
- *Adhering to authorship guidelines (e.g. ICMJE)*
- *Determining first author, last author, corresponding author, etc and the responsibilities that come from those positions.*
- *Acknowledging the contributions of other parties (e.g. Librarians, Core Facilities) as well as other forms of support (e.g. Grants).*
- *Understanding how to use CRediT (Contributor Roles Taxonomy) to acknowledge different types of contributions.*

Additional Sections

The following are suggestions related to additional sections that may be included in the lab manual.

Offboarding Procedures

This section describes any processes related to the transition of lab members out of the lab.

For example:
- *Developing a transition plan*
- *Transferring data and other materials to other team members*
- *Managing permissions and other access issues.*

Recommended Reading

This section is an annotated bibliography for new lab members.

For example:
- Grant proposals
- The lab's publications
- Formative research articles written by others