# ZHU LAB @NEU

Energy Storage, Sustainable Materials, and Advanced Manufacturing

# Lab Manual

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# Welcome!

My goal is to foster an environment that consists of scientific excellence and professional development and supports every lab member in reaching their full potential while having fun and doing great science. I want you to be happy, safe, and productive while you are here. This manual is the first point of reference for current lab members to achieve our goals as a team, and serves as a general introduction for prospective members. More information on the lab can be found here: https://coe.northeastern.edu/research/hongli_group/index.html

This lab manual was inspired by several others, and borrows heavily from them (e.g., this one and this one). It is also a work in progress. If you have ideas about things to add, or what to clarify, please talk to me (Hongli, the PI) or the lab manager.

When you join the lab, you are expected to read this manual and sign the Lab Agreement Form. You are also highly encouraged to read it while deciding if you want to join the lab. This lab manual is intended to be a starting point for a positive mentor-mentee relationship and lab experience. Ultimately, positive experiences will also require active investment in, and refinement of, our one-on-one interactions over time.

## Expectations and Responsibilities

### Everyone

*Big Picture*

Science is hard. But it's also fun. In the Zhu Lab, we want to make sure that everyone experiences a positive, engaging, hostility-free, challenging, and rewarding lab environment. To maintain that environment, we all must do a few things.

- Work on what you're passionate about, work hard at it, and be proud of it. Be so proud of it that you must suppress bragging (but it's ok to brag sometimes).
- Scientists must be careful. Don't rush your work. Think about it. Implement it. Double and triple check it. Incorporate sanity checks. Ask others to look at your data if you need help or something looks off. It's ok to makes mistakes, but mistakes shouldn't be because of carelessness or rushed work.
- If you do make a mistake, you should tell your collaborators (if they have already seen the results, and *especially* if the paper is being written up, is already submitted, or already accepted). We admit our mistakes, and then we correct them and move on.
- It takes a lot of work to carefully design and execute a sound study. Before diving in, have a look at these slides prepared by Dr. Serra Favila. Then have a chat with Hongli about other considerations that may be specific to your experiment. Careful experimental design is key, and Hongli is always happy to look over your experimental design with you.

- We all want to get papers published and do great things. But we do this *honestly*. It is never ok to plagiarize, tamper with data, make up data, omit data, or fudge results in any way. Science is about finding out the truth, and null results and unexpected results are still important. This can't be emphasized enough: *no research misconduct!*
- Respect your fellow lab-mates. Respect their strengths and weaknesses, respect their desire for quiet if they need it, and for support and a kind ear when they need that. Respect their culture, their religion, their beliefs, their sexual orientation.
- If you're struggling, tell someone (feel free to tell Hongli!). Your health and happiness come first. The lab looks out for the well-being of all its members. We are here to help. It's ok to go through hard patches (we all do), but you shouldn't feel shy about asking for help or just venting.
- If there is any tension or hostility in the lab, something must be done about it immediately. We can't thrive in an environment we aren't comfortable in, and disrespect or rudeness will not be tolerated in the lab. If you don't feel comfortable confronting the person in question, tell Hongli. In any case, tell Hongli.
- Always write your lab notebook with date and experimental details.
- Remember the lab philosophy: "We like to do good science and have fun. At the same time, but also separately".
- Push the envelope of scientific discovery and personal excellence.
- Do work we are proud of individually and as a group.
- Keep everything awesome.

*Small Picture*

There are a few day-to-day things to keep in mind to keep the lab running smoothly.

- Always adhere to proper experimental methods. Valuable research relies on using the correct materials and employing appropriate methodology.
- Use laboratory facilities responsibly. Clean the equipment thoroughly and perform any necessary maintenance to keep it in good working condition for future users. If you encounter any issues or malfunctions, promptly report them to the lab supervisor.
- Do not leave food, drinks, or crumbs out in the lab. Please put food trash in another trash can (not in the lab), especially late in the day or on Friday (so that food doesn't stay in the lab overnight).
- Keep the lab neat—especially in the phone area. Items left unattended may be cleaned, reclaimed, or recycled. Keep the lab clean, safe, and well organized.
- Make sure the door to the lab is locked if no one is inside. Turn off the lights if you are the last one leaving for the day.
- Dress code is casual, but not too casual – no tank tops, sweatpants, pajamas, no open-toed shoes - you can dress up if you want, especially when meeting with participants or presenting your research.

- Be on time. Especially when you are running participants – arrive 15-20 minutes early to set everything up. Be on time for your meetings: respect that others have packed schedules and everyone's time is valuable.
- If there is any issue, pls always communicate with Hongli face to face.
- If you have concerns, please communicate them directly to Hongli or the appropriate person to ensure they are addressed constructively.
- Lab notebooks and IP belong to the lab and university and not the individual and cannot be removed from the lab at any point.

Principal Investigator

All of the above, and I promise to also…

- I am responsible, reliable, inspiring, approachable, straightforward, solution-driven, action-taking, well-organized, professional, and hardworking.
- Give you support both in research and finance.
- Write a lot of proposals and get enough funding for you to do research.
- Give you feedback on a timely basis, including feedback on project ideas, conference posters, talks, manuscripts, figures, and grants.
- Be available in person and via e-mail on a regular basis, including regular meetings to discuss your research (and anything else you'd like to discuss)
- Give my perspective on where the lab is going, and where the field is going.
- Support your career development by introducing you to other researchers in the field, promoting your work at talks, writing letters of recommendation for you, and letting you attend conferences as finances permit.
- Help you prepare for the next step of your career, whether it's a post-doc, a faculty job, or a job outside of academia.

Post-Docs

All of the above, and you will also be expected to…

- I expect post-docs to affect the students and other peers in the lab positively.
- Post-docs are encouraged to aim for at least two leading publications per year, depending on the scope and progress of their projects. We can adjust expectations as needed to ensure high-quality work and impactful outcomes.
- Postdoctoral researchers are responsible for maintaining laboratory safety and operational standards, including organizing materials and supplies, conducting regular cleaning and waste disposal, performing preventive equipment maintenance, implementing safety protocols, and ensuring compliance with all laboratory safety regulations while mentoring junior lab members in proper safety practices.
- Follow and implement the advisor's guidance in research and lab protocol.

- (Suspended) Apply for grants. Though I will only hire you if I can support you for at least one year, it's in your best interest to get experience writing grants – and if you get them, you'll be helping the entire lab as well as yourself (because you'll free up funds previously allocated to you).

Graduate Students

All of the above, and you will also be expected to…

- Graduate students are encouraged to aim for at least one publication per year. This milestone will help support your progress toward completing your PhD within 4-5 years.
- Develop your dissertation research. Your dissertation should have at least 4 substantial experiments that answer a big-picture question that you have. Much of your work has to be done independently but remember that others in lab (especially Hongli!) are there to help you when you need it.
- Help mentor undergraduate students in the lab when they need it – either because they ask, or because I ask you to. Undergrads can also help you collect data.
- Make sure you meet all departmental deadlines (e.g., for your exams and thesis) -- and make sure Hongli is aware of them!
- Prioritize time for research. Coursework and TAing are important, but ultimately your research will get you your PhD and prepares you for the next stage of your career.

Lab Managers and other Full-Time Research Staff (I'm thinking of hiring one, but not in position yet)

All of the above, and you will also be expected to…(will update when this person onboards)

Undergraduate Students

All of the above, and you will also be expected to…

- Assist other lab members with data collection and analysis (unless you are working on your own independent project under the mentorship of another lab member, in which case you should work on that).
- Develop your weekly schedule by talking to your graduate student mentor or your post-doc mentor. You should be coming in every week and scheduling enough time to get your work done.
- If you are earning course credit for research, you must also attend lab meetings when your schedule permits, present at one of these lab meetings, and submit a write-up of your research by the end of the semester.

**Code of Conduct**

**Lab Intellectual Property (IP) Protection Rules**

Intellectual Property (IP) generated within this laboratory reflects the collective creativity, dedication, and many years of effort of all group members and is often supported by external funding agencies. Protecting this IP is essential to maintaining research integrity and safeguarding the laboratory's work. Accordingly, laboratory members shall not remove, copy, or retain laboratory SOPs, confidential know-how, confidential enabling information, protocols, recipes, or internal documentation, and shall not use lab-specific protocols or enabling know-how after leaving the laboratory. All enabling know-how, including lab-specific methodologies, parameter windows, optimization strategies, and operational knowledge, developed within this laboratory belongs to the laboratory, regardless of publication or patent status. Laboratory IP and confidential know-how should not be confused with general academic knowledge; the laboratory maintains a formal legal protection framework to safeguard its IP and confidential know-how.

All members are required to adhere strictly to the following rules:

1). General Principles

1.1. All discoveries, data, methodologies, experimental procedures, technical know-how, prototypes, ideas, and unpublished results developed within the lab are the property of the lab and Northeastern University (or relevant sponsoring institution/agency).

1.2. IP protection applies to all work conducted in the lab, including projects supported by federal grants, industrial collaborations, and internal funding.

1.3. Respect for the confidentiality and integrity of lab IP is a condition of membership in this group. Any violation will be considered misconduct and may result in disciplinary actions, up to and including termination of appointment and formal reporting to the University and funding agencies.

2). Confidentiality and Non-Disclosure

2.1. All members must sign this lab manual prior to beginning research.

2.2. Lab IP must not be disclosed, shared, or transferred to external parties, including faculty in other labs, collaborators, companies, or friends, without prior written approval from the Principal Investigator.

2.3. Discussions of lab IPs outside of approved channels are prohibited.

3). Use of Lab Confidential Know-How

3.1. Experimental methods, protocols, and confidential know-how developed in this lab may not be replicated, applied, or transferred to other labs without explicit PI authorization.

3.2. When leaving the lab, members must not take experimental protocols, data, or unpublished research results for independent use. Any future research building upon these methods must be formally approved through collaboration agreements.

3.3. Materials (samples, prototypes, devices, reagents, or custom equipment) produced in this lab remain property of the lab and must not be removed without permission.

4). Publications and Presentations

4.1. Publications must accurately acknowledge all funding agencies, collaborators, and contributors.

4.2. Manuscripts, abstracts, posters, or slides containing lab IP must be reviewed and approved by the PI before submission or public presentation.

4.3. Authorship must be based on substantial intellectual or experimental contributions, in accordance with academic integrity guidelines.

5). Student and Postdoc Responsibilities
5.1. Students, postdocs, and visiting scholars are entrusted with confidential IP during their training. This trust must be upheld both during and after their affiliation with the lab.
5.2. Before departing, members must return all lab notebooks, electronic data, and experimental records.
5.3. Members must not use training received in this lab to directly compete with or duplicate the lab's research without permission.
6). Collaboration and External Engagement
6.1. Any collaboration involving lab IP must be initiated and overseen by the PI. Members may not independently establish collaborations involving lab technologies.
6.2. Prior to sharing IP with external partners, appropriate legal agreements (e.g., Material Transfer Agreements, NDAs, or Sponsored Research Agreements) must be executed.
6.3. Violations—including transferring technologies or students to other labs without PI approval—will be treated as serious breaches of academic and professional ethics.
7). Compliance and Enforcement
7.1. These rules comply with Northeastern University policies and U.S. federal regulations governing federally funded research.
7.2. Failure to follow IP protection rules may result in:

- Immediate removal from projects involving federal funding.
- Loss of authorship on publications.
- Notification to the University's Research Integrity Office.
- Formal reporting to federal funding agencies (NSF, DOE, etc.).

7.3. The PI reserves the right to take appropriate action to safeguard the lab's research integrity and intellectual assets.

## Essential Policies

The lab, and the university, is an environment that must be free of harassment and discrimination. All lab members are expected to abide by the Northeastern University policies on discrimination and harassment, which you can (and must) read about the following:
Code of Ethical Conduct: https://policies.northeastern.edu/policy101/
Center for Research Innovation
Student Code of Conduct: https://osccr.sites.northeastern.edu/code-of-student-conduct/
Undergraduate Student Handbook (pages 54-56 of 88 page online PDF – Copyrightable Materials)
Graduate Student Handbook (Academic Policies and Procedures – Copyrightable Materials)
Policy on Conflict of Interest and Commitment: https://policies.northeastern.edu/policy400/
Policy on Responsible Conduct of Research: https://policies.northeastern.edu/policy500/
Policy on Research Misconduct: https://policies.northeastern.edu/policy502/
Policy on Data Access: https://policies.northeastern.edu/policy703/
Policy on Openness in Research: https://policies.northeastern.edu/policy503/
Policy on Shared Research Facilities: https://policies.northeastern.edu/policy512/
Policy on Keys and Keycards: https://policies.northeastern.edu/policy600/
Policy on Restricted Access and Supervision Requirements for Laboratories and Support Rooms: https://policies.northeastern.edu/policy602/
Policy on Export Control: https://policies.northeastern.edu/policy110/
Policy on External International Engagements:https://policies.northeastern.edu/policy112/
Policy Requiring Registration of University Travel: https://policies.northeastern.edu/policy612/
Policy on Travel to High-Risk and Sanctioned Destinations: https://policies.northeastern.edu/policy613/

The lab is committed to ensuring a safe, friendly, and accepting environment for everybody. We will not tolerate any verbal or physical harassment or discrimination based on gender, gender identity and expression, sexual orientation, disability, physical appearance, body size, race, or religion. We will not tolerate intimidation, stalking, following, unwanted photography, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome sexual attention. Finally, it should go without saying that lewd language and behavior have no place in the lab, including any lab outings.

If you notice someone being harassed, or are harassed yourself, tell Hongli immediately or report to title IX office.

Taking Photos & Videos

We respect the privacy and comfort of lab members by only taking photos or video recordings of them with their explicit knowledge and consent. This is especially important in situations where a lab member would otherwise not be aware of you taking a photo and therefore cannot object if they do not want you to – e.g., if they are wearing one of our VR headsets or are being scanned. To avoid ambiguity about when a lab member is vs is not aware of photos being taken, we ask that everyone obtain consent from lab members before taking photos or videos, and obtain consent again before posting any images on social media. This is done to respect others' privacy and acknowledge that people have varying degrees of comfort related to being photographed and especially with having those photographs shared on social media.

The goal of this is to foster an environment where everyone feels safe to be who they are, take risks, and have fun, without worry or self-consciousness. If someone wants to be photographed doing something fun or silly in lab events, and consents to be photographed, by all means go ahead! Just please respect the privacy of those who do not want that.

On a related note, you cannot photograph your participants during an experiment. If you would like a photograph of someone demonstrating your experiment, ask a lab member if they would feel comfortable being photographed while demonstrating what a participant does in an experiment.

Surveillance cameras are installed for safety and compliance purposes only, and footage will not be accessed without legitimate reasons.

## **Scientific Integrity**

*Research Misconduct*

The lab is committed to ensuring research integrity, and we take a hard line on research misconduct. We will not tolerate fabrication, falsification, or plagiarism.

A big problem is why people feel the need to engage in misconduct in the first place, and that's a discussion that we can have. If you are feeling pressured to succeed (publish a lot, publish in high impact journals), you should reach out to Hongli and we can talk about it – but this pressure is something we all face and is *never* an excuse to fabricate, falsify, or plagiarize. Also, think about the goal of science and why you are here: you're here to arrive at the truth, to get as close as we can to facts about the Science. Not only is research misconduct doing you a disservice, it's also a disservice to the field. And it risks your entire career. It is never right and never worth it. Don't do it.

*Reproducible Research*

If you gave someone else your raw data, they should be able to reproduce your results exactly. This is critical, because if they can't reproduce your results, it suggests that one (or both) of you has made errors in the analysis, and the results can't be trusted. Reproducible research is an essential part of science, and an expectation for all projects in the lab.
For results to be reproducible, the analysis pipeline must be organized and well documented. To meet these goals, you should take extensive notes on *each step* of your analysis pipeline. This means writing down how you did things every step of the way (and the *order* that you did things), from any pre-processing of the data, to running models, to statistical tests. It's also worth mentioning that you should take detailed notes on your experimental design as well. Additionally, your code should also be commented, and commented clearly. We all know what it's like to sit down, quickly write a bunch of code to run an analysis without taking time to comment it, and then having no idea what we did a few months down the road. Comment your code so that every step is understandable by an outsider.

Reproducibility is related to replicability, which refers to whether your results can be obtained again with a *different* data set. That is, if someone ran your study again (with a different group of participants), do they get the same results? If someone ran a conceptually similar study, do they get the same results? Science grows and builds on replicable results – one-off findings don't mean anything. Our goal is to produce research that is both reproducible and replicable.

*Authorship*

Like other labs, we will follow the APA guidelines with respect to authorship:

> *"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, and 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."*

At the start of a new project, the student or post-doc taking on the lead role can expect to be first author (talk to Hongli about it if you aren't sure). Hongli will typically be the last author, unless the project is primarily under the guidance of another PI and Hongli is involved as a secondary PI – then Hongli will be second to last and the main PI will be last. Students and post-docs who help over the course of the project may be added to the author list depending on their contribution, and their placement will be discussed with all parties involved in the paper. If a student or post-doc takes on a project but subsequently hands it off to another student or post-doc, they will most likely lose first-authorship to that student or post-doc. *The lead authorship rule is if you want to be the lead author, then take the responsibility as lead author in experimental and writing. If you cannot take the corresponding responsibility, then you will lose the position as lead author.* All these issues will be discussed openly, and you should feel free to bring them up if you are not sure of your authorship status or want to challenge it.

*Old projects*

If a student or post-doc collects a dataset but does not completely analyze it or write it up after the end of data collection, Hongli will re-assign the project (if appropriate) to another person to expedite publication. If a student or post-doc voluntarily relinquishes their rights to the project, Hongli will also re-assign the project to another individual. This policy is here to prevent data (especially expensive data, e.g., beamtime data) from remaining unpublished.

Integrity and Accurate Communication

In our lab, we maintain a strict policy against slander, misinformation, exaggeration, defamation, and misleading conduct. We believe in fostering a work environment built on trust, respect, and open communication. Engaging in slanderous behavior, spreading misinformation, or intentionally misleading others undermines the integrity of our research and damages the relationships within our team.

Any lab member found to be participating in slander, misinformation, or defamation will face serious consequences, up to and including termination of their position in the lab. This policy applies to all forms of communication, including verbal, written, and digital interactions.

If you encounter any instances of slander, misinformation, or misleading conduct, please report it immediately to the lab supervisor or the appropriate university authorities. All reports will be investigated thoroughly and confidentially.

We encourage all lab members to communicate openly, honestly, and professionally. If you have concerns or conflicts with another lab member, please address them directly and respectfully, or seek guidance from the lab supervisor if needed.

By maintaining a culture of trust and transparency, we can create a positive and productive work environment that enables us to conduct high-quality research and advance our scientific understanding. There is zero tolerance for defamation, exaggeration, and misleading.

General rules

*Code of Conduct*

-Always act with honesty and integrity in your research. Fabrication, falsification or misrepresentation of data is strictly forbidden.
- *No chemicals or supplies should be brought into or removed from the lab without the Principal Investigator's prior approval*.
- Maintain strict confidentiality of sensitive information, especially related to government projects. Do not share data or ideas with unauthorized persons, even within the lab.
- Intellectual property, data, and research materials generated in the lab belong to the university, not to individual personnel. Do not remove equipment, supplies, materials or data from the lab without permission.

*Data Management and Lab Notebooks*
- Document all experiments thoroughly in your lab notebook. Write entries for each experiment on the day it was performed. Include enough detail so that someone else could understand and repeat the experiment.
- Lab notebooks must stay in the lab. When you leave the lab, your notebook must be returned so it can be archived.
- Back up experimental data to the designated lab server or cloud drive, such as Dropbox, regularly, at least once per week.
- I will check your lab notebook and data during our regular meetings. Failure to maintain an up-to-date and complete lab notebook may result in disciplinary action.

*Research Conduct*

- Follow best practices to conduct reproducible research. Use version control, comment and document code thoroughly, and keep detailed records of data processing and analysis steps.
- Authorship on papers will be granted based on intellectual contributions to the project. As the PI, I expect to be included as a corresponding author on work coming out of the lab.
- Present your work at weekly meetings, and seek feedback from advisor.

*Lab Citizenship*

- Maintain a professional and collegial environment in the lab. Respect your colleagues' time and space. Clean up after yourself and be a good team player.
- Attend all required meetings and be on time. Notify me in advance if you must be absent.
- Respond to emails related to your manuscript, research and lab safety managementhour in a timely manner.

- Failure to adhere to lab rules and maintain research integrity may lead to serious consequences, including the potential termination of your position within the laboratory. It is essential that all lab members consistently follow established protocols, maintain a safe working environment, and uphold the highest standards of scientific ethics. Any deliberate or repeated violations will be subject to disciplinary action, up to and including dismissal from the research group.

## Lab Software and Inventory System

*Dropbox*

The lab utilizes Dropbox to synchronize project-related data, literature, and writings.

*Quartzy*

The lab uses Quartzy for the procurement and ordering of materials, supplies, and equipment.

*Inventory protocol, Facilities Manuals, and Materials safety data sheets*

1) Upon Receipt of Chemicals:
    a. Clearly label each chemical container with the barcode.
    b. Store chemicals immediately in designated cabinets or storage units according to their specific hazard classification (flammable, nonflammable, acid, base) or required conditions (e.g., low-temperature refrigerators).
    c. Accurately record the chemical in the SciShield inventory system, including the barcode, storage location as indicated on the labels, and relevant details.
2) During Chemical Use:
    a. Always handle and use chemicals strictly following their Material Safety Data Sheets (MSDS/SDS).
3) After Chemical Use:
    a. Promptly return chemicals to their assigned storage locations in step one to ensure accurate inventory tracking and safety.
4) Disposal:
    a. When a chemical container is emptied, properly dispose of it following the laboratory waste management protocol.
    b. Immediately remove the empty chemical from the SciShield inventory system to maintain accurate and up-to-date inventory records.

Pls always read manuals and materials safety data sheets when you first use the equipment or handle a new material. If you cannot find them in our facilities manual drawer or MSDS drawer, google it. All these information is well organized in specific drawers in the lab next to the sink.

*E-mail*

Email is a convenient communication tool. Hongli can be reached via email.
Please respond to emails promptly regarding lab matters, such as lab safety, research, or manuscript writing.

*Slack*

Slack is used as the primary means of lab communication and sharing. The best way to get in touch with Hongli is via Email.

**General Policies**

**Lab notebooks:**

1). Record Every Step of Your Work
- Document your experiments daily, including the date, title, and objective for each session.
- Include all steps, even minor adjustments or troubleshooting you perform, as they may be critical for understanding and replicating results.

2). Be Specific and Detailed
- Write down exact quantities, materials, and parameters used (e.g., temperatures, times, pressure, ratio, concentrations).
- Record observations (e.g., color changes, unexpected results) as they occur.

3). Maintain Chronological Order
- Do not leave empty spaces; draw a line or write "N/A" to indicate sections not used.
- Avoid rewriting notes from memory—capture information in real-time or as soon as possible.

4). Include Data and Calculations
- Attach raw data (e.g., printed graphs, EIS plots) to your notebook or reference where it is stored digitally.
- Include all calculations, assumptions, and formulas used.

5). Reflect on Results
- Add brief conclusions or insights after each experiment, noting what worked and what didn't.
- Propose next steps or changes for future experiments based on results.

6). Ensure Legibility and Organization
- Write clearly and consistently. If corrections are necessary, strike through errors and rewrite them rather than erasing.
- Use sections or headings to organize different experiments for easy navigation.

Why It Matters?

A well-maintained lab notebook is not just a requirement—it is a reflection of professionalism and a safeguard for intellectual property. It ensures our results are reproducible, facilitates collaboration, and could be crucial for publications, patent applications, or resolving disputes. Here is more references for lab notebook,

## Lab Working Hours Policy

Standard lab hours are 9:00 am–6:00 pm or 10:00 am–7:00 pm to maintain a consistent and productive research environment; adjustments can be approved by the PI based on individual circumstances or project-specific needs. Full-time employees, such as postdoctoral researchers, must maintain an average of 8 working hours per day (40 hours per week) to remain eligible for full-time benefits; if significantly fewer than 40 hours are worked in a given week, vacation time must be used to cover the difference, in line with HR policy. Requests for vacation or personal time must be submitted via email at least two weeks in advance, and sick leave should be communicated as soon as possible; all approved leave must be promptly updated in Workday, consistent with HR guidelines.

## Noise Policy

I love that lab members get along and want to spend time with one another. This is a critical aspect of a productive, friendly, and positive lab environment. But I also realize that you are all very busy and want to have a place to focus and work quietly.

Motivated by the concerns of some lab members, and in conversation with them, we have devised a set of policies so that you can all work effectively. These policies do not preclude socializing at specific, agreed-upon times (e.g., lunch, happy hours); in fact, we encourage you to! These policies also do not preclude meeting with one another to discuss research, classes, life, etc; again, we encourage you to! But keep these policies in mind:

Policies

1. General quiet time: Quiet time is between 9am and 5pm in the lab. Please respect other people's needs to work quietly in lab during those times by lowering your voice and generally keeping noise to a minimum. If you do need to talk, do it quietly and/or set up a meeting in a room with closed doors.

2. Headphone rule: If someone is wearing headphones, respect their need for quiet. Do not tap them on the shoulder to talk. Do not talk loudly next to them. Exception: if there is a fire alarm or other emergency and they are not aware, do alert them for their own safety.

3. Flexible work locations: Feel free to work from library when Policies 1 & 2 aren't enough.

## Meetings

*Biweekly Lab Meetings (Suspended)*

Biweekly lab meetings (~2 hours) are meant to be a forum for trainees to present literatures/project ideas and/or data to get feedback from the rest of the group. Projects at any level of completion (or even not yet started!) can benefit from being presented. These lab meetings can also be used to talk about methods, statistical analyses, new papers, and career development. Some weeks we may explore a particular issue and have people read different papers – in that case, come to lab meeting having read your paper and be prepared to summarize it for the group.

Each trainee (RA, students, post-docs) is expected to present at least once every semester. These meetings are informal, and you can do what you wish with your slot – just be prepared to contribute something substantive. Lab members are also expected to attend every meeting. Undergraduate students are encouraged to attend as often as possible (assuming it fits in their course schedule).

Occasionally, we may have joint lab meetings with other faculty in the department – these may be combined with our weekly lab meeting or an additional meeting. We will also use lab meetings (or ad-hoc scheduled meetings) to prepare for conference presentations and give people feedback on job talks or other external presentations. Lab meeting agendas and notes will be kept in the #lab-meetings channel on Slack.

*Individual Meetings*

Each full-time lab member (RAs, graduate students, post-docs) will have a one-hour slot set aside to meet with Hongli weekly. If scheduling conflicts arise (e.g., because of travel), we can try to reschedule for another day that week.
Hongli will meet with undergraduate students at least every other week (or according to need); post-docs and graduate students should meet with their undergraduate mentee on a regular basis.

Deadlines

One way of maintaining sanity in the academic work is to be as organized as possible. This is essential because disorganization doesn't just hurt you, it hurts your collaborators and people whose help you need. When it comes to deadlines, tell your collaborators as soon as you know when a deadline is, and make sure they are aware of it the closer it gets. Don't be afraid to bug them about it (yes, bug Hongli as well).

Give Hongli at least *one week's notice* to do something with a hard deadline that doesn't require a lot of time (e.g., reading/commenting on conference abstracts, filling out paperwork, etc).

Give Hongli at least *two weeks' notice* (preferably more) to do something with a hard deadline that requires a moderate amount of time (e.g., a letter of recommendation).

If you want feedback on research and teaching statements, or other work that requires multiple back-and-forth interactions between you and Hongli before a hard deadline, give her as much time as you can; at the very least *three weeks*.

For manuscript submissions and revisions (i.e., which either have no deadline at all or only a weak deadline), send drafts to Hongli as soon as you have them, and bug her to give you feedback if she hasn't responded in *two weeks* – papers are important!

Presentations

Learning to present your research is important. Very few people will read your papers carefully (sad, but true) but you can reach a lot of people at conference talks and posters. Also, if you plan on staying in academia, getting a post-doc position and getting a faculty position both significantly depend on your ability to present your data. Even if you want to leave academia, presentations are likely to be an important part of your job. Additionally, every time you present your work, you are representing not just yourself but the entire lab.

It is therefore highly encouraged that you seek out opportunities to present your research, whether it is at departmental talk series and events, to other labs, at conferences, or to the general public. If you are going to give a presentation (a poster or a talk), be prepared to give a practice presentation to the lab at least one week ahead of time (two weeks or more are advisable for conference presentations, and *many* weeks ahead of time are advisable for job talks, which require much refining). Practice talks will help you feel comfortable with your presentation, and will also allow you to get feedback from the lab and implement those changes well in advance of your real presentation.

Templates for posters will be available, and you can use those as much or as little as you'd like. Some general rules for posters should be followed: minimize text as much as possible (if you wrote a paragraph, you're doing it wrong), make figures and text large and easy to see at a distance, label your axes, and make sure different colors are easily discriminable. Other than that, go with your own style.

Hongli is also happy to share slides from some of her talks if you would like to use a similar style. You'll get a lot of feedback on your talks in any case, but other people's slides might be helpful to you as you are setting up your talk. As with posters, feel free to go with your own style as long as it is polished and clear.

## Check-in and check-out rules

Lab Check-In (Initial procedures when first joining the lab) Procedure:

1) Complete lab safety training before entering the lab.
2) Upon entering the laboratory, immediately put on the required personal protective equipment (PPE), such as lab coats, gloves, and safety glasses.
3) Perform a quick inspection of your workstation and any equipment you'll be using to ensure they are in proper working order. Report any issues to the lab supervisor.
4) Sign in to the lab notebook, noting the date, time, and tasks you plan to undertake.
5) Review the lab manual thoroughly, paying close attention to safety procedures, equipment operation guidelines, and experiment-specific protocols you will be following.
6) Ensure you have your Husky Card for access to the lab.

Lab Check-Out (Procedures before graduating) Procedure:

1) Complete all ongoing experiments or projects, ensuring they are closed and left in a safe state.
2) Record all relevant experimental data, observations, and protocol changes in the lab notebook or digital system, providing detailed and accurate information for future reference.
3) Before leaving the lab, please ensure that all data, writings, and lab notebooks are submitted to Hongli for review and proper archiving.
4) Dispose of waste materials according to the lab's safety guidelines and local regulations, ensuring proper handling of hazardous substances.
5) Clean your work area thoroughly, including lab benches, equipment, and tools. Disinfect surfaces as required by lab protocols.
6) Store all materials and equipment in their designated locations, ensuring they are properly labeled and organized for easy access by other lab members.
7) Schedule a meeting with the PI (Hongli) to close your work and any pending issues or concerns before checking out.
8) After checking out, maintain the confidentiality of the research conducted in the lab. Do not disclose any sensitive information, unpublished data, or intellectual property to individuals outside the lab without explicit permission from the PI. NDA is onboard before you leave.
9) Return any lab resources, such as books, software, materials, supplies, set-ups, and equipment, to Hongli and sign the *lab check out form*.

## Recommendation Letters

Letters of recommendation are extremely important for getting new positions and grants. You can count on Hongli to write you a letter if you have been in the lab *at least one year* (it's hard to really know someone if they have only been around for a few months). Exceptions can be made if students or post-docs are applying for fellowships shortly after starting in the lab.

If you need a letter, notify Hongli as soon as possible with the deadline (see Deadlines for guidance), your CV, and any relevant instructions for the content of the letter. If the letter is for a

grant, also include your specific aims. If the letter is for a faculty position, also include your research and teaching statements. In some cases (especially if short notice is given), you may also be asked to submit a draft of a letter, which will be modified based on Hongli's experience with you, made more glamorous (people are much too humble about themselves!), and edited to add anything you left out that Hongli thinks is important. In my recommendation letter, the first merit I will always mention objectively its the person's responsibility and responsibility. This will ensure that the letter contains all the information you need, and that it is submitted on time.

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The Zhu Lab has been supported by funds from DOE, NSF, and private foundations, as well as start-up funds, internal grants, and seed funding from Northeastern University. If you need to buy something, or must charge a grant for something (e.g., reimbursements), let Hongli know and she will oversee the process. The lab bank account is shared with the group member, pls always keep the information confidential.

Reading test Lab members: If you are looking at a printed version, please write your name below to indicate you have read the current version of the manual and agree to follow these policies. Date Printed name Signature.

| **Date** | **Printed name** | **Signature** |
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