Li Laboratory for Polymer Digital Engineering (PDE lab) Mentorship Compact

Mission Statement for Li Lab Mentoring and Career Development

The Li Lab at the Mechanical Engineering Department, University of Wisconsin-Madison, has three central goals:

- To do quality science to advance the national health, prosperity, and welfare
- To develop each lab member to become a successful scientist/engineer
- To maintain a collegial, welcoming, and intellectually stimulating environment

As your graduate advisor, I will provide the mentorship and training needed to help you develop into an independent scientist/engineer. To accomplish this goal, it is important that we establish effective communication and align our expectations with each other. This document provides a framework for communicating the culture of my lab, and how you and I will work together to further your scientific productivity and intellectual development. I believe in mentoring each individual in a transparent manner that best meets their needs, and I look forward to having open discussions about these expectations and revisiting them as necessary to enable your successful professional development. Please do not hesitate to bring up any questions or concerns that you may have.

Please note that this document is not a substitute for university rules and regulations, and that those policies and any legal requirements supersede anything in this document.

What you can expect from me

- **I will set the scientific direction for the lab and provide the means to pursue those directions**. This will include helping you to find a research topic, writing grants to fund the research, and maintaining the necessary university protocols for us to utilize the laboratory. Additionally, I will seek out collaborators for our work to further your opportunities.
- **I am committed to mentoring you now and in the future.** I am committed to your education and training while in my lab, and to advising and guiding your career development. I will work to promote you and your work. I will provide honest letters of evaluation for you when requested.
- **I will encourage you to attend scientific meetings and make an effort to fund these activities.** These meetings are important to showcase your work and for the networking opportunities as you pursue positions after your time in my lab ends.
- **I will be available for regular meetings and informal conversations, and will provide timely review of research.** In addition, I will do my best to provide an open-door policy and respond quickly to e-mails. Please be aware that there will be times when I will be unavailable due to other obligations. I will add these times to my calendar so you can prepare accordingly. I will do my very best to answer email questions the same day. For abstracts and small data questions, I will generally be able to review in 1-2 days, for papers and thesis, I will need 2-3 weeks. In the event of a lab emergency, I may be contacted on my cell phone. Don't hesitate to bug me if you've sent me something and have not received a response within the times listed above. I also recognize that sometimes research runs right up until the deadline. In these cases, I will do my very best to accommodate last-minute, urgent requests.
- **I will provide a work environment that is intellectually stimulating, supportive, safe, and free from harassment.** I take seriously any difficulties you experience in relationship to this statement – if there are conflicts with another lab member, collaborator, or other colleague, please inform me and I will work with you and the other party to find a resolution. I will strive to understand your unique situation and am open to your suggestions on how to improve your experience in the lab.

What I expect from you

You will take ownership of your educational experience

- You will need to **determine the requirements for your individual graduate program and are responsible for insuring that you are in compliance**. As you progress, I will work with you to select courses, qualifying exams, and committee members.
- You will **keep me updated on your research progress and challenges.** This is the only way that I can effectively serve as your mentor.
- To earn your degree **you must transition towards independence**. We will work together to track this process, but ultimately when you earn a degree will be up to the work you produce, not simply the time you put in. I do not believe that a certain number of publications are required for a degree because each project is different. Typically, a PhD student will publish 4-5 first-authored papers and a MS student will publish 1-2 first-authored papers.
- **Work hard to make progress and overcome challenges.** Research is not easy, but the struggles and challenges often indicate that you're doing something worthwhile. Part of your transition to independence is formulating solutions to your challenges. Thus, when you come to me with a challenge you're facing, please also come up with a list of solutions that you've thought of and possibly already tried. I want to help when I can, but you'll learn more by trying to overcome challenges on your own first.
- **Seek out professional development opportunities** – being a successful scientist/engineer involves more than being good at the bench. You must communicate well (presentations, papers, grants), develop personal skills (lab management, mentoring), maintain high ethical standards, and for a faculty career, teach. However, these opportunities must be balanced with the most important element of your career development – research progress towards your thesis/ dissertation. Keeping me up to date with your career goals and areas you hope to grow in will help me to pass along opportunities that I see.
- You will be involved in at least one **outreach** activity every year. Outreach is a key component of scientific research in a university setting. We will discuss and confirm the outreach activity at the beginning of each academic year.

You will develop your personal research skills

- **Create an individual development plan.** An individual development plan (IDP) helps you to assess strengths and areas for improvement. It also helps you (1) to plan the activities that you will participate in to maintain your strengths and improve in the areas that you have identified and (2) to set SMART goals for yourself. I would like to discuss your IDP at least annually so I can make sure that I'm passing along opportunities that align with your plan.
- **Stay on top of the scientific literature in your area.** To do this, you'll need to block off some time each week for reading and updating your literature database. Make it your goal to send the lab new papers before they send them to you. This process is challenging but is made easier by subscribing to relevant table of contents (TOCs) alerts for common journals in your area and setting alerts in Google Scholar/PubMed. Often, we will set up journal clubs on topics of interest to the lab to help us learn together. Read the papers I suggest, run a literature search, and read papers suggested by this search. A rule of thumb for our lab is that you are expected to read at least one paper per day on average (5 papers per week).
- **Learn how to plan your experiments/simulations.** This is a critical step toward independence and to keep your research moving towards the overall goal of your project. Make sure your experiments/simulations address the question of interest rigorously. This includes using appropriate experimental/computational approaches, proper statistical planning, etc. These plans should be presented at a lab meeting before experiments/simulations begin. You will also need to learn how to effectively plan the sequence and timing of tests to maximize efficiency and to develop plans with short/medium/long-term goals.
- **Keep detailed lab notebooks.** Documenting what you did, whether it worked, what you would do differently the next time are critical to research progress. This helps future you (or me) remember

what past you did, which is critical when writing up papers and your thesis/dissertation. It's also important to have a running list of interesting research questions for future study. I currently do not have a preference whether this is a traditional paper lab notebook or an electronic lab notebook. My preference would be an electronic lab notebook because (1) much of our work has a computer component to it so it saves time in adding materials to the notebook and (2) they are automatically backed up. These notes can also come in the form of readme text files kept along with the data. Referencing these readme files in a lab notebook entry is a very good way to document your progress.

- **Develop your writing and presentation skills**. As you start to make progress in your research, begin your paper by outlining the figures and drafting the abstract. Be prepared to go through rounds of revisions before submitting an abstract or paper. Although the availability of travel funds will vary, I encourage you to submit your work for presentation at one conference per year. I suggest trying to attend 1-2 relevant seminars per month to learn both science and how to give a good talk.
- **Develop your mentoring and management skills**. Mentoring undergraduate researchers and new graduate students not only helps you achieve your experimental/computational goals, but also provides an opportunity to further your professional development as a supervisor. As the direct supervisor of an undergraduate student, you will be expected to train them appropriately, provide them with experimental/computational guidance, and ensure that they operate in a safe and respectful manner in the lab.
- **Apply for fellowships, traineeships, and travel grants**. Not only will an award help your career and the overall lab funding situation, the experience of writing the proposal will help you think about what you are doing more deeply. I expect that all students seek out independent funding opportunities.
- **Learn how to accept and utilize constructive criticism**. The feedback from me, colleagues, committee members, and course instructors is intended to improve your work. If you ever feel that feedback is too direct or is a personal attack on you, then please come talk to me. I hope that our supportive environment allows us all to provide honest feedback to each other because it is much better to receive constructive criticism from your lab than from a reviewer or someone at a conference.

You will contribute to the lab and be a good lab citizen

- **Help to train new students.** Senior graduate students are responsible for helping to train new students in the ways of the world (e.g., lab procedures and how individual/group meetings work). **Science is a community** - many people will help you along the way, and you should return the favor. Share your insider knowledge of techniques with others. Teaching others will help to solidify your knowledge.
- **Data belongs to the lab, not to any one individual**. As a result, you will be expected to leave your original notebooks and files when you leave the lab. In addition, there will be times when you will be asked to assist me in submitting grant applications to NSF/DOE/DOD/etc. This activity is essential to provide continuing support for the lab. Additionally, it will give you an opportunity to develop skills in grantsmanship.
- **Complete your designated lab jobs.** There will be many tasks that we have to complete together such as ordering, general maintenance of equipment, lab safety, etc. Failure to do your lab jobs not only affects you, it can impede the entire lab and will not be tolerated. Everyone is expected to make sure that supplies do not run out, to report problems with equipment/facility to the person in charge, and to keep the lab clean and organized.
- **Keep lab protocols up to date** in the main lab folder (i.e., R:\ME_YingLi_Lab). Keeping protocols up to date ensures that all experiments/simulations are carried out correctly. It is important that data is stored on the Research Drive because the IT department manages the backup of these files.
- **Be polite, neat, and gracious when working in the labs of other investigators.** Always follow their rules. If something breaks during your use, then report it immediately to the appropriate

person.

- **Be respectful, tolerant of, and work collegially with laboratory colleagues: respect individual differences in values, personalities, and work styles.** This diversity makes our lab stronger!

Nuts and Bolts

Hours and Vacation

The hours in our laboratory are flexible – however, I do have the general expectation that as a research assistant your commitment to the laboratory will be similar to a "full-time job". One of the positive aspects of research in a University setting is the general flexibility concerning hours. However, if setting a 9-5 type schedule is helpful or needed for your productivity, we will discuss this individually. If your productivity is not up to the laboratory's standard, I will first supply a warning. If productivity does not change, we will discuss more strict mechanisms to ensure proper time is committed. All this being said – work/life balance is incredibly important for your mental health (and long-term productivity!) so please be sure to reserve some time for things that you enjoy outside of the lab. This may include vacations or trips to see family. Please alert me in advance of these trips so that we can plan accordingly. In general, 1 week of vacation is expected, with smaller trips/breaks also negotiable. All federal holidays are observed in our laboratory (this does **not** include Spring Break).

Work-Life Integration

Being ambitious and working hard are part of our lab culture, but it should come from a perspective of driving yourself out of the fun of pushing your limits and exploring what you are capable of. The key is to know your limits. Similar to playing sports, you advance by pushing out of your comfort zone, but if you push too hard, then you end up injured and stuck on the sidelines. Managing your motivation and work habits while integrating interests and commitments outside of work is a key self-leadership skill that will serve you well throughout your career, and now is a great time to build that skill. Maintaining your physical health is imperative for maintaining your mental health. Work-life integration is a skill that everyone must work hard to cultivate. You can get useful tips and advice on this from Josh, your labmates, and other resources (books, podcasts, etc).

Meetings

Come prepared to discuss/present your recent research and next steps. If you initiate the meeting, then please send a calendar request to all who are expected to attend the meeting. Please include in this request, a written agenda that includes: (1) your accomplishments since the last meeting, (2) the questions/challenges would you like to discuss, and (3) your planned next steps. We have group meetings weekly during the semester and weekly/bi-weekly outside of the semester. You will be expected to present either a research update or a journal club at the group meeting periodically.

Annual Progress Meetings

Each year we will meet to discuss your progress and set goals for the next year. This meeting will be structured around completing the annual evaluation form. This meeting will help us to determine things that are going well or are areas for improvement. I will tell you whether I am satisfied with your progress and help identify steps you can take to fix any concerns. This is also an opportunity for you to communicate to me what I can do to help you succeed. Tell me whether you feel that you need more guidance, more independence, to meet more often, etc. Also, please tell me what I can do to be a better mentor. Note that this feedback should not only be reserved for the annual progress meeting because part of having a transparent mentor-mentee relationship is a regular discussion about what is going well and what can be improved.

Authorship

One of the most important tasks in science/engineering is disseminating your research through publications and presentations; therefore, authorship on these items is an important indicator to the

outside world of your role in these accomplishments. Authorship implies a significant contribution to a paper such as intellectual ideas that change the research or experimental/computational contributions (just following instructions and not actively participating in the experimental/computational design/interpretation will be acknowledged, but likely would not result in an authorship). Frequently, journals require the specific contributions of each author to be listed. While the order of authors varies by the specific field, in general in the engineering field the first author is the student/post-doc who took the lead on the research and wrote the paper, the last author is the PI (principal investigator) of the lab, and the authors in between are in order of decreasing contribution. Failure to complete papers before leaving the lab may result in a junior member doing so as the 1st author in your place.

Conflict Resolution

If a conflict arises with another lab member during your time in my lab, I will work with you to find a resolution. If the conflict fails to be resolved or you do not feel comfortable involving me, I encourage you to consult with the Department Chair, Chair of your graduate program, or the university Ombuds office to attempt to settle the disagreement.

Signed

_____ Date:

Prof. Ying Li

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Student Name: Date: