

## **Expectations for students and postdocs in the Law group**

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### **1. Diversity and inclusion**

One of the primary goals of the Law lab is to foster a diverse and inclusive environment. I want to recruit, retain, support, and help to graduate people from diverse backgrounds including race, ethnicity, national origin, gender identity, sexual orientation, religious beliefs, age, socioeconomic status, and so on. Research shows that diverse labs are more creative and productive. More importantly, we will do better science together when everyone feels supported and included and when everyone's contributions are valued. To this end, I expect all Law lab members to treat everyone with respect and to celebrate our differences. If you see someone being harassed or treated unfairly, please step up and say something if you can. If you are being harassed or treated unfairly, please come talk to me. Whether the problem is within the group or outside it, we can work together to determine the best course of action. If you see opportunities to improve the diversity and inclusiveness of the lab, please let me know. I am always looking for ways to improve the lab culture.

### **2. Plagiarism, academic honesty, and data manipulation**

Plagiarism is the use of someone else's words, figures, code, ideas, etc., without proper attribution. Plagiarism is strictly prohibited in this group. The most common way that plagiarism arises is in writing. People can be tempted to use someone else's words and assume that no one will notice or that it isn't a big deal. This is incorrect. It is likely that someone will notice. If I see a manuscript with a section that is written in a very different style, I will suspect plagiarism. If you publish a scientific paper, it will be widely read and it is likely that someone will notice if a section is plagiarized. Plagiarism is a major problem. It can ruin the reputation of the scientist who plagiarized. If you are confused about how to properly attribute an image, quote, code, etc., please ask me; I'm happy to help. If I find that a student or postdoc in my group has plagiarized, that person will be dismissed from the group immediately. In addition, if I find that a student in my group has cheated in a class, that person will also be dismissed from the group immediately.

Data manipulation is common and is not always inappropriate. The general rule for data manipulation is that it is OK as long as you preserve the original data set and as long as you are clear and honest about how you manipulated the data. For example, it is fine to normalize data as long as you state clearly that the data is normalized, explain how you did the normalization, and save the unnormalized data. Data manipulation that is inappropriate includes removing data points, editing images, smoothing data, or other techniques to "make the data look better" without being clear about what you did. If you have questions about data manipulation, please ask before you do it. If I find a student or postdoc in my group has manipulated data without my knowledge, that person will be dismissed from the group immediately.

### **3. Publications**

I generally expect that all students and postdocs will publish multiple papers during their time in the group. Publications are one of the major ways we communicate our results to the broader community and are an important metric for graduation. If you have done the majority of the work on a project, you will be the first author. If you have assisted with a project, you will be a co-author. In rare cases in which two students collaborated equally on the project, we will have co-first authors. High school interns, undergraduate students, graduate students, postdocs,

faculty, and staff scientists are all eligible to be authors on a paper. If the paper would not exist in its current form without the contribution of someone, then that person should be an author on the paper. Concerns about authorship should be brought up early as they are easiest to deal with before the paper is written. In general, I will always be the corresponding author on publications from the group, but this can be negotiated for postdocs who would like to take ownership of a project. I expect the first author to take the lead on writing the paper, making the figures, and managing the references. All figures should be made using the template provided. Paper drafts should be saved in a new folder in the “Papers” folder on the Law lab network drive. All data that was used in the paper should also be stored there in an open access format for future reference. Drafts should be labeled as `papername_FA#_SL#` where FA are the initials of the first author and SL are my initials. # is a number indicating which revision number we are on. For example, the first draft written by the student will be `papername_FA1_SL0`. After I look at it, it will be `papername_FA1_SL1`, and so on. This helps keep track of who had the paper last and which draft is the most recent. I will do my best to provide comments on drafts within a week of receiving them. Please feel free to remind me if you haven’t heard back after a week. In general, there will be multiple rounds of writing and editing before a paper is ready to be submitted to a journal. The actual paper submission can be done by me or by the student or postdoc. However, papers should not be submitted without my approval.

After submission, the paper will either be rejected or sent for review. If the paper is rejected immediately, this is called a desk rejection. This happens somewhat frequently. In this case, we will either appeal or submit the paper to a different journal. If the paper is sent for review, it will generally take 4-10 weeks to get the reviews back. Occasionally, the reviewers will recommend rejecting the paper. If this is the case, we can appeal or submit the paper to a different journal. Very rarely, the reviewers will recommend accepting the paper with minor or no edits. Most times, the reviewers will ask for edits to the paper. We will generally have a few weeks to edit the paper and resubmit it. It may go for review again or it may be accepted or rejected by the editor. Overall, it will take months from the first submission to the final publication. This is normal and to be expected.

#### **4. Conferences**

I expect all students and postdocs to present at conferences while in the group. Conferences are another major way we communicate our results and are important networking opportunities. The number and type of conferences each person attends will be determined based on the specific project and results. However, if there is a conference you are interested in attending, please let me know! I am not aware of every conference that exists. Students are expected to draft their own conference abstracts, but no abstract should be submitted without my approval.

Normally conference registration, housing, and travel will be paid for from grant funds. UD has additional travel grants available to graduate students which we should make sure to pursue. Students will never be expected to pay for a work-related conference out of their own pockets. As of now (2021), we have travel credit cards that students can use to pay for conference travel. Students are not expected to pay for travel up front and then wait for reimbursement. I generally expect students to do their own conference registration, find their own hotel rooms, and book their own travel to conferences. You are free to choose your own method and timing of travel. Please keep in mind that travel funding is limited and be smart about the cost of your travel. Students are encouraged to share hotel rooms with other students/postdocs if possible. If this isn’t possible, please let me know. Some conferences like the Materials Research Society conference will reduce the student registration fee in exchange for the student doing a small

amount of work at the conference. In general, this is a good way to help keep conference costs down, but please discuss with me before applying for these positions.

Appropriate dress for most conferences is business casual when presenting. When not presenting, I expect students to look professional. This generally means that your clothing should be clean and in good repair. When you are not at the conference itself (e.g. going to dinner with friends, going to a tourist attraction), you can wear whatever you like. Everyone is expected to behave professionally at all times while at conferences. These are professional events and should be treated as such. Please remember that you are representing the group, the department, and the university and act accordingly.

## 5. Lab notebooks

It is the responsibility of each student or postdoc to keep their own lab notebook. I will provide the physical lab notebooks. You will probably use more than one lab notebook during your time in the group. In addition, you may have more than one notebook at a time if you have a nanofab notebook in addition to your regular notebook as the nanofab notebooks are made from special paper and need to stay in the nanofab. We also keep communal lab notebooks for shared tools like the MBE systems and the FTIR system. The purpose of the lab notebook is to keep track of everything you are doing. You should provide enough detail in your notebook that someone reading it in the future can understand what experiment you were doing and why. You will probably refer to your lab notebook extensively when you are writing papers or your thesis; you want to make it easy to find the information you need. If you are doing the same things over and over (e.g. running the same procedure in the nanofab), you can write that procedure down once and refer to it in subsequent pages. Always write down anything unusual that happens. For example, if you drop a sample on the floor while doing FTIR measurements, write it down in your lab book. If your sample is a different color than you expect, write it down. That way if the sample looks strange later, we know why. I strongly recommend writing down all of the details of any experiment you do for future reference (e.g. scan rate, number of scans, spin speed, bake temperature, etc.). This way if the experiment works well, you can reproduce it exactly and if it doesn't work, we can figure out why. More detail is always better in a lab notebook. You are welcome to use your lab notebook to take notes on seminars or papers that you read. The point of the notebook is to be useful to you in addition to documenting your experiments for the future.

In addition to being a record of your experiments and thoughts, a lab notebook is a legal document. For example, if we were to patent a discovery, the lab notebook would be part of the documentation for the patent. If we had a patent dispute with another lab, the lab notebooks would be consulted to see who made the discovery first. There are therefore some specific requirements for keeping a lab notebook:

- Each page in the notebook is numbered. Never remove pages from a lab notebook. If you do so, the reader of the notebook will assume you had something to hide. If you leave a page blank, put an X through the entire page.
- Write the date every time you add to the notebook. This will help establish a timeline in case we are ever in a legal dispute. This is also useful to you if you need to know how old a sample is or when exactly you did a fabrication step, for example.
- Always write in pen, never in pencil.
- If you make a mistake, put a single line through your writing, ~~like this~~. This way, future readers of your notebook can see what you crossed out. Never scribble out your text so that it is not readable.
- Always write in English.

- Feel free to make drawings or include printouts of data if that will help explain your notes. Printouts should be stapled or glued into the notebook.
- You may find it helpful to make an index at the beginning or end of the notebook. This is not required, but many people find it useful.
- Bring your notebook to individual and group lab meetings so you can provide details about your experiment if asked.

## **6. Working hours and schedule**

I expect students to work “enough” hours to make progress on their research. This will generally be 40 hours per week, though this will depend on the exact project details. One of the benefits of working in academia is significant flexibility in work schedule. I am happy to extend that flexibility to group members, but I expect everyone to treat their research as their primary job. For people who are serving as TAs or have other academic commitments like courses, those responsibilities may be prioritized over research. Please talk to me if you are concerned about how to balance your various commitments. I do not require group members to work in the evenings or on the weekends, though many people find that doing some off-hours work (e.g. starting a long FTIR scan, doing an additional day of growth) can significantly speed up their research progress. If you are an MBE user and the system needs maintenance, you may be required to work on the weekend. Ideally this will only happen a few times per year. If you work on a weekend, you are welcome to take a weekday off in exchange.

I do not want to micromanage students’ working hours, and I do not care which precise hours are worked. Some people prefer to come in early and leave early while others prefer to come in late and stay late; both are fine with me. Frequently, students’ schedules are determined by the availability of shared equipment in the MGF or in the ISE core facilities. All students are expected to attend weekly group meetings and individual meetings as scheduled. Everyone is free to work from home on days when they don’t have any experiments to do in the lab.

## **7. Laboratory behavior**

We are an experimental group, so you will spend the majority of your time working in various on-campus labs. Most of the labs used by the group are shared facilities (Materials Growth Facility, Keck Center for Microscopy and Microanalysis, Advanced Materials Characterization Lab, Nanofabrication Laboratory, etc.). We also do some work in labs that are not shared facilities, but that belong to other individual research groups. When working in any lab, you are expected to abide by the rules of that lab. This includes safety guidelines, restrictions on working hours, restrictions on number of hours spent in the lab, and so on. If you have an issue with how a shared facility is being run, please come talk to me and we can talk to the facility manager about accommodations. I expect everyone to do their part to keep all labs clean and tidy. You are not the only person working in the lab. If you leave your trash behind, someone else has to clean it up. If you don’t put the tools away, no one else can find them and use them. If you leave samples lying around, no one else can use that space. This behavior is not acceptable. If a student in my group is not acting responsibly in the lab, that person will be warned by me and may have their lab access temporarily revoked in the case of a shared lab. If this happens repeatedly, the student may be dismissed from the group. In general, please leave the lab in better shape than you found it.

Students are expected to speak English in the lab. As described in Section 1, we strive to create an inclusive environment in the lab. If two people are speaking a language that the third

person does not understand, that person will feel excluded even if that is not the intent of the other people. I know that it can be exhausting for some international scholars to speak English while they are also adjusting to graduate school, dealing with a new culture, taking classes, learning lab techniques, and so on. However, everyone needs to speak English in the lab so that everyone knows what is going on and is included in group discussions.

Inevitably, you will make a mistake in the lab and break something. This will happen to everyone at least once, and probably more than once. This is part of the learning process. If you break something, get a part stuck, or are generally not sure how to proceed, please stop what you are doing and ask for help from me, a senior graduate student or postdoc, or a lab manager if it is a shared facility. Often, if you stop at the first sign of trouble, the problem can be fixed. If you try to fix it yourself, you are likely to cause more damage. If/when you do break something, I will not be upset as long as you tell me or a lab manager right away. If you are upfront and honest about what happened, we can fix it and move on. If you try to hide what happened, it will be that much more difficult to fix and I will be upset. Generally after making a mistake, the student is asked to help fix whatever is broken. I will also ask the student to work with me or a lab manager to figure out how we can prevent that mistake from happening in the future. To avoid making mistakes, I recommend that you not work when you are tired, make sure to leave enough time to do a procedure so that you don't feel rushed, use checklists if they are provided so that you don't forget steps, take notes on how to do the procedure and refer to them often, and ask for help if needed.

## **8. Mentoring**

My mentoring style will be a little different with each person. Different people have different needs, and I will do my best to accommodate them. I will also do my best to treat each student equitably. If you have suggestions for things I could do that would be helpful for you, please don't hesitate to tell me. I am always trying to improve my mentoring. Generally, we will have a group meeting once per week at which students will present updates on their progress. These meetings usually last 1.5 hours. The goal of this exercise is to share research problems and solutions with the group. I hope and expect that students will be able to help each other out with problem solving, giving constructive feedback on experimental design, and learn from each other. Each week one person will also give a short presentation on a topic of their choice. The goal of this activity is for us all to learn something new and to practice giving presentations, which is an important skill for everyone to have. All group members are required to attend group meetings. If you can't attend, please let me know ahead of time. For students in their first and second year, I will also schedule weekly individual meetings. At these meetings, we will discuss your research progress in depth and discuss which steps to take next. These meetings usually last 30 minutes or less. I expect students to come to these meetings with a short update of what you have accomplished, descriptions of problems you have encountered, and/or a list of things that you need my help with. Please bring all of the relevant data and your lab notebook. You should never come to an individual meeting with nothing to discuss unless you have been out of the lab in the previous week. For students in the third year and above, you may choose to continue meeting weekly or you may choose to meet less frequently or on an as-needed basis.

I will also ask students to fill out individual development plans (IDPs) 1-2 times per year. I will provide the IDP document in advance. The purpose of the IDP is to allow us to reflect on your accomplishments in the past year and plan for the next year. IDPs are a good way for us to

make sure that we agree on what the next big goals are. They also help us to plan for milestones like paper submission, conferences, qualifier or committee meetings, and graduation.

## **9. Vacation, sick leave, other time off**

As discussed in Section 6, students are responsible for determining their own daily and weekly schedule. In general, I expect students to treat research as their job and spend enough time in the lab to make consistent progress toward their degree. Because research is never really done, it is easy to end up spending significantly more time in the lab than planned. Just because you are working more hours does not necessarily mean you are making more progress. As with any activity, the return on investment of your time in the lab eventually diminishes. It is therefore important for everyone to take some time off. Maintaining work-life balance is important both for your productivity in the lab and for you overall mental health and wellbeing. I strongly recommend against working more than ~40 hours per week. In general, I find that people who work more hours may be more productive in the short term but are ultimately less productive over time as they feel stressed and burned out. Each person is different, but I encourage everyone to manage their time and to not overwork themselves.

In general, I am happy to approve requests for vacations of 1-2 weeks at a time. Please do not plan a vacation on top of a conference. If you have already submitted an abstract for a conference, please plan your vacation around it, even if you have not yet heard if your abstract is accepted. If you have already planned a vacation, please do not submit an abstract for a conference that falls at the same time. If you are an international student and would like to take a longer trip to visit family, please discuss with me ahead of buying tickets. These longer trips are absolutely fine with me; they just require more advance planning. Finally, if you are an international student and need to go to your home country to renew your visa, please give me at least six months notice of your plans. For some nationalities, visa renewal can be a very long process, so advance planning is needed to prevent significant research disruptions.

You are welcome to take time off for religious or cultural holidays that are not already days off on UD's calendar. Please let me know about these days off in advance, as I am not familiar with the holidays for every religion or culture and therefore appreciate advance notice.

If you are sick, please do not come to the lab. If you come in when you are sick, you are likely to get others sick and you are likely to prolong your illness by not getting the rest you need. It is better for everyone if you stay home when you are sick. You do not need my pre-approval to stay home if you are sick nor do you need a doctor's note; just let me know so I am aware of the situation.

You are welcome to take time off for mental health. Mental health is just as important as physical health, and if you need time off, that's fine. I generally don't want to pry into students' private lives. However, if you have a personal or mental health issue that is going to affect your lab work, please talk to me. Often there are accommodations that can make things easier and less stressful. For example, if you are suffering from anxiety around a particular activity, I am happy to work with you on ways to restructure the activity to reduce your anxiety. You are not required to disclose mental health issues, but I can't help you if I don't know what the problem is.

Sometimes a student will need a leave of absence for personal, professional, medical, or parental reasons. The UD Graduate College has policies for these different types of leave which are available on their website. For the case of parental leave, the Graduate College will pay for six weeks of student salary (as of 2021). In general, please contact me as early as possible if you think a leave of absence will be necessary. I'm happy to work with you on the details.

## **10. Coursework**

Students are responsible for ensuring that they are choosing courses to satisfy their degree requirements. I am happy to provide guidance and discuss which courses might be most helpful for a particular student, but I do not know the particulars of the degree requirements for all the programs from which I take students. One of the benefits of grad school is that you can take a wide range of courses that interest you. In general, I am happy for students to take whatever courses they are interested in as long as degree requirements are satisfied. However, after students pass their qualifier exams, it is much more expensive for me to pay tuition for students to take a course. Therefore, if you want to take a course for credit after passing your qualifiers, please come talk to me first so we can see what the financial impact will be. If you want to sit in on a course without taking it for credit, you can do so without asking me first.

## **11. Qualifier**

All departments require a qualifier exam, though the particulars vary by department. Students are expected to work on their qualifier preparation themselves, though I am always happy to answer questions and discuss anything that might be confusing. For qualifying or comprehensive exams that require a written paper and/or a presentation, I can also provide some feedback prior to the exam itself. I am happy to look at qualifier paper outlines and drafts and comment on sections to include or exclude and the overall paper structure. Since this is an exam paper, I can't help with the actual writing. For presentations, I can watch a practice and provide feedback on ways to improve. In addition, please discuss the composition of your qualifier exam committee with me well ahead of time, as some faculty are more suited to some projects than others.

## **12. Thesis/dissertation defense**

As with the qualifier, the thesis should be written by the student. I am happy to review chapters; please give me at least a week to provide feedback on each chapter. Students are responsible for ensuring that the thesis is properly formatted and that all forms are filled out and turned in ahead of any relevant deadlines. Most students require 3-4 months to write a thesis, so you are strongly encouraged to plan ahead. Writing a thesis on a short deadline can be extremely stressful.

## **13. Graduation**

Requirements for graduating with a Ph.D. are fuzzy. This is intentional, as every student is different and every project is different. However, I will attempt to give some general guidelines here. Most students will take 5-6 years to graduate. This time might be shorter if you are lucky and all your experiments work on the first try, or it might be longer if your project is complex or if we have instrument problems. To graduate, students should have published at least one first-author paper and ideally more than one. Most students end up with ~3 first-author papers, corresponding to three main chapters in their dissertation. Students should have "a few" additional co-authored papers from collaborations which can be turned into additional dissertation chapters if desired. I expect graduating Ph.D. students to be acting as independent scientists. This means that you are ready to graduate when you can plan experiments on your own, can write papers with relatively little assistance, can identify new research directions, can learn new techniques from papers or talks and apply them to your research, and can mentor new students. This does not mean that you must be able to do everything by yourself before you can graduate! No scientist works alone and I neither expect nor want my students to be working alone. This just means that to graduate, you should be taking the lead on your project, rather than waiting for me to tell you what to do.

If you want to start planning for your graduation, please talk to me about where you are in your research and what else needs to be done. I am happy to have this conversation early and often; my responsibility is to help you graduate. If you aren't sure about whether or not you are ready to graduate, ask me and we can discuss. Ideally, we will start planning for graduation 6-9 months before you want to defend your thesis. This gives you time to finish up any experiments, write any final papers, schedule any exams (e.g. data defense, final committee meeting), and start writing your thesis. I usually recommend starting to look for a job ~6 months before your anticipated defense date. If you get a job offer that requires a certain start date, let me know as soon as possible and we can try to work something out.

## **What students and postdocs should expect from me**

1. I will provide a safe, supportive, and inclusive working environment. Please let me know as soon as possible if you encounter any problems; if I don't know about a problem, I can't do anything to fix it. If you ever have any safety concerns, please let me know immediately so we can take steps to address the problem.
2. I will do my best to help you become an independent scientist, including meeting with you regularly to discuss your project, encouraging you to take ownership of your project over time, and providing guidance about professional development.
3. I will listen to your feedback with an open mind. If there are things I can change about my own mentoring style to help you be more successful, I am happy to consider it.
4. I will provide funding for your project as long as you are making adequate progress toward your degree. This funding may be in the form of research or teaching assistantships. Students are strongly encouraged to apply for fellowships as these frequently provide a higher salary and are prestigious.
5. I will provide actionable feedback on all presentations and written documents. I will do my best to provide feedback on written documents within a week.
6. I will help you find a job to the best of my ability. This includes discussing potential career paths, writing recommendation letters, contacting my colleagues for those interested in a postdoc or industry position, providing feedback on written application materials and/or job talks, and giving advice on negotiations. Finding a job is ultimately the responsibility of the student.