

Joaquín Rodríguez-López (JRL) Group

Manual and Expectations

Updated 07/18/2024

Group Website: <https://rodriguezlopez.chemistry.illinois.edu/>

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1. Introduction

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Our group. The Rodríguez-López group tackles analytical and materials challenges in electrochemical science that impact our understanding of the fundamentals of electrified interfaces, addressing problems in the design of energy, sensing, and environmental technologies. We strive to be a world-class group that leads in electrochemical analysis using electrochemical imaging, nanoelectrodes, modern nanofabrication tools, spectroscopy, electrochemical simulations, and new instruments for electrochemical education. We welcome a diverse body of students and postdocs who are interested in chemistry, materials science, engineering, and related fields. We are open to pursue new directions that synergize our expertise with others'. We are a highly collaborative group, with a strong track record of producing exciting work with collaborators in polymer, catalysis, energy, simulation, and biological sciences. Our most proud achievement is the training of well-rounded group members with great prospects for their careers. Undergraduate, graduate, and post-graduate students have found their way to industry, national laboratories, and academia as postgraduates, and as new faculty. Our group fosters a strong sense of collaboration and encouragement to achieve your best during your stay at the University of Illinois – this includes pursuing prestigious awards and fellowships ([see group members and their distinctions](#)).

Diversity Statement. We enable a diverse group of scientists to achieve excellence in their profession through the development, appreciation, and sharing of skills that complement our groups' and foster positive attitudes leading to inclusiveness. We are aware of the many hurdles and difficulties that students find in constructing their professional life, and we are committed to help students overcome them by providing an environment where they can thrive in exploring their interests in science without fear. We believe that students with different backgrounds complement our academic and scientific experience. We strive to be inclusive with the idea that excellence is only achieved if we develop the tools that help bring out the best talents and realize the potential from every member. We value and welcome people of every race, ethnicity, gender, sexual orientation, religious beliefs, identity, ability, country of origin, etc. We value the diversity of our group, and we will not tolerate hateful speak or negative actions in all forms, including but not limited to sexual harassment and assault, racist or sexist language, homophobia, xenophobia, etc. We are mindful of challenges in work-life balance and mental health, and we address them to the best of our possibilities to enable our group members not only to be their best at academics, but also exemplary parents, happy students, ethical scientists, and overall, great people.

2. Workplace Expectations

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2.1 Principal Investigator (PI)

Group PI: Joaquín Rodríguez-López (JRL), Ph.D.
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2.2 Role of the PI

JRL leads the overall scientific, academic, and human resources directions of the group. He defines the scientific agenda of the group with input from group members, representing the group through external engagement (presentations, seminars, outreach events, etc.), writing proposals and securing funding, procuring new collaborations, organizing laboratory activities, and being the ultimate decision maker for the laboratory.

Mentoring. JRL encourages at least one meeting with each student every two weeks to discuss about activities performed during that period, and one meeting with the entire group per week during the Spring and Fall semesters to allow members to present their progress over the past semester, or to practice suitable assignments. A space to discuss group business will be provided in these meetings, and group members are welcome to request extraordinary meetings when required. Students may contact JRL *via* email, phone, or text (i.e., Slack) as well as meet with him in office or via videoconference at agreed times. JRL will encourage group members to seek competitive fellowship opportunities and will help with review and supply recommendation letters when appropriate. Depending on the funding situation, some students may be given RA on 2nd year but sufficient funding to support the students for RA from 3rd year to 4th or 5th year will be provided. JRL will be available to discuss and help members identify potential employment opportunities and will provide support (e.g. recommendation letters, facilitating networking introductions, encouraging conference travel) for members to find a job when appropriate.

2.3 Expectations of students

Metrics for Productivity: Productivity is measured with a combination of work hours in the lab, data analysis, quality of experiments (results and controls), publications, and presentations at conferences. All these aspects are detailed as follows:

Hours. Because our work takes place in several different locations (e.g. RAL, Beckman, MRL and MNTL facilities) and with potentially different activities (e.g. 3h in a clean room suit or at the dry box are clearly more tolling than 3h at a desk) our laboratory focuses strongly on results, rather than hours. We encourage you to be available from 9 am to 5 pm, Mon.-Fri., engaging anywhere between 6-8 hours of focused work, and according to the demands of the day (e.g. considering other activities such as attending seminars or group meeting). Work from home/outside the lab still counts as working hours, if you are being productive. However, your best judgement should prevail to benefit quality over quantity according to your own working style. If a solid 10-hour session of experiments with good controls and repetitions in one session is better than segmenting your work throughout the week, commit to that and rest accordingly to avoid burnout. Perform necessary control experiments to prove your hypotheses and pre-analyze data as you go so you can be flexible in your experimental design, making efficient use of your laboratory time. This is better than working blindly to then find out after your experimental session is done that your data is

inadequate. Solid data analysis and data management are crucial to designing successful experiments. Fixing instruments or designing setups for experiments counts as lab work.

Publications: Historically, the number of publications for PhD student graduates in the group from 2012 to 2024 ($n = 14$ graduated students) are 10 ± 4 total publications (median = 10), of which 5 ± 2 (median = 5) were (co-)first author papers, typically including at least one review/perspective article. We will train you and encourage you to achieve these levels of productivity, but as a reasonable guide towards graduation, we expect 2 or 3 (co-)first author and at least an equal number of co-authored works to satisfy the lower bounds of this distribution. Every project is different, so obviously this is not a solid rule, but it does give you an idea of what the work of a well-integrated graduate student looks like in our group. JRL will strongly encourage you to arrive to your preliminary exam with at least one solid story that is equivalent to a publication or submitted/final drafted work, with the rest of the publication trail happening after your prelim. Hopefully, the experience of writing your first paper will catalyze many other works. Please keep in mind that writing literature is a crucial part of the PhD work, it teaches you how to organize, support, and effectively communicate your ideas and results. Our intentions will always be to help you conceive new and interesting ideas that contribute to human knowledge, to start and finish a project successfully, and to communicate your results appropriately with the research community. To learn this well, you will likely need to do this a couple of times, sometimes leading and sometimes just helping others. It is also important to mention that we always pride ourselves on publishing original work that pushes the boundaries of concepts and techniques in electrochemistry – it is our commitment that these published works will not be “fillers” or publications for the sake of publishing. Our publication track record on this point supports these commitments.

Presentations: Every student should give at least one oral presentation at a national conference during their graduate studies. Poster presentations are expected at other conferences. Typically, by their graduation, each student has attended 2 to 4 major conferences, including Pittcon, GRC/GRS, ECS, MRS, and ACS among others. The group will encourage you to attend annually the Turkey Run Analytical Chemistry Conference (TRACC) which occurs during the Fall semester, as a regular opportunity to bond with several like groups in the Midwest area. If you attend a meeting, you are expected to present, and to request travel funding from the organizers/department, regardless of the status of your grant, thus plan with time your attendance.

Valued Skills by PI: The JRL Lab prides itself on a work ethic that benefits your ability to answer research questions unambiguously and that ultimately leads to high productivity. We highly value originality of ideas and experimental design, and an attitude of “trying” before giving up on a relevant question. Of course, prioritizing experiments is key to efficiently using your time, but there should be good reasons, rooted in simulations, data analysis, and sound concepts, that you will use to justify any priorities given to experiments. We will not cut corners on data analysis and experimental design to ensure that all our experiments are reproducible. Attention to detail will set you up for success. JRL will advise you on a regular basis during weekly meetings to help steer your project.

Expectations for External Funding: Students are expected to apply for as many relevant fellowships as possible. Fellowships applied to (and secured, in bold) are: **NSF-GRFP**, DoD

NDESG, Link Energy Fellowship, Beckman Graduate Fellowship, Ford Fellowship, ACS Analytical award, etc.

General for all laboratory members. As described in the various sections of this document, all members are expected to abide by all safety, equipment, and general lab protocols, as well as the expected behaviors. Departmental expectations for students are discussed in their department's group manual and will not be discussed in detail here.

Expectations for Graduate Students on RA: Graduate students funded via RA assignments should devote nearly all work time to experiments, publications, and presentations. Volunteering or membership on department organizations (DCGSAC, WCC, etc.) is encouraged and is a valid use of in-office time. Participation in outreach activities through student organizations (e.g. DCGSAC, SACNAS, ACS, etc.) is also encouraged, and can be considered as part of lab time when aligning to projects involved with group funding. However, any volunteering and outreach should not account for more than 20% of your total time over a period of 6 months.

Expectations for Graduate Students on TA: Graduate students funded via TA assignments should comply to their TA duties but devote as much of their remaining time as is reasonable to lab work. Teaching and grading must come first. If TA duties become a burden beyond expectations described in the graduate manual, discuss with JRL to work something out. (The TA-ship is for 20 hours per week; anything over that needs to be addressed with the instructor, and with JRL if his involvement is necessary.)

Expectations for Undergraduates: Undergraduate students are expected to learn as much possible about basic electrochemistry and performing quality experiments. Expected work hours are dependent on research credit hours taken during the semester. Undergraduates should rarely work without graduate student supervision; working alone in the lab is strongly discouraged for safety reasons. When appropriate, undergraduate workers will be co-authors on publications; our laboratory has an excellent track record of undergraduate research, with students publishing even as first authors on works.

Expectations for Visiting Scholars: Visiting scholars have similar expectations to graduate students on RA funding (see above). They are expected to discuss their progress with their own PIs in addition to JRL.

Expectations for Postdoctoral researchers (Postdocs): Postdoctoral researchers are expected to maintain a high level of scholarly performance and a positive and didactic attitude towards our group activities and interactions with collaborators, graduate and undergraduate students. This means that expectations include both skilled works, as evidenced by quality scientific output representative of high-level scholarly performance, and strong, respectful, and constructive interactions (including but not limited to mentorship), reflecting the positive and didactic attitudes towards other members and collaborators. In addition to doing original experiments, Postdocs should assist whenever possible graduate and undergraduate students with their projects (experimental blocks, data analysis, literature, etc.) as a means to improve their mentorship skills and provide a mechanism to transfer skills to the laboratory. These types of interactions will be encouraged, but not forced upon any student. Because training of Postdocs will typically occur outside UIUC, it is important to realize that adapting to the practices of the school and the lab will be key to their success and performance in the JRL laboratory. In the same vein, the potential of a power differential due to seniority affecting relationships with students should be carefully kept in

check: past performance or a hierarchical organization mindset should not be invoked to expect deference from students. In fact, these attitudes are likely to contradict the positive and didactic attitudes mentioned above and will result in an attention call from JRL if they become pervasive.

Postdocs in the JRL laboratory will be required to fill out yearly self-reviews like those used by graduate students in the department, which include a list papers/ manuscripts and conferences produced, a list of research accomplishments, results and feedback from mentorship activities, and a self-evaluation. JRL will review this document together with the postdoc. This will help them monitor better their progress and help them be accountable to the group's vision and standards. To better prepare postdocs for this requirement, JRL will establish a series of postdoc meetings (individual and in-group) to help mentor them and work on establishing desirable performance metrics according to their intended professional future.

2.4 New member orientation. When new members arrive, a mentor will be assigned to help them out as necessary (e.g. learning about the Champaign-Urbana area, learning about lab culture and procedures).

For the mentee: Mentees should feel comfortable to ask any help from their mentors. Mentees are supposed to pay attention and take notes when getting trained. Always ask or consult SOPs if you don't know for sure what you should do. Mentee should respect mentor's time, come prepared, follow directions. During first lab cleanup or when you first start in the lab you should familiarize yourself with lab contents and locations.

For the assigned mentor: Mentors should have enough time to help the new student familiarize with the instruments, procedures and techniques. A comfortable professional relationship should be developed between the mentor and the mentee. Mentors should keep in mind that mentees are not as experienced in the lab as they are.

Other senior members: Be open to assist new comings. If you notice there is something wrong with new members (behaviors or actions), point out directly but politely. Try not to take lab-related critique personally but the way of delivery also matters a lot. If possible, address the problem individually instead of in public. Avoid passive-aggressive behavior or personal criticism. **Be polite.**

International students/visiting scholars: Language barriers are often an issue. Native English speakers should be understanding and patient. Please tend to the needs of the individual; check occasionally for comprehension.

Undergraduate members: Undergrad members are mostly in need of more attention and training, especially freshman and sophomore students. Mentors should make sure their student is up to speed. Special training (e.g. protocol of NoChromix, waste disposal, hazardous chemicals) should be provided for them according to their level of knowledge.

Things to cover during new member orientation. Upon arrival to campus, you will have to report first to HR in your home department. Please schedule this first meeting before you arrive to Champaign. During this first orientation, you will be asked for requirements for your job verification and will be instructed to obtain all required university ID and procedures. It is

imperative that you finish these procedures as soon as possible, as otherwise this delays your ability to do necessary trainings in the lab.

Safety training. You will need to schedule a safety training for laboratory work with the group's safety officer and to complete the self-serve [SCS Safety exam](#) before engaging in any laboratory work, thus making a high priority on your first day(s). This training should happen during your first week in the group, since it will be required for you to obtain desk space and to start working in the laboratory. During the in-person training session you will learn about the general layout of the laboratory and the main safety aspects to address.

This is a list of aspects that your mentor will discuss with you during orientation, preferably during the first two weeks of your stay. Mentors, please use this as a checklist.

- Securing your I-Card in case you haven't
- Getting keys to the laboratory
- **Setting up your profile in the group website, getting added to group Slack, to the group e-mail list, and to the Google calendar for reserving instruments.**
- **Getting added to the group Box folders to upload for group meetings and subgroup meetings, and for access to software.**
- Passwords to computers and access to the printer and shared computers.
- Using TeamViewer or remote connection
- Storeroom purchases: Obtaining your basic PPE (safety glasses, lab coat, gloves, etc.) and your lab notebook.
- Your desk set-up (getting a desk computer from surplus, setting up software, etc.).
- Learning to navigate and understand the Chemical Inventory (<https://unillinois.chemicalsafety.com/unillinois/Default.aspx>)
- Preparing your training portfolio. For instance, some of you will use facilities at the MRL, some in Chemistry, some at Beckman. Consult with JRL about the expected and/or desired training.
- Procedures for use of shared disposable supplies (scintillation vials, Pasteur pipettes, etc.)

3. Time away from the laboratory

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3.1 Vacation policy: A typical appointment is 11/12 months per year depending on the group member's department of origin. We will abide to the PTO policy laid out by the Chemistry department which allows for 38/39 days per year of time off and limits the number of weekend days you need to attend (<https://chemistry.illinois.edu/diversity/resources/graduate-students-personal-time-pto-and-sick-leave-policy>). Postdocs typically receive 24 paid vacation days annually, and they will be required to log in their vacation and sick time as instructed by HR. Postdocs are strongly encouraged to take their full 24 days of vacation every year.

For students we will not have an official counter for this (i.e., you don't need to "stamp", or "check-in" your days off). If a significant deviation from the time allowed by the PTO is observed, or if you expect it to happen, then a discussion with JRL will be necessary and corrective measures will be discussed. It is important to note, that outside the holidays sanctioned by the PTO and University policy, any other time where you take holidays will count. For example, this includes

the summer period. Group meeting may or may not run during these months but are expected to engage in research activities during these periods unless you take official time off as per the PTO policy. You can spread this time over the year. You are expected to let know JRL and your lab mentors or collaborators at least 2 weeks in advance regarding your holiday/time off plans, as this might change immediate research plans. The intention of this is to be aware about work to be completed in anticipation of deadlines that are external to the group, and to facilitate planning of activities. Mention during subgroup/group meeting or discuss with JRL individually. When on holiday, members and JRL can post their schedule on the calendar (Google Calendar).

3.2 Personal days

- a. Illness: You are encouraged to take sick days (and not to come into lab within reason) if you are feeling ill. For slight/short illnesses, these days do not necessarily impact your vacation/sick time unless you'll be absent for more than 2 days.
- b. Maternity/paternity or leave of absence: These situations will need to be discussed with JRL on a case-by-case basis, but please know that there are resources at the institutional level to provide you with instruments that would allow you to take care of your situation while pausing your research duties in an organized fashion.
- c. Flexible time – Many activities in your normal life can take large blocks of time that are unavoidable (e.g. a doctor's appointment, fixing your car, going to a special event). As a matter of policy, JRL does not keep a record of where you are and what you are doing during the day. You are expected to make your best effort to attend group meeting and subgroup meeting. JRL will help accommodate as much as possible your schedule. We will consider that below ½ day (e.g. 4h) is flexible time (does not need to be counted) and more than ½ day during normal working time (e.g. non-holiday) should be considered or logged as holiday time.
- d. Conference travel: When attending a conference, you are of course engaged in activities related to the laboratory, and these days should not count against your vacation budget. However, leisure travel associated with attending conferences (e.g. “one week traveling now that we're in Europe” or “I will visit my family while I'm here over an extended Thursday-Monday weekend”) do count as vacation time.

3.3 Emergency situations

- e. Personal and family emergencies are unavoidable. For the emergency itself, we will follow a modified flexible time for these situations, with the equivalent time at 1 day (i.e. you do not have to worry for about asking for permission or time if the duration is less than one day). However, you are strongly encouraged to inform JRL as soon as convenient of your situation. Please consider that we are all a community of researchers, and we care for each other. Let us know if something bad happens.
- f. International students and their travel home may require an extended vacation and vacation time should be used in this case. It is okay to use total vacation time in a large block to travel abroad. Please consider your obligations and discuss with JRL beforehand.

3.4 Adverse weather

- g. If classes are cancelled, then students, including graduate students, should not come to lab. If the weather services suggest staying home, please follow their suggestion. This will not affect your vacation time. Otherwise, use your best judgement, but please consider: Illinois in the winter can present inclement cold conditions, and during the summer there is the possibility of

strong storms, including tornadoes. If you are unfamiliar with these situations, you should pay close attention to recommendations by the school.

3.5 Well-Being: Happy scientists are productive and positive people that will help improve the lab culture. We encourage the following activities and actions:

- Looking out for your lab mates
 - If you notice a person is out for several days, check in with that person
 - No judgement, just checking in (e.g. “Just wanted to make sure you are doing okay” or “Do you need help with anything?”)
- “Self-Care Activities”
 - Includes doctor appointments, counseling, working out, etc.
 - Don’t need to report to JRL, you are in control of most aspects of your schedule, and it’s acceptable if you don’t interfere with others’ time or with group activities (group meeting, etc.)
 - Make-up time? Not necessary, if productive in lab.
 - Agreed as a group to not abuse this policy.

Mental and Physical Health Concerns: If you are not feeling well, either physically or mentally, take the time off you need to seek out help and take care of yourself.

Resources:

[Counseling Center \(https://counselingcenter.illinois.edu/\)](https://counselingcenter.illinois.edu/)

[McKinley Health Center \(https://mckinley.illinois.edu/\)](https://mckinley.illinois.edu/)

[Women’s Resource Center \(https://oiir.illinois.edu/womens-center\)](https://oiir.illinois.edu/womens-center)

[Cultural Houses \(https://oiir.illinois.edu/our-centers\)](https://oiir.illinois.edu/our-centers)

Work-Life Integration: We encourage you to explore the great offers in professional and personal development that UIUC offers you. These may include participation in registered student organizations (RSO’s), outreach, participation in clubs (e.g. language clubs), attendance to workshops or seminars that help you grow as a person or as a scientist. Keep in mind that a good way of knowing if these activities are helping you towards your degree, is that engaging in them help you advance in your PhD requirements, to gain clarity in your work, or to release stress that otherwise would obscure your thought process. These activities should not be replacing your actual PhD experience, rather improving it.

4.Expectations of progress, including progress towards degree

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4.1 Feedback mechanisms

A significant contributor to stress in graduate school and in the lab is a feeling of not knowing where one stands in terms of progress. Below are some mechanisms for feedback to different group members. In addition to yearly reports, if a student is unsure about their progress toward their degree, schedule a meeting with JRL to discuss concerns. He will give an honest evaluation about your progress and provide alternatives/suggestions to student’s research concerns. As described in section 2, the lab convenes once weekly for research update meetings and for weekly group meetings. You are expected to attend both meetings, unless special circumstances previously

discussed with JRL arise (e.g. overlapping teaching or class schedule, sickness, sickness of a dependent). The expectations for these meetings include:

Weekly research meetings (“subgroup meeting”). These meetings will take place on Friday morning (typically from 10 am to 1 pm, but adjustments will often be necessary depending on JRL’s schedule). During these meetings, JRL will listen to your results and provide feedback about them and the general directions you should take, will suggest literature and methods to better understand your results, and may suggest collaborations. The meeting will take place directly with JRL and with other members in the group or collaborators, who will be present to also contribute with feedback. This mechanism is crucial to build healthy collaborations and for you to enrich your experience. You are expected to report on the results obtained during the immediate period’s time prior to the meeting (typically the past 2 weeks). Your reports should include a brief outline of the activities you performed (one slide), a brief (no more than 1 slide) introduction to the topic of your experiments and/or the status of each project you will present in each section, your results (which should include raw and pre-processed data including screen-shots, as well as fully replotted or processed results), calculations and estimations based on these results, and a summary slide showing your most important takeaway and a brief description of your next steps and/or intended schedule. Presentations should be concise and clear, with data analyzed and organized (you don’t need to show every measurement). It is important to show both successful and undesired results, should they arise. Key experimental information should be included, such as concentration, electrodes, scan rate, potential, etc. Strive to be brief and avoid redundancy if you have a lot to report. Individual meetings would be better if there are more details JRL wants to know about. We will enforce this format for everyone in the lab. Please upload your slides to the corresponding subgroup folder no later than 9 pm on the Thursday before the meeting.

Comprehensive research meetings (“group meeting”). These will occur every Wednesday, 4:00-5:15 pm, unless otherwise noted. The group meeting starts with a “minute moment” which can cover any topic that is relevant to the group and will be discussed by the previous presenter. The meeting will conclude with group announcements and an open discussion about anything that needs to be dealt with as a group. Please make sure to be on time, as some members need to leave by 5:15 pm. Presentations are more of a full-length presentation (about 40-60 min presentation, followed by discussion/questions) with background, introduction, methods, results, and conclusion followed by a Q&A section. It can be a research presentation, or a practice talk for literature seminar, preliminary exam, thesis defense, or a conference talk. If it is a practice talk, the audience should give written feedback on the speaker’s oral delivery, science knowledge and slides. Presenter brings writing supplies when practicing for prelim/defense/job interview. If you need an additional practice outside of hours of the group meeting (for Prelim, Final defense, practice for job/interview/meeting), please coordinate with other lab members to setup time and meeting place. You would need to reserve a room for practice and send out friendly email reminders to group members. When in person, it is a tradition that the person presenting on the group meeting brings snacks and drinks for the group to enjoy prior to the talk.

4.2 Departmental requirements.

Because group members may come from different departments or different area concentrations within the chemistry department, it is extremely prudent to individually verify the corresponding student manuals for the specific requirements in each case. Below, we present some general

procedures to follow in Chemistry. JRL asks you to consult with the Analytical office for scheduling in his calendar, so that this happens efficiently.

Literature Seminars. Pick a topic and discuss it with JRL before committing time to research on it. Also, consult previous year's literature seminars (see Analytical/IMP office) to ensure you don't pick previously covered topic. You will be allowed to take about 2 weeks dedicated to working on your presentation and paper. You are still expected to complete research goals (to some degree). Find a balance between lab research and literature seminar.

Prelim exam: As mentioned before, JRL will encourage you strongly to arrive to your preliminary exam (for Ph.D students) with a solid story, and hopefully a publication in hand. You will be able to practice in front of the group, and JRL will be delighted to offer you advice on how to better structure your documents. We strongly encourage you to seek advice from your fellow senior group members regarding your presentation and the content and organization of your documents. Because it will be critical for you to know background and fundamentals of your research, we will make our best effort to help you with these contents by providing you representative questions in a safe environment. Prelim is typically stressful, but we want you to be prepared! Typically, we will allow you to dedicate 1 month prior to prelim for preparing yourself (Studying background info, practicing presentation to group, etc.) We encourage you to practice your presentation in front of group (main group meeting) and additional with smaller groups if possible. Practice as much as possible! Please Upload final presentation for box, so that others can use for guidance.

Original Research Proposal: Similar guidance to *Literature Seminars*.

Graduation: You should aim for obtaining your Ph.D in 5 years or less, ideally in 4 years. When will you know that you are ready? JRL will let you know of his expectations around the 3-year mark in your training. However, you are encouraged to discuss specific project goals with JRL in a private meeting to outline any research goals he thinks need to be accomplished before a graduation date is set. Some things you might want to consider:

- Present at a research conference. Try for at least 1 per year (after 1st year). TRACC counts as a research conference, but at some point, you should do at least one national meeting.
- Start looking for/interviewing for next position around the beginning of your 4th year. As a PhD student, spending 4-5 years is a long time and plans may change over time. One of the biggest drawbacks of staying in academia and in a research-intensive environment is that you can lose track of what is expected in other fields such as the industry. And this remains a constant worry (esp. for international students with visa issues) about how you are going to transition to the industry and find openings. **However, it is important to note that our laboratory is not exclusively focused on academic research – in fact, our graduates have gone to academic, national lab, and industrial positions.** JRL can help you thinking about this transition by:
 - Talking with you about your goals after graduation.
 - Encouraging your participation in traineeships or internships by discussing common interests with his contacts in industry.
 - Encouraging your participation in projects that involve industrial partners.
 - Encouraging your discussion with contacts involving alternative career paths. For instance, if you were interested in patent law, we could set up an internship with the

OTM office at UIUC; if you were interested in some completely different career path – even away from science – we can discuss options.

- It will be your responsibility to keep track of deadlines for a smooth graduation. Once you discuss with JRL about a target date, you will be responsible for contacting the departmental office and requesting for a timeline of events you will need to comply for graduation (e.g. Fall and Spring semester obviously have different deadlines).
- How much time will you have to complete your thesis? It is fine if during the final 2-3 months most of your time is spent working on their thesis, but ideally you still want to combine writing of your document with experiments and training new students.
- Dissertation format and style. Please see past dissertations, currently kept in the lobby to JRL's office or consult the Graduate Manual of your department for formatting requirements.
- Check-out procedures. You will need to fill out several check-out documents related to exit procedures, exit interview requirements, key return, etc. All of these will need to be completed with the help of your home department office. In addition, the JRL group has a separate check-out procedure that you will need to fill out, and is found [here](#).

5. Seminars and Conferences

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5.1 Seminars. We strongly encourage you to create the habit of attending seminars. A large public University with several top ranked disciplines, UIUC brings outstanding presenters from all over the USA and the world for seminars. You are of course expected to attend seminars related to your discipline. Because our group is strongly associated to the Analytical Chemistry area, which periodically hosts seminars on Fridays, 4:00 pm, you are strongly encouraged to attend these seminars, especially if the topic is related to electrochemistry. Attending literature seminars by a fellow group member, regardless of the seminar series they participate in, is expected. Attending one or two seminars per week is reasonable.

5.2 Conferences and meetings.

Scientific events are important for your professional development, as you get the opportunity to showcase your work, get exposed to the work of others, and network with potential collaborators and employers. Funds are usually available for travel to scientific conferences and meetings. You should know that most graduate students can apply for travel funding from the chemistry department at least once in their graduate studies. There are several opportunities for graduate and postdoctoral students to also apply for travel funds (e.g. through the Women's chemistry committee, ECS/ACS/Pittcon/ISE travel awards, or other institutes on campus).

JRL is always welcoming and open to considering your travel for scientific conferences – however, you will also be asked to pursue external and internal opportunities to complement the expenses of travel, regardless of the availability of funding. Also, you should always inform JRL if you are planning (or would like) to attend a conference BEFORE any other action is taken (e.g.

submitting an abstract, making bookings or reservations). **As a specific policy of the group: if you travel to a conference, you will make all possible effort to present work.** As a scientist in the community, you are responsible for identifying conferences you would like to attend. Keep in mind that most conferences will require you to take action AT LEAST 6 months (or more) prior to the conference if you will submit an abstract.

Abstracts and documents. You will be required to submit to JRL with AT LEAST ONE WEEK in advance any abstract for a conference or poster for display. JRL will give you feedback as soon as possible and will inform you if there are other steps to take. Consider that if your abstract includes collaborators, it is a measure of etiquette to share with them your abstract and get their approval. This will be approached after you share your document with JRL, so if you have collaborators, make sure to send JRL your document promptly. Some abstracts might also require vetting from sponsors, so keep this in mind.

Tickets, hotels, transport. Timely purchasing of tickets and lodging is important to keep prices low. Please discuss any arrangements with JRL prior to booking. Send JRL with copy to the Analytical area office your plans. Ask for her help if you are in doubt. As a rule, always consider travelling in economic terms – in some cases a hotel nearby the presentation area is required, but in most cases booking early will help in identifying inexpensive alternatives.

Reimbursements. Process all your reimbursements through the Analytical office. JRL will make all effort to get these in a timely manner, but keep in mind that the reimbursement process might take several months. If possible, discuss your plans with the Analytical office – some expenses can be covered by our funds at the moment of purchase, which de-emphasizes the need for reimbursements, this includes flights. Reimbursed items will only correspond to reasonable expenses in lodging, travel, and food: for instance, first-class travel is prohibited, food is usually limited to a cap corresponding to a per-diem (for breakfast, lunch, and dinner), and lodging is also limited per university regulations.

6. Purchasing

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Stockroom budget. Small quantities of chemical and lab supplies can be purchased from the chemistry storeroom. Supplies typically purchased from the storeroom are lab notebooks, pens, small tools (tweezers, scissors, etc.), glassware, and electronic equipment, among others. For all office supplies (staples, pens, pencils, markers, paper), please use our unrestricted fund account (ask JRL or the group purchasing officer for the number) or request these from the analytical office.

Purchasing your start-up package. Your mentor will take you to the storeroom to get a start-up package which includes lab coat, safety glasses, a notebook, and other basics. Learn to purchase in the storeroom.

Bulk purchases. Larger amounts of supplies, such gloves and kimwipes, are ordered online by a purchasing officer. If you notice that the lab is running low on gloves, kimwipes, glass pipettes, and petri dishes, please notify the purchasing officer. Sometimes, Thermofisher offers special

discounts, thus if you are planning to make a Thermofisher purchase, please notify the purchasing officer to request a quote.

Chemical purchases. Chemicals are ordered purchased through the SCS “Reaction” website, and the order needs to be first approved by JRL. If you would like to purchase a costly chemical or a costly equipment, please discuss your purchase plans with JRL first. If you only need a small portion of a chemical, e.g. for trying a “quick experiment” and you are unsure if you want to buy a commercial amount, then we suggest that you login to the SCS Chemical Inventory and look for it in some other group. UIUC Chemistry groups are fine with sharing small portions of chemicals for this purpose. If you find your chemical in a group, please make sure to contact or visit a group member (or the PI in case the chemical is specialized) from that group requesting permission to use it or to get a small sample. The inventory can be found here: <https://unillinois.chemicalsafety.com/unillinois/> Our group is very conscientious about minimizing waste and buying only what is necessary. Uncontrolled expenses might create issues with funding – including where your salary comes from! So keep in mind that we need to measure and use our resources as best as possible.

Materials specific to your project. You will be given a CFOP to use for your project. All your orders go through JRL for his approval. If you feel compelled to do so (e.g. if you have not discussed an experiment with him) or if he requests information, please send a description for the intended use of the requested material. If an item is urgent, please let JRL know as possible. Because of the purchasing system, it is very difficult for JRL to approve orders when out of town. Please keep this in mind when ordering supplies.

Do not sign. YOU ARE NOT AUTHORIZED TO SIGN ANY DOCUMENT REGARDING THE PURCHASE OF MATERIALS OR SERVICES, NOR TO AUTHORIZE THEM UNLESS A PURCHASE ORDER SENT THROUGH REACTION IS PRESENT. In the past we’ve had issues with software and pipette services being directly approved by students before submitting them to procurement. An excuse letter that goes all the way to higher powers in the University necessary in those cases – please, do not make JRL suffer and most importantly, jeopardize the availability of research funds.

Instruments and larger equipment. You are not allowed to place orders of this type without discussing them with JRL first, as these typically require special budgeting and additional forms that only JRL can fill out.

7. Publishing

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Publishing your work is an essential part of our scientific activity – work that is not reported, has no impact in the community. You might also have heard the motto “Publish or Perish” – while we do not agree with the threat of perishing, we do engage in commitments with our collaborators and sponsors, and publishing is often essential to continue doing work. Also consider: no publication is perfect, and no explanation is ever complete. However, your work should contribute to new

knowledge in the community, it should be reproducible, and we should be absolutely convinced about its value to science, and as such, we will have high standards for publication.

Students came up with this process:

- You have some sort of actual results that ties nicely into a story or proof for a hypothesis. How will you know that this happens? There will be several indications of a story coming to completion during subgroup meeting. JRL will let you know when a manuscript should be created. Does this mean that you should simply write your results and assume all is done?
- No. Starting the manuscript is just the beginning. If you want to be proactive, many authors recommend that once you start a project you start thinking of a flexible outline. It should be flexible because science is a work in progress – your initial hypothesis will often require modifications. Your experiments might or not work, and you will need to adjust the course. However, when you get the green light to publish, it means that a self-consistent storyline has been identified.
- Once JRL lets you know that we should publish, a process starts where the expectation is for you to dedicate your intellectual resources to this task. Do not delay the process, consider it instead an opportunity for something exciting. Plus, delaying the publication of a really good idea opens the possibility that your idea is first reported by others – which is *sort of good* for science but somewhat not great for your morale, especially if your experiments are done with more rigor.
- Make a draft of your paper. Bring it to JRL, he will have more input to as to what needs to be done for the story to become a paper. He may also be in a position to realize that the story will not work out as a paper. JRL will give some positive direction to your expectations and goals of publishing, including the target journal and authorship.
- If you are part of a grant, they have written objectives, which control or direct your experiments. Keep these in mind when you are developing your draft. Point being a rough story is already present. Either way, at this stage, you will need to have a draft put together.
- Read the literature. Read and pay attention. Figure out what makes a great paper – a succinctly written, logical story, great figures, attention to detail are some common attributes. Great papers require a significant effort. Discuss with JRL and other group members if you find any block to the writing process – sometimes large activation barriers are easily defeated with the right catalyst – an idea or a suggestion.
- Read all our literature – yes, we recommend each paper in our website. Great examples of how to present common experiments (e.g. SECM, spectroelectrochemistry, polymers) are to be found there.
- *Then what?* Create a folder in the “Manuscript Drafts” folder in box. You will add all suitable documents in this folder (figures, data, drafts). Have a full complete draft, intro, abstract, results, discussion and upload it here.
- Make sure it is proofread, with decent enough figures. Get input from your labmates about the figures. The Manuscript Drafts folder is accessible to all – some of your labmates will give you input in this stage as well.
- Once JRL decides that a suitable draft is present, he will provide feedback for you. Assume this process will take two weeks at least. A draft in good shape typically helps out. Feedback will be uploaded in box.
- Revise the feedback and make any necessary modifications. Then the paper will go back and forth between you and JRL at least once more.

- Once a version has converged, you will be asked to dedicate one session of at least 3 h to read the manuscript with JRL. We read it out loud, word by word, figure by figure. If you want this process to go faster, then do this exercise before the meeting with JRL.
- If you have collaborators, then the manuscript will go to them at this point. Otherwise, JRL will ask you to prepare the manuscript for submission – this implies using templates from the publisher, and uploading materials to the publisher’s website.
- JRL will give you a cover letter, and you should discuss with him potential reviewers.
- Once the paper is submitted, we are done!
- Wait. Not yet. If all goes well with the editors, your manuscript will likely receive revisions. These range from minor cosmetic changes to deep re-evaluations of your experiments, interpretation, or simulations. Revisions also have often the effect of upsetting the authors – it is wise to read them, ponder about the best intentions of the reviewer to make your paper better and more impactful, and address to the best of your possibilities the comments. It doesn’t mean the reviewer is always correct – sometimes there are questions that have simple straightforward answers – but it does mean that we will always try to address their concerns as fully as possible.
- You will prepare a draft with a simple version of the answers to the reviewers and arrange a meeting with JRL to discuss the overall strategy. In this meeting, new experiments might be suggested, which you should carry out promptly as the revision stage often comes with a deadline. A draft of the answers to the reviewers will circulate between you, your co-authors, and JRL, until a final version is available. JRL will compile all in a response letter and give you instructions to re-upload the documents as instructed by the editor.
- And then, hopefully your paper gets accepted!
- When your paper gets accepted, please send the information to the webmaster, as well as a representative image (usually the table of contents figure). The webmaster will announce your paper on the webpage, add it to the publications list, and JRL will tweet it and announce it to the world.
- Congrats!
- Wait, but my paper was rejected. This happens. And it gives us the opportunity to re-evaluate how we are presenting and supporting an idea, or it gives us the opportunity to re-evaluate where to submit a work so it is properly appreciated. JRL will give you clear input regarding revision and re-submission strategy. Some of our most highly-cited and well-received papers have been rejected by journals (and when it’s been unfair – like many aspects of life – it’s been their loss, not ours!).

What constitutes First author? In our lab, seniority does not equal to first author. The first author will be the person that carried out the majority of the experimental and intellectual work. If there are two people that contribute approximately in equal parts, we will consider a first co-authorship with the ultimate order of authors decided upon discussion with them. In the past, mentors (who contribute intellectually) and co-workers (who contribute with key aspects of the experiments, repetitive experiments, or with significant portions of the writing) have been made co-authors.

What do you do to have your name in the paper? Doing experiments that are used in the manuscript, writing, and contributing intellectually to writing ideas in the text. You don’t get authorship because you revised a section or a paper, provided a (simple) sample (e.g., “I lent you my glassy carbon electrode!”), or only discussed the work during group meetings.

Talk to JRL for sure if you have any conflicts in your head well before time. Don't let it stew and build up and then say things after something is published.

How and where does a collaborator get his name in the paper? When it contributes to the paper, and that is decided in part by JRL and the collaborator PI. If questions about the order of authorship come up without the corresponding authors present, bypass it at any cost, and **do not provide any commitments**. You can say something like: "Ok let me talk to my adviser (JRL) about this, and why don't you do the same with your adviser." Talk to JRL clearly about the scenario or conflict that may be happening with your collaborator

Ethics: don't try and obstruct the truth. You have no control about how the foundations of nature behave in your experiment. So do not try to manipulate the result to fit your expectation of what is happening. Nobody is going to blast you or put you to the sword if something that was overwhelmingly expected does not work out. JRL policy states clearly that the expectation is that you try your best, and you don't have to get a specific result to be in JRL's good books. Some of our best hypotheses have been revised ones, where pieces of data help us re-evaluate our initial thoughts. **Let your experiment speak!**

8. Data management

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Every group member is expected to properly keep and organize their samples and data throughout their tenure at JRL lab. When leaving the group, please coordinate with the next responsible person for handing over the samples, lab supplies (tweezers, electrodes, fabricated tools, etc.), and make sure to properly store the data and presentations in the shared cloud service (UIUC Box). Lab notebook needs to be stored on a shelf in antechamber outside JRL's office.

Requirements by law. The many federal grants we manage require us to keep records of our laboratory activities. Similarly, if you've ever thought about submitting a patent application, clear records of inventions need to exist. The following is an excerpt of a typical "Data Management Plan" submitted by the JRL group to our funders. **Please follow all the recommendations here, especially those regarding the keeping of lab notebook records. Make a habit of keeping a good lab notebook.**

"The generation, recording, processing, archiving and sharing of data and information for the proposed work will be managed systematically and emphasizing the need to keep faithful, useful and reproducible records. This management plan covers all recorded scientific or technical information.

Raw data. Electrochemical experiments will generate information in the form of digital recordings of current and voltage values as a function of time and/or electrode potential, and of SECM probe position when appropriate (i.e. data arrays producing "images"). These will be stored in their simplest form as spreadsheet tables, text files, data files and binary files. When appropriate, backup files consisting of screen-printed digital images will be generated to recall and organize this information more readily. Data generated from spectroscopy, optical and electron microscopy and scanning probe techniques will consist of digital images and arrays of data typically from proprietary software, but when possible, this information will be backed up in their simplest

electronic format (e.g. text files) and screen-printed digital images as mentioned above. Data from simulation models using commercial software will be stored using text files and recording conditions used for its generation. Some electrochemical and scanned-probe measurements will require normalization to immediate experimental conditions, smoothing, multi-dimensional rendering, axis-transformations or Fourier or Laplace transformation. This will be done while always retaining the original data file and linking it through the modified file by book-keeping.

Analyzed products. Interpreted data will include plots, images, videos, tables and manuscripts. Manuscripts will be generated using word-processing software and PDF formats and may contain text, drawings, calculations, plots, pictures and images. These materials will be generated using spreadsheet software and image processing software. Researchers in the Rodriguez-Lopez group are encouraged to keep images in simple and widely-available formats such as JPEG, TIFF and GIF and composite figures in widely available program formats (e.g. Publisher, PowerPoint, etc...).

Documentation. All students and researchers in the Rodriguez Lopez lab are required to maintain laboratory notebooks, labeled according to book # and researcher last name and with sequentially numbered, dated and signed pages. Each notebook documents the study and session title, design of experiments and results, including supported information that is not digitally recorded (e.g. temperature, reaction time, etc.) The narrative includes materials (or models in the case of the simulations), equipment used, step by step procedures, on-the-fly analysis, figures, drawings and images and other types of results. Files are cross-indexed to the relevant notebook, notebook page, technique, position within page and other chronological information. It should be possible to retrieve and understand any electronic data file using the information from the laboratory notebook. For most electrochemical data generated, the proprietary software used stores and prints additional relevant details of measurements. Laboratory notebooks will be legible and organized and include the necessary detail for the replication of the research and for responding to any questions. Any changes made to the data to correct errors will be clearly annotated by the researcher in the notebook, signed and dated. Information recorded in the notebook will be physically and electronically supported by weekly report narratives submitted to the PI where experiments are analyzed and presented for discussion using word-processing software. These reports are kept separately from the notebook and provide a quick guide to experiments and data files referenced in the notebook. For simulations, recorded information about models and output files, typically text or image files for the two commercial software used in our laboratory (COMSOL Multiphysics and DigiElch) will be recorded in a similar fashion than experimental results.”

9. Lab responsibilities and protocols

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9.1 Lab responsibilities. Several times a year, group members discuss and assign lab responsibilities for each member. These are available on a shared Box folder: [current link](#).

○ Group Job Responsibilities:

- Instruments: A person in charge of an instrument is responsible for the cleanliness, maintenance, and repair of that instrument. If an instrument is broken, please inform the person in charge promptly. The person responsible for the instrument should also have the instrument repaired timely, either through a university shop or an outside vendor. A manual should also

be created for each instrument with the particulars of that instrument, including usage, shutdown procedure, repair contacts, hazards, etc.

- Common spaces/equipment: Keep space clean and orderly, repair as needed.
- Safety: Perform all duties required of the safety officer, including the annual audit, and any additional responsibilities requested of DRS.
- At the end of the day
- If you are the last person in the lab, check that all doors are closed and locked, including the group room and any instrumental room. You are expected to always carry your keys if you leave the lab, should someone else closes the doors behind you.

9.2 Lab consumables. Vials, kimwipes, solvents, gases and other supplies are available in RAL 57 (Consumables) and RAL 50 (Solvents) for making your work easier. If you use the last item of a consumable available in the storeroom (e.g. vials, pipette tips, etc.), refill; otherwise ask the purchasing officer to place an order. Don't plan to do it later, don't think much about it, just do it. If you follow this advice, we will all find ourselves using a small portion of our time for this common task.

- For gloveboxes: if pressure is below 500 psi, replace tank immediately and keep the old tank in the gas cylinder corral in RAL 50/48. If pressure is below 200 psi, return the tank.
- For all other general tanks, when close to 50 psi, replace tank
- Keep the wrench used for cylinder replacement in its dedicated place (top of the solvent cabinet). Remember, wrench to be used only to tighten the flow valve to the tank for the very end. Ask someone to help you if you are doing this for the first time.
- Polishing pads: organized into regions/person, store petri dishes against wall. Be clean! Polishing pads are a source of cross-contamination, you want to change pads often or use a different pad for different materials.
- Turn light off on microscope, stop "live capture" when not using. Turn off UV-Vis lamps, and potentiostats, when not using them. Keeping lamps on decreases their lifetime.
- **Do not return used salt bridges to container with new bridges.** Make new salt bridges if there are no more. This is a task we typically assign to first-year students, and we will let you know when it is your turn to prepare them.
- Waste management: when a bottle fills, replace it, label it, take waste tracking form and stick it on the top of the bottle, replace form and label appropriately. Remember, filled waste bottles go to RAL 50, in front of EZ shelves.

9.3 Instrument scheduling. We all share common instruments. Since a maxima is that your time is not more important than other's time, please schedule instruments with the same considerations that you would like others to have with you. **Plan your time well – this will minimize unused time. For instance, you might be thinking about an SECM experiment that will take you the whole afternoon (say 6 hours).** You reserve from 2 pm to 8 pm. However, you spend prep-time, off the instrument, from 2 pm to 5 pm, leaving you only with 3h for the experiment, the risk of stepping into others' time, and of course, underutilizing precious SECM time. This would not be acceptable. Instead, consider performing your prep time in advance, reserving for a shorter time, or letting your labmates know that the instrument will be available from 2 pm to 5 pm.

- Do not excessively schedule (>2 days in a row) without discussing with other people that use the instrument. If you are aware that other people are using it and are unable to reach out,

consider leaving a note on your calendar booking as “Talk to me if you need to use the instrument”.

- Do not leave experiments running overnight or unsupervised without assessing the risk and clearly signaling that an experiment is ongoing.
- Cancellation or delay? email people to the mailing list or via Slack.
- If no show (>1h late), text/email/contact the person in charge. If you don't get a response within at most 1h + 15 min after the original time of schedule, you can use the instrument in question.
- If you break an instrument, email and let people know. This includes faulty cables (if you do not know how to fix them) or weird behavior (especially with the glove boxes). Part of your training is to learn how to fix these issues – there is no one in lab that “fixes things” for you. At some point you need to figure out how this is done, and you should contact JRL or senior members for guidance.
- Respect personal space and belongings. If in doubt about a particular piece of equipment, ask your lab members.

10. Interpersonal relations and expectations of conduct

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10.1 Expectation of conduct

From their first induction in the lab, all group members will be regarded as scientists, thus erasing any unwarranted or overly hierarchical power differential between members. This implies that the work that high school students, undergraduates, graduate students, and postdocs is equally important. All members in the group deserve a proper working environment – your experiments, as important as they are, are not more important than those performed by your labmates. Everyone is expected to follow the rules, and as such, having no exceptions will make our coexistence in the lab much easier.

While all members will be regarded as equals, this does not mean that expected standards and contributions to the lab environment are necessarily the same amongst all group members. While JRL as the PI is the ultimate instance in all aspects related to the lab, senior graduate students (e.g. Ph.D candidates) and postdocs have undergone training and research-related experiences that give them a bigger picture of research than that of a training student, and thus are expected to set the example to younger members regarding professional ethics, conflict resolution, time management, and work-life balance, amongst other topics. It is expected that, when requested, they will offer advice and experience, and that they will be proactive at solving issues. Here are some examples of what we mean:

- *Safety*: all students are expected to strictly follow established safety rules; but from among senior students/postdocs we will choose our safety manager, and these same students are expected to report to JRL perceived risks or suggest changes in procedures to improve our safety. Senior members and postdocs are expected to strictly adhere and be an example of how safety rules are put in place.
- *Conflict resolution*: conflict is inherent to any work environment. While we expect that all group members will be open to engaging in strategies to solve their conflicts, senior students and postdocs are expected to actively help defuse conflictive situations. There is

an expectation that their experience will be reflected in a higher maturity to address issues in lab.

- *Lab culture*: Creating an inclusive environment and keeping our ego's, biases, and sometimes our emotions in check is not an easy task; being professional at the workplace requires constant improvement, just as it has taken years for a work culture in the lab to set in. Senior members and postdocs are expected to actively work towards inclusiveness by setting good examples: demonstrating how one addresses students respectfully, how one asks questions in a professional manner, how one builds a positive environment that gives confidence to the rest about their abilities and potential, and by contributing to annihilating and preventing toxic, racist, sexist, or xenophobic remarks or attitudes.

10.2 Cleanliness. This is an analytical laboratory and being clean in your work is essential to decrease the risk of cross-contamination. This is even more relevant given the number of shared spaces we use (benches, glove boxes, common instruments). **Leave no trace; clean up after experiments. Or if you are actively working on an experiment and have to pause, leave a note saying whose setup/waste is it, and when will it be cleaned up (as long as it doesn't conflict with the calendar).** Other points to note:

- Make sure waste gets in trash (no Kimwipes© on floor by trashcan) or proper waste container
 - Clean up vials by sonicator – they should also be clearly labeled.
 - Be proactive - if garbage is sitting a long time, clean up. Politely ask cleaning crew or inform the analytical office if trash is getting seriously in the way.
 - Be clean in the glovebox! Because of the small space and difficulty in manipulating items, it is critical that we have higher standards for these spaces. Learn how to use tongs to manipulate items in the box. Use aluminum foil for setting a temporary clean mat on the glovebox space you use, and make a habit of bringing in waste bottles and containers for solids, pipettes, and used kimwipes and to take them out every session. Clean immediately solvent spills. JRL suggests always the use of double gloves (glove on your hands, going into the glovebox gloves, and then gloves inside of the box) for work involving heavier solvent manipulation (e.g. rinsing of samples, SECM cells, etc.).
 - Empty waste from temporary waste immediately after rinsing. This will be strongly enforced by your labmates. We want to avoid overfilled containers.
 - Our group generates various types of waste (organic, inorganic, heavy metals, fluoruous, aqueous acidic/basic etc.) Write down waste added to waste bottles. This is required per safety rules and helps the life of the waste officer. Note it takes around 2-3 hours of paperwork to finish a large volume of waste disposal.
 - Maintain cleanliness and organization in your drawers, desk, and common working areas. If we all follow this suggestion, deeper lab cleaning sessions should be an easy task.
 - Turn off balances, clean up spills, calibrate the balance. This will prevent cross-contamination and inaccuracies developing on balances. 1
- Group Cleanup:
 - We will conduct a deep lab clean-up once every six months.
 - Jobs will be assigned as group at the group meeting the week prior to the scheduled cleanup
 - Each researcher should clean their own space (bench, desk, hood, sweep and mop floor) and clean their assigned group space for that day.

- To keep cabinets clean and organized, please return chemicals to the correct location promptly after use
- As a tradition, on the Friday of the lab cleanup exercise, food (typically pizza) will be purchased for group. The graduate student in charge of ordering food should purchase enough food for each person in the group (including visitors and undergraduates) and adhere to any allergies or dietary restrictions. As a rule, please attempt to keep food purchases below \$100 per occasion. JRL will reimburse you.

10.3 Ethics and conflict resolution. When requested to complete any training modules regarding topics of ethics, harassment, discrimination, etc. please do so promptly. These modules are often required by University policies, and the ability for you to remain in good standing can be compromised if you don't complete them in form. While ethics training is often offered in various forms to students, we realize that this might not be the case for all group members (postdocs, undergrads, visiting students). Thus, we will hold at least one ethics-oriented group meeting led by JRL or invited guests.

Conflicts. As mentioned earlier, conflict in the workplace can arise at any time. It's important to have an idea of the procedures we should follow to solve them:

Member-to-Member Conflicts: Start person-to-person – attempt to resolve the conflict in a gentle, non-accusatory tone, preferably in the presence of a witness (and preferably a senior member or postdoc). If the conflict escalates beyond what can be solved between the people involved, go to an agreed upon mediator(s) to be determined on a case-by-case basis. It is expected that most conflicts will be able to be solved through the first two steps. If the conflict still has not been resolved, or if the situation is affecting one of the students' ability to work or mental/person health, the conflict should be taken up to JRL. If the conflict is threatening to one's life, call 911 and then notify JRL. All ethics and scientific integrity issues should be reported to JRL.

Member-to-PI Conflicts: We recognize that there is a power difference involved in the resolution of such a conflict. It is preferred that a member would first manage the conflict informally in-house without involving administrators (if possible) via an email to JRL, another graduate student's mediation, or a meeting with JRL. Members should let JRL know if they feel that his response was inadequate and could do so via email. If the member still feels that the conflict has not been resolved, the member should let JRL know and address the issue with another mediator. Mediators/resources for graduate students include first, the assistant director of diversity and climate, the director of graduate studies (DGS), or the department head.

10.4 Communication with other group members. You are expected to develop communication skills during your stay in the laboratory. How you conduct yourself with your students in TA is also important.

Etiquette will be essential in writing all sorts of documents, from e-mails to letters, invitations; it also includes oral communications – how well you formulate a question determines importantly how it is answered and how you make a name for yourself in a community. As you are now part of the laboratory, you represent aspects of it in meetings, conferences, seminars, etc. Thus, it will be imperative that you conduct yourself in a professional manner, and away from

comments or questions that exhibit arrogant, toxic, racist, sexist, or xenophobic remarks or attitudes.

In e-mail communications. Always address formally your recipient (Dear Prof. X, Dear labmates, Dear students). Greet and then state the purpose of your e-mail. Write any additional detail you might need for your recipient to understand your message. Finally, sign your e-mail. In e-mail exchanges with multiple replies, you can be a bit more informal. For more informal, day-to-day communications, Slack should be preferred as a tool.

10.5 Lab safety. The following is a non-exhaustive description of lab safety procedures. Everybody's experiments are different, and will carry different risks that must be discussed with the safety officer and receive full DRS training (e.g. use of lasers, use of pyrophoric materials, use of compressed gases, etc.).

All students/postdocs must complete the SCS Safety Checklist – signed by both student/postdoc and the PI in consultation with the safety officer.

Resources for safety and MSDS:

- UIUC Chemistry Joint Safety Team
 - <https://publish.illinois.edu/chemistryjointsafetyteam/>
- Division of Research Safety: (DRS)
 - www.drs.illinois.edu
- Personal Protective Equipment
 - Do not wear shorts or sandals in the lab – long pants and closed toed shoes are required (even at your desk).
 - Use of protective gloves when performing work in lab is required. Please remove your gloves when leaving the lab area and dispose of them in the trash. You are not allowed to wear gloves when in common areas or in the hallway.
 - Safety glasses should be worn at all times.
 - Use of lab coats in lab areas (but not in office or break room areas!) is mandatory.
- Chemical Waste
 - Properly label all waste containers and be aware of what is in the jerrican waste.
 - All waste must be labeled with Waste Accumulation Container tags available free of charge from the storeroom (except Jerricans).
 - Follow DRS procedures for allocating waste
 - Jerricans should be capped at all times when not in use. Funnels should not be left in the open jerricans.
- Chemicals
 - Acids and bases should be kept in separate secondary containment.
 - Input all new chemical containers into the Chemical Safety EMS Inventory module.
 - Properly dispose of all chemical containers and make sure to remove these containers from the inventory system.
 - Peroxide-generating species should be tested every 6 months and documented accordingly.
 - Jerricans, solvent waste, and all liquids (including 4L bottles) should be kept in secondary containment and off of the floor.
- Working in the lab
 - Undergraduate students should not be working in the lab without their graduate student mentor or a senior member.

- Do not work in lab after Midnight (12 am).
- No food or drinks are allowed in the lab or at your desk.
- Know emergency procedures for fires, spills.
- Student researchers are to check MSDS for chemicals they have never used before.
- Proper training and review of SOP (if necessary) is required before operating any instrumentation.
- Sharps and Broken Glass
 - Needles, syringes (even without needles attached), and glass pipettes go in the sharps container.
 - Do not put wrappers in the sharps containers.
 - Broken glass, test tubes, glass vials, and TLC plates with a glass back go in the cardboard broken glass containers.
 - ONLY GLASS in the broken glass containers (no caps, no liquids).
 - Glass deposited in the cardboard containers should be clean.
 - Submit sharps containers through DRS.
 - Close and wrap cardboard glass boxes in tape and label as “TRASH.” Place in the hallway for janitors to pick up.
- Your Work Space
 - Keep your work area as clutter free as possible.
 - Do not leave uncapped needles or open vessels on bench space where someone walking by could accidentally bump into it.
- Miscellaneous Safety Considerations
 - It is recommended that vacuum pumps are kept in secondary containment for ease of moving and transferring oil.
 - Change the oil in your high vacuum pumps every 4-5 months or more often depending on usage.
 - Lab floor space should be clear of clutter to allow ease of passage in case of emergencies.
 - When using communal lab spaces (balances, sonicators, instruments, etc.) clean after yourself. Keep these communal spaces clean.

10.6 Considerations for group dismissal. As a group, we believe that all members deserve a chance to correct any problematic behavior. Dismissal is a complex topic. However, there are situations that may warrant a deeper discussion or procedures regarding the involvement of members in the laboratory. Such considerations will be made when:

- Repeatedly poor or malicious conduct is reported or observed. This includes (but is not limited to): unwarranted tampering with others’ experiments, intentional safety violations or dismissal of warning in the use of PPE, sabotage of group activities (e.g. rude or unwarranted interruptions during group/subgroup meeting, refusal to participate in group cleaning or job assignments, etc.)
- Lack of performance: not generating results or materials to demonstrate the execution of laboratory experiments or simulations despite repeated warnings from, and discussions with JRL.
- Repeated offenses to lab protocols (e.g., waste disposal, cleanliness, use of PPE) or special protocols (e.g. COVID-19).

- Repeated unprofessional behavior: verbal abuse, disruption of laboratory office space, rude or foul language.
- Serious offenses: sexual harassment, sexist/xenophobic/discriminatory comments or behavior, use of physical violence in the workplace.

As a PI to a successful lab, JRL counts will all group members to watch for situations that may lead to these offenses, and to contribute to preventing them.