Policies and Expectations

Reppert Research Group

September 12, 2025

1 Group Objectives

- **Do good science.**
  - Uncover the physical and chemical principles that govern biological function.
  - Use microbiological tools to control and tune the physical properties of complex systems.
- **Train good scientists.**
  - Enable junior researchers at all levels – undergraduate, graduate, and postdoctoral – to develop the critical thinking abilities, theoretical knowledge, and technical and communication skills to work as independent scientists in research, education, and/or industry.
- **Enable new (good) technology.**
  - Identify and disseminate ways in which new fundamental findings from our research can enable the development of new technologies that benefit society.
  - Work to engage the public in discussing the safe, ethical, and equitable development of new technologies such as bioengineered organisms.

2 Group Culture

Developing a friendly, dynamic, and cohesive culture is critical to success as a research group.

- **Be respectful:** All group members are to be treated with dignity and respect, regardless of position in the group (e.g., undergraduate, graduate, postdoc, or PI). *There is no hierarchy for respect.*
- **Be considerate:** All work should be conducted in a way that helps *all* group member succeed and does not inhibit the success of any member. *Be aware of how your actions impact others.*
- **Engage others:** Group members are expected to work collaboratively, actively engaging and learning from one another in scientific and professional discussions. *Think outside your box.*
- **Address problems early:** Any group member who perceives a developing problem that affects their work should be proactive in addressing it. *Don't wait for problems to become unbearable.*
- **Address problems appropriately:** Whenever possible, conflicts should be resolved directly between the involved parties. Interactions must always be respectful, considerate, and mutually supportive. Conflict resolution should always target the mutual benefit of all parties. *Research is not a zero-sum game.*
- **Get help:** Problems that don't seem to be easily resolvable – whether personnel, research, or administrative – should be brought to the attention of the PI as quickly as possible. *This includes cases in which the PI may be at fault.*

3 Group Skills

While each student develops specialized skills associated with their individual research project, all students are encouraged to develop a basic proficiency in the following areas:

- Technical writing
  - Clear argumentation
  - Correct grammatical structure
  - Appropriate referencing
- Technical speaking
  - Preparation of presentations
  - Delivery of prepared content
  - Extemporaneous speaking on familiar scientific concepts
- Molecular dynamics (MD) simulation
  - Set up and run an MD simulation using a PDB file as input
  - Visualize the simulation (e.g., using VMD)
  - Analyze the simulation data (energy equilibration, structural dynamics, etc.)
- Visible and infrared (IR) spectroscopy
  - Understand the physical basis of linear spectroscopy
  - Carry out basic absorption spectroscopy measurements in both visible and IR regimes
- Recombinant protein expression
  - Handling of recombinant plasmids
  - Bacterial culture and protein expression
  - Protein purification
- Scientific computing:
  - Python: data analysis and visualization
  - Overleaf/LaTeX: text and equation editing
  - Inkscape/gimp: graphics and visualization
- Quantum Dynamics Theory:
  - Basic formulation of dynamics in wavefunction picture.
  - Basic formulation of dynamics in density matrix picture.
  - Applications to spectroscopy, especially the harmonic oscillator (IR spectroscopy) and displaced harmonic oscillator (visible spectroscopy)

4 Group Working Hours and Vacation Policy

As much as possible, group members are expected to function autonomously, setting their own working hours and selecting appropriate times to take vacation days.

- **Time commitment:** No specific policy exists regarding minimum working hours or maximum vacation time. In general, lab members should work to maximize productivity, not the number of hours spent in lab. Maximizing productivity will very likely require working extra hours some weeks (e.g., 50 - 60 hours) and working fewer hours (30 - 40) in other weeks.[1]
- **Working from home:** Group members with significant theory or computational components to their projects are welcome to work at home, so long as this is conducive to productivity. The only restriction is that all members should work on campus with sufficient regularity to maintain regular meetings and close intellectual connection with other group members.
- **Vacation Policy:** Vacation requests should be cleared in advance by the PI (at least a month's notice is expected for times away greater than 1 week), but will generally be approved unless they conflict with a specific lab function or leave the lab critically understaffed at an important time. As a rough rule of thumb, it is reasonable to take four weeks of vacation time each year, in addition to any federal holidays observed by the university.

[1] As a point of reference, working hours in the PI's own graduate experience varied from $\sim$ 60 - 80 hours/week during the first two years to $\sim$ 40 hours/week in his final years. This is not intended as a strict guideline for group members (and the PI will not track group members' working hours), but may be useful as a point of reference.

5 Group Safety

Safety is a critical priority in our research group. The first rule of safety is simply **to use good common sense**. No amount of training will keep you safe if you don't apply it. If you know an activity is risky, **do not do it**. If you see other group members participating in risky activities:

1. Do not join them.
2. Express your concerns to them.
3. If they persist, report the problem to the PI.

Conversely, common sense is not alone sufficient to ensure safety in the research laboratory: You must also be knowledgeable about the risks around you to make informed decisions. To that end, the university has developed a variety of **required** training modules. **All group members must complete and document this training before beginning work.** Although the time commitment for this training may feel onerous, use it as an opportunity to learn more about your field. Required safety training includes the following:

- Required Chemistry department safety training. An overview is available at `https://www.chem.purdue.edu/chemsafety/Training/Training1.htm`. For our lab, training must include the following:

    1. Complete the **Lab Safety Fundamentals** training on the REM website and submit a copy of the completion certificate to both Paul Bower and the PI . Register here: `https://www.chem.purdue.edu/chemsafety/Training/LSFRegistration.php`
       You will need certificates for *each* of these modules:
       - Lab Safety Fundamentals
       - Office Ergonomics
       - Slips, trips, and falls
       - Biosafety Cabinets
       - Fume Hood Safety
       - Liquid Nitrogen Safety
    2. Review our lab-specific **Chemical Hygiene Plan** (CHP) and turn in a completed **Chemical Hygiene Plan Awareness Certification** form to Paul Bower (plus a copy to the PI). A printed copy of our group CHP is available in the safety binder near the door in BRWN 4165. The CHP Awarenes Certification form is available here: `https://www.chem.purdue.edu/chemsafety/CHP/CHPAC2014.docx`
    3. Complete the **Personal Protective Equipment** (PPE) reading exercise and turn in a completed PPE Training Confirmation form to Paul Bower (with a copy to the PI). The PPE reading exercise is available here: `https://www.chem.purdue.edu/chemsafety/Training/PPETrain/ppetonline.htm`
    4. Complete the **Building Emergency Plan** (BEP) online training and submit a completed copy of the **BEP Training Certification** form to Paul Bower (with a copy to the PI).
    5. Review the **Liquid Nitrogen -Safe Handling and Use** presentation on the REM website, complete the **Liquid Nitrogen Safety Worksheet** and submit to Paul Bower (with a copy to the PI). The REM presentation is available here: `https://www.purdue.edu/ehps/rem/training/`. The worksheet is available here: `https://www.chem.purdue.edu/chemsafety/docs/LiqN2Worksheet.pdf`.

- Complete all relevant biosafety training. For our group this includes the following:

    6. Complete the **Biosafety for Principal Investigators, Lab Personnel, and IBC Members** course on the CITI training site and forward a copy of your completion certificate to the PI. Access CITI courses by selecting "LOG IN THROUGH MY INSTITUTION" at `https://www.citiprogram.org/index.cfm?pageID=14&region=1`.

7. Review the **Biological Safety Manual** and submit a copy of the **Safety Awareness Certification** form to the PI. A printed copy is available in the safety binder near the door in BRWN 4165. The awareness certification form can be printed from the online manual at `https://www.purdue.edu/ehps/rem/documents/programs/bioman.pdf`.
8. Review our lab-specific **Standard Operating Procedures** (SOPs) and sign the last page. A printed copy is available in the safety binder near the door in BRWN 4165.

- Complete relevant ethics and professional conduct training. In particular, this should include:

9. Complete the **Responsible Conduct of Research (RCR) Training - Faculty, Postdoctoral, and Graduate Students** course on the CITI training site. Access CITI courses by selecting "LOG IN THROUGH MY INSTITUTION" at `https://www.citiprogram.org/index.cfm?pageID=14&region=1`

6 Group Software

Since our research has a significant computational component, most members can expect to need at least some of the software listed below during their time with the group. As much as possible, we work with open-source packages, both for economy and to support their development. Open-source programs commonly used by the group include the following:

- **Jupyter Notebooks**: for data processing and programming simple simulations.
- **PuTTy**: for accessing off-site computational resources (e.g., the Brown cluster) via ssh from Windows machines. (Linux and Mac typically include ssh capabilities natively.)
- **WinSCP**: for transferring files to and from remote sources.
- **VMD (Visual molecular dynamics)** for viewing and analyzing protein structures and trajectories.
- **Inkscape**: for high-quality graphics and figures.

7 Professional Progress Self-Assessment

At least once a year, each member of the group should complete the following self-assessment and discuss it with the PI to ensure satisfactory progress toward academic goals.

1. What are your long-term career goals?

2. What specific goals do you have for your time with the group?

3. What are your main strengths as a scientist?

4. What are your main weaknesses as a scientist?

5. What is one weakness you'd like to develop into a strength this year?

6. How are you managing work-life balance?

7. What is one area in which you've succeeded in the past year?

8. What is one area in which you can do better?

9. How has the PI supported you well in the last year?

10. How can the PI support you better moving forward?

8 Specific Expectations for Research Credit

This document describes formal expectations for CHM499 (undergraduate) and CHM699 (graduate) research credit in the Reppert group.

General requirements:

For both graduate and undergraduate research, primary expectations are:

- **To follow all safety standards and document compliance with all safety training requirements**. Group safety is of paramount importance! If you're unsure of the requirements, contact the advisor or group safety officer immediately.
- **To be an active participant in group research**. What this looks like on a day-to-day basis depends on experience. For beginning students, this may involve mostly shadowing senior students/postdocs and asking as many questions as possible. For students who have been with the group a few years, this will likely involve independent lab and/or computational work. Wherever you are in that process, just contribute as best as you're able. If you're unsure of your role, ask – early and often!
- **To be respectful and professional in all lab activities**. Maintaining a healthy group culture is critical to any functioning lab group, and all students are expected to be courteous, respectful, helpful, and inclusive in all lab activities. Conversely, any student who feels uncomfortable due to the behavior of another lab member should promptly bring the problem to the advisor so that it can be addressed.

Note that student roles are typically determined more by time with the group than by grad/undergrad status. An undergrad who has been with the group for 2.5 years will likely know more about lab operations than an incoming graduate student – and that's okay!

All students who are able should attend weekly group meeting.

CHM 499: Specific Expectations for Undergraduate Research

- For each hour of enrolled 499 credit, students should spend 3 - 4 hrs per week (or more) either in the lab or working actively on a computational/literature project.
- Students should *also* attend a weekly group meeting. (This is in addition to time spent in lab.)
- Students should meet with the advisor at least *every other week*. (More often is fine!) 15 minutes is usually sufficient, but these meetings are important to keep communication channels working.
- At the start of each semester, each student should also create a shared Excel spreadsheet and keep a running record of meetings with the advisor. (Detailed notes aren't needed – just meeting dates). This helps both the advisor and student to ensure that regular meetings actually take place.
- All required safety training should be completed (signed, sealed, and delivered to the Department Safety Officer) *within 2 weeks* of the start of the semester.
- So long as the above requirements are met, students can expect an "A" grade in the course, unless warned in advance by the advisor that performance is for some other reason not acceptable.

CHM 699: Specific Expectations for Graduate Research

Requirements are less formal for graduate students, reflecting the fact that graduate students should be transitioning to an independent research career. Nonetheless, these items should be kept in mind:

- Graduate students should provide the research advisor with a progress update *in some form* at least once a week. This can be by e-mail, Zoom, or in-person conversation. A 5-minute chat in the lab may sometimes be sufficient, or you may need to schedule a 1-hour one-on-one meeting to share data. But generally weekly meetings should be planned in advance, and the student should approach the meeting with a definite agenda of what they would like to present or discuss.

- Graduate students will generally receive a "satisfactory" grade in CHM 699 unless they are specifically informed by the advisor of a problem and fail to address it.
- Students will never receive an "unsatisfactory" grade because an experiment failed. This is part of research. What is essential is to make a consistent research effort and think critically about how to move forward with your project.

Note that it generally *falls to the student* to make/keep the advisor informed of what they need to make progress – whether that's lab materials, computational resources, time off form work, a solo project, or research guidance. The advisor is responsible for providing students with as many resources as possible but will often be unaware of needs unless explicitly informed. If you don't have something you need, ask – and keep asking until you get it!