Chemistry and Biochemistry

Frequently Asked Questions (FAQ) for Joining a Lab in the Georgia Tech School of Chemistry and Biochemistry for Master's and Ph.D. students

CONTACTS

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PURPOSE

As a prospective or recently admitted (congrats!) Ph.D. student, you may be asking yourself many questions: What's the point of pursuing a Ph.D.? What is graduate school like? Where should I apply and who should I work with? You likely have many questions and concerns on your mind when choosing which universities and labs to join for your Master's or Ph.D. research. This frequently asked questions (FAQ) document is aimed at addressing some of those questions. Principal investigators (PIs - the people who "run the labs") may choose to circulate this document or even modify it to give prospective students a sense of how their lab is structured, and to provide insights into their mentoring style and expectations. Please note that this document is *not* meant to be a contract or agreement between a mentee and a PI. This is because some PIs have expectations and mentoring styles that are tailored to a specific mentee based on short- and long-term career goals. Moreover, some PIs may be extremely flexible and allow mentees to set their own expectations if they so choose.

Please refer to Georgia Tech's Chemistry/Biochemistry Graduate Handbook for more info about our specific department and graduate program:
https://chemistry.gatech.edu/sites/default/files/documents/grad_handbook_2023.pdf

GENERAL FAQ FOR GRAD SCHOOL

- ***What is the point of getting a Master's or Ph.D. degree?***

Master's and Ph.D. students in STEM fields advance the frontiers of science and medicine, which is an inherently worthwhile pursuit for many people. Fundamentally, Master's and Ph.D. degrees are advanced research degrees (for Master's degrees, a research thesis may or may not be optional). These degrees are usually tailored to prepare you to conduct scientific research in your field of interest. Thus, Master's and Ph.D. degrees are required for many academic, industry, and government research roles. There are also jobs that a Ph.D. can help you attain, even if the degree is not required; examples are science-based patent law, science-based sales associate, and scientific editors/writers. While getting a research heavy Master's or Ph.D. isn't necessarily the most efficient way to achieve these roles, they're worth noting as you consider the possible trajectories your career could take.

Reconsider pursuing a Master's or Ph.D. degree if you're not seriously interested in basic research and/or are not interested in one of the 'doors opened directly' mentioned below. Hopefully, you will have

done enough research during your undergraduate studies that you will have an idea about whether you enjoy research.

Example of doors opened directly by a Ph.D.
- A doctorate (Ph.D. or Medical Degree) is often a strict requirement for becoming a teaching professor (i.e., academic professional) or research professor (i.e., principal investigator) at a university. This is what Ph.D. programs have traditionally prepared students to do (but of course, they prepare you for much more).
- Nearly all biotech and pharma R&D roles with title "Scientist" or higher require a Master's or Ph.D..
- Having a Ph.D. is a major asset (and in many cases all but required) if you plan to start a biotech company.

Examples of doors opened indirectly by a Ph.D.
- Many people learn to code during their degree, opening the door to data science and potentially software engineering roles.
- Many people learn general skills and/or field-specific skills that make them attractive candidates in consulting, venture capital, finance, etc.
- A Ph.D. is an excellent education for careers in science writing, policy, journalism, and many others.

- ***What is the structure and timeline of a Ph.D. program?***

By far the most significant part of grad school is leading a significant, novel research project under the guidance of your advisor and presenting/publishing the results. Before you can do that, you must figure out what the project will be, who your advisor will be and take courses in relevant topics. Note that a huge component of the student experience depends on the program and specific graduate advisor. Once coursework and teaching requirements are done, essentially all decisions are up to you and your advisor. After the first 3 years, it often matters very little which Ph.D. program you are in and very much whose lab you are in.

Ph.D. Finances & Logistics
- All respectable Ph.D. programs pay their students a stipend intended to cover their cost of living**.** This typically ranges from $35k-45k per year based on the local cost of living. Programs typically also cover health insurance, may provide stipends to support relocation, laptops, etc.
- Ph.D. students do not typically pay tuition (that is covered by the program/advisor).
- Some schools offer subsidized housing, which may be well below the market rate.
- Time off/vacation is typically set by the program/university, but expectations should be discussed with your advisor.
- Graduation is typically subject to specific requirements (e.g., submitting a paper and/or writing a thesis, but the final decision is usually up to the advisor and thesis committee).

Ph.D. Program Timeline
The following is a rough timeline of what happens in a Ph.D. program.
- Y1 (first year): Choose an advisor/lab to join. In some programs, you will do 3-month rotations in the labs of ~3 faculty of your choosing. The goal is for you to figure out who your Ph.D. advisor will be, and to some extent for the prospective advisors to evaluate you. Some programs do not do rotations; instead, you just choose a lab to join without doing proper rotations.
- Y1-Y6: Perform roles as a graduate teaching assistant. Some programs require you to do a certain number of semesters as a TA. The overall amount you're required to TA will also depend on your research advisor's funding availability.
- Y1-Y3: Required coursework, typically 1) to bring you up to the undergraduate level in topics relevant to your research and 2) to bring you up to the graduate level in the immediate field of

your Ph.D. program. The amount of required coursework ranges from practically none to quite a lot. Usually concentrated in Y1-Y2.

- Y2: Develop the proposal for your thesis research and defend it in a qualifying exam. Structure and difficulty of qualifying exams range dramatically between programs.
- Y3-Y5: Conduct thesis project, publish papers, present at conferences, network, etc.
- Y4-Y6: Graduate. Average is closer to 5-6 years. Typically, dependent on research success with a major influence being the discretion of your advisor.

Most programs allow you to leave after 2 years (usually any time after you pass quals) with a Master's degree in your field. This is a great safety net; in essence enabling you to get paid to obtain an M.S. (though we don't recommend you use this as a loophole to get a free master's).

Example taken from the Georgia Tech's Chemistry/Biochemistry Graduate Handbook
https://chemistry.gatech.edu/sites/default/files/documents/grad_handbook_2023.pdf

Graduate Program Timeline

Year	Month(s)	Requirement, Milestone, or Event
1	August	Initial orientation, teaching assistant training
	Fall semester	Register for 6-9 credits of coursework (two or three classes) Register for CHEM 9000 (Doctoral Thesis), CHEM 8001 (Faculty Seminar), CHEM 8000 (Departmental Seminar), CETL 8000 (Graduate Teaching Assistantship Preparation) and CHEM 8997 (Teaching Assistantship, if you will be a Teaching Assistant that semester) Start work on research advisor identification by talking with faculty and their students.
	Aug. – Feb.	Research rotations with one or more research groups (optional but encouraged)
	Aug. – Oct.	CHEM 8001 (Faculty Seminar)
	October	Graduate student-faculty retreat (optional, but strongly encouraged)
	Nov. 15	Earliest date to submit paperwork to join a research group
	Spring semester	Register for 6 credits of coursework (two classes) CHEM 8002 (Resources Seminar) Register for CHEM 9000 (Doctoral Thesis), CHEM 8000 (Departmental Seminar), and CHEM 8997 (Teaching Assistantship, if you will be a Teaching Assistant that semester)
	Jan. – August	Literature exams
	Feb. 1	Deadline for selection of research group
	July 15	Deadline for assembly of a thesis advisory committee
	Summer	Register for CHEM 9000 (Doctoral Thesis) You should be fully integrated into your research group and initial project
2	Fall semester	Complete required coursework (if necessary) CHEM 7001 (Introduction to Research) CHEM 8003 (Student Seminar)
	October	Graduate student-faculty retreat (optional, but strongly encouraged)
	December 1	Report summarizing research to date due for CHEM 7001
	Jan. – May 15	Ph.D. candidacy exams
3	Fall semester	Proposal Writing Class (CHEM 8801)
	October	Graduate student-faculty retreat (optional, but strongly encouraged)
	Aug. – April	Annual meeting with thesis committee members
	May 15	Annual progress report due to thesis committee and grad program office
4	October	Graduate student-faculty retreat (optional, but strongly encouraged)
	Aug. – April	Annual meeting with thesis committee members
	May 15	Annual progress report due to thesis committee and grad program office
5	October	Graduate student-faculty retreat (optional, but strongly encouraged)
	May 15	If data review meeting has not yet occurred, annual progress report due to thesis committee and grad program office
	6-months prior to defense	"Data review" meeting with thesis committee approximately six months before expected Ph.D. thesis defense date, for the purpose of planning and approving the expected content of the thesis.
5.5		**Ph.D. thesis seminar and defense (Average duration of Program is 5.5 years)**

- ***When I am applying to Master's or Ph.D. programs, how do I evaluate those programs (i.e., which one should I apply for?)***

A lot of the elements of Master's and Ph.D. programs vary significantly between programs. Consider the following list when evaluating programs.

Optionality

- Faculty you're interested in potentially working with. Note that faculty may not be taking students, so having multiple backup options is important.
- How much mandatory coursework? Ranges from minimal to a significant amount of time. Too much can interfere with rotations, research, etc.
- Structure of qualifying exams? Ranges from moderate to a high amount of effort. E.g. outside proposal vs inside + outside proposal.

Security

- Program funding policy and guarantees. Some programs guarantee funding for 5 years even if the advisor becomes unable to provide support.

Resources & Environment

- Research resources at the institution. Presence of a hospital / School of Medicine. If your research requires expensive/scarce equipment (e.g., NMR spectrometers, core facilities, cryo-EM, synchrotron), what is availability like?
- Geographical scientific hotspots – confluence of multiple universities + industry
- How many faculty at the institution excite or inspire you? Look at the visiting seminar series – does the institution attract speakers that you find exciting? We believe the value of being in a lively scientific environment is tremendous.
- Commitment to causes important to you – diversity, student unions, etc.

Other Elements

- Finances: How does the stipend compare with the local cost of living?
- Historical data on time to degree and career outcomes

- ***What is graduate school actually like?***

Graduate school will paradoxically be one of the most rewarding and one of the most difficult experiences of your life. You *will be* a different person before and after graduate school (often, in the best way). There's not a single experience that will define your time in graduate school. You will juggle learning many new things at the same time: taking new coursework (typically, at a more detailed level than you're accustomed to), how to teach/mentor (you will typically TA your first semesters), learning new technical techniques, learning how to exist in a new environment (typically, a new city or country), learning how to write, learning how to troubleshoot things that don't work, learning how to decipher the literature, learning how to present data, learning time management skills, learning how to multitask, learning how to conceptualize hypotheses, learning how to network/socialize, learning how to deal with failure, learning how to cope with imposter syndrome, learning the politics of science, learning how to deal with emotional and physical stress, learning how to establish your boundaries/capabilities, learning how to define your career goals, and more.

GENERAL RECOMMENDATIONS FOR CHOOSING A LAB / MENTOR TO DO YOUR THESIS RESEARCH WITH:

- Apply to at least 15 to 20 different schools and departments. You might not have a lot of confidence you can get into a "good school". Aim for the moon and don't be shy about applying to your dream schools, but also be realistic. Try not to only apply to schools in one region: apply all over if you can. This can include out-of-state and out-of-country options. Depending on your interests and experiences, consider applying to a wide range of departments (i.e., Chemistry vs. Biochemistry vs. Biophysics vs. Biomolecular Engineering, etc). Get at least a few people (PIs, graduate students, undergraduate advisors, family & friends) to read over your CV, your research statements, etc. The best applications will highlight that you have seriously thought about *why* you want to pursue graduate school, how graduate school will help you reach your *future goals*, and how your previous *experiences* will help you succeed in graduate school. Fit between your goals and the scope of the graduate program is a very important and overlooked aspect of the admissions process.
- Choose a lab in a city/state/country that you can imagine yourself living in, such that you will be able to engage with your hobbies and interests outside of the lab. There are many cool things to do in Atlanta: https://discoveratlanta.com/50fun/main/
- Do your homework on the type of research going on in the School of Chemistry and Biochemistry. Visit each faculty's website to learn about what they do: https://chemistry.gatech.edu/faculty/academic-faculty-PI
- Pay attention in the CHEM 8001 course (Faculty Seminar) required for all first-year students. Here, you will see a lot of short presentations (~25 minutes) from faculty who are looking to recruit new students. What aspects of those talks stand out to you? Was the science cool? Was it more basic science or more application based, and which are you interested in? Were the methodologies interesting or cutting-edge? Were you inspired by the presenter's passion? Could you see yourself doing that sort of research for 4 to 5 years?
- Choose a lab whose research program contains elements that you're passionate about. This could be the scientific problem (*i.e.,* how does metal catalysis work vs what natural products are made by different organisms vs how do proteins misfold to cause disease), the field of study (biochemistry vs inorganic chemistry vs analytical chemistry), or techniques employed in the lab (total organic synthesis vs biomolecular NMR vs mass spectrometry vs computational quantum mechanics (QM) and molecular mechanics (QM/MM) calculations). You will spend years of your life performing research (often monotonously), so don't choose a lab whose research makes you go "meh". Work on a research problem that *lights a fire* under you! Work on a project that makes it difficult to sleep at night because you're so excited and motivated to solve those problems (obviously, do get sleep though).
- Even within the same division (Biochemistry, Analytical Chemistry, Inorganic Chemistry, Theoretical Chemistry, Physical Chemistry), there are many different research topics and approaches. As an example, biochemistry could be divided into computational biochemistry (i.e., using computers to solve biochemical questions), structural biochemistry (i.e., making recombinant proteins *in vitro* and solving their structures), and cellular/molecular biochemistry (i.e., studying biochemical processes inside cells). There might also be biochemistry labs that combine biochemistry, biophysics, traditional chemical synthesis, and drug discovery. So, think beyond "I want to do Biochemistry research" and ask which type of Biochemistry research.
- Choose a lab where the research questions, lab culture, lab environment, *and* personality of the lab fit your specific needs. If you haven't worked in a lot of different labs, this might be difficult to answer. However, review the list of questions below (in the FAQ) and ask yourself what your answers to those questions might look like versus what the PI tells you. Talk to other students with more research experience, if needed. How did they choose a lab? *Trust your gut*.

- Some graduate programs do “rotations” where you pick a few labs to try out, almost like speed dating. Georgia Tech doesn’t do “rotations” per se. Most students just join labs, and then switch if it doesn’t work out. However, rotations might be possible if arranged with the PI and/or graduate program advisor (Kenyetta).
- It is common for students to take a few months (maybe even a few semesters) to find which lab will fit their needs. It is better to find a good, long lasting fit than rush into something. However, there may also be fierce competition to join popular labs; this can make choosing a lab very stressful. My suggestion is to have your top four or five choices before you join the department; maybe even reach out to those PIs prior to your official start date to start a conversation.
- Choose a PI who can mentor you in the way you’d like to be mentored. Again, think about how you’ve liked to learn in the past. Are you more of a hands-on learner who needs someone to show them things directly, or are you the type who loves to figure things out independently? There are some PIs who never see their graduate students, but they’re wonderful people and maintain a great lab. There are also PIs who train students one-on-one. The spectrum of mentoring styles and lab management styles is immense.
- Choose a PI who can communicate their expectations to you clearly and transparently. Choose a PI who will be flexible or semi-flexible with your needs. Choose a PI who will care about you as both a researcher and as a person. Choose a lab where the expectations and goals of the PI align with yours (see below FAQ). Or, alternatively, be flexible in adjusting your own expectations to match the PI so long as the research is cool enough to do so. It cannot be stated enough how important it is to have a PI who cares about your mental health and scientific success.
- Talk to current members of your potential lab (undergraduates, graduate students, post-docs, research scientists) to get a more detailed view of the research, lab climate, and PI. When possible, choose a lab that has lab members you could hang out with. You will be around these people all day every day. You don’t want to join a lab where people do not ever communicate with each other or help each other out with research. In addition to friends in your graduate cohort, you will need a lab community that will support you to get through research without feeling lonely or isolated. For people who come from marginalized backgrounds, consider joining a lab that has diversity in the type of people in the lab (including the PI and other graduate students).
- Once you have a few candidate labs you’re interested in joining, send a personal e-mail to the PI. Briefly explain your background and why you’re interested in their lab; why would you be a good fit for that lab? The e-mail needs to be personalized and show you did your homework, but not the length of a novel. PIs really dislike blanket e-mails where there’s no evidence the student did anything to understand the lab’s research. Your goal is to set up a one-on-one meeting where you can discuss some of the FAQs noted below.

  <u>Bad example:</u>
  Dear Sir,
  My name is Peter. Having read through your profile and your area of research I wish to undergo a Ph.D. in your research area. I believe I can work with you to the best of my capacity. Attached to this mail is my CV.
  Thanks for your thoughtful consideration.

  <u>Better example:</u>
  Dear Dr. Octavius,

  My name is Peter Parker. I’m a first-year graduate student in Chemistry and Biochemistry at Empire State University. I ran across your website on the faculty page and was really fascinated by your research arachnids, especially the work you’re doing how different families of arachnid proteins. I read your recent paper entitled “Structural conversion of the spidroin C-terminal

domain during assembly of spider silk fibers" and it got me really excited about the potential of learning NMR to study spider proteins during my Ph.D. I haven't done any NMR in the past, but I do have experience in classification of arachnids during my undergraduate work with Dr. Trainer at Gotham University. I think work in your lab could help prepare me for my eventual goal of working as an NMR spectroscopist in industry.

Let me know if you have any openings in the lab, and if so, if we could meet to talk about ongoing projects and a potential rotation.

Thank you!
Best, Peter

- Be aware that some PIs might want you to have previous experience in the field of research or type of techniques used in their lab. Try not to take this personally. Other PIs don't care about your background, but care more that you are motived, passionate, and inquisitive.
- Remember at the end of the day that the best graduate school experience will be tailored to suit to *your goals and interests*.
- Sometimes campus visitations are "interviews" and sometimes you're already accepted and you're really interviewing that program. In the case your visitation is an interview, example questions you might be asked include:
  - Why do you want to get a PhD?
  - Tell us about yourself
  - Why are you applying to this specific PhD program?
  - Why are you interested in my lab?
  - What do you want to do after you finish your PhD?
  - Tell us about your research experience
  - What excites you the most about your past or future research experiences?
  - What are your strengths and weaknesses?
  - Describe any challenges you've faced before and how you overcame them
  - What does an ideal supervisor / mentor look like to you?
  - Do you have any publications? If so, how did you contribute and how did the work advance the field
  - Do you have any leadership or mentoring skills?
  - What number of publications do you expect to get during PhD?
  - If you get into a disagreement with group members or your supervisor, how would you resolve it?
  - How do you generate ideas?

- Example questions to ask others (PI, students, etc) are outlined below

THE BELOW FAQ IS FOR THE MCSHAN LAB IN THE SCHOOL OF CHEMISTRY AND BIOCHEMISTRY

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MCSHAN LAB FAQS

- ***How did you get into science?***

I got into science as a kid from watching shows like Cosmos, Bill Nye the Science Guy, the Magic School Bus, Planet Earth, Star Trek, and Dexter's laboratory. I started wanting to do research after joining robotics club in middle school / chemistry club in high school and competing in the U.S. National Chemistry Olympiad. I tutored students while an undergraduate in college and I fell in love with teaching. I also tried out undergraduate research when I was in college and fell in love with it.

- ***Where did you get your degrees/research training and what is your scientific background?***

I earned a B.S. in Biochemistry from the University of Kansas where I carried out undergraduate research in epigenetics in the lab of Dr. Justin Blumenstiel. I loved research (but wasn't the best at genetics). I switched to biochemistry research because I fell in love with structural biology (how cool is it to see atomic coordinates in space and correlated that with function??). I wanted to develop new therapeutics by studying the structure and function of biomolecules. I obtained a Ph.D. in Molecular, Cellular & Developmental Biology at the University of Kansas in the lab of Dr. Roberto De Guzman studying the structure, function, and inhibition of bacterial type III section systems using NMR spectroscopy. During my Ph.D. I received a NIH T32 biotechnology training grant, which allowed me to do an industry internship in the lab of Y. John Wang at Genentech in the field of drug formulation. I then did a postdoctoral fellowship with Dr. Nik Sgourakis at the University of California, Santa Cruz studying classical antigen presentation and T cell receptors using NMR spectroscopy and X-ray crystallography. Our lab moved during the pandemic, and I continued my postdoctoral fellowship with Dr. Nik Sgourakis at the Children's Hospital of Philadelphia & The University of Pennsylvania studying non-classical antigen presentation using NMR spectroscopy and computational biology. I had a feeling I wanted to run my own lab at the end of my Ph.D., but it wasn't until my industry internship + postdoctoral position that I was sure of that.

- ***How long have you been at Georgia Tech?***

I joined Georgia Tech as an Assistant Professor of Chemistry and Biochemistry in July 2022.

- ***Are you taking students right now?***

Generally, I am always looking for graduate students who are excited about our lab's research themes. Let's talk! However, there may be times when I cannot take you due to space, time, or funding limitations. If you end up joining another lab, I will still be happy to collaborate with you and support you when possible. If you like my "vibes" feel free to ask me to be on your thesis committee.

- ***What kind of students do you look for?***

I typically look for individuals that display the following qualities: kindness, creativity, open-mindedness, ambition, perseverance, organization, passionate, self-motivated, inquisitive, and hardworking; interests in biochemistry, biomolecular structure; computational biology; protein engineering; immunology, and human health; someone who I can vibe with where communication is easy, frequent, and transparent; someone who wants to grow as a scientist and as a person; someone who is not afraid to fail (since 90% of what we do will likely fail, but we keep going despite that!); someone who

will challenge me and challenge themselves intellectually. Students in my lab tend to work hard while also maintaining a good work-life balance.

- ***Are graduate students usually co-advised?***

Co-advising typically means the graduate student has two formal mentors/advisors. Most graduate students are not co-advised. However, under the right circumstances, co-advising can be a really great experience for all parties involved. Usually, co-advising makes the most sense when the project calls for interdisciplinary science at a conceptual or technical level. If you have an idea for a co-advised project, let's discuss it. Both PIs and you need to have a discussion to see if it could work.

- ***What projects are going on in the lab currently?***

Research in our lab falls into several general areas:

- applying structural (X-ray crystallography, solution NMR, cryo-EM) and computational biology (modeling, MD simulations) tools to understand the atomic structures of interesting biomolecules. we study a wide range of systems from natural products to designed proteins to immunological receptors to lipid transfer proteins.
- characterizing the structure and function antigens important for the immune system; for example, lipid antigens associated with tumor immunity
- designing new proteins that don't exist in nature to serve as therapeutics; we use machine-learning based tools like RFDiffusion and AlphaFold
- understanding the role of lipid/protein interactions in disease and immune responses
- developing and applying computational tools to study lipid/protein interactions

We are also engaging with several collaborative studies with other labs at Georgia Tech and beyond.

- ***Are there any specific courses that students in your lab take?***

I think students should take whatever graduate level classes they're interested in, but of course those related to the lab you join would be helpful.

Graduate students in my lab typically take a combination of the following:
CHEM 6501 Biochemistry I
CHEM 6573 Molecular Biochemistry
CHEM 6762 Protein Engineering
CHEM 6572 Macromolecular Structure
CHEM 6582 Biophysical Chemistry
CHEM 6765 Drug Design, Development and Delivery
CHEM 8853 Special Topics in Biochemistry (the "special topic" varies by semester)

- ***Do you tend to give your students projects or have them select their own?***

I will usually assign new students a project to start off with while you learn techniques in the lab and learn how to be an effective researcher. You will always have a choice in what project you're involved in, and usually a few potential projects are suggested. Eventually, the aim is to develop aspects of your project *together* with you where you have more independence and agency. These projects usually will fall under the scope of the research goals of the lab, but under special circumstances they could deviate. In reality, our funding and expertise will dictate what projects we can carry out.

- ***How many lab members do you currently have, and what type of student are they?***

We currently have eight Ph.D. students and a bunch of undergraduates (Biochemistry and Biology majors). Our students come from all types of backgrounds, both culturally and research interest wise. All current and alumni lab members are listed on our website, http://mcshanlab.com/.

Please reach out to these lovely people to ask them questions about the lab.

- ***What kind of techniques will I learn during my time in the lab?***

You will be expected to learn both web lab (experimental) and dry lab (computational techniques), as well as learn how to integrate them. I would say we're ~70% experimental and ~30% computational, but that varies from student to student.

From our website:
"The McShan lab is not focused on any particular approach or technique, although we are particularly fond of solution nuclear magnetic resonance (NMR) spectroscopy. We strive to solve outstanding biological questions with relevance to immunology, medicine, and pathology. Trainees joining our lab will gain hands on experience in biochemical/biophysical characterization of protein-protein and lipid-protein interactions (surface plasmon resonance, isothermal titration calorimetry, hydrogen/deuterium exchange mass spectroscopy), structural biology (solution NMR, X-ray crystallography, cryo-electron microscopy), computational biology (Rosetta modeling, molecular dynamics simulations), protein design/engineering, chemical biology, and immunological assays."

- ***What kind of mentoring style do you have?***

I am generally more of a "hands on" type of mentor. Students are surprised with how hands on I am. My goal is to train all members in the lab one-on-one as much as possible. However, realistically that is not possible since my time is limited. I will still do my best. I am a very empathetic person. I have a very bubbly personality, which some people enjoy and some may not enjoy. I'm an advisor, a protector, an advocate, a mentor, a connection broker, a cheerleader, and an affirmer. I always try my best to be an inclusive mentor who is aware of your needs and learning style. I will listen to you and respect you. I will try to adjust by mentoring style based on your specific needs. Figuring that out takes some time / effort on both ends and requires effective communication.

- ***How often do you meet with your students?***

Usually, meetings with students will be very informal and occur frequently. You can expect that I will check in with you somewhere between daily and weekly, depending on how packed my schedule is. I will usually ask how you're doing, ask if you need anything, and ask to see any new data. This isn't meant to make you feel pressured. It is a means to provide an opportunity to discuss any progress, bottlenecks, confusion, or problems that we could address one-on-one. I will try to allow you to set your own goals and timelines, but sometimes I need to intervene to keep progress in motion. We will have more formal one-on-one meetings a few times a semester to discuss your career goals and other topics. These formal meetings will include discussion of individual development plans, career goals, classes you're taking, plans for conferences, upcoming grant opportunities, etc. If formal weekly meetings would be useful for you, we can arrange that. If I bug you too much, please let me know.

- ***What are your expectations for hours in the lab?***

The reality of graduate school is there is an excellent correlation between how much you work and how productive you are (i.e., how many papers you published). Of course, there are other factors as well. Because of the reality of research, I expect Ph.D. students to be in the lab *at minimum* 10 am to 6 pm Monday to Friday. Hours in the lab are set such that you have enough time to get your work done. However, I am also sympathetic that you have other commitments, such as classes, TA, and studying for lit exams/candidacy, etc. It's also important to me that you're able to maintain a work-life balance for your relationships, hobbies, and mental health. I also understand if you're not a morning person – but showing up to the lab at 2 pm is generally considered unprofessional and not effective. The most important thing is getting the work that needs to be done achieved in a timely manner.

In general, you can expect the following time commitments in the McShan lab:
1st year Graduate Students – 30ish hours per week
Master's Students – 30ish hours per week
Ph.D. Students – 40 to 50ish hours per week* *depends greatly on what year of study you're in

You will not be asked to stay late or come in on the weekends unless the specific experiment requires you to do that (usually, we can design it such that it doesn't). 4th and 5th year students work a little harder than beginning students to meet the high demands to publish and graduate. As always, feel free to discuss work hour expectations with me.

- ***How many papers will I be expected to publish?***

We really want you to get papers out of your research! I will try my best to design projects in a way where this is achievable. Expectations for numbers of papers depends a lot on the field of research, the impact factor of the journals you're submitting to, the difficulty of your specific project, and how much effort you put in your research. Where we submit your paper will depend on what story your data tells. For Master's students, aim to publish at least 1 first author paper. For Ph.D. students, aim to publish around 3 first author papers and a few middle author papers. It is good (not required) to have some publication in the works prior to your candidacy exam in Spring of your 2nd year. You will have opportunities to participate in collaborations with other groups. You will work with the PI and your thesis committee to define the publishing expectations to graduate (the requirements vary wildly between labs, fields, and graduate programs). The best Ph.D. thesis will tell a unified story that progresses through the degree and culminates in an interweaved story that advances the field.

- ***How is the lab structured? How do you envision collaboration between students?***

I attempt to structure the lab such that no projects are completely overlapping, although they might be related to each other, especially because we're just getting off the ground. You will be expected to collaborate with our lab members frequently, as well as with others in the department. You will likely be asked to mentor another lab member at some point.

- ***Is there funding currently available for me? Will I have to TA?***

As a new lab, we are currently limited in funding. For now, most graduate students will be expected to TA for a few semesters (usually until the 3rd year). I will also encourage you (and help you) to apply for your own funding. Summers you will be paid as GRA when possible. If you have concerns, discuss them with me. The funding climate is harsh. Please be patient with me as I work on getting funding.

- ***Do you do any lab building activities?***

Yup! We try to have lab lunches, lab dinners, and other types of lab community activities each semester. Karaoke, bowling, movie nights, and arcades are some ideas. Examples of what we have done in the past: Barbie Movie, Georgia Renaissance Festival, Sushi, and Korean Hot Pot.

- ***Will I be able to attend scientific conferences?***

Yup! You will be encouraged to attend scientific conferences, especially when you have data to present. You and I will work out the best conferences to attend based on your research and career goals.

Examples of conferences related to our work:

- Biophysical Society Annual Meetings

https://www.biophysics.org/upcoming-annual-meetings

- Experimental Nuclear Magnetic Resonance Conference (ENC)

https://www.enc-conference.org/

- International Conference on Magnetic Resonance in Biological Systems (ICMRBS)
https://icmrbs2026.org/

- American Association of Immunologists Annual-Meeting
https://www.aai.org/Meetings/AAI-Annual-Meeting

- Protein Society Annual Symposium
https://www.proteinsociety.org/annual-symposium

- RosettaCon
https://www.rosettadesigngroup.com/rosettacon/

- ***How do you help students achieve their career goals?***

I will ask all lab members to engage with Individual Development Plans (IDPs) each semester. I will also work with you to figure out what career goal works for you. I will design your research in the lab in a way that is tailored to help you pursue your career goals and be a competitive applicant. When possible, I will actively help you apply for jobs and make job contacts for you. I will write you great letters of recommendation when I can – I will explicitly tell you if I cannot write you a good recommendation for any reason. I will support your career goal no matter what you decide to do. There are SO many more jobs than just academia or industry (see: https://gpchemist.acs.org/career-paths/best-nontraditional-careers-for-chemists.html). My advice is do what you love and what makes you excited.

- ***Where do students go after they graduate your lab?***

Students I have worked with in the past have gone on to a variety of successful jobs. Some stay in academia – going onto graduate school or postdocs (when they didn't think they would!). Some go onto industry jobs (for example, at Merck or Johnson and Johnson). I will do my best to prepare you for whatever career goal interests you.

- ***Will I be able to partake in an internship if I want to?***

Most likely, yes. I will try to help you get an internship if that is useful for your career goals. The timing of the internship is important, and we can discuss that when appropriate.

- ***Can I see the office space / lab space?***

Yup! We're in MoSE G125. I will give all new and prospective students a tour of our lab and our office space, as well as a tour of the NMR and X-ray crystallography facilities.

- ***Are there lab meetings or journal clubs?***

Yup! We have weekly lab meetings during Fall and Spring semesters. During some lab meetings, a lab member will present their most recent research findings (or their plan for research). During other lab meetings, a lab member presents a paper from the literature. All lab members, including undergraduates and even me, are expected to present, participate, and ask questions.

- ***How often do students take time off for vacation?***

You will generally be allowed around 2 to 3 weeks of vacation per year (set by Georgia Tech – see the graduate student handbook). I'm a very flexible PI, but do not take advantage of that please. Discuss with me when you will be gone as soon as you know you will be leaving (not after the tickets are booked!).

FUN

Ph.D. Comics
https://Ph.D.comics.com/

Other Resources About Graduate School, Applying to Ph.D. Programs, Daily Life as Graduate Student, and Finding an Advisor

How to Choose a PhD Advisor: Everything Explained
https://www.youtube.com/watch?v=ayUiHXo44lY

Insider Information: Applying to Quantitative Biology Ph.D. Programs
https://hershbhargava.com/writing/applying-to-Ph.D.-programs/

Finding a Fit: Biological Science Doctoral Students' Selection of a Principal Investigator and Research Laboratory
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8711816/

How to Pick a Graduate Advisor
https://www.sciencedirect.com/science/article/pii/S0896627313009070

Examining Black and Latinx STEM graduate students' laboratory rotation experiences and their impact on advisor selection
https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2024.1299315/full

The Definitive 'what do I ask/look for' in a Ph.D. Advisor Guide
https://www.cs.columbia.edu/wp-content/uploads/2019/03/Get-Advisor.pdf

Interviewing with potential Ph.D. advisors
https://graduate.rice.edu/news/current-news/interviewing-potential-Ph.D.-advisors

Choosing and Joining a Lab (Harvard BBS)
https://bbsPh.D..hms.harvard.edu/program/choosing-and-joining-lab

How to Choose the Right Lab: Advice from Someone Who Didn't
https://gpchemist.acs.org/lab-life/how-to-choose-the-right-lab.html

Choosing a Lab and Applying Successfully
https://ibs.smhs.gwu.edu/sites/g/files/zaskib981/files/2022-03/Weizmann%20-%20Choosing%20a%20Lab.pdf

Lab Rotation in Grad School: Full Explanation and Tips
https://graduate.rice.edu/news/current-news/lab-rotation-grad-school-full-explanation-and-tips

How to succeed in Ph.D. program lab rotations

https://dho.pathology.wisc.edu/how-to-succeed-in-Ph.D.-program-lab-rotations/

Academic Life: The Whole Package
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3258939/

A day in the life of chemistry Ph.D. student
https://www.editage.com/insights/a-day-in-the-life-of-chemistry-Ph.D.-student

Example Student Organizations that Cultivate Community and Identity @ GT

Woman+ in Chemistry (WiC)
https://chemistry.gatech.edu/wic

National Organization for the Professional Advancement of Black Chemists and Chemical Engineers
https://linktr.ee/gtnobcche

LGBTQIA+ resource center
https://lgbtqia.gatech.edu/

Graduate Student Forum
https://gsf.gatech.edu/home

Biophysical Society Chapter at Georgia Tech
https://loadtest.biophysics.org/student-chapters/georgia-tech

Student Polymer Network (SPN)
https://twitter.com/spn_gt?lang=en

Women in Materials Science and Engineering
https://twitter.com/gtWiMSE

Literature on Mentoring / Graduate Student Life in STEM

Mentorship Structures: What Forms Does Mentorship Take?
https://nap.nationalacademies.org/read/25568/chapter/6

The Science of Effective Mentorship in STEM
https://www.ncbi.nlm.nih.gov/books/NBK552775/

STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes
https://www.science.org/doi/10.1126/sciadv.aau4734

Evidence for a mental health crisis in graduate education
https://www.nature.com/articles/nbt.4089

Behind the graduate mental health crisis in science
https://www.nature.com/articles/s41587-024-02457-z

The Dark Side of Development: A Systems Characterization of the Negative Mentoring Experiences of Doctoral Students
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8734396/

Supporting Historically Underrepresented Groups in STEM Higher Education: The Promise of Structured Mentoring Networks
https://www.frontiersin.org/articles/10.3389/feduc.2022.674669/full

Transforming mentorship in STEM by training scientists to be better leaders
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6206201/

Introduction to effective mentorship for early-career research scientists
https://bmcproc.biomedcentral.com/articles/10.1186/s12919-021-00212-9

Mental Health Resources @ GT

The **Center for Mental Health Care & Resources** (https://mentalhealth.gatech.edu/) offers confidential support and services to students in need of mental health care. During regular business hours, students who are not actively in counseling may **call 404-894-2575** or **walk-in to the office** located at the Charles A. Smithgall, Jr. Student Services Bldg. 353 Ferst Dr., Suite 238 Atlanta, GA 30332-0285. Any time outside of business hours, students may **call 404-894-2575** and select the option to speak to the after-hours counselor. Please note, our after-hours system is not set up for staff or faculty to call on behalf of a student so, please encourage your student(s) to call directly or consider completing a referral to the Office of the Dean of Students (https://cm.maxient.com/reportingform.php?GeorgiaTech=&layout_id=4/).

Emergency On Campus Options

- Students who are experiencing an immediate life-threatening emergency on campus can call the Georgia Tech Campus Police at **404-894-2500**

- 988 Suicide & Crisis Lifeline (Lifeline Chat): https://chat.988lifeline.org/
- Crisis Text Line: Text HOME at 741741 / Students of color can text STEVE at 741741: https://www.crisistextline.org/
- Georgia Crisis and Access Line: 1-800-715-4225
- National Suicide Prevention Lifeline: 1-800-273-TALK (8255): https://suicidepreventionlifeline.org/chat/
- Trevor Lifeline: (866) 488-7386
- ULifeLine or Text “START” to 741-741 or 1-800-273-TALK (8255)

Additional services offered by Satellite counselors' (walk-in consultation hours): Each Satellite counselor provides weekly consultation appointments at varying times based on their schedules (see highlighted section below for my Fall '23 hours). Anyone can access a Satellite counselor during these times, to set up a consultation email is preferable, once a message is received the Satellite counselor will reply with available dates/times and a link. Some Satellite counselors will accommodate in-person walk-ins at these times as well.

What it is:

- Consulting about a brief, non-emergency concern during the counselor's posted walk-in consultation hours (similar to Let's Talk). Consultations are approximately 15 minutes.

- Providing information to students about mental health resources on campus and how to get connected
- Consulting with faculty/staff about a student of concern

What it isn't:

- Not for a walk-in counseling appointment or initial assessment
- Not for students who are seeking support in their counselor's absence. Students who need additional/urgent support when their counselor is unavailable should visit the Center for Mental Health Care & Resources
- Not for crisis
- Not for case management

Tara's Satellite Counselor's Consultation Hours for the College of Sciences:

Please email tara.holdampf@studentlife.gatech.edu for an appointment, or stop by my Office Location: MoSE 1120B

- Monday-Friday 3:00 PM - 4:00 PM

Other useful web pages to explore:

- **Resources** https://mentalhealth.gatech.edu/

GT Wellness Hub: https://gtwellnesshub.com (self-paced online resources for students)

Division of Student Engagement and Wellbeing: https://students.gatech.edu/
Health, Wellness & Recreation: https://students.gatech.edu/health-wellness-recreation
Tech Ends Suicide: https://mentalhealth.gatech.edu/end-suicide-initiative
Mental Health Services: https://mentalhealth.gatech.edu/about/services

Additional resources for faculty and staff:

- **QPR Training:** https://mentalhealth.gatech.edu/programs-trainings/qpr-training
- **Mental Health First Aid:** https://police.gatech.edu/mhfa-class
- **Employee Assistance Program (EAP):** https://hr.gatech.edu/eap

Adapted in part via material from Hersh Bhargava, James Fraser, and Chuck Sanders