Chemistry MS Graduate Student Handbook

January 2022 revision

Department of Chemistry & Biochemistry
Swenson College of Science & Engineering
University of Minnesota Duluth

Use of this Handbook:

The purpose of this information is to provide a reference on matters specific to the Graduate Program in the UMD Chemistry and Biochemistry Department. It is not intended as a substitute for the information contained in the University of Minnesota Duluth Catalog, the University of Minnesota Graduate School Catalog, the University of Minnesota Duluth Graduate Student Handbook, the University of Minnesota Graduate Assistant Employment Policy, or the information available through the Graduate School website, but rather should be viewed as a supplement to those sources and review of some important points contained in these sources.

During a student's time in our program, they should remain in contact with the Graduate School about all of their deadlines and policies. It is your responsibility to know your own pathway to graduation, and ensure you are making good progress.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

The information in this handbook and other University catalogs, publications, or announcements is subject to change without notice.

Contact Information

Chemistry MS Program office:
Heikkila Chemistry and Advanced Materials Science Building, room 126. Campus map.
Office hours are M-F, 8am to 4:30pm, when classes are in session

Director of Graduate Studies (DGS):
Prof. Kathryn Schreiner
Office: HCAMS room 310
kschrein@d.umn.edu

Graduate Program Coordinator (GPC):
Peyton Carlstrom
Office: HCAMS room 126
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Chemistry & Biochemistry Department Head:
Prof. Steve Berry
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smberry@d.umn.edu

Duluth Graduate School
University of Minnesota Duluth
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Duluth, MN 55812
Phone: 218-726-7523
Fax: 218-726-6254
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Twin Cities Graduate Student Services and Progress Office
Graduate Student Services and Progress (GSSP) Office
333 Robert H. Bruininks Hall
222 Pleasant Street SE
Minneapolis, MN 55455
Phone: 612-625-3490
Fax: 612-626-3002
Email: gssp@umn.edu

Training Requirements & Responsibilities

Your Responsibilities as a Graduate Student

As a graduate student in the Chemistry MS program, you have a responsibility to keep up to date on required trainings and know your benchmarks towards graduation. You should be familiar with the information on both the UMN and UMD Graduate School websites (see links on pg. 1 of this document), as well as the information in this document. You must regularly check your UMD email to keep informed on any announcements or issues, and keep track of your own progress towards graduation.

Note that continuance of your funding requires you maintain *good standing* in the program. Good standing means you are putting forth your best effort in all aspects of your training: coursework, research, and (if applicable) teaching. We expect you to:

- Maintain a 3.0 average GPA in your coursework
- Complete research benchmarks as defined by your chosen research advisor
- Fully commit to all teaching responsibilities and complete tasks given to you by your TA instructor
- Be respectful and prompt in any communications with or requests from the DGS, Department Head, or Department staff or faculty
- Behave in a professional manner in all aspects of your graduate work and at any time while on the UMD campus. You are representing our department in your coursework, teaching, and research, and we expect you to be a professional member of our team.
- Behave in a respectful, professional, and empathic manner with all undergraduate students you teach or advise, including avoiding personal relationships
- Know the policies and protocols of the UMD Graduate School, including ensuring all paperwork and benchmarks are met on your path to graduation

Failure to adhere to those expectations will result in a discussion with the DGS and/or Department Head and the development of a disciplinary action plan. Depending on the severity or continuance of the issue, it could also result in the termination of your Graduate Assistantship and/or removal from the Chemistry MS program.

Graduate Student Orientation

During the week before the first day of classes, you will be required to attend graduate student orientation held in-person on the UMD campus. This orientation will include information about your graduate appointment, teaching assistantship training, and an orientation to the UMD campus and our department facilities. *This orientation week is required for all incoming graduate students.* Note that your Graduate Assistantship position begins the Monday before the first day of classes, so this is considered a paid training week.

Laboratory Safety Training

Laboratory Safety training is required for all graduate students to ensure you can work safely in both your teaching and research laboratories. You will be required to complete online laboratory safety training through the UMD Chemistry GTA Canvas site annually before starting your

teaching appointment each fall. You will also be required to complete some in-person safety trainings, including Fire Extinguisher safety training and an in-person safety training and orientation to your teaching laboratory. You may also be required to complete additional safety training or training for research involved with human or animal subjects for your research laboratory, which will be arranged with your research advisor.

University System Training

Throughout your time at UMD, you will be asked to take trainings from the University of Minnesota related to proper workplace conduct, including sexual harassment and other types of bias. Your continued good standing in the program is contingent on completing these trainings in a timely manner.

Funding Opportunities

Teaching and Research Assistantships

The majority of graduate students in our program are funded on Graduate Teaching Assistantships (GTAs). These assistantships, which are 50% appointments, require 20 hours per week of teaching work within the Department of Chemistry and Biochemistry. Some graduate students are also funded on Graduate Research Assistantships (GRAs) which are supervised and funded by research faculty in the department. Both of these types of assistantships have the same benefits, which include an Academic Year stipend of ~$15,000, tuition reimbursement, and access to University of Minnesota Duluth employee health benefits (note that while tuition is paid for, students are still responsible for paying their student fees, which total ~$900 per semester). Most of our students are also funded an additional $4,500 during the summer on a mix of summer GTA positions, fellowship funds, and GRAs. Assuming continued good standing, we commit to funding our admitted Chemistry MS students for two academic years.

Travel Funding

Travel funding is available through the UMD Graduate School and Swenson College for travel to professional conferences and in rare cases for other purposes, like travel for fieldwork or to perform research in another laboratory. Contact Kim Habig in the graduate office (umdgrad@d.umn.edu) for more information on the availability of travel funds and information on how to apply. Students are encouraged to speak to their research advisors for help with matching these funds if they are insufficient for the travel requested.

Research Funding

Funding for your research needs should be provided by your research advisor. This in turn means that any research you perform will be overseen and approved by your research advisor, and you will follow any rules or regulations for working in your research advisor's laboratory. You may also have the opportunity to apply for research funding yourself, through outside competitions like the NSF Graduate Research Fellowship program or small research grants through your professional society. Applying for and obtaining this type of outside funding can

look favorable on your CV and is good practice in grantsmanship. You should speak to your advisor for permission and help before applying for any outside research funding.

MS Degree Requirements

Degree Options

The Chemistry MS program has two different degree tracks. Graduation details for each track are listed in the Chemistry MS Program Sheet. The Plan A track is focused on thesis research, while the Plan B track is focused more on classwork with some time spent on a smaller capstone project or projects. Both tracks require graduate level coursework in the Chemistry & Biochemistry Department and a total of 30 graduate credits (either coursework + thesis or coursework + capstone). All students should work closely with their research advisors in determining which coursework they would like to take.

Plan A Track

The Plan A track requires a total of 30 credits. Of that, 10 credits must be thesis credits (CHEM 8777) and 20 must be graduate level coursework. At least 14 of those 20 credits must be CHEM, including CHEM 8099 (Introductory Chemistry Seminar, 1 credit) and CHEM 8184 (Second Year Chemistry Seminar, 1 credit). The remaining 6 course credits can be any graduate level courses offered at UMD (including Chemistry, but also including any other graduate courses). The remaining 12 credits within CHEM (after the two seminars) can be any 5000 or 8000 level CHEM courses.

A Plan A track student is required to complete and defend a thesis before they are eligible for graduation. More information about the Plan A Thesis is below.

Plan B Track

The Plan B track requires a total of 30 credits. Of that, 2-6 credits of Plan B project credits (CHEM 8094) are required, and 24-28 credits of graduate level coursework. The two chemistry graduate seminars (CHEM 8099 and CHEM 8194) are required. Up to 6 course credits may be taken outside of CHEM, and can be any graduate-level coursework offered at UMD. The remaining coursework credits can be any 5000 or 8000 level CHEM courses.

A Plan B track student is required to complete and defend a Capstone project before they are eligible for graduation. This project is broadly defined, and can include literature research, laboratory work, an education or outreach project, or any other project approved by the students' primary advisor and the DGS. Depending on the breadth of the project, the student can sign up for 2-6 project credits with the project advisor. The student may do multiple projects with multiple advisors, as long as they do not apply more than 6 credits of CHEM 8094 to their MS degree.

Degree Certificates

Some of our students earn separate certificates during their degrees from outside programs. The most popular is the Community College Teaching Certificate offered by the UMD Department of Education. Up to 6 credits of outside graduate courses from these certificate programs can be applied to your Chem MS, though note that more credits are often needed for the completion of these certificates. Therefore, students who pursue certificates in addition to their Chemistry MS will take more than 20 credits of coursework during their time at UMD. These certificates are administered by other programs, not the Chemistry MS program, so it is up to you as the student to ensure you are meeting the certification requirements.

Thesis Advisor & Committee

Choosing Your Thesis Advisor

Your relationship with your thesis advisor will likely be the most important one during your graduate career. Your advisor is committed to providing you with regular input and mentorship on your thesis research, but also will provide professional and career guidance. Therefore, choosing a thesis advisor is one of the most important decisions you will make while in our program.

Your thesis advisor must be a member of the Chemistry Graduate Faculty with the ability to be a primary advisor of a graduate student. We have affiliated faculty in departments beyond Chemistry & Biochemistry, including Large Lakes Observatory, the Natural Resources Research Institute, the UMD Medical School, the UMD Pharmacy School, and the Department of Chemical Engineering.

During your first month in residence at UMD, you will be required to meet with at least three potential research advisors, to discuss possible research topics and learn about their research expectations. These meetings are required whether or not you think you know who you would like to ask to be your advisor, to ensure you learn about the breadth of research in the program and meet multiple faculty before you make your decision. During these meetings, it is good to discuss both research topics as well as your potential research advisor's expectations for graduate students in the laboratory, as many faculty advisors' work expectations for graduate students vary widely.

Some discussion topics to bring up with your potential advisor include:

- What research topics are available currently in the laboratory? Are these funded projects or would I as the student have to apply for grants to fund the research?
- What are some of the specific skills the advisor emphasizes in training their students? This can include specific instrumentation, field work, writing or speaking skills, or specific chemical protocols. Think about how these skills match with your personal goals for your Chemistry MS.
- What are the lab's expectations for daily work? Do I have to be in the lab every day or can I make my own schedule, working nights and/or weekends if that's what works best?

Do I need approval for vacation time, and how much vacation time do students usually take in the lab?
- How often does the advisor meet with students, and what are the advisor's preferred mechanisms for interacting with students (email, cell phone, Slack channel, lab group meetings, 1-on-1 meetings, set meeting times or meetings as needed, etc)?
- What are the expectations for work to be completed while in the lab? What is the usual amount of data or research that's required to complete a thesis? Is there a thesis that the advisor can share as an example of a completed MS?
- What careers do students usually go into after completing their MS with the advisor?

When discussing these questions with potential advisors, consider how the answers match with both your goals for your Chemistry MS degree, and your preferred advisor / advisee mentoring relationship. It is important that you choose an advisor who is both a good match for you *scientifically* as well as a good match for you *professionally*. You may also request to speak with current or former students from any advisor you're considering, to get a student view of how the advisor runs their lab.

Once you complete your meetings, you should first contact your preferred advisor to ensure that there is a space for you in their lab, and that they would like to offer you a research position. Then, contact the DGS as well as the GPC with your final decision, which will be officially logged. We encourage you not to make the decision hastily, but also to make sure you are settled in a research lab by the end of your first month in residence so that you can begin your thesis work promptly.

Choosing Your Thesis Committee

In addition to your primary advisor, you will also choose an advisory committee. This committee of faculty will help you with your research work and will provide a vital mentoring team beyond your primary advisor, as well as serving as your final examination committee during your thesis defense. You should choose this committee in close consultation with your research advisor, who should have good advice about the desired expertise that would be most helpful for your thesis committee.

You are required to have a committee of at least 3 faculty, which includes your research advisor. The other two committee members must include 1 Chemistry MS graduate faculty, and 1 faculty with an appointment to an outside graduate program. This can be a faculty member with multiple appointments (i.e. an appointment within Chemistry MS and other programs) but your outside member cannot be your research advisor. Please see the Graduate Roles webpage for lists of faculty members in other graduate programs.

Your Relationship with your Advisor

Your relationship with your advisor will be the most important relationship of your graduate career. It's important that you and your advisor maintain a healthy, positive, and respectful relationship while you are in the program. This can sometimes be difficult, and you are always

welcome to speak to the DGS, members of your thesis committee, or another trusted faculty member if you would like advice on how to maintain that relationship with your advisor.

Sometimes in rare cases, the relationship between you and your advisor will break down to the point where you would like to switch laboratories, and choose a new research advisor. This usually happens due to a personality conflict or a mismatch of expectations between the student and advisor. This is allowable, but is not a decision to be taken lightly, since both student and advisor have invested significant time and often funds into training and research. If you are considering changing advisors, you should start with a conversation with the DGS to talk about the pros and cons of a switch and potential ways forward. The earlier you make this switch the better, as switching to a new advisor does mean re-starting a new thesis project, which still needs to be finished within a 2-year time frame from when you started in the Chemistry MS program. Switching advisors is often a stressful process for both student and advisor, which is why we recommend that you consider carefully the answers to the recommended advisor questions above before you choose a research laboratory. This change of advisor must be approved by the DGS and the new advisor, and the student is required to inform the DGS, their old advisor, and their new advisor in writing of this change.

Facilities

Office, Laboratory, and Conference Room Space

As a graduate student in the Chemistry & Biochemistry Department, you will be assigned a desk in one of our graduate student offices. We make every effort to ensure this desk is near to your research laboratory, but because of space constraints cannot always promise this. However, this office space will be in the same building or department as your research advisor. These offices are kept locked and you will receive a key to the office and also receive a key to lock your desk.

Once you choose your research advisor, you will also receive key access to your research laboratory and the building where your research laboratory is located. Make sure you have a conversation with your research advisor about their rules for safety in the laboratory when working after hours.

The Chemistry & Biochemistry Department has conference rooms available in HCAMS for professional meetings. If you would like to reserve a conference room for a professional purpose, please contact one of our front office admin staff who can make that reservation for you.

GTA Office Hours

Because your office space will be located in a shared room and may be far from the building where you teach, classrooms are available for you to hold your GTA office hours. In Swenson Science Building, room 121 is set up for office hours, and multiple GTAs can hold office hours in that room at one time. In HCAMS, GTAs may speak to office staff about reserving a conference room to hold their office hours. Note that because the HCAMS conference rooms are smaller,

and also used by faculty, these rooms are often unavailable for preferred times. SSB 121 is only used for office hours, and will be available whenever you prefer.

Mail
All Chemistry graduate students will be assigned a mailbox on the 3rd floor of HCAMS, located near the 314 Conference Room. Please make sure you check and empty your mailbox regularly.

Steps and Deadlines to Degree Completion

Graduation Timeline
All of our students are guaranteed funding for 2 years upon admission, assuming continued good standing in our program. Two years is enough time for the vast majority of our students to finish their degrees, though in rare cases with extenuating circumstances, the department does consider 5th semester or 3rd year funding for graduate students. This funding is requested via written letter to the Department Head and Director of Graduate Studies, describing the circumstances and why they warrant continuing funding. This letter should be sent early in the spring semester of the student's second year, to ensure funded positions are still available for the next academic year and the request can be given full consideration. Submission of the request does not guarantee 3rd year funding will be granted.

Students should bookmark the UMN Graduate School Tracks to Graduate pages for the Plan A Track or the Plan B Track, depending on their chosen degree track. *It is the student's responsibility to ensure that they are making appropriate progress towards graduation, including submitting required paperwork in a timely manner.* Specific benchmarks required by the Graduate School as well as our program are listed below - all of these benchmarks must be met to graduate from our program.

Year One Benchmarks
In their first year residence, students should be focused on completing the bulk of their required coursework and beginning their thesis work, while maintaining high quality teaching as part of their GTA. Specific benchmarks to hit in the first year include:

- Meet with at least 3 potential research advisors, and choose a research lab within your first month in residence
- Complete the required CHEM 8099 seminar in your first semester (note this is fall only course; if you begin off cycle in spring, take this in your first fall in residence)
- In addition to classes, sign up for at least 2 credits of CHEM 8777 thesis credits in your second semester in residence (*Plan A only*)
- Choose your thesis committee members in consultation with your advisor, and inform the DGS and GPC of your committee members once this is decided.
- Complete a thesis proposal, and present your proposal to your committee at the end of your first academic year. Inform the DGS via when this committee meeting is planned.
- After completing 10 course credits (usually at the end of your first year), fill out a Graduate Degree Plan, your contract with the UMN Graduate School for the courses you

will complete during your time in the program. This must be signed by your advisor and the DGS, and then will be forwarded for approval by the Graduate School.

Year Two Benchmarks

In their second year in residence, students should be focused on completing remaining coursework and devoting considerable time to thesis research. Specific benchmarks to hit during the second year include:

- Continue thesis research and plan with your advisor a writing schedule for your thesis. Read the UMN Thesis Formatting rules carefully and ensure you follow them when writing.
- Re-check your GDP and ensure that you are completing all classes that you listed. If you need to make a change to your GDP (for example, if a course you planned on is not offered), small changes can be made with the Graduate Petition Form.
- Review the appropriate Path to Graduation document (Plan A or Plan B). Make a note of all required paperwork.
- Sign up for CHEM 8184 in your last semester in residence (most students take this course in the spring semester, but a fall version is available as well)
- At least one month before you plan to graduate: Apply for graduation. This should be done in consultation with your advisor, who will approve your graduation plans.
- Once your thesis is approved by your advisor, it should be sent out to your thesis committee for review. This should happen at least two weeks before your scheduled defense date to ensure your committee has enough time to read and review your thesis. Your committee must approve your thesis for defense - initiate the Reviewer's Report Form here.
- Schedule your defense date in consultation with your advisor and committee. Your defense needs to include time for public seminar held in person or over zoom, time for public questions, and 1-2 hours for private oral examination with your committee. Please schedule rooms for these events in consultation with the GPC, and send all public seminar information (name, location, title, abstract) to the GPC at least one week in advance so the seminar can be advertised within the department.
- After your defense oral exam, your committee will vote on whether or not you passed. Be sure your advisor has the link to the Final Exam Form and the Thesis Deposit Approval Form (see Plan A Path to Graduation Document above). In many cases, your committee will decide that you have passed your exam but you are still required to make edits to your thesis before graduation. These edits must be completed to your advisor's satisfaction, and your thesis must be deposited, *before* you are eligible to graduate.

Year Three and Beyond

If you do not defend and graduate before the beginning of your third academic year, and you have not been approved for additional funding from the department, you must still enroll in the Graduate School to keep your credits active so that you can graduate when you are ready. In order to do this, you must register for 1 credit of GRAD 999 *before* the start of the academic semester. More information about keeping your active status can be found at the UMN Graduate School Special Registration Categories page. *Note that it is much cheaper and easier*

to stay enrolled in GRAD 999 as you prepare for graduation than to let your credits lapse and have to re-enroll later.