Welcome to Graduate Studies in the Department of Chemistry

Excellence in graduate training is central to the research and teaching missions of our department. The success of our Ph.D. students is of paramount importance to us. This handbook, also online at https://www.cmu.edu/chemistry/grad/forms_policies/index.html along with supplementary materials, is intended to provide a clear guide to the steps leading to the Ph.D. The majority of this handbook is specific to your academic experience in the Department of Chemistry (and your college graduate handbook specific to Mellon College of Science). **All Ph.D. students are responsible for familiarity with the requirements that are in place when they enter the program and should retain this handbook as an important reference.**

While this handbook is specific to your academic experience in the department, it is just one element of the Graduate Student Handbook Suite. There are several other resources within the suite that you should consult when needed:

- Departmental Handbook (this handbook!)
- MCS College's Handbook (available on the MCS Intranet)
- University-Wide Graduate Student Handbook (Office of Graduate & Postdoctoral Affairs)
- The Word Student Handbook

Our Ph.D. program emphasizes research training and productivity, original and creative thinking, and the development of excellent communication skills to support a successful scientific career. The handbook describes:

- orientation information to help first-year students get settled and off to a quick start,
- formal requirements for the Ph.D. Degree in Chemistry, as well as the M.S. available to current students,
- annual review procedures designed to promote steady, timely progress toward the degree, and
- policies related to academic integrity, research conduct, finances, time off, and other student concerns.

All of the requirements in this handbook apply to students entering the program beginning in Fall 2024. Since some requirements differ from those that apply to students entering in previous semesters, new students should always check their own handbook to confirm requirements and inquire with us about any questions.

Note that students must complete the academic program requirements in place when they enter unless they elect newer ones in writing. When requirements are changed, it is because the department believes the new rules offer an improvement; any such changes will be discussed at a meeting with the graduate students. However, students currently enrolled whose degree program is affected by a change in requirement may

choose to be governed by the older requirement that was in place at the time of their matriculation. In case degree requirements are changed and certain courses are no longer offered, the department will try to find some compromise that allows those students to satisfy the original requirements.

Procedures such as those on program oversight, policies on financial matters, and others starting on page 58 that are not part of your degree requirements may be updated during a student's graduate studies (e.g. based on budgetary or other constraints) and the new departmental policies will apply to all current students at that time**. Please be aware that, in the case of a conflict, university policy supersedes departmental policy.**

Feel free to discuss additional questions with us or Lorna Williams-Rolley at any time.

Requirements last revised March 2024.

Graduate Program Committee Members for 2024
Ryan Sullivan (Chair)
Lorna Williams-Rolley
Isaac Garcia-Bosch
Mike Hendrich
Oles Isayev
Rongchao Jin
Anna Kietrys
Tomek Kowalewski
Danith Ly
Gloria Silva
Lenny Vuocolo
Newell Washburn

Degrees Offered

Ph.D. in Chemistry

Students are admitted and supported on stipend for the purpose of full-time work toward completion of the Ph.D. in Chemistry. The department normally expects degree completion in 4.5–5.5 years, with monitoring of the student's timely progress via advisory committee meetings and an annual review by the Graduate Program Committee. Should extraordinary circumstances affect a student's ability to work full-time on the Ph.D., they should consult with the departmental graduate ombudsperson to discuss available options for continuing work on the degree and, if already at ABD status, review Carnegie Mellon's Doctoral Student Status Policy (www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html) for additional details.

M.S. in Chemistry

Occasionally, students wish to earn the M.S. in Chemistry in parallel to the Ph.D., which is typically possible in 3–4 semesters with courses for the Ph.D. also counting for the M.S. degree plus additional units from coursework and/or evidence of substantive research accomplishment (see detailed requirements, page 57). Note that the Department of Chemistry does not admit students solely for the purpose of pursuing the M.S. in Chemistry and financial support is not available for M.S. students. Rarely, a student may leave graduate studies because they are unable to complete the Ph.D. for academic or personal reasons. When possible, the department works with the student to facilitate completion of the M.S. in these cases, although they will be responsible for remaining tuition and fees if a terminal semester as an M.S. student is required to complete the degree. Students interested in the M.S. are advised to pursue sufficient coursework in the first 3–4 semesters and consult the Academic Program Manager or GPC Chair about requirements.

University Policies and Expectations

It is the responsibility of each member of the Carnegie Mellon community to be familiar with university policies and guidelines. In addition to this departmental graduate student handbook the following resources are available to assist you in understanding community expectations:

The Word/Student Handbook:
https://www.cmu.edu/student-affairs/theword//index.html

Academic Integrity Policy:
https://www.cmu.edu/policies/student-and- student-life/academic-integrity.html

University Policies Website:
https://www.cmu.edu/policies/

Office of Graduate and Postdoctoral Affairs:
https://www.cmu.edu/graduate/policies/index.html

A University Policy is a rule that has been officially sanctioned by the president of Carnegie Mellon University and senior university leadership, and that generally has university-wide applicability. Links to policies especially relevant to graduate students are at www.cmu.edu/graduate/policies/. A complete list of university policies is at www.cmu.edu/policies.

The Mellon College of Science also has a small number of policies governing graduate students, particularly related to graduate student time off and membership of dissertation committees, and these are incorporated in this handbook. They are also available: https://www.cmu.edu/mcs/people/faculty/resources/index.html.

Please see Additional Department and University Policies and Protocols, page 64 for key policies and protocols.

Academic and Research Policies

Academic Integrity

The Department of Chemistry requires all graduate students to maintain the highest standards of academic integrity as described in Carnegie Mellon's Policy on Academic Integrity. Graduate education and research require building upon the ideas and findings of others to create reliable new knowledge, so giving appropriate credit for other's work is critical for any student or researcher. When done well, appropriate citations facilitate progress in science by directing readers to highly relevant, related work as described in the ACS Style Guide. If done poorly, a published work may contain plagiarized elements that would lead to retraction of the article, which in turn can negatively impact all co-author's reputations and careers. As a graduate student, you need to meet the university's and the chemical profession's standards and take on this professional responsibility.

Graduate students are expected to learn the university standards during Orientation (e.g. by reading the related university policies, participating in TA training), to be familiar with the standards in the ACS Style Guide, and to continue to ask questions of their instructors and advisors if they have doubts about how to handle a specific situation. The burden is on the student to ensure special care is taken to avoid even the suspicion of an infraction. Please review the University expectations at www.cmu.edu/student-affairs/ocsi/ and the Policy on Academic Integrity at www.cmu.edu/policies/student-and-student-life/academic-integrity.html.

Departmental procedures

Suspected violations of academic integrity by graduate students will be handled following Carnegie Mellon's Academic Disciplinary Actions Overview for Graduate Students. Generally, the faculty member who discovers a suspected violation determines the penalty at the initial review and action level, **in consultation with the GPC Chair and/or department head.** The consultation should include:

- discussion of penalties under consideration,
- the nature of the suspected violations, and
- the nature of the evidence of those violations.

The department head has the option to appoint an ad hoc committee which will convene a departmental disciplinary hearing to hear from the involved parties, review the matter, and recommend to the department head a penalty where warranted. Upon the final decision, the student will be informed in writing immediately of the decision, the basis for this decision and (when applicable) the penalty imposed, along with information about their right to appeal. The letter outlining the decision will be directed to those indicated in the Academic Disciplinary Actions Overview for Graduate

Students https://www.cmu.edu/student-affairs/theword/academic/graduate-academic-disciplinary-procedures.html.

Consequences. Below are examples of academic integrity infractions and potential penalties. The penalties listed are examples of the range, not a comprehensive list, and the severity of the penalties may vary depending on whether there are any mitigating factors in a specific situation:

- Using text, tables, or figures directly from a published source (print or online) without proper citation is plagiarism. Note that both identical text and minor paraphrasing are considered plagiarism. Potential penalties for plagiarism include, but are not limited to, failure in a course or program requirement, immediate termination from a research group (without 3 months' probation), disclosure of the infraction to the prospective advisor(s) if eligible to join or change groups, and potentially termination from the graduate program without the opportunity to change groups.
- Collaboration on an assignment or borrowing a classmate's or a colleague's data for a course assignment without explicit permission of the instructor is an infraction that could lead to failure of the assignment or failure of the course (grade of R) without the opportunity to repeat the course.
- Providing unfair advantage as a TA, e.g. by sharing exam questions or answers in advance with one or more students, may warrant termination of a TA assignment, ineligibility for future TA assignments and possible suspension or termination from the Ph.D. program.

Departmental appeals process. A student may appeal an academic integrity penalty in writing to the department head within 7 (calendar) days of receiving a written decision and penalty for an academic integrity infraction. The department head may refer the matter to a small ad hoc committee for review or decide to review the evidence themselves, hear from the involved parties, and determine whether the penalty was appropriate or should be altered. Every effort will be made to resolve the appeal within 30 days, or as soon thereafter as is practical. Further appeals will be handled according to the Academic Disciplinary Actions Overview for Graduate Students: https://www.cmu.edu/student-affairs/theword/academic/graduate-academic-disciplinary-procedures.html

Research Requirements

Research is an integral part of the PhD in chemistry program. Students are registered for the research course (09-861 – Chemical Research) most semesters.

Responsible Conduct of Research

(RCR) training is mandated by both NSF and NIH for research scientists, postdocs, research staff, graduate students and undergraduates funded on their grants. Per NIH's

definition, “responsible conduct of research is defined as the practice of scientific investigation with integrity. It involves the awareness and application of established professional norms and ethical principles in the performance of all activities related to scientific research.” Carnegie Mellon has in place plans to meet these requirements which are described here:
www.cmu.edu/research-compliance/responsible-conduct/training.html
The department has determined that both to give valuable preparation for a research career and to simplify administration of this mandate, **all graduate students are required to participate in the RCR training**. **You are responsible for providing a copy of the certificate of completion to the department to maintain departmental records of this requirement and of our compliance with NSF and NIH mandates.**
This training is important for maintaining eligibility for grant support, including in the first summer in residence and beyond, and as part of developing your broad research skills. **You are responsible for fitting this into your schedule without reminders from the department and completion will be required as part of your completion of Introduction to Research.**

All new Chemistry graduate students, regardless of the type of financial support that they currently receive (including TAs) are required to complete the online training for physical science from CITI by mid-semester of the first semester in residence. The course will take a few hours to complete (it may be done over multiple sessions) and the instructions for registering are under “CITI On-line RCR Education” on this page:
www.cmu.edu/research-compliance/responsible-conduct/training.html

In some cases, an advisor may require a combination of online training and in-person training. Students with current or anticipated NIH support should contact their advisor about whether they need to attend the RCR Seminars or can just complete the online training to meet the departmental requirement. CMU offers an RCR Seminar Series to satisfy the NIH requirement of 8 in-person contact hours to be completed as soon as possible. Registration is required for the RCR Seminars that will involve both lecture and discussion.

RESOURCES AND REGULATIONS GOVERNING RESEARCH AT CARNEGIE MELLON

Office of Sponsored Programs
www.cmu.edu/osp/

Office of Research Integrity & Compliance
www.cmu.edu/research-compliance/index.html

Intellectual Property Policy
www.cmu.edu/policies/administrative-and-governance/intellectual-property.html
The policy reflects the following goals:

- To create a university environment that encourages the generation of new knowledge by faculty, staff, and students.
- To facilitate wide transfer of useful inventions and writings to society.
- To motivate the development and dissemination of intellectual property by providing appropriate financial rewards to creators and the university, and administrative assistance to creators.
- To ensure that the financial return from the development of intellectual property does not distort decisions and operations of the university in a manner contrary to the mission of the university.

Policy on Restricted Research
www.cmu.edu/policies/research/restricted-research.html

Human Subjects in Research Policy:https://www.cmu.edu/policies/research/human-subjects-in-research.html

Departmental People and Resources

Logistics

Department of Chemistry Main Office Location: Mellon Institute, Room 408
Department of Chemistry Graduate Program Office Location: Mellon Institute, Room 404
Department of Chemistry Undergraduate Program Office Location: Doherty Hall, Room 1317
Departmental Directory: www.cmu.edu/chemistry/people/
Departmental Event Calendar: via google calendar or online at: www.cmu.edu/chemistry/news/calendar.html

Mailing Address: Department of Chemistry, Carnegie Mellon University, 4400 Fifth Avenue, Pittsburgh, PA 15213

Phone Numbers: (412) 268-3272 for general concerns, e.g. departmental seminars and events; (412) 286-3150 for graduate student issues; (412) 268-2340 for teaching-related questions

Department of Chemistry Faculty: Current faculty, including affiliated faculty whose primary appointment is in another CMU department but who have a courtesy appointment in Chemistry, can be found online: www.cmu.edu/chemistry/people/faculty/

ID Cards: You can get your Carnegie Mellon photo ID card at the HUB. Your card will also give you access to Mellon Institute (MI) and the MI library after 5:00 PM. Access to Mellon Institute can be requested by submitting this google form. These ID cards have additional features, including the ability to submit your ID photo online. For more information: www.cmu.edu/idplus/

Keys: Students typically receive a key to an office/laboratory when they are assigned a temporary desk or join a group when the faculty member agrees. The faculty member must give verbal or written permission for the student to receive a key. It is the student's responsibility to return that key in person to the departmental Senior Administrator when they either leave that group or graduate.

Phones: Most Carnegie Mellon phone numbers begin with 268. When you are on campus, you dial simply 8 and the last four numbers. For off campus calls, dial 9+1 and the ten-digit number. Long distance calls are billed to you individually.

Parking and Transportation: If you want to purchase a parking permit (prices vary according to location), you need to contact the Parking Office as soon as possible (www.cmu.edu/parking/) since student spaces may run out. The university has an arrangement with the Pittsburgh bus system so that you can ride free in a large region

with your Carnegie Mellon ID. Students interested in the special program for evening and weekend parking nearby should contact the Academic Program Manager about free access to Dithridge Garage after 5 PM and on weekends. Note that this special program is under review by the university and may not continue.

Departmental IT Help: If you need departmental IT help, please contact the departmental IT representative by submitting a help ticket to Chem IT Support: chem-it-support@andrew.cmu.edu.

Computer Accounts and Email: You should already have a computer account on the "Andrew" system when you arrive. More information is at: www.cmu.edu/computing/services/comm-collab/.You may want or need to have multiple accounts but we strongly recommend that you use your Andrew email account when communicating with CMU faculty and staff. You should plan to ***check your email at least twice a day***. **The majority of important announcements and requirements will be sent to you only by email.**

Department Calendar: The department maintains an online calendar for departmental seminars, Ph.D. defenses, and other public student presentations that are part of the Ph.D. program at www.cmu.edu/chemistry/news/calendar.html.

Academic Calendar: The academic calendar can be found at https://www.cmu.edu/hub/calendar/index.html and provides information on all deadlines including registration dates, class start dates, and add/drop deadlines, exam dates and more.

Mailboxes and Mailroom: The Mellon Institute mailroom is on the third floor near the freight elevator. Each lab group has an assigned mailbox, typically shared with several other students. The store room manager oversees the MI mailroom if you have questions.

Temporary desk and computing: You will be assigned a temporary desk in a lab where you will be able to work and get to know other students until you join a group. Until you have a temporary desk assignment (typically assigned the first week of Orientation), your main access to computing will be through your own device on the university's wireless network or the computers in the Mellon Institute Library.

Photocopiers and Fax: The department's photocopier/scanner/fax machine is located in MI 400. There is a Quick Guide on the shelf next to the machine that explains how to use the basic functions. If you are making copies, you will need to enter your research group's access code which can be found on the first page of the Quick Guide. If you are receiving a fax, the number is (412) 268-1061. You can sign out journals from the MI Library for very brief periods (2 hours) to make copies. Teaching assistants will typically be responsible for course-related copying and should use the copier in the Doherty Hall undergraduate office for this purpose.

Key Contacts in the University, College and Department

Office of Graduate and Postdoc Affairs graded@andrew.cmu.edu
The Office of Graduate and Postdoc Affairs is responsible for support programs for graduate students including travel grants, small research grants, professional development seminars, and events designed for women and students of color.

Curtis Meyer, Interim Dean of Mellon College of Science and Professor of Statistics and Biological Sciences
x8-1789, mcsdean@andrew.cmu.edu
Leading academic officer in the Mellon College of Science (www.cmu.edu/mcs/). Advocates for the college within the university and beyond. Reviews grievances that cannot be resolved within the department. Assistant is Stefanie Oldfield, x8-1789, svr@andrew.cmu.edu

Dejan Slepcev, Associate Dean for Faculty and Graduate Affairs, Professor of Mathematical Sciences
x8-2562, slepcev@math.cmu.edu
Handles college-wide policy issues affecting graduate students. Convenes the MCS Graduate Student Advisory Council for input from students and to promote cross-college interactions among graduate students. Also acts as MCS Ombudsperson.

Manfred Paulini, Associate Dean for Research, Professor of Mathematical Sciences
x8-3887, paulini@cmu.edu
College wide policy issues related to research. Responsible for all research aspects in the college. Communicates grant opportunities.

Michael Young, Associate Dean for Diversity, Equity, and Inclusion
X8-5919, michaely@andrew.cmu.edu
Responsible for furthering the college and university DEI mission by working closely with department heads and leadership to implement DEI-focused initiatives, programs, and practices at the departmental and college level.

Gwen Stanczak, Director of Graduate Programs
Email: gwens@cmu.edu
Acts as a support for graduate students at the dean's office level. Handles college level fellowships

Walter Bruce Pitts, Building and Facilities Manager
x2525, wpitts@andrew.cmu.edu
Responsible for maintenance and facilities in MI. Manages building repairs and projects.

Catherine Getchell, Director of the Office of Disability Resources
x8-6121, getchell@cmu.edu
Responsible for promoting responsive, reasonable accommodations and resources on disability issues for all members of the CMU community. Students with disabilities are encouraged to self-identify with the Office of Disability Resources and

request needed accommodations. Any questions about the process can be directed to Catherine.

Bruce Armitage, Department Head and Professor
Mellon Institute 722, x8-4196, army@cmu.edu
Responsible for the overall leadership and administration of the department. For appointments, contact Jessica Derenburger x8-3272, jessd@cmu.edu

Kevin Noonan, Associate Department Head and Professor
Mellon Institute 849, x8-2138, noonan@andrew.cmu.edu
Focus on department infrastructure, curriculum planning, and graduate student concerns and petitions. Works with the GPC Chair and Department Head as needed on departmental planning.

Ryan Sullivan, Graduate Program Committee Chair, Professor of Chemistry and Mechanical Engineering
Chairs the Graduate Program Committee activities for orientation, annual review of graduate students, review of student petitions, and discussions of changes in Ph.D. requirements.

Gizelle Sherwood, Director of Undergraduate Studies and Labs, Teaching Professor
Doherty Hall 3304, x83783, gsherwoo@andrew.cmu.edu
Responsible for the operation of the undergraduate laboratories and oversees the laboratory staff. Works closely with graduate students as Teaching Assistants by providing training and overall supervision. Advises undergraduate students and oversees the undergraduate teaching curriculum.

Ashley Carman, Senior Sponsored Research Administrator
Mellon Institute, Room 406, x8-3392, acarman@andrew.cmu.edu
Grant support, budget preparation, application package assembly, internal routing.

Umi Davis, Undergraduate Academic Coordinator
Doherty Hall 1317, x8-2318, keishawd@andrew.cmu.edu
Assists in administration of the undergraduate program. Handles scheduling undergraduate classes and reserving rooms for review sessions or office hours in Doherty.

Jessica Derenburger, Senior Administrative Coordinator
Mellon Institute 408, x8-3272, jessd@cmu.edu
Coordinates key departmental activities such as faculty searches and department social events. Assists with graduate program, including room reservations, events, and graduate recruiting. Responsible for keys, photocopier, fax, departmental directory, procurement card reconciliation, and other issues.

Ashley Ellibe, Employment Processes Manager
Mellon Institute, Room 412, x8-1062, aellibe@andrew.cmu.edu

Employment recruiting, visa immigration processing, faculty reappointment, promotion and tenure, job postings, onboarding, administrative support and personnel records, faculty advisor

Tina Rankin, Administrative Coordinator
Mellon Institute, Room 440A, x8-1064, trankin@andrew.cmu.edu
Responsible for purchase orders, reimbursements, and work orders for building repairs.

Tim Sager, Business Manager
Mellon Institute 440B, x8-3343, ts1c@andrew.cmu.edu
Oversees the business functions of the Department, including personnel, payroll, and research contracts. Enter through 440A when visiting Tim.

Matthew Salyers, Communications Manager
Mellon Institute 409F, x8-6358, msalyers@andrew.cmu.edu
Graphic design, web development and maintenance, social media, content creation, PR liaison, alumni magazine.

Lorna Williams-Rolley, Academic Program Manager
Mellon Institute 404, x8-3150, lornaw@andrew.cmu.edu
Administration of graduate studies, including registration, enrollment, monitoring program requirements, degree certification, etc. Coordinates graduate student recruitment efforts. First point of contact for many questions.

Committees & Support Related to Graduate Life and Academic Affairs

Graduate Program Committee (GPC)
The Department's Graduate Program Committee will advise first-year students about courses, selecting an advisor, and other matters during the first year. The GPC also provides general oversight regarding the graduate program policies and procedures, including the annual review of progress for all graduate students. General questions or concerns regarding registration, grades, and program requirements should be directed to the academic program manager. Detailed questions and concerns you may have about your academic progress or upcoming program requirements can be directed to the chair of the GPC. However, you should feel free to talk with any member of the committee about your questions or concerns. Current GPC chair is Dr. Ryan Sullivan.

Graduate Ombudsperson
Lorna Williams-Rolley serves as graduate ombudsperson for Chemistry graduate students to assist with sensitive or confidential concerns and provide referrals to other resources when needed. The ombudsperson's role is described in greater detail on page 69 and at https://www.cmu.edu/mcs/grad/ombudsperson.html . Generally, students are welcome and strongly encouraged to discuss issues early to try to avoid them

becoming more serious. Additionally, students may confer with the MCS Ombudsperson, Manfred Paulini paulini@andrew.cmu.edu .

Chemistry Graduate Student Advisory Committee (GSAC)
The Graduate Student Advisory Committee provides input to the GPC on matters of concern to graduate students and the graduate program in general. For example, the GSAC has been involved in revisions to the graduate program requirements and in assessing the program. You can also talk with members of the GSAC to learn more about the graduate program and to share feedback about it. You can also address concerns to them and they can often help you determine how to get assistance.

Carnegie Mellon Graduate Student Assembly (GSA)
The Graduate Student Assembly (GSA) serves as student governing body for graduate students at Carnegie Mellon. In addition to university services listed here, the GSA actively works on issues to improve the quality of life for graduate students and to provide varied social activities to enhance students' experience of graduate school. Departmental happy hours and the department's graduate student lounge are funded in large part by graduate students' activities fees.

Mellon College of Science Graduate Student Advisory Committee (MCS GSAC)
Similar to the departmental GSAC above, the Mellon College of Science often has a group of graduate students (two from each department) to provide input to the Associate Dean for Faculty and Graduate Affairs. The MCS GSAC has organized past events such as the MCS Graduate Student Poster Session and panel discussions on careers in science. The Associate Dean for Faculty and Graduate Affairs convenes this committee.

Chemistry Social Committee
Members of the Social Committee are involved in developing activities for the improvement of graduate student life in the department.

Chemistry Summer Seminar Committee
This committee coordinates the Summer Seminar Series, where graduate students in the Chemistry Department host seminars delivered by peers. The seminars are a great opportunity to practice delivering professional seminars and serving on the organizing committee develops valuable organizational skills for organizing future professional meetings. When students are interested in organizing it, they should approach the department head about the potential to develop the summer program.

Mellon FIT
Mellon FIT is a student organization that maintains a gym and hosts free weekly fitness classes in Mellon Institute. This organization is open to all members of the CMU community. Organizational information is available on the TartanConnect Club list from CMU.

Resources for Teaching, Communication, Outreach, Entrepreneurship, and Other Career and Professional Development

Graduate students can find support and resources for development toward various career interests through the central university resources and local Pittsburgh organizations below. You are encouraged to talk with the contacts below and departmental faculty to identify good opportunities for you. Especially when the job market is competitive, employers often look for signs of your interpersonal, communication and leadership skills as well as your scientific expertise.

American Chemical Society Pittsburgh Section: The Pittsburgh ACS is a very active section with regular meetings held by the Energy and Technology committee, the Environmental Committee, and the Younger Chemists Committee. The ACS also has a strong outreach and networking program, not to mention the ACS National Meetings (largest scientific conference in the world) held twice a year. For more information, visit www.pittsburghacs.org

ACS Younger Chemist Committee (YCC): The Pittsburgh YCC organizes events to help pre-career chemists find their path and develop the network and skills they need to succeed. They also host social events and do outreach related to science and education. The YCC is a subcommittee of the American Chemical Society. For more information visit: https://pittsburghacs.org/groups/younger-chemists-committee/

International Society for Optics and Photonics (SPIE): SPIE is an international interdisciplinary society that focuses on the advancement of light-based research and technologies for the betterment of the human condition. The society offers a wide array of conferences held all over the world throughout the year as well as immense support for its student members. The Carnegie Mellon University chapter of SPIE strives to follow the overall vision of the organization by organizing community events, both within and without the University, such as outreach with local high schools and hosting seminar speakers.

AVPGE Professional Development Seminar Series: Organized by the Office of the Assistant Vice Provost for Graduate Education, seminars in business, management and communications skills geared to better prepare our graduate students for successful careers in academic, corporate, public and research sectors. Interested students can learn more here: https://www.cmu.edu/graduate/professional-development/

Career and Professional Development Center: The CMU center provides resources to research companies, make connections and network with others, and apply and interview for jobs. Learn more here: www.cmu.edu/career/

DNAZone: The Center for Nucleic Acids Science and Technology (CNAST) has developed since 2009 this educational outreach program for 4th–12th grade students based on nucleic acid themes. The DNAZone program creates educational materials that can be

used in teaching core concepts of chemistry, physics, biology and engineering, and illustrate how chemistry is the foundation for bio- and nanotechnology. The educational materials are used through a network of outreach programs at Carnegie Mellon (e.g. Summer Academy for Math and Science) and in CNAST faculty members' demonstrations and experiments in classrooms at two schools from the Pittsburgh Public School system. Contact: Professor S.R. Das, dnazone@andrew.cmu.edu . www.cmu.edu/cnast/outreach-dnazone/

Eberly Center for Teaching Excellence: The Eberly Center provides seminars and individual consultations to help graduate students who wish to improve their teaching or prepare for future careers as faculty members. For students who may wish to pursue academic careers, particularly at four-year colleges or teaching-intensive universities, this is an invaluable opportunity to prepare for those positions. More resources are available at www.cmu.edu/teaching

Language Support in the Student Academic Success Center: The Language Support provides language training and testing for non-native speakers of English at Carnegie Mellon is designed to help students achieve the robust English fluency needed for teaching in the American classroom and giving professional-quality presentations. In addition, students are strongly encouraged to take advantage of this resource even after passing the ITA test at the level required by the department in order to make their English fluency an asset in teaching, research communications, and their future careers. More details about programs and policies are available at https://www.cmu.edu/student-success/programs/language-support/index.html

MCS Supplemental Conference Travel Funding: The MCS Deans office provide the opportunity each semester for supplemental conference travel funding for MCS graduate students.
www.cmu.edu/mcs/grad/grad-student-conference-funding.html

National Organization of Black Chemists and Chemical Engineers Pittsburgh Student Chapter: The Pittsburgh chapter of the National Organization of Black Chemists and Chemical Engineers (NOBCChE) was started in 2010, led by a CMU graduate student. The chapter includes undergraduate and graduate students, as well as postdoctoral fellows, from University of Pittsburgh, Carnegie Mellon, and Duquesne University. NOBCChE's primary goal is to increase underrepresented minority participation in science, math, engineering, and technology (STEM) disciplines. Members attend scientific seminars, regional and national conferences, chapter meetings, community outreach events for students grades K-12, and professional development activities. The chapter also hosts social events throughout the academic year. Contact: Prof. S.R. Das, srdas@andrew.cmu.edu

Provost/GSA Conference Funding: The Provost's Office and the Graduate Student Assembly provide Graduate Student Conference Funding which you can learn about here: https://www.cmu.edu/graduate/professional-development/conference-funding/

Society of Analytical Chemists of Pittsburgh (SACP) and Spectroscopy Society of Pittsburgh (SSP) Monthly speakers, and participation in PittCon (the largest Analytical chemistry conference in the US). Information is available at their website: https://chemistryoutreach.org/

Swartz Center for Entrepreneurship: The Swartz Center for Entrepreneurship, works with its partners to serve the entire CMU community to accelerate bringing research innovations and promising ideas to the global marketplace and helping all entrepreneurial students, faculty, staff and alumni tap into the "innovation ecosystem." Students interested in developing entrepreneurial skills can learn more about opportunities here:
www.cmu.edu/swartz-center-for-entrepreneurship/get-involved/learn.html

Laboratory Safety

Graduate students are at the forefront for maintaining and enhancing the safety culture in the department for themselves and others. Training during orientation lays a foundation, and follow-up with advisors and EH&S about acquiring additional skills needed for specific research projects should be a normal part of maintaining safety as a priority.

Environmental Health and Safety (EH&S)
www.cmu.edu/ehs/
EH&S provides a broad range of services to the university to promote the protection of its community. Their web site includes biological, chemical and lab safety information, and MSDS links as well as online training. Every graduate student needs to be aware of their responsibilities in handling an accident in the lab, whether in the teaching labs or in the research lab, including how to pursue medical attention when needed and how to report an accident. Be sure to find out who your group's safety liaison is and ask the advisor where/how to learn more about the specific concerns important in your research. **Your initial contact in any emergency should be Campus Police (x8-2323)** or if an incident doesn't require an immediate response, you can contact EH&S. The university does ***not*** recommend students calling 911; Campus Police will determine if that is needed and take care of that, if appropriate.

University Lab Safety Committee
The University Laboratory Safety Committee reviews and makes recommendations on matters of laboratory safety policy and concern across departments. You can bring important safety matters to the attention of Professor Karen Stump who chairs this committee.

Introduction to Facilities and Resources

Center for Molecular Analysis (CMA)
The Center for Molecular Analysis features modern high-performance analytical instruments for use by researchers both at CMU and externally. It provides training to

faculty, graduate students and research staff in the operation of the various instruments there, including LCQ ESI/APCI Ion Trap mass spectrometer, DE-STR MALDI-TOF mass spectrometer, EMR Orbitrap Mass Spectrometer + Binary UHPLC, Ion Trap mass spectrometer with APCI capabilities, nanoflow LC, UHPLC, FITR-NIR, UV/Vis-NIR, NMRs, CD, and Diode Array UV-VIS. Reservations for time on the CMA instruments can be at www.cmu.edu/chemistry/facilities/cma .

Location: Mellon Institute 551
Mark Bier, Director, CMA
Telephone: x8-3540

NMR Center

The NMR Center contains two Bruker 500 MHZ Avance NMR spectrometers and can perform multinuclear and multidimensional NMR experiments in both direct and inverse detection mode using gradient-assistant spectroscopy. The facility can perform a wide variety of NMR experiments including routine 1D NMR spectroscopy, Dynamic NMR spectroscopy, 1D multipulse sequences, multinuclear multidimensional NMR spectroscopy, and NMR spectroscopy with pulsed field gradients.

www.cmu.edu/chemistry/facilities/nmr/
Location: Mellon Institute 302
Roberto Gil, Director of NMR Facility
Telephone: x8-4313

Other Instrumentation

Additional instrumentation within the department is maintained in individual research groups. More details can be found here: www.cmu.edu/chemistry/facilities/dept.html

Other available instruments within related research centers and university wide can be found here: www.cmu.edu/chemistry/research/centers.html

Environmental Health & Safety (EH&S)

www.cmu.edu/ehs/

EH&S provides expert training and overall guidance in safe management of chemicals and biological agents in research and teaching labs. The department also has asked each research group to appoint a safety officer so you will have someone nearby who is familiar with the university and EPA expectations and safe lab practices particular to your group. EH&S will provide the training you need for your research; **please ask your advisor about any specialized training you may need** (e.g. biological safety, radiation).

Graduate Student Lounge

The Graduate Student Lounge serves as an informal gathering place for graduate students in the Departments of Chemistry and Biological Sciences so they can take a short break from the office/lab. The main lounge is for social interaction with a small area that can be used as an occasional workspace. The code to unlock the door is 134.

Location: MI 729 A&B
Contact: Jessica Derenburger

Mellon Institute Gym
The MI Gym has weight lifting equipment, cardio equipment, and a yoga room. Sometimes free fitness classes are also offered in Mellon Institute through Mellon FIT. Please send an email to mellonfit@gmail.com to obtain a waiver that you must sign to gain access to the gym.

Location: MI 301
Contact: mellonfit@gmail.com

Mellon Institute Library
www.library.cmu.edu/about/hours
The MI Library has an excellent collection, particularly in journal holdings.

Location: Wean Hall, 4416
Contact: Chasz Griego, Liaison Librarian
Telephone: x8-6107
Email: cgriego@andrew.cmu.edu

Mellon Institute Storeroom
www.cmu.edu/mcs/mi-storeroom/
This is the shipping and receiving area for MI and also stocks chemicals, electrical supplies, and hardware.

Location: Third floor, near the rear entrance/exit.
Contact: Ray Butko
Telephone: x8-3212

Mellon Institute Post Office and Mellon Institute Copy Center
The MI Post Office handles U.S., international, and campus mail during limited hours in the morning. Copying facilities are available for use with a departmental account number.

Location: Third floor, near the rear entrance/exit, by the freight elevator.
Contact: Ray Butko
Telephone: x8-3212

Mothers' Room
A small private room is available to new mothers inside the women's room on the 2nd floor of MI. The space is equipped with a comfortable chair and table, as well as a changing table. No key is required for access.

Location: MI 210

Undergraduate Program Office
Many instructors use this as a common location where TAs pick up student papers.

Location: Doherty Hall 1317
Contact: Umi Davis**,** Program Assistant for Undergraduate Studies
Telephone: x8-2318

Undergraduate Computer Cluster
These Macs and PCs are for chemistry major use and can be a place for you to respond to email conveniently when you are in Doherty.

Location: Doherty Hall 2300
Contact: Umi Davis**,** Program Assistant for Undergraduate Studies
Telephone: x8-2318

Undergraduate Laboratories
The Doherty Hall labs are the location for the laboratory courses in which many graduate students work as TAs.

Locations: 1st, 2nd, and 3rd floors, enter at Doherty Hall south entrance
Contact: Gizelle Sherwood, Teaching Professor and Director of Undergraduate Studies and Laboratories

University Student Services—Quick Guide

The following brief summary of services will help you begin to get settled at Carnegie Mellon. For more detailed information regarding student services, please consult www.cmu.edu/graduate.

Cohon University Center: The Cohon University Center (CUC) houses a large variety of facilities, including recreational areas (pool, gymnasium, fitness facilities, free exercise classes); dining options; the University Store (textbooks, clothing, gifts), and Entropy (a convenience store). www.cmu.edu/cohon-university-center/

Enrollment Services ("The Hub"): The Hub is the central location for obtaining your ID, course registration, and other enrollment services. It is located in Warner Hall, Room 28A. Please see the Enrollment Services website www.cmu.edu/hub/ for additional information such as the schedule of classes and forms related to registration.

Housing Services: Located in Morewood Gardens E-Tower, the Housing Office (x8-2139) will furnish you with listings of rentals in the vicinity. Their web site is www.cmu.edu/housing/.

Payroll Office: Payroll is equipped to answer questions related to your paycheck (including some income tax questions) and is located at the CMUWorks Service Center at 4516 Henry St. Questions regarding your paycheck (income tax, etc.) should be directed initially to Tim Sager, Business Manager for the Chemistry Department, (x8-3343). www.cmu.edu/cmuworks/

University Health Services: Located in the first floor of Morewood Gardens E-101 (x8-2157), this office can provide information regarding health insurance and offers a variety of basic medical care. Hours of operation are available at www.cmu.edu/health-services/

Office of International Education (OIE): The Foreign Student Advisors, currently on the first floor in Warner Hall, are important contacts to assist you with questions about visas. OIE also organizes the International Student Orientation held during August which international students are required to attend. You can visit their website: www.cmu.edu/oie/ or contact them by email at oie@andrew.cmu.edu.

Office of Disability Resources: Students with disabilities are encouraged to self-identify by contacting Catherine Getchell, (412) 268-6121, getchell@cmu.edu, to access the services available at the university and initiate a request for accommodations.

Center for Student Diversity and Inclusion: The Center offers resources to enhance an inclusive and transformative student experience in dimensions such as access, success, campus climate, and intergroup dialogue. Additionally, the Center supports and connects historically underrepresented students and those who are first in their family to attend college in a setting where students' differences and talents are appreciated

and reinforced. Department-level activities complement the Center's work.
https://www.cmu.edu/chemistry/discover/diversity.html

Timeline for Completion of Ph.D. Requirements

This timeline shows the typically expected time to complete the Ph.D. in 4.5–5.5 years, given timely completion of these requirements along with good progress in research.

Year 1	
1st Semester	• Attainment examinations taken • Course work begins • Language Support in the Student Academic Success Center work toward English proficiency begins for non-native English speakers
Mid 2nd Semester	• Commitment to research advisor and joining a group due by mid-semester (typically completed by early in 2nd semester)
End of 2nd Semester	• TA requirement typically completed
Year 2	
By start of 3rd Semester	• English Language Proficiency requirement due • Advisory Committee formed
3rd Semester	• Literature seminar due • Attainment requirement due • Four Course requirement due
4th Semester	• Research progress report and Candidacy exam completed, including poster presentation, written report, and oral exam due
Year 3	
5th Semester	• Thesis proposal due *Ph.D. Candidacy and All-But-Dissertation Status typically achieved*
6th semester	• ABD committee meeting to review research progress, thesis direction(s) and discuss professional development plans
Years 4–5	
7th and 9th Semesters (or preceding summer)	• ABD committee meeting due, to review research progress, thesis outline, estimated timeline to graduation, and discuss career plans and job search
10th–11th Semester	• **Completion of Ph.D. typically achieved.**

Ph.D. Requirements

The vision of the Ph.D. program is to develop each student's knowledge and skill in original chemical research so that our graduates are prepared to initiate new research directions, adapt to changing business or societal priorities, and communicate research for positive impact on science and society. Specifically, the learning objectives of the program are for students to:

- Attain background knowledge appropriate for Ph.D.-level research
- Prepare for teaching and mentoring roles in academia and industry
- Speak effectively to an audience of faculty and peers about chemistry
- Develop professional-level scientific writing skills
- Conduct extended research with increasing independence
- Generate ideas for innovative research in chemistry and defend the methods and importance of the research
- Make an original contribution to knowledge, and produce material worthy of publication

This section describes the formal requirements for the Ph.D. Degree in Chemistry at Carnegie Mellon as well as the review procedures designed to ensure steady progress toward that degree. It is intended to provide a clear guide to the steps leading to the Ph.D. Degree in Chemistry. The requirements for the Ph.D. degree have been formulated to aid the graduate student to develop the proficiency typically expected of a research scientist in chemistry in academia, industry, or government. Students with other career interests are encouraged to discuss them with their Advisory Committees and others inside and outside the university to incorporate additional professional development to address those goals. In the interests of both the students and the faculty, the requirements for the Ph.D. degree carry a schedule for their completion. The schedule and review procedures are intended to speed the student's progress toward Candidacy and provide consistent focus on the student's research progress. The normal time to complete the Ph.D. is 4.5–5.5 years. Extensions on Ph.D. program deadlines may be possible in exceptional circumstances according to the procedures under **Petitions for Extension** (page Petitions for Extension 59).

The Department will regularly inform students of their progress toward the degree (see Annual Reviews, page 58). ***Failure to satisfy any requirement on a timely basis is cause for a dismissal from the graduate program following the procedures outlined below under Academic Actions and Appeals (page 60).*** Note that an academic year comprises two semesters, with the summer not being construed as a semester.

In the event that the requirements are changed, students may adopt the new requirements or remain under the requirements in effect on their matriculation, at their discretion.

Attainment Examinations

The purpose of the attainment examination requirement is to ensure sufficient fundamental background for graduate course work and breadth for further research. The attainment exams assess incoming students' knowledge in core areas of chemistry frequently represented in the department's research and ensure that deficiencies are addressed through appropriate course work and/or a re-examination.

Expectations
By the end of the third semester, entering graduate students must pass an attainment requirement three out of five areas of chemistry: Organic, Inorganic, Physical, Instrumental Analysis, and Biochemistry.

Students may meet this requirement by:

- Passing 3 out of the 5 attainment examinations
- Passing graduate course work in the area, typically 12 units, as deemed appropriate by the Graduate Program Committee with a grade of at least a B in each course.
- Retaking (up to 2 times) and passing the attainment exam

In order to receive credit toward passing an attainment exam, a student must earn at least a B (3.0) in a full semester of GPC-approved coursework in that area (typically 12-units).

Current courses approved for the attainment requirement:

- **Organic Chemistry**: 09-711 Physical Organic Chemistry, 09-714 Advanced Organic Chemistry, or 09-718 Bioorganic Chemistry: Nucleic Acids and Carbohydrates
- **Inorganic Chemistry**: 09-736 Transition Metal catalysis for Organic and Polymer Synthesis
- **Physical Chemistry**: 09-701 Quantum Chemistry, or 09-611 Chemical Thermodynamics AND 09-612 Introduction to Quantum Chemistry.
- **Instrumental Analysis and Biochemistry**: Currently no courses fulfill this attainment requirement

For physical chemistry attainment credit based on performance in approved mini-courses (09-6xx), students must receive at least a B (3.0) in each of the physical chemistry mini-courses. Otherwise, they will need to retake and pass the physical chemistry attainment exam, or they may retake the mini-course with the lower grade or take a different GPC-approved course and earn B's in each of two mini-courses for a total of 12 units. Note that 09-603 Mathematical Analysis for Chemistry is recommended as preparation for physical chemistry graduate courses but does not count toward the physical chemistry attainment requirement.

All students will take attainment examinations upon arrival in the department for the purpose of guiding advising on courses. Based on the results of the exam, the choice among the options above is determined by the Graduate Program Committee after consultation with the student and advisor (if one has been selected). Note that if a

student does not have sufficient background to enter a graduate course in a given area, they will need to take (or audit) undergraduate coursework approved by the Graduate Program Committee, and then either retake and pass the attainment exam in that area or pass appropriate graduate course work by the end of the third semester in residence. Attainment requirements must be satisfied before a student may complete the research progress report requirement.

Outcomes
Students may retake the attainment exam when it is administered to new students in January and/or the following August. Failure to pass the attainment requirements by the end of the third semester will lead to a warning or probation. Failure to meet this requirement by the end of the second year in residence will lead to a delay in completing the research progress report and is grounds for termination from the program. With the agreement of the advisor, the student may petition the GPC in writing to request an extension beyond the third semester to complete the attainment requirement. (See **Petitions for Extension,** page 59)

Courses

The purpose of the course requirement is for students to display mastery of their field and in-depth knowledge appropriate for conducting research.

The equivalent of at least four full-semester graduate-level lecture or laboratory courses in chemistry or closely related fields must be passed with a B (3.0) or better in each course by the end of three semesters in residence, for a total of at least 45 units. Students are encouraged to take at least one course outside of their research area, which may include courses in other departments. A list of previously approved courses in other departments is available from the GPC. **Students must discuss other course work outside of the department with their advisors and submit the Request to Enroll in Outside Courses form before the last day to add a course for that semester**.

Relevant department policies related to course work include the following:

- At least two of the four courses should be in the Chemistry Department (09-XXX)
- One relevant upper-level course (typically 500-level or higher) in another department may be considered for graduate credit; approval by the GPC for the course is required.
- Up to two graduate chemistry courses from a previous institution may be considered for transfer credit with approval from the equivalent CMU course, the student's research advisor and GPC chair according to the department's policy on Transfer of Course Credit and University Policy on Grades for Transfer Courses. The grade will not be listed on the student's transcript; only the course title and units awarded will be visible.
- Students are also required to complete 09-700 Introduction to Research (or the equivalent if the course is not available in the spring semester) to become familiar with faculty and research in the department and 09-911 Graduate Seminar to develop skills in critically reading and presenting the chemistry literature. In addition, students must take 09-912 Current Research in Chemistry for the first four semesters to broaden their exposure to current research beyond their own research

area. These units do not count toward the four full-semester graduate lecture and laboratory courses.

- Up to 12 units of Independent Study may be used toward the four full-semester course requirement in rare situations where important lecture or laboratory course work is not available to meet a deadline and when all three of the following are approved by the GPC Chair, and filed with the department: (1) a syllabus or reading list; (2) clear parameters for one or more substantial required written products demonstrating the learning, proportional to the proposed number of units, and (3) a faculty supervisor with expertise in the area and willingness to answer questions, evaluates the outcomes and gives a letter grade.
- Students are required to register for 09-861 – Chemical Research each semester they are conducting research. Grades are assigned by the student's research advisor.

Additional relevant university policies include:

- If a student repeats a course, note that the first grade will continue to appear on the student's transcript and will be counted in the GPA used for the M.S. degree. See Carnegie Mellon University Grading Policies for details: www.cmu.edu/policies/student-and-student-life/grading.html
- Courses may be taken in other departments or at the University of Pittsburgh (through cross-registration) with the approval of the Academic Advisor. The Department of Chemistry accepts the grading policy of other departments and the University of Pittsburgh for approved courses. The grade will not be listed on the student's transcript; only the course title and units awarded will be visible.

Course Advising

Students, in consultation with the GPC and their research advisors, may plan a program of courses both to fit their background and interests and to satisfy the Ph.D. requirements. While well-prepared students often take the minimum four full-semester courses, students are advised to take additional work as needed for their background, career goals, and research interests. With permission of their research advisor, interested students may be able to take or audit a course in management, teaching, or policy that may be of interest for their career paths. Such courses do not count as one of the four required courses in chemistry or closely related fields. For non-credit options with flexible scheduling, please see also the Professional Development Seminar Series offered through the Assistant Vice Provost for Graduate Education and programs offered through the Eberly Center for Teaching Excellence. **NOTE: Students who are interested in completing the M.S. in Chemistry need additional coursework and an overall GPA of 3.0.** They are advised to seek advice from the GPC Chair by the beginning of the 3rd semester in residence (See M.S. Requirements page 57).

Expectations and Outcomes

Two grades of C or a single grade lower than C will lead to probation and to review of the student's standing by the GPC each semester until the course work requirement is satisfied. To continue in the Ph.D. program, the student must earn a B or better in each course for enough GPC-approved courses in the subsequent semester(s) to remain on

track to satisfy the course work requirement by the end of the third semester. Note that advisors are strongly encouraged to review a student's grades before accepting them into their research groups and low grades may lead to an advisor's negative decision.

The course requirement normally must be completed before the student is eligible to complete the research progress report oral exam and is required to advance to Ph.D. candidacy. Failure to meet the course work requirement by the end of the third semester is grounds for termination from the program. If terminated from the Ph.D. program, students who have not yet completed the M.S. degree may be eligible to transfer to the M.S. program for one semester as described under **Academic Actions and Appeals** (page 60).

SEE ONLINE FOR: Transfer of Graduate Course Credit form
Independent Study Credit form
https://www.cmu.edu/chemistry/grad/forms_policies/forms.html

Department of Chemistry Policy on Course Transfer

Students may request transfer of credit for up to two previous graduate courses from other institutions that are equivalent to courses offered at Carnegie Mellon. The student must provide (1) a course syllabus or other sufficient course description for such courses, (2) an official transcript showing the relevant previous courses, (3) supporting documents stating the course was not used for a previous degree, and (4) signatures from the Carnegie Mellon course instructor, their advisor, and the Graduate Program Committee indicating their approval. The approval form is available from the Graduate Program Coordinator or on https://www.cmu.edu/chemistry/grad/forms_policies/forms.html . A minimum grade of B is required to transfer credit for a course. Also, courses needed to meet the requirements of a previously received degree may not be transferred

Graduate Teaching

The purpose of this requirement is to help students prepare for teaching and mentoring roles in academia and industry and to contribute to the quality and safety of instruction in the undergraduate program. Excellent performance as a TA can be used to indicate many of the relevant skills for future positions requiring management and communication skills. Through this experience, students can hone a variety of skills relevant to many careers, including:

- explaining concepts and procedures to novices and non-experts,
- motivating why a topic is important and interesting,
- observing and giving feedback on laboratory work and safety,
- giving constructive feedback on written work,
- communicating expectations effectively, and
- managing work performed by teams.

Note that, in order to develop the widest range of these skills as a TA, non-native speakers of English must have excellent English proficiency, often Pass or Restricted I on the ITA Test, to receive TA appointments in recitation and at least Restricted II for TA appointments in laboratory. Students are also encouraged to hone many of the skills above as part of mentoring undergraduates in research and they should discuss opportunities for this with their advisors (e.g. as part of the Annual Review of Graduate Students).

Expectations

Every student must teach for at least one semester as a Teaching Assistant, either as a recitation TA, laboratory TA, or a grader/course assistant. This formal academic requirement is an important part of a graduate education and must be completed to the satisfaction of the instructor for that course.

Teaching Assistant Duties

After the one-semester requirement is completed, students may continue as a TA as part of their financial support and must continue to maintain satisfactory performance (as described under Financial Support, page 67). The details of TA assignments vary by course and students must consult with the course instructor each semester about their specific duties and expectations for satisfactory performance

The duties of a Teaching Assistant require approximately 15–20 hours per week. Note that TA duties are one of the primary sources of financial support and that renewal of an appointment as a TA is contingent on satisfactory performance as a Teaching Assistant. Therefore, the expectations below are important for all TAs.

Teaching assistants are expected to fulfill all of the responsibilities of their role in a timely fashion and to make appropriate arrangements with the instructor at least 1–2 weeks in advance if they anticipate any difficulties in doing so. For example, instructors need to be consulted in advance if a TA would like to arrange for someone to teach a class for them. Barring unforeseen emergencies, travel arrangements must be made far enough in advance that they do not conflict with TA training and teaching responsibilities.

Training

The Department provides TA training each August specific to the roles of recitation TAs, lab TAs, and course assistants for which attendance is required for the first two semesters in which the student serves in a particular role. Representative topics covered during TA training include:

- Chemical Safety Training and Laboratory Waste Disposal
- First Aid Training
- Academic Integrity
- Teaching a Recitation
- Microteaching (teaching a very short lesson with immediate feedback)
- Safety in the Undergraduate Chemistry Laboratory
- Teaching in the Laboratory
- Introduction to Grading
- Grading Exams and Problem Sets

Note that instructors for TA training, in addition to the Director of Undergraduate Studies and Laboratories also serve as ongoing resources when TAs have questions or concerns about their responsibilities.

Outcomes
Instructors determine the expectations for each graduate TA assignment. If a TA appears to be having difficulties meeting these expectations, instructors are expected to provide timely written feedback to let the TA know what type of changes or improvements are needed. The feedback should be sent to the TA and cc'd to the Director of Undergraduate Studies and the GPC Chair. If a student is informed of a significant deficiency, does not address the problem adequately, and cannot document reasonable efforts to improve, that semester will not count toward the one semester required for the doctoral degree. An additional semester as a TA or an appropriate Independent Study will be required until the graduate teaching requirement is fully satisfied. If no written feedback suggests the need for changes, the TA can interpret that as an indication of satisfactory performance.

Feedback
Recitation and laboratory TAs can typically receive early course feedback from their students to improve their performance during the semester and a formal TA evaluation at the end of the semester that can be used to document their effectiveness for job applications or in nominations for departmental, college or university teaching awards. Instructors may also provide end-of-course evaluations for their TAs. Where applicable, progress in mentoring undergraduates in research is also assessed by advisors during the Annual Review of Graduate Students (page 58).

Further Development
Those who wish to develop specific skills through their additional TA experiences should discuss their goals with both GPC Chair and the Director of the Undergraduate Program and Laboratories so that a long-term strategy can be developed to assist them. Students who only get the opportunity for serving as a course assistant are strongly encouraged to discuss alternative opportunities for further development of their skills with the GPC Chair.

As part of the Annual Review of Graduate Students (page 58), students are encourage to meet 1-1 with the GPC Chair if they are interested in enhancing their skills in this area. For example, students who are seeking careers involving teaching or management should proactively seek feedback on their TA performance from the supervising instructor and the course instructor. For areas of additional experience or training, the Director of Undergraduate Studies can advise on additional opportunities to further develop teaching skills.

English Language Proficiency

Each student for whom English is not a native language must demonstrate fluency in spoken English by the end of the first year in residence. The Language Support in the Student Academic Success Center has been established by Carnegie Mellon University to

teach this skill, and administer the required fluency test. The purpose of this requirement is to ensure every student's ability to communicate effectively in English with Department members and external colleagues about their research and to enhance their ability to contribute effectively to the Department's educational programs.

Expectations

Students are generally expected to receive a Restricted II (formerly called Category 3) or better by the beginning of the third semester in residence and to continue working toward Pass or Restricted I (formerly referred to as Category 1 or 2). Starting in the first semester in residence, the Department expects a consistent effort in working with the Language Support in the Student Academic Success Center and in speaking English regularly in departmental activities to achieve these goals in a timely manner. While the Language Support in the Student Academic Success Center may recommend different workshops for different individual needs, a student's total hours in workshops, tutoring and self-paced work at the Language Support in the Student Academic Success Center should be between 15–30 hours each semester until reaching Restricted II to be viewed as consistent effort. In addition, effort is required year-round, including 15–30 hours in the summer, until reaching Restricted II. Students are expected to take the test at the earliest opportunity recommended by the Language Support in the Student Academic Success Center and the department.

Note that all students who received Restricted I or Restricted II who are working as TAs are required by Carnegie Mellon policy and Pennsylvania law to work concurrently with the Language Support in the Student Academic Success Center to improve their English fluency, typically through the workshops and/or individual tutoring. This work at the Language Support in the Student Academic Success Center is called the ITA Support Program Requirement. (See "CMU's Evaluation and Certification of English Fluency for Instructional Personnel" page 35)

In addition, the Department strongly encourages students to use English day-to-day in discussing their research since non-technical conversations in English often do not improve fluency on scientific topics. Advisors are also encouraged to talk directly with students when problems with English appear to interfere with communication about research and to inform the GPC as early as possible when they have concerns in this area.

Outcomes

Good standing in the department may be jeopardized if a student neglects to work sufficiently on their English fluency, based on information from the Language Support in the Student Academic Success Center. However, because the Department recognizes that language learning rates can vary substantially, the deadline of reaching Restricted II by the beginning of the third semester may be adjusted for individual students' needs as long as the student maintains appropriate, consistent efforts to improve. Failure to reach Restricted II by the beginning of the third semester may delay completion of the formal seminar requirement if the required effort at the Language Support in the Student Academic Success Center has not been made for one or more semesters or in the summer. Students are expected to make up the deficiency in hours of training as

much as possible within the Language Support in the Student Academic Success Center's offerings before they can schedule the formal seminar.

Failure to make sufficient efforts in line with recommendations from the Language Support in the Student Academic Success Center and the Department may lead to probation after one semester. Students who have not reached Restricted II by the beginning of the fourth semester in residence and have not sustained consistent efforts to improve English fluency may not be allowed to complete the research progress report and are at risk for termination from the program.

SEE ONLINE FOR: ITA Test Category Descriptions
https://www.cmu.edu/student-success/programs/language-support/index.html

RELATED POLICIES ON ENGLISH FLUENCY FOR TEACHING ASSISTANTS

Carnegie Mellon University Evaluation and Certification of English Fluency for Instructional Personnel

Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the English Fluency in Higher Education Act of 1990. Through this Act, all institutions of higher education in the state are required to evaluate and certify the English fluency of all instructional personnel, including teaching assistants and interns. The full university policy can be reviewed at: www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html.

The fluency of all instructional personnel will be rated by Language Support in the Student Academic Success Center to determine at what level of responsibility the student can TA. See English Language Proficiency (page 33 of this handbook) for more information.

In addition to administering the International Teaching Assistant (ITA) Test (a mandatory screening test for any non-native speaker of English), Language Support in the Student Academic Success Center helps teaching assistants who are non-native English speakers develop fluency and cultural understanding to teach successfully at Carnegie Mellon. Visit the website for additional information: www.cmu.edu/student-success/

Department of Chemistry Responsibility in the University Policy on English Fluency for Instructors

Each graduate student with a Restricted I or Restricted II on the university's ITA Test who has a current TA assignment is required to complete the ITA Support Program concurrent with the TA assignment as described here: www.cmu.edu/icc/language-certification/scoring-guide.html

The department is responsible for ensuring student compliance. The policy below reinforces the seriousness of this university requirement. The Language Support in the Student Academic Success Center reminds students with ITA Test scores of Restricted I and Restricted II of this requirement every semester, so forgetting or misunderstanding the requirement is not an acceptable excuse. If you have conflicts with your coursework or TA assignment, it is your responsibility to notify the department at the beginning of the semester and try to come up with a solution. You must plan your research around this ~1–2 hour/week obligation for training to improve your English. You need to begin work with the Language Support in the Student Academic Success Center at the beginning of each semester to be successful. Restricted I and Restricted II students are strongly encouraged to take advantage of the opportunities at the Language Support Center to pursue a score of Pass, which requires no additional language training.

The following are the consequences for failing to comply with this 15 hours/semester requirement in semesters when you have a TA appointment as a Restricted I or Restricted II student:

1. If the Language Support in the Student Academic Success Center's mid-semester attendance report shows less than 50% completion (7.5 hours) toward the goal, you will receive a warning letter cc'd to your advisor(s). Note that if you have delayed too much, it may be impossible to catch up after this date.

2. Failure to complete or very nearly complete the 15 hours of concurrent Language Support in the Student Academic Success Center work during a TA assignment will be viewed as not satisfactorily meeting the expectations for the TA assignment. That semester of teaching will not be counted toward the departmental requirement of two semesters as a TA.

3. Students in Restricted I and Restricted II who are not in compliance with this requirement will be required to make up any deficiency in their Language Support in the Student Academic Success Center work by no later than the end of the subsequent semester or summer, whether or not they are a TA at that time. For example, a student who completes 5 hours of Language Support in the Student Academic Success Center work in the fall semester would be required to complete 25 hours in the immediately following spring.

4. Advisors will be informed about any semester when a student is out of compliance. When a student is egregiously out of compliance (e.g. 5 hours or fewer of Language Support in the Student Academic Success Center work in a single semester) or when

they have not made up the work as described above, their eligibility to receive a full-semester TA appointment will be in jeopardy. Additional requirements for developing English fluency may be assigned as a condition of receiving a TA appointment, if a TA appointment is possible.

Advising and Selecting a Research Advisor

The primary responsibility of the Research Advisor is directing the research for the dissertation, but they also provide guidance for meeting the other Ph.D. program requirements, general educational advice, career planning, and often job search assistance. The Research Advisor also provides formal written notice when issues in the student's research performance jeopardize continuation in the group (See **Academic Actions and Appeals**, page 60).

A Research Advisor is to be selected from the Chemistry faculty by mid-semester of the second semester in residence. This involves mutual agreement between the student and the faculty member and requires approval by the Department Head. Selecting an advisor and joining a lab/group in the first semester is encouraged when the student is confident of their interests. The advisor (or co-advisors), the student and the department head must agree for a student to join a group officially.

Process of Joining a Group

In general, the process of joining a group is flexible and students are responsible for actively seeking out faculty during the initial weeks of the first semester to discuss their research interests and possible openings available in the group. While every effort is made to admit students with research interests that match openings in the department's research groups, student are not admitted to particular research areas and first-year students sometimes develop new research interests that affect the distribution of openings. Flexibility in the process is intended to allow students to find a group suitable for them and for faculty to find good matches for their research groups. These are the major strategies:

- Students complete 09-700 Introduction to Research to learn about faculty research,
- Students are encouraged to meet with faculty of interest 1-1 as soon as possible, visit regular group meetings to learn more about the ongoing research and talk with others in the group; and
- Students may arrange 2–3 rotations of typically 4–6 weeks each for hands-on experience in their groups of interest, although some groups may not offer rotations,

Prior to selection of a Research Advisor, students are strongly encouraged to discuss their research interests with a minimum of three faculty members. Moreover, the students should get to know the faculty widely, get advice from students whose studies are further advanced, and visit with faculty in their offices. It must be understood that the chosen advisor will occasionally decline the relationship, either because of overload, lack of sufficient research support or lack of intellectual compatibility.

Expectations and Deadlines

A first-year student must join a research group prior to their first summer in the department in order to remain in the Ph.D. program. Students who have not secured an advisor by mid-semester of their first spring in the department are advised to consult the GPC Chair. More advanced students who lose an advisor may be eligible to change advisors (see *Outcomes*, below, and *Eligibility to Change Advisors*, page 62).

The Research Advisor becomes de facto the Academic Advisor to the student making the student aware of Ph.D. requirements in collaboration with the GPC, recommending coursework, and monitoring progress toward the Ph.D.

The Research Advisor may set their own requirements for good standing in the group and has the responsibility to communicate in writing any deficiencies in an advisee's research activities that are significant enough to jeopardize their continuation in the group and/or in the Ph.D. program as described under **Academic Actions and Appeals** (page 60).

Outcomes

A student without a Research Advisor at any stage in the Ph.D. program typically is not eligible for financial support in the summer and will normally be required to withdraw from the Ph.D. program, with discussion of options to complete the M.S. in Chemistry, if not already completed.

While the advising relationship typically lasts the duration of a student's Ph.D. studies, either the student or the Research Advisor (or co-advisor) may terminate their relationship according to the approved departmental procedures described under Academic Actions and Appeals. A student otherwise in good standing in the department may then select a new Research Advisor on mutual agreement between the student and the faculty member, and approval by the Department Head.

Normally, for a new advisor to consider a student favorably, they must be in good standing and must be making timely progress on program requirements expected for their semester in the program. As described under Academic Actions, the student may request a 1–2 month grace period to search for a new advisor and will have the opportunity to be considered for a teaching assistant or other position during that time, should one be available, although financial support cannot be guaranteed. A student who is changing groups typically needs to join a new group prior to summer in order to continue in the Ph.D. program. See additional information about changing advisors (page 70).

SEE ONLNE FOR: Thesis Agreement Form
Thesis Agreement Form (Co-Advising option)
https://www.cmu.edu/chemistry/grad/forms_policies/forms.html

Advisory Committees

The primary purposes of the Advisory Committee are: (1) to evaluate the student's performance on the research progress report/candidacy exam, thesis proposal, and dissertation, and (2) to discuss the student's progress and provide additional guidance on research and overall professional development. The Committee may also be called

upon for input when there are questions about a student's ability to continue in the Ph.D. program.

Forming the Advisory Committee

Prior to forming advisory committees, students are encouraged to consider the types of knowledge and skill that they would like to develop and to meet with potential committee members to discuss research interests. Students are encouraged to build 1-1 relationships with their Advisory Committee members, some of whom may become collaborators, additional mentors or references.

In consultation with the Graduate Program Committee and their advisor, a student will select a Research Advisory Committee by the beginning of the third semester in residence. This committee will comprise the membership of the examination committee for the research progress report and thesis proposal. The Committee may also be called upon for input when there are questions about a student's ability to continue in the Ph.D. program. In addition, after the student reaches ABD status, the Advisory Committee will meet with the student approximately annually in Dissertation Progress Meetings to support timely completion of their Ph.D.

A typical Advisory Committee will consist of the Research Advisor(s) and two other Chemistry faculty members, normally from the Tenure Track or Research Track. When it would be advantageous for the student's research, one of these members may be from outside the department. Students should seek approval from the GPC when requesting a member from outside the department. Note that each faculty member may serve on a limited number of these Advisory Committees to ensure that they can provide the appropriate amount of attention to each student. Therefore, students are typically advised to have committees with three faculty members; students with co-advisors should have four members.

Note that advisory committees may need to change when a student plans their dissertation defense in order to conform to MCS Guidelines on Doctoral Thesis Committees which require a "visiting" member not affiliated with the department.

Advisory Committee Chair

The student will also select a Chair of the committee, different from the Research Advisor(s), whose role is to oversee and provide feedback on the oral exam for the research progress report/candidacy exam, to coordinate and summarize formal written feedback on the thesis proposal, to help the student in preparing for dissertation progress meetings, and to provide a brief summary and written feedback to the ABD student and the GPC after dissertation progress meetings. The student may also consult with the GPC about choosing a chair.

Individual Development Plans (IDP)

Individual Development Plans (IDPs) are meant to promote professional and personal growth by formally documenting goals and facilitating dialogue, collaboration, and accountability between advisors and advisees. Carnegie Mellon has developed a set of templates that can be used by doctoral students and their advisors to create an Individual Development Plan. You can find the templates here: https://www.cmu.edu/graduate/professional-development/index.html

The department provides guidelines to advisors to help students develop a IDP. The annual review and annual ABD meetings also support a student's IDP.

MCS Policy on Doctoral Thesis Committees
www.cmu.edu/mcs/people/faculty/resources/handbook/doctoral.html
The Mellon College of Science has additional requirements for doctoral thesis committees which require the addition of a visiting member for the dissertation defense. A thesis defense committee can have no fewer than 4 members and at least one member of the committee shall be a "visitor" (a person not affiliated with the Department or participating in the student's thesis research). A visitor can be from another CMU department, another university, of from outside academic institutions altogether. Note that if you have an advisory committee with members from outside the Chemistry Department, you are advised to plan ahead if you wish to avoid changes in your committee to satisfy the MCS policy. Please consult with the GPC chair when initially forming your committee.

Literature Seminar

The learning objectives of the literature seminar are to demonstrate that the student has:

- mastered a topic in the current chemistry literature sufficiently to speak effectively to a general audience of faculty and peers about it and
- read the research literature appropriately and critically to provide a synthesis with implications and/or to identify open questions in the area.

The seminar presentations also introduce all seminar participants to issues in the current chemical literature and create an environment for discussion of the literature.

Students will enroll in 09-911, Graduate Seminar, for their first four semesters, and receive non-lecture course credit for delivering their seminar and providing constructive feedback to other students on their presentations.

Expectations

The topic may be chosen by the student with the approval of the student's advisor(s) and the course instructor. Students may choose a seminar topic to broaden their knowledge beyond the current project or serve as a foundation for the thesis proposal. Details are provided in the syllabus for 09-911. An extension to present the seminar in the fourth semester in residence may be requested by petitioning the Graduate Program Committee, explaining what makes the circumstances exceptional and proposing an alternate deadline.

The seminar must be based on published work done in other laboratories. In general, seminars should draw on many articles from the literature and represent a synthesis of ideas that goes beyond summarizing individual pieces of research. An annotated bibliography should be submitted two weeks in advance of the presentation to the course instructor and student's advisor. Presentations are expected to be approximately 30–40 minutes in length, including approximately 10 minutes of questions and discussion with peers and faculty. Students are advised to arrange a

practice talk with their advisor and others to prepare. Additional guidelines are available in the supplemental materials section and through the course instructor.

If a student who is a non-native speaker of English has not yet reached Restricted II on the ITA test, they must seek written permission to proceed with the seminar from the GPC Chair. Permission will be granted based on a combination of their hours of training at the Language Support in the Student Academic Success Center, and faculty observations in the department. The literature seminar presentation may be delayed based on fewer than 15 hours/semester effort at the Language Support in the Student Academic Success Center in any semester or summer.

Outcomes

Formal evaluation of the seminar will be by the course instructor, the student's advisor, and one other faculty member selected by the student (ideally a member of their Advisory Committee) and will include evaluation of responses to questions. The student will receive detailed feedback and constructive suggestions on the seminar from at least two faculty members, along with written feedback from the audience.

Should the seminar be determined to be deficient (recorded as failure), the instructor may allow the student to repeat the requirement before their Advisory Committee or in the Graduate Seminar setting. In this case, the deficiencies must be communicated in writing by the course instructor and advisor to the student and the Graduate Program Committee, along with a new deadline for re-presenting the seminar. The student may not proceed to defend the research progress report without a satisfactory performance on the literature seminar.

SEE ONLINE FOR: 09-911, Graduate Seminar Feedback Form
https://www.cmu.edu/chemistry/grad/forms_policies/forms.html

Ph.D. Candidacy: Research Progress Report, Candidacy Exam, Thesis Proposal

The candidacy requirement has two components: (A) a written research progress report with associated oral exam and (B) a written thesis proposal. Both components must be passed by the start of the 5th semester in residence for the student to remain in good standing. In the absence of an approved petition for extension by the GPC, failure to pass both requirements by the end of the 5th semester in residence is grounds for termination from the Ph.D. program.

Part A. Research Progress Report and Oral Candidacy Exam

Each student must write and present a detailed progress report on the current project, along with relevant background and immediate research plans for the next 6 months and show breadth and depth of knowledge at the oral candidacy examination appropriate for a successful Ph.D. in that research area by the fourth semester in residence. The learning objectives of the requirement are for the student to:

- achieve a substantial level of understanding of the theoretical and/or experimental background of their current project(s), including foundational topics related to their work,
- demonstrate appropriate progress in obtaining and interpreting research results indicating the abilities necessary for successfully completing the Ph.D. with increasing independence,
- discuss substantively their ongoing work, including near-term future research plans (6 months) and
- write a report demonstrating scientific writing skills appropriate for Ph.D. work.

Passing this requirement is typically the last step to Ph.D. candidacy. Normally, students will complete the research progress report in the fourth semester in residence. All students must pass the research progress report requirement by start of the fifth semester in residence to remain in the Ph.D. program, unless there are exceptional circumstances documented in petitions approved by the GPC. The requirement may be completed in the third semester if the student is ready and the advisor is in agreement.

Eligibility for Oral Candidacy Exam

The Ph.D. requirements expected in the first and second years normally must be completed before the student may complete the oral exam and advance to candidacy.

While one semester as a teaching assistant is required to advance to candidacy, exceptional circumstances may occasionally delay a student's completion of this requirement. In such cases, the student will still be allowed to complete the research progress report and thesis proposal requirements on the normal schedule, i.e. in the 4th semester, assuming they have met their attainment and coursework requirements.

Students will typically **not** be eligible to take the oral exam if they have not passed all attainment requirements, have not satisfied the graduate course requirement, or have not made the required consistent efforts with the Language Support in the Student Academic Success Center toward passing the English proficiency requirement. Students may petition the GPC for an exception to go ahead with the oral exam; documentation must be provided to show strong effort to date with the Language Support in the Student Academic Success Center and extenuating circumstances.

Since the advisor is the primary judge of appropriate research progress for their group, **the advisor is strongly encouraged to provide a formal written warning letter by the end of the third semester or no later than the first day of classes of the fourth semester** if the student may not be making sufficient research progress for success on the research progress report requirement. Early warning gives the student opportunity to improve their research performance, work toward an M.S., and/or pursue other advisors or other Ph.D. programs. Ideally, the student should provide a draft of the results and discussion section of the research progress report to their advisor in the first week of the 4th semester for spring semester completion or August 15 for fall semester completion to aid their assessment of research progress.

Poster Presentation

The purposes of the poster presentation are to expose the student to a wide range of questions in preparation for the oral exam, to develop scientific speaking skills appropriate for scientific conferences, and to facilitate feedback from various members of the department.

The report is to be presented as a formal poster presentation, following ACS format, with an accompanying research overview paper (details described below). The poster presentation must include the scientific objectives in the thesis research, an overview of the necessary background material, the theoretical and experimental techniques used, and representative results obtained to date. Students should expect to present their research in approximately 5–10 minutes, repeated 3–4 times to different small groups, during the day of the poster session, and to answer questions from a wide variety of faculty members and graduate students. Attendance at the poster session portion of the progress report may be by any of the Chemistry Faculty, graduate students, or other interested members of the department or university.

Written Progress Report and Future Plans

The purpose of the written report is to summarize the student's research progress to date, demonstrate scientific writing skills appropriate for Ph.D. work, and provide context for the work presented at the poster session and assessed at the oral exam. In addition, a 15–18 page research overview (excluding References and Addendum), must be presented to members of the Advisory Committee and the Graduate Program Committee at least one week before the scheduled poster session. The report should include the following sections:

- Title page, including title, author, advisor(s), advisory committee members, date, and "In partial fulfillment of the Research Progress and Oral Preliminary Exam Requirement"

- Abstract of up to 200 words
- Introduction providing an overview of the relevant theoretical and/or experimental literature sufficient to demonstrate their mastery of the literature in the area of the intended thesis work, and explaining the goals and rationale of the project (3–4 pages)
- Research Progress, including representative results and discussion for work-to-date for 1–2 major projects (6–7 pages total, including tables and figures),
- Experimental, or Theoretical Analysis (3–4 pages)
- Future Research Plans (2-3 pages) including:
  - research question(s) to be addressed in next 6 months,
  - anticipated impact and significance,
  - methods, with details for immediate next steps (6 months),
  - expected outcomes, and
  - alternate approaches to address potential pitfalls.
- References (does not count in page limit), including titles and full lists of authors.
  - Generally, 25–50 references would be appropriate.
  - Students should take this opportunity to learn to use End Note, Mendeley, or similar software for managing references.
- Addendum (does not count in page limit), including replications, spectra, synthetic methods, details of measurements, and other materials that would be in Supplemental Information in a paper.

Reports must be in 12 pt Times New Roman or 11 pt Arial with 1.5 spacing and should follow ACS Style for references (although titles should be added). Note that students with multiple projects who wish to submit a progress report longer than 15–18 pages, excluding front matter and references, need written permission from all members of their advisory committee.

Feedback and Assessment of Written Progress Report

Advisors should review the draft of the report to offer suggestions and pose questions to mentor improvements in writing but should not edit heavily. The quality of the writing should reflect the student's efforts with feedback/suggestions from the advisor on a small number of initial drafts. All committee members normally review the report within 1-2 weeks after it is submitted and complete the written feedback form to be submitted to both the advisory committee chair and the Graduate Program Coordinator.

If the written report is not assessed as at least a conditional pass by at least the advisor and one other committee member, the exam can be delayed for up to 3 weeks for revisions with the approval of the GPC Chair. If a student does not submit a written report by the 4th week of the semester that is evaluated as at least conditional pass, an advisor should place the student on probation in the group with the possibility of termination from the group, and possibly from the Ph.D. program, depending on the outcome of the oral exam.

Exam Committee

The Exam Committee will normally be the student's Advisory Committee, although the Graduate Program Committee may add or approve replacing a member if additional expertise is needed in a specific area**.**

All committee members are expected to ask questions and should not intervene in each other's questions, except to rephrase questions, if needed, after a student's response. Attendance at the examination may be by any of the Chemistry Faculty, although they will be nonparticipating spectators. Note that members of the GPC can attend to assist with questions about requirements, policy or procedure and/or to facilitate completion of the outcome/feedback form.

The Advisory Committee Chair is responsible for the following aspects of the requirement:

- giving written feedback to the student, advisor and GPC on quality of the student's final written report normally within 1-2 weeks after it is submitted,
- ensuring sufficient breadth in the oral exam to address the requirement objectives within the two hours allotted,
- keeping track of the nature of the questions asked and noting the quality of the student's responses, and
- leading the discussion to complete the feedback form and arrive at the overall outcome and providing the outcome of the exam to the student and GPC in person and in writing on the designated departmental form.

The Advisor is responsible for:

- giving feedback on the quality of the student's final written report at least one week before the oral exam, and
- participating in asking questions, particularly to ensure that the background for the student's specific research is assessed substantively.

Oral Candidacy Exam

The purpose of the oral exam is to assess whether the student has the necessary background knowledge to conduct their thesis research and to determine whether the student is on a trajectory to complete the Ph.D. successfully. The Graduate Program Committee holds a yearly information session on preparing for this exam.

Scope. The oral exam comprises a 25–30 minute student presentation and 1–1.5 hours of question and answer with the exam committee. While the student may prepare additional slides to help with answering questions, committee members may require that some questions be answered without those aids.

The scope of the advisory committees' questions may include topics directly related to the background, methods and results of the current project and future thesis directions as well as any subject matter related to the student's thesis research area. During this oral examination, the student is expected, through a prepared presentation and substantive responses to questions, to show:

- Substantial level of understanding of the theoretical and/or experimental background of the current project(s), including foundational areas relevant for

future thesis work in the field,
- Appropriate progress in obtaining and interpreting results to indicate ability to complete the Ph.D. successfully and with increasing independence, and
- Ability to discuss substantively their ongoing work, including near-term future research plans as well as the context, rationale, major questions and methods for the next 6 months of their thesis work.

At the end of the formal exam, the student will be asked to present 2-3 brief ideas (one slide each) for thesis proposal topics. These will **not** be evaluated as part of the oral exam outcome; the purpose of presenting the ideas is early discussion to help the student in formulating the thesis proposal. (See **Part B**, page 48)

Because the focus of the exam is the evaluation of the student's knowledge and progress toward the Ph.D., discussion between the committee members during the exam should be limited to brief clarification of issues that the student would not be expected to know.

It is recommended that the student organize a practice oral exam with other members of their group and of related research groups in order to prepare for the potential range of questions in the oral exam, including fundamental background critical for the student's Ph.D. work. Since advisors generally do not attend practice exams, students are strongly encouraged to discuss their areas of study with their advisor(s) to seek guidance well in advance of the oral exam (e.g. during the 2nd year annual review and no later than by the start of the 4th semester).

Timeline. The written research progress report should be presented to the Advisory Committee **by the end of the 2nd week of the semester in which the requirement is due**. When the paper is submitted, a date for the oral exam should be arranged that is acceptable to all committee members and falls within 2–6 weeks of the report submission, during which time the poster session normally will also be held. The student must receive oral feedback from the committee on the day of the exam and written feedback from the Advisory Committee Chair should follow in 1–3 days, though formal written feedback may take one week in the case of failure.

Any extension for the oral exam requires approval of a written petition from the student to the GPC and the agreement of the advisor. (See **Petitions for Extension,** page 59)

Outcomes

Note that a passing performance requires satisfactory performance on both the written report and oral exam. The poster presentation is required as preparation for the oral exam and an early feedback opportunity but is not normally evaluated formally. There are four potential outcomes to the progress report requirement, to be determined by majority vote of the committee: high pass, pass, conditional pass, or failure (See the Candidacy Exam Assessment Form https://www.cmu.edu/chemistry/grad/forms_policies/forms.html).

In the case of failure, the committee must agree by majority on one of the following next steps:

> _____ **Probation with opportunity to revise and have re-exam in the current group.** The student may repeat the oral exam and revise the written report, continuing as a member of the group(s) on probation. The student must pass fully, without conditions, at the re-exam, within 2 months to continue in the group and the Ph.D. program, with the specific deadline to be set in consultation with one of the GPC Chair. Financial support from the advisor for the student must be continued during the probation. The student must pass fully on the second attempt to remain in the Ph.D. program. Students will normally remain on probation until successful completion of the thesis proposal.
>
> _____ **Termination from group with option to change groups on a probationary basis**. Note that in the case of co-advisors, a new, signed thesis agreement is needed if the student wishes to remain with one of the current advisors. If a change of groups is possible, the student must then fully pass the progress report requirement and oral preliminary exam in the new research group by the end of the sixth semester in residence to regain good standing and remain in the Ph.D. program. If the student is not able to join a new group officially within 1–2 months grace period (funding for a grace period is not guaranteed), they cannot continue in the Ph.D. program. ***Students must have 3 or more months written notice in a probation letter from the advisor prior to this result***.
>
> _____ **Termination from the Ph.D. program.** The student cannot continue in the Ph.D. program and may transfer to the M.S. program, although funding cannot be guaranteed for M.S. students. Up to 6 units from the written research progress report may be applied toward the M.S. pending approval from their research advisor and the GPC Chair. ***This outcome is reserved for re-exams or for students who have had 3 or more months written notice in a probation letter***.

The Advisory Committee Chair should normally submit the outcome and feedback *in writing within one week* to the student, Advisory Committee, and Academic Program Manager for the Graduate Program Committee, including detailed requirements for revisions or re-exam with a specified deadline.

Any requests for extensions beyond the agreed-upon deadline must be made and approved in writing by the GPC chair; otherwise, the student is at risk for termination.

In the case of failure, the Advisory Committee Chair must share the draft with the GPC chair to ensure sufficient feedback about deficiencies and clear expectations for revisions or a re-exam or reasons for failure and termination. They are encouraged to circulate the draft by email to the Advisory Committee in all cases.

SEE ONLINE FOR: Research Progress Report and Candidacy Exam Guidelines, Procedure and Assessment Forms for Written Report & Oral Exam
Candidacy Exam Assessment Form – Oral Preliminary Component
Candidacy Exam Assessment Form – Written Research Progress Report Component
https://www.cmu.edu/chemistry/grad/forms_policies/forms.html

Part B. Thesis Proposal

Each student is expected to write a thesis proposal during their 5th semester of residence. The learning objectives of the thesis proposal are:

- Generate ideas, hypotheses, objectives, and approaches for 2-3 years of potential thesis research that could feasibly be completed in the student's current group, or in collaboration with other groups, using resources available to them
- Demonstrate the student's growing independence in designing, proposing, and defending research questions, hypotheses, and approaches
- Articulate the significance, innovation, and contribution to scientific knowledge, applications, and/or methodologies of their proposed research
- Place their proposed research in the context of prior research and the current state of knowledge that supports how the proposal would advance our scientific understanding or discovery
- Justify the objectives, approach, and methods of the proposed research
- Produce a compliant written research proposal that demonstrates the scientific writing skills, organization, clarity, and scientific understanding appropriate for PhD research in chemistry
- Explain their proposed research clearly and effectively through an oral presentation to their committee and the department community
- Effectively rationalize and justify their thesis proposal that demonstrates a graduate-level understanding of the science by addressing questions during the oral committee exam
- to generate ideas for 1-2 years of potential thesis research that could be done in the student's current group (possibly including collaboration with other groups, with the advisor's and other PI's permission),

- Revise the written proposal to address any significant aspects required by the committee, gaining experience with the revision process also used for peer-reviewed journal articles

- Prepare students to effectively design, plan, conduct, and disseminate their dissertation research of a sufficient scientific quality

Whether the thesis proposal is actually undertaken by the student will depend on availability of the necessary resources (e.g. funding for supplies). Even if the project is not executed, developing a proposal provides valuable experience in building on current expertise and convincing others of the importance, innovation and feasibility of the work, as will be needed in most careers whether the position is in academia, industry, or government.

Proposal Prospectus. The thesis proposal topic should fall within the student's research area but represent an innovative departure from anything included in the research progress report. The proposal could also be based on work done by other students in the group, but it should still involve an innovative step beyond prior work. A simple extension of the student's or previous group member's work would not be appropriate.

Students should develop an idea in consultation with their advisor to assess feasibility, significance and innovation. In order to be potentially viable as part of the student's thesis work, the thesis proposal's goals should be approved by the advisor. Even if resources are available to allow the student to undertake the proposed project, the advisor may still alter the research direction based on the overall needs of the student and the group.

If a student is interested in proposing a collaborative project, they must also consult with the other faculty member(s) whose group or instrumentation could potentially be involved. While two students may coordinate ideas for complementary work, each student must submit their own distinctive proposal.

The student is free to consult with anyone, including the advisor, in developing the proposal, but the advisor's role should be non-directive and the work should represent the student's own creative thinking.

Once the student has a preliminary topic approved by the advisor, these should be submitted to the rest of the advisory committee in a one-page written document addressing four sub-sections: a) Executive Summary, b) Significance, c) Innovation, and d) Approach.

Topic Review. To ensure sufficient innovation and promote feasibility within the desired timeline, students will submit the one-page prospectus to their committee for review. The committee members may follow up with clarifying questions or raise concerns if they feel the proposal idea is not suitable. A meeting is not required but is recommended if the committee has a large concern about the proposal topic.

Written proposal. Like proposals submitted to a funding agency, students' thesis proposals will be expected to conform to the following format, with subheadings to be determined in consultation with the research advisor(s):

- **Cover Page** (title, student name, date of submission, names of advisory committee members and chair of committee noted, Executive Summary)
- **Executive Summary** (300-400 words, included on the cover page)
- **Specific Aims & Objectives** (1–1.5 pages): provide a captivating and succinct high-level overview of the proposed research, making the significance, innovation, and approach clear. You will develop each of these further in the following sections. *You want to capture the reviewer's interest early in your proposal, and this is the place to do so.*
- **Background**, including Preliminary and/or Literature Results (1-2 pages max) – focus must be on the *proposed* research, not your current research and results. Current research and literature can be used to motivate the proposal and approaches to be used, and demonstrate it is feasible.)
- **Research Strategy** (7-9 pages) Suggested subsections: (suggested lengths will vary depending on the nature of the proposed research, e.g. a theoretical study versus new method development)
    - Research Tasks/Objectives (~4-6 pages; ideally three distinct but related tasks/objectives with 1–2 pages devoted to each): this is where you dive into describing the proposed research to be done in greater detail.
    - Approaches/Methodology (~3-4 pages): describe the most important and new approaches and methodologies to be used to achieve the above Research Tasks/Objectives. Discuss likely barriers and strategies to address these such as using alternate methods or additional experiments.
    - Summary & Work Plan (~0.5 page): Briefly lay out the work plan, what order the research tasks will be performed in, why, and how they depend on each other. The proposal should constitute 2-3 years of your research effort. Also use this to summarize the Research Strategy for the reviewer, again making the key elements of the significance, innovation, and approach clear.
- **References** (no page limit, 30-50 references would be typical, use the numbered ACS style)

Formatting guidelines

- Font: should be no smaller than 12-point Times New Roman/11 point Open Sans, 1.1 line spacing, 0.75" margins. Use the formatting of the provided Word template.
- You will want to use most of the allowed length of 12 pages total so that you can articulate your proposal to sufficient detail, focusing on the three main criteria above.

Timeline.

- By beginning of Fall semester: one-page prospectus of the proposal idea submitted to committee for their approval.

- By Fall break: Student submits written proposal to committee

- Month of November: Presentations and exams occur during the month of November, ideally before Thanksgiving, subject to faculty availability. The academic program manager/GPC will work with students who run into scheduling issues.

- End of Fall semester: Student completes the revisions, addendums, or re-exam required for a conditional pass.

Students enter All But Dissertation (ABD) status by the start of the spring semester by passing the thesis proposal. If completing the proposal in the Spring semester, students will follow the same approximate timeline. Failure to pass the proposal by the end of the 5th semester in residence is grounds for termination from the Ph.D. program unless a petition for extension has been approved.

Pursuing guidance and feedback. While the thesis proposal should be produced largely independently, students are encouraged to pursue sufficient feedback to complete the proposal in a timely way. The student is encouraged to seek feedback and guidance from their committee or other relevant members of the department after the topics are presented to the advisory committee. A preliminary draft should be shown to the advisor **at least 1 week** prior to final submission to provide sufficient time for feedback. Advisors should not edit the draft heavily.

Students are also encouraged to consult the following resources in developing and writing the proposal:

NIH's Writing Your Application, particularly NIH peer review criteria and writing tips (grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm)

Write Like a Chemist: A Guide and Resource by Marin Robinson, Fredricka Stoller, Molly Costanza-Robinson, available online at the MI Library (site.ebrary.com/lib/cmu/detail.action?docID=10246242).

Presentation: The public presentation should be approximately 30 minutes (no more than 35 minutes) and cover the main content of the written proposal, again focusing on the significance, innovation, and approach criterion. The presentation will be given without interruption or questions except for crucial clarification questions. During the presentation, the committee and audience should hold their questions except for brief clarification questions from the committee that impede their understanding. After the

presentation, the audience will have a chance to ask questions. No recording or pictures of the presentation/slides by the audience is permitted.

Conditional Pass or Re-Exam: In the event of a conditional pass, the committee should provide the expected revisions to the written proposal or for a written addendum, within 3 days to the student. In the event of a failed exam with re-exam, the committee should provide constructive feedback for the student and set a re-exam date in conjunction with the advisor and GPC.

Review Committee. The Review Committee will normally be the student's Advisory Committee. The choice of a collaborative topic may lead to a change or addition to the review committee at the request of the student, advisor or GPC. Review committee members may reach out to students with questions of clarification about the written proposal, if needed, for their critique. However, the formal evaluation should be based on the written work.

Roles of committee members: Details for the roles of the advisory committee chair, committee members, and advisors can be found in the departmental guide to the thesis proposal. The document is available online or can be requested from the academic program manager.

Thesis Proposal Requirement Guide

Outcomes. Passing the thesis proposal requirement typically leads to Ph.D. Candidacy and All-But-Dissertation status. After the response and any revisions are submitted to the Review/Advisory Committee, there are four potential outcomes to the thesis proposal, to be determined by majority vote of the committee: high pass, pass, or fail with the option either to (a) revise the proposal or (b) to change groups.

_____ **High Pass** indicates outstanding performance based on the **overall assessment criteria.**

_____ **Pass** indicates clearly satisfactory knowledge of both fundamentals, the state of the science, and research methods that indicates they are on a trajectory to successful timely completion of the Ph.D.

_____ **Conditional Pass** indicates that the identified deficiencies are deemed minor and that additional work over a short period (2-3 weeks) is expected to polish skills and understanding that helps bring out the best in the student and produces a quality proposal.

_____ C**onditional pass with extensive revisions and re-exam** indicates that the deficiencies are considered significant (e.g. important fundamental errors in background knowledge, major misunderstanding of the literature relevant to the proposal, incomplete or badly flawed research proposal).

Failure indicates grave concerns about a student's ability to generate ideas and design research independently, and/or their chemistry fundamentals such that the advisor and committee question the student's ability to complete a Ph.D. in this research area. If a student fails, the committee must agree **by majority** on one of the following actions:

- Advisor(s) permit an oral re-exam and revision to the proposal typically within 2-3 months, upon agreement of the GPC Chair. The student must pass fully on the second attempt to remain in the Ph.D. program. If co-advisors cannot agree on the outcome during the deliberation, the matter will be referred to the Department Head and/or their designate(s) for resolution.
- Advisor(s) will terminate the student from their group(s). If the student is terminated from the group and cannot join a new group within a 1-2 month grace period, they would be terminated from the Ph.D. program. *If a change of groups is possible, the student may be accepted only on a probationary basis and given up to 3-4 months to pass the original proposal while simultaneously conducting research satisfactory to the new advisor.* ***Note*** *that, at the discretion of the Graduate Program Committee, a new research progress report may also be required for students who change major research areas.* In each case, the deficiencies must be communicated in writing by the Advisory Committee Chair to the student and the Graduate Program Committee within 1-3 days.

A student may not achieve ABD status without a satisfactory performance on the thesis proposal. Failure to defend a thesis proposal successfully by the end of the fifth semester in residence is grounds for termination from the Ph.D. program, unless the GPC has approved an extension based on a petition from the student.

SEE ONLINE FOR: Thesis Proposal Requirement Guidelines

Chemistry Student Database: Faculty Access

Chemistry Student Database: Student Access

Advancement to Candidacy and All-But-Dissertation Status

Students' status in the program will be reviewed each year (described under Annual Reviews, page 58). During the first two years in the program, a student is referred to as a "Ph.D. student." Upon successful completion of the first two years of requirements through the research progress report and thesis proposal, listed below, a student advances to candidacy, which designates completing a major portion of the requirements for the Ph.D. listed below:

- Attainment examinations or approved coursework in the related areas
- Selection of a Research Advisor
- Selection of an Advisory Committee
- The equivalent of at least four full-semester graduate courses in chemistry or related fields with a grade of B in each course

- Literature Seminar
- Research Progress Report and Candidacy Exam
- Thesis Proposal
- Satisfactory teaching for one semester as a Teaching Assistant, and
- English Language Proficiency of Restricted II on the ITA test (if a non-native speaker of English).

Completion of the Ph.D. candidacy requirements will also mark attainment of the status designated **All But Dissertation** (**ABD**) by Carnegie Mellon.

In accordance with university policy, ABD students must complete the Doctoral Candidate form to declare their intention to complete their dissertation in residence (on campus) or *in absentia* (off campus).

Students meeting the normally expected deadlines reach candidacy and ABD status during the fifth semester in residence.

Dissertation Progress (ABD) Meetings

Expectations

To ensure ongoing and timely discussion of the student's progress after they reach ABD status, the Advisory Committee Chair should work with the student to convene a meeting approximately annually beginning in the first semester a student is ABD (i.e. ABD meetings should occur in the 6th, 8th and 10th semesters. The goals of the meeting (in most cases, though it may vary with the student's research group) are to:

- review research accomplishments since the research progress report at each meeting,
- discuss short-term research plans and, where relevant, progress or plans related to the thesis proposal,
- review the planned scope of the dissertation based on an outline in the 4th year and beyond,
- discuss the estimated timeline for completing the needed work,
- identify and deal constructively with obstacles to completing the plan, and
- provide advice for professional development and career planning/job searches, including progress on program objectives such as speaking, teaching/mentoring, and writing at the Ph.D. level. Discussion of professional development is strongly advised in the first ABD meeting to allow time for participation in relevant activities for exploring interests and enhancing skills.

A brief written summary of the meeting should be prepared by the Committee Chair and shared with the student, Advisory Committee members, and the Graduate Program Committee, preferably using the form available at:
https://www.cmu.edu/chemistry/grad/forms_policies/forms.html

Outcomes

If, at any of these meetings, the Advisory Committee finds a significant concern with the student's performance, the student's Research Advisor and/or Committee Chair should communicate these concerns to the Graduate Program Committee within one week. The Graduate Program Committee will review the student's standing in the program at

the time of the last departmental review and possibly recommend a committee meeting very soon. In serious cases of little or no progress or lack of annual committee meetings, the advisor, in consultation with the Advisory Committee and the GPC Chair, may place a student on probation in the group if they are considering terminating the student from the group (see **Academic Actions and Appeals**, page 60).

Probation in the group would normally last for 3 months during which the student would retain their level of financial support. The advisor is expected to notify the student in writing of the conditions for regaining good standing in the group and when those conditions have been satisfied. If an ABD student is on probation, they are strongly advised to consult the department head regarding strategies to address the situation. Note that, since opportunities to change research groups after reaching ABD status are quite rare, probation as an ABD student comes with a significant risk of termination from the group and Ph.D. program.

Residency

University regulations require one year of full-time residency for the Ph.D.

Doctoral Dissertation and Public Defense

The student must write and publicly defend a Doctoral Dissertation. The University standard for the Ph.D. degree states that the thesis must embody the results of extended research, constitute an original contribution to knowledge, and include material worthy of publication. It must demonstrate the candidate's ability to conduct an independent investigation, to abstract principles from which predictions can be made, and to interpret in a logical manner facts and phenomena revealed by the research. This requirement must be satisfied within seven years of the attainment of ABD status, by regulations of the Mellon College of Science if that is sooner than University statute of limitations of ten years.

Defense Committee: As outlined in the Doctoral Student Status Policy, https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html, students will complete all requirements for the Ph.D. degree within a maximum of ten years from original matriculation as a doctoral student, or less if required by a more restrictive department or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards a doctoral degree only if newly admitted to a currently offered doctoral degree program under criteria determined by that program.

Under extraordinary circumstances, such as leave of absence, military or public service, family or parental leave, or temporary disability, a school or college may, upon the relevant department's recommendation and with the written approval of the dean, defer the lapse of All But Dissertation status for a period commensurate with the duration of that interruption. Students, who are pursuing the Ph.D. degree as part-time students for all semesters of their program, as approved by their program, may also appeal to their program or department for extension of the time to degree limit.

Defense Committee

A student's defense committee made up of their advisory committee and an outside member that fits the MCS Policies on Doctoral Thesis Committees.

Setting up a Defense

Students should discuss their defense plans with there advisor and committee and keep the departmental Academic Program Manager with any changes in their plan. Students should submit the forms for scheduling their defense and setting up their committee directly to the program manager. All forms can be obtained by contacting Lorna Williams-Rolley.

SEE ONLINE FOR:

MCS Policies on Doctoral Degrees such as Guidelines on Doctoral Thesis Committees
https://www.cmu.edu/mcs/people/faculty/resources/handbook/doctoral.html

Doctoral Student Status Policy (including statute of limitations)
www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html

M.S. Requirements

Please note that the requirements for the M.S. in Chemistry are not a subset of the Ph.D. requirements. Interested students may need to complete additional work to receive the M.S. Students interested in receiving the M.S. are advised to consult with the GPC or Academic Program Manager, ideally by the start of the second year in residence.

M.S. in Chemistry

Students may earn the M.S. in Chemistry in the normal course of pursuing the Ph.D. by fulfilling the requirements below. Note that students are not admitted for the purpose of earning the M.S. degree and the department does not offer financial support for students wishing to pursue the M.S. as a terminal degree.

Candidates for the M.S. in Chemistry are assigned to an Academic Advisor for the M.S. Degree, who coordinates with the Chair(s) of the Graduate Program Committee and the Department Head. The Academic Advisor for the M.S. Degree meets with the student to formulate a course of studies, and annually thereafter to assess the progress of the student.

Candidates must complete at least 96 units of work, distributed with some flexibility but subject to the following constraints:

1. A minimum of 48 units must be in graduate lecture courses in Chemistry.

2. No more than 18 units may be in undergraduate courses in Chemistry. These must be in upper-level courses (400 level or above) and may include no course equivalent to one previously required to complete a degree in any other college or university.

3. Relevant upper-level undergraduate or graduate courses in other departments or at the University of Pittsburgh (through cross-registration policies) may be taken for credit toward the 96 units, with the approval of the Graduate Program Committee.

4. To be used for credit, no grade shall be lower than C. The average grade of 96 units, of the first 120 units attempted, must be at least B. Graduate Teaching, 09-931/2 may not be applied as course credit toward the M.S. degree.

5. Graduate research credit — candidates who elect to apply units earned in graduate research toward the M.S. degree must complete not fewer than 20 units of 09-861 (Graduate Research). If more than 25 units of graduate research are to be credited, substantial evidence of research accomplishment or proficiency must be presented. Such evidence can be in the form of a dissertation, or in the significant authorship of scientific publications, or the equivalent, and must be approved by the Research Advisor and the Graduate Program Committee.

6. If no more than 25 units of graduate research are to be credited toward the M.S. degree, evidence of research proficiency may be provided by the successful completion of the Literature Seminar requirement of the Ph.D. Requirements.

Evaluation of Student Standing and Progress Toward Ph.D.

Role of the Graduate Program Committee

The Graduate Program Committee (GPC) serves the following functions:

- Advises first-year graduate students on course selection and other academic matters until a Research Advisor is selected,
- Monitors students' progress in annual reviews, based on input from the student and advisor, and provides written feedback to students,
- Reviews petitions for extensions on program requirements,
- Meets jointly with the Graduate Student Advisory Committee to discuss student feedback and concerns about the program, and
- Provides ongoing assessment and review of the graduate program, proposing changes as needed.

The Graduate Program Committee Chair provides the following functions:

- Advise students or faculty members on matters that they may wish to bring to the GPC,
- Advise students on the selection of Advisory Committee members,
- Organize periodic information sessions about the Ph.D. requirements,
- Write warning and/or probation letters in relation to difficulties in satisfying program requirements (e.g. low grades, not satisfying the English proficiency requirement),
- Reviews advisors' warning and probation letters to students to aid in consistency with the handbook, and
- Review formal academic actions, other than granting of degrees, such as placing a student on probation in the Ph.D. program or terminating an ABD student from the program.

When an immediate action is required, the Chair(s) of the Graduate Program Committee may act for the Committee. The Chairs are also available to advise students or faculty on matters that they may wish to bring to the GPC.

Annual Reviews

Each fall the Graduate Program Committee will solicit brief status reports from each student in the program, along with a written response from the student's advisor, to serve as the basis for an annual review of students' progress through the graduate

program. The primary goals of the Annual Review are (1) to check for and address significant concerns of students and/or advisors that may significantly affect a student's timely progress to the Ph.D. and (2) to facilitate advisor feedback on issues or skills important for students' future career development, particularly those that may otherwise fall into the background during the year. The major components of the review process are:

- The student's status report, approximately 4–6 pages long, addressing specific questions distributed in advance and posing questions/topics for discussion with the advisor (e.g. recommended reading or study topics for the candidacy exam, opportunities for conference presentations, skills desired for career plans, progress on program objectives such as scientific writing),
- Advisors typically meet each student prior to submitting written feedback to both discuss the student's status report and to enable the student to ask questions about the advisor's written feedback.
- Upon agreement of the advisor, the brief status report, along with the advisor's written feedback and other relevant data such as grades and Language Support in the Student Academic Success Center work, will serve as the basis for review by the Graduate Program Committee.
- The GPC provides brief written feedback including the student's standing in the program, progress on Ph.D. requirements, and suggestions for improvement.

Since students do not attend the annual review meeting, they are encouraged to meet with the GPC Chair prior to the review if they wish to share additional information with the committee relevant to the review. Advisors or students who have concerns that are difficult to express in their written reports should consult with the GPC Chair to discuss how to best communicate their concerns.

Petitions for Extension

An extension of any of the Department's program requirements requires petitioning the Graduate Program Committee, (1) explaining what makes the circumstances exceptional, (2) proposing an alternate deadline, and (3) providing a plan for satisfying the requirement as soon as possible. For example, serious illness or a death in the family would be exceptional circumstances, and the desire to finish a paper for publication would not be exceptional. Extensions may be given by the advisor, in consultation with the GPC Chair, only for health issues when circumstances are urgent or serious and do not allow time for a formal petition to the Graduate Program Committee. However, even in the urgent case, the advisor must provide some written record (e.g. a short email) to support an extension until discussion with the student can be reasonably arranged.

All petitions for extensions need to include a specific plan for satisfying the requirements. In addition, students on probation must offer a plan for gaining good standing. All plans must include a timeline with observable milestones in terms of courses, projected grades, TA assignment (if any is expected), and concrete evidence of research progress such as written research reports, posters or papers accepted at meetings, submitted publications, and/or patent applications. Supporting documents need to be attached with the petition as evidence of current research progress. A

physician's or psychologist's note is needed to support a semester of extension based on ongoing personal/health issues, as opposed to a leave of absence which might also be considered for serious personal/health issues when the student would not be able to work full-time.

The normal extension request is for an additional 2–6 weeks, or up to one semester, with the possibility of an additional extension for students who have changed groups and need to establish research in the new group prior to the research progress report requirement or who have documented exceptional circumstances. As part of the petition review, the student, advisor or GPC may request formal input from the student and the advisory committee, and the advisor and GPC may place additional conditions on the continuation of the student in the Ph.D. program as a result of the review.

In general, petitions for extensions should be received four weeks before the start of the semester in which completion of the requirement is expected or as soon as possible, if the reason for the extension request is health or personal and cannot be foreseen. Note that extensions for the thesis proposal will be granted only in rare cases.

If a potential extension is discussed with the GPC Chair in person, it is the student's responsibility to summarize any agreements made in writing for consideration by the GPC. Requests should not be considered approved until written approval comes from the GPC.

Academic Actions and Appeals

The department is committed to supporting students in meeting the standards set by their research advisors and to ensuring that all students maintain the high standards of performance that reflect Ph.D. quality work. The following procedures are designed to give students a reasonable opportunity to correct deficiencies in their work when needed and to make a transition to other future plans when some requirements by the advisor or department are not satisfied.

Failure on a Ph.D. Program requirement

Failure on either the research progress report/candidacy exam or the thesis proposal requirement requires a majority decision of the advisory/exam committee with the assessment forms with detailed comments provided in support of the decision. The student has the right to appeal within 7 days of the decision by following the University's grievance procedure for graduate students. While a strong effort is normally made to identify students' difficulties and provide probationary warnings, failure on any Ph.D. program requirement can still lead to immediate withdrawal from the Ph.D. program with the option to transfer to the M.S. program when the difficulties cannot reasonably be identified in advance. Financial support is not guaranteed for completion of the M.S., although a terminal semester with TA support may sometimes be possible as described under **Termination from the Ph.D. program** (page 62).

Departmental Warnings or Probation

Students who do not make satisfactory grades or do not complete other requirements at the expected time typically receive a warning letter from the GPC indicating when they are at risk for losing good standing in the Ph.D. program or will receive a probation letter when they are at risk for possible termination from the Ph.D. program. Failure to make consistent efforts with the Language Support in the Student Academic Success Center on English proficiency may also lead to departmental probation.

Advisors ending research-advisor relationship with a student

Advisors may terminate a student from the group, for example, based on a student's inability to learn how to produce reliable results within a reasonable period of time and while using reasonable resources. Faculty members are strongly encouraged to consult the GPC when they observe early signs of concerns about a student's performance or progress. Difficulties that cause the advisor to consider terminating a student should be documented by the advisor in written feedback and discussed in person in a timely way, as discussed below. Such discussions should be included, when needed, formally as part of the annual review and the GPC can assist advisors and students at other times when they may have concerns. Students who are concerned about difficulties in the interactions with their advisor may wish to contact the Graduate Ombudsperson for confidential discussion or the GPC Chair for their perspective or assistance.

Faculty and departmental concerns will generally be expressed in two forms, warning letters or probation letters. The GPC Chair needs to review a copy of any warning or probation letters before they are sent to ensure compliance with departmental and university policies.

1. <u>Warning letter</u>: If an advisor is dissatisfied with one of their student's progress or efforts in research, they are strongly encouraged to provide both in person and in writing a warning to the student about the areas of concern and the criteria for continuing as a member of the group in good standing to assist in addressing the concerns promptly. Normally, such a notice would specify a plan for monitoring the student's progress toward the desired performance or progress. If the concerns are serious enough that the student may be terminated from the group or Ph.D. program, the warning letter should provide, when possible, 6 months written notice of when financial support would be terminated if the concerns are not adequately addressed.

2. <u>Probation letter</u>: If an advisor has serious concerns and may wish to terminate a student from their group, they should consult with the GPC Chair about the details of proceeding to put the student on probation in the group. The minimum recommended probation for addressing an advisor's concerns is 3 months, during which time the student's financial support as a TA or RA will continue and will be typically maintained by the advisor if the probation occurs in the summer. Probation letters must include a written notice of when financial support would be terminated if the concerns are not addressed satisfactorily; these letters must be approved by the GPC Chair. Students on

temporary visas are advised to consult with OIE at the start of any probation to discuss visa implications in the event of potential termination that semester.

Note that Annual Review feedback may serve the purpose of a probation or warning letter.

Eligibility to change advisors

A student may change advisors only once, and such changes should occur in the first 1–2 years if at all possible to complete the degree in a timely way.

If terminated from their group prior to reaching ABD status or if choosing to change advisors, a student may request a 1–2 month grace period to find another advisor before termination from the Ph.D. program, although financial support cannot be promised during this period. After this grace period, a student without an advisor cannot remain in the Ph.D. program. Where possible and appropriate, TA positions or other assignments may be offered, depending on availability of funds and positions. However, if a student is without a research advisor, the department cannot guarantee funding.

If an advisor wishes to terminate a student from their group after the student achieves ABD status, the student may request a formal meeting with the advisory committee and the GPC Chair to review the grounds for the decision and to explore options for the student to complete the M.S. or possibly change to another group if the majority of the advisory committee is supportive of such a change.

If a student is on probation in one group but otherwise in good standing in the department (as described under Research Advisors, page 37), they remain eligible to change advisors. If a student is on probation for lack of timely progress on departmental requirements and a new advisor is willing to consider the student for their group, the student may only be accepted in the group on a probationary basis and remains at risk for termination at the end of the semester in which they changed groups if the advisor's expectations are not satisfied and the cause for departmental probation has not been satisfactorily addressed.

Termination from Ph.D. program

If a student is not making adequate and timely progress through the program requirements or on dissertation research and no exceptional circumstances have been documented in petitions approved by the Graduate Program Committee, the GPC may place a student on probation and state the criteria or conditions to regain good standing. If a student does not adequately address the concerns on the timeline specified in the annual review memo or the probation letter, the GPC may require the student to withdraw from the Ph.D. program.

With GPC and department head approval, the student may be eligible to work toward the M.S. program for a terminal semester if there is a means of financial support, or to transfer to the M.S. without financial support. Note that students who have already completed the M.S. in Chemistry requirements will not be eligible to transfer to the M.S. program and typically are not eligible for TA support. A terminal semester with support to complete the M.S. program normally requires a double TA

assignment; there needs to be an available TA position for which the student has suitable background in order for the student to receive a stipend as a TA.

A student will not normally be terminated from the Ph.D. program without the warning of three months of probation, nor will financial support normally be terminated without three months warning, normally in a probation letter from either the advisor or the department. Six month's notice will be given when possible. Limited exceptions with less notice may occur. For example, an advisory committee's decision based on failure of a program requirement may lead to termination in less than three months. Also, extended, unapproved absences, serious misconduct covered under university policies, such as scientific misconduct, violations of academic integrity, misuse of computing resources, and workplace threats or violence, all include dismissal as a potential sanction.

Appeals

A student may appeal academic decisions (e.g. grade, probation, termination) by an instructor, the GPC, advisor, or advisory committee following the university procedure for graduate student grievances. The student may also consult with any member of the GPC or the departmental graduate ombudsperson in an advisory capacity prior to an appeal. A summary of the processes available to Carnegie Mellon graduate students who seek review of academic and non-academic issues is available at: www.cmu.edu/graduate/policies/appeal-grievance-procedures.html

Additional Department and University Policies/Protocols

Policies on Time Off, Leaves, and Withdrawals

MCS Policy on Graduate Student Time Off

Consult this policy before planning your time away from campus and be sure to seek approval from your advisor (or the GPC Chair before you join a group) before planning any travel.

Students with graduate assistantships are expected to continue with their research during academic breaks (including summer months) with the exception of official University holidays. Paid time off for personal business or vacations generally is not included as part of a graduate's financial support. A supported graduate student who wants to take a short break (one or two weeks) must get approval for that break from their advisor and, if required by the terms of the student's support package, must make up the work.

Supported graduate students wishing to take longer periods of personal time off must do so without financial support. The advisor will notify the Department's Business Office of any such arrangements so that an appropriate adjustment in the student's support can be processed.

The timing and length of any time off must be approved in advance by the advisor before travel commitments are made. Before absences, the student must discuss with the supervising faculty member(s) ways to ensure that their progress is satisfactory and that research and/or teaching responsibilities can be met satisfactorily. Students with TA responsibilities are expected to be on campus to attend any department required TA training and at the end of the semester to finish grading or other duties assigned by the department.

Leaves of Absence

In certain circumstances such as health problems or changes in family circumstances, students may wish to consider a brief leave of absence from graduate study. Details about whether and how to pursue this option are available by consulting the Academic Program Manager (page 69).

Carnegie Mellon University Student Leave Policy

www.cmu.edu/policies/student-and-student-life/student-leave.html

Process for Taking & Returning from Leave of Absence or 'withdrawal' from program

University process: www.cmu.edu/hub/registrar/leaves-and-withdrawals

New Policies/ "Grandfather" Policy

Students must complete the academic program requirements in place when they enter unless they elect newer ones in writing. When requirements are changed, it is because the department believes the new rules offer an improvement; any such changes will be discussed at a meeting with the graduate students. However, students currently enrolled whose degree program is affected by a change in requirement may choose to be governed by the older requirement that was in place at the time of their matriculation. In case degree requirements are changed and certain courses are no longer offered, the department will try to find some compromise that allows those students to satisfy the original requirements.

Internship Policy

ABD students are permitted to take a summer internship that relates to their PhD studies with the approval of their advisor and the department. (Non-ABD students may be allowed to take an internship in rare circumstances). Typically, students will not receive a stipend from the department during their internship. The student is required to remain enrolled full-time in the university by registering for 36 units of Internship credit. To be approved for the internship, students should contact the academic program manager at least a month in advance of the start of the summer semester. A copy of the internship offer, description of work, dates of internship, and written approval from the advisor should be submitted to the department. A pass/no pass grade will be assigned and students should submit a 1-2 page write up at the end of the internship period.

Note for students on F & J visas: International students are required to consult with the Office of International Education for eligibility for work authorization before starting or seeking an internship/co-op or consulting opportunity. International students will benefit from proactively reviewing OIE guidance regarding off-campus work authorization. Off-campus work authorization processing times can take several weeks or months, and international students will benefit from starting the off-campus work authorization process as early as possible.

Withdrawing from a course

Students should follow the procedures and dates outlined by the university for course withdrawals. If the course is necessary for a timely completion of the PhD, the student should contact the academic program manager to discuss the issue further.

Financial Matters

Sources of Financial Support

Full-time Ph.D. students in the Department of Chemistry in good standing normally receive financial support as either a teaching assistant or a research assistant, with tuition and fees included in that support package. **Stipend payments** are semi-monthly, payable on the 15th and last days of the month. Once a student joins a research group, decisions about how the student will be supported are made by the research advisor(s).

All graduate students receiving assistantships are expected to spend full time on their education and assigned duties and may not engage in any other activity for compensation without specific approval as outlined under ***Policies on Outside Employment*** (page 68). Students are encouraged to take course work and pursue professional development activities appropriate to their career goals, while keeping in mind that their effort on their Chemistry Ph.D. duties needs to be maintained at a satisfactory level at the same time.

The amount of time a student spends on research depends on the amount of course work approved by the advisor, the nature of their financial support, and the requirements of the specific group in which they are working. For graduate students taking courses and/or supported as a TA, working on research should be the default work activity when not in classes or completing TA duties. As the Ph.D. requirements are completed, research becomes full-time. For PIs to remain competitive for external funding, research progress and ultimately dissemination through publications are essential. Thus, graduate students are expected to deliver their best, most efficient effort to produce results that will achieve those goals.

Research assistantships (RA) are typically funded by government agencies, private foundations or industries to a faculty member as Principal Investigator (PI), and sometimes directly to a student through a fellowship from a private foundation or a gift to the university. Students who are supported as RAs will be expected to conduct appropriate research under the direction and guidance of their research advisor(s). Students funded on research grants are responsible for prioritizing their time appropriately based on their source of support and asking their advisor any time they are unsure of these priorities. Because Department of Chemistry faculty members make every effort to help students integrate funded projects into the student's thesis, RAs are generally expected to make research effort their utmost priority.

Students are strongly encouraged to explore opportunities for **external fellowships** and discuss them with their advisors to determine whether they are currently competitive for that opportunity and, if so, how best to pursue it. Securing an external fellowship can help students to pursue their own research ideas and broaden their research experience. More information is provided under Additional Fellowships (page 68).

Teaching assistantships (TA) are a limited departmental resource distributed to research advisors with primary faculty appointments in the Department of Chemistry, who then assign these positions to selected students. Advisors may allocate the TAs to students in their group according to the group's needs, with the limitations described

under ***Time Limit on TA Support*** (page 67). Teaching assistant duties include, but are not limited to, conducting recitation classes, teaching in laboratory classes, holding office hours and grading. Minimum English proficiency requirements must be met in order for a student to hold some teaching assistantships and the Intercultural Communication Center administers the testing for Carnegie Mellon. (See page 33 for more about English Proficiency and Graduate Teaching requirements.) Students who will be TAs for the department spend on average 15–20 hours per week in their assigned duties.

To be considered full-time, students must be registered for a minimum of 36 units. Students who fail to register for at least 36 units by the 10th day of classes each semester will be administratively withdrawn and are not eligible to be paid. Building access with a CMU ID card is automatically terminated. Failure to register also jeopardizes student health insurance, student loans, and affects tuition charges for research advisors and the department. Students who are not registered properly risk the loss of student status which is a very serious problem, particularly for students on a visa, and difficult to correct.

Students who have achieved ABD status may have the option to switch from ABD in residence status to *in absentia* (ABS) which can often allow the completion of thesis writing while employed elsewhere once experimental work is complete. Please refer to Carnegie Mellon's ***Doctoral Student Status Policy*** (www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html***)*** or discuss with the departmental graduate ombudsperson about details.

Time Limit on TA Support

The normal time to complete the Ph.D. is 4.5–5.5 years and financial support as a TA cannot be guaranteed beyond a student's 5th year in residence, although an advisor may provide support as a research assistant beyond the 5th year. When a student is not graduating in the 10th semester and will not be supported on RA in the 11th semester, the student and advisor must jointly petition the department head for financial support as a TA at the start of the spring semester. The petition must show a very good plan for the next 1–2 semesters with (1) the student's thesis outline and intended timeline for completing it approved by the advisory committee and (2) the advisor's plan for publishing the student's remaining work and moving him/her toward graduation. An advisor may still provide support as a research assistant beyond the 5th year without petition.

Summer Funding

Graduate student stipends are for the academic year. Summer support normally is provided from research assistantships funded by grants, etc., awarded to the faculty or fellowships/awards received directly by the student from internal or external sources. Limited exceptions may be made for summer support from the Department under some circumstances by prior arrangement with the Department Head, dependent on the available resources. In all cases, a faculty member's decision not to support one of their students during the summer must be approved by the Department Head. Due to the likelihood of summer funding on a research grant requiring 100% effort, any summer

travel must be planned very carefully in consultation with the research advisor to maintain that effort.

Policies on Outside Employment

Employment outside of the research assistantship or teaching assistantship is prohibited for full-time graduate students in the Department of Chemistry during the academic year. can jeopardize the tax status of all graduate students, and thus any opportunity must be reviewed by the Research Advisor, the Graduate Program Committee, and the Associate Dean for Administrative and Financial Affairs. This policy does not apply to departmental approved internships. Exceptions

Outside employment during the summer is prohibited if summer support is provided. If summer support is not available, the student may seek outside employment with permission of their Research Advisory Committee.

Students who are experiencing extraordinary stress for financial reasons are strongly encouraged to reach out to the Departmental Graduate Ombudsperson.

Written Notice of Changes in Financial Support

Every effort is made to provide continuous support to students in good standing, within the limits of the available resources. The Department places a high priority on maintaining continuous financial support for graduate students and provides notice to students on changes in their financial support, with a 6-month written notification, where possible, in the event of a change in the funding. If a student's funding is lost or reduced unexpectedly and continuous funding proves difficult to arrange, the student should first consult the Department Head.

If a student is terminated from the Ph.D. Program, the student's first notice of a possible change in financial support will normally be when they are initially placed on probation. The probationary period will typically last 3-4 months. If conditions for reestablishing good standing are not met within that time, a student may, depending on departmental resources and available positions, receive a terminal semester in the department with funding through a TA position during the academic year or other employment during the summer.

Additional Fellowships

Students are strongly encouraged to pursue all fellowships for which they are eligible and competitive. For example, outstanding U.S. citizens are eligible for NSF Graduate Research Fellowships during their 1st or 2nd year of a Ph.D. program. Announcements about college and departmental fellowships and additional opportunities for current students are announced by email. You may review previous departmental awardees (www.cmu.edu/chemistry/discover/awards/grad/awards-all.html) for ideas about fellowships for which you can apply or use the database through CMU's Fellowships and Scholarships Office: www.cmu.edu/fso. You can also consult the Global Communication Center for writing guidance to prepare excellent applications.

Attendance at Conferences

In most cases, decisions regarding the student's attendance at conferences and funding availability is at the discretion of the Research Advisor. The University provides additional sources of funding through an application process provided by the Graduate Student Assembly and the Provost's Office for students, student work groups or groups to attend a conference, whether as a participant or as a presenter. The process is managed by the Office of the Assistant Vice Provost for Graduate Education. Students can find more information about the application process and deadlines at: www.cmu.edu/graduate/professional-development/conference-funding. The Dean of MCS also has a process for supplemental conference travel funding (see link on page 19). Please also see the department web site for additional information about the department's Edwin N. Lassettre Graduate Travel Award for students in physical chemistry or chemical physicswww.cmu.edu/chemistry/grad/fellowships/lassettre.html.

GuSH Research Funding

GuSH Research Funding is a source of small research grant funds provided by GSA and the Provost's Office and managed by the Office of Graduate and Postdoc Affairs. Students can find more information about the application process and deadlines at: https://www.cmu.edu/graduate/professional-development/research-funding/index.html

Emergency Student Loan

Graduate students who find themselves in need of immediate funds for emergency situations should contact the Office of the Dean of Students www.cmu.edu/student-affairs/index.html, to inquire about the types of emergency funding available to enrolled students.

Resources for Exceptional or Challenging Situations

Graduate Ombudsperson

Lorna Williams-Rolley serves as ombudsperson for graduate students to assist with difficult academic or personal situations where a confidential sounding board and/or an intermediary can be helpful. Examples of situations where students are encouraged to seek advice or assistance include:

- Difficulty in communications with advisor, particularly when those difficulties may lead to potentially changing advisors or leaving the program,
- Conflict with other group members that is difficult to resolve within the group,
- Issues related to diversity or the departmental climate for those groups who are historically underrepresented in science, or

- Personal concerns that interfere significantly with the ability to make timely progress in research or program requirements. These might be due to health, family or financial challenges.

Upon the student's request, information shared will be kept in confidence, as long as no laws require otherwise. Should help be needed from additional sources, the student would be asked before sharing confidential information.

In the event that a difficulty cannot be resolved within the department, please refer to the grievance procedures for resolving difficult matters which are available here: www.cmu.edu/graduate/policies/appeal-grievance-procedures.html

Additionally, students may confer with the Office of Graduate and Postdoc Affairs graded@andrew.cmu.edu , on issues of process or other concerns as they navigate conflicts.

Procedures for Changing Advisors

A student may change research advisors at any time, provided (1) a new advisor is ready to accept the student and (2) the student has not changed advisors before. Normally, the student must be in good standing in the Ph.D. program. Typical reasons for such changes are shifts in research interests away from the advisor's area or difficulties in advisor-student communication. The process of changing advisors will generally involve:

- soliciting a new advisor (typically done confidentially and with advice from the departmental ombudsperson),
- being accepted by that individual,
- determining how to discuss the desire for a change with the prior advisor,
- giving the prior advisor sufficient opportunity to discuss the situation (and potentially ways to address any concerns leading to the desire to change), and
- determining, with the prior advisor and the Department, what should be done to finish work in the former group and provide a smooth transition, similar to what would be expected leaving other types of jobs.

Students who are considering a change of advisors are encouraged to seek confidential advice on the details of these steps by consulting the GPC Chair. Note that prospective advisors should generally keep discussions of change of advisor confidential until the student's decision is final and the Department Head has approved of the change. (See also: Eligibility to Change Advisors, page 62).

Key Offices for Academic & Research Support

Computing and Information Resources

www.cmu.edu/computing

Computing Services maintains and supports computing resources for the campus community, including the campus wired and wireless networks, printing, computer labs, file storage, email and software catalog. As members of this community, we are all responsible for the security of these shared resources. Be sure to review the Safe Computing (https://www.cmu.edu/computing/safe/) section and the University Computing Policy (https://www.cmu.edu/policies/information-technology/computing.html)

Visit the Computing Services website (https://www.cmu.edu/computing/) to learn more. For assistance the Computing Services Help Center is available at 412-268-4357 (HELP) or it-help@cmu.edu.

Student Academic Success Center

https://www.cmu.edu/student-success/

Student Academic Support Programs

Learning Support

Supplemental Instruction: Supplemental Instruction (SI) is an academic support model that utilizes peer-assisted study sessions. The SI program provides regularly scheduled review sessions on course materials outside the classroom. SI is a non-remedial approach to learning as the program targets high-risk courses and is available in select courses based on data related to past student performance and feasibility.

- Peer Tutoring: Weekly Tutoring Appointments are offered in a one-on-one and small group format to students from any discipline who need assistance with a course that may not be supported by our other services. Weekly appointments give students the opportunity to interact regularly with the same tutor to facilitate deeper understanding of concepts. Students can register online through the Student Academic Success website.
- Academic Coaching: Academic Coaching provides holistic one-on-one peer support and group workshops to help students find and implement their conditions for success. We assist students in improving time management, productive habits, organization, stress management, and study skills. Students will request support through the Academic Success Center website and attend

in-person meetings or meet using video and audio conferencing technology to provide all students with support.

- "Just in Time" Workshops: The Student Academic Success team is available to partner with instructors and departments to identify skills or concepts that would benefit from supplemental offerings (workshops, boot camps) to support students' academic success and learning. We are eager to help convene and coordinate outside of the classroom skill-building opportunities that can be open to any student interested in building skill or reinforcing course concept mastery.
- Study Partners: Support for students to create and benefit from their own study groups: The Student Academic Success team assists students in forming and benefiting from peer study groups, whereby all students can reap the benefits of peer-to-peer learning, student agency, and collaboration skill development. Staff from the Student Academic Success Center will be made available to instructors and students to assist with the formation of peer-led study groups. This level of support is open to any course where the instructor requests or agrees such support is appropriate and students are interested in both leading and participating.

Language and Cross-cultural Support

More than 60% of graduate students at Carnegie Mellon are international students, and others are nonnative speakers of English who have attended high school or undergraduate programs in the US. Many of these students want to hone their language and cross-cultural skills for academic and professional success. Students can choose from sessions on

- how to give a strong presentation,
- writing academic emails,
- expectations and strategies for clear academic writing,
- how to talk about yourself as a professional in the U.S.,
- developing clearer pronunciation,
- using accurate grammar,
- building fluency, and more.
- Students can make an appointment with a Language Development Specialist to get individualized coaching on language or cross-cultural issues.

The Student Academic Success Center is also charged with certifying the language of International Teaching Assistants (ITAs), ensuring that nonnative English speakers have the language proficiency needed to succeed as teaching assistants in the Carnegie Mellon classroom. Students preparing to do an ITA Certification should plan to take classes offered by the language support team at the SASC from the beginning of their

first semester. Start by contacting the language support team at the SASC website or attend a Language Support Orientation at the SASC or in your department.

University Libraries

www.library.cmu.edu

The University Libraries offers a wide range of information resources and services supporting graduate students in course-work, research, teaching, and publishing. The library licenses and purchases books, journals, media and other needed materials in various formats. Library liaisons, consultants and information specialists provide in-depth and professional assistance and advice in all-things information - including locating and obtaining specific resources, providing specialized research support, advanced training in the use and management of data. Sign up for workshops and hands-on topic-specific sessions such as data visualization with Tableau, cleaning data with OpenRefine, and getting started with Zotero. Weekly drop-in hours for Digital Humanities and for Research Data Research Management are scheduled during the academic year. Start at the library home page to find the books, journals and databases you need; to identify and reach out to the library liaison in your field; to sign up for scheduled workshops; and to connect with consultants in scholarly publishing, research data management, and digital humanities.

Research at CMU

www.cmu.edu/research/index.shtml

The primary purpose of research at the university is the advancement of knowledge in all fields in which the university is active. Research is regarded as one of the university's major contributions to society and as an essential element in education, particularly at the graduate level and in faculty development. Research activities are governed by several university policies. Guidance and more general information is found by visiting the Research at Carnegie Mellon website.

Office of Research Integrity & Compliance

www.cmu.edu/research-compliance/index.html

The Office of Research Integrity & Compliance (ORIC) is designed to support research at Carnegie Mellon University. The staff work with researchers to ensure research is conducted with integrity and in accordance with federal and Pennsylvania regulation. ORIC assists researchers with human subject research, conflicts of interest, responsible conduct of research, export controls, and institutional animal care & use. ORIC also provides consultation, advice, and review of allegations of research misconduct.

Key Offices for Health, Wellness & Safety

Counseling & Psychological Services

https://www.cmu.edu/counseling/

Counseling & Psychological Services (CaPS) affords the opportunity for students to talk privately about academic and personal concerns in a safe, confidential setting. An initial consultation at CaPS can help clarify the nature of the concern, provide immediate support, and explore further options if needed. These may include a referral for counseling within CaPS, to another resource at Carnegie Mellon, or to another resource within the larger Pittsburgh community. CaPS also provides workshops and group sessions on mental health related topics specifically for graduate students on campus. CaPS services are provided at no cost. Appointments can be made in person, or by telephone at 412-268-2922.

Health Services

www.cmu.edu/HealthServices/

University Health Services (UHS) is staffed by physicians, advanced practice clinicians and registered nurses who provide general medical care, allergy injections, first aid, gynecological care and contraception as well as on-site pharmaceuticals. The CMU Student Insurance Plan covers most visit fees to see the physicians and advanced practice clinicians & nurse visits. Fees for prescription medications, laboratory tests, diagnostic procedures and referral to the emergency room or specialists are the student's responsibility and students should review the UHS website and their insurance plan for detailed information about the university health insurance requirement and fees.

UHS also has a registered dietician and health promotion specialists on staff to assist students in addressing nutrition, drug and alcohol and other healthy lifestyle issues. In addition to providing direct health care, UHS administers the Student Health Insurance Program. The Student Health Insurance plan offers a high level of coverage in a wide network of health care providers and hospitals. Appointments can be made by visiting UHS's website, walk-in, or by telephone, 412-268-2157.

Campus Wellness

https://www.cmu.edu/wellness/

At Carnegie Mellon, we believe our individual and collective well-being is rooted in healthy connections to each other and to campus resources. The university provides a wide variety of wellness, mindfulness and connectedness initiatives and resources designed to help students thrive inside and outside the classroom. The BeWell@CMU e-newsletter seeks to be a comprehensive resource for CMU regarding all wellness-inspired events, announcements and professional and personal development

opportunities. Sign up for the Be Well monthly newsletter via *https://bit.ly/BeWellNewsletter* or by contacting the Program Director for Student Affairs Wellness Initiatives, at *alusk@andrew.cmu.edu*.

Religious and Spiritual Life Initiatives (RSLI)

www.cmu.edu/student-affairs/spirituality

Carnegie Mellon is committed to the holistic growth of our students, including creating opportunities for spiritual and religious practice and exploration. We have relationships with local houses of worship from various traditions and many of these groups are members of CMU's Council of Religious Advisors. We also offer programs and initiatives that cross traditional religious boundaries in order to increase knowledge of and appreciation for the full diversity of the worldview traditions. Our RSLI staff are here to support students across the spectrum of religious and spiritual practice and would be more than happy to help you make a connection into a community of faith during your time at CMU.

University Police

http://www.cmu.edu/police/

412-268-2323 (emergency only), 412-268-6232 (non-emergency)

The University Police Department is located at 300 South Craig Street (entrance is on Filmore Street). The department's services include police patrols and call response, criminal investigations, fixed officer and foot officer patrols, event security, and crime prevention and education programming as well as bicycle and laptop registration. Visit the department's website for additional information about the staff, emergency phone locations, crime prevention, lost and found, finger print services, and annual statistic reports.

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault, and fire safety policies and containing statistics about the number and type of crimes committed on the campus and the number and cause of fires in campus residence facilities during the preceding three years. Graduate students can obtain a copy by contacting the University Police Department at 412-268-6232. The annual security and fire safety report is also available online at https://www.cmu.edu/police/annualreports/.

Shuttle and Escort Services

Parking and Transportation coordinates the Shuttle Service and Escort Service provided for CMU students, faculty, and community. The Shuttle & Escort website has full information about these services, stops, routes, tracking and schedules.