

NSCL Graduate Student Mentoring Plan

Last updated May 2018 by Artemis Spyrou

The graduate student mentoring plan was written after a recommendation from the 2013 NSF CA review committee, and submitted to NSF and reviewed by the MSU Graduate School. The version provided here is based on that first version, with minor updates, which are applied on a yearly basis.

Introduction

The education of graduate students is a core mission of NSCL. As a university-based user facility, NSCL plays a prominent role in the education of the next-generation of nuclear scientists through a close synergy of high-quality class-room education and cutting-edge research throughout the student's entire graduate career. About 90 MSU graduate students are advised by faculty at NSCL and have their office at the Laboratory. Their research revolves around the scientific opportunities in experimental, theoretical and astrophysical nuclear science, and accelerator science and engineering at the Laboratory. Roughly a third of the students are supported by the NSF Cooperative Agreement and additional support comes from a variety of independent funding sources and fellowship opportunities, predominantly from DOE, NSF, NNSA and MSU. Approximately 10% of the nation's nuclear science Ph.D's are trained at NSCL, and more than 75% of NSCL graduate students are U.S. citizens. The average time-to-Ph.D. degree for students at NSCL is 5.0 years (measured for completions between 2010 and 2017), which is significantly below the national average of 6.5 years reported in the 2016 NSF report on "Doctorate Recipients from U.S. Universities").

MSU graduate students who perform research at NSCL are enrolled in graduate programs in the College of Natural Science (Department of Physics and Astronomy (P&A) and Department of Chemistry) and the College of Engineering. The relevant departments have graduate student handbooks that describe the rules and guidelines for the relevant programs and for the mentoring provided by Ph.D. guidance committees chaired by the student's advisor. Several years ago, the decision was made to further strengthen the mentoring framework for graduate students (as well as postdoctoral researchers) at NSCL through a concerted effort led by the Associate Director for Education and Outreach, who is appointed by the Laboratory Director. Part of the role of the Associate Director for Education and Outreach is to institutionalize accepted best practices listed in this mentoring plan, monitor their effectiveness, make adjustments based on feedback from faculty, students and others, and to develop new activities that may further improve graduate education at NSCL. Administrative support for the Associate Director for Education and Outreach comes from the Laboratory Business Operations Department. One person from that department is assigned to provide support to the Associate Director for Education and Outreach as his/her highest priority.

This document describes the mentoring plan for graduate students. It applies to all MSU students whose Ph.D. advisor resides at NSCL. Long-term visiting students whose advisor does not reside at NSCL are invited to participate in and benefit from various elements of the mentoring plan.

Arrival at NSCL

When graduate students join NSCL, they meet with the Associate Director for Education and Outreach and the Administrative for Education. The Assistant provides the student with an introduction of the Laboratory, including a checklist of administrative tasks that have to be completed. This introduction is in addition to the information the student receives from the Graduate Student Office of their Academic Department and the NSCL's HR. The students take safety and other pertinent training at the Laboratory when they first arrive, and can request or be asked to sign up for additional trainings based on their anticipated research work.

Another source of information provided to the incoming students is the NSCL Graduate Student Handbook [1], which is a document separate from and in addition to the Graduate Student Handbooks

available from the Academic Departments. It focuses on practical information, lists useful resources, lays out expectations for the student and the advisor, and describes the different types of graduate student appointments. The NSCL Graduate Student Handbook was drafted by the NSCL graduate students under the guidance of, and in close coordination with the Associate Director for Education and Outreach, to ensure the information is to the point and complete. It is reviewed and updated once per year, typically just prior to the arrival of new students early in the summer.

All incoming students are encouraged and offered financial support to start graduate school early in the summer prior to classes starting in the fall. Incoming graduate students meet individually with the Associate Director for Education and Outreach to discuss general practices and expectations as well as research opportunities at the Laboratory. The goal is to introduce students to graduate research early and offer them several options. The NSCL Graduate Student Brochure [2], which is comprised of 1-page descriptions of the research programs of each faculty member. It is updated yearly and serves as a useful resource. The Associate Director for Education and Outreach provides guidance on the basis of the interests of the graduate student and faculty availability. Regardless of whether students already have a strong preference for the type of research they wish to pursue, they are highly encouraged to talk to a large number of faculty to ensure they receive a good overview of the opportunities prior to making a definite choice about which research group they will pursue their Ph.D. thesis research in. Students are also encouraged to try out research with a research group for a period of time and there is no disadvantage to the student if he/she decides to switch research groups. Although the students are advised to make a definite choice after approximately one year in graduate school¹, students can change their advisor at later stages.

Graduate students are assigned a desk in one of the student offices or cubicle areas by the graduate student representative on the NSCL Office Space Committee. The assignment is coordinated with the Associate Director for Education and Outreach, the chair of the space committee, and the initial advisor of the student. A computer is set up prior to the arrival of the student and a one-page quick-info sheet [3], generated by the graduate students, is placed on the desk assigned to the incoming student. Useful information, including the documents described above, is available on the NSCL Graduate Student Wiki [4], which is maintained by the graduate students.

Mentoring during the first phase of Graduate School

The first year of graduate school has a heavy load of course work. Depending on the type of appointment (Teaching Assistant² or Research Assistant/Fellowship), the students may have limited time to perform research, except during the summers. The academic performance of the graduate students is monitored by the Associate Director for Education and Outreach, who communicates with the student and/or the advisor if the student is not in good academic standing or fails a class. The Associate Director for Education and Outreach serves as an additional point of contact for advice (besides the advisor, the relevant NSCL Department Head and Academic Department-specific person responsible for the graduate program) for a wide range of matters. The goal is to address emerging issues before they become a hindrance to a student's progress.

At the beginning of the academic year, a social event is organized, to which graduate students and faculty at the Laboratory are invited. The goal is to introduce and help integrate new graduate students. At this

¹ Chemistry students must select a research advisor by the end of the first academic semester after meeting with at least three faculty members.

² Physics students must teach for at least one semester (although two semesters is common), chemistry students at least two as part of the program requirements. Often this is accomplished in the first year of graduate school, but fellowship students can choose to teach at a later stage. This requirement can be waived by the academic department if a student has prior teaching experience.

event, the new graduate students make initial acquaintance with faculty and senior graduate students so that it is easier to seek contact to discuss research opportunities.

First year graduate students are invited to a monthly lunch (supported by the Laboratory) with faculty in a small group setting, typically comprised of 3-5 students and 2 faculty members. These group lunches are distinct from lunches that graduate students might join with their research group. There is no set agenda for these lunches - they help to expand the mentoring network for students, and to lower the barrier for students to contact a diverse group of faculty in case they have a question or concern, or seek career advice. Students are strongly encouraged to join lunches with faculty other than their advisor. Department heads do not join so that students can interact with faculty outside of their line management. The lunch program is managed by the Associate Director for Education and Outreach, together with the Assistant to the Associate Director for Education and Outreach, who takes care of the scheduling the lunches. At the end of each academic year, a survey is conducted to evaluate the effectiveness and impact of graduate lunches, and make improvements.

The Associate Director for Education and Outreach meets with all graduate students as a group once per month, typically during one of the weekly graduate student seminars. These seminars are organized by the students, and in which faculty, aside from the monthly visit by the Associate Director for Education and Outreach, do not participate. During the monthly meeting, updates and information about general affairs at the Laboratory are provided to the students and issues specific to the graduate students are discussed. The Associate Director for Education and Outreach also distributes a variety of announcements and opportunities to the graduate students by email.

Near the end of the spring semester, all students submit a brief summary of their academic and research progress to the Associate Director for Education and Outreach. Recently this process is done through an online form. This summary or online form serves as input for the graduate student reappointment deliberations for the next academic year. Each student receives a status letter from the Associate Director for Education and Outreach, in which the terms, requirements, and type of appointment for the next academic year are described. To ensure that the progress of students is evaluated evenly, all NSCL faculty meet at the end of the spring semester, and discuss the progress of all NSCL-based students.

Mentoring during the research phase of graduate school

Once the core course work has been completed and the graduate students focus predominantly on their thesis research, the student's advisor and the members of his/her Ph.D. guidance committee are the primary sources of mentoring. A guidance committee meeting is held every year, in which the student presents his/her progress. Copies of the guidance committee forms go to the student's department, and also to the Associate Director for Education and Outreach, who monitors progress and communicates with the student or his/her advisor if necessary. The committee forms serve as input for yearly reappointment decisions for the students (see above). In addition, students are encouraged to talk to faculty members (e.g. those who participated in the informal lunches in the first year) outside of their guidance committee, or line management.

Students are also encouraged to contact the Associate Director for Education and Outreach or seek advice from Department Heads and other faculty members or senior graduate students about any matters related to the work environment at NSCL, and on issues that affect their ability to focus on their research and course work. MSU has a wide variety of resources available to make it easier to balance graduate school and life, and with support from NSCL's HR Department, the Associate Director for Education and Outreach can help seek resources or discuss ways that the Laboratory can assist managing various personal circumstances flexibly and efficiently. Some of the available resources are listed in [10].

For matters that affect graduate students more generally, the Associate Director for Education and Outreach communicates with the President of the NSCL Graduate Organization (a student elected by the students), directly to all students during the monthly meeting with all graduate students, or by email.

Many graduate students need to spend significant amounts of time at other Universities or at National Laboratories. During this period they remain MSU students and are required to continue to follow the policies and procedures of their academic departments and of the laboratory. It is the responsibility of the advisor to ensure that a local advisor/mentor exists at the location where the student is placed, and that the mentor is aware of the relevant mentoring policies.

The ability to give good presentations is key to achieving a successful career in research and education. Besides the regular advice provided by the research advisor to the graduate student, additional feedback on the research presentation skills is given during the public first-year literature-based seminar (for chemistry students) and oral subject exam (for physics students) through a feedback form that is filled out by the audience. The same form also serves as input for the grading by the guidance committee. Presentations associated with these exams must be broadly announced and given in sufficiently large rooms (seminar or lecture room) at a time suitable for a large audience to be able to join. The regular research discussion slot (Thursday morning at 11 am) is the preferred time. The faculty member responsible for scheduling the research discussions requests a list of students which are likely to give their oral exams/first year seminars from the Associate Director for Education and Outreach at the start of each semester, so the presentations can be scheduled. In later years, students give short presentations about their research in a closed-door meeting with the guidance committee³. In addition, practice talks for APS meetings are held publicly at the lab, and feedback from the audience is requested. Graduate students are also strongly encouraged to give a public research discussion⁴ about their research in preparation of their thesis defense and senior students are typically sent to conferences other than the DNP/APS meetings. Students are encouraged to propose opportunities to present their research, or to interact with researchers from other facilities.

Career Advice and Planning

Career advice is an important element of mentoring and the mentoring plan for graduate students. It is an integral part of the yearly guidance committee meetings, and discussions regarding career planning are documented on the guidance committee form.

Besides the resources available through the MSU Graduate School (see below), the NSCL Graduate student mentoring plan contains a special focus on career planning. Graduate students are encouraged to interact informally with regular seminar speakers (often during lunch). Every semester, one-two non-academic speakers are included in the seminar program (out of a total of typically 12-14 speakers) to present a broad view of career opportunities outside the traditional academic track. These speakers are often NSCL alumni who have been successful in a career outside of academia. Occasional alumni get-togethers or other events, such as job fairs, offer additional interactions for current students (and postdoctoral researchers) with successful NSCL alumni from a variety of careers. The NSCL alumni contact list currently contains the names of over 250 alumni who have offered to be contacted by students and postdocs for career advice [6]. The web-based list can be instantly filtered by profession and geographic distribution to facilitate finding a contact.

Besides these resources and events, graduate students are encouraged to communicate with faculty and staff at the Laboratory and on campus about career opportunities. With such a large and diverse group of faculty, each with significant professional networks and connections, it is rare not to be able to find someone who can provide information about opportunities, or a contact to communicate with.

³ Chemistry students have a second-year oral exam, which includes a presentation as well as a proposal document. Only faculty attend.

⁴ Mandatory for chemistry students.

Participation in Laboratory Life: Committees, Events and More

A large number of events are happening at the lab and it is everyone's responsibility to participate and ensure their success. This includes regular seminars and research discussion, outreach events, diversity efforts, science communication, mentoring, safety, social activities, and more. Graduate students at NSCL are encouraged to take initiative and show leadership in areas not directly related to research. The development of advocacy, outreach and organizational skills is important for their careers. The Laboratory and the graduate program greatly benefit from the students' involvement in committees and activities. Committees with student representatives include the office space, safety, electronics, social events, seminar, graduate recruiting, outreach, diversity advisory, and Women and Minorities Lecture Series committees. Graduate Student representatives on these committees are chosen by the students.

Graduate students play a critical role in outreach activities of NSCL, ranging from serving as tour guides (for which students are financially compensated, and receive specialized training from the NSCL Outreach Coordinator) to voluntary participation in science fairs, open houses etc. The graduate student on the outreach committee is the main point of contact for such activities. In addition, NSCL is very supportive of student-led initiatives, such as the Women and Minority in the Physics Sciences (WaMPS) organization [7].

The graduate students are an integral part of many laboratory social activities, which include the Tuesday morning "coffee and bagels", the Thursday afternoon "ice cream social", summer BBQs and various other receptions for new arrivals and departing colleagues. These activities further foster the interaction among all laboratory employees. The graduation of students is celebrated in a Farewell Party, to which laboratory employees are invited.

MSU Graduate School and Other Resources Available for Mentoring

The MSU Graduate School [5] has a wide variety of resources available for the mentoring and career development of graduate students. The NSCL mentoring plan, combined with departmental graduate handbooks and the NSCL graduate student handbook contain discipline-specific, as well as broader professional development elements. In support of disciplinary mentoring, an assessment tool that helps students create an individual development plan (IDP) is available through AAAS [8]. Use of this resource is strongly endorsed by the MSU graduate school. Resources for additional professional development are available through the MSU Center for Academic & Future Faculty Excellence (CAFFE) [9], which is the product of an I³ award by NSF. CAFFE provides a wide variety of opportunities for students and other academic personnel to strengthen their professional development, as well as tools to evaluate skills and plan and develop careers [6]. MSU also has many resources in support of underrepresented groups, and you can find more information in [11]. One example is the Alliances for Graduate Education and Professoriate (AGEP), an NSF program that supports recruitment, retention and graduation of underrepresented U.S. minorities [12].

Graduate students at NSCL are highly encouraged to make use of these resources, and faculty at NSCL are encouraged to work with students to effectively use them to strengthen the students' disciplinary and professional development.

References

- [1] https://extwiki.nsl.msu.edu/gradwiki/lib/exe/fetch.php?media=resources:gradhandbook_may2013.docx
- [2] <https://www.nsl.msu.edu/researchers/graduate/brochure.html>
- [3] https://wikihost.nsl.msu.edu/gradwiki/lib/exe/fetch.php?media=resources:physics_incoming_students.pdf
- [4] <https://extwiki.nsl.msu.edu/gradwiki/doku.php>
- [5] <http://grad.msu.edu/>
- [6] <http://www.nsl.msu.edu/ourlab/alumni>
- [7] <https://msu.edu/~wamps/>
- [8] <http://myidp.sciencecareers.org/>

[9] <http://cafffe.grd.msu.edu>

[10] <https://wikihost.nsl.msu.edu/gradwiki/lib/exe/fetch.php?media=resources:gradstudentsupport.pdf>

[11] <http://inclusion.msu.edu>

[12] <https://grad.msu.edu/agep>