

Updated February 2022

# Graduate Program Handbook

PLANT BIOLOGY AND CONSERVATION

**Northwestern University and the Chicago Botanic Garden**



# The Plant Biology and Conservation (PBC) Graduate Program

Welcome to the Plant Biology and Conservation Program! The PBC graduate program – begun in 2005 – is a partnership between Northwestern University (NU) and the Chicago Botanic Garden (CBG). There are three different degree tracks available: master’s degree with an internship, Master’s degree with a research thesis, and a PhD. Students in all degree program earn their degree from Northwestern University and work closely with faculty at both institutions. The primary mission of the PBC program is to foster an academic and research environment that allows students to gain experience, skills and knowledge to become scholars, leaders, and practitioners in plant biology and conservation.

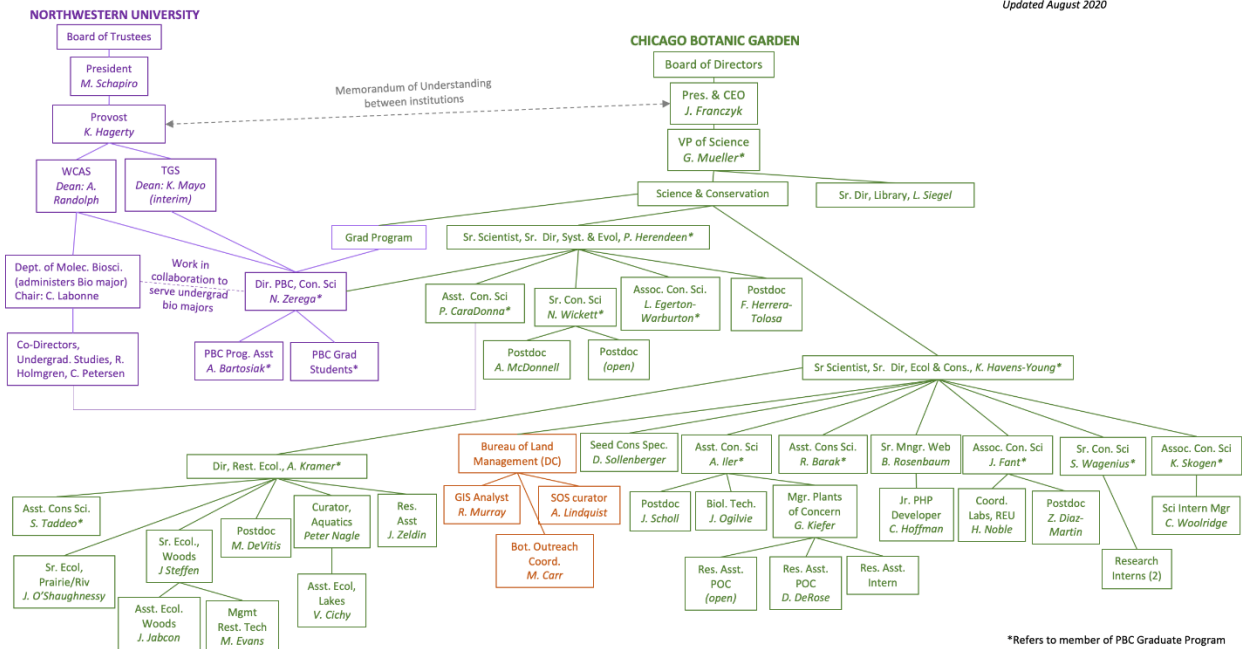
The PBC graduate program brings together basic and applied sciences faculty from NU and CBG and allows students to readily cross departmental and disciplinary boundaries in choosing courses and thesis committee members. The scientists at CBG have adjunct appointments at NU and typically serve as primary thesis advisors on students’ committees.

PBC faculty are committed to helping students prepare for career options that await them after the completion of their degree, such as further academic training, employment with governmental or non-governmental agencies in land management and conservation, teaching at the college level, scientific journalism, science policy and administration, or many other endeavors.

PBC students must meet all the basic requirements set forth by TGS relating to [grades](#) and [satisfactory academic progress](#). This handbook provides additional information about requirements specific to PBC.

Organizational Chart of the PBC Graduate Program and Chicago Botanic Garden Science Department

Updated August 2020



\*Refers to member of PBC Graduate Program

## THE GRADUATE SCHOOL STATEMENT ON DIVERSITY AND INCLUSION

Northwestern University does not discriminate or permit discrimination by any member of its community against any individual on the basis of race, color, religion, national origin, sex, pregnancy, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship status, veteran status, genetic information, reproductive health decision making, or any other classification protected by law in matters of admissions, employment, housing, or services or in the educational programs or activities it operates. Harassment, whether verbal, physical, or visual, that is based on any of these characteristics is a form of discrimination. Further prohibited by law is discrimination against any employee and/or job applicant who chooses to inquire about, discuss, or disclose their own compensation or the compensation of another employee or applicant.

Northwestern University complies with federal and state laws that prohibit discrimination based on the protected categories listed above, including Title IX of the Education Amendments of 1972. Title IX requires educational institutions, such as Northwestern, to prohibit discrimination based on sex (including sexual harassment) in the University's educational programs and activities, including in matters of employment and admissions. In addition, Northwestern provides reasonable accommodations to qualified applicants, students, and employees with disabilities and to individuals who are pregnant.

Any alleged violations of this policy or questions with respect to nondiscrimination or reasonable accommodations should be directed to Northwestern's Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, [equity@northwestern.edu](mailto:equity@northwestern.edu).

Questions specific to sex discrimination (including sexual misconduct and sexual harassment) should be directed to Northwestern's Title IX Coordinator in the Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, [TitleIXCoordinator@northwestern.edu](mailto:TitleIXCoordinator@northwestern.edu).

A person may also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting [www2.ed.gov/about/offices/list/ocr/complaintintro.html](http://www2.ed.gov/about/offices/list/ocr/complaintintro.html) or calling 800-421-3481. Inquiries about the application of Title IX to Northwestern may be referred to Northwestern's Title IX Coordinator, the United States Department of Education's Assistant Secretary for Civil Rights, or both.

## Plant Biology and Conservation Statement on Diversity and Inclusion

Our work in the Plant Biology and Conservation Program focuses on understanding the natural world around us and finding solutions to major global challenges, including mitigating and adapting to climate change, and preserving biodiversity and essential ecosystem functions to help secure equitable access to a sustainable environment in the present as well as for future generations. This can only be accomplished as an anti-racist community. The Program in Plant Biology and Conservation unequivocally states that we do not tolerate racism and will actively work to combat and eliminate institutional and systemic inequities and biases. We will purposefully strive to identify, discuss and challenge issues of race, color, ethnicity and the impacts they have on our community. We will actively work together to create a community where Black People, Indigenous People, People of Color, and Immigrants from all historically underrepresented groups feel valued and can excel in an anti-racist environment.

## **COVID-19 Policy and Updates for Northwestern Students**

The University's response to COVID-19 pandemic is in a constant state of development. The situation around the pandemic and our community changes daily. To ensure that our students are as prepared and informed of University policy regarding this please utilize the resources below on a regular basis. Should an urgent situation arise where the University will be closed due to state regulations all students, faculty, and staff, will be contacted directly by the PBC director and program assistant.

NU COVID-19 [updates](#)

TGS specific COVID-19 [updates](#)

WCAS COVID-19 [announcements](#)

Daily Symptom [tracker](#)

[Extension of milestones](#) due to Covid – For students who were active in TGS when the pandemic started in March 2020, TGS has provided an automatic, four-quarter (one-year) extension of outstanding qualifying exam, prospectus, and/or doctoral and master's degree deadlines (i.e., time to degree) that fall on or after March 30, 2020

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## MASTER’S DEGREE: THESIS TRACK

### TYPICAL TIMELINE AND MILESTONES FOR THESIS TRACK MASTER’S DEGREE

The Chicago Botanic Garden and Northwestern University offer a research thesis track Master of Science in Plant Biology and Conservation. Students receive a strong foundation in plant ecology, evolution and conservation and can choose to specialize from a variety of research areas. Students typically take between two to two and a half years to complete the degree, with all course work completed in year one and research emphasized in year two. Below is an overview of a typical timeline. Please see the next section for more details.

Qtr	Year 1	Year 2
<b>Fall</b>	<ul style="list-style-type: none"> <li>• PBC 450 (2 units)</li> <li>• PBC 451 (1 unit)</li> <li>• Up to 1 elective</li> <li>• Milestones:</li> <li>• Complete <i>Thesis Research Advisor Agreement</i> form if you have identified your advisor</li> <li>• Consider applying for research grants</li> </ul>	<ul style="list-style-type: none"> <li>• No courses, register for TGS 512: Continuous Registration</li> <li>• Work on research/thesis</li> </ul>
<b>Winter</b>	<ul style="list-style-type: none"> <li>• Course or Independent Study in Statistics or Data Science – see Appendix 1 for details</li> <li>• PBC 499 (1 – 2 units; requires <a href="#">Approval for Independent Study form</a> and permission number)</li> <li>• 1 – 2 electives (usually including PBC 401)</li> <li>• Milestones:</li> <li>• Apply for research grants</li> <li>• Complete <i>Thesis Research Advisor Agreement</i> form if you have identified your advisor</li> </ul>	<ul style="list-style-type: none"> <li>• No courses, register for TGS 512: Continuous Registration</li> <li>• Work on research/thesis</li> <li>• Complete the <i>Application for Degree</i> form in GSTS if you plan to graduate in June</li> </ul>
<b>Spring</b>	<ul style="list-style-type: none"> <li>• PBC 499 (1 unit, requires form and permission number)</li> <li>• 2 – 3 electives (usually including PBC 402)</li> <li>• Milestones:</li> <li>• Finalize formation of thesis committee</li> <li>• Submit <i>Thesis Advisor Agreement</i> Form if you have not yet done so</li> <li>• Complete thesis proposal and submit form</li> <li>• Start research (if you haven’t already)</li> <li>• Apply for research grants</li> </ul>	<ul style="list-style-type: none"> <li>• No courses, register for TGS 512: Continuous Registration</li> <li>• Complete <i>Master’s Degree Completion</i> form in GSTS if you plan to graduate in June</li> <li>• Defend thesis and graduate</li> </ul>
<b>Summer</b>	<ul style="list-style-type: none"> <li>• No registration required</li> <li>• Work on research</li> </ul>	<ul style="list-style-type: none"> <li>• Progress review if not yet graduated</li> </ul>

## DEGREE: REQUIREMENTS

The Graduate School (TGS) sets [minimum requirements](#) for all graduate degrees. The Program in Plant Biology and Conservation has additional requirements for the thesis track Master's degree. Many of the necessary forms that students will need can be found [here](#). The requirements are as follows:

1. TGS requires that students meet the minimum course requirements. To be eligible for a Master's degree, a student must successfully complete (minimum GPA 3.0 with no X or Y grades) at least nine letter graded courses (non P/NP) authorized for graduate credit and meet the minimum requirements of the equivalent of three quarters of full time registration. The Plant Biology and Conservation has additional course expectations which include the successful completion of 11 letter graded units as follows. Note, it is possible to take up to 2 of those units with courses that do not carry graduate credit, but you must first get permission from your advisor and Director of Graduate Studies.
2. Credit earned at an undergraduate institution or at another graduate school or a professional school may, with program approval, be applied towards the program's coursework requirements above nine units, but not toward the minimum requirement, for a master's degree at Northwestern University.
3. Students must complete all of the degree requirements within the approved timeline. For the master's degree, requirements must be completed within five years of the date of initial registration in The Graduate School.
4. Students must form a thesis committee and defend their [thesis proposal](#) by the spring of their first year in the program. Failure to do can be considered unsatisfactory academic progress.
5. Students will complete a written thesis and an oral thesis defense. After the written thesis is submitted, a public presentation of the thesis is given, followed by a defense with the student's committee. It is recommended that the defense is completed by the summer of year two.
6. [Satisfactory Academic Progress](#) must be maintained by all students. A student will not be in good academic standing if they have an overall grade average below B (3.0 GPA, or any single grade below C), has more than three incomplete grades, fails to pass the proposal defense by end of year 1, or fails to make satisfactory progress with research as determined by the student's thesis committee.



## RESEARCH ADVISOR AND THESIS COMMITTEE

### Research Advisor

Some Master's students will enter the PBC graduate program with a selected research advisor, while some will not. To introduce students to the research that is happening in the program, and provide information on potential advisors, NU/CBG scientists will present short seminars on their research during the fall quarter. In addition, Independent Study courses (PBC 499, typically taken in the winter and spring quarters of year one) will facilitate the mentor selection process. All students must secure a thesis advisor by spring quarter of year one and submit the Thesis Research Advisor Agreement [form](#) to the PBC program assistant. The selection of a thesis committee is the joint responsibility of the student and thesis advisor. If at any point the student or advisor believes it would be in the best interest of the student to change advisors, a new advisor may be chosen and a new Thesis Advisor Agreement form must be submitted to the PBC office.

It is recommended that Master's students fill out an *MS Individual Development Plan (IDP)* [form](#) with their research advisor by the spring quarter of year one. This plan outlines the goals and expectations of both the student and advisor and can be used to assess progress toward the degree during progress reviews.

### Master's Thesis Committee

Students will form their thesis committee by the spring quarter of their first year. The thesis committee must be made up of at least 3 people, two of whom must be members of the Northwestern TGS faculty (this includes faculty based at NU as well as adjunct faculty from CBG). The student's research advisor counts as one of these faculty members. The third member may be from an outside institution, but this is not required.

## THESIS PROPOSAL

Students will present a thesis proposal to their committee in the spring of year one (and no later than the end of their first year). Students turn in a written research proposal to their committee 2 weeks before the thesis proposal meeting. Details about proposal requirements and the process for the meeting can be found [here](#). After the meeting, the committee members and the student complete and sign the Master's Thesis Proposal [Form](#). This form is turned in to the PBC program assistant after the proposal meeting and serves as documentation of committee membership. If at any point the student and advisor agree a change should be made to the committee, this may be done by submitting a written notification of the change to the PBC Program Director. Information and forms about the thesis proposal can be found on the website under [MS Resources](#). If the student does not pass the thesis proposal, the committee will provide feedback for improving the proposal and provide an expected timeline for submitting and presenting a revised proposal. This must be done no later than fall of year two. If the student does not pass after the second attempt, they may be put on academic probation.

## ANNUAL PROGRESS REVIEW

After the thesis proposal meeting, students must have a minimum of one committee meeting per year. However, it is often advisable to have more or to keep your committee up to date with your progress. Progress is measured in terms of successful completion of coursework and meeting research goals as outlined in the thesis proposal. Often, Master's students will defend their thesis and graduate in year two, so an annual review is not required. However, if the student has not graduated within two years of starting the program, an annual review meeting with the student's committee is required no later than summer quarter of year two. After the meeting, the Annual Progress Review [form](#) must be filled out and turned in to the PBC program assistant.

## ACADEMIC PROBATION AND THE REMEDIATION PROCESS

If the student's committee is concerned about the progress of the student, the committee members may find it necessary to organize additional progress reviews. There are three sets of criteria that TGS considers in determining whether students are making satisfactory academic progress: GPA, milestone deadlines, and program length. When a student fails to meet any of the three sets of criteria established, the student will be placed on probation by The Graduate School. If a student does not re-establish satisfactory academic standing during two probationary quarters and does not successfully petition for an extension of the probationary period, the student will become ineligible to receive financial aid and will be excluded (dismissed) from The Graduate School. If a student is on academic probation, they may also be excluded from consideration for PBC travel and research awards. Refer to TGS policy on [satisfactory academic progress](#), [academic probation](#), and [petition process](#) for more details.

## WRITTEN THESIS AND ORAL DEFENSE

Master's students are expected to defend their thesis to their committee by the end of the second year in the program. The defense will consist of a research presentation open to the public (scheduled for ~1 hour including questions), followed by the oral defense/final exam to just the thesis committee (schedule 2 hours for this). During the committee defense, committee members will focus their questions on the issues pertaining to the thesis research, but more general questions relevant to the research subject are also appropriate. All committee members will sign off on the [Thesis Defense Decision form](#) with a committee decision regarding whether the student has passed or not. If revisions or re-examination are necessary, the committee will specify details. The committee will also indicate a deadline for the revisions or re-examination and consequences for not meeting the deadline. At this point, a copy of the Thesis Defense Decision form should be turned into the PBC program assistant. Students should retain the original for themselves if revisions or re-examination is expected. Once revisions are made and approved, the student will turn in a PDF version of the final approved thesis along with the signed *Thesis Defense Decision* form to the PBC Program Director. At this point the student has met the thesis requirement of the degree. If a student has not turned in the revised thesis within a year after the defense, the student must re-defend the thesis and incorporate discussion of all newly published data in the area of study. Bound theses of PBC alumni are available at the CBG library (in the Plant Conservation Science Center) or in PDF format upon requests to the PBC Program Assistant or Program Director.

Details about the defense and thesis formatting can be found in the [MS Thesis Format/Defense Guidelines](#) document.

## CHECKLIST FOR MS THESIS DEFENSE and Graduation

- Watch for graduation deadlines for each quarter and fill out the *Application for Degree* form and the *Master's Degree Completion* form through [GSTS](#) by the appropriate deadlines.
- Schedule a defense date well in advance so that you can find a date that works for all your committee members and you can reserve a room.
- Defenses can be held at NU or CBG or via zoom. Contact the PBC program assistant for a room reservation. Schedule at least 3 hours for the defense.
- Outside committee members that are not local may video conference/skype into the defense if they are not able to physically be there and you are conducting your defense in person. It is the student's responsibility to make the arrangements for this.
- Your thesis must be submitted to your committee members at least 2 weeks before the thesis defense. Before submission, you should have gone through drafts with your major advisor.
- Be sure to schedule your defense to allow ample time to make revisions for the graduation deadline.
- Once your defense date, time and location have been settled, contact the PBC program assistant with the thesis title, date, time and location as well as an image that can be used for a flyer to advertise the defense.
- Bring or email the [MS Thesis Defense Decision](#) form to the defense.
- If no revisions are necessary, turn in the signed form to the PBC Program Director after the defense. If revisions are necessary, keep the original for the final approval signing by your research advisor.
- By the graduation deadline date, upload the final fully signed form along with your final revised and approved thesis to GSTS. Send an email to the PBC program assistant and program director (with your advisor cc'd) when this has been completed. At this point you can be approved to graduate. Congratulations!
- Upload your final thesis to be digitally archived in the NU library by following the step in the Final Thesis Upload guide, located in the [resources](#) section from our website.

- If revisions are necessary, make appropriate revisions by the deadlines stipulated by the committee and get necessary signatures for final approval of the revised thesis.
- If re-examination is required, schedule the defense by the deadline stipulated by the committee
- Once all final revisions have been approved by your committee, turn in the signed *MS Thesis Defense Decision* form with all appropriate signatures and email the PDF version of the final approved thesis to the PBC Program Assistant.
- You have now completed your thesis requirement toward your graduation.

## IMPORTANT DATES FOR GRADUATION

In order to graduate, students must complete the *TGS Application for Degree* form (approximately two months before the quarter graduation deadline) and the *TGS Master's Degree Completion* form (approximately one month before the quarter graduation deadline). Students should plan their thesis defense at least 2-4 weeks before the deadline for submission of the *Master's Degree Completion* form to allow time for revisions. These forms are accessed through GSTS. Please see the chart below for approximate dates, but check the [University Academic Calendar](#) for the exact dates for your year.

<b>Graduation Quarter</b>	<b>Defend thesis by</b>	<b>Application for Degree form due</b>	<b>Master's degree completion form due</b>
Fall	End of November	Early November	Early December
Winter	Mid-March	Early February	Mid March
Spring	End of April	Mid April	Mid May
Summer	End of July	Mid July	Mid August

## MASTER’S DEGREE: INTERNSHIP TRACK

The Chicago Botanic Garden and Northwestern University offer an internship track Master of Science in Plant Biology and Conservation. Students receive a strong foundation in plant ecology, evolution and conservation and can choose to specialize in an area of interest through an internship. Students typically take one year to complete the degree, with all course work completed in one academic year and an internship completed in the summer. Below is an overview of a typical timeline Please see the next section for more details.

### TYPICAL MS INTERNSHIP TIMELINE AND MILESTONES

	Year 1
<b>Fall</b>	<ul style="list-style-type: none"> <li>• PBC 450 (2 units)</li> <li>• PBC 451 (1 unit)</li> <li>• 1 elective (optional)*</li> </ul>
<b>Winter</b>	<ul style="list-style-type: none"> <li>• Course or Independent Study in Statistics or Data Science – see Appendix 1 for details</li> <li>• 2 electives</li> <li>• One additional elective (optional)*</li> <li>• Organize internship for spring or summer</li> </ul>
<b>Spring</b>	<ul style="list-style-type: none"> <li>• PBC 402 or other ecology course (1 unit)</li> <li>• 2 electives. One elective may be PBC 499 if you are starting your internship</li> <li>• One additional elective (optional)*</li> <li>• Begin internship if it is to start in the spring</li> </ul>
<b>Summer</b>	<ul style="list-style-type: none"> <li>• Complete internship and turn in all required materials</li> </ul>

\*Students are required to register for at least 3 units each quarter. However, you may register for up to 4 units each quarter.

## DEGREE REQUIREMENTS

The Graduate School (TGS) sets [minimum requirements](#) for all graduate degrees. The Program in Plant Biology and Conservation has additional requirements for the internship track master's degree. The requirements are as follows:

1. TGS requires that students meet the minimum course requirements. To be eligible for a Master's degree, a student must successfully complete (minimum GPA 3.0 with no X or Y grades) at least nine letter graded courses (non P/NP) authorized for graduate credit and meet the minimum requirements of the equivalent of three quarters of full time registration. The Plant Biology and Conservation course expectations are as follows:
  - a. **Three required courses comprising 4 units** (PBC 450 – 2 units, PBC 451 – 1 unit, and a 1 unit course or Independent Study in Statistics or Data Science – see Appendix 1 for details. PBC 450 is a 2 unit course; all other courses are 1 unit)
  - b. **Five electives** (two of which are recommended, but may be substituted if student shows previous coursework in these areas: PBC 401 and PBC 402)
2. Students must complete all of the degree requirements within the approved timeline. For the master's degree, requirements must be completed within five years of the date of initial registration in The Graduate School.
3. Students work with the Internship Advisory Committee to set up an internship in order to meet the internship requirement for the degree. Students are expected to complete at least 240 hours of an internship and have a tangible product that it is turned in upon completion of the internship, along with evaluation forms from the student and internship host. More information and forms can be found [here](#).
4. Satisfactory Academic Progress must be maintained by all students. A student will not be in good academic standing if they have an overall grade average below B (3.0 GPA, or any single grade below C), have more than three incomplete grades, fail to pass the proposal defense by end of year one, or fail to make satisfactory progress with research as determined by the student's thesis committee. Additional information can be found [here](#).

## IMPORTANT DATES FOR GRADUATION

In order to graduate, students must complete the *TGS Application for Degree* form (approximately two months before the quarter graduation deadline) and the *TGS Master's Degree Completion* form (approximately one month before the quarter graduation deadline). These forms are accessed through GSTS. Please see the chart below for approximate dates, but check the [University Academic Calendar](#) for the exact dates for your year.

Graduation Quarter	Defend thesis by	Application for Degree form due	Master's degree completion form due
Fall	End of November	Early November	Early December
Winter	Mid-March	Early February	Mid March
Spring	End of April	Mid April	Mid May
Summer	End of July	Mid July	Mid August

## PHD DEGREE

Below is an overview of a typical timeline for the PhD degree. Some milestones may vary. Please see the next section for more details.

### TYPICAL PHD TIMELINE AND MILESTONES

	Fall	Winter	Spring	Summer
Year 1	<ul style="list-style-type: none"> <li>PBC 450 (2 units)</li> <li>PBC 451 (1 unit)</li> <li>1 elective (1 unit, optional)</li> <li>Submit Dissertation Advisor Form</li> </ul>	<ul style="list-style-type: none"> <li>Course or Independent Study in Statistics or Data Science – see Appendix 1 for details</li> <li>Up to 2 elective units (suggested PBC 401)</li> <li>1 unit PBC 590*</li> </ul>	<ul style="list-style-type: none"> <li>3 elective units (including PBC 402)</li> <li>Form and meet with dissertation committee &amp; submit dissertation committee form</li> </ul>	<ul style="list-style-type: none"> <li>3 units of PBC 590</li> <li>Consider applying for research grants</li> </ul>
Year 2	<ul style="list-style-type: none"> <li>1 elective (1 unit)</li> <li>2 units of PBC 590</li> <li>Apply for research grants</li> <li>TA 1 quarter during year</li> <li>Annual review meeting</li> </ul>	<ul style="list-style-type: none"> <li>1 elective (1 unit)</li> <li>2 units of PBC 590</li> <li>PA</li> </ul>	<ul style="list-style-type: none"> <li>1 elective (1 unit)</li> <li>2 units of PBC 590</li> <li>Qualifying exam</li> <li>PhD Prospectus</li> <li>Present in PBC seminar series</li> <li>PA</li> </ul>	<ul style="list-style-type: none"> <li>3 units of PBC 590</li> </ul>
Year 3	<ul style="list-style-type: none"> <li>Apply for NSF DDIG</li> <li>TGS 500</li> <li>Annual Review meeting</li> <li>TA 1 quarter during year</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>PA</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>PA</li> <li>Present in PBC seminar series</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>Latest allowed completion of Qualifying Exam and PhD Prospectus</li> </ul>
Year 4	<ul style="list-style-type: none"> <li>TGS 500</li> <li>TA 1 quarter during year Apply for research grants</li> <li>Annual Review meeting</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>PA</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>Should have applied for external grants by now</li> <li>Present in PBC seminar series</li> <li>PA</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> </ul>
Year 5	<ul style="list-style-type: none"> <li>TGS 500 PA</li> <li>Annual Review meeting</li> <li>Permission to write meeting 3-6 months before defense</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>PA</li> </ul>	<ul style="list-style-type: none"> <li>TGS 500</li> <li>PA</li> <li>Defend and turn in dissertation</li> <li>Graduate</li> </ul>	

\*PBC 590 is used to bring your total units/quarter to 3 units. You can manage your elective and PBC 590 units for each quarter during your first two years as appropriate for you. The above scenario is just an example.

## PHD DEGREE REQUIREMENTS

The Graduate School (TGS) sets [minimum requirements](#) for all graduate degrees. The Program in Plant Biology and Conservation has additional requirements for the PhD degree as outlined below.

1. **Coursework:** Students must complete a total of 13 units of credit. These include the following. Note, it is possible to take up to 4 of those units with courses that do not carry graduate credit, but you must first get permission from your advisor and Director of Graduate Studies.
2. **Satisfactory academic progress** must be maintained by students, or they will risk losing funding or being dismissed from the program. A student will not be in good academic standing (and will be put on academic probation) if they have an overall grade point average below B (3.0 GPA), any single grade below C, have more than three incomplete grades, fail to pass the qualifying exam by the end of their third year, or fail to make satisfactory progress with research as determined by the student's dissertation committee or in their teaching assistant (TA) and project assistantship (PA) assignments. Some additional details about expectations follow:
  - At a minimum, students must have at least one committee meeting each year to maintain satisfactory academic progress. The first committee meeting must be no later than spring of year 1 to maintain satisfactory academic progress. More information about annual progress reviews is below.
  - Attendance at weekly PBC seminar series and journal club is required.
  - Annual public presentation of research at PBC seminars in years 2 and beyond is required to maintain satisfactory academic progress.
  - Satisfactory performance in TA assignments is required to maintain satisfactory academic progress. The number of teaching assignments will vary with total graduate student enrollment and course needs, but there is a minimum requirement of **two quarters of teaching**.
  - Satisfactory performance in PA assignments is required to maintain satisfactory academic progress.
3. **Annual Progress Reviews** – to maintain satisfactory academic progress, students must have annual progress reviews with their committee and submit the [annual progress review form](#) to the Program Assistant upon completion of the review. More information can be found in sections below.
4. **Qualifying Examination and Prospectus** – The Qualifying Examination is an important checkpoint meant to demonstrate that a student is progressing on their dissertation research toward the Ph.D. degree. It includes the preparation of a written research proposal (*Prospectus*), along with an oral presentation of the proposal and questioning from a committee about the work and related topics. dissertation and progress on them so far. The committee will either approve this or request additional work. More information can be found in sections below. This must be successfully completed at least three months before the defense date. However, we recommend that you complete this much earlier if possible. See sections below for more details and timeline for this milestone.
5. **Permission to Write and Dissertation Outline Approval** - At the “permission to write” meeting, the student will provide an overview/outline of all the experiments and analysis they plan to include in the dissertation.



6. **Dissertation and defense** – The advisor, the student, and the committee together determine the appropriate timeline for writing and submitting the dissertation. Each student must complete an original research study and produce a dissertation acceptable to the dissertation committee. More information can be found in sections below. It is expected that students will complete their dissertation defense by the end of year 5 to maintain satisfactory academic progress. Funding beyond year 5 is not guaranteed.
7. **Public Presentation of Dissertation** – Upon successful completion of the dissertation defense, students will schedule a public presentation of their dissertation research. This should occur within 2 months of the defense.
8. **Publication requirement** – All PhD candidates must have a publication based on their research from their PhD research submitted for review before receiving the PhD degree. This may be in a peer-reviewed journal or other type of publication.

## PHD ADVISOR AND DISSERTATION COMMITTEE

### PhD Research Advisor

Upon arrival at Northwestern, PhD students should have identified a major research advisor. Student and advisor should complete the *Dissertation Research Advisor Agreement* form to indicate their plan to work together. The advisor will help the student decide which classes to take during years one and two. The advisor must approve all electives. Student and advisor should meet regularly, at least three times during the first year, prior to the start of each quarter. Students should also feel free to consult their advisor or the PBC Program Director as the need arises during the course of the year. It is of particular importance that students contact their advisor and/or the PBC Director if they are experiencing problems with any courses, or any other aspect of the PBC program. If at any point the student or the advisor believes it would be in the best interest of the student to change advisors, a meeting should be arranged with the student, current advisor, proposed new advisor, and PBC Executive Committee to discuss the change. If it is determined that a new advisor should be chosen, a new *Dissertation Research Advisor Agreement* form must be submitted to the PBC office.

The research advisor is also responsible for helping students form their qualifying exam and dissertation committee, and for ensuring that students have annual meetings with their committee. More information about this can be found below.

### Dissertation Committee

The selection of a dissertation committee is the joint responsibility of the student and the graduate advisor. Dissertation committees will be comprised of at least four members, two of whom must be TGS faculty (includes all full-time NU faculty and CBG adjunct faculty), and one of whom is an outside reader from an institution other than NU or CBG. Students will form and meet with their committee by the end of their first year, at which point a *PhD Annual Review* form should be submitted to the PBC office. If at any point the student and advisor agree a change should be made to the committee, this may be done by submitting a written notification of the change to the PBC Program Director. Outside committee members that are not local may call in/video conference/skype into committee meetings. It is the student's responsibility to make the arrangements for this if necessary.

## PHD ANNUAL PROGRESS REVIEWS

PhD students should fill out an [Individual Development Plan \(IDP\)](#) by the fall quarter of year two with their dissertation advisor. This plan outlines the goals and expectations of both the student and advisor and will be used to assess progress toward the degree during progress reviews with dissertation committee each fall, starting in year 2. Shortly after the student and advisor fill out the IDP in the fall, the form should be discussed at the student's annual progress review meeting with the dissertation committee so that everyone is aware of, and in agreement with, the expectations. Then the filled in pdf version, a signed hard copy, and the [PhD Annual Review form](#) must be submitted to the PBC program office. The meetings provide an opportunity for students to discuss their work with scientists from outside the student's laboratories. They serve to assess the student's progress toward the PhD degree, but are not intended to be examinations. Progress is measured in terms of successful completion of coursework and meeting research goals. A student's first committee meeting should be held no later than spring of year one. After that, progress reviews must be conducted annually starting in fall of year two.

**Annual review meetings should be held annually, and no later than spring of each academic year.** Students are responsible for scheduling the annual meetings with their committee. The annual review form must be signed by all committee members. A copy of the annual review form will be kept in each student's file. Additional committee meetings may be arranged throughout the year as deemed appropriate by the student and/or advisor.

## ACADEMIC PROBATION AND THE REMEDIATION PROCESS

If the student's committee is concerned about their progress, the NU/CBG faculty members of the committee may find it necessary to organize additional progress reviews. If there are only two NU/CBG faculty members on the committee, the PBC Director will sit in on the additional meeting. If a student is not making satisfactory academic progress (see above for details on what constitutes satisfactory academic progress), they may be excluded from consideration for PBC travel and research awards and put on academic probation. The student may then have up to two quarters (excluding summers) to achieve satisfactory academic progress. If it is not achieved after two quarters of being placed on academic probation, the student will be dismissed from the program.

## PHD QUALIFYING EXAM AND PROSPECTUS

### Qualifying Examination and Prospectus

The exam will be overseen by the student's committee and will include written and oral components (described below). The written components must be submitted to committee members no later than 2 weeks before the date of the exam. It is strongly encouraged that all students take their qualifying exam by the end of the summer of year two. After passing the qualifying exam, students advance to PhD candidacy. By completing the exam in year two, students are well positioned to apply for grants that require candidacy, and it prepares them well for summer fieldwork. Also, if the committee requests that the student re-take the exam, there is still time to do so. If a student needs to take the qualifying exam later than summer of year two, they must get permission from their committee ahead of time. To do this, the student must prepare a brief explanation justifying the reasons for a delayed exam. This explanation must be approved by their committee and sent to the PBC program director. If a student does not pass the qualifying exam by the end of the summer of year three, they will be put on academic probation. If a student does not pass the exam within two quarters (excluding summers) of being placed on academic probation, the student will be dismissed from the program.

### Written Component of Qualifying Exam: PhD prospectus

The prospectus serves as a concise overview of the entire PhD research project and serves as a guide for expectations on a student's dissertation research going forward. It should be a narrative organized by proposed chapters that gives the entire committee a clear "big picture" perspective on your work and how it all fits together. Examples of past, successful prospectuses can be requested from the Program Assistant or Program Director.

**Information for each expected dissertation chapter should include the following sections:**

1. Abstract – Summary of objectives, methods, results and significance of research
2. Objectives and hypotheses – these should be clearly articulated with justification
3. Methods – these should include a level of detail that reflects understanding by the student
4. Preliminary Results and/or expected results
5. Significance of research
6. Timeline

### Oral Component of Qualifying Exam

Students should prepare a **succinct 15 minute** presentation of the proposed research. The committee should have read the prospectus and not need a complete reiteration of its contents. Delivery of the presentation will be followed by questions from the committee. Students should be prepared to address questions from the committee members on broad topics associated with their research. Precise details of the format of the oral examination are at the discretion of the committee. Each student should consult with the committee at least one month before (although much earlier is advised) their exam to establish the specific knowledge expectations for the oral exam.

Students should also request a recommended reading list from the committee members well before the exam. One effective way to do this is to send committee members a list of publications/resources you have already read or plan to read for your research and organize this list by topic. Ask the committee members what additional publications/resources you should be familiar with.

## Evaluation

During the qualifying examination, the examination committee will ask the student questions about the proposed research as well as general questions to assess student's knowledge base and identify any gaps that will need attention. The quality of the prospectus, performance in the oral examination, performance in coursework, research aptitude, research accomplishments in the program, and performance in TAs and PAs will all be considered by the committee members to evaluate the student's advanced understanding in biology and specifically in the field of plant biology and conservation in order to assess whether the student has the necessary knowledge base to proceed in the PhD program with their proposed research. Students must demonstrate satisfactory performance in all categories in order to be admitted to candidacy. Keep in mind that this is not a time for students to ask the committee questions or seek guidance on their research plan. While a few items may come up, that type of interaction should be conducted during committee meetings. This is an exam. Students should also bring a list/unofficial transcript of all graduate courses completed so that the committee can determine if additional coursework is necessary.

## Results of Examination

Students must bring appropriate forms to the qualifying exam to be completed by the committee and then turn them in to the program assistant. These forms are the [qualifying exam form](#) and the [prospectus form](#). There may be circumstances in which students do not pass the exam. See the section below for more information on failure to advance to candidacy.

## Notification to the Graduate School Regarding Qualifying Exam

It is the responsibility of the student to complete the TGS *PhD Qualifying Exam Form* and *PhD Prospectus Form* in GSTS. It is the responsibility of the dissertation committee chair to contact the PBC Program Assistant and Director with the results of the qualifying exam and to turn in the signed *PhD Qualifying Exam* form to the PBC Program Assistant and Director. It is the responsibility of the student to turn in a pdf of the PhD Prospectus to the PBC Program Assistant and the Director. In the case of a pass, official notification will be sent to the The Graduate School indicating the PhD student passed the examination. Students are notified via email by The Graduate School of their admission to candidacy.

## Failure to Advance to Candidacy

For students whose performance in any of the qualifying exam categories (advanced understanding of biology, successful completion of courses, research aptitude, research accomplishment as demonstrated through the qualifying exam and previous research, and performance in PA and TA positions) is judged insufficient for advancement to candidacy, three alternatives are available and are up to the discretion of the committee and approval by the PBC Executive Committee. In any of the scenarios below, student funding will be affected.

1. If the committee determines that the student has the potential to pass with further preparation, the student may make a second attempt at a later date. If the committee chooses this option, the committee members will inform the student what they need to do to prepare and will give the student a date by which to complete the 2<sup>nd</sup> qualifying exam. However, it must be successfully completed no later than summer of year three, or the student will be put on academic probation or will be dismissed from the program. If a

student fails to pass the 2<sup>nd</sup> exam, they will be dismissed from the program, or one of the options below may remain possible at the discretion of the committee.

2. After the first attempt at the qualifying exam, the committee may decide that the student will not be given a second chance to take the qualifying exam but that the work accomplished is sufficient to merit consideration for terminal Master's degree. It is also possible that after a 2<sup>nd</sup> failed attempt to pass the qualifying exam this route may be recommended by the committee. In either case, if the committee proposes the student prepare and defend a MS thesis, then the student may petition the PBC Executive Committee for permission to write and defend a Master's thesis. Contact the Program Director for details about the petition request. If the petition is granted, the thesis must be written in the format of a Master's thesis and defended before the student's committee, which is generally reconstituted from the qualifying exam committee. The awarding of a terminal Master's degree by PBC should reflect significant achievement by the degree recipient. A terminal Master's degree will be awarded by The Graduate School upon recommendation by the program director acting on the advice of the student's committee.
3. If the committee decides that the student's performance is not sufficient for either of the two above options, the student will be dismissed from the program with no degree.

## PHD DISSERTATION

The advisor, the student, and their committee together determine the appropriate timeline for writing and submitting the dissertation. Each student must complete an original research study and produce a dissertation acceptable to the dissertation committee. Doctoral research usually begins in the summer quarter of the first academic year and continues uninterrupted until all the requirements for the PhD degree have been met and a satisfactory dissertation has been completed. The program expects students to have authored publications over the course of their degree and it is recommended that at least one first-author data paper is submitted by the time of the defense. All requirements for the PhD degree must be met within nine years of initial registration in the doctoral program. A comprehensive list of requirements for the PhD degree can be found in the previous sections.

## PERMISSION TO WRITE AND DISSERTATION OUTLINE APPROVAL

At the “permission to write” meeting, the student will request permission to write his or her dissertation. In preparation for this meeting, the student will submit a detailed dissertation outline. At the meeting, the student will discuss the experimental results and defend the conclusions to be described in the dissertation. The outline must be submitted to the final exam committee members at least two weeks prior to the “permission to write” meeting. During the meeting, the committee will determine whether additional experiments or substantial alterations to the proposed dissertation outline are required prior to scheduling the final exam. Where appropriate, contingencies regarding the outcomes of requested experiments should be agreed upon during this meeting as indicated on the *Dissertation Outline Approval* form. The signed form should be turned into the PBC Program Assistant.

## SETTING THE DATE FOR THE FINAL EXAMINATION (DISSERTATION DEFENSE)

Once the date for the final examination has been determined, the student must

1. Access the *TGS PhD Final Exam* form (this can be found under TGS Forms in GSTS), fill in the requested information, and submit via GSTS.
2. Obtain from the PBC website the *PhD Examination Committee Report* form and complete the appropriate sections and take the form to the exam. At the conclusion of the exam, the form must be signed by each of the committee members and returned, completed, to the PBC program office. If the student passes (with or without conditions), the student will be required to follow the TGS guidelines for [degree completion](#).

## FINAL EXAMINATION (DISSERTATION DEFENSE)

Two weeks prior to the final exam, students will present their committee with the written dissertation. A complete guide to the writing of the dissertation is available from The Graduate School and should be consulted for stylistic requirements. The document is called: [Format Guidelines for Doctoral Dissertations](#). It is expected that the student’s advisor will have read and approved the dissertation prior to its submission to the committee. The final exam meeting will be just to the student’s committee and will include an oral presentation by the student (30-40 minutes long, providing an overview and synthesis of the dissertation chapters), followed by a discussion of the research involving questions for the student, and will conclude with the evaluation of the dissertation. If the committee judges the dissertation to be satisfactory it can be approved at this meeting; although final corrections, revisions, or editing may be requested. The committee’s decision is recorded on the *PhD Examination Committee Report* form. Possible outcomes are: an unqualified pass, a conditional pass requiring no re-examination but revisions, a mandatory re-examination, or a failure to pass the exam. Students may arrange the public seminar of their dissertation if they receive an unqualified or conditional pass (see section below). The committee will set a deadline for making any required revisions and indicate the consequences for not meeting the deadlines.

Consequences could include but are not limited to academic probation, or re-examination. If a student has not turned in the revised dissertation within a year after the final exam, the student may be required to re-defend the dissertation and incorporate discussion of all newly published data in the area of study.

## PUBLIC PRESENTATION OF DISSERTATION

If the student has received an unqualified or conditional pass, the public seminar can be scheduled in consultation with the committee. This is a formal seminar presented to the PBC program members and invited guests. It is recommended that the public seminar be scheduled within one month of the defense. The seminar must be arranged through the PBC office. The program staff will assist in advertising the public presentation. It is strongly recommended that the arrangements be made at least 14 days prior to the presentation.

## OTHER REQUIREMENTS

### TEACHING RESPONSIBILITIES FOR PHD STUDENTS

Many students may pursue a career that involves both research and teaching. Experience as a teacher is therefore a valuable part of the PBC graduate program. Teaching assistantships (TA) allow students to gain further expertise in the subject material of the course and enhances the student's communication skills. The PBC program currently requires **at least two quarters** of serving as a Teaching Assistant for the PhD degree, although the requirement may vary with total graduate student enrollment. Teaching assignments require that the student work with the course instructor to organize and conduct quiz, discussion, and/or laboratory sections for one quarter. Specific courses will vary, but generally students will TA for one larger biology course and one PBC course.

### SEMINARS

#### *Program Invited Speaker Seminars*

All students should attend the Invited Speaker Seminar on scheduled Friday mornings at 10:00 am at CBG throughout the academic year. PhD students are required to host a seminar speaker once a year in the second and third years. This involves inviting a speaker, coordinating his or her visit schedule, meals, and schedule the speaker's talk. The PBC program assistant can work with the speaker to assist with travel arrangements. (See *Preparing for a Seminar Speaker* under Forms and Documents on the PBC website).

#### *PhD Research Seminars*

Starting in the second year, PhD students are required to present their research as part of the PBC seminar series. This is generally a 20-30 minute research presentation. Two or three PhD students will present at a seminar meeting.

#### *Informal Seminar Programs*

In addition to the formal seminar series, numerous informal seminar programs are offered throughout the University. These include special departmental seminars, symposia, laboratory group meetings, and journal club. Participation in such activities is considered an important part of graduate training and is encouraged.

### PROFICIENCY

The PBC program requires that all students demonstrate a basic proficiency in plant biology and conservation. This requirement is satisfied in part by successful completion of all the required graduate course work with a B average or better. Students are expected to read widely in the primary literature related to their area of research.

## INTERNATIONAL STUDENTS

International students who did not complete their undergraduate education in an English-speaking institution need to demonstrate English proficiency before being able to serve as teaching assistants. Students can satisfy the English proficiency requirement by passing the **Versant test** (scoring 65 or higher out of a possible 80) or **SPEAK test** (scoring 50 or higher out of a possible 60). Students can also satisfy The Graduate School's English proficiency requirements by completing any of the three listed below:

**TOEFL Speaking Section sub-score.** A score of 26 or higher (out of a possible 30) on the Speaking Section of the TOEFL internet-based test will now fulfill TGS's English proficiency requirement. Students who submit a score in this range will not be required to take the Versant test upon arrival at Northwestern, and can consider their proficiency requirement to be met.

**Two Versant test scores of 63 or 64.** Students who score within the two-point margin of error for passing the Versant test on two separate occasions will fulfill the English proficiency requirement. The tests need not be consecutive.

**Teaching demonstration in LING 480.** During summer quarter 2016, English Language Programs will re-introduce Linguistics 480, The Language of Teaching and Teachers. This course will be co-taught with the Searle Center for Advancing Learning and Teaching, and will include a teaching demonstration as a capstone project at the course's conclusion. This demonstration will allow students to demonstrate their English proficiency in a live, face-to-face context, as they directly address the skills they will need to be effective teachers and TA's. Students who demonstrate the required level of English proficiency during their teaching demonstration will fulfill the English proficiency requirement. More information about the course and teaching demonstration (including pre-requisites for enrollment) will become available later in AY2015-16 from the Department of Linguistics.



## ORIENTATION AND REGISTRATION INFORMATION FOR FIRST-YEAR MS AND PHD STUDENTS

First-year MS and PhD students are expected to attend the TGS new student orientation (at NU) and the PBC orientation (at CBG), both in mid-September, the week before classes start.

### E-MAIL

Your e-mail address will have been set up for you before your arrival at Northwestern by The Graduate School. If you have not received this information by the beginning of August, please contact the PBC program assistant or you may contact the Northwestern University IT Help Desk (1-4357 or 847-491-4357). You can also visit the NUIT Information Center, 1800 Sherman Avenue, Evanston Campus <https://www.it.northwestern.edu/index.html>

### REGISTRATION

Registration for fall quarter takes place on the Friday before fall quarter classes begin. Registration and courses will be discussed during the PBC orientation. Students will register for PBC 450 and PBC 451 for the first quarter. Students also have the option of registering for an additional elective and may discuss elective options with the Program Director if they have questions.

Courses usually carry one unit of credit except for PBC 450 (2 units), independent research (PBC 590, 1-3 units) and independent studies (PBC 499, 1-2 units). Full-time registration consists of either three or four units per quarter.

*ALL PhD STUDENTS MUST REGISTER ON TIME TO RECEIVE PROPER PAYMENT OF STIPENDS AND SCHOLARSHIPS.* Registration dates can be found in the [Academic Calendar](#)

Registration takes place online, using [CAESAR](#)

## COURSEWORK

### PBC AND OTHER NORTHWESTERN COURSES

All PBC students must take a combination of PBC required courses and elective classes. Courses are subject to change each quarter, and up-to-date information can be found in the NU class schedule prior to each quarter. Additional Northwestern classes may be appropriate as electives. Please see [TGS General Registration Policies](#).

Please refer to the website for [current course offerings](#). Students can tailor their electives to their specific interests and elective courses can be taken across departments. If you choose to take any elective courses that are not at the graduate level (i.e. carry graduate credit, and be 300-level or 400-level), you may do so with the permission of your advisor and Director of Graduate Studies. However, overall, **9 units must be taken at the graduate level or you will not be able to graduate.**

### COURSES AT OTHER UNIVERSITIES

In addition to Northwestern classes, PhD students can take classes at qualifying universities through the **CIC Traveling Scholar Program** (15 member universities, including the University of Chicago). MS students and PhD students can enroll in courses through the **Chicago Metropolitan Exchange Program** (University of Illinois at Chicago). For official policy, please see section 4.12: "Taking Courses at Other Universities"

### ADDITIONAL INFORMATION

#### *MS Students*

##### **Independent Study**

MS students can register for PBC 499, an independent study with their advisor, or another faculty member (must complete the *Approval for Independent Study* form and receive a permission number from the PBC program assistant before registering.

##### **Enrollment in TGS 512**

For the second year and beyond of the PBC MS program, students should register for TGS 512, Continuous Registration. The fee for TGS 512 is \$100 per quarter. No registration is required during the summer quarter.

#### *PhD Students*

##### **Bioethics Course**

All PhD students, generally in their second year, are required to take the non-credit Bioethics course, IBiS 423. To register for this course, email [ibis@northwestern.edu](mailto:ibis@northwestern.edu).

##### **Independent Research (PBC 590)**

For the first eight quarters, students will register for PBC 590 to bring their total number of credits to 3 or 4 (e.g., if student is taking two courses, they can register for 1 unit of PBC 590 to bring the total number of credits to 3 for the quarter).

##### **Enrollment in TGS 500**

After they have completed the required courses and electives (including 8 quarters of PBC 590), PhD students should register for TGS 500.

## ACADEMIC INTEGRITY

Both the University and the PBC graduate program take academic integrity very seriously. Cases of suspected academic dishonesty, including suspected plagiarism, will be referred directly to The Graduate School for follow-up, and may result in expulsion from the PBC program. Among the most important goals of graduate education are maintaining an environment of academic integrity and instilling in students a lifelong commitment to the academic honesty that is fundamental to good scholarship. Standards of academic integrity are violated whenever a student engages in any action that jeopardizes the integrity of scholarly work. Such actions include, without limitation, cheating in the classroom or on examinations, including master's final examinations and PhD qualifying examinations; the intentional and deliberate misuse of data in order to draw conclusions that may not be warranted by the evidence, fabrication of data; omission or concealment of conflicting data for the purpose of misleading other scholars; use of another's words, ideas or creative productions without citation in either the text or in footnotes; paraphrasing or summarizing another's material in such a way as to misrepresent the author's intentions; and use of privileged material or unpublished work without permission.

For more information about the TGS and University policies on academic integrity, please refer to: [TGS Policy](#) and [NU Policy](#)

## FUNDING INFORMATION

### MS PROGRAM

All research thesis track Master's degree students will be considered for tuition scholarships. Scholarships cover a portion of tuition costs during year one. The curriculum can be completed in one academic year. After completion of curriculum requirements, students will maintain matriculation, as they complete their research, by registering for TGS 512 (\$100/quarter), excluding during summer quarter. MS students may have the opportunity to serve as a proctor, grader or TA for courses.

### PHD PROGRAM

PhD students are guaranteed funding for at least five years if they remain in good academic standing and are making satisfactory academic progress. The first year of support is derived from a Northwestern University full tuition scholarship plus a stipend and full coverage of health insurance premiums for plans available through Northwestern University. In subsequent years, it is the policy of the PBC program to use research assistantships, teaching assistantships (see above), project assistantships, and fellowships to continue support.

Project assistantships (PAs) may consist of helping with research or administrative work. These projects will be assigned during the summer for the following academic year. Whenever possible, student interest will be taken into account when assigning PA projects. Please speak with the Program Director for more information.

#### TGS Policy Regarding Remunerative Work

##### *17.2 Permission to Work*

*The request for permission to have additional remunerative work in addition to TGS fellowship/graduate assistantship funding can be submitted via email by the student or faculty. The request should provide the nature of the work, the number of hours, the amount of compensation and duration of the proposed work. The department should review the request to ensure that the additional work will not interfere with the student's progress toward his/her degree or interfere with any assigned duties. The student's advisor and department chair should endorse the request and forward it to the Associate Dean in the appropriate school and to Mary MacLean or Pat Mann in TGS. The department and student will be notified via email if and when approved. Any questions should be directed to Mary MacLean or Pat Mann.*

## TRAVEL AND RESEARCH AWARDS

All PBC graduate students are encouraged to apply for research grants to cover expenses and travel awards to attend conferences.

## DEPARTMENTAL AWARDS

The Northwestern Plant Biology and Conservation Research Award for [MS students](#) and [PhD students](#), funds student research up to \$1,500. The award can be used for research expenses including equipment, supplies and/or travel. The application can be found on the PBC forms and documents page. The deadline dates are January 31 and July 31 for MS students and February 28 and August 31 for PhD students.

PBC also funds student travel to professional conferences and workshops (up to \$500). Funds can be used to travel to the location, conference registration and accommodations. Students are allowed one travel award per year. Applications can be found on the PBC [forms and documents pages](#), and are due two months before the conference or workshop. PhD students also apply for a [Conference Travel Grant](#) through The Graduate School.

## ADDITIONAL FUNDING OPPORTUNITIES

Additional opportunities to fund research or travel can be found on these sites: [PBC Grants page](#)

Northwestern Fellowships and Grants [Page](#)

## ACADEMIC AND PROFESSIONAL RESOURCES

### Career and Professional Development Programs

#### **Searle Center for Advancing Learning and Teaching and The Graduate School Programs**

PBC students have access to the Searle Center for Advancing Learning and Teaching and resources through The Graduate School.

The Searle Center is a valuable resource for students interested in improving their teaching skills in preparation for an academic career. Additional information about the Searle Center programs can be found on their website:

<https://www.northwestern.edu/searle/initiatives/grad/index.html>

#### **Professional Development for Graduate Students**

Please consult The Graduate School website for the numerous professional development opportunities available

<https://www.tgs.northwestern.edu/professional-development/index.html>

*PBC students have participated in these professional development programs:*

- [ComSciCon](#) Chicago – A science communications workshop
- [Dissertation Bootcamp](#) – A two-week intensive dissertation writing workshop
- [Ready, Set, Go](#) – A summer workshop focusing on oral presentation skills for STEM graduate students
- [Science Club](#) – An after-school science program for middle school students
- [Teaching Certificate Program and Graduate Teaching Fellowship](#) – Programs to improve teaching skills

#### **Northwestern Career Advancement (formerly Northwestern Career Services)**

Northwestern Career Advancement provides comprehensive career services to all life sciences graduate students and postdoctoral fellows considering non-academic as well as academic careers. Career counselors assist students and fellows with career decision making by helping them explore and re-classify interests, values, and skills through one-on-one counseling meetings and career assessments.

Life sciences trainees should also utilize the Career Resource Center and other online materials to research employers and careers of interest to them. Employment counselors work closely with students and fellows to help them develop individualized job search strategies and refine job search skills (resumes, CVs, interviewing). More detailed information can be found on the University Career Services [website](#).

#### **Advice**

Spencer Hall's [Resources for Graduate Students and Post-Docs](#) contains a wealth of information on being a successful graduate student, getting grants, getting a job, and many other concerns.

#### **Libraries**

Students have access to library resources at both Northwestern University and the Chicago Botanic garden. Through these libraries, students can access books and articles from many relevant journals. If a student cannot gain access to a particular book or journal article from either NU or CBG's library, students can request it from Interlibrary Loan through the NU library.

[Northwestern University Library](#)

[Chicago Botanic Garden Library](#)

CBG Library contact: [library@chicagobotanic.org](mailto:library@chicagobotanic.org)

### **Student Lounge**

A student lounges are available to PBC students on the 3<sup>rd</sup> floor F wing of Tech and 6<sup>th</sup> floor of Hogan Hall at Northwestern. These rooms provide computers, printers, lockers, and a small refrigerator and microwave. These are great spaces for quiet places between classes, an alternative location to working at home or in the CBG lab space if needed, and also as a collaborative space for PBC students on campus. Both student lounges are accessed via wildcard key card access. If you do not have your wild card the PBC director and program assistant will let you in.

## STUDENT LIFE RESOURCES

### NORTHWESTERN'S OFFICE OF STUDENT CONDUCT

The mission of the [Office of Student Conduct](#) is to provide support and education to students involved in campus conduct matters, to facilitate the resolution of student conflicts, and to play a key role in educating and training students, faculty, and staff about community expectations, values and standards. In addition, the office is responsible for coordinating the Division of Student Affairs' student conduct system, maintaining student conduct records, and administering the formal student disciplinary processes: the University Hearing and Appeals System (UHAS).

### NORTHWESTERN'S OFFICE OF INSTITUTIONAL DIVERSITY AND INCLUSION

**Vision:** To realize an ideal Northwestern University where community members are challenged to engage differences as strengths in an environment that ensures equality of access, opportunity, participation and representation.

**Mission:** To help create and sustain a diverse, inclusive and welcoming environment for all Northwestern community members including students, faculty, staff and alumni.

We maintain a deep commitment to diversity and inclusion, and we invite you to learn more about our work on the [Office of Institutional Diversity and Inclusion website](#).

**Resources:** <https://www.northwestern.edu/diversity/resources/index.html>

### NORTHWESTERN'S OFFICE OF EQUITY

The [Office of Equity](#) at Northwestern University works to create a culture of access, belonging and accountability for all Northwestern community members. That includes supporting those impacted by discrimination or harassment and providing reasonable accommodations to individuals with disabilities.

- Learn about policies and accommodations related to equal opportunity and access.
- Learn about the Office of Equity's role related to sexual misconduct response and prevention.

**Mission Statement:** Northwestern University is committed to fostering an environment in which all members of our community are free from discrimination and harassment—including sexual misconduct. Such conduct violates the values of our institution and disrupts the living, learning, and working environment for students, faculty, staff, and other community members.

The University prohibits discrimination and harassment on the basis of race, color, religion, national origin, sex, pregnancy, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship status, veteran status, genetic information, or any other classification protected by law in matters of admissions, employment, housing, or in the educational programs or activities it operates.

The Office of Equity works to uphold the University's commitment by:

- Responding to reports of discrimination and harassment, including by helping students, faculty, and staff understand the University's processes for making such reports.
- Providing support and resources to those impacted by discrimination and harassment.



- Providing training, consultation, and resources to the University community regarding accommodating individuals with disabilities, the University's affirmative action programs for faculty and staff, and responding to reports of discrimination and harassment; and
- Working with students, faculty, and staff to revise and implement policies related to discrimination, harassment, and providing reasonable accommodations to individuals with disabilities.

If you are interested in making a report of discrimination or harassment, please visit:

[Equal Opportunity and Access website](#)

[Sexual Misconduct Response and Prevention website](#)

## NON-DISCRIMINATION AND NON-HARASSMENT POLICIES AND PROCEDURES AT CHICAGO BOTANIC GARDEN

You can access the Chicago Botanic Garden's non-discrimination and non-harassment policies and procedures for reporting at this link: <https://www.chicagobotanic.org/policies> As some students in the program may also be Chicago Botanic Garden employees or volunteers, below is additional information relevant to these different roles.

Both Northwestern and the Chicago Botanic Garden expect that all students, faculty, and staff involved in the joint program for the training of graduate students in plant biology and conservation will treat each other with civility and mutual respect. Both entities are committed to cultivating an environment that values diverse backgrounds, approaches, and perspectives.

As stated in Northwestern's Policy on Discrimination and Harassment and Policy on Sexual Misconduct, Northwestern does not tolerate discrimination or harassment (including sexual misconduct) on the basis of any protected class. As stated in the Chicago Botanic Garden's Non-Discrimination, Equal Employment Opportunity and Affirmative Action, Title IX, Anti-Harassment & Anti-Retaliation Policies & Anti-Harassment and Discrimination Complaint Procedures, the Chicago Botanic Garden also does not tolerate discrimination or harassment (including sexual harassment, sexual assault, or other forms of sexual violence) on the basis of any protected class.

If a Northwestern student, faculty, or staff member participating in the joint program feels they are being discriminated against or harassed on the basis of a protected class or retaliated against by any other participant in the program, Garden employee, or Garden volunteer, that person should immediately report that behavior to Northwestern's Office of Equity, or to the Director of the program, who will then report the concern to the Office of Equity.

If a Northwestern student, faculty, or staff member reports to the Office of Equity an allegation of discrimination, harassment, or retaliation involving a Chicago Botanic Garden employee or volunteer, the Office of Equity will immediately report the allegation to the Garden's Vice President of Human Resources/Title IX Coordinator.

If a Chicago Botanic Garden employee learns of an allegation of discrimination, harassment, or retaliation involving a Northwestern student, faculty, or staff, the Chicago Botanic Garden employee will immediately report the allegation to the Vice President of Human Resources/Title IX Coordinator at the Chicago Botanic Garden, who will immediately report the allegation to Northwestern's Office of Equity.

You can find additional resources about reporting obligations and investigation procedures can be found [here](#).

Based on the nature of the allegations and the wishes of the impacted individual, Northwestern will coordinate with the Chicago Botanic Garden to provide support and resources to the impacted individual, and, if appropriate, conduct a prompt, impartial, and thorough investigation into the allegations. Where Northwestern deems it appropriate to conduct an investigation, Northwestern and the Garden will have the option to collaborate on a

joint investigation. The Garden also reserves the right to conduct a separate investigation in addition to any investigation conducted by Northwestern. Whether a joint investigation or separate investigations are conducted, Northwestern and the Chicago Botanic Garden will share information – including the nature of the allegations and the findings of any investigation – with each other to the extent permitted by law.

## CONFLICT RESOLUTION

PBC is committed to assisting students with concerns, conflicts, complaints, or other issues. When conflicts occur between an advisor and student, if possible, they should first try to resolve the issue themselves. Here are [some resources](#) to assist with this process. If the conflict cannot be resolved, the student can seek advice or intervention from their thesis/dissertation committee members, the program director, or another member of PBC community they are comfortable speaking with. If these approaches are unable to provide appropriate assistance, the program director can refer the student to a third NU party (or the student can reach out to a third NU party directly), including the [university ombudsperson](#), who will act as a delegate or intermediary in finding a solution.

## CAMPUS LIFE

Please reference The Graduate School's Campus Life website for additional resources and information including student activities, health, housing, family resources, and dealing with conflict.

<https://www.tgs.northwestern.edu/campus-life/index.html>

Off Campus Life at Northwestern <https://www.northwestern.edu/offcampus/>

### U-Pass

U-Pass is a special fare card to be used on all Chicago Transit Authority (CTA) transportation (the El system and Pace buses) for all full-time "resident" students in The Graduate School. The U-pass is covered by the TGS student activity fee (see below). Please note that the U-pass is provided for first year MS students and all PhD students.

<https://www.tgs.northwestern.edu/campus-life/housing-transportation/u-pass.html>

### TGS Activity Fee

The Graduate School has implemented a mandatory activity fee of \$110 per quarter (\$440 for 4 quarters for academic year 2015-16) to support services for full-time students of The Graduate School, including the U-pass.

## HEALTH INSURANCE COVERAGE

### General Information

The Graduate School (TGS) works with the Office of Risk Management and the Student Health Insurance Office to provide health insurance to TGS students.

All full-time students must have health insurance coverage throughout their academic studies at NU. New students must either 1) enroll in the NU/Aetna Student Health Insurance Plan, or 2) waive coverage. Either option can be completed by submitting the online Coverage Selection Form in [CAESAR](#). It should also be noted that in CAESAR, there is a section entitled "Coverage Selection." Here the student can indicate if there is other coverage from parents, spouse, etc. If so, they must provide the exact policy number/group number information along with the name of the insurance carrier.

PhD students who are enrolled full time are eligible to receive a **full health insurance subsidy** if the student is enrolled in the Northwestern student health plan.

Master's degree [thesis track](#) students receive a 50% subsidy on the first year's health insurance premium. After the first year, when thesis track students are enrolled in TGS 512, they no longer receive a subsidy towards their health insurance coverage.

### Graduating or Departing Students

Students enrolled in the NU health plan who are graduating or leaving the University at the end of a term and wish to cancel their enrollment in the plan, must submit a request in writing to the Health Insurance Office (633 Emerson Street) by the last day of the quarter they are leaving the University. They may also fax requests to 847-491-4268. When a student graduates from the program, they will need to complete the Health Insurance cancellation form 6-8 weeks prior to graduation.

### Additional Health Insurance Resources

Health Insurance Office Phone: 847-491-2113

Email: [student.insurance@northwestern.edu](mailto:student.insurance@northwestern.edu)

Please see the TGS Student Health Insurance Information page for information on enrolling in the Aetna plan for

TGS students: <https://www.tgs.northwestern.edu/campus-life/health-and-wellness/student-health-insurance/index.html>

Specific details about Northwestern's student health insurance including annual premium rates can be found here: <https://www.northwestern.edu/healthservice-evanston/insurance-patient-accounts/health-insurance/insurance-enrollment/fall-entry-full-time/index.html>

## HOUSING RESOURCES

On campus graduate housing is available at Northwestern.

<https://www.northwestern.edu/living/housing-options/graduate-housing/engelhart/index.html>  
<https://www.northwestern.edu/living/>

Wildcat Pad is an off-campus housing network for Northwestern students.

([www.wildcatpad.com](http://www.wildcatpad.com))

TGS Housing and Transportation. (<https://www.tgs.northwestern.edu/campus-life/housing-transportation/index.html>)

## STUDENT LEAVE POLICY

Please refer to The Graduate School website for the latest information on student leave:

<https://www.tgs.northwestern.edu/academics/leaves-withdrawal-readmission.html>

*The following is a minimum leave policy available to all PBC students in good standing:*

1. Parental leave for birth or adoption of a child – 6 weeks leave with pay
2. Family leave to attend to a sick family member (child, spouse, parent) – 6 weeks leave with pay
3. Personal or family illness or emergency – 6 weeks leave with pay
4. Extended medical leave of absence – Up to one year without pay (Graduate School policy)
5. Additional leave may be negotiated between a student and his/her advisor

## DEPENDENT CARE GRANT

Northwestern will pay up to \$500 for dependent care (including day care while PhD students travel to a conference or do field work). For more details on this, please see <https://www.tgs.northwestern.edu/funding/fellowships-and-grants/internal-grants/dependent-care-grant.html>

## LEGAL SERVICES

The TGS activity fee also covers legal services to assist with issues such as landlord, credit or debt problems, and traffic violations <https://www.tgs.northwestern.edu/campus-life/legal-services.html>

## STUDENT COUNSELING SERVICES

Free and confidential counseling services are available to all students from Counseling and Psychological Services (CAPS). Students are eligible for at least 12 sessions through CAPS. If you need CAPS services, call 847-491-2151. <https://www.northwestern.edu/counseling/>

**In case of an emergency after hours, please call the Crisis Line at 847-491-8100.**

## ADDITIONAL INFORMATION AND POLICIES

### ID CARD/WILDCARD

The Student ID/Wildcard gives students access to all University facilities (e.g., the libraries, the Sports and Aquatic Center, etc.) It also provides some discounts at merchants in Evanston and Chicago.

Upload your photo ahead of time for your Wildcard and U-Pass:

New students can either upload their picture to the Wildcard Office website ([https://www.northwestern.edu/userservices/wildcard/get\\_a\\_card/photo-submission.html](https://www.northwestern.edu/userservices/wildcard/get_a_card/photo-submission.html)) or they can have their picture taken when they arrive on campus. **We encourage our new students to upload their picture, so the Wildcard is ready before they arrive on campus.**

During new student week, the McCormick School of Engineering distributes the Wildcards in the lobby of the Technological Institute located at 2145 Sheridan Road (intersection of Sheridan Road and Noyes Street).

While you are here as a student at Northwestern, if you lose your Wildcard, you can obtain a replacement card at the Wildcard Office. The office is open from 8:30 am to 5:00 pm, Monday through Friday. The Wildcard office phone number is 467-6843. The cost to replace your Wildcard is \$15.00.

### PARKING PERMITS

Students that plan to park on campus will require a parking permit which can be obtained through the University Police parking office. The office is located at 1841 Sheridan Road – south campus entrance and is open from 8:00 am to 4:00 pm, Monday through Friday. Students need a Wildcard, their car's make/model and license plate number and driver's license to obtain a parking pass. Less expensive parking is also available at Ryan Field. Please check with the parking office for current fees. <https://www.northwestern.edu/up/parking/>

### PAYROLL

Stipends are automatically deposited to the student bank account on the last day of each month once the student completes the necessary payroll paperwork during graduate student orientation. For questions about your monthly stipend, please contact the PBC program assistant.

### TAXES

Here is a website for students that have questions about paying taxes:  
<http://www.tgs.northwestern.edu/funding/filing-taxes.html>

### SOCIAL SECURITY CARDS FOR INTERNATIONAL STUDENTS

When an international PhD student is scheduled to be a teaching assistant for a course and will be paid by the University, the PBC program will write a verification letter to the Social Security Office located in Evanston. The letter will verify the following information for the student:

Age

Identity

Citizenship

The student provides verification of their current address with a lease or utility bill.

International MS degree students are advised to contact the International Office to learn about their options for obtaining a social security number.

The PBC program is unable to provide Social Security verification letters for MS students in the program since they are not receiving stipend payments from Northwestern.

## OTHER DEGREE PROGRAMS OR FOR-CREDIT COURSEWORK

Enrollment in any formal degree program (J.D., M.B.A., etc.) or participation in for-credit coursework outside of the PBC curriculum requires prior approval from the program director and student's advisor. Requests will be considered on an individual basis and are not automatically granted.

## OUTSIDE EMPLOYMENT FOR PHD STUDENTS

<https://www.tgs.northwestern.edu/academic-policies-procedures/policies/student-funding-policies.html>

## PBC STUDENT WEBSITE GUIDELINES

The PBC webpage hosts student research pages, and we'd love all students to have a page describing their research. It's a great way to get info out about your research and for making contacts. It's also nice to include on your CV for grant or job applications. For those of you who don't have one yet, please follow the instructions below and send the required materials to the PBC program assistant. What's Needed to Start A Webpage (Created by PBC Program Assistant)

1. An image of either you or your field site/study organism (send as a jpeg, not embedded in a document).
2. A brief list of your interests (i.e. Restoration Ecology and Reproductive Biology OR Systematics and Evolution, etc)
3. A brief statement about your research. You could always use the abstract from your thesis proposal or a grant you've prepared.
4. Optional - other pictures with captions, lists of awards, relevant links, etc.

Sample PBC Websites

## CHICAGO BOTANIC GARDEN

Student workstations are available in the **Plant Conservation Science Center** at CBG. This is also where the labs are housed, and many PBC professors and staff have their offices.

### CBG ID CARD

New students will receive CBG ID cards during orientation. At other times, cards can be obtained at the security office. The ID will allow students through the security gates at the North and South ends of CBG, and into the labs and offices of the plant science center.

The ID card entitles students to discounts at the CBG café and The Garden Shop, and free or discounted entry to many garden sections and events (e.g., The Model Railroad Garden, the tram, and the seasonal Butterflies and Blooms exhibit). In addition, the CBG ID offers complimentary admission for cardholders and 1-2 guests to many of the museums and zoos in the Chicago area, including: Adler Planetarium, Art Institute, Chicago Children's Museum, Brookfield Zoo, Chicago History Museum, DuSable Museum, Field Museum of Natural History, Lincoln Park Zoo, Museum of Contemporary Art, Museum of Science and Industry, Peggy Notebaert Nature Museum, and the Shedd Aquarium (as of 2015).

#### *TRANSPORTATION*

**Getting to the Chicago Botanic Garden** <http://www.chicagobotanic.org/visit/directions>

The **Pace Bus 213** travels between Evanston and CBG. See <http://www.pacebus.com/> for the schedule.

The **Metra commuter rail, Union Pacific North Line** train reaches the Braeside station, approximately one mile from CBG's entrance, and the Glencoe station, approximately 2 miles from the entrance. From the Glencoe station, students can take the employee shuttle. The shuttle leaves the station at 7:20 am, arriving at the Plant Science center at 7:30 am, and leaves the Plant Science Center at 4:25 pm to arrive at the station by 4:30 pm.

The **Milwaukee North Line** train services the Lake Cook Metra station. Students can take a shuttle from the Lake Cook station that departs at 8:15 am, arriving at the Plant Science center at 8:30, and leaves the Plant Science center at 4:35 pm to arrive at the station by 5:00 pm. Students can also bike between Evanston and CBG, along the North Branch Trail.

**Parking** – There is limited parking behind the Science Center. Priority for spots is given to volunteers and staff. Students should park in the lots/spaces north or south of the Science Center.

## PBC COMMITTEES AND STAFF

The administrative staff of PBC is a valuable resource for information on stipends, registration, teaching and departmental activities. A full list of PBC staff and faculty can be found on the program website. Faculty and staff are located at either NU (Hogan Hall, 2205 Tech Drive) or CBG.

### **PBC STAFF**

Nyree Zerega	Director	847-467-1266	<a href="mailto:n-zerega@northwestern.edu">n-zerega@northwestern.edu</a>
Antonio Benitez	Program Assistant	847-467-2799	<a href="mailto:antonio@northwestern.edu">antonio@northwestern.edu</a>

### **CURRICULUM COMMITTEE**

Nyree Zerega		847-467-1266	<a href="mailto:n-zerega@northwestern.edu">n-zerega@northwestern.edu</a>
Louise Egerton-Warburton		847-835-6915	<a href="mailto:louise.egerton08@gmail.com">louise.egerton08@gmail.com</a>
Paul CaraDonna		847-835-6935	<a href="mailto:pcaradonna@chicagobotanic.org">pcaradonna@chicagobotanic.org</a>
Amelia Litz			
Reed Benkendorf			

### **GRADUATE ADMISSIONS**

#### ***MS Program***

Nyree Zerega		847-467-1266	<a href="mailto:n-zerega@northwestern.edu">n-zerega@northwestern.edu</a>
Stuart Wagenius		847-835-6978	<a href="mailto:SWagenius@chicagobotanic.org">SWagenius@chicagobotanic.org</a>
Amy Iler		847-835-6966	<a href="mailto:ailer@chicagobotanic.org">ailer@chicagobotanic.org</a>

#### ***PhD Program***

Nyree Zerega		847-467-1266	<a href="mailto:n-zerega@northwestern.edu">n-zerega@northwestern.edu</a>
Rebecca Barak		847-835-8397	<a href="mailto:rbarak@chicagobotanic.org">rbarak@chicagobotanic.org</a>
Sophie Taddeo		847-835-6915	<a href="mailto:louise.egerton08@gmail.com">louise.egerton08@gmail.com</a>

### **PROFESSIONAL DEVELOPMENT COMMITTEE**

Jeremie Fant		847-835-6959	<a href="mailto:jfant@chicagobotanic.org">jfant@chicagobotanic.org</a>
Andrea Kramer		847-835-6971	<a href="mailto:akramer@chicagobotanic.org">akramer@chicagobotanic.org</a>

### **MASTER'S INTERNSHIP COMMITTEE**

Andrea Kramer		847-835-6971	<a href="mailto:akramer@chicagobotanic.org">akramer@chicagobotanic.org</a>
Krissa Skogen		847-835-6916	<a href="mailto:kskogen@chicagobotanic.org">kskogen@chicagobotanic.org</a>
Nyree Zerega		847-467-1266	<a href="mailto:n-zerega@northwestern.edu">n-zerega@northwestern.edu</a>



**RECRUITMENT, RETENTION, AND DIVERSITY**

Amy Iler		<a href="mailto:ailer@chicagobotanic.org">ailer@chicagobotanic.org</a>
Becky Barak		<a href="mailto:rbarak@chicagobotanic.org">rbarak@chicagobotanic.org</a>
Jeremie Fant	847-835-6959	<a href="mailto:jfant@chicagobotanic.org">jfant@chicagobotanic.org</a>
Amelia Litz		
Josh Scholl		
Krissa Skogen	847-835-6916	<a href="mailto:kskogen@chicagobotanic.org">kskogen@chicagobotanic.org</a>
Sophie Taddeo		<a href="mailto:staddeo@chicagobotanic.org">staddeo@chicagobotanic.org</a>
Nyree Zerega	847-467-1266	<a href="mailto:n-zerega@northwestern.edu">n-zerega@northwestern.edu</a>

## APPENDIX I

### DATA SCIENCE/STATISTICS OPTIONS

Students may choose from a variety of options to fulfill this requirement

1. Here is a list of potential courses to choose from. For some of these courses you may need to contact the professor to get permission to take them. Quarters when they are offered are subject to change.

#### *FOR STUDENTS WITH BASIC STATISTICS BACKGROUND*

- o PBC 435 Biostatistics (spring) – This class will focus on examples from ecology. Some use of R and other programs will be included but will not be the focus of the class. Syllabus is still being developed
- o [IEMS 303 Statistics](#)
  - o Recommended pre-requisites or equivalents (IEMS 202-Probability or equivalent; EECS 111-Fundamentals of Computer Programming)
  - o Description
    - Introduction to the foundations of statistics and statistical computing for data analysis and their applications using R. Covers descriptive statistics and statistical inference for estimation, testing and prediction.
    - Examples come from manufacturing, medicine, and business

#### *FOR STUDENTS WHO WANT TO BUILD THEIR R DATA ANALYSIS SKILLS WITH A FOCUS ON SOME BASIC STATISTICS*

- o [EARTH 390/PBC 470](#) Special Topics: R Data Science (winter) – this is a good general class for students who want to begin to learn how to use or advance their intermediate skills in R for data analysis.
  - o As we are in the era of ‘big data’, the quantity and quality of data available for environmental, ecological and earth science research has exploded over the past few decades. The free and open-source R programming language has become a powerful tool in data analysis in scientific research. This course offers an introduction to the fundamentals of data science using the programming language, R. The course contents span from basic R programming skills to advanced skills including data management, visualization and analysis of spatial data such as weather and satellite imagery data. By conducting hands-on exercises and an extensive project, students will develop dynamic and reproducible outputs based on their own fields of interests. This course does not require prior coding experience

#### *FOR STUDENTS WHO HAVE A GOOD STATISTICS BACKGROUND AND WANT TO ADVANCE THEIR PYTHON CODING SKILLS FOR ANALYSES*

- o [EARTH 361](#) Scientific Programming in Python (fall)
  - o Introduction to coding, scientific computing, and visualization for analyzing data in the physical sciences. Emphasis on Python, but Unix, shell scripting, and Generic Mapping Tools are also introduced. Students undertake a significant final coding project individually or in pairs.

#### *FOR STUDENTS WHO WANT TO LEARN THE BASICS OF THE SCIENTIFIC PROCESS FROM ARTICULATING QUESTIONS TO DATA PRESENTATION*

- o Anthro 390 Quantitative Methods: Turning numbers into a story (fall)
  - o This class will provide rigorous guidance on how one moves through the scientific process, from articulating scientific questions to answering and presenting them in a way that your audience can really relate to. We will do this using a large dataset. Specific skills to be developed include human subjects training, formal literature review, hypothesis generation, development of analytic plans, data cleaning, performing descriptive statistics, creation of figures and tables, writing up results, scientific poster creation, and oral presentation of results. This course will be a terrific foundation for writing scientific manuscripts, theses, and dissertations.

#### *FOR STUDENTS WHO HAVE A GOOD STATISTICS BACKGROUND AND WANT TO ADVANCE THEIR STATISTICS SKILLS, USING R*

- o There are a variety of options in the statistics department, listed here <https://statistics.northwestern.edu/courses/2021-2022-course-schedule.html> Note that several courses are restricted to Statistics students or may require permission of instructor, so students will have to reach out directly to instructors.

- o [IEMS 304](#) Statistical Learning for Data Analysis (offered all quarters – permission from instructor may be necessary)
  - o Pre-requisites: IEMS 303 (Statistics) and EECS 111 (Fundamentals of Computer Programming), or equivalents
  - o LEARNING OBJECTIVES: Understand common data structures in modern predictive and explanatory modeling problems in business, engineering and the sciences and how to formulate the most appropriate solutions; Learn R statistical software basics and how to use it for regression and classification problems; Develop ability to fit appropriate linear and logistic regression models, including model selection and diagnostics; Develop ability to interpret fitted linear and logistic regression models for explanatory and predictive purposes; Learn fundamental concepts in nonlinear regression and classification, including maximum likelihood estimation, cross-validation, ridge and lasso shrinkage; Learn how to fit and interpret popular supervised learning models including trees, smoothers, nearest neighbors, random forests, and boosted trees

*FOR STUDENTS INTERESTED IN BEING INTRODUCED TO THE RANGE OF POSSIBILITIES WITH LARGE DATA SETS AND THE OPPORTUNITY TO WORK ON AN INDEPENDENT PROJECT*

- o [NICO 401](#) Introduction to Programming for Big Data (0.67 units, taught 2 weeks before fall quarter officially starts, but counts toward fall course load and tuition costs). No pre-requisites required
  - o [NICO 402](#) Independent Project for Programming for Big Data (0.33 units – fall quarter). Must have taken NICO 401
2. A student may propose another relevant course not on the list above. The course should be at the 300 level or above and carry graduate credit. If you believe a course at the 200 level or below is most relevant for your research/career plans, you may propose that for review as well. To propose another course, first speak with your research advisor or internship committee (or to the program director if you have not yet selected an advisor). Then contact the program director to get it approved.
  3. Students may develop their own stats/data science experience via a graded PBC 499 Independent Study arranged with their advisor. This would involve creating a study plan, and regular check-ins between student and advisor. This could take one of the following forms (or other ideas may be proposed).
    - o Students may sign up for [DataQuest](#) for the quarter of study. The student and advisor should plan out the expectations for the course to be completed. DataQuest is an online platform with self-paced, interactive courses on R, Python, SQL, and more.
    - o Students may register for various [workshops through Northwestern Computing Services](#) in a given quarter to cover the areas where they want to learn and grow. The student and advisor should plan out the expectations for the course to be completed and meet regularly for check-ins.

## APPENDIX II

### STUDENT GOVERNMENT

#### **Rep. to the GSA/GLAC**

Drake Mullett

[DrakeMullett2018@u.northwestern.edu](mailto:DrakeMullett2018@u.northwestern.edu)

#### **Rep. to the CBG Science Department Meetings**

Tinay Hernandez

[TinayHernandez2022@u.northwestern.edu](mailto:TinayHernandez2022@u.northwestern.edu)

Jackie Fitzgerald

[JacquelynFitzgerald2024@u.northwestern.edu](mailto:JacquelynFitzgerald2024@u.northwestern.edu)

#### **Journal Club Leaders**

Willow AbshireSims

[willowfairy989@gmail.com](mailto:willowfairy989@gmail.com)

#### **Social Chair**

Rafael Urbina Casanova

[rafaelurbinac@gmail.com](mailto:rafaelurbinac@gmail.com)

Elsa Godtfredsen

[egodtfredsen@chicagobotanic.org](mailto:egodtfredsen@chicagobotanic.org)

#### **Diversity Liaison**

Haley Carter

[HaleyCarter2020@u.northwestern.edu](mailto:HaleyCarter2020@u.northwestern.edu)

Tatiana Guider

[TatianaGuider2021@u.northwestern.edu](mailto:TatianaGuider2021@u.northwestern.edu)

#### **Recruitment**

Rory Schiafo

[rschiafo@u.northwestern.edu](mailto:rschiafo@u.northwestern.edu)

Amelia Litz

[AmeliaLitz2023@u.northwestern.edu](mailto:AmeliaLitz2023@u.northwestern.edu)

#### **Welcoming Committee**

Jack Schooley

[JackSchooley2021@u.northwestern.edu](mailto:JackSchooley2021@u.northwestern.edu)

Rafael Urbina Casanova

[rafaelurbinac@gmail.com](mailto:rafaelurbinac@gmail.com)

#### **Organizational Meeting Manager**

Tinay Hernandez

[TinayHernandez2022@u.northwestern.edu](mailto:TinayHernandez2022@u.northwestern.edu)

Rory Schiafo

[rschiafo@u.northwestern.edu](mailto:rschiafo@u.northwestern.edu)

#### **Science Communication Chair**

Imeña Valdes

[ImenaValdes2020@u.northwestern.edu](mailto:ImenaValdes2020@u.northwestern.edu)

#### **Student Curriculum Rep**

Amelia Litz

[AmeliaLitz2023@u.northwestern.edu](mailto:AmeliaLitz2023@u.northwestern.edu)

Dan Sandacz

[DanielSandacz2022@u.northwestern.edu](mailto:DanielSandacz2022@u.northwestern.edu)

**Professional Development**

TBD

## APPENDIX III: ARCHIVING MS THESES

# Plant Biology & Conservation Theses

Digital Archiving and Public Access to Northwestern Research

Northwestern University Libraries offers an option for students to publish their master's thesis online and have them digitally archived. Arch is Northwestern's open access research and data repository.

### Benefits for publishing and archiving your thesis:

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- Your work will help accelerate discovery and increase knowledge in your subject domain by adding to the global corpus of public scholarly information

### Get started:

- Visit Arch: <http://arch.library.northwestern.edu/>
- Log in with your NetID
- Describe your thesis: title, author, date, keywords, rights, license, subject, etc.
- Upload your thesis PDF and any related supplemental files (data, analysis code, figures, images, presentations, documentation, etc.)
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### Frequently Asked Questions:

*Do I have to transfer my copyright to Northwestern University?*

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*What is an embargo?*

An embargo is an option for you to deposit your work immediately, but to set a delay on the public release of your work. Some researchers select this option when they are in the process of publishing their work in a peer-reviewed journal or book, or if they are applying for a patent. A typical embargo period is two years.

*Will this limit my options for publishing in peer-reviewed journals or books?*

It depends on the policies of the publisher. Some publishers prohibit submissions of work that is already publicly available online, while others do not. If you plan to publish your thesis work in a peer-reviewed publication you can either use the embargo option to delay the release of your thesis files, or you can opt-out entirely.

For questions or support in publishing your thesis, please contact [digitalscholarship@northwestern.edu](mailto:digitalscholarship@northwestern.edu)