

**Cornell University** 

# Field of Horticulture Graduate Student Handbook

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Welcome to the field of Horticulture. The field offers qualified students the opportunity to obtain an advanced graduate degree in a Master of Science (M.S.) degree program to students with a B.S. degree and a Doctor of Philosophy (Ph.D.) degree program.

The Graduate School at Cornell is organized by Fields rather than departments. The Field of Horticulture includes faculty in the Section of Horticulture as well as other related departments. Although this may seem to be an unusual organizational structure, it allows faculty with similar interests in different departments to advise graduate students.

# **Upon Arrival**

Newly admitted graduate students should correspond with the Director of Graduate Studies in their field to clarify program details. Upon arrival to campus, students should report to their major advisor, the Director of Graduate Studies, and the Graduate Field Coordinator. New graduate students should take the responsibility of meeting professors, other graduate students, office staff, technicians; and greenhouse, test garden, orchard, and field staff. Students should also become familiar with campus buildings, laboratories, and staff offices. The director of graduate studies, as well as other faculty members and staff, can provide assistance to become familiar with university and department policies. An orientation program for all incoming graduate students is held during the week of registration in January and August.

This handbook will help you understand how the department operates, what is expected of you, and what you may expect from the department. The faculty, Director of Graduate Studies, and the department chair have an open-door policy and make every effort to address student needs. This handbook provides supplemental information that applies specifically to the Field of Horticulture and should be used in conjunction with information published by the Graduate School (www.gradschool.cornell.edu). Please feel free to ask questions as you adjust to your new surroundings.

# **Major Advisor & Special Committee**

The faculty person who directs your thesis work is usually considered the major advisor or chairperson of your special committee. This advisor is most often identified prior to your arrival and will guide you through your graduate study. Your chair should be recorded with the

Graduate School within the first three weeks of matriculation. Use the online Special Committee Selection and Change form to assign your chairperson. This can be done on-line directly through the 'Student Center' website pre-A-Exam or through the <u>Graduate School website (forms)</u> post A-Exam.

Other members of the special committee represent the minor fields chosen (one additional minor Field for a M.S. degree and two minors for a Ph.D.). The other members of the Special Committee should represent Fields other than Horticulture.

### **Choosing a Special Committee**

The Special Committee chair should be chosen by the end of the first semester at Cornell. At Cornell, the Special Committee has the ultimate power to decide the specific requirements for completing a degree. Therefore the committee should be Selection of the minor members is best done in consultation with the major advisor/chairperson. Feel free to interview various members of the graduate faculty before making your decision. Tell them of your goals and find out what interests you have in common.

One minor member is required for an M.S. and two for a Ph.D. degree.

There is great flexibility and a wide range of possible subjects. Popular minor subjects include plant biology, plant breeding, plant pathology, soil science, international agriculture, agricultural economics, entomology, ecology, biometrics, biochemistry, rural sociology, and landscape architecture. They should be chosen in consultation with your major advisor with the aim of enhancing your research project, as well as providing you with information useful in your future career. Use the Graduate Committee Selection form on Student Center to add members to your committee. Students often collaborate on research with other faculty at Cornell; it is not expected that all collaborators be members of the Special Committee.

### **Degree Requirements**

### **MS Degree Requirements**

- Coursework and credits required for the MS degree are determined by the student's Special Committee.
- At least two semesters of PLSCI 7000: Seminar in Horticulture.
- Required to register for PLSCI 8900: MS Thesis Research after the first semester of study. Credit hours will vary and should be determined with your chair.
- Student selects a Special Committee composed of one professor representing the major field/chair and at least one professor representing a minor field; more than one minor member is permitted.
- Committee members advise students in the selection and conduct of research problems for the thesis and courses needed to acquire the expected competence.
- You must submit a complete thesis draft to all members of your Special Committee at least six (6) weeks before the final masters exam. (Your Special Committee may modify

this requirement). At least five (5) days before the exam, you must provide all members of your Special Committee with a complete, formatted, and editorially acceptable copy of the thesis or dissertation for final approval. (Your examining committee may still require modifications.) Final Examinations may not be scheduled until this requirement has been met. Code VI.G.4, Guide to Graduate Study

- Exit seminar must be scheduled during one of the PLSCI 7000: Seminar in Horticulture lectures, or one-hour prior to the final exam.
- Pass a final oral examination.
- Fulfill a minimum of 2 registration units (semesters). Students for a Master of Science degree majoring in horticulture are expected to demonstrate competence in the three core areas of Horticultural Biology, Horticultural Production and Management, and Horticultural Methods, as listed in Suggested Courses. See Coursework for more information.
- **Feaching experience is expected but not required and can be satisfied by assisting a faculty member in teaching a course, working in extension, or taking a course in education.**
- Candidates must submit an acceptable thesis based on a research project.
- MS students who want to apply for admission to the PhD program can use an expedited procedure described under Admissions.
- MS degree candidates are expected to complete degree requirements in two years but have up to 4 years to complete requirements.

### PhD or MS/PhD Degree Requirements

Doctoral students with a Master's degree enroll directly in the PhD program. Doctoral students without a Masters enroll in the MS/PhD program.

#### Courses

- Coursework and credits required for the Ph.D. degree are determined by the student's Special Committee
- Doctoral students majoring in the Field of Horticulture are expected to develop broad competence in each of the three core areas: Horticultural Biology, Horticultural Production and Management, and Horticultural Methods during their course of study or show evidence of having attained that competence previously.
- Many courses can be used to meet each of the core requirements. Those offerings allow the student, working with his/her special committee, to tailor their courses to individual needs.
- Four semesters of PLSCI 7000: Seminar in Horticulture for credit.
- Register for PhD thesis/research credit (PLSCI 9900) each semester after the first semester of study. Credit hours will vary and should be determined with your chair.



- Pass the "Q Conference," an oral qualifying conference that includes critical examination of proposed research and an evaluation of qualifications. Used to determine courses. Should be completed in the second or third semester of study.
- Pass the "A" exam; an oral exam reviewing the student's mastery of subject matter related to his/her thesis topic and the course work taken. Normally taken after two years of study, can be combined with the M exam. Must be taken at least one year before the B Exam.
- Candidates must earn two residence units after the A Exam before taking the final B examination.
- Exit seminar must be scheduled during one of the PLSCI 7000: Seminar in Horticulture lectures, or as a special seminar one-hour prior to the B exam.
- Pass the B exam which covers the subject of the dissertation. Must be taken in or before the14th semester of study

#### **Thesis and Dissertation**

- MS/PhD students will take a master's exam and submit a master's thesis. Once the thesis has been submitted and approved, the student can continue on in the PhD program. To complete the PhD program, they would take an A exam and then a B exam, and then finally submit a dissertation. The Master's and A exam can be combined; but a master's thesis will be required.
- Candidates must submit a doctoral dissertation, based on a research project, that is acceptable to their Special Committee. While each committee is different, a common expectation is that the dissertation contains three papers that have been or can be published in a research journal.
- You must submit a complete draft to all members of your Special Committee at least six weeks before the final masters or B exam. (Your Special Committee may modify this requirement). At least five days before the exam, you must provide all members of your Special Committee with a complete, formatted, and editorially acceptable copy of the thesis or dissertation for final approval. (Your committee may still require modifications.) Final Examinations may not be scheduled until this requirement has been met. Code VI.G.4, Guide to Graduate Study

### Timeline

- The time to complete an MS/PhD program is usually 5 to 6 years; PhD program 4 to 5 years
- Fulfill a minimum of 6 registration units, 2 of these between the A and B exam. For students completing an MS/PhD, 2 registration units count towards the MS, additional units, even if earned before the M exam, count towards the 6 registration units required for the PhD. (Code of Legislation, V.C.)
- The Ph.D. must be completed within seven calendar years of starting the PhD or MS/PhD program.
- Students select a Special Committee composed of one professor representing the major field acting as chair and at least two other professors as minor members. Minor members must be members of, and represent, Graduate Fields other than Horticulture. This

approach permits the student to work with faculty members who can best direct the student's graduate study, regardless of college, department, or field affiliation.

- Committee members advise the student in the selection and conduct of research problems for the dissertation.
- Teaching experience is required and can be satisfied by assisting a faculty member in teaching a course, working in extension, or taking an education course.

#### Coursework

Your course program is developed with the advice and direction of your special committee. Specific courses may be required by members of the committee and are usually suggested as a means to obtain essential training to save students from having to spend more time and effort in mastering the subject independently. Students should use their own judgment, along with the advice of the committee, in deciding which courses will provide the best training.

It is assumed that graduate students entering the Field of Horticulture will have completed the equivalent of an undergraduate degree in biology, horticulture or agriculture. If they do not have such a background, it is expected that they make up any deficiencies with appropriate undergraduate courses, as determined by the student's special committee.

Students majoring in the Field of Horticulture are expected to develop broad competence in each of three core areas:

- 1. Horticultural Biology
- 2. Horticultural Production and Management
- 3. Horticultural Methods

Doctoral students are expected to take at least 3 credits in Horticulture from Horticultural Biology and Horticultural Production and Management; and 1 course in Horticultural Methods during their course of study, or show evidence of having attained that competence previously. The large number of courses suggested for each concentration will allow students, working with their special committee, to tailor to individual needs.

Doctoral students will take 4 semesters of the horticulture seminar (PLSCI 7000: Seminar in Horticulture).

Doctoral students are expected to develop teaching competence through a minimum of one semester as a teaching assistant. Additional coursework, workshops and teaching experience are available for those expecting to teach in the future.

Masters students will also be expected to demonstrate competence in the three core areas.

Masters students will take at least two semesters of PLSCI 7000: Seminar in Horticulture.

All Masters candidates are expected to show competence in teaching, by having prior teaching experience, by serving as a teaching assistant for one semester, or by enrolling in a course on college-level teaching.

#### Courses that provide competence in the three core areas

Suggested courses in horticulture and allied fields that could constitute a syllabus for graduate students studying horticulture. Note that graduate students may enroll in *4000-level courses*, but those undergraduate courses do not count towards graduate degree requirements.

#### **Core Group I: Horticultural Biology**

PLHRT 6190	Root and Rhizosphere Ecology
PLHRT 6250	Postharvest Biology of Horticultural Crops
PLHRT 6253	Advanced Postharvest Biology: Postharvest Technology
PLHRT 6730	Ecology of Agricultural Systems
PLBIO 5420	Plant Physiology
PLBIO 6070	Plant Nutrition Quality Improvement of Plants
PLBIO 6220	Comparative Plant Development: Evo-Devo
PLBIO 6410	Laboratory in Plant Molecular Biology
PLBIO 6540	Plant Cell Biology
PLBIO 6620	Plant Biochemistry
PLBIO 6841	Plant Form and Function: Anatomy, Cell Biology, and Development
PLBRG 6060	Advanced Plant Genetics
PLBRG 7170	Quantitative Genetics in Plant Breeding
PLBRG 7420	Genotypes to Phenotypes: The Evolution of Genetic Modeling in Plant
Breeding	
PLSCI 5030	Hemp Breeding and Genetics
PLSCS 6100	Plant Responses to Environmental Stresses and Global Climate Change
PLSCS 6420	Mineral Nutrition: From Plants to Humans
PLSCS 6660	Applied Plant-Microbe Interactions
PLSCS 6720	Nutrient Cycling in Natural and Managed Ecosystems
PLSCI 4460	Plant Behavior and Biotic Interactions, Lecture
PLSCI 4461	Plant Behavior and Biotic Interactions, Laboratory
PLSCS 4130	Physiology and Ecology of Yield
PLSCS 4660	Soil Ecology

#### Core Group II: Horticultural Production & Landscape Management

PLHRT 5025	Hydroponic Food Crop Production and Management
PLHRT 5204	Principles and Practices of Growing Grapes and Making Wines
PLHRT 5420	Berry Crops: Culture and Management
PLHRT 5850	Public Garden Management

PLHRT 5910Creating the Urban Eden: Woody Plant Selection, Design, and Landscape<br/>EstablishmentPLHRT 5920Creating the Urban Eden: Woody Plant Selection, Design, and Landscape<br/>EstablishmentPLHRT 5931It's Just Grass: Grassing the Urban EdenPLHRT 6020Principles of Plant PropagationPLHRT 6450Ecological Orchard ManagementPLHRT 6500Fruit Crop PhysiologyPLHRT 6551Principles of Nutrition and Nutrient Management in Crops and LandscapePlantsPLSCI 5015Hemp Production SystemsPLSCI 5060Hemp ProcessingPLSCI 5210Soil and Crop Management for SustainabilityPLSCS 6140Weed Ecology and Management

#### **Core Group III: Horticultural Methods and Communication**

PLHRT 6170 Advanced Analytical Methods for Plant Systems International Teaching Assistant Program Course ALS 5780 BIOMG 6870 Tricks of the Trade: How to Use Genetics to Dissect Cells, Molecules and **Developmental Pathways** BIOMG 7510 Ethical Issues and Professional Responsibilities Statistical Methods I BTRY 6010 BTRY 6020 Statistical Methods II BTRY 6520 **Computationally Intensive Statistical Methods** BTRY 6830 Quantitative Genomics and Genetics BTRY 6840 **Computational Genetics and Genomics** COMM 5660 Science Communication Workshop COMM 6660 Public Engagement in Science **Qualitative Research Methods** DSOC 6150 DSOC 6190 Quantitative Research Methods EDUC 5510 Engaged Learning Through Extension, Outreach, and Instruction PLBIO 6525 Light and Video Microscopy for Biologists Concepts and Techniques in Plant Molecular Biology PLBIO 6831 PLBRG 6030 Genetics Improvement of Crop Plants Chemistry and Pharmacology of Cannabis PLSCI 5045 Let Your Life Speak: Selfhood, Community, Change PLSCI 5500 PLSCI 5940 Skills for Public Engagement Digital Plant Science: Frontiers and Challenges PLSCI 6440 Advanced Statistics and Experimental Design PLSCI 7201 PLSCI 7202 Applications of Machine Learning to Plant Science PLSCI 7203 Engineering Novel Strategies for Plant Science Measurement and Sensing PLSCS 6600 Remote Sensing Fundamentals

PLSCS 6900	Scientific Method in Practice
PLSCS 6950	Planning and Reporting Research
STSCI 6520	Computationally Intensive Statistical Methods
<i>COMM 4660</i>	Public Communication of Science and Technology
STSCI 4780	Bayesian Data Analysis: Principles and Practice

Upon completion of course work, students must sign up for research credits. Please remind the student they must enroll in something as a registered student, at least in thesis research (HORT 5000, HORT 8000 or HORT 9000).

# Funding

All PhD students and most MS students are guaranteed assistantship funding for the minimum duration of their degree program and we make every effort to assure support through completion as long as academic progress is being made. Funding typically comes from many sources.

### Assistantships

Most graduate students in the Department of Horticulture are supported on Teaching Assistantships (TA), Graduate Assistantships (GA), Research Assistantships (RA), or Extension Outreach Assistantships (EOA). Their assignment time may be distributed throughout the year in various ways, depending on the requirements of the project. The assistantship provides a stipend, tuition remission and health insurance. In exchange, assistants are expected to work an average of 15 hours per week on assistantship duties. Those duties may be completely distinct from the research project; the section strives to have them contribute in some way to the overall training.

The assistantship is intended to allow graduate students to spend most of their time on courses and research.

Vacation. Graduate students funded on assistantships or fellowships for spring, summer, and fall terms are entitled to two weeks (10 weekdays) of annual vacation each calendar year in addition to Cornell University holidays.

### **Graduate TA Policy**

#### Background

Teaching assistantships fulfill two roles. They meet the educational requirement of developing teaching competence, and they provide financial support for graduate study.

Students anticipating being a teaching assistant must apply each academic year. This application is for the purpose of matching students with courses, and is done SIPS-wide. The number of assistantships is similar to the number of anticipated applicants, so students who were expecting funding are very likely to be supported—as long as they apply.

#### Policies

- All MS and PhD students, regardless of funding source, are have an educational requirement to serve as a TA at least once during their time at Cornell.
- MS and PhD students may have funding packages that include teaching assistantships in many semesters. That expectation is explicit in the acceptance letter. Faculty advisors shall accommodate the need for their graduate students to TA, and adjust research and coursework expectations accordingly. Every effort will be made to ensure that teaching or section curriculum assignments are distributed fairly and that any special circumstances of individual graduate students are considered. Instructors will advise students whether they need to take or audit a course in order to have sufficient expertise in the subject for which they will be a TA.
- Students who are supported by private funds or grants, national or international fellowships, SUNY minority fellowships, Biology teaching assistantships or Extension and Outreach (Geneva) assistantships will be required to meet the Field teaching requirement of at least one semester.
- Students supported by a Graduate School Fellowship shall not be required to serve as a TA during their fellowship year.
- If an extension or outreach teaching experience is substituted for a classroom TA, the student's major professor, DGS, and committee will have to approve the substitution. This should include a plan that helps the student achieve the equivalent educational goals of classroom teaching.
- Graduate students who are funded on external sources during a semester in which they serve as a TA should enroll in PLHRT 7000: Graduate Teaching Experience for the number of credits equal to that of any course they are a TA. This may be taken for a letter or S/U grade. The instructor in the course will complete the grade sheets for that semester.
- If a student's limited proficiency in English prevents them from serving as a TA in the classroom the student may be required to developing their English proficiency through course at the English Language Support Office and courses in teaching skills in order to teach in the future.
- Students will keep the Graduate Field Coordinator informed of their TA or equivalent experiences so accurate records can be kept.
- All instructors should meet with and discuss what is expected of the TA prior to the beginning of the course. Students should also discuss what they want to gain during the TA experience with the instructor
- Any dispute regarding the assignment of TAs may be addressed to the student's major advisor in consultation with the SIPS DGS/GFA Council.

### **TA Application Process**

Section I: Application Timeline

- Early January
  - TA solicitation for the coming academic year is released
- February 5

- TA applications due
- February 22
  - Initial TA appointments announced
  - Applicants not receiving appointments remain on waitlist
- March 8
  - Last date to decline a TA appointment
- March 8 ongoing
  - TA Rebalancing to fill vacant TA positions
  - Waitlisted applicants are given priority for open slots
- May 24
  - TA appointments finalized for coming academic year
- October 15
  - o Rebalance TA assignments for spring semester

#### Section II: Application, Selection, and Notification Procedures

#### A. Application

All students who are planning to TA or who would like to request TA support must submit an application by the stated application deadline. Even those students who have been promised a TA position in their appointment letter must submit a TA application in order to be assigned to a TA appointment in the coming academic year. You can check on the status of your application by contacting the GFC for your home Field. Only SIPS Graduate students in non-professional degree programs (i.e. MS and PhD) are eligible to apply. <u>SIPS TA Application Form</u>

#### **B. Selection Process and Selection Criteria**

All assignments for each Section will be approved by the DGS of your field. Your application will initially be reviewed by the DGS home Section/Field to be considered for TA assignments within your home Section. Following initial review by your DGS, your application may also be considered by members of the SIPS Graduate Field Council to be considered for TA assignments in other SIPS sections. In some cases your application may also be reviewed by course instructors. Those applicants that do not receive an initial TA assignment will be waitlisted. Each year some number of TA appointments are declined by students, due to the adventitious availability of grant and fellowship funding. Students on the waitlist will be given first priority for TA positions that become available when a TA assignment has been declined. Once all TA positions are filled the remaining applicants are dismissed from the waitlist. A new application needs to be made for each new academic year in which TA support is requested.

TA selection is based on multiple criteria and the weighting placed on each criterion will vary from year to year and from Section to Section based on the needs of instruction and the need to support all of our continuing graduate students. The two main priorities for TA selection are to ensure that: all of our MS and PhD students receive tuition and stipend support while they remain in good standing, and that all of our courses are well staffed by qualified TA's. The following are criteria that will be considered in selecting individuals for assignment to TA positions:

• applicant skills, training, and prior teaching experience

- instructional needs of the course and instructor needs for support
- applicant funding plan for the coming academic year
- the availability of alternate sources of funding for the applicant
- explicit guarantees of support which must be honored
- the number of previous TA appointments the applicant has received
- whether the applicant needs to TA to meet a teaching requirement
- approval of the faculty adviser

#### **C.** Notification Procedures

If your funding situation changes, and you no longer want to be considered for a TAship, then please let your GFC know immediately so that we can remove your application to make room for others. If a position is not available initially we will retain your application on the waitlist. Quite often slots become available late in the spring and summer and we will continue to make offers until all positions are filled.

Please note that only your DGS/GFC can approve an offer. All conversations with course instructors or other members of the Cornell community are purely a preliminary review and those entities cannot make an offer.

If you are offered a TAship, you must accept it or reject it by the specified deadline (see timeline above). Once you have signed an appointment letter, you are bound to adhere to the contract. If your situation changes, contact your GFC immediately. Your DGS/GFC, will strive to find an alternative and release you from the contract. However, the fulfillment of the contract is ultimately the student's responsibility.

#### **Fellowships & Other Funding Sources**

While the Field commits to fully funding graduate students for the anticipated duration of their study, getting independent funding provides more flexibility for the student and is a valuable demonstration of ability to get external funding. We encourage and assist students in obtaining such funds.

Fellowship information is available from the Graduate School, www.gradschool.cornell.edu. Two common sources are National Science Foundation Graduate Researcher Fellowships (apply in the first year) and USDA Graduate Fellowships (apply in A Exam year.) Additional information is forwarded via e-mail to the graduate student list.

# **Learning Goals for the Field of Horticulture**

#### Train future leaders in horticultural research, education and outreach in both industry and public-sector spheres.

#### Learning goal

#### Students will develop a working knowledge of commercial horticultural 3.6 plant management (i.e., crop production and/ or landscape management)

- Students will develop proficiency in horticultural research systems using 4, 5, 6 • appropriate current technologies and methods.
- Students will become effective horticulture teachers and extension • educators by first-hand experience with teaching assistantships (TAs) and extension-outreach assistantships (EOAs) and through participation in departmental outreach efforts.

#### Foster scholarship, research and communication skills in horticultural science

Learning goal	Assessment*
• Students will have a contemporary knowledge of the biology underlying the horticultural processes they study beyond what is taught in graduate	3, 4, 5, 6
courses.	
• Students will develop effective writing skills that communicate research results to appropriate audiences	9, 10
• Students will be proficient at delivering presentations based on their research results to diverse audiences, as measured by audience evaluations.	1, 2, 7, 9, 12

#### **Engage in and conduct original research**

Le •	earning goal Ph.D. graduates will have the knowledge and training to design and implement original research, and share research findings through written	<b>Assessment</b> * 2, 5, 6, 8
•	Students will, where appropriate, master and improve contemporary research techniques used in their discipline.	5, 6
•	Students will become a national authority in the subject area of their thesis research.	10, 11, 12

#### **Prepare to be professionals in their discipline**

#### Learning goal

#### Assessment\*

7,9

Assessment\*

- Students will be familiar with the expectations of professionals in their 6, 8 field. For those pursuing faculty positions, these expectations include curriculum development, teaching, grant writing and administration, publishing, team management, collegiality, professionalism, and outreach.
- \* See section below to identify activities during which assessment occurs

# **Assessment of progress**

Student progress is assessed through the following activities. The numbers refer to the table above.

- 1. Grad Field Review, semi-annual student presentations to the entire Horticulture Grad faculty and graduate student body.
- 2. Full seminar
- 3. Q conference (PhD)
- 4. A Exam (PhD)
- 5. Final Exam (M for MS, B for PhD)
- 6. Graduate Committee meetings to evaluate student progress
- 7. Faculty evaluation of the quality of student TA work, publications and presentations
- 8. The Field will track student employment for graduates
- 9. Student publications and presentations in outreach
- 10. Peer-review journal articles
- 11. Honors and awards
- 12. Presentations at national and regional professional meetings

#### Semi-Annual Graduate Review

Each semester graduate students present a brief oral summary of their research to the entire Graduate Field. Each student presents once a year, regardless of where they are in their research. Students who are presenting full seminars for the Department are exempt from presenting at the graduate field reviews for that year. Sharing research progress with faculty and other graduate students encourages the exchange of ideas and the possibility of modifying research directions. Students who have not started thesis research present a research plan. Students are encouraged to share their accomplishments, goals, frustrations, and projected completion dates.

The current format is a "pitch and poster" that includes a two-minute presentation followed by discussion at a poster. This format has found favor for crafting succinct and exciting explanations of the subject, and then for feedback on the work at the poster. For students near the end of their study, a standard 15-minute conference presentation is an option. Students presenting submit an abstract and review form in advance that is then shared with participants.

Following the presentation, the whole Field meets for updates and discussion of issues raised by both students and faculty. Then faculty meet for a short time to discuss concerns or unusual

circumstances related to each student's progress. Reviews are scheduled in August and January, just before classes start.

### **Student Progress Review**

The Graduate School requires an annual review with the Special Committee Chairs intended to make each spring. The review is intended to assess to what extent the expected milestones for the previous year were met and to agree on new ones for the coming year and estimate when major exams are likely to take place. The review starts with the student summarizing their progress and plans in a standard format. That serves as a basis for a conversation, following which the writeup can be amended, and the advisor provides commentary.

### **Field Appointed Committee Member**

The Director of Graduate Studies may assign an additional member of the Field of Horticulture to participate in your M, A or B exam. This person would be recorded on your Special Committee as: Field Appointment Member for Exam.

#### Maximum time to degree

The MS needs to be completed within eight registered semesters, the PhD within fourteen registered semesters.

### In Absentia

In absentia status provides an opportunity for graduate students to engage in approved study in a location at least 100 miles away from the University's Ithaca campus during the academic year while continuing to work under the guidance of the Special Committee. Access to university services and benefits continue. Time registered in absentia conts toward the time lmmit non finishing a degree.

status is the preferred option for students who are finishing writing a thesis but have already moved away. Assistantship support is only available if the student can complete the work required by the particular assistantship. You can earn 1 registration unit (RU) if the arrangement enhances the student's program of study. For more information see the <u>Code of Legislation</u>, the Grad School Rep, or your Horticulture Grad Field Coordinator.

### Leave of Absence

A leave of absence can be granted for either personal or medical reasons, but the process is different for each type of leave. A health leave of absence requires filing with Gannett Health Services. More information is available at Cornell Health website.

The maximum number of years allowed for leave of absence is four. Time on a leave of absence does not count toward the time limit on finishing a degree.

A student who takes a leave of absence does not have access to campus facilities and personnel that normally accompanies student status. Therefore it is usually not appropriate for students who are continuing their degree program in another location.

For more information see the Graduate School Code of Legislation or obtain information directly from the Field Grad School Rep, 143 Caldwell Hall or your Horticulture Grad Field Coordinator.

## Examinations

All members of the graduate faculty are notified of examinations and all are welcome to attend. Students are responsible for notifying the graduate Field Coordinator at least two weeks in advance to reserve a room and send a notice to graduate faculty. Students must submit a Schedule of Exam form for M, A and B exams to the Graduate School at least one week in advance otherwise the exam results are not valid. All exams must be held on the Ithaca or Geneva campus and all members of your committee must be present. Extensive information on Exams, Doctoral Dissertation and Master's Thesis production can and should be obtained from the Graduate School. Note: All research degree candidates (M.S. and PhD) must apply for graduation using the Graduation Manager (Online) system during the semester prior to their anticipated conferral date. Even if your degree does not require a thesis or dissertation you must still apply for graduation. Students in professional degree programs may apply for graduation through their field or affiliated college. Ask your GFC for clarification if you are unsure. After each examination, a Results of Examination form must be filled out and submitted to the Graduate School within three business days and a copy to the graduate Field Coordinator.

### Q Conference (MS-PhD and PhD)

The Field of Horticulture has a formal conference with the Special Committee near the end of the first academic year.

Q Conference is a requirement of the Field of Horticulture for MS-PhD and PhD candidates, it is not required by the Graduate School. This should take place before the beginning of the third semester of the PhD.

The purpose of the Q Conference:

- To convene the committee members and the student to discuss and evaluate the student's proposed research plan. Students should schedule the Q Conference when they have a clear focus on what they are going to work on and have had a chance to put together a written outline or research proposal on the topic. The expectation is for the student to have read much of the literature directly relating to his/her research project and be prepared to answer questions justifying his/her approach to the research. This should take place before the beginning of the third semester of the Ph.D.
- To determine what courses still need to be taken or discuss ways the student can gain the necessary background to accomplish their research program. Students should bring a list of courses they have taken at Cornell and relevant course work from their MS or undergraduate days. They should write down their goals for the research work and any

other academic goals they might have (e.g. getting teaching credentials, getting extension experience, writing for various audiences, etc.).

An outline of the proposed research or research proposal, list of relevant classes, and academic goals should be given to each of the committee members at least one week before the Q Conference. This will provide a clear focus and discussion on the proposed research project. Is it well thought-out? What have others done in this area? Is it doable in the time frame given? Are there adequate facilities and support to carry it out? Is the student ready to take on this project? Does his/her background allow for critical thinking in this subject area? Are there courses that are missing and should be added?

The Q Conference is a way to officially launch the Ph.D. work, with the agreement of the committee as to how the research will be pursued. It is also a good way to encourage the student to organize their thinking. It should be a positive experience. A minimum of two hours should be scheduled.

The student must notify the GFC at least two weeks in advance of the Q Conference so that other faculty members of the graduate field can be notified should they wish to attend or contribute. A Q Conference form will be given to the student for all committee members to sign at the end and the form should be returned to the Graduate Field Coordinator.

In rare instances, if the Special Committee determines that the Q conference results indicate that the student is not prepared to undertake a PhD program, the student may be found not be in good academic standing. The committee chair shall write a detailed evaluation and counsel the student with their options

### M Exam (MS)

Thesis Defense Exam for MS. This exam is both for an independent MS, or for the MS part of an MS-PhD program. An MS-PhD student continuing with the same project and Special Committee, and with that committee's approval, combine the M exam and A exam.

This oral exam will discuss the student's research and thesis manuscript. The exact format varies by committee, so it is good to have the members agree on the format well in advance. In general, students start the exam with a brief (10-15 minutes) oral presentation of the main methods and results of the project to set the stage for the discussion and to demonstrate the ability to present their work. Questions may address the scientific background of the research and hypotheses, the general approaches and specific methods used, the results, and the interpretation of the results. At least 2 hours should be scheduled for the MS thesis defense. The Special Committee often requires changes in thesis after the exam and these may require from a few days to a few weeks to complete.

### A Exam (PhD)

Exam for Admission to Doctoral Candidacy for PhD students. The exam can be taken as early as after two semesters of registration, and must be taken before starting the 7<sup>th</sup> semester of registration. A good target date is near the end of the second year of study.

The A exam is a comprehensive exam given by the student's committee to test their general knowledge in the areas of plant sciences and related fields relevant to the student's PhD program in Horticulture and minor fields. It is designed to determine your ability to begin research. It does not necessarily focus on your specific research topic or research results. Although questions of specific factual nature are common, emphasis is also placed on your ability to utilize and synthesize your knowledge to address more complex problems. A minimum of 3 hours should be scheduled; although there is no time limit. It is typically an oral exam and some written questions are allowed if a faculty member so chooses. It is appropriate and useful to discuss examination expectations with your committee members well in advance of the exam. Other faculty members in the Field are invited to participate, are allowed to ask questions. Each exam is unique. Therefore others' experiences only represent what can happen, not what will happen.

The student generally provides a list of courses they have taken as a graduate student. Questions relating to these classes as well as background information relating to the student's current research are fair game. You are encouraged to chat with each of the committee members to get a sense of topics that the committee member may ask about.

As a result of the A Exam committee members may require additional coursework that they believe will be needed for sufficient preparation in a particular subject area.

#### **B** Exam

Final Defense for PhD (B Exam). PhD students must be registered for at least 2 semesters between passing the A exam and scheduling the B exam.

See <u>Thesis and Dissertation</u> for detailed instructions and procedures including resource list of typists, editors, and couriers.

This oral exam will discuss the student's research and dissertation manuscript. The Special Committee will determine the exact format, which should be discussed well in advance. A common approach is for the student to begin with a brief oral presentation of the main methods and results of the project to set the stage for the discussion and to demonstrate the ability to present their work. Questions may address the scientific background of the research and hypotheses, the general approaches and specific methods used, the results, and the interpretation of the results. At least 3-hours should be scheduled for the PhD defense. Normally, changes are required in the dissertation after the exam that may require from a few days to a few weeks to complete.

Many committees prefer that those thesis chapters intended for publication be written as manuscripts for the intended journals. Rewriting dissertation chapters for journal publications after a student has left to assume new duties elsewhere is very difficult. The publisher will then require only minor editorial revisions and it can be submitted quickly.

## **Thesis - Dissertation**

#### Thesis or Dissertation Deadlines (Code VI.G.4) Guide to Graduate Study:

You must submit a complete draft to all members of your Special committee at least six weeks before the final masters or B exam; however, your Special Committee may modify this requirement. At least five days before the exam, you must provide all members of your Special committee with a complete, formatted, and editorially acceptable copy of the thesis or dissertation for final approval but keep in mind, your examining committee may still require modifications. Final Examinations may not be scheduled until this requirement has been met.

#### When you have a finished an approved manuscript:

**MS** – Submit the thesis electronically through the Graduate School website Graduation Manager. Follow the directions via Graduation manager re: University requirements when ordering your thesis copies. One copy (regular paper, not archival-quality) for the Field of Horticulture library in 22 Plant Science should be sent to the Graduate Field Coordinator; your chair and committee members may also require their own printed copy.

**PhD** – Submit the thesis electronically through the Graduate School website Graduation Manager. Follow the directions via Graduation manager re: University requirements when ordering your thesis copies. Note that one copy (regular paper, not archival-quality) for the Field of Horticulture library in 22 Plant Science should be sent to the Graduate Field Coordinator; your chair and committee members may also require their own printed copy.

Complete details for thesis and dissertation submission requirements can be found at the <u>Graduate School Thesis and Dissertation</u>.

**Note:** Our Director of Graduate Studies will not sign off your name on the provisional degree list until the field has received a copy of your thesis.

# **Publishing Your Research Work**

Students are encouraged to publish their research results in professional journals so their work can be widely disseminated. Some advisors have specific publication expectations, a common one being three papers published in field-appropriate journals for a PhD.

This is easily accomplished if the thesis is organized and written with this intent. Professional journal articles are a source of pride for the student, enhances career opportunities, and reflects well on the reputation of the Department. Few academicians read theses from other institutions, so the only practical way of sharing scientific contributions is through professional journals. If

you expect to publish part, or all, of your thesis, you will be required to sign a License to Use Copyrighted Material form with the Thesis Advisor at the Graduate School.

### Commencement

Information on degree conferral dates, commencement and diploma distribution can be obtained from the Thesis Advisor at the Graduate School, 350 Caldwell Hall, 255-5810, or <u>Office of</u> <u>Commencement Events</u>.

# **Facilities and procedures**

### **Working Hours**

Working hours for department staff (offices and facilities) are: Monday through Thursday, 8:00 am-4:30 pm; and Friday, 8:00 am-3:30 pm. Some offices such as the greenhouses, farm, or orchards may vary. Laboratories and graduate student offices are usually accessible 24 hours a day.

### **Orientation of Facilities Use**

We are required by law to make certain that all users of chemicals, equipment, and facilities are familiar with potential hazards and appropriate safety precautions. Graduate students are required to attend orientation and training sessions before using any of the laboratory, growth chamber, greenhouse, or field research facilities. Orientations for facility usage are held regularly and graduate students should watch for announced times (usually by e-mail). If you are unable to attend, please contact the person in charge of orientation to make other arrangements. Do not use a facility or hazardous equipment if you have not been through the appropriate training session!

### **Right to Know**

Federal and New York State law mandates and the university requires that all graduate students and employees attend an orientation on the "Right to Know" Act. This introduces the law, the Material Safety Data Sheets (MSDS), general toxicology and laboratory safety. You will receive a memo with times and locations of the orientation meetings. You will also receive a Safety Guideline checklist, mandated by the University, and you are required to return the checklist to the departmental safety representative. Safety Information notebooks are available for your reference in the main offices and in the department laboratories. You will receive an index to the notebook as a quick guide to its contents.

### Student Office and Lab space

### Desk Assignments

The department has several rooms in the Plant Science building set aside for graduate students to share, and a desk will be made available for each graduate student upon their arrival. A student

will be assigned and occupy only one desk regardless of location. Assignments will be made by the graduate Field Coordinator. Students on a Leave of Absence or with space elsewhere (such as in Geneva, or have lab/desk space) may be asked to forfeit their desk space to others, if there is a need for space when new students arrive. Students should not switch desk without GFC approval; and they must empty and clean their assigned desk prior to departure.

#### Laboratories and Equipment

Most research projects and professors have one or more laboratories with research equipment. Students will normally use of their advisor's laboratory and equipment. To use other equipment in the department, permission should be obtained from the professor involved.

Laboratory space is assigned by the major advisor. Equipment, glassware, reagents, etc. are generally purchased to use in specific laboratories. They should not be transferred to other locations unless approved by the faculty member in charge. Before using laboratory equipment, students are expected to obtain permission and instruction from the faculty member in charge or his/her designate. Each student is responsible to keep their work areas clean. Laboratory supplies or other purchases should be approved by the student's major advisor. Disposal of toxic materials must follow proper safety procedures

#### PLSCI 7000: Seminar in Horticulture

Section seminars are held weekly for faculty, staff, and graduate students during the academic year. All graduate students are expected to attend all seminars unless they have a course conflict, and they should register for PLSCI 7000 to receive credit. It is expected that all PhD students will take at least 4 semesters and MS students will take at least 2 semesters of PLSCI 7000.

#### Society of Horticulture (SoHo)

The field of horticulture has a dynamic graduate student association called, The Society for Horticulture (acronym: SoHo). All graduate students are automatically members. SoHo promotes fellowship among peers and future colleagues with food at regular meetings, cook-outs, and a holiday party. Events during the year promote professional growth by giving members the opportunity to develop communication, inter-personal, and future career skills. They raise funds to maintain and acquire common resources (e.g., a computer lab and lunch room). They represent graduate students on several department committees. Once a year they invite a speaker to deliver a key department seminar. Participation in SoHo is an excellent means to learn about and prepare for success within the field and as graduate students at Cornell.

#### **Special Events**

There are several events that occur throughout the year and are open to all members of the department. You are encouraged to get involved in planning and participating in all of them. Some of the standard events are listed below. Watch for notices!

• Summer Picnic – July

- Horticulture Section Picks (cherries, blueberries, etc.) for the section community and immediate family members
- SoHo Welcome BBQ July or August
- SIPS Holiday Party- early December
- Annual Banquet and Dance in Geneva wintertime

# Admissions

# **Regular admission cycle**

Applications for Fall admission are due December 1 of the preceding year.

Applications are evaluated holistically using a rubric that assesses for many predictors of success in our graduate program.

The most competitive applicants are those who seek to do something important through horticulture, who have the training and talent to achieve that goal, for whom our program is well positioned to help them reach that goal.

### Alternative admissions cycles

### Spring matriculation

There is no open call for applications for spring admissions because no funding is available. In exceptional cases, admission can be open to students who have full funding and an advisor. In those cases, applications are reviewed relative to the most recent regular admission cycle.

### In-House Application to a Ph.D. Program

Students who were admitted into the M.S. degree program, have fulfilled those requirements, and then wish to continue their studies in a Ph.D. program must complete a new on-line application for admission to the Horticulture PhD program. Because the criteria and expectations for MS students are much broader than for the PhD program, it is not common nor expected that students admitted to an MS will apply for a PhD in our program. Students contemplating a PhD should apply for the MS-PhD program initially. In House applications are reviewed with the same rigor as external applications and compete for funding with the external applications. Application fee waiver information can be found here: <u>Graduate School Application Fees</u>.

### Readmission

Students who have let their registration lapse in their current program and wish to return to finish their degree should use the <u>Application for Readmission (Form R3)</u>.

Update history Updated 07.07.20 Tara Reed Updated April 2021 Thomas Björkman



**Cornell University** 

# Member Handbook

# for Faculty in the Graduate Field of Horticulture

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Updated 2021

# **Horticulture Graduate Field**

Members of the Field of Horticulture reside primarily in the Section of Horticulture, both on the Ithaca campus, and at Cornell AgriTech in Geneva. In addition, some faculty members of other departments such as Plant Biology, Plant Breeding, Crop and Soil Science, Food Science, etc., are also members of the field. A current list of members can be found on the Graduate Field website and can be obtained from the GFC.

The Field of Horticulture is headed by the Director of Graduate Studies, Thomas Björkman, supported by the Graduate Committee, Jenny Kao-Kniffin, Bill Miller, Chris Watkins and Lailiang Cheng. Josh Balles is the GFC (Graduate Field Coordinator).

# Admission

### Application Procedure for Students

Faculty are encouraged to recruit applicants. Academic networks, research conferences, seminar visits and other engagement with prospective applicants or their advisors are an excellent way to increase our visibility and the likelihood of having a good student apply.

*Prospective applicants*. Faculty are encouraged to interact with potential graduate applicants. General graduate field information is best provided by the GFC so that it is current. All information pertaining application to the field are online at https://cals.cornell.edu/school-integrative-plant-science/degrees-programs/msphd-graduate-fields/msphd-field-horticulture/graduate-field-requirements-horticulture. Visits to campus are encouraged and the GFC can assist in putting together a schedule on a day that works for the student.

Applications come in to the Graduate School via CollegeNet. As each application is completed, it is released for review by the GFC. The DGS committee reviews complete applications using a holistic rubric that covers many areas that predict success in our program.

The application contains a statement of purpose (aka research statement) and a personal statement. The two have distinct prompts that we hope will elicit information that allows us to assess most of the qualities in the assessment rubric.

Academic preparation

- Grades (include trajectory),
- Rigor and relevance of curriculum
- Maximizing curricular opportunity
- Research and extracurricular experience

Fit with mission and expertise

- Desire to be a leader in the profession
- Effective and available faculty advisor in subject of interest
- Potential to have assistantship and research funded

Non-cognitive competencies

- Self Awareness Can match ability and goals.
- Long-term planning Long term goals with realistic strategy that matched actions
- Resilient to failure Productively persistent in the face of prolonged challenges

Research potential (For MS, the extension equivalents are important)

- Research Experience Including progressive trajectory, learning
- Complex thinking Logic, context and vision
- Resilient to failure Deals productively with experiments that don't work at first

Diversity contributions

- Strengthens pipeline of underrepresented demographics in profession
- Brings novel and valuable perspectives on research topic
- Can lead activities that enhance diversity and inclusion in our program

The admissible applicants are shared with the graduate faculty, and faculty are alerted to applicants who may be of particular interest. Top applicants who are candidates for recruiting fellowships are also identified and prospective advisors noted. Faculty interested in making an offer work with the DGS to develop a funding package. These packages typically include program funds for at least half the expected duration of the student's program. The GFC sends the letter of admission.

### Timeline

Applications are due Dec. 1 for Fall admission. We strive to make offers by February 10 in order to be competitive with peer graduate programs. The graduate committee reviews applications promptly and provides the graduate faculty with a list of admissible students by Dec 10. Faculty are asked to identify students on interest by early January. We host top prospects at a recruiting event in early February. Offers are made as quickly as we can determine a funding commitment. Applicants have until April 15 to accept offers, under an agreement among graduate schools.

### Alternative admissions cycles

Spring. It is possible to review students for Spring admission with an October 1 deadline. No institutional funding is available in that cycle, so it is used primarily by tuition-paying masters applicants and Employee Degree Program. In those cases, applications are reviewed relative to the most recent regular admission cycle.

Change to PhD. Students who were admitted into the M.S. degree program, have fulfilled those requirements, and then wish to continue their studies in a Ph.D. program must complete a new on-line application for admission to the Horticulture PhD program. Because the criteria and expectations for MS students are much broader than for the PhD program, it is not common nor expected that students admitted to an MS will apply for a PhD in our program. Students contemplating a PhD should apply for the MS-PhD program initially. In House applications are reviewed with the same rigor as external applications and compete for funding with the external applications. Application fee waiver information can be found here: Graduate School Application Fees.

### Funding

Each student is typically supported by a variety of funding sources during the course of their study. There are funds in endowments, teaching and extension assistantships that are available to Horticulture graduate students with restrictions and commitments made by those who hold those funds. The DGS role is to coordinate funding packages. Most funding packages require at least half the cost to be borne by the major advisor. Commitments often have to be made farther into the future than known funding sources.

All PhD students, and most MS students are guaranteed full funding by the field when they are admitted. The anticipated funding plan is usually developed between the DGS, who is aware of potentially applicable funding sources, and the major advisor (Special Committee Chair), who are expected to provide a significant proportion of the support. Note that Teaching and Extension assistantships only cover 9 months, the other 3 must be provided by the major advisor's program funds.

# Learning Goals for the Field of Horticulture

### Train future leaders in horticultural research, education and outreach in both industry and public-sector spheres.

#### Learning goal

- Students will develop a working knowledge of commercial horticultural plant management (i.e., crop production and/ or landscape management)
- Students will develop proficiency in horticultural research systems using 4, 5, 6 appropriate current technologies and methods.
- 7,9 Students will become effective horticulture teachers and extension educators by first-hand experience with teaching assistantships (TAs) and extension-outreach assistantships (EOAs) and through participation in departmental outreach efforts.

#### Assessment\*

- 3, 6

#### Foster scholarship, research and communication skills in horticultural science

Le •	earning goal Students will have a contemporary knowledge of the biology underlying the horticultural processes they study beyond what is taught in graduate	<b>Assessment*</b> 3, 4, 5, 6
•	courses. Students will develop effective writing skills that communicate research results to appropriate audiences	9, 10
•	Students will be proficient at delivering presentations based on their research results to diverse audiences, as measured by audience evaluations.	1, 2, 7, 9, 12

#### Engage in and conduct original research

Learning goal	Assessment*
• Ph.D. graduates will have the knowledge and training to design and	2, 5, 6, 8
implement original research, and share research findings through written	
and oral communication.	
• Students will, where appropriate, master and improve contemporary	5,6
research techniques used in their discipline.	
• Students will become a national authority in the subject area of their	10, 11, 12
thesis research.	

### Prepare to be professionals in their discipline

#### Learning goal

- Students will be familiar with the expectations of professionals in their field. For those pursuing faculty positions, these expectations include curriculum development, teaching, grant writing and administration, publishing, team management, collegiality, professionalism, and outreach.
- \* See section below to identify activities during which assessment occurs

### Assessment of progress

Student progress is assessed through the following activities. The numbers refer to the table above.

- 1. Grad Field Review, semi-annual student presentations to the entire Horticulture Grad faculty and graduate student body.
- 2. Full seminar
- 3. Q conference (PhD)
- 4. A Exam (PhD)

Assessment\*

6.8

- 5. Final Exam (M for MS, B for PhD)
- 6. Graduate Committee meetings to evaluate student progress
- 7. Faculty evaluation of the quality of student TA work, publications and presentations
- 8. The Field will track student employment for graduates
- 9. Student publications and presentations in outreach
- 10. Peer-review journal articles
- 11. Honors and awards
- 12. Presentations at national and regional professional meetings

# **Studies**

# **TA Requirement**

MS and PhD students must serve as a teaching assistant at least 1 semester for a HORT course – regardless of funding source. This is an educational requirement intended to make sure all students have some teaching experience. Students are supported on a Teaching Assistantship during this semester, unless they have a fellowship that precludes such an appointment; in that case they should enroll in a teaching experience for credit.

In addition to the teaching requirement, many students will be financially supported on Teaching Assistantships for additional semesters.

For some part of their graduate career. Teaching assistantships entail a commitment of 15 hours per week, on average for the semester. Students must apply annually to SIPS in order to be assigned a teaching assistantship.

### Course Work

The course program is developed with the advice and direction of the special committee. Specific courses may be required by members of the committee and are usually suggested as a means to obtain essential training to safe students from having to spend more time and effort in mastering the subject independently. Students should use their own judgment, along with advice of the committee, in deciding which courses will provide the best training for future needs. The Graduate School has no course requirements for obtaining an advanced degree; course requirements are set by each Graduate Field.

Graduate students entering the Field of Horticulture are expected to have completed the equivalent of an undergraduate degree in biology, horticulture or agriculture. If they do not have such a background, deficiencies should be made up with appropriate undergraduate courses, as determined by the student's special committee.

Doctoral students majoring in the Field of Horticulture are expected to develop broad competence in each of three core areas, as listed in Suggested Courses Table 1: Horticulture

Biology, Horticultural Production and Management, and Horticultural Methods. Doctoral students are expected to select a minimum of 3 credits in Horticulture from Core Group 1 and 2 and 1 course in Group 3 during their course of study, or show evidence of having attained that competence previously. The large number of courses suggested for each concentration will allow students, working with their special committee, to tailor to individual needs.

It is expected that all doctoral students will take 4 semesters of the horticulture seminar (PLSCI 7000).

Students for the Masters Degree majoring in horticulture will be expected to demonstrate competence in the three core areas, as listed in Suggested Courses Table 1. All Masters candidates are expected, if possible, to show competence in teaching, by having prior teaching experience, by serving as a teaching assistant in a course for one semester, or by enrolling in a course on college-level teaching.

Doctoral and Masters students minoring in horticulture are expected to choose at least one course each from HORT Core Groups one and two that is listed as PLHRT or taught by a horticulture faculty member and listed as PLSCI

**Table 1.** Suggested courses in horticulture and allied fields that could constitute a syllabus for graduate students studying horticulture. Note that graduate students may enroll in 4000-level courses, but those undergraduate courses do not count towards graduate degree requirements.

#### **Core Group I: Horticultural Biology**

- PLHRT 6190 Root and Rhizosphere Ecology
- PLHRT 6250 Postharvest Biology of Horticultural Crops
- PLHRT 6253 Advanced Postharvest Biology: Postharvest Technology
- PLHRT 6730 Ecology of Agricultural Systems
- PLBIO 5420 Plant Physiology
- PLBIO 6070 Plant Nutrition Quality Improvement of Plants
- PLBIO 6220 Comparative Plant Development: Evo-Devo
- PLBIO 6410 Laboratory in Plant Molecular Biology
- PLBIO 6540 Plant Cell Biology
- PLBIO 6620 Plant Biochemistry
- PLBIO 6841 Plant Form and Function: Anatomy, Cell Biology, and Development
- PLBRG 6060 Advanced Plant Genetics
- PLBRG 7170 Quantitative Genetics in Plant Breeding
- PLBRG 7420 Genotypes to Phenotypes: The Evolution of Genetic Modeling in Plant Breeding
- PLSCI 5030 Hemp Breeding and Genetics
- PLSCS 6100 Plant Responses to Environmental Stresses and Global Climate Change
- PLSCS 6420 Mineral Nutrition: From Plants to Humans
- PLSCS 6660 Applied Plant-Microbe Interactions
- PLSCS 6720 Nutrient Cycling in Natural and Managed Ecosystems
- PLSCI 4460 Plant Behavior and Biotic Interactions, Lecture

PLSCI 4461	Plant Behavior and Biotic Interactions, Laboratory
PLSCS 4130	Physiology and Ecology of Yield
PLSCS 4660	Soil Ecology

#### **Core Group II: Horticultural Production & Landscape Management**

PLHRT 5025	Hydroponic	Food	Crop	Product	tion	and l	Management	
				0.0		~		

- PLHRT 5204 Principles and Practices of Growing Grapes and Making Wines
- PLHRT 5420 Berry Crops: Culture and Management
- PLHRT 5850 Public Garden Management
- PLHRT 5910 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment
- PLHRT 5920 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment
- PLHRT 5931 It's Just Grass: Grassing the Urban Eden
- PLHRT 6020 Principles of Plant Propagation
- PLHRT 6450 Ecological Orchard Management
- PLHRT 6500 Fruit Crop Physiology
- PLHRT 6551 Principles of Nutrition and Nutrient Management in Crops and Landscape Plants
- PLSCI 5015 Hemp Production Systems
- PLSCI 5060 Hemp Processing
- PLSCI 5210 Soil and Crop Management for Sustainability
- PLSCS 6140 Weed Ecology and Management

#### **Core Group III: Horticultural Methods and Communication**

- PLHRT 6170 Advanced Analytical Methods for Plant Systems ALS 5780 International Teaching Assistant Program Course BIOMG 6870 Tricks of the Trade: How to Use Genetics to Dissect Cells, Molecules and **Developmental Pathways** Ethical Issues and Professional Responsibilities BIOMG 7510 BTRY 6010 Statistical Methods I BTRY 6020 Statistical Methods II Computationally Intensive Statistical Methods BTRY 6520 Quantitative Genomics and Genetics BTRY 6830 BTRY 6840 **Computational Genetics and Genomics** COMM 5660 Science Communication Workshop Public Engagement in Science COMM 6660 **Oualitative Research Methods** DSOC 6150 **Quantitative Research Methods** DSOC 6190
- EDUC 5510 Engaged Learning Through Extension, Outreach, and Instruction
- PLBIO 6525 Light and Video Microscopy for Biologists
- PLBIO 6831 Concepts and Techniques in Plant Molecular Biology
- PLBRG 6030 Genetics Improvement of Crop Plants

PLSCI 5045	Chemistry and Pharmacology of Cannabis
PLSCI 5500	Let Your Life Speak: Selfhood, Community, Change
PLSCI 5940	Skills for Public Engagement
PLSCI 6440	Digital Plant Science: Frontiers and Challenges
PLSCI 7201	Advanced Statistics and Experimental Design
PLSCI 7202	Applications of Machine Learning to Plant Science
PLSCI 7203	Engineering Novel Strategies for Plant Science Measurement and Sensing
PLSCS 6600	Remote Sensing Fundamentals
PLSCS 6900	Scientific Method in Practice
PLSCS 6950	Planning and Reporting Research
STSCI 6520	Computationally Intensive Statistical Methods
COMM 4660	Public Communication of Science and Technology
STSCI 4780	Bayesian Data Analysis: Principles and Practice

Upon completion of course work, students must sign up for research credits. Please remind the student they must enroll in something as a registered student, at least in thesis research (HORT 5000, HORT 8000 or HORT 9000).

# Assessment

### Semi-annual Graduate Field Review Day

Each semester the field meets and graduate students present a brief oral summary of their research to the entire Graduate Field. Each student presents once a year. Sharing research progress with faculty and other graduate students encourages the exchange of ideas, and the possibility of modifying research directions. Students presenting submit an abstract as well as a review form in advance so that a report can be printed up before the review. These are distributed to the faculty and the students. Students are encouraged to share their accomplishments, goals, frustrations, and projected completion dates. Faculty meet for a short time after the presentations to discuss concerns or unusual circumstances related to each student's progress.

Attendance at semi-annual graduate field review days is expected of both the graduate faculty and all graduate students. Graduate field reviews are held the last day before spring semester classes start in Ithaca and the last day before fall semester classes start in Geneva. Respective committee chairs are expected to coach the student in their presentation.

### **Student Progress Review**

The Student Progress Review is conducted annually in the spring. It is intended to be a review of the previous year and outlook for the coming year. The student writes up their accomplishments and plans, and have a discussion with the major advisor. The advisor's comments are added and the form is submitted to the graduate school. Ideally this is an iterative process with the goal of getting agreement on what were strong and weak parts of the previous year and how that affects

goals for the coming year. The SPR is also a good time to update the anticipated dates of the next exam and of completion.

Failing to complete the process and submit the form will result in the Grad School blocking registration for the fall.

### Exams

All members of the graduate faculty are notified of every examination and are welcome to attend. Students are responsible for notifying the graduate field coordinator at least one week in advance in order to make this happen. Students must also submit a Schedule of Exam form of all exams (except Ph.D. qualifying) in the Graduate School at least one week in advance otherwise the exam results are not valid. While it is the student's responsibility to take care of it, as chair, please check with the student or the GFC to ensure this has happened. All exams must be held on the Ithaca or Geneva campus and all members of your committee must be present. Extensive information on Exams, Doctoral Dissertation and Master's Thesis Production can and should be obtained from the Graduate School.

### Q Exam - qualifying exam or conference for PhD

The Q conference is intended to convene the committee members and the student to discuss and evaluate the student's proposed research plan. Students should schedule their Q exam when they have a clear focus on what they are going to work on and have had a chance to put together a written outline or research proposal on the topic. The expectation is that the student should have read much of the literature directly relating to his or her research project and be prepared to answer questions justifying his or her approach to the research. This should take place *before the beginning of the third semester* of the Ph.D.

During the Q conference, the committee should determine what courses still need to be taken or discuss ways in which the student can gain the necessary background to accomplish their research program. Students should bring a list of courses they have taken at Cornell and relevant course work from their MS or undergraduate days. They should write down their goals for the research work and any other academic goals they might have (e.g., getting teaching credentials, getting extension experience, writing for various audiences, etc.).

An outline of the proposed research or research proposal, list of relevant classes and academic goals should be handed to each of the committee members. The committee and student then have a focused discussion on the proposed research project. Is it well thought-out? What have others done in this area? Is it doable in the time frame given? Are there adequate facilities and support to carry it out? Is the student ready to take on this project? Does his or her background allow for critical thinking in this subject area? Are there courses that are missing and should be added? The Q conference is a way to officially 'launch' the Ph.D. work with the agreement of the committee as to how the research will be pursued. Also, it is a good way to encourage the student to organize their thinking. It should be a positive experience.

While the Q conference is not an officially required exam by the Graduate School, it is a requirement of the field of Horticulture. A Q conference form will be given to the student so that all committee members can sign it at the exam. If the Q conference results are unsatisfactory, the committee chair shall write a detailed evaluation for the student. The student needs to notify the GFA at least a week in advance of the exam so that other faculty members of the graduate field can be notified should they wish to attend or contribute.

#### A Exam - Exam for Admission to Doctoral Candidacy for PhD students

A comprehensive examination given by the student's committee to test the general knowledge of the student in the areas of plant sciences and related fields that are relevant to a PhD program in Horticulture. It is designed to determine if you are ready to begin research. It is not to discuss your specific research topic or research results although they may enter the discussion. Although questions of specific factual nature are common, emphasis is also placed on your ability to utilize and synthesize your knowledge to address more complex problems. Normally a minimum of 3 hours should be assumed although there is no time limit (and some have gone more than 4 hours, so don't schedule only 2 hours!). It typically is only oral although some written questions are allowed if a faculty member chooses. It is appropriate and useful to discuss examination expectations with your committee members well in advance of the exam. Other faculty members in the Field are invited to participate, so they may come to the exam and are allowed to ask questions (although typically they do not ask many questions). Each exam is unique, so others' experiences only represent what can happen, not what will happen. By Grad School rules, this exam must be taken a minimum of 1 year before the thesis defense exam.

### B Exam - Final Defense for PhD or Thesis Defense Exam for MS

The "Doctoral Dissertation, Master's Thesis, and Advanced Degree Requirements" bulletin has the detailed instructions and procedures.

This oral exam is to discuss the student's research and dissertation or thesis manuscript. It is expected that at the start of the exam the student will prepare and give a brief (usually 10-15 minutes; similar to an oral presentation at a scientific meeting) presentation of the main methods and results of the project to set the stage for the discussion and to demonstrate an ability to present their work. Questions may address the scientific background of the research and hypotheses, the general approaches and specific methods used, the results and the interpretation of the results. Again, normally at least 3 hours should be assumed for the PhD, although MS thesis defenses typically take less time. Normally, there are some changes required in the dissertation or thesis after the exam that may require a few days to few weeks to complete.

In general, it is typically extremely difficult to re-write thesis chapters for journal publications after a student has left to assume new duties elsewhere, so it is recommended that the thesis be written in the "manuscript" format where the publishable chapters are in the complete form of a manuscript for submission to a scientific journal. They will then require only minor editorial revisions and can be submitted quickly.

# **Faculty Membership in the Field of Horticulture**

University Faculty in the Section of Horticulture are expected to have the Field of Horticulture as their primary Graduate Field. University Faculty elsewhere at Cornell may be full members of the graduate faculty of the Field of Horticulture as a secondary field.

# Membership types and eligibility

Appointments as primary field continue until resignation or retirement. Appointments as a secondary field are for a five-year term. Renewal is contingent on being active in the Horticulture Graduate Field. Usual activities include voting on membership, engaging in thoughtful discussions on Field policies and informed votes thereon, mentoring students as minor advisor representing Horticulture, and engaging in the semi-annual grad review.

Minor membership is available for senior RTE faculty, allowing them to represent Horticulture as minor members of a graduate student committee.

Courtesy faculty, such as those who work for USDA or the Boyce Thomson Institute, are members of the University Faculty.

Adjunct faculty are not members of the University Faculty, but are eligible for divisional membership if their role and activities meet criteria set forth by the Graduate School.

# **Procedure for joining**

- 1. Lecture in Ithaca/Geneva. It is customary for a faculty member applying to the field to give a lecture in Ithaca and/or Geneva in order for the members to get acquainted with your work (i.e. faculty at both places must have had a chance to attend a seminar locally within the last year).
- 2. An electronic version of your full resume is required. Please send to the GFC.
- 3. A vote will be sent out to the entire field with your resume. All current graduate faculty members must vote.
- 4. A membership application is filled out and sent with a letter from the Director of Graduate Studies to the Dean of the Graduate School. Information needed from you in order to fill out this application:
  - a. your primary department
  - b. your Cornell title and date effective
  - c. your highest degree, institution and year awarded
  - d. which concentration(s) you will be representing on special committees (horticulture has the following: Breeding of Horticulture Crops; Horticultural Crop Management Systems; Physiology and Ecology of Horticultural Crops; Human-Plant Interactions

- e. areas of research to be listed online and in the grad school
- f. your position responsibilities, i.e. percentage of research, teaching, extension, admin, etc.
- 5. Via email, please provide the GFA with text to be included in the field graduate brochure as well as a digital photo of yourself. Sample text:
- 6. "NINA L. BASSUK Professor of horticultural physiology. BS Horticulture, Cornell; Ph.D. Horticulture, University of London. Professor and Program leader of the Urban Horticulture Institute with the Department of Horticulture; Director of Graduate Studies for Horticulture. Works on the problems of establishing woody plants in the urban environment. Specific areas include site assessment, plant selection for difficult site conditions, root zone modifications, and propagation of difficult to root woody plants and transplanting technology. Also a member of the graduate field of Landscape Architecture. Teach HORT/LA 491-492: Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment. Office: 33 Plant Science. Phone: 607-255-4586; Fax: 607-255-9998; Email: <u>nlb2@cornell.edu</u>"
- 7. The Dean of the Graduate School will notify you of your membership status by letter. Your information and picture will then be added to the paper and online graduate field brochure next time it is updated.