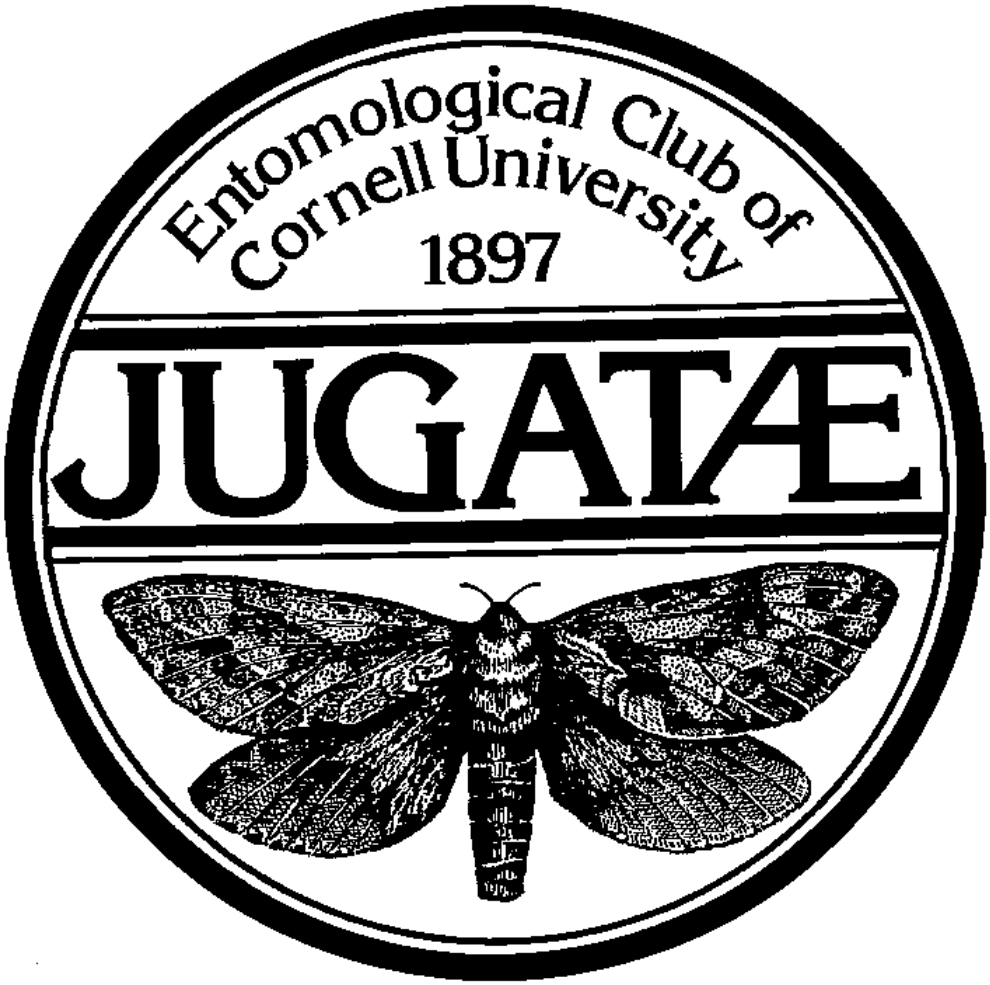
EXUVIAE



A Handbook for Entomology Graduate Students

2011-2019

EXUVIAE

Graduate student handbook
Department of Entomology, Comstock Hall
Cornell University
Ithaca, New York 14853

This handbook is intended to provide a convenient source of information; however, it should be viewed as a supplement to, rather than replacement for, the official University publications such as the *Cornell University Policy Handbook for Students, Faculty and Staff, Cornell University announcements,* and the *Graduate Code of Legislation.* It should be viewed as an ongoing project. People and policies constantly change in a University environment so much of the following information may change. Therefore, a pdf of this handbook will be available on the entomology website. The usefulness of this handbook depends upon it being repeatedly modified and improved. If you notice any revisions or additions that should be made, please contact the Jugatae secretary.

Acknowledgements

Several students, staff, and faculty in the Department of Entomology were instrumental in creating this handbook and we would like to thank all of them:

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Stephanie Westmiller

Important People (2019-2020)

Department Chair – Bryan Danforth (bnd1)
Student Service Representative (SSR) – Stephanie Westmiller (st342)
Director of Graduate Studies (DGS) – Jennifer Thaler (jst37)
Jugatae President – Samantha Willden (saw326) and Kaitlin Deutsch (krd59)

Who to contact when you have questions your peers and Advisor can't answer?

Advisor: Always start here if appropriate
Special Committee members: Useful on scientific questions and as mentors, these are people you may feel particularly comfortable with
GFA: You want to know how a Field/Cornell process works or you feel comfortable with them
DGS: You have a question about your advisor, the program, or your scientific progress or you feel comfortable with them
Chair: You need to talk to the leader of the Department, or you feel comfortable with them.

TABLE OF CONTENTS

ADDITIONAL RESOURCES

The graduate school web page is the first place to turn if you have a question about Cornell policies. One of the most convenient aspects is access to all of the forms that need to be submitted for course registration, committee selection, travel grant applications, etc. They are available as pdf files from: http://www.gradschool.cornell.edu/forms. There are also notices for vast numbers of professional development opportunities.

The Graduate Field of Entomology page is an excellent resource:
http://entomology.cals.cornell.edu/graduate

The Entomology page has some additional, more general, information:
http://entomology.cals.cornell.edu/

Graduate Student Resources for A-Exam timeline and expectations.
https://entomology.cals.cornell.edu/graduate/resources-students/

The Graduate Student Society, Jugatae, now has a website with additional information:
http://blogs.cornell.edu/jugatae/

I. DEGREE REQUIREMENTS

SPECIAL COMMITTEE

One of the first decisions you will make as a graduate student at Cornell is selection of your Special Committee. A minimum of two committee members (a major and one minor advisor) is required for the Master's degree and a minimum of three (a major and two minor advisors) is required for the Ph.D. degree. We encourage you to talk to other graduate students and faculty and to seek as much information as possible before selecting your committee members. Are your proposed committee members available for consultation on a regular basis? What expectations do they have for graduate students they advise? Will they read grant proposals, thesis chapters, etc. critically and carefully? Are they willing and able to write letters of recommendation for you? Particularly if you are not working directly on your advisor's project, you should consider what special expertise or resources the other members of your committee can bring to your project.

Our graduate students already have a major advisor or Special Committee chairperson when they arrive. The Field of Entomology requires that a tentative major advisor be identified before a student is admitted. This advisor represents the major subject, Entomology, and a specific concentration, e.g., insect behavior, insect pathology, etc. You can select your major advisor and additional committee members online through Student Center (http://studentcenter.cornell.edu/). You will see a panel on the right-hand side labeled "Advisor." Use the menu options here to select your graduate committee and their concentrations. It is usually best to choose concentrations that will complement your major and be relevant to your thesis and/or career plans. It is possible, but not necessary, to restrict yourself completely to the Field of Entomology. MS students are required to have a full committee selected and official in Student Center by the end of the first year. PhD students should have at least 2 committee members by the end of the first year and are required to have a full committee official in Student Center by the end of the third semester.

You may take courses in your area of interest from potential committee members, but some may not teach so you should talk to your advisor and other students about potential committee members. Make an appointment to meet with each of your potential committee members. Bring relevant materials: curriculum vitae, course records, summary of research plans, etc. Be prepared to discuss why he or she is appropriate as a member of your committee. You should have your Special Committee formed by the end of your second semester. This is especially critical if you want to get their feedback on proposed field work for your first summer of experiments.

Once you have assembled your committee, don't panic if you realize a member is no longer needed or you want someone else. Remember that you are responsible for putting together a committee that best suits your needs. You can make committee changes online as mentioned above. All members of the new committee will need to approve the change. Although it is much easier to make committee changes before the Admission to Candidacy, A-exam, it is also possible to do so afterwards by seeking the approval of the Dean.

INITIAL AND ANNUAL COMMITTEE MEETINGS

Once you have selected your Special Committee and have decided upon a general direction for your research, you must schedule your initial committee meeting. **This first meeting must be scheduled within the first year, even if you plan to add committee members at a future time**. This meeting should be viewed as an opportunity to discuss research interests, organize your academic and research plans, establish your coursework requirements, and find out what will be required in your A-exam (see below). You should also take advantage of the interview to solicit your committee's ideas and suggestions on how to approach your areas of interest and implement research. Discuss experimental design, anticipated equipment and space requirements, funding, etc. Giving the Committee a written report a week ahead of the meeting allows you to be prepared and take full advantage of their time.

Committee meetings are required yearly until a thesis is submitted.

CLASSES

All Cornell classes can be found on the "Courses of Study" website (http://courses.cornell.edu/). Select "Course Descriptions" from the left-handed menu and then use the "prefix" pull-down menu to select entomology classes (ENTOM), or some other department. The most relevant courses for Entomology graduate students are likely to be under BIOEE, BIONB, BIOMG, BTRY, etc.

Your course work will be decided upon by your Special Committee. Every semester you must register for a total of **15 credits**. This will include your classes plus the remainder of the 15 credits as ENTOM 8900 (Master's-Level Research) or ENTOM 9900 (Doctoral-Level Research). If you have no classes for a given semester, take 15 credits of ENTOM 8900 or 9900. Please register for the appropriate section (the one led by your major advisor). All classes should be taken for a letter grade, **except ENTOM 8900 or 9900, which should be taken as (satisfactory/unsatisfactory) S/U**. You must also register for GRAD 9016 during the summer if you are conducting research.

At the beginning of every semester, all Masters and PhD students will automatically be enrolled for 12 credits in a research course by the Graduate School. At the end of the drop period, the Graduate School will adjust the number of credits in the GRAD course, based on how many credits you have registered for, to balance your registration to a minimum of 12 credits. This procedure is a failsafe in case you forget to enroll and you do not need to take any action to adjust these GRAD credits, as it will happen automatically. Simply ensure that you enroll for 15 credits through the ENTOM research courses as described above. The GRAD courses are listed below for your reference.

- GRAD 9010 Graduate-Level Research (pre candidacy PhD students)
- GRAD 9011 Doctoral Dissertation Research (post candidacy PhD students)
- GRAD 9012 Master's Thesis Research
- GRAD 9000 Non-Degree Study
- GRAD 8000 In Absentia students

CORE CURRICULUM

There are currently two required courses for students enrolled in the Field of Entomology: ENTOM 2120 – Insect Biology, and ENTOM 7670 – Professional Development in Entomology. ENTOM 7670 must be taken in the first semester and the student must attend the Jugatae weekly seminar. Students should continue to attend the weekly Jugatae Seminar series thereafter. ENTOM 2120 should be taken in the first or second year. This course is meant to give students a broad overview of the field of entomology, including systematics, anatomy, physiology, basic and applied ecology, and the natural history of insects. Students who have taken an equivalent course at another institution or who have a very solid background in basic entomology may be exempt from this requirement. Discuss this with the DGS to assess whether or not you will be required to take ENTOM 2120.

The Entomology Director of Graduate Studies (DGS) will refuse to sign any student's petition to take an A-exam, M-Exam or B-exam unless these requirements have been met. The Special Committee designates all other required courses at the initial committee meeting. Your committee may require working knowledge of a foreign language relevant to your field. Most of your courses will be taken during your first two years, i.e., before your A-exam. It is wise to take courses from your committee members. This will help you to get to know each other and if they are providing expertise for your project, the conceptual material presented in their course(s) will probably be useful as well. You may want to teach a similar course at some time and having a good set of notes will help.

After your A-exam you will focus primarily on research rather than classes. However, taking a graduate seminar or occasional course is not unusual. Discuss these courses with your committee at your annual meeting.

REQUIRED SEMINARS

PhD students are required to give a 15-30 minute presentation annually to the department beginning in their second year. This can be done at one of the following events: NB&B lunch bunch, Evol group, PIG, EEID, annual department symposium, Jugatae etc. The event can be discussed with your advisor and then reported to the graduate field assistant in the yearly Student Progress Review.

ADMISSION TO CANDIDACY, A-EXAM

The A- exam may be taken after being enrolled for 2 semesters, but it is usually taken during the 4th or 5th semester of a Ph.D. program. Before scheduling a date and time for the A-exam:

1. You should meet with your major advisor to ensure that the Field and Special Committee requirements are fulfilled, i.e., any required courses, seminars and language proficiency.

2. Before your A exam you should meet with your committee to find out the expectations and after the exam you should receive feedback on strengths and weaknesses from each member.

3. You must notify your DGS and Student Services Representative of your intent to take the exam **at least 7 days** (more is helpful) before the scheduled date using the "Schedule of Examination" form (http://www.gradschool.cornell.edu/forms). A public announcement must be posted 7 days before the exam and all of the information must be sent to the Graduate Faculty in the Field of Entomology as well as to the Graduate School. This form requires signatures of all of your Special Committee members so plan accordingly.

4. A complete A exam time line can be found on website (https://entomology.cals.cornell.edu/sites/entomology.cals.cornell.edu/files/shared/A-exam%20Checklist%20and%20Requirements%20FINAL%2010-23-18.pdf)

The A-exam has several purposes. Principally, it is a test of your general knowledge and identifies any subject areas where you are deficient. The other, related purpose is to determine if you are ready to undertake your research project. Some students will already have been conducting research by the time they take the A-exam and the exam may begin with a brief presentation of some results gathered to that point. Others may have recently determined a research project and the exam may begin with a research proposal. Well in advance of your anticipated exam date, (e.g., the previous semester) discuss with your advisor and each of your committee members individually what he or she expects of you during the exam. You don't want any surprises! The exam is oral, but there is a required written component.

THESIS

The Graduate School Thesis and Dissertation website (http://www.gradschool.cornell.edu/thesis-and-dissertation) contains essential information concerning degree deadlines, scheduling exams, registration in absentia, thesis format, etc. Download the booklet early, read it often, and follow the instructions. All of the necessary forms (e.g., "Schedule of Final Examination" and "Approval of Thesis Form") can also be accessed from the Graduate School Forms webpage (http://www.gradschool.cornell.edu/forms).

The Graduate School also presents seminars several times a year to advise students who are writing theses and dissertations. These meetings are well advertised and offer the opportunity to get authoritative answers to questions about your thesis, dissertation, registration, fees, commencement, etc. It will save you a lot of blood, sweat, tears, and paper to attend one of these seminars.

POINTS TO CONSIDER IN DEVELOPING THE DISSERTATION PROPOSAL*

(* Copied here with the kind permission of Jason Millman, Education Department, Cornell University.)

The dissertation proposal is intended to help you and your committee evaluate your selection of a research problem and the adequacy of the procedures you intend to use. The major headings below can serve as an outline for your proposal if the nature of your problem permits. It is possible that

another outline will be more appropriate. The important thing is that the following points are considered and applicable questions answered somewhere in the proposal.

I. Title of Dissertation
II. The Problem
  A. Nature of Problem
    1. Statement of Problem
    2. Objective(s) of Study (What is the objective of your study? What is the product to be?)
    3. Scope of the Problem (What aspects of the problem do you propose to investigate? What aspects will you not investigate?)
  B. Background
    1. Significance of Problem and Your Dissertation (Why is this problem worthy of your time and attention? How will your investigation contribute to its solution?)
    2. Situation (What is the situation from which your problem stems?)
    3. Literature Review (How extensive is the literature in this area? Where is it to be found? What are the most significant writings on the problem area? What do they show? What are the shortcomings of existing literature in terms of your problem?
III. Method of Attack
  A. Assumptions and Limitations (What assumptions underlie your study? What evidence do you have that they are justified?)
  B. Hypotheses (Will you test hypotheses? What are they? If tested, how will they contribute to solution of the problem? As stated, do they contain both independent and dependent variables? Can both variables be measured within your resources?)
  C. Definitions (What meaning do you attach to various terms you intend to use? If variables are to be measured, how will you determine presence or absence of the quality involved?
  D. Collection of Data (What will be the source of your data? If a sample, what will be its composition? What sampling design will be used, how many cases and what types? What instruments will be needed, how validated? How will data answer questions in your hypotheses?)
IV. Major Kinds of Analysis
    What methods will you use? How will you present the results of the analysis? What interpretations will you be able to draw? How much data are needed to answer the question?
V. Time Schedule
    When will each step be completed?
VI. Outline of Dissertation

<u>THESIS DEFENSE, MS M-EXAM and PhD B-EXAM</u>

The requirements for a Master's degree must be completed within four years of first registration in the Graduate School. The Master's thesis defense may be written or oral or both. All faculty members in the Field are invited, although typically only your committee members will attend.

The determination of pass or fail rests exclusively with the Special Committee, and Special Committee Members must unanimously approve.

The Ph.D. B-examination is oral (but can include written components) and covers the subject of the dissertation. The B-exam must be passed within seven years after first registering in the Graduate School. However, you can petition for an extension if it will take longer. The committee chair must attend the B-exam, a proxy is not allowed.

The Graduate School insists that you schedule your thesis defense only when the thesis is virtually in final form. This should ensure that you will be able to submit the thesis within the 60-day time period. The Late Filing Penalty is $100**.** As with the scheduling of the A-exam, the B-exam is scheduled using a form found on the Graduate School website (http://www.gradschool.cornell.edu/forms). This form must be signed by the entire committee, DGS and Student Services Representative and must be filed with the Graduate School at least 7 days in advance of the date of the exam. **This means informing the DGS and Student Services Representative before the 7-day posting period in order to announce the exam to the Field of Entomology and get the appropriate signatures.**

REQUIRED SEMINAR

The Field of Entomology requires Ph.D. students and strongly encourages M.S. students to present a seminar detailing research findings forming the basis for their written dissertations or theses. This seminar is to be presented on the Ithaca campus, in the semester or summer session preceding filing of the dissertation or thesis. Ph.D. students should present a standard academic lecture; i.e., 50 minute talk plus ten minutes for questions. Formats available to satisfy this requirement, with approval of the Special Committee, include the Jugatae lecture series sponsored by the Department, or a seminar scheduled exclusively for satisfying the requirement. In all cases, the chair of the Special Committee, or a proxy, should make certain that the event is properly advertised, provide an evaluation of the seminar for the student, and see that a copy of the seminar announcement is inserted in the student's file (maintained by the DGS). The seminar must be announced at least 7 days before the presentation. The DGS will refuse to sign any Ph.D. student's petition to take the B-exam unless their seminar is scheduled.

THESIS OPTION

Ph.D. dissertations and M.S. theses may be organized either as a single work or as a series of relatively independent chapters, called the "thesis option" format. The thesis option format may contain a unified introduction and bibliography or separate introductions and bibliographies, but a single title. There may be a unified summary, or the two-page abstract (required of all theses) can serve as a summary statement for all chapters. The thesis option enables you to prepare your thesis as a series of papers in a format ready for publication, and indeed publication of chapters before the thesis defense is a good strategy. Co-authorship is permitted, but you must be the first author on all published works included in your thesis. You should acknowledge in the publication that the research is part of a thesis, and the Graduate School requires you to get written permission from the publisher to include it verbatim in your thesis. If you choose to publish research results in advance of writing your thesis, which is highly recommended, you must have all of your committee members read the manuscript and provide comments before submitting it. Else they

will be reluctant to read it later when it has already been published and may not allow its inclusion as a thesis chapter. Besides, it is wise to take advantage of their expertise.

Most committees will encourage you to take the thesis option and publish your results as you complete significant units of your projects. Nevertheless, in some circumstances it may be appropriate to prepare a classical thesis as one large work. If you are considering this be sure to discuss it with your committee at your annual meeting.
The following thesis formats are suggested:

Traditional Thesis	Thesis Option
Literature Review	General Literature Review
Material and Methods	Manuscript 1:
Results	Introduction
Discussion	Materials and Methods
Conclusions	Results
Literature Cited	Discussion
Appendices	Literature Cited
	Manuscript 2:
	(etc.)
	General Discussion and Speculations
	General Conclusions
	General Literature Cited
	Appendices

TIMELINE FOR STUDENT PROGRESS

Based on conversations with both faculty and students, the department developed the following timeline to provide mutually-agreeable milestones for satisfactory completion of the degree program:

Graduate (PhD) student milestones:

- form a committee [end of first year]
- first committee meeting for prescriptive interview to decide on course work and initial projects [end of first year]
- at least 15 minute seminar to department [on a yearly basis starting in year 2; Jugatae, NB&B lunch bunch, Evol group, PIG, annual department symposium, etc.]
- annual committee meetings [after year 1]
- annual progress reviews [Spring every year] – distributed to committee as well
- A-exam [by end of fifth semester]
- B-exam [at end, of course; within 5 years]
- at least three thesis chapters/papers [published, in press, in manuscript form]

- participate in department activities such as Jugatae seminars, Jugatae grad student organization, social events, recruitment weekend, Insectapalooza, annual department symposium

GUIDELINES FOR STUDENTS AND FACULTY ADVISING

Our department has developed some general 'best practices' guidelines for both faculty and students. Check with your advisor, many of the individual faculty have their own guidelines.

What faculty mentors expect from their graduate students

• Read! …in your area of specialization, but also more broadly.

• Manage your time and resources.
  - Be proactive about developing your research projects and timelines for achieving your goals for your time at Cornell.
  - Schedule time each week to anticipate both supply and personnel needs, as well as keeping track of grad school milestones/deadlines.
  - Timelines can and should be revisited frequently.

• Maintain a strong work ethic and stay organized.
  - This involves keeping organized field and lab notes, working smart (not just hard!), and keeping a healthy work-life balance.

• Behave like a scholar.
  - You are an ambassador at many levels (University, Department, Lab) and are beginning a long-term academic relationship that will extend far beyond graduate school.

• Attend and be prepared to interact at lab meetings.
  - This involves reading all lab meeting materials ahead of time.
  - If you are leading a discussion, develop objectives and/or questions to promote group discussion.

• Communicate with your faculty mentor.
  - Schedule regular meetings (weekly is ideal) to keep your mentor updated on your progress and to discuss research (develop new ideas, troubleshoot old ones, etc…)
  - Run plans by your mentor before beginning new experiments or making changes to existing ones.
  - Many faculty are happy to have your drop in on them with questions, but some faculty may prefer meetings that are schedule ahead of time. Ask your mentor what their policy is regarding drop-in visits vs. more regularly scheduled meetings. This may also depend on the faculty mentor's teaching or grant deadlines.
  - While most meetings will focus on discussing research progress, pitfalls, and ideas, we also recommend that students meet with their mentor(s) to discuss

any personal or professional challenges. Graduate school is no walk in the park! We want you to leave the Department being proud of your accomplishments and certain about your future goals and plans.

• Keep your office and lab (and lab space) clean and organized.

• Attend on-campus seminars.
  - Jugatae at a minimum, plus others relevant to your field and areas of interest.

• Help train others in the lab, including other graduate students and undergraduates.
  - This will vary year to year based on discussions with your mentor, but will range from co-advisement of undergraduate projects to offering general assistance in training students on lab and field methods.

• Present your work at in-house meetings (annual January Symposium and Jugatae) as well as national (ESA) and international (ICE) meetings. Ask your advisor for advice on other meetings that you should attend given your background and interests.

• Apply for grants.
  - Demonstrating grantsmanship is excellent preparation for the future, looks great on your CV, and can help you to conduct projects that the lab may not have full funding for. Funding opportunities include in-house grants (Rawlins travel grants as well as Griswold research grants) as well as external grants (Sigma Xi, Explorer's Club, NE SARE, NSF, USDA, etc.). You should discuss grant ideas with your faculty mentor. Letters of support may be needed for these grants, so make sure you give your faculty mentor time to prepare these letters.

• Publish your work.
  - We encourage you to think of thesis chapters also as manuscripts. Manuscripts carry more weight over your scientific career and can easily be reformatted as chapters.

• Back up your data and notes regularly.
  - There are endless options for how to do this, but students are encouraged to use at least two methods (e.g. CALS server, Cornell Box, an external hard drive).

What you can expect from your faculty mentor

• Help you to define your research questions and design and carry out research projects.

• Challenge you to know your area better than your mentor does.

• Help you make connections for your career in academia and other areas to the best of your mentor's ability.

• Help identify training opportunities and resources, both in and outside of the lab, that will further your particular interests and professional goals.

- Support your participation in local, national and international scientific conferences.

- Provide timely feedback on your scientific writing.
    - Let your mentor know when you will be submitting grants or papers and give them a chance to read and comment on your writing. Advisors vary in how much feedback they give, but they should always be willing to read and comment on your work in a reasonable timeframe.

- Open door policy.
    - While faculty tend to provide the best feedback during scheduled meetings, most faculty try to maintain a reasonable open door policy (see expectations above regarding this). Keep in mind that faculty may be busy with their own administrative, research, teaching and extension deadlines. It is always a good idea to plan important meetings in advance.
- Promote you in the field both during and after your tenure at Cornell.
    - Faculty mentors under most circumstances should be willing to write letters of recommendation, provide feedback on grants and fellowships, and provide editorial feedback on manuscripts.
    - Faculty mentors may wish to present your work in scientific conferences or talks. They should discuss this with you, involve you in the talk preparation and acknowledge your contributions.

- Co-authorship in papers.
    - Who is an author on papers arising from your MS or PhD thesis work is something that is generally negotiated between faculty and student. If faculty have provided grant funding, expertise, resources, or significant editorial help it is generally appropriate to include them as senior (last) authors on papers. We urge students to discuss the issue of co-authorship with their faculty mentor in order to understand their policy on this issue.

UC Davis Entomology list of good mentoring practices:
http://entomology.ucdavis.edu/Graduate/Mentoring_Guidelines/

OTHER STUDENT EXPECTATIONS

You will have a much richer graduate school experience if you become an active member of the department. One important aspect of this is attending the Jugatae Seminar series. Even if the seminar is not directly related to your research interests you will benefit by getting to know people and learning about other ideas and approaches. Another way to get involved is to become an active member of Jugatae, the Entomology Graduate Student Organization. All students affiliated or interested in entomological endeavors may participate in Jugatae, but it tends to be primarily a group of graduate students from the Field of Entomology. The main functions of Jugatae are to host, organize, and run the Annual Entomology Symposium, coordinate events and activities for graduate students and the department (e.g., end-of-year departmental picnic, Insectapalooza participation), and to facilitate interactions and community building among graduate students in and associated with the Department of Entomology. The Jugatae Constitution and by-laws provide more information about the organization and may be accessed online

(http://blogs.cornell.edu/jugatae/). Even if you are generally a loner, it is very worthwhile to get to know your fellow graduate students. They are the people you will learn the most from at Cornell! Furthermore, running an academic institution requires participation by the academics themselves (that means you!), so please do your part to help out. Jugatae meetings will be announced via e-mail and the Jugatae website (http://blogs.cornell.edu/jugatae/). A great opportunity to socialize with the people in your department and beyond is "SNEEB" (a now outdated but widely used acronym). Every Friday at 5PM (while classes are in session) beer and pizza are provided in the Corson-Mudd Atrium by various faculty members from the Departments of Entomology, Ecology & Evolutionary Biology, and Neurobiology & Behavior. SNEEB is a great way to end the week.

Student Vacation Policy

Neither the Cornell Graduate School nor the Field of Entomology have a clear policy about what constitutes a reasonable expectation for graduate student vacation leave. Some faculty feel that graduate students should not take vacation leave outside of the one week that Cornell is closed between the Christmas and New Year's holiday. Other faculty members are willing to grant their student's vacation leave as long as these requests are made well in advance and the vacation leave does not interfere with their research or teaching responsibilities. We recommend you discuss this with your graduate advisor to find out what their expectations are. Policy 1.3 states positions, appointment periods and time away policy.

SEMINARS AND DISCUSSION GROUPS

Entomology is an interdisciplinary field which makes it easy to find discussion groups that include people with a variety of backgrounds. There are book clubs and journal clubs (when active) composed of members of different labs and even different departments. These groups are informally organized, structured as a departmental seminar series, or as courses. Many labs have discussion sessions (generally during lab meetings) that tend to be more specific in scope but may be open to anyone interested in the topic. The best way to find out more about the events in your area(s) of interest is to talk with people with similar interests. This type of initiative is invaluable for the formation of a successful graduate student therefore the best attitude is to keep your "head up and ears open"! Schedules can change each semester depending on the time availability of the participants, so be sure to check the websites or stay in touch with the contact person. Below is a list of discussion groups and seminars:

Jugatae Seminar Series (Department of Entomology)
http://entomology.cals.cornell.edu/news-events/jugatae-seminar-series
Mondays at 3:15PM, 2123 Comstock Hall - unless otherwise noted. All members of Entomology receive weekly emails as reminders for this seminar series.

Seminar Series – Department of Neurobiology and Behavior (NB&B)
http://www.nbb.cornell.edu/seminars.shtml
Thursdays at 12:30PM, Morrison Seminar Room, A106 Corson-Mudd Halls - unless otherwise noted.

Seminar Series – Department of Ecology and Evolutionary Biology (E&EB)
http://ecologyandevolution.cornell.edu/

To receive seminar announcements via e - mail, send an email to lyris@cornell.edu. The message should read: SUBSCRIBE EANDSSEMINAR - L FIRSTNAME LASTNAME. Mondays at 12:20PM, Morrison Seminar Room, A106 Corson-Mudd Halls - unless otherwise noted.

BIOPL 6470 - Systematics Discussion Group
This group is composed of graduate students, post-docs, and faculty mostly from the Departments of Plant Biology and Entomology. This is a weekly meeting that takes place in the Plant Biology building. Discussions are led by staff, visitors, and students on topics of current importance to systematic biology. It can be taken for credit by enrolling in BIOPL 6470 - Systematic Biology Journal Club.

ENTOM 7640 - Plant-Insect Interactions
This group is coordinated by Profs. Jennifer Thaler (jst37), Anurag Agrawal (aa337), Andre Kessler (ak357), and Katja Poveda (kap235). Meetings are Fridays at 9:00 AM in Comstock 2123 or Barton. The group presents preliminary research and discusses primary literature and research ideas about herbivory, pollination, and other plant interactions with other organisms. Participants include students, post-docs and faculty from various departments including Entomology, Ecology and Evolutionary Biology, Neurobiology and Behavior, Genetics and Development, and the Boyce Thompson Institute.

ENTOM 6900 - Ecology and Evolution of Infectious Diseases
The group discusses the ecology, epidemiology, genetics, and evolution of infectious disease in animal and plant systems in weekly discussions of research papers published in the primary scientific literature.

ENTOM 7570 - Spatial Population Ecology
This group is coordinated by Prof. Saskya van Nouhuys (sdv2). The group discusses the role of space for population dynamics and the importance of spatial scale in studies of animal and plant ecology. Each meeting will start with a short lecture followed by a student-led discussion based on book chapters or published papers.

Insect Toxicology and Resistance Journal Club (Scott Lab)
This group is coordinated by Prof. Jeff Scott (jgs5). This group discusses current literature in the fields of insect toxicology, insecticide resistance, RNAi, and evolutionary biology.

Pollinator Reading Group
Bi-weekly discussion meetings. To find out the schedule email list-serve pollinator-l@list.cornell.edu

Evo-Group Seminars
EvoGroup is a monthly gathering of people interested in evolutionary biology, systematics, phylogenetics, and population genetics. Each seminar presents two 20 minute talks, usually on the first Thursday of every month from 4-5pm in the Morrison Seminar Room (A106 Corson-Mudd Halls). If interested in presenting, email Ezra Lencer (el468). To subscribe to the Evo-Group listserve for announcements of upcoming events please send an e-mail to evo-group-L-request@cornell.edu, with the message "join". This program is funded by the GPSAFC.

Symbiosis Group
The Symbiosis Group is a monthly gathering of people interested in symbiotic relationships between plants, animals, and microbes. It is organized by Teresa Pawlowska (tep8) and Esther Angert (era23) in Plant Pathology and Microbiology, respectively. They also have a list-serve: "symbiosis-L".

For discussion groups and graduate seminars in the department of Ecology and Evolutionary Biology, contact Patty Jordan (pj17), the E&EB graduate field assistant, for more information.

TEACHING

Graduate students are strongly encouraged to teach at some point during their graduate program. This could be as a paid teaching assistantship (TA), guest lecturer, and/or via outreach/extension presentations. Teaching plans should be discussed in the Initial Committee Meeting (see above). The Cornell Center for Teaching Excellence (CTE, http://www.cte.cornell.edu/) has a number of programs designed to promote graduate student training in teaching and professional development. The GET SET program consists of workshops, discussion groups, symposia and conferences all focused on teaching and learning in higher education. They also offer various participation-based certificates focused on specific aspects of teaching, such as course design, course assessment, innovative approaches to pedagogy, enhanced teaching with technology, etc. These certificates demonstrate a commitment to teaching excellence and professional development, qualities essential for the competitive academic job market. Along with the CTE, the graduate school works with a number of other departments to put together professional development programs for graduate students and postdoctoral scholars, focused on communication, career development, leadership & management, teaching, and responsible conduct of research. One of the programs offered is through the Center for the Integration of Research, Teaching, and Learning (CU-CIRTL) providing both on-site and virtual seminars as part of a network of Institutions. CU-CIRTL especially focuses on career preparation and development, including course construction, preparing research and teaching statements, navigating the academic job search, preparing your tenure package, etc.

For more information, visit:
http://cte.cornell.edu
https://teaching.cornell.edu/programs/graduate-students-postdoctoral-fellows
https://gradschool.cornell.edu/academic-progress/pathways-to-success/
http://gradschool.cornell.edu/cu-cirtl

PROFESSIONAL DEVELOPMENT

Cornell has many professional development opportunities available for graduate students. Several programs are listed below:

Cornell University Career Services (CCS). CCS offers a variety of resources to graduate students to assist with career development and planning. For more information, visit http://www.career.cornell.edu/students/grad/.

Broadening Experiences in Scientific Training (BEST). The BEST Program aims to enhance training opportunities for graduate students and postdoctoral scholars to prepare them for careers outside of conventional academic research. For more information, visit http://www.best.cornell.edu/.

Pathways to Success offers professional development programs for graduate students and postdoctoral scholars, designed to build core competencies and transferable skills in the following areas: Career Development, Leadership & Management, Teaching, Responsible Conduct of Research, and Personal Development. For more information, visit http://gradschool.cornell.edu/pathways-success.

Cornell University Institute of Biotechnology. The high-powered computing lab at Cornell (BioHPC) offers bioinformatics workshops in key areas of interest. For more information, visit https://cbsu.tc.cornell.edu/workshops.aspx.

The Learning Strategies Center
Time Management Strategies http://lsc.cornell.edu/time-management/

USEFUL WEBSITES

Graduate Student Resources
https://gradschool.cornell.edu/resources/

Graduate School Forms
http://www.gradschool.cornell.edu/forms

Graduate School Thesis and Dissertation Guidelines
http://www.gradschool.cornell.edu/thesis-and-dissertation

Cornell Courses
http://courses.cornell.edu/

Jugatae
http://blogs.cornell.edu/jugatae/

II. FINANCIAL SUPPORT

You can find more information by visiting the graduate school website at https://gradschool.cornell.edu/financial-support/

THE ADMISSIONS PROCESS

The selection of graduate students begins with an application review by the Field of Entomology Admissions Committee which determines acceptable candidates and potential fellowship nominees and provides a list of candidates deemed acceptable for admission to the Field of Entomology faculty. The next step involves selection of the student by a faculty member, who will act as the student's advisor, and identification of financial support for the student's first year (Note: It is possible to change advisors at a later date, but this is fairly rare). Final acceptance is dependent on approval by the Graduate School, which is, in most cases, automatic. Since advisors are responsible for providing their students with lab space and financial support, acceptance is ultimately dependent upon the availability of these resources. Applicants should therefore communicate with faculty of interest and check to see if such resources are available.

FUNDING GUARANTEE

The Field of Entomology guarantees each incoming M.S. candidate 2 years of support and each Ph.D. or M.S./Ph.D. candidate 5 years of support. Should a student in an M.S./Ph.D. complete their M.S. and then pursue a significantly different line of research for their Ph.D., the student may petition for a one-year extension of the guarantee. This petition is made to the Director of Graduate Studies (DGS), who then consults with the Admissions Committee for evaluation of the petition. Students in an M.S./Ph.D. program may also petition to change (Graduate School form) into a Ph.D. program without completing a M.S. Funding guaranteed to all students applies to the calendar year, with graduate assistantships comprising support during the 9-month academic year, and Field support from the Graduate School coupled with funding from major advisors comprising sources for the 10-week summer session. Students should consult early with their major advisor concerning responsibilities required for their summer employment, as these vary from program to program. Any stipends received for periods of off-campus degree-related activities will be counted as part of the guarantee. However, unpaid interruptions of study for non-degree-related activities will generally not be counted. As 2 or 5 years may be too short a time period for obtaining an M.S. or Ph.D. degree, Graduate students making good progress can still be eligible for funding. While priority will be given to those still within the time limit specified by the guarantee, strong efforts will be made to maintain funding for students who take longer to complete degrees as long as adequate progress toward completion is demonstrated.

This commitment to guaranteed funding was made both to enable the Field to continue to be competitive in recruiting and retaining outstanding students, and to aid students in pursuing their graduate degrees without the stress of uncertainty of funding. However, this guarantee does not relieve students and their advisors of the responsibility of identifying the exact sources of funding received by each student. To meet the commitments of these guarantees, everyone must do their part. Therefore, the following responsibilities of the Director of Graduate Studies (DGS), Entomology Department Chair, graduate students, and faculty advisors are outlined below.

How student funding determined:

Responsibilities of the DGS/DEL/Department

1. The DGS will submit applications for as many qualified incoming candidates as possible for sources of support from the university or college (e.g., incoming fellowships, special fellowships, or assistantships)
2. The DGS will email faculty in the spring about how their students will be supported the following year and if they want to be supported by a TA what is their preferred class. The DGS will make TA assignments each spring. Final approval is the responsibility of the Chair of the Department of Entomology (Ithaca).
3. The department delegates summer support funding made available to the Field from the Graduate School. Students under guarantee and without other funding will be afforded equal support from department funds, with major advisors expected to make up the balance of support for the 10-week summer session.
4. The DEL will make a call for EOA applications in the winter. The DGS will work with the DEL to distribute EOA assignments.

Responsibilities of Graduate Students

1. Students are expected to apply for all possible sources of funding in support of their programs. This includes National Science Foundation (NSF) fellowships, special minority or nationality group fellowships, etc. It is the individual student's responsibility to apply for as many sources of funding as are appropriate. The location of resource libraries is discussed later in this chapter under Research Grants. Any funding generated by students from sources inside or outside Cornell counts as part of the funding guarantee.
2. Students are expected to apply for TA-ships for Entomology courses for which they may be qualified. Students should speak with teaching faculty to determine their qualifications.
3. Students unsuccessful in obtaining Entomology TA-ships will apply for TA-ships in the Introductory Biology program. Students refusing to exercise all of these options will not be guaranteed alternative (i.e., less time-consuming) sources of funding and thus may have their guarantees withdrawn.
4. Students should work with their major advisor to apply for appropriate sources of outside grant support for their dissertation projects, either within proposals submitted by their advisors, or on their own (e.g., NSF Fellowships, Doctoral Dissertation Improvement Awards from NSF).
5. To be eligible for funding students must continue to make good progress and complete their SPR requirement each spring. The DGS will be notified of insufficient progress made by any students, whose guarantees may then be withdrawn at the discretion of the DGS, faculty advisor, and Special Committee. Students will have the opportunity to appeal on a case-by-case basis.
6. The Graduate School maintains a listing of fellowships, scholarships and other types of aid that are available. Students are encouraged to check this listing for available sources of funding.

Responsibilities of Faculty Advisors

1. Faculty advisors should submit proposals that provide graduate student stipends either to fund specific research programs, or to hire graduate students as research assistants (15 hr/wk GRAs) with work-loads similar to students who are teaching (TAs) to earn stipends.

2. Faculty advisors should work with their students to identify available outside funding sources to support the student's specific field of research.
3. Faculty advisors who have no personal sources of support for incoming graduate students should submit to the DGS the names of incoming students whom they are interested in sponsoring so that the DGS can submit their folders to the Introductory Biology program for consideration as TA. All faculty must have enough funds to work as a partner in summer support deliberations.
4. Faculty advisors should respond to the email from the DGS in winter outlining support for the coming year and requesting TA support.
5. Faculty advisors are expected to honestly review the progress of their continuing students on an annual basis and to inform the DGS if any students are making insufficient progress.

REGISTRATION

Graduate students are required to enroll in **15 credit hours** each semester. Some or all of these can be research credits. For example, if you are taking 9 credits of courses you'll need to enroll in 6 research credits to bring your total to 15. The course to enroll in for research credits is ENTOM 8900 (M.S. students) and ENTOM 9900 (Ph.D. students). Enroll in the section assigned to your advisor. Please note that you must register for GRAD 9016 for the summer if conducting research.

Registration for new graduate students and students with "holds" on their registration happens just before the start of each semester *on-line*. A "hold" occurs when tuition has not been paid, there are big library fines unpaid, or there are other problems with a student's status. Other graduate students are registered automatically.

It is now illegal for graduate students to register without presenting evidence of immunization against measles, mumps, and rubella or of a tetanus booster within the past ten years. New students have a grace period and are not prevented from registering; however, Cornell Health may request cancellation of registration of those students not in compliance. Vaccinations may be obtained at Cornell Health https://health.cornell.edu/services/medical-care/immunizations. For more information see: https://health.cornell.edu/. You can also get immunizations (possibly cheaper) at the Tompkins County Health Department, 55 Brown Road, near the Tompkins County Airport: http://www.tompkinscountyny.gov/health/dch/immunizations.

Graduate students are automatically enrolled in the Aetna Student Health Insurance Plan. Fully funded PhD students are not allowed to waive this insurance, but MS students are allowed to petition for waiving insurance if they can produce an equivalent alternative insurance and fill out a waiver by the deadline. Follow guidelines found at: https://health.cornell.edu/get-care/insurance-billing

LATE REGISTRATION

It is important to verify that your tuition is paid by the billing date for the new semester. If you are away from campus, you should enlist the help of the Student Service Representative or DGS to be enrolled. If you are no longer taking classes, it is imperative to enroll in research credits by the deadline to insure that you are a full time student. It is a good habit to pre-enroll the previous semester. Luckily, grad students have flexibility on course enrollment and can drop and add until

late in the semester. There is a $350 fine (plus interest) for late registration (usually about 2 weeks after the beginning of the semester).

ASSISTANTSHIPS AND FELLOWSHIPS

In general, it is the responsibility of the faculty to secure adequate support before accepting a student. However, new students owe it to themselves to be well informed about their current support and about their advisor's previous history and future plans. In most cases, continuing students will have to take an active role in making their funding arrangements each year.

Three-year pre-doctoral fellowships (including some reserved for minority students) are awarded by the NSF to students in the early stages of graduate study. Applicants must have completed fewer than 20 semester credits of post-baccalaureate course work. Other fellowships are listed on the following webpage: http://www.gradschool.cornell.edu/costs-and-funding/fellowships. Emails that announce new fellowships and call attention to upcoming fellowship deadlines should be read promptly. The Graduate School maintains a fellowship database that can be accessed at http://www.gradschool.cornell.edu/fellowships. A few Graduate Assistantships may be available through the Dean of Students Office (401 Willard Straight Hall; www.dos.cornell.edu/dos/) that involve counseling or organizational duties for programs like ALERT, fraternities and sororities, student families, off-campus students, graduate student workshops, and new student orientation. The application deadline is usually in March.

There are four main sources of financial support for graduate students: teaching assistantships (TAs), graduate research assistantships (GRAs), extension/outreach assistantships (EOAs), and fellowships. Note that most of these provide support only during the academic year and not during the summer. TAs, GRAs, and EOAs require a time commitment of 15 hours/week (20 hours/week for Introductory Biology) and provide a stipend, tuition waiver and health insurance. (The Student Activity Fee is the responsibility of the student.) Stay aware of available sources and deadlines by regularly checking the "Field Board", the bulletin board in the hall on the 2nd floor of Comstock. Also, the Student Service Representative (Stephanie Westmiller, st342) will help notify graduate students of impending deadlines.

TAs:

Teaching Assistantships (TAs) cover tuition and stipend in exchange for service in an undergraduate course. Specific duties are assigned by the course instructor. TAs are limited to 15-20 hours per week, and should average no more than 15 hours per week, with the exception of Investigative Biology Laboratory [BioG 1500], which may average 20 hours per week. TA appointments are assigned by the DGS in the Spring of the preceding year, taking into account student/advisor support needs, desires and instructor preferences. Students apply directly to the Introductory Biology office to be considered for Intro Bio TAs. There are currently 9 semesters of TA support assigned to the Entomology Department each academic year. There are no formal applications for Entomology TAs. However, students must indicate which courses they are qualified to teach on the annual progress reports. TA applicants are reviewed by the DGS and teaching faculty of the department, with additional recommendations made by the individual course instructors. If you are interested in being a TA for a course offered in the department you should talk with the professor in charge of the class that semester to express your interest. Applications for Introductory Biology (BioG 1500, BioG 1105-1106) are usually due in early-to-

mid March. Apply at 1140 Comstock Hall. If you are really interested in one of these TAs, let the DGS know so they can lobby for you.

GRAs:
There are three forms of graduate assistantship. Graduate Research Assistantships (GRAs) are appointments focused on thesis-related research. Research Appointments (RAs) are focused on research that may not be related to the student thesis. Graduate Assistantships (GAs) are any other non-teaching academic appointment. GRAs and RAs will typically be funded by a research grant held by the major advisor. RAs and GAs are limited to 15-20 hours per week, and should average no more than 15 hours per week. Funds for GRAs come from several sources: (1) extramural competitive grants awarded to individual faculty members by agencies such as the USDA, NSF, NIH, etc. and (2) the Bradley collection assistantship. The first category is the principal source for GRAs, which means that faculty members depend on external funding to support their graduate students. GRAs are generally expected to complete 15 hours per week in their adviser's lab on duties not directly related to the student's thesis or dissertation.

EOAs:

EOAs are assistantships that focus on outreach and extension and are selected by a faculty committee (currently chaired by Dr. Art Agnello). The EOA committee normally solicits proposals for EOA projects in the late Fall semester. Proposals must be submitted using a form distributed annually by the EOA committee. Proposals may come from faculty, staff, or graduate students. The assumption is that all projects will be led by a graduate student under the supervision of a faculty member. The EOA committee has regularly scheduled (weekly) meetings for the EOA students to get feedback on their projects throughout the Fall or Spring semesters. EOAs are open to students in Ithaca as well as Geneva. Once the EOA committee identifies suitable projects for the coming year, these are sent to the DGS, who incorporates them into the final matrix of graduate students support for the coming academic year. EOAs require 15-20 hours per week on duties related to extension and outreach for the department. *Please note that since the inception of this source of funding students have mainly participated in outreach related duties as most extension work is not needed until the summer months; assistantship duties for a given academic year normally end at the end of Spring semester, before summer begins.

Cornell Fellowships:

Cornell Kieckhefer Adirondack Fellowship:

The Kieckhefer Adirondack Fellowship is an annual fellowship to support a PhD student conducting research in the Adirondacks region. For more information, visit https://cals.cornell.edu/academics/student-research/graduate-grants-proposal/

Sigma Xi Cornell Chapter:

Proposal deadlines are usually in February each year. Find more information at https://orgsync.com/69744/chapter

Graduate School Fellowships:

Graduate School Recruitment Fellowships (Cornell):

The Field of Entomology is awarded a pre-set number of Graduate Recruitment. Fellowships each year, available to incoming Ph.D. students only. After recruitment weekend, or another format of interview, the DGS and the Admissions Committee rank all

interviewing applicants, and the Fellowships are offered to the top recruits. If a recruit declines the verbal offer to attend Cornell, the Fellowship may be offered to another student. These Fellowships are for two academic semesters, and either or both semesters can be deferred to any point in the student's tenure with permission from the Fellowship office. If a Fellowship goes unused in a given recruiting season because a candidate given the offer declines at a point too late for the Fellowship to be offered to someone else, the DGS can request that the Graduate School roll the Fellowship forward to the next recruiting year, and these requests are typically granted.

Fellowships in Support of Diversity:

Eligible underrepresented ethnic or other minorities (URMs), first generation graduate students, or others with a history of overcoming disadvantage can be nominated for recruitment Diversity fellowships from the Graduate School. These nominations are made by the DGS in January or February and cover two full years of support – typically the first and last years of the student's degree program. Both M.S. and Ph.D. students are eligible, but Ph.D. students are given heavy preference by the Graduate School. Students must have submitted a Diversity Essay with their graduate application to be considered.

Presidential Life Sciences Fellowships (PLSF):

During recruitment season, the DGS may nominate outstanding applicants to be considered for PLSF Fellowships. Typically, 10 appointments are made university-wide, spread broadly among Life Sciences Fields. Preference is given to interdisciplinary nominees, and there is an expectation of outstanding grades, GRE scores, statements of purpose, and letters of recommendation. There are three submission deadlines each recruitment season; all are equivalent, and it generally seems best to hold off on nominations until after recruitment interviews. The PLSF covers the first two semesters of Ph.D. work and the minimum stipend for the first summer. Awardees are required to rotate in three labs on campus, at least one of which could be outside the anticipated home Field. The rotations are very flexible. Students entering Cornell on PLSF Fellowships have the possibility of changing fields after their first year.

Graduate School Top-Off Fellowships:

Students are eligible to apply for this fellowship only if they have secured an external fellowship that covers at least 50% of the current 9-month GRA stipend and the cost of annual health insurance. It is a competitive process; the student must submit an application for the award. The application should be accompanied by a copy of your external fellowship award letter. The contact for this fellowship is Holly Boulia at haw65@cornell.edu.

CALS Fellowships:

Land Grant Fellowships, Continuing:

The DGS may nominate up to two students per year for CALS Land Grant Fellowships, following the guidelines distributed by CALS. The Fellowships are intended to support students whose research embodies the ideals of the CALS Land Grant Mission. Awards are for two years, so only continuing students with two or more years remaining on their Ph.D. are eligible. Nominations are typically due in February or March. This program is

dependent on CALS funding and is not offered every year. Past Entomology students have been supported on these fellowships.

Department of Entomology Graduate Fellowships:

Palmer Fellowship:

The James B. and Martha K. Palmer award is given to a finishing Ph.D. student for one semester of support. This is intended to be a "finishing" award, so heavy preference is given to students in the final year of their Ph.D. Nominations for the Palmer are made by faculty advisors who must submit (1) a letter of support for the students and (2) the student's CV. Nominations are reviewed by the DGS, the Chair of the department, and the Department Business Manager. Heavy preference is given to students who have been outstanding in research and who have been excellent Department citizens. Students who receive a Palmer Fellowship are required to write a letter of thanks to the Palmer family.

Simeone Fellowship:

The Simeone Fellowship Fund will be established and provide 9 months of graduate student support (tuition, stipend, insurance). This Fellowship can be used to support outstanding incoming students (as a recruitment fellowship) or outstanding current students. Should there be no current students in need of support, the DGS may elect to use these funds for incoming student recruitment. The award will be based on academic standing, Departmental citizenship, and financial need.

Sarkaria Fellowship:

This is an endowed fellowship that can only be given to students who are advised by a member of the Sarkaria Institute (SIPTI) and have a strong concentration in Insect Physiology and Toxicology. The Sarkaria Fellowship can provide two semesters of support. The Board determines how the funds are allocated on an annual basis. Only members of SIPTI are eligible to have students funded as Sarkaria Fellows, and this funding is expected to be for only one year for any given student.

Chapman Fellowship:

The Chapman Fellowship is awarded annually to a graduate student in the Field of Entomology, with preference given to students sponsored by a faculty member located at the Agricultural Experiment Station in Geneva. Selection is based on: 1) scientific quality of research work; 2) publications and presentations; and 3) involvement in professional activities. Candidates are judged on the merits of their achievements while conducting graduate studies. The student is provided a full year of tuition, stipend and fees. The Fellowship was established by Paul Chapman in 1992. Chapman was hired as a full professor of entomology in 1929 and served as Head of the department at Geneva from 1948-1965. He established the fellowship to ensure that the department would continue to inspire young entomologists to follow the principles and insights he believed important in his colleagues.

Summer Support:

The Field of Entomology requires that faculty provide summer support that is equivalent to the12-month stipend of their students. Typically, summer support would come from faculty grants, but the department may also have funds to help faculty meet this financial

requirement. Should students elect to take all or part of the summer off for personal reasons, the summer support levels can be adjusted accordingly based on mutual agreement between faculty advisor and the student. These mutual agreements should be stated in writing and submitted to the DGS for final approval.

Additional sources of support for graduate student travel, extension, and research:

Insectapalooza Small Grant for Graduate Students

Established in 2011, and using funds earned from previous Insectapalooza events, Jugatae offers small grants in aid of improving or creating exciting Insectapalooza displays. Previous Jugatae members have expressed a desire to give back money earned at Insectapalooza towards the establishment of graduate student involvement in the Entomology open house. Any graduate student involved in Insectapalooza is eligible to apply. The purpose of this grant is to foster graduate student involvement in Jugatae, using Insectapalooza earned money to encourage a leadership role of the graduate community in displays, as well as in the creation and improvement of an Insectapalooza display. Applications are requested late September and due the start of October. Funds are available on a sliding scale based on the amount available and the amount decided upon by the Insectapalooza grant committee. See constitution By-Laws for details.

Cornell Atkinson Center for a Sustainable Future:

The Atkinson Center for a Sustainable Future has several programs that offer research funding to graduate students. Please consult the following website for proposal deadlines: http://www.acsf.cornell.edu/grants/.

Michael Villani Award:

This is an annual merit-based award of approximately $500 and is awarded based on the consensus of the AgriTech technical staff.

George S. Gyrisco Award for Applied Research:

This is a research award of $500. The recipient is chosen by the DGS in consultation with the DEL and others. Because the award is intended to support research, it should be given to continuing students who are not finishing imminently. Preference is given to students who have been outstanding in research and who are excellent Department citizens.

Graduate School Travel Funds:

Funds to support travel to conferences or to do research are available from the Graduate School. Applications for conferences can be submitted to the Graduate School up to 30 days after the Start Date of the conference. Applications for research travel must be submitted by October 1 for the Fall semester and February 1 for the Spring semester. The level of support varies depending on the destination, but may be $500-750 annually. These are essentially awarded upon request. For the application go to https://gradschool.cornell.edu/financial-support/travel-funding-opportunities/

The Mario Einaudi Center for International Studies (http://www.einaudi.cornell.edu/)

Aawards grants for Ph.D. candidates for research-related travel with direct relevance to international or "comparative" studies. Deadline for application is in March and the student must be nominated by the DGS.

RESEARCH GRANTS

Grants, large or small, are available for those who take the time and effort to apply for them. This kind of support is especially important to students not working on their advisor's project(s). In any case, grantsmanship is an important skill in academia and one worth refining early.

The Office of Sponsored Programs (115 Day Hall, 5-5014, www.osp.cornell.edu) is primarily for the use of researchers, not students. Nevertheless, it has a resource library with several compendia of agencies and industries that provide research grants, including the Directory of Research Grants from Oryx Press, Bowker's Annual Registry of Grant Support, and Taft's Foundation Reporter, among other publications. Faculty and the DGS will also help students become aware of funding sources. A good way to start applying for research grants is to ask other students where they have successfully applied for funding. Don't be afraid to ask to read successful grant applications for inspiration and an idea of what the granting agency is looking for.

Some proposals must be submitted in the name of a faculty member such as those awarded by the U.S. Department of Agriculture (USDA) Competitive Grants Program and by several programs at the National Science Foundation (NSF), National Institutes of Health (NIH), the Environmental Protection Agency (EPA), Department of Interior (National Park Service and Fish and Wildlife Service), Department of Energy, Department of Defense, World Health Organization (WHO), and National Geographic Society. New York State sources include the departments of Environmental Conservation and Agriculture and Markets.

Many students also apply for and receive smaller ($200-1500) research grants, such as those given out by the Mellon foundation, the Cornell chapter of the Sigma Xi, the national Sigma Xi, and the American Association of University Women. Deadlines and applications for these small money sources are put up on the "field board" in the hall on the second floor of Comstock Hall.

GRISWOLD FUND

Each year the Grace H. Griswold Fund is able to provide limited support to members of the Department of Entomology for three main purposes:

Griswold Lecturers:

The fund pays for expenses (travel, lodging, meals), honoraria, and publicity for speakers of special reputation and quality, who are invited to deliver the Griswold Lecture as part of the Jugatae seminar series. Joint sponsorship by other academic units on campus is encouraged. Partial support may be provided in cases where the invited speaker is traveling on other business in addition to presenting a Griswold Lecture. All members of the Department and Field of Entomology are invited to nominate candidates. Nominations will be requested by the Griswold Fund Committee Chair each semester. The nomination procedure is as follows:

1. One nominating and one supporting letter should be sent to the Chair of the Griswold Fund Committee.
2. Support letters must identify the proposed lecture topic and address the topic's suitability (general interest to a diverse audience), the scientific reputation and qualifications of the nominee, and their ability as an engaging public speaker.
3. A proposed lecture date (to within a month or two) and the approximate level of funding required should be provided. One of the nominators should be prepared to make the actual

arrangements, should an award be made, by communicating with the invited speaker, arranging for publicity, and serving as a local "host" (introducing the seminar, creating an itinerary, making reservations, conducting the visitor from place to place, arranging for informal discussions, brown bag lunches, etc.).

Publications:

The fund is able to provide support for publication expenses of graduate students in the Department of Entomology, though others may apply in cases when other sources of funding are nonexistent or inadequate. Publication expenses could include page charges and costs of plates, figures, and artwork, but excludes reprint orders. An acknowledgment of the Grace H. Griswold Fund must be made in the publication. Obtain an application form from the Chair of the Grace Griswold Fund Committee and apply immediately after the paper is accepted for publication. No requests will be considered after the paper has been published.

Please note that many journals waive or partially waive publication. This applies even if the paper is co-authored with someone with institutional support for publications but waiver requests must be made at the time the paper is submitted. In addition, members lacking other institutional support may apply to the C. P. Alexander Fund of the ESA for a waiver of charges for pages exceeding the first 5 for manuscripts submitted to the Annals of the ESA. Therefore, at the time of the request for Griswold funds the student must show evidence of having sought this type of aid. Copies of the letter requesting the waiver and the response from the editor of the journal are sufficient.

Travel and Research support:

The Grace Griswold endowment supports domestic travel, supplies and equipment to help facilitate student research projects. Students are eligible starting with their first year of study and continuing through their tenure in the Field of Entomology. The only restriction is that if a student has not completed their A exam by their 5th semester, they will not be eligible to apply for these funds until they have done so. The committee will approve up to 5 awards per semester with each award not exceeding $2,000. Proposals should indicate the purpose of the equipment/supplies and the importance to their graduate program, and provide a timetable and complete budget, including a list of all available sources of funds. A supporting letter from the student's major professor should address the importance of the proposed equipment/supplies and the availability of other sources of funds. The Griswold Committee Chair invites requests for scholarship support from the Griswold Fund twice a year.

RAWLINS GRADUATE STUDENT ENDOWMENT

In 1994 Professor Emeritus W. Arthur Rawlins established this fund that honors his late wife, Alma D. Rawlins. The Rawlins endowment supports travel to scientific meetings and travel in support of research. All PhD students in the Graduate Field of Entomology are eligible to apply. All MS students are eligible to apply after they have completed two semesters of graduate study. The maximum funding available from the Rawlins Endowment per student for their duration at Cornell will be no more than $4000. The national meeting maximum is $1000 per meeting and the international meeting maximum is $1500 per meeting. The application includes a one page

statement of how the student's program will benefit from the support, an abbreviated curriculum vitae, an itemized list of proposed expenses, and a brief statement of support from the student's major professor. The Rawlins Endowment Committee comprises the Chairs of the Entomology Departments in Ithaca and Geneva and a graduate student. The Rawlins Committee Chair invites requests for support from the Rawlins Fund twice a year.

EXTERNAL GRANTS AND FELLOWSHIPS

Many professional societies have grants available for graduate students. Below are a small subset, but you should peruse the website of the societies that are appropriate to your research interests.

Animal Behavior Society:

Several graduate student grants are available from this society. For deadline and more Information, visit http://www.animalbehaviorsociety.org/web/awards-student-grants.php

Boehringer Ingelheim Fonds PhD Fellowship:

The Boehringer Ingelheim Fonds Fellowship provides two years of support for European citizens. For more information, visit http://www.bifonds.de/fellowships-grants/phd-fellowships.html

Sigma Xi National:

Sigma Xi offers Grants in Aid of Research twice a year to graduate students in science and engineering fields. Deadlines are March 15th and October 15th annually. For more information, visit https://www.sigmaxi.org/programs/grants-in-aid

Fulbright U.S. Student Program:

Fullbright awards provide funding to pursue study or research in a participating foreign country for a one year period. For more information, visit: http://us.fulbrightonline.org/applicants/getting-started

American Association of University Women:

The American Association of University Women provides fellowships for women who are U.S. citizens or permanent residents. For more information, visit http://www.aauw.org/what-we-do/educational-funding-and-awards/career-development-grants/

Society for Study of Evolution, Rosemary Grant Award:

The Rosemary Grant award offers funding to support students in the first two years of their degree programs. For more information, visit http://www.evolutionsociety.org/content/society-awards-and-prizes/the-rosemary-grant-awards.html

Northeast Sustainable Agriculture Research & Education (SARE) Graduate grant:

Northeast SARE grants provide funding for students doing research in sustainable agriculture. Deadlines are usually in May. For more information, visit http://www.nesare.org/Grants/Get-a-Grant/Graduate-Student-Grant

ESA Monsanto Research Grant:

The ESA Monsanto Research Grant provides funding for an MSc or PhD student use for salaries, equipment, supplies, or travel. Applicants must be ESA members. For more information, visit http://www.entsoc.org/awards/monsanto-research-grant-award

ESA Kenneth and Barbara Starks Plant Resistance to Insects, Graduate Student Research Award:

This award recognizes innovative research by a graduate student in entomology or plant breeding/genetics. For more information, visit http://www.entsoc.org/starks

Society for Integrative and Comparative Biology:

The Society for Integrative and Comparative Biology has several graduate student grants. For more information, visit http://www.sicb.org/membership/awards.php3

FEDERAL FUNDING

NSF Graduate Research Fellowship Program (GRFP):

The NSF GRFP provides three years of funding for outstanding graduates in STEM fields. Applicants must be U.S. citizens, nationals, or permanent residents. For more information, visit http://www.nsfgrfp.org/

NIH F31 Ruth Kirschstein National Research Service Award (Individual Pre-doctoral Fellows):

This award provides funding for graduate students in health-related fields. For more information, visit:
http://grants.nih.gov/grants/guide/pa-files/PA-11-111.html#_Part_1._Overview

USDA Agriculture and Food Research Initiative (AFRI) Grant Program:

The USDA AFRI program solicits grant proposals from several research areas. For more information, visit http://nifa.usda.gov/afri-request-applications

EPA Star Fellowships for Graduate Environmental Study:

This award provides funding for graduate students in environmental fields. Applicants must be U.S. citizens or permanent residents. For more information, visit http://www.epa.gov/ncer/rfa/2015/2015_star_gradfellow.html

NSERC Graduate Student Grants:

NSERC provides funding for graduate students in STEM fields. Applicants must be Canadian citizens or permanent residents. For more information, visit
http://www.nserc-crsng.gc.ca/Students-Etudiants/pg-cs/index_eng.asp

The Cornell Graduate School also maintains a database of fellowships at
http://www.gradschool.cornell.edu/fellowships

Finally, check your undergraduate institution; many have grants for continuing graduate students.

General note about forms:

See the Student Service Representative first thing to fill out payment paperwork (e.g., I-9, W-4, Patent Agreement, Direct Deposit form if desired, etc.) It is also necessary for international students to visit the Cornell Office of Global Learning (B-50 Caldwell Hall, http://www.isso.cornell.edu/) in person within 30 days of arrival to verify paperwork.

Helpful websites with forms:
http://www.gradschool.cornell.edu/forms (Graduate School)
http://www.isso.cornell.edu/ (Cornell Office of Global Learning)

EMPLOYMENT ELIGIBILITY VERIFICATION (I-9 FORM)

The Immigration Reform and Control Act of 1986 requires that Form I-9 be filed for all graduate appointments, regardless of past employment. Forms are available from Stephanie Westmiller. This is a very important form, as no paychecks will be processed until an I-9 is on file. Talk to Stephanie Westmiller about the appropriate paperwork to fill out.

TAXATION OF STIPENDS (Ask not what your country can do for you ...)

The following websites may help: http://gradschool.cornell.edu/costs-and-funding/tax-information and http://www.isso.cornell.edu/financial
Any student having income from U.S. sources must file a Federal Income Tax Return each year (due April 15). Stipends for fellowships and assistantships (TAs, GRAs) are considered taxable income. All assistants must file a W-4 withholding form (see Student Service Representative). Tax is withheld on all assistantships and thus the University will issue a W-2 form by January 31 of the year following your employment.

Tax is not withheld from fellowships. American citizens and resident aliens have no tax deducted and are responsible for self-reporting their income. If you expect to owe the government taxes (owe more than $500), you must pay estimated taxes quarterly in order to avoid fines since no tax is withheld automatically. Contact the IRS for appropriate forms to file.

Foreign students from countries with a tax treaty with the United States will not have taxes withheld on the amount of income that is exempt. Foreign students from countries without a tax treaty will have taxes withheld and a form will be sent out at tax time. See the International Student and Scholars Office (B-50 Caldwell Hall) for information. ISSO sets up Tax Seminars for Foreign Students prior to April 15. These sessions are very informative and useful for students unsure of the U.S. tax system. Foreign Students should not use U.S. Resident tax software. ISSO releases tax software for Foreign Students to use for their U.S. taxes.

Course-related expenses such as books, supplies and fees are tax-deductible from fellowships and scholarships only and receipts should be kept.

III. FACILITIES AND SERVICES

KEYS

The keys for room access in Comstock are obtained by the Ken Ayers in 1148 Comstock Hall.or through the Student Service Representative. The keys will be distributed during new student orientation. The doors to Comstock Hall are open from 6:00AM to 7:00PM Monday-Friday. The doors will be automatically locked after hours, on weekends, and on holidays. During these times Comstock Hall can be accessed at the front and back door using your Cornell ID card.

MAIL

The mailroom is located between 2119 and 2121 Comstock. Save time by directly pigeonholing mail to other people in the department. For this purpose, most boxes are not locked. Please give mail destined for a locked mailbox to Lisa Westcott for distribution. Mail for anyone at the Insectary should be placed in an envelope in the campus mailbox addressed to Insectary Building, Tower Rd. Intercampus mail addressed to Geneva should include "Box 15 Kennedy" and "Geneva Entomology" Envelopes for campus mail are available on the bookcase in the mailroom. Note that the mailroom is intended for University and business mail only. Please use your residential address for your personal mail.

U.S. mail addressed to the department should include "Comstock Hall, 129 Garden Avenue". The University zip code is 14853. The return address must be Cornell University, Department of Entomology, Comstock Hall, Ithaca NY 14853-2601.

FAX

The departmental fax machine is found in the mailroom on the second floor. The number is 607-255-0939.

PHOTOCOPYING

The photocopier is located in the mailroom on the second floor of Comstock. Graduate students may set up an account (auditron) number for personal photocopying. You will be billed for copies made on your account quarterly. Copies are $.08 each for B&W and $.15 each for color. To obtain an auditron number for making photocopies, contact Lisa Marsh (lmm266) or Darin Gillenwater (djg326) in 2132 Comstock Hall.

VendaCards purchased at Mann Library operate photocopiers at other statutory libraries, including the Entomology Library.

OFFICE SUPPLIES

Obtain office supplies through your advisor.

SUPPLIES AVAILABLE ON CAMPUS

Purchases made in the Campus Store, Chemistry Stockroom, Physics Stockroom and General Stores can be charged to a department account number or paid for with cash. The Chemistry Stockroom (chemical reagents, dry ice, laboratory equipment, etc.) is found in the basement of Baker Lab. The website and complete catalog can be found here: http://stockroom.chem.cornell.edu/. There is also a Physics Stockroom (electronics, liquid nitrogen and related supplies) in the basement of Clark Hall. The website and a complete catalog can be found here: http://www.lassp.cornell.edu/stockroom. Various companies such as Qiagen and Applied Biosystems have freezer programs on campus where supplies can be purchased at a discount or ordered without shipping charges.

PURCHASE ORDER/PROCUREMENT CARDS ("P-cards")

See your advisor for information on processing purchase orders or procuring supplies and equipment. Be sure to save all invoices, receipts and packing slips for purchases and send them to Lisa Marsh or Darin Gillenwater in 2132 Comstock Hall.

DEPARTMENT VEHICLES

The Cornell University Fleet is the largest pool of vehicles available, including pickup trucks, vans, minivans, and cars. These vehicles are available to faculty and researchers in Cornell's statutory colleges (which includes the College of Agriculture & Life Sciences). The University Fleet Services (5-3247) is located at 209 Solidago Rd (formerly known as 311 East Palm Rd), near the Cornell Orchards. https://fcs.cornell.edu/content/lease-university-fleet-vehicle

Graduate students should work through their faculty advisor to make reservations for the use of Fleet vehicles. First time state fleet drivers must complete and submit a "Driver Registration" form (available online) and will be asked to show a valid driver's license. A driver history form will also need to be completed every 3 years. The registration form needs to be signed by the departmental administrative manager before it is taken to the fleet office.

Always drive carefully! In case of traffic or parking violations, the **driver**, not the Department, pays the resulting fine.

Accident procedure:

There was a case in which the "other" party filed a claim against Cornell for an exorbitant amount of money when only a minor scrape had occurred. A police report would have prevented this from occurring, so please be mindful.

1. Call campus police (5-1111) and let them investigate the accident. Be sure to request a written report, no matter how minimal the damage to either vehicle seems.
2. Immediately inform the Administrative Manager, Cheryl Gombas (5-1867) of the accident.
3. Call Insurance and Risk Management ASAP (254-1575) if using a project vehicle. If using a State fleet vehicle please call 5-3247. An accident report form must be filed within 24 hours of the accident. It is very important that our claims adjusters learn the

facts promptly after the accident when they are still fresh in the minds of witnesses and/or those who have rendered assistance.

Driving a Cornell or project owned vehicle

In order to drive a project owned, Departmental vehicle, or State fleet vehicle you must have the driving history questionnaire and driver registration form on file.

You must be on official business and be on the payroll at Cornell in order to drive a Cornell vehicle. Every Cornell-owned vehicle has a log sheet and must be completed every time you use the vehicle. If a vehicle does not have a log sheet, please contact the person from whom you obtained the vehicle.

TRAVEL

While traveling, keep all receipts to turn in to the travel office, even if you are not requesting reimbursement for these items. **You must turn in original receipts**. Keep good track of your mileage if you are traveling in your own vehicle.

If you are to be reimbursed for your travel, food, and lodging costs, request a Travel Reimbursement Form from Darin Gillenwater or Lisa Marsh. Fill out as much of the form as you can when you return (You might want to take a copy of this form with you so that you can keep track during your trip!). Turn in the form and necessary receipts to Darin Gillenwater or Lisa Marsh for processing.

NOTE that an "Absence from Campus" form (see Travel, Chapter III) should be submitted to Lisa Westcott for any travel off campus on official business (generally out of Tompkins County).

INJURY

Cornell University is dedicated to providing a safe and healthy environment for all Cornell students, faculty, staff, guests, and contractors. All accidents and injuries, no matter how minor, are required to be reported to University officials through the use of our injury reporting system. The supervisor of an injured employee, the department head, or a designated individual within the department must complete all sections of this form within 24 hours after the injury is first reported. To begin this process, please use the form located at https://rmps-prod.hosting.cornell.edu/accinj/ (log-in required).

See the Environmental Health & Safety (EHS) website for useful information on reporting accidents that occur while working at Cornell (http://sp.ehs.cornell.edu/Pages/Home.aspx), as well as information on chemical safety and other useful information. You should also discuss specific lab procedures and safety issues with your major professor as each lab should have specific safety regulations.

CONFERENCE ROOMS

Rooms 2123, 2124, 4134, and 6138 Comstock are the departmental conference rooms, creatively referred to as the "Second Floor Conference Rooms", the "Fifth Floor Conference Room", and the

"Sixth Floor Conference Room". Mailroom key to Comstock Hall opens these rooms. The conference rooms can be reserved for meetings, seminars, informal presentations, thesis defenses, etc. To reserve a conference room send an email to Lisa Westcott (lew1), Cheryl Gombas (cag45), Lisa Marsh (lmm266), Stephanie Westmiller (st342), or Darin Gillenwater (djg326).

ADMINISTRATIVE ASSISTANCE

Some general observations: The administrative staff is, in many ways, the functional backbone of the department. They perform essential services and can be invaluable to you as a graduate student seeking your way through the administrative catacombs. When you arrive, take the time to get to know them. A friendly relationship with the administration can make life easier for all involved.

The following is a list of the staff members who you may need to contact for assistance:

Department Administrative Contacts

Bryan Danforth
Department Chair
2126 Comstock Hall
Phone: 5-7723
Email: bnd1@cornell.edu

Jennifer Thaler
Director of Graduate Studies
4138 Comstock Hall
Phone: 5-7064
Email: jst37@cornell.edu
- key contact for graduate students

Cheryl Gombas
Administrative Manager
2136 Comstock Hall
Phone: 5-1867
Email: cag45@cornell.edu
- oversees finances of the department and support staff
- oversees all administrative staff
- oversees all endowment and scholarship accounts

Lisa Westcott
Administrative Assistant to the Chair
2126 Comstock Hall
Phone: 5-7723
Email: lew1@cornell.edu

Darin Gillenwater
Accounts Representative and Website Manager
2132 Comstock Hall
Phone: 5-3965
Email: djg326@cornell.edu
- responsible for financial transactions, including cash handling (collection of payments for all personal photocopies and phone calls)
- Website and social media development and maintenance

Lisa Marsh	Financial Reporting Specialist 2132 Comstock Hall Phone: 5-3250 Email: lmm266@cornell.edu - *manages all grant and Hatch accounts* - *manages all grants from proposal to post award* - *responsible for departmental financial transactions*
Stephanie Westmillller	Student Service Representative 2134 Comstock Hall Phone: 5-6198 Email: st342@cornell.edu - *responsible for graduate student appointments as TA or GRA* - *processes paperwork for student needs* - *general contact for graduate student issues*
Ken Ayers	Comstock Building Coordinator 1148 Comstock Hall Phone: 5-6526 Email: kla10@cornell.edu - *maintains key security for Comstock Hall* - *receives all deliveries* - *maintains equipment inventory as it relates to location of equipment* - *responsible for building maintenance*

DEPARTMENT COMMITTEES

A number of committees supervise and execute the various functions in the Department of Entomology. The number of committees varies between years, as new committees are added and others are discontinued. The Chairperson of the Department generally announces committee assignments at the beginning of the fall semester. If you are interested in serving a term on one of the committees with student representation, it is best to express your interest to the Jugatae Chairperson, who meets with the Department Chair to determine student representatives. Participation on committees is encouraged! The committees listed below that are in bold face permit student members. See website for current list of student committee members.

Collection Committee: Coordinates the Cornell University Insect Collection located on the second floor of Comstock Hall. Decides how the collection should operate, how its funds should be disbursed, including planning spending of Alexander Fund and Bradley Endowment allocation for the Collection. See Insect Collection, Chapter III.

Curriculum and Teaching Committee: Establishes the curriculum of undergraduate and graduate courses offered by the Department of Entomology and specifies the requirements for completion of an undergraduate major and minor in entomology.

Extension Executive Committee: Promotes and recognizes excellence in extension, improves web presence for extension fact sheets and other information, reviews departmental extension efforts annually, and coordinates with the Public Outreach Committee to oversee EOA activities.

Graduate Admissions: Manages and reviews the admission of new graduate students.

Griswold Fund Committee: Manages and reviews applications for the Grace H. Griswold Fund. The fund supports members of the Department of Entomology for three purposes: Griswold Lecturers (expenses and honoraria for invited speakers), publications (defrayment of publication costs), and scholarships (e.g., student travel scholarships). See Griswold Fund, Chapter II.

Jugatae Seminar Committee: Coordinates and organizes the departmental seminar series.

Newsletter, Website and Social Media Committee: Promotes the department and its achievements through the newsletter and website, as well as coordinates the department's online presence through social media.

Public Outreach Committee: Assists with the organization and implementation of departmental public outreach activities such as Empire Farm Days and Insectapalooza; provides advice and guidance on the outreach section of the website; Coordinates with the Extension Executive committee to oversee EOA activities.

Social Committee: Responsible for encouraging friendly relations within the department and organizing social events.

COMPUTING

Cornell Information Technologies (CIT) is located in the Computing & Communications Center in the Ag Quad (119 CCC; 5-8990; itservicedesk@cornell.edu). Detailed information concerning CIT's services is available through the Web at http://www.it.cornell.edu/ and student resources can be found at https://it.cornell.edu/students. In person help is available at the service help desk, which is especially useful for laptop emergencies.
Online Help Ticket: Alternately, you can submit a request for service online through the CALS OIT Help Desk (http://cals.cornell.edu/about/leadership/ofa/it/remedy).

Other Services:

- Wireless Internet – RedRover and eduroam networks are available through most of Comstock Hall although there may be a few dead spots. See the CIT webpage for more information on connecting.
- Cornell Statistical Consulting Unit (CSCU) - is a fee-for-service unit available to the entire Cornell community, but is free for faculty, staff, and students associated with certain Colleges, including CALS. If not part of contributing Colleges, the initial consulting meeting with a client is provided at no cost, but all subsequent and follow-up visits require financial support. For more information on how to use the CSCU, refer to their web site https://www.cscu.cornell.edu/.
- Workshops - CIT offers short, non-credit workshops every semester to teach the basics of a variety of popular application packages and computer operating systems. These workshops are

free to graduate students but you must register in advance at http://www.it.cornell.edu/training/.

- Computer Labs for Public Use - A variety of computer labs have both Macs and PCs available for student use. A complete list can be found at http://labs.cit.cornell.edu/. Useful software and manuals are available for use.
- Computer Sales and Service - The Campus Bookstore has computer equipment and software. Many programs are available in discounted academic editions. Much of the larger computer hardware items tend to be over priced and often less than cutting edge.
- Network Resources - Cornell has a suite of site-licensed programs known as Bear Access for use with Macs and PCs for accessing network services such as email, FTP, the World Wide Web (WWW), etc. from home or school. Software also includes Student Center, which allows access to your grades, Bursar bills, mailing addresses, and other administrative files.
- Printing Resources - Mann Library has excellent printing resources, described at: http://mannlib.cornell.edu including a 42 inch high quality printer. Cornell Digital Print Services, a department within Cornell Business Services, provides a wide array of printing services. See their website for more information: http://www.cbsds.cornell.edu/.

MAILING LISTS

Being connected to the network is very important for access to email, if nothing else. Most departmental, college, and university information is now transmitted by email! In order to send bulk email to faculty, students, and staff associated with the entomology department, send messages to ENTO-ANNOUNCE-L@list.cornell.edu. You have also automatically been subscribed to the entomology graduate student mailing list, ENTO-GRADUATE-L@list.cornell.edu (updated by the department) and JUGATAE-L@list.cornell.edu (run by the student group).

INSECT COLLECTION

The Cornell University Insect Collection (CUIC), housed in 2144 & 2114 Comstock, was founded in 1871 and currently houses upwards of **seven million specimens**. It is the largest collection at a land grant university and is among the seven largest insect collections in North America, and has worldwide representation of terrestrial arthropods, with strengths in the Lepidoptera, Coleoptera, Hymenoptera, Diptera, and aquatic orders. Holdings include approximately 200,000 species with over 6,900 represented by types. It is a research collection (as opposed to an exhibit collection) and serves as a systematic resource, reference collection for applied entomology, and an indispensable teaching and training resource. Anyone interested in using the collection should contact the Curator, Corrie Moreau (csm277@cornell.edu), or the Collection Manager, Jason Dombroskie (jjd278@cornell.edu). This collection is intended for use by authorized individuals and most students will probably have more contact with the teaching and local collections than with the CUIC.

Voucher Specimens

Students and faculty are required to deposit properly preserved and labeled voucher specimens to document their research. Vouchers permit future researchers to examine the actual organisms studied in a research project. This is particularly important for all studies (ecological, evolutionary, behavioral, etc.) since future systematic research can change/update the taxonomic concepts for

the organisms involved. Without the existence of voucher specimens, such changes will reduce the credibility of your research and in some cases make it invalid if your data and findings cannot be definitely tied to a specimen and not just a taxonomic name as these can change/split/merge/etc. Deposition of vouchers, a routine part of any field research (and many lab-based projects) involving arthropods, should take place near the completion of the thesis research and specimens voucher numbers should be included in all publications.

To deposit voucher specimens:

1. Obtain a CUIC number from the Curator or the Collection Manager. This is a specimen identification number that will be unique to each voucher you deposit. This is the voucher number you will use in your thesis and all publications that rely on these specimens.
2. Specimens must be properly prepared (i.e., pinned, spread, or placed in 70% ethanol) to allow archival preservation. Labels should include locality (country, state, county, nearest post office, georeferenced lat/long), date (for lab colonies: date of establishment), collector, collection code (if relevant), and any pertinent ecological information. For labels use acid-free, high-quality, 100% rag paper and India ink. Labels can be obtained from the CUIC. The CUIC unique specimen number goes on a separate label.
3. Specimens will be placed in the main collection according to taxonomic position. After deposition of specimens, please provide the CUIC with the citations or reprints of articles pertinent to the voucher specimens. These will be incorporated into our specimen database. In this way future workers can use the database to access the published information relevant to your specimens.
4. In all published papers, note in the materials section that voucher specimens have been deposited in the Cornell University Insect Collection under CUIC "X." In this way, workers reading your paper will know that they could examine specimens by contacting the CUIC.

Identification

Students involved with field research should be aware that specimens can be sent out for identification. For example, the USDA/ARS Systematic Entomology Laboratory generally provides free services for researchers. See the Collection Manager to find out who to contact to have your specimens identified. The Collection Manager can also handle shipping.

LIBRARIES

The Comstock Memorial Library of Entomology (http://entomology.mannlib.cornell.edu/) is now integrated with the main life sciences collection in Mann Library. The library is the most complete entomological library within the university land grant system and currently numbers approximately 40,000 volumes. Several hundred periodicals are currently received, including many non-English titles in Western European and Asian languages. Increasingly, journals are also available electronically. There is also a large collection of rare books which are kept in a locked vault and are accessible by contacting the librarian. Graduate students can check out books for a six-month period and bound journals for 3 days. Books on reserve for an Entomology course are available in the library for 2 hour loans. Most reading material on reserve for classes can be found at the Reserve Desk on the first floor of Mann Library. Articles for a course are available via E-reserve which is found via the Library Catalog.

The Library Gateway http://www.library.cornell.edu/ has links to all Library resources. The On-Line Catalogue https://newcatalog.library.cornell.edu/ lists bibliographic and circulation information for all of the 19 Libraries' holdings. There is a help file and a number of different types of keyword searches in addition to call number, author, and title searches.

Mann Library is the central library for the College of Agriculture and Life Sciences (CALS). Many older books are located at the Library Annex (https://annex.library.cornell.edu/), a warehouse on rt. 366 near the Cornell Orchards Store. The books stored in the annex can be removed from storage upon request (see https://annex.library.cornell.edu/content/requests for information on how to make requests). Mann offers an extensive collection, computerized reference searching, photocopying, and an interlibrary loan system for borrowing materials not held at Cornell. Mann Library's collection includes books, journals (some are available on-line either from the publisher or from the Mann server), and databases in the fields of agriculture, plant and animal sciences, nutrition, food science, biology and biotechnology, natural resources and environmental sciences, textiles, and selected social sciences (applied economics, communication, design, education, family studies, housing, human development, human ecology, human services, and rural sociology).

INTERNATIONAL STUDENT RESOURCES

The International Students and Scholars Office or the Office of Global Learning (ISSO, http://www.isso.cornell.edu/) offers a variety of services and resources for international students including visa information, help with US taxes, health information, financial aid, banking, and social events. All international students must check in with the ISSO upon arrival at Cornell. There are also many student-run organizations representing diverse countries and cultures that offer social opportunities and support communities for international students. You can search for a particular organization here: http://orgsync.rso.cornell.edu/

DIVERSITY AND INCLUSION

Cornell University is committed to maintaining a respectful, inclusive, and diverse community. The university is actively working to track and address bias, improve disability access, and support gender equity on campus. There are many communities at Cornell that aim to bring people together from diverse backgrounds (http://diversity.cornell.edu/networks-and-orgs). More information on Cornell's diversity initiatives can be found here: http://diversity.cornell.edu/.

UNIVERSITY POLICIES RELATED TO GRADUATE STUDENTS

A summary of Graduate School and University policies relevant to graduate students can be found at http://gradschool.cornell.edu/policies , and policy specifically for students on assistantships can be found at https://www.dfa.cornell.edu/sites/default/files/policy/vol1_3.pdf.

PARENTAL LEAVE POLICY

Policies regarding parental leave for graduate students can be found at http://www.dfa.cornell.edu/sites/default/files/vol1-6.pdf At Cornell, this policy is termed "Parental Accommodation Policy" and is much broader than simply maternity leave. Cornell

provides accommodation for childbirth, newborn care, adoption, foster care, and acute child health to enrolled students who are in good academic standing. Eligible graduate students may request paid accommodation (6 weeks or 8 weeks) or up to one year of reduced-load registered student status.

WORKERS' COMPENSATION POLICY

The graduate school outlines the process that students with injuries should follow at https://gradschool.cornell.edu/student-injuries. This policy affirms that students with injuries incurred while they are performing services for Cornell are eligible for workers compensation, and the New York State Workers' Compensation Board ultimately determines compensability under New York State law. An annual report on student injuries for the 2014-2015 academic year was provided at http://news.cornell.edu/stories/2015/11/improved-procedure-clarifies-handling-grad-student-injuries, and will be updated at the end of the current academic year. As it shows, in 2014 4 graduate/professional students workers' compensation claims were filed, and 4 were paid.

SEXUAL HARASSMENT POLICIES AND RESOURCES

Our department has a zero tolerance policy for sexual harassment and inappropriate behavior in the workplace. You have the right to feel safe during your graduate experience. If you experience sexual harassment, assault or inappropriate behavior, you have a number of options. If you feel safe and comfortable doing so, we suggest starting by talking to the DGS or the GFA. They can help you navigate the Cornell University reporting system and work with you to ensure your immediate safety. If you need to report an incident, Cheryl Gombas (cag45) is our designated contact. It is important to know that most Cornell faculty, staff, and student employees are obligated to consult with a Title IX Coordinator about any potential incidents. This does not, however, mean that you would be obligated to file a complaint.

There are some completely confidential support resources on campus:

Cornell Health (medical and mental health providers: 607.255.5155);
CURW (pastoral counseling: 607.255.6002);
Cornell Victim Advocate (607.255.1212, victimadvocate@cornell.edu);
Director of the Women's Resource Center (607.255.0015, wrc@cornell.edu);
Director of the LGBT Resource Center (607.254.4987);
University Ombudsman (607.255.4321).

Below are some informational resources about policies at Cornell and the process for reporting an incident:

SHARE (sexual harassment and Assault Response and Education): http://share.cornell.edu/
Cornell Health: https://health.cornell.edu/services
Victim Advocates: https://health.cornell.edu/services/victim-advocacy
NYS Student Bill of Rights: http://titleix.cornell.edu/reporting/student-bill-of-rights/
Student Guide to filing of a complaint: https://blogs.cornell.edu/titleix/files/2016/12/staff-faculty-guide_-filing-a-complaint_20161118-270m93c.pdf

The Cornell Health Victim Advocates
Cornell Health offers a victim advocacy program. These counselors are NOT mandatory reporters. They provide the following resources:

- Personal support and an opportunity to talk about what happened
- Information and answers to questions about options and resources
- Help thinking through and deciding on a course of action
- Accompaniment to meetings, court hearings, etc., or serve as a liaison
- Connection with campus, community, and state resources for counseling, advising , or reporting
- Connection with University offices (when appropriate, advocates can work with faculty and staff)

Title IX Office
You can make a report to the Title IX office. If you make a **Report** (and tell title IX all details of the incident), the information will be saved in Title IXs records, where your anonymity will be protected as much as possible. After making a report, you will have the option to pursue a formal **Complaint** or not. A formal Complaint initiates University procedures as outlined by University Policy. The Title IX office will work to make sure you fully understand what this entails before you begin. If you do not wish to pursue a Formal Complaint under these procedures, the University will honor your wishes unless doing so would not adequately mitigate the risk of harm to the complainant or other members of the University community or doing so impacts the University's ability to provide a safe and non-discriminatory environment for all members of the University community, including the complainant. If the incident you experienced was not clear cut (if it wasn't overtly sexual, threatening or repeated, and no contact was made, but you feel unsafe), the Title IX office may not be able to offer much assistance beyond storing a complaint. Working with your DGS or GFA may be more fruitful.

GRIEVANCE PROCESS (All complaints are free from retaliation as stated in Policy 6.4 pg. 17-18)

The graduate school outlines provisions and procedural steps for handling grievances involving graduate students and faculty members. Full information can be found at http://titleix.cornell.edu/guides_forms/complainant-guide-for-a-complaint-against-staff-or-faculty/ . The procedure provides a mechanism through which grievances can be fully investigated and decisions rendered. It covers grievances that involve individual graduate students and faculty on issues relating to graduate education and support. The Graduate Grievance Review Board includes two graduate student members, two faculty members, and a faculty chair.

PHYSICAL SAFETY

Entomological research often involves the use of hazardous substances and equipment. The health and safety of both users and others working nearby depends on knowing the hazards and conscientiously following safe procedures. Be informed about the substances you (and your co-workers) are using. Think ahead and almost every kind of accident should be preventable. Furthermore, it is important to know what to do in the event of an accident and how to clean up spills and properly dispose of wastes. For general safety information, go to https://sp.ehs.cornell.edu/Pages/Home.aspx

Graduate students working in labs must attend lab safety training, specifically the Laboratory Safety Course 2555. Some of the training is available online through the EH&S website at http://sp.ehs.cornell.edu/training/Pages/default.aspx. Those working in the greenhouse or field must attend the oeh.cals.cornell.edu federal worker protection standard yearly.

The Occupational Safety and Health Administration (OSHA) adopted new safety and health standard for employees who use potentially hazardous chemicals in research labs. The Cornell Office of Environmental Health and Safety (EHS) has developed a Chemical Hygiene Plan to promote health and safety in the lab. This plan, the OSHA Laboratory Standard/Cornell Chemical Hygiene Plan (http://sp.ehs.cornell.edu/lab-research-safety/laboratory-safety-manual/Pages/index.aspx), is provided to each lab, with a copy also available in the Entomology Library. The Cornell Chemical Hygiene Plan describes safe operating procedures, uses of protective equipment, employee information and training about lab safety, provisions for medical consultations and exams, and provisions for protection against hazardous substances.

Safety manuals may be obtained from Entomology Library or as a pdf on the EHS website http://sp.ehs.cornell.edu/lab-research-safety/Pages/default.aspx. Every laboratory should have a copy and all lab personnel should be familiar with the sections of the manual that pertain to their research. You can find detailed technical information and handling procedures for many chemicals in the red “MSDS notebooks" (Material Safety Data Sheet) that are located in Comstock Hall, Dyce Lab, the Insectary, and Schwardt Lab.

A full listing of "Right-to-Know" and OSHA required training sessions for laboratory personnel are provided by EHS and can be found at http://sp.ehs.cornell.edu/training/Pages/default.aspx.

EHS provides information on specific toxic substances, which includes physical characteristics, reactivity, health hazards, first aid, personal protective equipment to use, and procedures for spills and leaks. Safety Data Sheets can be viewed online at http://sp.ehs.cornell.edu/lab-research-safety/research-safety/msds/Pages/default.aspx. The use of respirators is highly regulated by OSHA and the Cornell EHS Respiratory Protection Program. Visit the EHS website for more information about who must wear respirators and how to obtain one.

Procedures for proper chemical waste disposal are provided in chapter 7.0 of the Chemical Hygiene Plan. Toxic substances should be disposed of properly (fill out the Chemical Waste Removal Form at https://sp.ehs.cornell.edu/lab-research-safety/waste/waste-pickups/Pages/default.aspx). EHS-licensed contractors pick up ONLY properly labeled toxic substances. You can reduce the amount of waste you produce by ordering and preparing just the amounts you need.

Any life safety concerns should be brought to the attention of a member of the Entomology Department Life Safety Committee. Contact Stephanie Westmiller (st342), room 2134 Comstock, to find out who to contact within the department.

Pesticides

It is New York State law and University Policy that all personnel working in agricultural environments (including farms, orchards, and greenhouses), where they might be exposed to

pesticides, are required to complete the Worker Protection Standard Training (https://oehwps.cals.cornell.edu/workshops/wps). This training certification is valid for 5 years. It is also New York State law and University Policy that all personnel actually working with pesticides are required to be certified pesticide applicators (CPA). Information about certification and re-certification requirements can be found at http://psep.cce.cornell.edu/certification/Certification.aspx. It is no longer sufficient that applicators work under the supervision of a CPA. Also, in the event of an accident that harms someone else's property, the University cannot indemnify you if you were acting illegally and without good intention. The Pest Management Education Program (PMEP) at Cornell University, together with N.Y.S. Dept. of Environmental Conservation (DEC) Bureau of Pesticides Management, provides training and testing. A list of training courses can be found on the PMEP website, http://pmep.cce.cornell.edu. There are also special training programs which can count towards credit hours. These can be found at https://oeh.cals.cornell.edu/training-workshops. In addition, training manuals for the examinations are available at http://store.cornell.edu/c-876-manuals.aspx or contact patorder@cornell.edu.

Examinations may be scheduled by contacting any DEC Regional Office (http://psep.cce.cornell.edu/certification/DECPhonenumbers.aspx).Those seeking certification at times other than those scheduled should contact Eric Harrington, Director of Occupational and Environmental Health for CALS (eh22@cornell.edu or 5-0485).

Information for safety guidelines within greenhouses at Cornell, policies for pesticide storage at Freeville farm, the insectary, and other department facilities, and cleanup and disposal procedures involving pesticides are found under the CALS policies heading at https://oeh.cals.cornell.edu/greenhouses.

IMPORTANT CONTACT INFORMATION

The following is a list of some of the University offices involved with safety. Also refer to the OSHA Laboratory Standard/Cornell Chemical Hygiene Plan (see link above) for a directory of health and safety resources at Cornell.

Nature of Problem	Resource
EMERGENCY	Public Safety (5-1111), 911 **Fire, Police, Ambulance**
Right-to-Know (Toxic substances) Training sessions Chemical information requests	Office of Environmental Health and Safety www.ehs.cornell.edu (5-8200)
Radiation safety Leaks or problems http://sp.ehs.cornell.edu/lab-research-safety/radiation/Pages/default.aspx	Mark Jadick (mgj38), 5-7544
Toxic Waste disposal http://sp.ehs.cornell.edu/lab-research-safety/waste/chemical-waste/Pages/default.aspx	Brian Seward (bs289), 5-4642
Respiratory protection	Occupational Health and Safety http://sp.ehs.cornell.edu/osh/Pages/default.aspx Tim Fitzpatrick (tpf29), 254-4482
Pesticide questions	Pesticide Management Education Program http://pmep.cce.cornell.edu/ (5-1866)
Security (& Lock outs!)	Public Safety (5-1111)
Medical problems	Cornell Health https://health.cornell.edu/ (5-5155)

For more information, contact the Office of Environmental Health and Safety at **http://sp.ehs.cornell.edu/Pages/Home.aspx** or 5-8200. You can also contact the CALS Assistant Director of Occupational and Environmental Health Eric Harrington (eh22) at 5-0485.

MENTAL HEALTH AND WELLNESS

Prophylaxis:
An ounce of prevention is worth a pound of cure. The graduate students recommend the following techniques to maintain good mental health throughout graduate school:
Keep own and advisors expectations reasonable
Talk to friends and family
Make time for exercise
Do hobbies
Regular work schedule (go home for dinner)
Take vacation
Counseling
Meditation
Make sleep a priority
Spend time with friends
Eating healthy
Start working on whatever is worrying me

Common reasons graduate students seek help with mental wellness include stress and anxiety, depression and loneliness, trauma or grief, challenges adjusting, relationship issues, questioning identity, existing mental health conditions. The most up to date information can be found on the Cornell Health website (https://health.cornell.edu/services/counseling-psychiatry). There are hotlines for emergencies, counseling services, workshops, drop-in services and more.

- **Cornell Health**- 607-255-5155
- **Cornell police**- 607-255-1111
- **EARS Peer counseling**-607-255-1115
- **Victim Advocacy**-607-255-1212
- The Victim Advocates are not Mandatory Reporters. Students can speak to them confidentially about issues regarding sexual harassment, stalking, assault and rape.
- **The Learning Strategies Office**-607-255-6310
- The LSO offers assistance to students who are struggling with things like time management, study skills, writing etc. They do great workshops and one on one counseling.
- **Crisis counseling and intervention** – call 607-255-5155 (24/7 for urgent concerns), or come to Cornell Health during business hours
- **Individual counseling** – short-term one-on-one therapy with a licensed professional counselor (see "How to get care" below)
- **Group counseling** – free weekly support groups and group therapy on a wide range of topics
- **Psychiatry** – evaluation and medication management for students also receiving counseling at Cornell Health
- **Drop-in consultation** – free walk-in "Let's Talk" walk-in hours at different campus locations, held daily Monday-Friday during the academic year
- **Help assisting others** – consultation on how to help students in distress (see Concern for Others and Resources for Faculty & Staff)

- **Internal referrals** – collaboration with Cornell Health's full range of services, including alcohol and other drug services, nutrition and healthy eating services, and victim advocacy
- **External referrals** – referrals to other Cornell resources, and (when appropriate) to licensed professionals or agencies in the community (including private practitioners, Family and Children's Services, and Tompkins County Mental Health Clinic)

IV. RESEARCH FACILITIES

INSECTARY

The Entomology Insectary and its associated greenhouse are located at the northeast corner of Tower and Judd Falls Roads, next to the Kenneth Post Lab (Department of Floriculture and Ornamental Horticulture). The Insectary is divided into two sections: the Old Insectary (north end), which was built in the 1930's, and the New Insectary (south end, facing Tower Rd.), added in more recent years. The Insectary Greenhouse (see below) connects the two buildings. The NY State Integrated Pest Management Program and the Northeastern IPM Center are located in the Blauvelt Laboratory Building, which is also part of the Insectary complex.

Prof. John Sanderson is the liaison between the Entomology department and CALS Greenhouse Management. He is the head of the floricultural entomology group, studying Integrated Pest Management of arthropod pests of greenhouse floral crops, with an emphasis on biological control. Prof. John Losey's research group is also located in the Insectary. His program focuses on managing insect populations through both Integrated Pest Management and insect conservation. The research groups of Laura Harrington and Elson Shields also conduct part of their work at the Insectary. There is a pesticide-storage area behind the Insectary building.

INSECTARY GREENHOUSE

The Insectary Greenhouse, like the Insectary, is divided into old and new halves. A common corridor that connects the Old and New Insectaries serves a total of 26 rooms. Nearly all rooms are supplied with hot water heat, evaporative cooling, ceiling fans, and vent windows. Most of the rooms are equipped with fluorescent lights and supplemental lighting (e.g., high intensity discharge, metal halide lamps) must be arranged by the user with the greenhouse manager or supervisor. Lighting schedule changes (L:D cycles) must also be arranged in this manner. Additional plant benches (with fluorescent lighting) are available in the main corridor. Workbenches, pots and soil are provided, as are wheelbarrows and a used-soil and plant dump (which must be used!). A fumigation chamber is available in the main corridor for treatment of small groups of plants.

You can contact the greenhouse manager with inquiries about the Insectary greenhouses. The greenhouse manager is responsible for watering and fertilization and also applies insecticides upon request for control of greenhouse pests in the rooms. The manager takes care of routine requests for soil, pots, workspace, fumigation, etc. Procedures for disposal of plant material, forms, and information regarding the shipping of live plant pests for study in the Insectary should be obtained from the greenhouse manager.

If you need to import plants, plant pests, and/or natural enemies from outside New York State, both New York State Dept. of Agriculture and Markets and USDA/APHIS approvals are required (http://www.aphis.usda.gov/plant_health/permits/plantproducts.shtml).

If you are working with genetically-altered plant or animal material (i.e., "recombinant DNA molecules"), get information and permits from the Cornell University Biosafety Officer (currently Alexis Brubaker, ab2324, 254-8475) of the Institutional Biosafety Committee (IBC) and see the

IBC website (http://www.ibc.cornell.edu). Log into e-MUA to create and online MUA form online.forms tab fill out the online (no hard copies accepted).

Please follow the guidelines for pesticide application and plant disposal available at http://greenhouses.cals.cornell.edu/.

A thorough explanation of Best Management Practices, the 'Greenhouse Use Policy' of the College of Agriculture & Life Sciences (CALS), and detailed pesticide application guidelines can be found at: https://oeh.cals.cornell.edu/greenhouses/.

DYCE LABORATORY

Dyce Lab is primarily used for the department's honeybee research, including graduate student research and extension programs. Apiculture studies are conducted at five sites in Tompkins County that occupy a total of 56 acres, of which 20 are at Dyce. It provides space for growing research and teaching programs. Dyce is about 3 miles from campus on Freese Rd. Go east from the Vet. School on Rt. 366 to Varna and turn left onto Freese Rd. The lab is on the right after about a half-mile.

FREEVILLE FARMS

The Thompson Vegetable Research Farm provides field plots for research, teaching, and extension related to vegetables. The farm is located 11 miles northeast from campus on Fall Creek Rd. just beyond the village of Freeville, northeast of the intersection of Fall Creek Rd. and Ed Hill Rd. Various faculty and students have projects at the Freeville Farm, and members of the entomology department have access to a full range of farm equipment, an irrigation system, a pesticide mixing and storage facility, and have support staff to assist with land preparation, harvesting, etc. The farm manager is Steve McKay (spm8, 607-844-8167) (https://hort.cals.cornell.edu/about/facilities/ithaca/thompson-vegetable-research-farm).

The Freeville Organic Research Farm comprises 30 acres adjacent to the Thompson Vegetable Research Farm, which were bought in 2001 by CALS. The farm is managed by the Department of Horticulture to serve as a site for interdisciplinary research aimed at optimizing organic vegetable production systems for the Northeast. More guidelines on how to apply for requesting plots and conducting research are on their web page
https://cuaes.cals.cornell.edu/farms/thompson-research-farm.

HANSHAW ROAD FIELD

Field crops research (primarily alfalfa and corn) is conducted on 50 acres of land managed by the University Farm Services (5-2235).

LONG ISLAND HORTICULTURAL RESEARCH LABORATORY (LIHRL)

LIHRL is located in Riverhead, NY. Facilities include a lab and office building, several greenhouses, and 45 acres of field plots. These facilities are currently shared among professional staff members in the Ithaca-based departments of Entomology, Vegetable Crops, Plant Pathology,

and Floriculture & Ornamental Horticulture. The facility is located at 3059 Sound Ave, Riverhead, NY 11901 (631) 727-3595, Fax (631) 727-3611, https://cuaes.cals.cornell.edu/farms/lihrec/

BOYCE THOMPSON INSTITUTE

The Boyce Thompson Institute for Plant Research (BTI) is an independent, non-profit research facility located on the Cornell campus on Tower Road near the Vet School (http://bti.cornell.edu/). Research in disciplines such as plant physiology, plant pathology, plant biochemistry, and entomology is conducted at the institute. Cooperation and collaboration between BTI and Cornell scientists and students is encouraged. Many Boyce Thompson scientists are currently ad hoc members of entomology graduate committees, providing their students with research facilities and financial support.

USDA PLANT, SOIL, AND NUTRITION LABORATORY

The USDA Plant Protection Research Unit is located at the USDA Plant, Soil, and Nutrition Lab (the "nut" lab) on Tower Road across from Boyce Thompson Institute (https://www.ars.usda.gov/northeast-area/ithaca-ny/robert-w-holley-center-for-agriculture-health/plant-soil-and-nutrition-research/). The Insect Pathology Research Project focuses on fungal biocontrol of insect pests that emphasize environmentally safe pest control methods with acceptable health risks. Target pest insects include the Russian Wheat Aphid, the Diamond Back Moth, and the Potato Leaf Hopper, and the current candidate fungi are *Beauveria bassiana*, *Paecilomyces fumosoroseus* and *Zoophthora radicans*. Scientists in the Plant Protection Research Unit serve as adjunct faculty members in the departments of Entomology and Plant Pathology. The USDA ARS Collection of Entomopathogenic Fungal Cultures, whose staff will store and/or provide fungal cultures upon request, is also housed there.

SARKARIA ARTHROPOD RESEARCH LABORATORY

The Sarkaria Arthropod Research Laboratory (SARL) was designed for the containment of pestiferous, and/or potentially beneficial, exotic arthropods. The facility is intended to be a shared-used facility for members of the Cornell community needing access to research space for exotic, quarantined arthropods and nematodes. The facility includes 2 wet labs, 2 temperature-controlled walk-in rearing chambers, an incubator room (housing 14 half-height and two full height incubators), and 2 greenhouses, all under quarantine. Studies to be conducted include evaluation of pest/host interactions, pest ecology (development, reproduction, and behavior), susceptibility of exotic pests to control methods, and evaluation of natural enemies (both native and exotic) for their impact on both pest species and non-target organisms.

V. LAND RESOURCES

Cornell seems to own most of Tompkins County. University land holdings are ubiquitous in central New York and there are many further afield. In addition to agricultural sites, there are a number of natural preserves. Many are suitable for hiking, entomologizing, class trips, and field research. Insect collecting is not technically allowed in some areas and it is best to check with the Natural Areas office of Cornell Botanic Gardens (Natural Areas Program Director: Todd Bittner, rtb52@cornell.edu, 5-9638). Permission is quite readily granted to graduate students and other researchers. In certain areas it is necessary to submit in advance a written request for a collecting or research permit. To submit a request for research visit: http://www.cornellbotanicgardens.org/our-gardens/natural-areas. Cornell Botanic Gardens maintains about 3400 acres of natural areas spanning 42 sites, including about 200 acres on campus.

Within walking distance of Comstock Hall, the botanical gardens of Cornell Botanic Gardens (http://www.cornellbotanicgardens.org/visitor-info/maps) offer an introduction to the local flora as well as convenient hiking, skiing and swimming. Maps and info are available at the visitor's center (5-2400, One Plantations Road, near the southeast shore of Beebe Lake).

NATURAL USE AREAS OF THE CORNELL BOTANIC GARDENS

Within a short drive from campus are many Cornell land holdings incorporating much of the habitat diversity found in New York State -- bogs, forests, meadows, and so on. Most of these parcels of land are completely open to hiking, birding, etc., but as many are unusual or ecologically fragile the Cornell Botanic Gardens Natural Areas Committee regulates their use. Major restrictions are:

1. Notification of intended use (e.g., collecting) is required.
2. No living or dead organic materials, or any geological materials are to be removed, nor should anything be left (no fishing, trapping, or collecting, but deer hunting is allowed by permit).
3. No snowmobiling or use of all-terrain or off-road vehicles.
4. No fires, no overnight visits.
5. Stay on the trails whenever feasible.

As noted above, it is important to check with the Natural Areas office before collecting the arthropod fauna of a site. Permission for field research should be sought well before the field season begins.

The Natural Areas Committee is trying to collect ecological information on the Areas for the benefit of other users (e.g., records of species occurrences). Anyone interested in providing such information can contact the Plantations staff (plantations@cornell.edu, 5-3020).

Information on all Plantations' preserves, including detailed maps, plant community descriptions, and other interesting natural history information, can be found at http://www.cornellbotanicgardens.org/our-gardens/natural-areas/profiles. There is also an interactive, mobile friendly set of trail maps at http://www.cornellbotanicgardens.org/trails/hikes.

The following is a brief description of some nearby natural areas, intended to give some idea of what is available. Be warned, however, that these directions are approximate, and some sites are very difficult to locate; most are poorly identified and landmarks are few. Cornell Botanic Gardens has some maps and other information. A field guide to Cornell's natural areas, both on and off campus, is available through the Cornell Botanic Gardens gift shop (https://store.cornell.edu/c-1302-garden-shop-gifts.aspx , 5-2400, One Plantations Road, near the southeast shore of Beebe Lake).

Bald Hill; Palmer-Adams Reserve. Largely second-growth forest varying in terrain and history. White pine, red pine and aspen with brushy undergrowth, open hickory-oak and open sugar maple with ericaceous, laurel, hawthorn, and striped maple understories. 146 acres. DIRECTIONS: From Cornell, take Judd Falls Rd to 366 west, turn right, then immediately turn left on Pine Tree Rd. In 1.5 mi, at T, turn left on 79 east (Slaterville Road). In 5.7 mi, turn right on Boiceville Road (past Caroline Elementary). At T, turn left on Central Chapter Rd. In 1.1 mi, turn right on Grove School Road. In 1.3 mi, turn left on Bald Hill School Rd. In 1 mi, turn right at a narrow driveway to enter preserve.

South Danby; Astronomy Lab Site. About half of this site is recently abandoned agricultural fields, and includes both dry and wet meadow. Portions of meadow are being invaded by shrubs and trees, with white pine being the most common. Goldenrod is abundant, and vegetation is relatively low, about 1 to 2 feet. (Now owned by Department of Environmental Conservation, available for research under agreement with the DEC.) 60 acres. DIRECTIONS: 15 mi. southeast of Ithaca in Danby State Forest. 1.5 mi. south of Danby on Route 96B, turn right onto South Danby Rd. Cross Hill/Travers Rds., turn right at the Y onto Fisher Settlement Rd. and go 1.8 mi. to the north edge of the site; the south edge is in another 0.5 mi.

Lighthouse Point; Biological Station. This contains a vestige of the cattail marsh that once dominated this end of Cayuga Lake, also reed grass, gooseberry, and arrow arum. Bottomland forest with willows, cottonwood, box elder, sycamore and dead elms. Grapes, red-osier dogwood, highbush cranberry, teasel, evening primrose, privet mullein and poison ivy are common. DIRECTIONS: The 15-acre triangle of land between the mouths of Fall Creek and Cayuga Inlet. Turn left on Willow St. from 13N then turn left onto Pier Rd. Park at the golf course office.

Connecticut Hill; Carter Creek. Typical upland northern hardwoods forest with beech, hemlock and sugar maple, and in disturbed sites red and white oak, red maple, white ash and Ostrya. Partridge berry, wintergreen, clubmosses, goldthread, Canada mayflower, pine sap and Indian pipe are common. Most of the area east of the creek is disturbed, with aspen, hawthorn, blackberry, gray dogwood, oaks, maples, shadbush and white pine. 426 acres. DIRECTIONS: From Ithaca, go 12 mi. Route 13 south, turn right on Carter Creek Rd. Cornell property begins on the left at 0.7 mi. and on the right at 0.85 mi., and continues up to the State Environmental Conservation land. Park just beyond the bridge at 1.1 mi.

Steep Hollow Creek; Jane E. Hardy Preserve. This is a fairly steep-sided glen and is one of Ithaca's most pristine glens. The top of the slope is dominated by red oak, black oak, shagbark hickory, pignut hickory, and sassafras among others. Characteristic species of the lower slope are basswood, red maple, white ash, and black cherry. 3 acres

DIRECTIONS: Take Route 13 south, turn right onto Route 327. In 0.6 mi there is a pull-off on the right for the first spot. In another 0.15 mi, there is another pull-off to the right.

Renwick Slope; Newman Preserve. Small but nice example of the oak-hickory forests common in the area. Res, white, black, and chestnut oaks are common, with shagnut, pignut, and bitternut hickories. Ground cover is dwarf ericaceous shrubs, such as blueberries and wintergreen. Wide variety of goldenrod species, including the locally rare elm-leaved goldenrod. 6 acres. DIRECTIONS: Easy walk from campus (1.5mi). Take Thurston Ave west to Stewart Ave, turn right. Stewart Ave turns into Cayuga Heights Rd. Turn left on Devon Rd. Entry into preserve is at intersection of Devon Rd with Renwick Drive and Sunset Drive.

Mount Pleasant; Frost Ravine. The ravine does not have steep walls, and the stream has a gentle gradient, with occasional limestone ledges. There are many large granite glacial erratics. The surrounding woods are mixed deciduous, with sugar maple, white ash, beech, basswood, red oak and shagbark hickory. Hop hornbeam, musclewood and witch hazel are in the understory. The western side is recovering from cultivation and has hawthorn, aspen and goldenrod. 31 acres. DIRECTIONS: Traveling east on Route 366, turn left on Mt. Pleasant Rd., cross Turkey Hill and Baker Hill Rds. Continue approximately 2 mi, to the ravine access on the left side. The access is a 25-foot-wide strip in a hedgerow of aspen and marked with a Cornell Natural Area sign. Follow the flagged pedestrian trail to Frost Ravine.

Etna Fringed Gentian Area; Fringed Gentian Natural Area. This is an old field/pasture land that is being rapidly invaded by shrubby vegetation and trees. A hemlock swamp is on the western boundary. Fringed gentians, a locally rare species, can be most easily seen along the roadside edge of the property (blooming Sept. to Oct.). Please note that the area is being used for research and take extreme caution walking there, particularly when the plants are in bloom. 31 acres. DIRECTIONS: Take Forest Home Drive to Warren Rd, then make a right onto Hanshaw Rd. After crossing Route 13, continue 0.85 mi. to the southeast corner of the site (on the left). The house is private; a white POSTED sign marks the beginning of Cornell property that is bounded on the north by private property. Park on the shoulder of Hanshaw Rd.

Monkey Run; Monkey Run Natural Area. This area is heavily used for recreational purposes, and is especially good for birding. It is part of a long biological corridor extending along Fall Creek. Some areas have a logging history, and some areas were previously used for crops; apple trees are still present. Some ornamental species, such as the daylily, are evident. The forests range from dry, upland oak forest to rich flood plain near the creek, wet meadows are also found, wildflowers are abundant in the spring. 500+ acres. DIRECTIONS: Take Route 366 east, turn left on Monkey Run Road. Continue beyond the abandoned railroad right-of-way to a small parking area at the bottom of hill.

McLean Bogs; McLean Bogs. The area is characterized by glacial topography such as kames, kettles and eskers, and contains an acid bog and an alkaline bog. The bogs are fed from springs flowing from glacial gravels and support some rare boreal plants. Mud Pond, the alkaline bog, consists of 1/2 acre of water surrounded by a shrubby quaking mat dominated by speckled alder, red-osier dogwood and water-willow. It also has bog bean, marsh-cranberry, swamppink orchid, with-rod, purple chokeberry, white dogweed, arrowwood, broad-leaved cattail, marsh fern, marsh St. Johnswort, pitcher plant, sundew and skunk cabbage. The acid bog contains leatherleaf, bog

rosemary, cotton grass, the locally rare Vaccinium myrtiloides, and winterberry around the edges. Please take special care not to trample these fragile wetlands. The bogs have been under protection and study since 1919, and represent a rare habitat for this region. The northern deciduous hardwoods stand has matured to near-climax condition. 82 acres. DIRECTIONS: Take Route 13 north to Dryden and continue for 4 mi. to Sweetland Rd., which is a sharp, blind left-hand turn. Continue 0.35 mi. to a yellow house (Hollenbeck) on the right. The access is a 25-ft brushy strip between this house and the next cultivated field. Park on the shoulder; it is 0.25 mi. along the fenceline to the south edge of the preserve.

Ringwood Preserve. A mixture of birch-beech-maple and oak-hickory associations reestablishing in disturbed logging sites. On the upper slope, old chestnut stumps can be found. The understory includes hobblebush, maple-leaved viburnum, blackberries and witch hazel. Herbs include wintergreen, trailing arbutus, starflower, groundpines, goldthread, and some species of orchids. Wetlands range from running streams and permanent ponds to vernal ponds and wooded swamps. These contain sedges, ferns, mosses, and water-loving herbs. 211 acres. DIRECTIONS: From East Hill Plaza, take Ellis Hollow Rd. east for 4.5 mi. Turn left onto Ellis Hollow Creek Rd., in 0.5 mi. the road forks turn right onto Ringwood Rd., and continue 1.7 mi to the southeast boundary of the preserve. There is a widened parking area near the pond 0.2 mi further, with a path along the south edge of the pond. A second path further south on Ringwood Rd. leads to the hemlock stand.

Slaterville 600; Slaterville Wildflower Preserve. Like much of the rest of the state, this land was cut over in the late 1800's, but there is no evidence of use for farming or pasture. The forest is mainly mature beech-maple-hemlock with white ash, but no oak or hickory. The understory contains viburnum, witch hazel and striped maple. There is a wealth of wildflowers growing along the creek beds in the rich alluvial and well-drained gravelly loam soils. The preserve is particularly noted for its richness of ferns, horsetails and groundpines. At this point, Six Mile Creek is flanked by steep gorge walls covered with ferns, lichens and liverworts. Some of the overwash areas have speckled alder swamps. 379 acres. DIRECTIONS: Take Pine Tree Rd to Route 79 east, turn left on Route 79. In 7 mi, turn left onto Harford Rd. In 0.3 mi. turn left onto Six Hundred Rd. and park at the bridge. Proceed to the end of the road (0.5 mi.), park on roadside. Cross the creek via the old bridge and follow trail for 1 mi. Foot trails lead to the north into the wildflower preserve and the east, which leads into DEC land.

Lick Brook; Howard Edward Babcock Preserve. Lick Brook has a large waterfall and several smaller ones. Along the gorge, hemlock, yellow birch, and red maple are dominant. Red cedar, chestnut oak, and white oak are also found. Several locally rare ferns are found along the gorge: glade fern, blunt-lobed woodsia, and walking fern. Blue phlox is abundant at the base of the gorge. Toothwort, an important food of the West Virginia white butterfly larvae, is also found. DIRECTIONS: Take Route 13 south. Just past Buttermilk Falls State Park, turn left onto Sandbank Road. In 1.6 mi bear right on Townline Road and park on the right side. The trail is clearly marked.

CORNELL EXPERIMENTAL PONDS

The department of Ecology and Evolutionary Biology maintains 91 artificial ponds and 2 large reservoirs on 160 acres of fenced land near the Tompkins County Airport. The ponds are 2.4 m

deep, 0.1 ha surface area and contain up to 1000 m^3 of water. Laboratory and storage facilities with electricity, running water, and telephones are available. The facility was designed for replicated experiments in aquatic environments and it is also available for teaching and extension-related activities.

General operations of the ponds are overseen by the Department of Ecology and Evolutionary Biology. Fees are charged for extended research use, varying with the number of ponds used and the nature of the experiments. Pilot projects are encouraged and some funds are available to assist investigators without grants. Fees are not charged for occasional sampling from ponds or other areas where no specific treatments or conditions are required, but a "Request for Use" form must be submitted. For information or permission on general collecting, contact the experimental ponds manager, Robert Johnson (rlj5@cornell.edu).

NATURAL AREAS ON AND NEAR THE CORNELL CAMPUS

In addition to those listed here, there are several natural areas on and near the Cornell campus. Again, all the restrictions about collecting still hold for these areas. These areas include Fall Creek Gorge, Beebe Lake, Hasbrouck Woods, Cascadilla Gorge, and Slim Jim Woods. Information and locations of these and other areas on campus can be found at the Cornell Botanic Gardens Visitor's Center (5-2400).

OTHER SITES

Cornell runs or is affiliated with a number of research stations in the northeast, such as Cranberry Lake in the Adirondacks, and Millbrook (Institute of Ecosystem Studies) in the Hudson Valley, at which graduate students can arrange to do their field work. In addition to the Cornell Natural Areas, Tompkins and nearby counties have many acres of relatively undisturbed state forests, state parks, and county and municipal tracts suitable for collecting and field research. Permission to work on city land such as 6-Mile Creek can be requested from the Dept. of Public Works (City Forester: Jeanne Grace, jgrace@cityofithaca.org, 607-272-1718). Inquiries about collecting or research use in other sites should be directed to the appropriate government office.

VI. CORNELL AGRITECH IN GENEVA

While there is only one Entomology department at Cornell University, there are two campuses. One is located on the Ithaca campus and the other is located in Geneva, New York, at Cornell AgriTech, https://agritech.cals.cornell.edu/. The mission of AgriTech at Geneva is to conduct research to advance knowledge in entomology, food science, horticulture, plant pathology, and plant breeding and genetics leading to the development, protection, production and use of specialty crops with emphasis on fruit and vegetables. The station's campus, located 50 miles north-west of Ithaca at the top of Seneca Lake, houses the departments of Food Science and Technology, Entomology, and the School of Integrated Plant Sciences (Sections of Horticultural Science, Plant Breeding, and Plant Pathology & Microbe Biology), along with the headquarters of the NY State IPM program, and the facilities of several state and federal agencies. AgriTech has a worldwide reputation for excellent research.

FACILITIES

An asset of the Geneva Entomology Department is the availability of excellent facilities for research. The Entomology Department and the Section of Plant Pathology and Microbe Biology are housed in Barton Laboratory. Among the laboratory facilities of the Entomology Department are growth chambers, flight tunnels, a media preparation room, an insecticide spray lab, well-equipped chemistry and molecular biology labs, a potting shed, and attached greenhouse facility. A well-equipped microscopy lab is housed in Barton Lab under the administration of Plant Pathology and Microbe Biology. These facilities include a scanning electron microscope, a confocal laser scanning microscope, and two inverted scopes with video capability.

Other resources include substantial and recently renovated greenhouse space and over 800 acres of research farmland within a radius of a few miles. Cornell Lake Erie Research and Extension Center in western NY and the Hudson Valley Research Lab in Highland NY also provide resources for fieldwork.

The Frank A. Lee Library is now closed but Mann Library serves the information needs of the faculty, research, staff and graduate students involved in research and outreach. By using Borrow Direct and Interlibrary Loan material is sent through campus mail (https://www.library.cornell.edu/services/request). For hours and other information visit the website at: http://mannlib.cornell.edu/help/outreach/geneva-experiment-station . The library's physical collection includes titles on horticultural food crops of economic importance in New York and specifically focuses on wine and grape related subjects. Lee Library's online access extends to all subject areas covered by the greater Cornell Library system and beyond.

There are considerable interactions and shared use of facilities among faculty and staff across different programs and departments/sections at AgriTech due to their close proximity. This interaction provides a multitude of educational experience for a student.

Additionally, AgriTech has a partnership with Hobart and William Smith Colleges (HWS) that allows faculty and students access to their facilities. This includes the faculty dining room, library and athletic building.

UNITS

Administrative Service Center (ASC) provides organization and support for the faculty, staff and students in Geneva. Cornell Information Technology (CIT) has on station expertise to provide support for AgriTech faculty, staff, and students. These services include internet access, video conferencing, and support for computing. Buildings and Properties (B&P) provide maintenance engineering and special services to support research and other functions at AgriTech. Areas of responsibility include capital projects, maintenance, operation and improvement of buildings, utility systems, field research operations, grounds, greenhouses and vehicles. Field Research Operations manages all the land, field facilities and equipment used in support of field research. They also provide pesticide management services. AgriTech Environmental Health and Safety (EHS) provides programs and services to reduce safety, health and environmental risks.
ASC: https://agritech.cals.cornell.edu/administrative-resources/administrative-service-center/
B&P: https://agritech.cals.cornell.edu/administrative-resources/buildings-properties/
EHS: https://sp.ehs.cornell.edu/emergency-services/fire-medical-spill-response/Pages/Cornell-AgriTech.aspx

TRANSPORTATION: COMMUTING, PARKING & FLEET VEHICLE

One perceived obstacle to working in Geneva is its distance from Ithaca (about 50 miles). For Cornell students and employees who need to commute between Ithaca and Geneva for classes or academic-based business, the College an intercampus shuttle service. A bus departs each campus in the morning and returns at the end of the work day. For more information on the shuttle schedule, see https://agritech.cals.cornell.edu/sites/agritech.cals.cornell.edu/files/shared/Bus%20schedule%20Updated%208-2017.pdf. Unlike the Ithaca campus, the Geneva campus does not require you to have a parking permit.In general, Geneva students live in Ithaca during the first year and take as many courses as possible, then move to Geneva. Many students find it helpful to live in Ithaca during the first years while taking classes and to attend seminars on the Ithaca campus, although the Entomology Jugatae Seminar Series is video conferenced between the two campuses as are some other seminars. Many students in later years of their degree program choose to move or commute to Geneva to conduct their research. Some students do some of their thesis work in Ithaca and then commute to or live in Geneva in the summer for field research. The station has a fleet vehicle service. Reservations are made through Cornell University's Fleet Operations website (https://cornell.agilefleet.com/_NewRequest.asp). Additional information can be obtained from the Department Administrative Assistant at Geneva, Holly King (hak3).

HOUSING

Housing is generally cheaper in Geneva than in Ithaca. In addition, the Station provides inexpensive but limited housing for single students. Maximum stay is 6 months. They are especially useful as summer housing for Geneva students who mainly live in Ithaca in early years of their graduate programs.

The first stop for off station housing information is Local Housing Options page provided by the station website. A local newspaper, The Finger Lake Times, and Human Resources of Hobart and William Smith College also provide a list of available local housing.

Local Housing Options by AgriTech:
https://agritech.cals.cornell.edu/administrative-resources/administrative-service-center/housing/
Finger Lake Times classified: http://www.fltimes.com/classifieds/
Hobart & William Smith HR: https://www.hws.edu/offices/hr/

GRADUATE STUDENT ORGANIZATION

In 1994, Geneva students founded a new organization called Student Association of the Geneva Experiment Station (SAGES). This interdepartmental graduate student organization exists to promote leadership, encourage the study of agricultural issues relevant to the State of New York, and promote better relationships between the Station and the city of Geneva. SAGES members plan and conduct social activities for members and members of the Station community as a whole. SAGES also manages the Student Car service for students commuting to Ithaca, provides information on housing, health care, and organizes meetings with thesis advisors and the student health insurance coordinator. SAGES has been very active as a part of the Graduate and Professional Student Association (GPSA) and acts as a group to consider issues at the Station that affect students. Several outreach activities are organized by SAGES and its recent achievement is the SAGES Agricultural Scholarship for local senior high school students who are interested in studying Agricultural Science. SAGES members raise the scholarship fund through selling apple cider made by members at the Food Science Pilot Plant and through helping to sell books at the annual Station Club Book Sale.

SAGES maintains a large student garden during the summer months in which students plant, maintain and harvest all the produce from the plot. Visit the SAGES website at: http://sagesnysaes.wordpress.com/ or at: https://www.facebook.com/sagesnysaes.

OTHER ADMINISTRATIVE DETAILS

Special committee

If the chairperson of your Special Committee is at Geneva, it is recommended that you have a co-advisor at the Ithaca facility to assist you with logistics and to provide assistance. It may be worthwhile to have one of your minor members at the Station as well, especially if that person will be very involved in your thesis research. In any case, it is important to keep in touch with committee members in Ithaca while you are working at Geneva.

GENERAL BENEFITS AND DISADVANTAGES OF WORKING IN GENEVA

The most important advantage of working in Geneva is the access to excellent research facilities. The surrounding research farms are located on some of the best agricultural soils in the world, making fieldwork in many different crops feasible. The proximity to the commercial fruit and vegetable industry opens opportunities for extension experience and on-farm research, if desired. Even though the Station is a smaller campus, it breeds a more informal atmosphere, both socially and bureaucratically. Many graduate students find the smaller atmosphere a pleasant place to conduct research. The Geneva area, also known as the lake trout capital of the world, has all of the recreational opportunities available in the Finger Lakes, such as organized sports through station or city leagues and many water and winter sports.

Disadvantages of the Geneva experience center mainly on the distance from the Ithaca campus. Although physical disadvantages, such as the smaller graduate student population and a one-hour drive to get to classes or academic business are not easy to overcome, but most disadvantages are diminished by advanced telecommunication tools. Geneva Entomology has access to four conference rooms that are fully equipped with Polycom teleconferencing equipment. Beginning in Fall 2010, Entomology seminars are fully broadcasted in Geneva. Geneva students now have the option of remotely having committee meetings through Polycom, and participating in Jugatae meetings from Geneva.

VII. EXTENSION PROGRAMS

OVERVIEW

The Entomology Extension program provides educational and research support to its New York State constituents through the Cooperative Extension division of the NYS College of Agriculture and Life Sciences (CALS). CALS Cooperative Extension (CCE) programming and Extension specialists and agents provide the educational interface between consumers/producers and the latest research. Entomology faculty and staff with Extension appointments are located both in Ithaca and Geneva. They maintain close working relationships with teaching/research faculty and staff. This results in an effective team approach for addressing problems in New York State caused by arthropod pests.

The audience of the entomology extension programs varies extensively and includes county agents, regional extension specialists, county and state health officials, veterinarians, agribusiness personnel, consultants, producers (farmers), homeowners and the general public.

Entomology extension interacts with nearly all departments in CALS along with several departments in the College of Veterinary Medicine and the College of Human Ecology. Multidisciplinary cooperation is enhanced through several statewide program committees, including field crops, vegetables, fruit, livestock and poultry, housing and home environment and landscape horticulture. Entomology personnel are also integrally involved and contribute to the activities of Cornell's New York State Integrated Pest Management Program. In addition, entomology extension cooperates with several state government agencies and with many agricultural and industrial organizations.

The entomology extension programs are coordinated by the Department Extension Leader (DEL, currently Art Agnello, ama4@cornell.edu) The DEL oversees intra-departmental coordination, documentation, and communications with CCE Administration.

Broadly, the overall objectives of the entomology extension programs are to:

1. Provide up-to-date pest management technologies for field and forage crops, livestock and poultry, fruits and vegetables, floriculture, ornamentals, structural, household, home and grounds, and human pests.
2. Provide information and training in general entomology, identification of specimens, and local handling of pest-related problems.
3. Provide information and training in the principles and application of Integrated Pest Management (IPM).
4. Promote the safe and intelligent use of pesticides for the user, consumer, and the environment.
5. Change attitudes on use of pesticides for managing pests from scheduled preventive treatments to acceptance of economic thresholds and spray-as-needed concepts.
6. Provide educational programs through 4-H and youth entomology projects, Master Beekeeper, Master Gardener, and Urban Gardener Programs.

INSECT DIAGNOSTIC LABORATORY

The Insect Diagnostic Lab (http://idl.entomology.cornell.edu/) was established in 1971 and was originally set up to help serve non-commercial agricultural constituents of New York State and Cooperative Extension agents. The services of the laboratory are now open to all. The lab can be contacted by email at IDLDiagnosticLab@cornell.edu. Jason Dombroskie (jjd278) is responsible for the day to day operations of the lab. There is currently a $25 fee for insect identification. Lab staff identify insects affecting people, property and plants, and suitable control recommendations are made when necessary. A series of fact sheets about common insect problems is available on the website (http://idl.entomology.cornell.edu/factsheets/). Individuals with insect or disease questions should first consult their local Cooperative Extension Service for help. The lab is also a first detector for the National Pest Diagnostic Network and an identifier of insects that are being surveyed through the Cooperative Agricultural Pest Survey (CAPS) of the Department of Ag and Markets or through other state and national survey efforts.

PESTICIDE MANAGEMENT EDUCATION PROGRAM (PMEP).

The Pesticide Management Education Program (202 Rice Hall) promotes the safe use of pesticides for the applicator, consumer, and environment, and also serves as a pesticide information and education center for those interested in pesticide chemicals. There are two sub-groups within the program, the Pesticide Safety Education Program (PSEP) and the Pesticide Sales and Use Reporting group (PSUR). PSEP is a federally mandated program that provides unbiased information about pests and pesticides and promotes sound decision making and safe handling practices to pesticide users. PSUR maintains a number of databases for the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). Most of these databases relate to the New York State Pesticide Reporting Law of 1996. PSUR also maintains databases of pesticide products currently or formerly registered for use in New York State, as well as chemical profiles and other documents (historical or current) on various active ingredients. For more information visit the PMEP website: http://pmep.cce.cornell.edu/.

VIII. HISTORY, POLITICS AND PEOPLE

A Brief History of Cornell University

And its Department of Entomology

Originally written by Edward H. Smith, Professor of Entomology, Emeritus

"We will give my students the best facilities for obtaining an entomological training that can be found in the world."

John Henry Comstock to his wife, Anna Botsford Comstock, 1881

Tradition is a strong force in the life of a university and the graduate student coming under the university's influence will do well to acquire some historical insight. This is not easy to do. Institutional history isn't a coffee break topic and while there are book-length histories, these don't usually make the student's reading list. What is needed is a pre-digested history in capsule form that provides an overview and cites sources for the individual who wishes to go beyond the "bare bones." This essay seeks to meet that need.

The Institutional Setting

The earliest institutions of higher learning in the United States were modeled after their European predecessors. They were captives of organized religion and they catered to the privileged class. By the mid 1800s, a strong national spirit of democracy was asserting itself in the United States and calling for a new kind of institution, one free of church domination and devoted to the educational needs of the working class. These educational aspirations found legislative expression in the Morrill Act of 1862 that provided a federal land grant to the various states. This grant was to support "at least one college where the leading object will be; without excluding the other scientific and classical studies, …to teach such branches of learning as are related to agriculture and the mechanic arts, …in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life" (Smith, 1976:6). This legislation was a landmark. The church and snobbery were out. Federal support and needs of the sons and daughters of the working class were in.

The emerging spirit of the federal Morrill Act coincided with the maturing philosophy of one, Ezra Cornell. Cornell was a shrewd, self-made farmer, business man, developer and politician. He had become wealthy in partnership with S.F.B. Morse as they laid telegraph lines to capitalize on the invention of the telegraph. Cornell's Quaker upbringing left him uncomfortable with his wealth. At the same time, he was upset with the church because it scorned his marriage to a non-Quaker. The founding of a staunchly non-sectarian university would ease his conscience by supporting education and getting back at the church at the same time.

Cornell recognized that, while possessing the vision and political skill to run the university, he lacked the polish, patience and intellectual attributes required to succeed. The person chosen to provide these qualities was Andrew D. White, a fellow state senator with impeccable credentials, Yale degree, study at the European centers of learning and experience at the University of Michigan. So in 1868, the university opened its doors with a strong commitment to the innovative spirit of the Morrill Land Grant Act. It was favored by its

picturesque setting "far above Cayuga's waters" and the dynamic leadership of Ezra Cornell, founder, and Andrew White, president.

White immediately set about recruiting faculty for his visionary university and soon learned that able faculty members at established institutions did not share his enthusiasm for Ithaca which, then as now, was considered "centrally isolated." About the best he could do was talk them into appointment as non-resident faculty. Under this arrangement, distinguished faculty would visit, give lectures and confide to White who their most promising graduate students were, who might consider living in Ithaca. Of this arrangement White said"…the former [non-resident faculty] shook the bush and the latter [young resident faculty] caught the bird" (White, 1905:358).

One of the non-resident professors was Louis Agassiz of Harvard, the most distinguished scholar of Natural History at the time. He rendered invaluable service to Cornell in its formative years, a fact often eclipsed by his more publicized role as a leader of opposition to Darwin's theory of evolution.

White served with distinction as Cornell's first president for seventeen years. His influence was felt beyond the campus and he achieved recognition as ambassador to Germany.

The contemporary Cornell University represents an organizational monstrosity with units on the lower campus comprising an endowed university with Liberal Arts, Law and Engineering while on the upper campus are State supported units of the land grant university, Colleges of Agriculture and Life Sciences, Human Ecology, Industrial and Labor Relations and Veterinary Medicine. Despite this organizational complexity, concerted effort is made to adhere to Ezra Cornell's wish to found an institution "where any person can find instruction in any study."

Well over a century later, the spirit of the founder is reflected in the university's continuing pledge to be in the people's service, to educate the sons and daughters of the working class, and to provide non-sectarian education. It was these guiding principles that nurtured the emerging discipline of entomology at Cornell.

Entomology at Cornell

The university was only four years old when the first course in entomology was given in 1872. The striking features of this development are that the course was offered by an undergraduate student at the request of students and the course was in applied entomology. The individual who taught the course was John Henry Comstock whose name, together with that of his wife, Anna Botsford Comstock, became synonymous with entomology at Cornell.

John Henry Comstock lived the American dream. His parents had very limited means but were appreciative of education. His father, Ebenezer, with his wife and small son, John Henry, left New York State to try homesteading in Michigan. He then joined the gold rush to California where he died of cholera en route. His widow and child returned to New York where she earned a meager livelihood as housekeeper and nurse.This required placing her son with family members and finally with the kindly Turner family of Oswego, NY. Mr. Turner was a captain of schooners sailing the Great Lakes. The frail John Henry was not sturdy enough for deck duty but was trained by Mrs. Turner as ship's cook. His duties aboard ship allowed plenty of time for reading. It was Harris's 1841 classic *Insects Injurious to Vegetation* which he happened upon while docked in Buffalo, NY that inspired him to pursue a career in entomology. This copy, inscribed by Comstock, is in the entomology library collection.

Comstock entered Cornell in 1869, a year after its founding. He was drawn by its freedom from religious dogma, freedom to select courses of one's own choosing, and work opportunities to defray expenses.

While Comstock reported to his mother how great it was to earn money shelling corn, the Director complained to the President that they were paying students more to shell corn than the corn was worth.

Comstock became an assistant to Burt G. Wilder, who had been recommended to White by Louis Agassiz as the person to head Cornell's Natural History program. Wilder immediately recognized Comstock's industriousness, self-reliance, and scholasticism, and ultimately became "Henry's special patron saint" (Smith, 1976:8).

In 1872, with a professor in entomology still not installed, a petition was submitted by 13 students requesting that Comstock, although himself a student, present a course on "Insects Injurious to Vegetation". The success of this effort led to his appointment as instructor in 1873 and assistant professor in 1876. His Bachelor of Science degree (1874) was the only degree he ever received.

The winsome student, Anna Botsford of Cattaraugus County, NY, enrolled in Comstock's class in 1875. Despite his reputation as an eligible bachelor who "did not waste sentiment on the young women of his acquaintance" (Smith, 1976:9), romantic interest developed in the course during their hikes in the campus gorges. It was not until after almost three years of acquaintance that they were married (October 7, 1878).

Comstock's vision of university life and the emerging field of entomology was colored by several experiences. The insecurities of his youth developed in him industriousness and self reliance. He was passionately attracted to the study of insects as fascinating components of natural history and for their economic importance. Within the congenial ranks of the developing university faculty he interacted with great minds of other disciplines whom White had assembled. The vibrant atmosphere of those times is well described by one of Comstock's early students, David Starr Jordan, who went on to become president of Stanford University: "The early years of my alma mater, though relatively crude and cramped, were enriched by an enthusiasm hard to maintain in days of prosperity. And the pioneer impulse far outweighed to our minds, any deficiency in coordination, equipment or tradition. At that time we were all young together, freshmen students, freshmen professors, freshman president, without experience to guide or hinder" (Smith, 1976:1).

Comstock's mentor, Wilder, encouraged him to study under K.A. Hagen at Harvard. He took a short turn (1879-81) in federal service in Washington, DC, as Chief, Division of Entomology, USDA. This appointment provided several benefits. He became acquainted with the nation's major insect problems, the developing network of entomologists, and he learned that political appointments were not to his liking. Returning to Cornell after two years, he and Mrs. Comstock laid the groundwork for their joint and separate careers. Comstock worked on two streams of effort: the organization and development of the department, and his personal program of teaching and research. Comstock fostered close interaction between teaching, research and extension, partially in reaction to earlier classical methodology in which student participation and practical ends were secondary to rigid pedagogy.

Not only did Comstock achieve through his personal program of teaching and research but able individuals were drawn to the center of excellence that he had founded. Comstock's goal in teaching was to provide a sound course in general entomology from which specialization could be developed. He provided the text for such a course, *An Introduction to Entomology* (J.H. Comstock, 1924) and assembled the personalities who laid the foundation for specialization. In terms of institutional development, Comstock lived in an era of giants, individuals of outstanding ability who almost single-handedly erected a disciplinary framework that became a model. The department of entomology that Comstock founded at Cornell was the nation's first and became

both a model and a Mecca. It was not only a fount of knowledge for a new field, but an institution of singular commitment and civility. For individuals with aspirations in the field, it was the place to go. At other land grant institutions, the model was copied with slavish repetition, a dubious compliment to the founder who cherished originality, and innovation.

It is virtually impossible to sort out the individual contributions of John Henry and Anna Botsford Comstock. They were strikingly different but their strengths were complimentary. Early on, Anna assumed the role as John Henry's advocate and protector. This was not a simple task when combined with their determination to make their home a social rallying point for students and faculty. She was highly successful in her role as campus Grande dame, author, artist, and caretaker wife. She founded the field of Nature Study and provided its standard text, *Handbook of Nature Study* (A.B. Comstock, 1911), which appeared in its 21st edition in 1986. Mrs. Comstock was the university's first woman faculty member, being named assistant professor in 1898. This appointment drew objections from university trustees and a year later she was appointed lecturer. It was not until 1913 that she was again appointed assistant professor. Full professorship came in 1920 when she was 66 years of age. Mrs. Comstock's death occurred in 1930 followed by his demise in 1931. Despite their passing, the Comstock era was extended under the leadership of James G. Needham. A product of the Comstocks, the two fields of Entomology and Nature Study were organized and advanced to national prominence. Here the personalities, their books, the physical setting, the times, and tradition came together in a combination that spelled greatness. Rarely has a single department so dominated a field. As would be expected, this uniqueness has been lost as other departments have come of age and joined in the pursuit of excellence.

A new era began in 1938 when Charles E. Palm, a new Ph.D., age 27, and an economic entomologist, was named Department Head. The technological revolution was in its ascendancy and there were new expectations of applied entomologists. Palm served until 1958 when he moved to higher administrative responsibility. His service as Department Head spanned two decades of remarkable development through World War II and the surge of technology revolutionized economic entomology. Since then, the discipline has moved into the era of molecular biology, Integrated Pest Management (IPM) and, more recently, biotechnology.

It should not be inferred that in light of these changes the Comstock tradition has been forgotten. It is still very much alive. This was revealed several years ago when administrative resistance interfered with naming the present building "Comstock Hall." A well orchestrated effort involving students, faculty, far-flung friends, and alumni provided a resounding response to the administration. The preferred name was "Comstock Hall", honoring both Comstocks. A plaque and portrait in the hallway entrance pays eloquent tribute to them.

Organizational Changes

Changing needs and interactions have prompted organizational changes. In 1964 the Division of Biological Sciences was formed to provide greater cohesiveness for work in biology. This action was predicated on the belief that while the physical sciences had undergone a period of momentous development, the next great leap forward would be in the biological sciences. The reorganization resulted in the formation of the Division of Biological Sciences which provided options to faculty members in the Department to transfer to a Division Section. Three members chose this course, marking a break with tradition. Research on insects was no longer the exclusive domain of the Department of Entomology. This trend has continued. In 1978 the Boyce Thompson Institute for Plant Research moved to campus, adding a strong contingent of entomological research. Participation of Institute members in the Departmental program has

gradually increased with many more individuals now holding adjunct professorial appointments in the Department.

The total entomological faculty in the Geneva and Ithaca campuses, Division of Biological Sciences, Boyce Thompson Institute, and other units on campus is unmatched by any American university. While organizational relationships within greater Cornell are bewildering, the Graduate Field of Entomology seeks to maintain an orderly framework through which graduate students can draw on these diverse resources.

Unlike most off-campus academic units, the New York State Agricultural Experiment Station at Geneva participates in all four phases of the university activity: teaching, research, extension and international agriculture. Its Entomology faculty participates in gradate training in both basic and applied work with specialized expertise in insect behavior, biochemistry, genetics, toxicology, and IPM. In July 2010 the Ithaca and Geneva departments merged to form a unified Department of Entomology.

The guiding principle underlying graduate study at Cornell is that the student has great latitude in tailoring his or her program to individual interests, the special committee selected by the student provides broad guidance, and the committee chairperson is the key contact individual. The system, while seeming to lack structure and specifics, has stood the test of time and works well for students whose professional goals have crystallized.

As the Entomology Club of Cornell University, "Jugatae" has a long and distinguished record. Like other components of the departmental unit it has undergone modification as needs and relationships have changed.

The name "Jugatae" was given to the organization by John Henry Comstock. One of his major research efforts was the classification of Lepidoptera based on wing venation. He divided the order into two sub-orders, Jugatae and Frenatae, according to the structures that synchronized the fore and hind wings in flight. He must have hoped that the new organization would help synchronize efforts among the diverse elements within the department.

The first meeting of Jugatae was held in 1897. At that time the staff consisted of Comstock and his two assistants, Mark Vernon Slingerland (applied work) and Alexander Dyer MacGillivry (teaching). The first meeting was attended by Slingerland and MacGillivry, seven female and six male students including James G. Needham, who later achieved distinction in aquatic entomology. MacGillivry presented the first seminar on insect muscles. Meetings were held weekly thereafter and usually included research reports, book reviews, and reports on collecting expeditions. In time and until 1938 the departmental staff included ornithologists and mammalogists, insuring broad scope of program topics.

Jugatae came to serve a social role in addition to its scientific role. "Tea" was a regular feature with a silver tea service used on special occasions. The selection of individuals to pour tea was somewhat indicative of peck order. The social agenda included a "get acquainted" reception at the beginning of the fall semester, a fall picnic, Christmas party, spring outing, and occasional social events at the homes of the Comstocks and Needhams. Photographic documentation establishes that Jugatae events were well attended and dress tended toward the formal, a cue being taken from the fact that Mrs. Comstock invariably wore elaborate headgear.

The flavor of past Jugatae meetings can be partially recaptured by reviewing the books of minutes in the entomology library. It was the responsibility of the secretary to insure that the ledger book faithfully recorded speaker, topic, business transactions, and bore the signatures of those in attendance.

Although, then as now, the department was split into factions by specialization and location, a neutrality prevailed at Jugatae. Jugatae was a forum for debate in accord with

unspoken rules. Professional rivalry was indulged in by some faculty members with students aligning themselves with regard to which side their bread was buttered on. The code of ethics precluded a faculty member's vigorous probing of a student's research report (Jugatae wasn't to be confused with qualifying exams). Above all, Jugatae was a training ground for students. One could keep a low profile while observing professional protocol, studying and learning. It also served as a safe forum for testing their leadership wings by presenting a topic before peers as a stepping stone toward presentation at professional meetings. A process of student metamorphosis became institutionalized.

There was an organizational dynamic that generated on-going dissatisfaction among students over the balance between faculty and student influence in running Jugatae. As a student dating back to 1938, I was caught up in these issues and only the retrospect of fifty years reveals the simple fundamentals that lay at the heart of our differences (we students suspected some sinister faculty plot). Without the tread of continuity provided by a few dedicated faculty members, the pendulum of activity swung widely reflecting the inconsistency of student leadership and the problem of achieving continuity in policy and management when vesting leadership in short-term student elective office. In short, the faculty had tenure – the students did not. Although atmosphere of unrest prevailed, the spirit of mutuality proved to be more durable to the lasting benefit of both sides. For most of us, faculty and students, Jugatae met needs that were not met by other facets of the faculty-student relationship.

Jugatae underwent marked changes after World War II reflecting far-reaching institutional changes. Seniority and formality gave way to informality and a new spirit of democracy. Faculty decision-making shifted from long-term administrators to faculty operating through committees. Affirmative action programs moved recruiting into the open reducing the influence of the "Old Boy" network. The women's liberation movement advanced. Women didn't serve tea at Jugatae merely because they were married to an entomologist. The knowledge gap between faculty and students narrowed. For the first time, it became recognized that on new frontiers of knowledge, students might know more than their teachers. The retirement cycle had impact. Faculty members who swelled the ranks in the post-World War II expansion period retired. They had been part of a tradition in which faculty participation in Jugatae was taken for granted. Their successors were young specialists who were less aware of a thread of communality within the department and they participated in Jugatae on a selective basis. This pattern in turn influenced the outlook of their students toward Jugatae.

The age-old problem of faculty-student participation was addressed anew in 1984 and the constitution rewritten to take note of decreased faculty participation and a perceived need for a representative organization to address the needs of entomology graduate students. As a result, Jugatae gave up its founding partnership principle and became a student organization.

Today, Jugatae maintains an active presence in departmental events. The President represents student interests at faculty meetings, most departmental committees have student members, and the annual Jugatae-organized Entomology Symposium highlights student research in the department.

The Contemporary Scene

The newcomer to Comstock Hall should not assume from these remarks that the golden age of entomology is behind us. Indeed, changes abound. Some are local in nature, others apply to the discipline.

On the local scene the student must address the question of how to escape the confines of narrow specialization to participate in the exciting intellectual life of a great university. Further

afield, the student must determine how to acquire the needed specialization and cultivate the mind-set required for participation in interdisciplinary effort required of major new problems. The faculty must consider what mix of disciplinary skills should be assembled to structure a modern entomology department and how they can be melded into a cohesive unit that capitalizes on the strength of diversity rather than divisiveness.

It's an exciting time to be an entomologist. Cornell's distinguished tradition of diversity, flexibility and academic freedom beckons you in your quest for a meaningful adventure in the give-and-take experience of graduate study.

Dedication

This essay is dedicated to students – unsung, untenured teachers of the faculty.

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This autobiography by Mrs. Comstock provides our best insight into the lives of this esteemed couple.

JUGATAE CONSTITUTION AND BY-LAWS

JUGATAE is the Entomology Field's student organization. JUGATAE strives to serve the needs of graduate and undergraduate Entomology students, to enrich the academic and social lives of everyone in the Field of Entomology, and to promote interest in all aspects of insect biology in the Cornell community. We further these goals through various social activities, participation in community activities, and fundraising events. Graduate students are encouraged to participate in social events, run for office, and attend monthly JUGATAE meetings. Above all, the department's weekly seminar series, which is organized by JUGATAE graduate students, serves as a University-wide forum for the exchange of ideas across a broad range of entomological topics presented by researchers worldwide.

Constitution

Article I – Name

The name of this organization is "JUGATAE."

Article II – Mission

JUGATAE will be an organization of graduate and undergraduate students associated with Entomology at Cornell University. The mission of the organization will be to provide a forum for addressing the needs of students in Entomology and to organize a seminar program in Entomology and allied fields, with the purpose of promoting interest and disseminating information therein.

Article III – Membership

Graduate and undergraduate students with a major or minor in Entomology or whose major professor is housed in the Department of Entomology will automatically be part of the membership. All members will be added to the mailing list for JUGATAE business and correspondence.

Article IV – Officers

The officers of JUGATAE are: President, Secretary, GPSA Representative, Treasurer, SNEEB Guru, and Seminar Coordinator. The officers will be elected by majority vote of the membership of JUGATAE, a quorum participating. These five officers form the Executive Committee.

Article V – Meetings

The Executive Committee will meet monthly with general meetings of all members called as necessary (at least once per semester).

Article VI – Amendments

This constitution may be amended at any general meeting by a two-thirds vote of a quorum. Motions to amend must be submitted to the President and Secretary and disseminated to the membership four weeks prior to the meeting.

Article VII – Motions

All motions brought before the membership must be submitted to the President and Secretary and disseminated to the membership four weeks prior to the meeting at which they will be placed before the membership. Approval of all motions, other than amendments to the constitution and by-laws, shall require majority approval by a vote of the membership, a quorum being present.

By-Laws

Article I – Overview of tenure and duties of officers

Section 1 – There will be five offices of JUGATAE: President, Secretary, GPSA Representative, Treasurer, SNEEB Guru, and Seminar Coordinator. The tenure of each office will be one year. The terms of the President, Secretary, Treasurer and Seminar Coordinator will run 1 July to 30 June.

Section 2 – Jugatae Executive Committee Duties:

The President will be the official representative of the JUGATAE membership. The student representative will attend department faculty meetings, conducts meetings of the Executive committee (those listed below), organizes general meetings (or emails) for the membership as necessary (or at least once per semester). In the fall, either the president or the treasurer needs to register the club with the student activities office in order to receive funding from the GPSAFC. In early October, they are also in charge of collecting applications for the Insectapalooza Grant.. In the spring, the president coordinates with the DGS recruitment weekend and hosting. They also are in charge of overseeing the spring department picnic, by sending out advertisements, securing a location, and a main dish.

The Vice President will assist in planning outreach events (Insectapalooza etc.), new student events (Orientation etc.), The Vice President will work with the President, Treasurer and Secretary on the Insectapalooza grant. The Vice President will assume the responsibilities of the President when required.

The Secretary will keep minutes of Executive Committee. As secretary, the student must attend Jugatae meetings, record the minutes and inform the other graduate students about social events. In October, the student works with the treasurer, vice president president on the Insectapalooza Grant. See Article II below for details. The secretary also maintains the Jugatae listserve.

The Treasurer will be custodian of all funds of JUGATAE. The student representative who puts together the yearly budget for expenses associated with the Jugatae student invited speaker, graduate student social activities, and spring picnic. The treasurer also is responsible for coordinating with the president, vice president and secretary for the Insectapalooza Grant, and then disseminating the awards. The Treasurer also applies for funding through the graduate school (GPSAFC) to supplement funds provided by the department. The treasurer works closely with the department administrative manager (currently Cheryl Gombas) to determine which accounts will be used to fund speakers and activities. They also oversee purchase of items to be sold at the Jugatae table during Insectapalooza and adding funds to the Jugatae CFCU bank account (of which the treasurer, president, and faculty advisor are the administrators).

The Seminar Coordinator will organize food and beverage for the department's weekly seminar series and will oversee the student invited speaker. The seminar coordinator committee will be comprised of the first year graduate students and chaired by a more senior Jugatae member. The coordinator is responsible for soliciting nominations for the Jugatae seminar student invited speaker. Once nominations are compiled, a speaker selected by Jugatae (online ballot) will be invited and the student works with the faculty member in charge of Jugatae for scheduling the speaker. Once the speaker arrives, the coordinator will work with the host (the student who invited the speaker) to schedule meetings and meals for the speaker. See details in Article II below. Additionally, the Chair coordinator will lead in the organization of the Annual Department Symposium early in the spring semester.

SNEEB Guru acts as a liaison, and the student must coordinate 3-4 entomology sponsored SNEEBS per semester. This includes: finding professors willing to sponsor the event ($175), purchase beer and snacks (~5/6 cases), advertise via posters, take care of pizza purchase (split by EEB NBB and ENTOM) and delivery, set up and clean up the event. Once the schedule

is known for Jugatae sponsored SNEEBS, email the jugatae listserve to solicit helpers for each SNEEB as a means of promoting graduate student involvement.

The GPSA Representative will keep minutes of the GPSA meetings. The graduate student association representative must attend meetings and disseminate CPSA news to the student body. Attendance to meetings (every other Monday) is a requirement to receive GPSA funding.

The Webmaster will be responsible for maintaining all web presence for Jugatae including the Jugatae blog.

The officers will keep detailed record of their respective correspondence, activities, and updates of duties. These records will be handed down to the next in line for their respective positions.

Section 3 – Nominations of Co-Chairs, Co-Secretary/GPSA Representative, Co-Treasurer, and Co-Seminar Coordinator are acceptable on the ballot. Both members of a shared office will be responsible for the commitments of the said office.

Article II – Jugatae Seminar and Insectapalooza Grant Details

Section 1 - Jugatae Student Invited Speaker Duties:

Every year the graduate student body gets together to invite a special student nominated speaker to give a Jugatae talk. Usually in the spring, there will be a call for nominations for speakers from the faculty organizer of the Jugatae seminar series. There should be one space a year allotted for the student invited speaker. When you receive notice that they are looking for speakers, email out to the jugatae list serve a call for nominations. See below for a sample email of this solicitation. Then the seminar coordinator complies the nominations (the nominators of which should be anonymous) into a survey. The Jugatae club will then be given ~ 1 week to respond to the survey with their preferred speaker (in the survey, let them rate their most to least preferred speaker, that way if the most preferred cannot come, perhaps the second can.) Once a speaker is selected, the seminar coordinator will email the invitation out to the speaker, cc'ing the person who nominated them. See below for a sample invitation email. Once you have heard back from the speaker confirming their interest, you can start to finalize their availability. The faculty organizer should have a list of dates available, which you can include either in the introductory email or follow up emails. Coordinate with the faculty member and the invited speaker.

The titles of the speaker's talk needs to be received by the administrative staff prior to the start of the semester in which the speaker is coming, along with an abstract of their talk. You will also coordinate with the speaker and the administrative staff on the speakers travel and accommodations. Flight and hotel are to be paid for by the Jugatae seminar budget.

Two weeks prior to their arrival, coordinate with the host (the student who nominated them, or another appointed person) to fill the speaker's schedule with meetings with faculty, students, postdocs, and any individual in another department that is interested in talking to the speaker. A good way to check for those interested in meeting with the speaker is to email various listserves (Entom, EEB, NBB, etc.). Along with meeting, meals need to be planned for the speaker of which they are not required to pay for.

Once the speaker has arrived, the host and the coordinator will be responsible for seeing that the speaker arrives on campus on time, attends every meeting, and coordinates the various meals.

Please see appendix 1 for sample emails

Section II: Insectapalooza Grant Details:

Jugatae members have expressed a desire to give back an amount of the money earned at Insectapalooza from the Jugatae Sales table towards future Insectapalooza events. Any graduate student involved in Insectapalooza is eligible to apply. The purpose of the grant is see continued graduate student involvement in Jugatae, using Insectapalooza earned money to encourage a leadership role of the graduate community, as well as in the creation of or maintenance and improvement of an Insectapalooza display.

The application (Appendix 2) is sent out to the Jugatae listserve the end of September and is due one week after. The Jugatae Executive Committee, consisting of the president, secretary, and treasurer, makes up the Insectapalooza Grant Committee and makes decisions on awards based on the applications received and the available funds the week after all applications are submitted.

This grant was established in 2011, and in its first year, 7 submissions were received and all 7 were funded, to varying degrees. The total amount of funds awarded came to $380, with awards ranging from $30-$120.

Article III – Elections

Section 1 – The Secretary will solicit open nominations for the five officer positions, which constitute the Executive Committee staring 1 April. The duration of the open nomination period will be two weeks. The Secretary will organize and provide the membership with election ballots. The election period will last two weeks. The Executive Committee will tabulate the votes and the Secretary will announce the results to the membership.

Section 2 – A plurality vote, a quorum participating, will be necessary to elect each officer.

Article VI – Quorum

When the number of members in attendance at any given general meeting of JUGATAE is equal to two-fifths of the entire membership, a quorum will be considered present.

Appendix 1

Sample nomination solicitation:

Hello Graduate Students,

It is time to initiate nominations for the honor of being the student invited speaker for our Jugatae Seminar Series. The purpose of the student invited speaker is to showcase the graduate student's involvement in the department as well as in our ability to procure effective and engaging speakers with cross-disciplinary appeal.

As nominator, if your speaker is chosen, you will work with the student seminar coordinator to facilitate the arrival of the speaker and organize the speaker's schedule.

You have two weeks to submit your nominations to [seminar coordinator]. I will send another reminder when the end of submissions is near. For now, please include in your e-mail:

Name of Nominee
Current Institution/Affiliation
Field of study
Why they would make a good student-nominated speaker

With the Jugatae currently scheduled for Monday afternoons (3:45pm), it is anticipated that the speakers arrive on Sunday afternoon or evening and leave Tuesday. This would leave all of Monday and possibly some time on Tuesday mornings for meetings with faculty, staff, and students. Dinners can be arranged for both Sunday and Monday evenings.

Once all the nominations have been submitted and voting has occurred, you will be informed which speaker has been chosen. We really appreciate all your submissions.

Sample request for the speaker:

Subject: Would you come to Cornell to give a seminar?

Hello [speaker],

My name is [coordinator] and I am the student representative for Jugatae, Cornell Entomology's Graduate student group. You have been specially nominated to come give a seminar for Cornell's Department of Entomology Seminar Series. The seminar series has a campus wide appeal, bringing in speakers from all over the world to give presentations on a wide variety of insect-related subjects. Your name was brought to us by [host], a [a bit about who they are] and thought you would be a great presenter. The entire Jugatae community voted and would like you to come. Our seminars are during the

Spring and Fall semester on Mondays at 3:45. If you are available we would like to you come [Spring or Fall]. The following Monday seminars are free this [Spring or Fall]:

[Dates available, if applicable]

Let me know if any of these days work. Generally speakers come for 1 or 2 days. The day of the seminar we usually schedule you to meet with faculty and students from entomology as well as other departments that are interested in talking to you. If you are willing to come we will work with you to pay for travel and accommodations. We really hope you can make it.

Sincerely,

[coordinator]

Graduate Student
Cornell University
Dept. of Entomology
Ithaca, NY 14853

Appendix 2

Application for the grant:

Subject: Insectapalooza Graduate Student Grant – Due [in one week]
Call For Applications:
The Graduate Student Insectapalooza Small Grant
Due by 5:00pm [one week after solicitation]
The Graduate Student Insectapalooza Small Grant originated from the desire to use money earned at previous Insectapalooza's toward the improvement of future events. Therefore money used towards the improvement or creation of a graduate student run, graduate student created, or graduate student organized display at this year's Insectapalooza will be funded solely from the money acquired from Jugatae sales at Insectapalooza. All graduate students affiliated with the study of Entomology are eligible to apply.
Funding will be approved and administered by the Jugatae Executive Committee (unless a conflict of interest arises).
Guidelines:
1. Monetary awards must be used towards the improvement or creation of an Insectapalooza display for this year's event, [year].
2. Money requested should be utilized by the graduate student that applied for the money for the purpose stated in the application form. If for any reason funds need to be used for other means, the purpose must be approved by the Jugatae Executive Committee.
3. There is no monetary limit on how much an applicant can request. All applications will be evaluated on a case by case basis depending on the availability of the funds. However, these will be small grants so please use discretion.
4. Submissions of requests towards the improvement of this year's Insectapalooza event

should be performed, even without knowing the exact budget allocations. The goal of this grant is to encourage improvement of this year's Insectapalooza and therefore all requests will be considered. If there are budget concerns, the Jugatae Executive Committee will work with the applicant to ensure proper use of the funds and assess any necessity to award further funds to go toward the improvement of the applicant's display. Further questions regarding The Graduate Student Insectapalooza Small Grant can be directed towards the Jugatae President, [Name and Email of President])

Application for The Graduate Student Insectapalooza Small Grant
Due by 5:00pm, [one week after solicitation]
Please include the following in your application:
1. Name
2. Lab Affiliation
3. Insectapalooza Display of which you are affiliated
4. Amount Requested
5. Purpose of Funds
6. Benefit of the funds to your Insectapalooza Display
Note: these funds are for the express purpose of graduate student involvement in this year's displays and therefore strong emphasis should be placed on your role in the creation or execution of the displays with which this grant is funding.

IX. HOW TO SURVIVE GRADUATE SCHOOL

SOCIAL LIFE AT CORNELL

This chapter is frightfully short, but that does not reflect a deficiency of diversions, distractions, and displacement activities for the toiling graduate student. Instead, it reflects the impossibility of cataloguing all the options that would please all the readers of this volume. There are many. Comstock Hall and the other labs will come to resemble prisons at certain times, and it is, of course, important to have reliable escape routes and to manage your time so that you can enjoy yourself now and then. Ideally you don't have to figure this out by reading Exuviae; talking to fellow graduate students and post-docs will be much more helpful and is strongly recommended.

Among the social-type activities sponsored by Cornell, Grad Activities Week (held during registration) is a good way to get to know the school a bit and learn about some of the non-entomology student organizations on campus. Posted flyers and notes in your registration materials will alert you to G.A.W. events. The Big Red Barn is a kind of graduate student union that sponsors activities (listed on calendars in the Barn) including classes, parties, and the TGIF Happy Hour (cheap beer + snacks) on Friday afternoons.

The departments of Entomology, Neurobiology & Behavior, and Ecology & Evolutionary Biology (previously Ecology & Systematics) co-sponsor the private SNEEB Happy Hour every Friday at 5 PM on the first floor of Corson-Mudd Hall. Labs and students from the three departments share the responsibility of supplying beer and food. It's a great way to meet non-entomological biologists (expand breadth of knowledge, etc.) and to cement bonds with fellow students.

Cornell has student groups for nearly every nationality, profession, and social proclivity conceivable. Not all of these are frequented by graduate students. Check online (http://orgsync.rso.cornell.edu/) or with the directory in Willard Straight Hall (Campus Activity Office) for information. In addition, try Cornell Outdoor Education (Bartels Hall, https://coe.cornell.edu/), which sponsors outings and gives classes for backpacking, skiing, kayaking, etc. Information on intramural sports is available in Helen Newman Hall. The artistically inclined might prefer to check out various pottery, photography and drawing classes offered in Willard Straight Hall.

Also, don't forget that Ithaca is in many ways a real city and has community activities and organizations that may be of interest. Pick up the free publication "Ithaca Times" now and then for the entertainment calendar and other area information.

On the following pages are advice and admonitions for the bewildered grad; some will be useful to the new student and some may not become relevant for a few years. These notes should at least be consulted for a second opinion when your committee gives you advice that you suspect is insane.

RESOURCES FOR READING.

Smith, R.V. 1984. Graduate Research: a guide for students in the sciences. ISI Press, Philadelphia, PA.

Sternberg, D.H. 1981. How to Complete and Survive a Doctoral Dissertation. St. Martin's Press, New York, NY.

Stock, M. 1985. A Practical Guide to Graduate Research. McGraw-Hill, New York, NY.

SAGE ADVICE

Some Modest Advice for Graduate Students
by Stephen C. Stearns

Always Prepare for the Worst. Some of the greatest catastrophes in graduate education could have been avoided by a little intelligent foresight. Be cynical. Assume that your proposed research might not work, and that one of your faculty advisers might become unsupportive - or even hostile. Plan for alternatives.

Nobody cares about you. In fact, some professors care about you and some don't. Most probably do, but all are busy, which means in practice they cannot care about you because they don't have the time. You are on your own, and you had better get used to it. This has a lot of implications. Here are two important ones:

1. You had better decide early on that you are in charge of your program. The degree you get is yours to create. Your major professor can advise you and protect you to a certain extent from bureaucratic and financial demons, but they should not tell you what to do. That is up to you. If you need advice, ask for it: that's their job.

2. If you want to pick somebody's brains, you'll have to go to them, because they won't be coming to you.

You Must Know Why Your Work is Important. When you first arrive, read and think widely and exhaustively for a year. Assume that everything you read is crap until the author manages to convince you that it isn't. If you do not understand something, don't feel bad - it's not your fault, it's the author's. They didn't write clearly enough.

If some authority figure tells you that you aren't accomplishing anything because you aren't taking courses and you aren't gathering data, tell him what you're up to. If they persist, tell them to buzz off, because you know what you're doing, dammit.

This is a hard stage to get through because you will feel guilty about not getting started on your own research. You will continually be asking yourself, "What am I doing here?" Be patient. This stage is critical to your personal development and to maintaining the flow of new ideas into science. Here you decide what constitutes an important problem. You must arrive at this decision independently for two reasons. First, if someone hands you a problem, you won't feel that it is yours, you won't have that possessiveness that makes you want to work on it, defend it, fight for it, and make it come out beautifully. Secondly, your Ph.D. work will shape your future. It is your choice of a field in which to carry out a life's work. It is also important to the dynamic of science that your entry is well thought out. This is one point where you can start a whole new area of

research. Remember, what sense does it make to start gathering data if you don't know - and I mean really know - why you're doing it?

Psychological Problems are the Biggest Barrier. You must establish a firm psychological stance early in your graduate career to keep from being buffeted by the many demands that will be made on your time. If you don't watch out, the pressures of course work, teaching, language requirements, and who knows what else will push you around like a large, docile molecule in Brownian motion. Here are a few things to watch out for:

1. The initiation-rite nature of the Ph.D. and its power to convince you that your value as a person is being judged. No matter how hard you try, you won't be able to avoid this one. No one does. It stems from the open-ended nature of the thesis problem. You have to decide what a "good" thesis is. A thesis can always be made better, which gets you into an infinite regress of possible improvements.

   Recognize that you cannot produce a "perfect" thesis. There are going to be flaws in it, as there are in everything. Settle down to make it as good as you can within the limits of time, money, energy, encouragement, and thought at your disposal.

   You can alleviate this problem by jumping all the explicit hurdles early in the game. Get all of your course requirements and examinations out of the way as soon as possible. Not only do you thereby clear the decks for your thesis, but you also convince yourself, by successfully jumping each hurdle, that you probably are good enough after all.

2. Nothing elicits dominant behavior like subservient behavior. Expect and demand to be treated like a colleague. The paper requirements are the explicit hurdle you will have to jump, but the implicit hurdle is attaining the status of a colleague. Act like one and you'll be treated like one.
3. Graduate school is only one of the tools that you have at hand for shaping your own development. Be prepared to quit for awhile if something better comes up. There are three good reasons to do this.

First, a real opportunity could arise that is more productive and challenging than anything you could do in graduate school and that involves a long enough block of time to justify dropping out. Examples include fieldwork in Africa on a project not directly related to your Ph.D. work, a contract for software development, an opportunity to work as an aide in the nation's capital in the formulation of science policy, or an internship at a major newspaper or magazine as a science journalist.

Second, only by keeping this option open can you function with true independence as a graduate student. If you perceive graduate school as your only option you will be psychologically labile, inclined to get a bit desperate and insecure, and you will not be able to give your best.

Third, if things really are not working out for you, then you are only hurting yourself and denying resources to others by staying in graduate school. There are a lot of interesting things to do in life besides being a scientist, and in some, the job market is a lot better. If science is not turning you on, perhaps you should try something else. However, do not go off half-cocked. This is a serious

decision. Be sure to talk to fellow graduate students and sympathetic faculty before making up your mind.

Avoid Taking Lectures - They're Usually Inefficient. If you already have a good background in your field, then minimize the number of additional courses you take. This recommendation may seem counterintuitive, but it has a sound basis. Right now, you need to learn how to think for yourself. This requires active engagement, not passive listening and regurgitation.

To learn to think, you need two things: large blocks of time, and as much one-on-one interaction as you can get with someone who thinks more clearly than you do.

Courses just get in the way, and if you are well motivated, then reading and discussion is much more efficient and broadening than lectures. It is often a good idea to get together with a few colleagues, organize a seminar on a subject of interest, and invite a few faculty to take part. They'll probably be delighted. After all, it will be interesting for them, they'll love your initiative - and it will give them credit for teaching a course for which they don't have to do any work. How can you lose?

These comments, of course, do not apply to courses that teach specific skills: e.g., electron microscopy, histological technique, scuba diving.

Write a Proposal and Get It Criticized. A research proposal serves many functions.

1. By summarizing your year's thinking and reading, it ensures that you have gotten something out of it.
2. It makes it possible for you to defend your independence by providing a concrete demonstration that you used your time well.
3. It literally makes it possible for others to help you. What you have in mind is too complex to be communicated verbally - too subtle, and in too many parts. It must be put down in a well-organized, clearly and concisely written document that can be circulated to a few good minds. Only with a proposal before them can they give you constructive criticism.
4. You need practice writing. We all do.
5. Having located your problem and satisfied yourself that it is important, you will have to convince your colleagues that you are not totally demented and, in fact, deserve support. One way to organize a proposal to accomplish this goal is:
    a. A brief statement of what you propose, couched as a question or hypothesis.
    b. Why it is important scientifically, not why it is important to you personally, and how it fits into the broader scheme of ideas in your field.
    c. A literature review that substantiates (b).
    d. Describe your problem as a series of sub-problems that can each be attacked in a series of small steps. Devise experiments, observations or analyses that will permit you to exclude alternatives at each stage. Line them up and start knocking them down. By transforming the big problem into a series of smaller ones, you always know what to do next, you lower the energy threshold to begin work, you identify the part that will take the longest or cause the most problems, and you have available a list of things to do when something doesn't work out.

6. Write down a list of the major problems that could arise and ruin the whole project. Then write down a list of alternatives that you will do if things actually do go wrong.
7. It is not a bad idea to design two or three projects and start them in parallel to see which one has the best practical chance of succeeding. There could be two or three model systems that all seem to have equally good chances on paper of providing appropriate tests for your ideas, but in fact practical problems may exclude some of them. It is much more efficient to discover this at the start than to design and execute two or three projects in succession after the first fails for practical reasons.
8. Pick a date for the presentation of your thesis and work backwards in constructing a schedule of how you are going to use your time. You can expect a stab of terror at this point. Don't worry - it goes on like this for awhile, then it gradually gets worse.
9. Spend two to three weeks writing the proposal after you've finished your reading, then give it to as many good critics as you can find. Hope that their comments are tough, and respond as constructively as you can.
10. Get at it. You already have the introduction to your thesis written, and you've only been here 12 to 18 months.

Manage Your Advisors. Keep your advisors aware of what you are doing, but do not bother them. Be an interesting presence, not a pest. At least once a year, submit a written progress report 1-2 pages long on your own initiative. They will appreciate it and be impressed.

Anticipate and work to avoid personality problems**. If you do not get along with your professors, change advisors early on**. Be very careful about choosing your advisors in the first place. Most important is their interest in your interests.

Types of Theses. Never elaborate a baroque excrescence on top of existing but shaky ideas. Go right to the foundations and test the implicit but unexamined assumptions of an important body of work, or lay the foundations for a new research thrust. There are, of course, other types of theses:

1. The classical thesis involves the formulation of a deductive model that makes novel and surprising predictions which you then test objectively and confirm under conditions unfavorable to the hypothesis. Rarely done and highly prized.
2. A critique of the foundations of an important body of research. Again, rare and valuable and a sure winner if properly executed.
3. The purely theoretical thesis. This takes courage, especially in a department loaded with bedrock empiricists, but can be pulled off if you are genuinely good at math and logic.
4. Gather data that someone else can synthesize. This is the worst kind of thesis, but in a pinch it will get you through. To certain kinds of people lots of data, even if they don't test a hypothesis, will always be impressive. At least the results show that you worked hard, a fact with which you can blackmail your committee into giving you the doctorate.

There are really as many kinds of theses as there are graduate students. The four types listed above serve as limiting cases of the good, the bad, and the ugly. Doctoral work is a chance for you to try your hand at a number of different research styles and to discover which suites you best: theory, fieldwork, or lab work. Ideally, you will balance all three and become the rare person who can translate the theory for the empiricists and the real world for the theoreticians.

Start Publishing Early. Don't kid yourself. You may have gotten into this game out of your love for plants and animals, your curiosity about nature, and your drive to know the truth, but you won't be able to get a job and stay in it unless you publish. You need to publish substantial articles in internationally recognized, refereed journals. Without them, you can forget a career in science. This sounds brutal, but there are good reasons for it, and it can be a joyful challenge and fulfillment. Science is shared knowledge. Until the results are effectively communicated, they in effect do not exist. Publishing is part of the job, and until it is done, the work is not complete. You must master the skill of writing clear, concise, well-organized scientific papers. Here are some tips about getting into the publishing game.

1. Co-author a paper with someone who has more experience. Approach a professor who is working on an interesting project and offer your services in return for junior authorship. They'll appreciate the help and will give you lots of good comments on the paper because their name will be on it.
2. Do not expect your first paper to be world shattering. A lot of eminent people began with a minor piece of work. The amount of information reported in the average scientific paper may be less than you think. Work up to the major journals by publishing one or two short - but competent - papers in less well-recognized journals. You will quickly discover that no matter what the reputation of the journal, all editorial boards defend the quality of their product with jealous pride - and they should!
3. If it is good enough, publish your research proposal as a critical review paper. If it is publishable, you've probably chosen the right field to work in.
4. Do not write your thesis as a monograph. Write it as a series of publishable manuscripts and submit them early enough so that at least one or two chapters of your thesis can be presented as reprints of published articles.
5. Buy and use a copy of Strunk and White's *Elements of Style*. Read it before you sit down to write your first paper, then read it again at least once a year for the next three or four years. Day's book, *How to Write a Scientific Paper*, is also excellent.
6. Get your work reviewed before you submit it to the journal by someone who has the time to criticize your writing as well as your ideas and organization.

Don't Look Down on a Master's Thesis. The only reason not to do a master's is to fulfill the generally false conceit that you're too good for that sort of thing. The master's has a number of advantages.

1. It gives you a natural way of changing schools if you want to. You can use this to broaden your background. Moreover, your ideas on what constitutes an important problem will probably be changing rapidly at this stage of your development. Your knowledge of who is doing what, and where, will be expanding rapidly. If you decide to change universities, this is the best way to do it. You leave behind people satisfied with your performance and in a position to provide well-informed letters of recommendation. You arrive with most of your Ph..D requirements satisfied.
2. You get much-needed experience in research and writing in a context less threatening than doctoral research. You break yourself in gradually. In research, you learn the size of a soluble problem. People who have done master's work usually have a much easier time with the Ph.D.
3. You get published.

4. What's your hurry? If you enter the job market too quickly, you won't be well prepared. It's better to go a bit more slowly, build up a substantial background, and present yourself a later as a person with more and broader experience.

Publish Regularly, But Not Too Much. The pressure to publish has corroded the quality of journals and the quality of intellectual life. It is far better to have published a few papers of high quality that are widely read than it is to have published a long string of minor articles that are quickly forgotten. You do have to be realistic. You will need publications to get a post-doc, and you will need more to get a faculty position and then tenure. However, to the extent that you can gather your work together in substantial packages of real quality, you will be doing both yourself and your field a favor.

Most people publish only a few papers that make any difference. Most papers are cited little or not at all. About 10% of the articles published receive 90% of the citations. A paper that is not cited is time and effort wasted. Go for quality, not for quantity. This will take courage and stubbornness, but you won't regret it. If you are publishing one or two carefully considered, substantial papers in good, refereed journals each year, you're doing very well - and you've taken time to do the job right.

Acknowledgements: Thanks to Frank Pitelka for providing an opportunity, to Ray Huey for being a co-conspirator and sounding board and for providing a number of the comments presented here, to the various unknown graduate students who kept these ideas in circulation, and to Pete Morin for suggesting that I write them up for publication.

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REPLY TO STEARNS: SOME ACYNICAL ADVICE FOR GRADUATE STUDENTS

Raymond B. Huey

Preface

When Steve showed me the preliminary outline for his talk, my first response was to say, "Steve, this is really cynical, even by your standards! You can't possibly present such a negative view of graduate education." My second response was to draft an alternative outline, which I

intended as a direct challenge to Steve's, and which I presented after Steve so rashly stormed out of Ecolunch. A decade has passed since we performed that amusing skit. In transcribing our old outlines into text, Steve and I have tried to preserve the intentionally argumentative, point-counterpoint format, and flavor of our original presentations. We do so, not because we remain convinced that our old views are necessarily correct (I am pleased to note that Steve now recants his views, at least in part), but because we want to emphasize a diversity of views of how to be a graduate student.

Our main point is this: there is no one-way to be a graduate student. Each of us is an individual - each of us has individual needs, goals, capacities, and experiences. Advice that is productive for one student may be disastrous for another. So think about these and other views, but don't accept them without question.

Initial Premise

Graduate school provides an opportunity for you to change from being someone who reads to someone who is read. That is a major metamorphosis, indeed. Not surprisingly, it presents challenges as well as opportunities.

Always Expect the Best

If you anticipate the worst, you are likely to experience it. Instead, develop a positive attitude, decide what you want (T.A. position, research funds, etc.), and then get it. Go outside your university whenever possible for advice and for funds. Don't merely rely on your major professor. In short, be active and independent, not passive and dependent.

Some People Do Care

People are more likely to care about you if you act like a professional (see below) and if you make yourself valuable. Obtain a skill (multivariate statistics, electrophoresis) that you can share (and of course use yourself). Avoid being used, however.

Seek out and collaborate with fellow graduate students, especially ones who are doing interesting work and who are enjoying it. You are likely to learn far more from graduate students than from your advisor, if only because you have more in common and spend more time with them. In short, use these interactions as an opportunity to be introduced to different viewpoints and techniques and to become excited about your career.

Seek out emeritus or near-emeritus professors, at least ones who are still active. They have a wealth of knowledge and experience, and often have the time and interest to share it. Moreover, they can give you a personal appreciation for the history of your field. Science is an historical activity, and progress in science is often enhanced by an understanding of the past.

On "Exhaustive" Thinking

Thinking "widely and exhaustively" can be mentally exhausting if you aren't academically and emotionally prepared. You may instead make better use of your first year by making up deficiencies in your course background (do so as quickly as possible!). Moreover, some people simply need time before they are ready to think independently. That maturation process can sometimes be accelerated by starting your research with a problem that your advisor "hands you."

Ultimately, however, you must begin to think and do research independently, and you must understand why you are doing a particular project.

On Psychological Problems

Expect them. Everyone will go through periods of intellectual insecurity or stress, most likely in the first year or two. You can often minimize these problems with some simple tricks.

1. Get requirements out of the way as soon as possible. You will be surprised at how much your attitude toward graduate school and your research will improve once you pass all language requirements and qualifying exams. Keep in mind that faculty are inevitably impressed by students who aren't intimidated or slowed down by academic hurdles.
2. Some people simply need time to mature academically. So, fight directives and pressure to complete your Ph.D. in 4 years. You may need to take some extra time or even take a leave of absence. Changing schools or advisors sometimes helps, especially if you can first obtain a Master's degree.

Becoming a Professional

Think of yourself as a professional, someone who will be a biologist for the rest of your life. Start to accumulate a library and reprint collection, develop a computerized list of references and addresses, attend meetings, meet with visiting seminar speakers, correspond with people working on related problems, send out copies of your articles as they are published, etc.

Treat each project (even a literature review) as if it is potentially publishable.

Faculty are more likely to treat you as a professional if you act like one. They are a good source of suggestions in this regard. Ask their advice on efficient ways to organize your reprints and reference files, or ask them to recommend key papers (their own, or those of others) that influenced their thinking and careers. Read those papers, then go back and discuss them with the professor. (Note: Many graduate students have not read most of their advisor's papers, or those of other relevant faculty in their department.)

Despite your best efforts (and theirs), the faculty may have a difficult time treating you as a colleague rather than as a student. Therefore, develop contacts outside of the department and the university, thereby gaining a new perspective on biology and on your own work. Go on a tour of other universities, meet with faculty and students working in your area, volunteer (if appropriate) to give an informal seminar of your thesis work. If possible, spend a term and take courses at another university (or a field station), especially if a course is special and especially if you are spending your graduate career at one university. These outside contacts not only broaden your perspectives but may also increase your chances for a collaborative research project, a post-doc, or even a job.

Join appropriate scientific societies, attend their yearly meetings, give papers or posters, and get to know your future colleagues. Meetings can be exciting and a chance to find out what is new. Moreover, you get practice at speaking in front of a "foreign" (e.g., non-sympathetic audience).

On Courses

Never pass up a lecture course from a great professor, even if it is somewhat outside your main area. Seek courses that challenge you to think rather than to memorize. Auditing courses can often be an efficient way to get an overview of a field, at least if you are self-disciplined.

Take short courses that can save you time over the years. Many libraries give instruction on efficient literature searches (see also Smith's book, cited by Steve); and most universities offer introductions to computers, statistical packages, etc. If you don't know these critical skills already, immediately learn speed typing and word-processing.

On Proposals and Grants

Grant writing is a key skill. Ask professors for copies of their successful grant proposals (perhaps ask for unsuccessful ones as well). In other words, find out what makes a good proposal before your start writing; don't waste time "reinventing the wheel."

Be a scholar. Showing that you know and understand the literature makes a good impression, and it gives you an awareness of the key issues in your field.

Use the working proposal Steve describes as a basis for a real grant proposal. Many societies, government agencies (NSF), and organizations give grants to graduate students - ask your major professor and other graduate students for the names of such organizations. Prod your department or advisor to start a permanent file on such grants.

Getting your own grant has important benefits beyond simply funding your research. (1) It gives you something to add to your C.V.; (2) It helps establish your independence from your advisor and your department; and (3) It really impresses your advisor and your committee!

Interactions with Your Advisors

On Theses

(Tangent. Even after a decade, I can still hear Steve pontificating the first sentence in this section. His expression, "a baroque excrescence," is my fondest auditory memory of Berkeley.)

Onward. A thesis shouldn't be a culmination of your research career, but its beginning. You probably never really had your creativity challenged as an undergraduate. Here is your opportunity. Push yourself - you'll respect yourself more than if you are too cautious and try a no-risk project.

Remember that your future research directions need not be constrained by the topic of your thesis. In fact, your thesis experiences may convince you that your interests and talents are elsewhere. Use a Master's-to-Ph.D. switch or a post-doc to change directions, if appropriate.

Publishing

Contrary to widespread opinion, writing and publishing can be fun. More importantly, the process of writing is a positive learning experience - my understanding of my own research is invariably enhanced while developing a paper or grant proposal.

Writing and publishing aren't always fun, of course, but you can minimize problems by being careful, by organizing your thoughts before you write, by taking pride in crafting sentences carefully, and by having people critically review your papers before you submit them for publication. This review process should be sequential: First, give it at an "Ecolunch" (informal lunch-time gathering of graduate students). Second, write a draft and have your fellow graduate students and advisor review it critically. Third (optional, but advised), send it to one or a few experts in the field. Fourth, submit the manuscript.

(Having now been an editor of several journals and books, I would add several caveats. Make certain you follow the "Instructions to Authors" for the journal: If you use the wrong format, the editor will suspect that (1) your paper was previously rejected by another journal, or that (2) your work style is casual and not necessarily to be trusted. Also, carefully check the citations in the text against the literature cited section. Check text, tables, and figures for accuracy and neatness. (A paper that is neat and well designed is easy to read.) If you are writing an invited chapter for a book, do your very best to meet all deadlines. Editors cherish contributors who actually meet deadlines and follow instructions.

Publishing is an important responsibility - you share your insights with others. It is also essential. People occasionally get good jobs or a grant despite of a weak or nonexistent list of publications, but the odds of this happening are slim, indeed.

Although over-publishing is a mistake, as Steve notes, don't be embarrassed by writing one or a few minor papers - ample precedent exist. Moreover, we are often our own worst judge of what is truly significant (see Bartholomew 1982). After gaining the benefits of the experience, you can eventually obscure any truly trivial publications by using the following widely used technique - simply change your official "List of Publications" to a "Selected List of Publications" or to a "List of Publications since 2003" etc!

Miscellaneous

Watch for and take advantage of opportunities. If someone is organizing a special field trip, ask if you can go along and help. If there is a job search in your department, look through the applications and learn, first-hand, what makes a good C.V. and what makes a clear statement of research and teaching interests. (Note: Not all departments permit graduate students to read application files.) Find out your advisor's opinion of the candidates' job seminars. Thus when you start applying for jobs, you will have some idea of what works and what doesn't.

Concluding Remarks

Appearances to the contrary, graduate students need not be oppressed. You actually have as much freedom as you ever have (except perhaps as a post-doc or during a precious sabbatical). Be positive, not cynical.

Postscript

"Ten years later," I wish to emphasize one comment and then make one addition. First, do spend time around students and faculty who are doing significant research and who are excited about their careers. In short, surround yourself with good people. Enthusiasm is contagious. Second, learn to respect and to practice the art of being organized. Thus, be efficient and don't waste time. This will almost certainly enhance your productivity and your enthusiasm for your career.

Acknowledgments

I am, of course, grateful to Steve Sterns, whose outrageous views prompted this reply. T. Garland, Jr. made useful comments on a draft.

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MORE SAGE ADVICE*

The following advice is excerpted from the Bulletin of the Entomological Society of America (1989) 35: 13-16.

Hedging Against Uncertain Academic Opportunities: A Student Guide

I am charged with telling you, students, how to prepare for your future; specifically, how to prepare yourselves for employment in academia.

From my own professional experiences as well as from my experiences hiring new doctorates into faculty positions, what advice can I give you? I'll give it by responding to a series of questions, several of which were suggested when I was invited to prepare this discussion.

Should You Balance Basic and Applied Course Work?

A Ph.D. is a research degree, not a course work degree like B.S. or, to some extent, an M.S. I have seen outstanding Ph.D. graduates who have excelled in academic positions who have little or no course work during their doctoral programs. The courses you take during your doctoral program, and even those taken during your M.S. program if you are planning to go on for a Ph.D., are taken for the purpose of preparing you to conduct your Ph.D. research and continue research in your chosen area.

If the question whether you should focus on a basic or an applied area, the answer is that there are and will continue to be job opportunities for both kinds of graduates. The extent to which you can gain experience in both, however, will be an asset in terms of keeping more options open for you. For example, some applied experience will make you a stronger candidate for extension positions.

How Important Are Minors?

Minors as such are not important. We rarely look for them on a curriculum vita or transcript. You do need the greatest possible concentration and depth in your chosen area of expertise. This should be combined with evidence of an ability to work in collaboration on interdisciplinary research teams. You should also be able to redirect yourself and change over time.

Should You Obtain Broad Experience?

Most faculty position recruiters look first and foremost for the candidate with the greatest and the strongest research experience. Even teaching and extension positions usually have a research component, and the edge is most often given to the candidate with the strongest research credentials. Research is the most important criterion in the inherited internal scale of values in the academic community.

Some teaching experience is important, especially if you have the opportunity to teach a whole course or at least give several lectures. You need to have more than just experience as a laboratory teaching assistant, although any evidence of teaching looks good. Perhaps as important is an ability to communicate well orally so that you make a favorable impression when you interview. This will help persuade faculty members that you can handle yourself well in the classroom. The seminar you give during the interview is important in this regard.

Extension experience is much less critical. A graduate who has solid research credentials, with applied research experience, and who speaks and writes well and has computer skills will compete effectively for extension positions.

Are Extracurricular Activities Valuable?

Although not a critical necessity, outside activities and involvement in organizations such as ESA help round out your visa. Such experiences also help you mature and develop greater self-confidence and thus make you a more effective candidate in an interview.

Participating in extracurricular activities in your department while you are a graduate student will help the department head and faculty form a favorable impression of you. This translates into positive letters of reference.

How Much Practical Experience?

Several practical experiences could strengthen your credentials. Field research and experience at a branch station, and management of faculty research laboratories or programs, or teaching a course during the absence of a faculty member are helpful. Organizing a student seminar series or a fundraising activity or a new awards program or other similar activities can demonstrate your initiative and leadership. Participation in professional meetings and giving papers are important as well, although less important that having publications in respected journals. Abstracts of papers presented are not the equivalent.

Will Grant Writing and Publications Help?

Both of these areas are important – extremely important. Given the primary importance of research and accomplishments in an academic environment, any evidence that you can provide that you have been successful in research and have potential for even greater success in the future is of critical importance. Published articles (you can never have too many) that list you as the sole or senior author and appear in respected refereed journals provide such evidence in a convincing fashion. You should publish your doctoral dissertation, and this should at least be in press when you are applying for faculty positions. If you accept a job before your dissertation is published, make sure to publish it as soon as possible; otherwise, it will haunt you at promotion or tenure time.

Because university funding for research is limited and usually provides only a base level of support, you will be expected to generate sponsored funding if you are to fulfill your potential in research. Any evidence you can offer that you have written grant proposals and have been awarded funding as a result is convincing.

Is Postdoctoral Experience Important?

Many fields routinely require postdoctoral research experience before a candidate is considered for a beginning faculty positions. Such a position gives you an additional opportunity to write grants and publish research papers.

However, if you simply stay on in your adviser's laboratory, or if you are on a postdoctoral appointment for several years, it makes you look less than attractive and less employable. Someone looking at your vita may wonder why you haven't been able to move on sooner.

What Are the Most Important Items on a Vita?

1. Publication in respected, refereed journals.
2. Successful grant-writing experience.
3. Participation in interdisciplinary research.
4. A Ph.D. adviser with an excellent reputation.
5. Strong postdoctoral experience.

6. Evidence of excellent communication skills, including facility with computers and at least one foreign language.
7. Degree-granting institutions (diversity can be an asset).

Don't Do This

Don't take a faculty position at your Ph.D. institution, at least not until you have had faculty experience at another major institution. Putting yourself in a new environment after graduation stimulates your competitive urges and motivates you more than staying where you were a student, although the latter is always easier and more comfortable. When you stay, it is difficult for faculty to view you as colleague rather than as a student. Don't leave your Ph.D. institution before completing your dissertation, regardless of the financial burden it places on you. Don't become a workaholic. Take time to smell the daisies, and keep your sense of humor.

Land Grant College Employment?

I'd also like to speculate on the future employment at land grant institutions. I believe the future is bright for well-trained and highly motivated students. We are entering an era during which a significant proportion of the trained professionals at our land grant institutions will be retiring, and the pipelines are not filled with an adequate number of replacements.

Our inherited scale of academic values places search as the primary criterion for academic success. However, I think this will change because of new demands placed on academic institutions by society. We will move from disciplinary research to problem-solving interdisciplinary research, which will require research scientists to work in close collaboration. My vision of the land grant university of the future is one at which education and professional development, basic and applied research, and extension or a dissemination and public interface function will coexist in balance, each drawing on and supporting the others. It will be an exciting place to work and you should seriously consider the career opportunities it will provide. Our land grant universities need you to help people live and make a living.

I realize that my employment outlook for the future at land grant universities is brighter than some who might think me overly optimistic. For a contrasting view I refer you to Ross Miller's article in the Spring 1987 issue of the *Bulletin*, "Reflections on Employment in Entomology," (p. 4). Miller contends that we are producing too many new Ph.D.'s for the number of employment opportunities. I don't agree with him, particularly on prospects for the future at land grant universities, but I feel obliged to refer you to his viewpoint as well.

I'd like now to divert my focus briefly, straying from the assigned topic and offer you some personal advice that could help you be successful, regardless of whether you pursue your career in academia or in some other environment.

Learn to Manage Your Time

There are only so many hours in a day and week and I don't believe anyone can work effectively beyond 50 or 55 hours a week. I have seen too many faculty members and administrators who are poor managers of time who lug homework evenings and weekends, putting in extra hours to catch up at the expense of family and personal time.

In managing your time, recognize your most productive time of day and protect that for your most creative projects. I protect 7:30 to 9:30 A.M. each day for working in my office without interruption – no meetings and no telephone calls. At first others wondered whether I didn't come to work until 9:30 A.M., but they now accept my method of time management. An important part

of time management is developing a calendar and scheduling system that works for you (and your secretary if and when you are fortunate enough to have one).

80/20 Rule

Spend 80% of your time on the 20% of your tasks and responsibilities that are most important. To do so you must take time to reflect and assess which tasks are the most important.

When in Doubt, Delegate

The biggest reason for the failure of administrators and managers, including anyone who manages a program, is a failure to delegate. I believe this applies at all levels. Recruit outstanding subordinates and have confidence in them. They can make you successful and make your life much more tolerable.

Annual Performance Objectives

Develop annual objectives for yourself, share them with your superior, and seek approval for them. Then, evaluate your progress toward fulfilling them as you move through the year.

Monkeys Off Your Back

Don't let subordinates dump their problems on you. If they have the responsibility and the ability to solve problems offer them support and encouragement but let them keep the problems and keep their feet to the fire. You need room on your back for the monkeys your supervisor will dump on you; you can't do anything about them.

Trust Your Intuition

Don't do it if it doesn't feel right. Let me distinguish this from being afraid to take risks. You should dare to be different, to be a proactive risk taker, but there are times when it just doesn't feel right.

Don't Procrastinate

Making a decision is better than not making one, even if you risk a mistake. We learn from mistakes, as long as we don't make mistakes every time we make a decision.

Don't Lose Your Temper

It rarely pays to lose your temper. Keep your cool, it will driver others crazy and help you win most confrontations.

Don't Take Yourself Too Seriously

Maintain a sense of humor and an ability to laugh at yourself. In a sense, we are all actors on a stage and this too will pass. Paranoia is common in academic institutions. Faculty members are supposed to be the source of creative ideas for positive changes in our economy and society and yet they can be unduly conservative and resistant to change within our own institutions. Academic politics may be the worst kind because the stakes are so small, and because the men and women of honor are outnumbered by the men and women of principle.

An academic career can be a stimulating and rewarding one. The rewards are personal, intellectual and financial, although in the latter case not always as great as in the private sector. There is also great security and flexibility. I like managing my own time and coming and going as I please, as long as I get the job done. However, whatever career you choose, it is of utmost

importance that you enjoy what you are doing. Every job has some distasteful aspects, so you need to generally enjoy it and believe that you have the best job in the world at the time you are in it to be successful and receive the satisfaction you need to live a fulfilling life.

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