

Kandlikar Plant Ecology Lab

Kandlikar lab

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Welcome to the lab!

We are thrilled that you are here. Thanks for joining us in our quest to improve our understanding of ecological communities, and to make the world a better place while we do it.

This digital book is a living document¹ that includes important information for helping making your time in the lab a success. The first section (“Onboarding”) includes a number of logistical points that you will want to address within the first few weeks after joining. The second section (“Life in the lab”) includes more general information about day-to-day activities in the lab and our department more broadly. The “Resources” section will be curated with links to academic papers, blog posts, books, and other material that you are likely to find helpful at some point during your stay in the lab.

¹ We will dedicate at least one lab meeting each year to revising the contents of the book, and you are welcome to suggest changes on the [git repository](#) at any time.

Acknowledgements

The content of this book – and my approach to mentorship and running a research lab more generally – is highly shaped by my own experiences in academia, and by lab leaders across the world who have shared their work publicly. In particular, I want to give a shoutout to [Lauren Sullivan](#) and [Max Liboiron](#), both of whom have, in different ways, fundamentally reshaped my idea of what a research lab can look like.

Part I

Onboarding

1 Basic onboarding logistics

This chapter contains tedious (but super important!) logistical information to help you get settled into the lab.

1.1 Keys

All non-undergraduate members of the lab should request keys for LSA A363 and LSA A127, following the steps below.

Steps for submitting a Key Request

1. Navigate to https://lsu.edu/science/biosci/resources/work_requests.php
2. Click on the large “Biological Sciences IT support, work order, and key request form”.
3. Click on ” BioSci - Work Request ”
4. Click the purple “Request Service” button on the right the screen. If you are not already logged into your myLSU account, this will prompt for your username/password
5. Complete the form (select “2” for how many keys are you requesting, and you can input both room numbers.)
6. Gaurav will get an automated email to approve your request. If I don’t approve your request within 24 hours, feel free to remind me in person or on Discord.

1.2 Computing

All lab members of the lab will have access to computers (either a dedicated laptop or shared desktop) in lab for work. These

computers will all be connected to LSU servers, and you can log in directly with your LSU accounts. If you have trouble accessing your account, submit a Work Request to our Department IT office.

Steps for submitting a Work Request to BioSci IT

1. Navigate to https://lsu.edu/science/biosci/resources/work_requests.php
2. Click on the large “Biological Sciences IT support, work order, and key request form”.
3. Click on “BioSci - IT support request”
4. Click the purple “Request Service” button on the right the screen. If you are not already logged into your myLSU account, this will prompt for your username/password
5. Explain your problem in the Description field; include as much detail as possible to help Teryn/Aaron troubleshoot as quickly as possible.

1.2.1 Connecting to the lab printer

Steps for connecting to the lab’s wireless printer are posted next to the printer itself. Gaurav can help you if you run into issues, or you can submit an IT ticket as above.

1.2.2 Lab Discord

As soon as you can, please ask Gaurav (or anyone else in the lab) to send you an invitation to join the lab’s Discord. We use the discord for sharing relevant links, papers, events, etc.; to coordinate field trips and other research activities, etc. You will also have a private channel with Gaurav; please use this channel for informal communication, as emails tend to get lost.

1.2.3 Setting up on GitLab

During your first few weeks in lab, please follow the steps [here](#) to get set up with an account on GitLab.

1.3 Lab website

Please send Gaurav your photograph, brief bio, and pronouns for the [lab website](#). In general, the bio can include information like you hometown, general research interest, ongoing projects, and past experiences. Please feel free to share anything else you'd like to include!

1.4 Trainings

All LSU employees and students are required to complete trainings regarding data security, ethics, lab safety, etc., within a few months of arrival on campus. You will receive automated emails about such requirements, most of which involve completing modules on LSU Moodle. ***Please ensure that you complete all trainings on time***; lack of compliance has consequences for you personally and for the lab.

In addition to these, I also ask that everyone complete the “Basic Bio-Safety” and “Autoclave” training modules from LSU’s Environmental Health and Safety office within a month of joining the lab ([link](#)). Forward your confirmation email to Gaurav to maintain as part of the lab records.

1.5 Authorization to drive university vehicle

If you anticipate needing to drive the department truck, please complete the University’s driver authorization protocol: https://lsu.edu/riskmgt/vehicleuse/lsuam_vehicleuseprocedures.php. ***Complete this training and paperwork well in advance*** (e.g. 1 month) of when you anticipate using the vehicle.

1.6 Establishing a digital lab notebook

Follow the steps at [this link](#) to initiate your own lab notebook. Note that you need to [get set up on GitLab](#) before you can proceed with this step.

2 Making a formal plan for your time in the lab

All long-term members of the lab will be asked to complete this [Self Assessment/ Reflection activity](#) within the first few weeks of your time at LSU. You can expect this exercise to take ~2 hours, especially if you are coming into the lab with a lot of previous training.

After you complete it, please share it with Gaurav via email and/or Discord, and we will arrange an in-person meeting. During this meeting we will go through your responses, and thereby ensure that we are on the same page regarding your goals for your time in the lab.

You will complete this activity at least twice a year, so please save your reflection in a good place.

3 Expectations

Each one of us is on a different trajectory through life. We arrive to the lab with different histories, work towards different goals, and will leave with different sets of experiences. Thus, the exact nature of what it means to have had a “successful” time in the lab will differ from person to person. Nevertheless, there are a few expectations I have for everyone in the lab that I hope will help us establish a shared culture and lab vision, and to ultimately achieve our shared goals.²

3.1 Research expectations

Thematically, projects in our lab will generally center on questions about plant ecology/evolution, or on questions about the process of doing and teaching ecology. Given the value of integrating ideas, and results from theoretical, experimental, and observational approaches, I expect all lab members to develop expertise in each of these areas. In return, lab members can expect that I will provide the necessary resources and environment for developing such expertise.

3.1.1 Scope of research

3.1.1.1 *Undergraduate students*

When undergraduate students join the lab, you will initially be assigned to help with ongoing projects in the lab that are being led by a graduate student and/or postdoc. This period of working closely with a more senior lab member will help you learn the culture of our lab (and of ecology research more broadly), and will help you think about particular questions within plant ecology that might be most appealing to you. After a year

² If you feel that any of the expectations in this chapter are inconsistent with your values/outlook, or with how we can achieve success more generally, please (**please!**) discuss with Gaurav or propose a discussion topic for lab meeting!

working in the lab, you will be encouraged to develop ideas for an independent research project that fits then general types of work ongoing in the lab.

A note about grades in Biol 3999

As in my undergraduate ecology, I adopt some version of an ‘**ungrading**’ philosophy when it comes to semester grades for students working towards Biol 3999 credit.

You first ‘assignment’ in the lab will be to read through this lab handbook, and to write a brief essay (or unessay) about what you want to get out of this semester. We will then schedule a 30-minute meeting early in the semester to make sure that our expectations are aligned, and then again in the last week of the semester to decide on your final grade.

3.1.1.2 Graduate students

As discussed during recruitment meetings, I expect graduate students to take charge of defining both the general theme of your dissertation research, as well as the details of your dissertation chapters. That said, I recognize that achieving such independence takes time, and in fact can’t be achieved alone, and will always be available to support you in working towards this goal. In some cases, graduate students will be paid as RAs for a specific grant; in this case, please plan to spend 20 hrs/week on the specific project-related work. I will always work hard to offer RAs that match your dissertation theme.

3.1.1.3 Postdocs

The exact scope of postdoc work will depend on the source of funding, and will always be discussed with the individual postdoc both during recruitment and after starting in the lab (e.g. as part of the self assessment/evaluation exercise). In general, postdocs projects will be closely aligned with the major research themes in the lab, but I also strongly encourage postdocs to bring their own unique perspectives to our work. This has a number of benefits, including that will help us expand

our own scope by learning new ideas/techniques, and that it will help you further define yourself as an independent scientist and prepare for the next step of your career (see thoughts on career mentorship for more on this).

3.1.2 Publications

3.1.2.1 Undergraduates

Undergrads who demonstrate sustained commitment to a project (i.e. helping on a given project for ≥ 2 semesters) will generally be invited to participate as authors for any resulting publications. The exact details of what “sustained commitment” means will vary by project, and can be discussed with Gaurav and/or the graduate/postdoc mentor. Undergraduates who propose and carry out an independent research project will be encouraged to lead efforts in paper writing, and can expect sustained mentorship and support from the lab in this endeavor.

3.1.2.2 Graduate students

PhD students can expect to develop 3-5 dissertation chapters, each of which should result in a peer-reviewed publication (usually co-authored with Gaurav, but not strictly necessary). Our department’s PhD guidelines require that at least one of your dissertation chapters is fully published prior to your graduation, and whenever possible you should aim to have all of your chapters at least submitted by the time you graduate.

3.1.2.3 Postdocs

Postdocs should aim to lead at least 1 paper per year coming out of research in our lab. I also understand that postdocs might also be finishing up papers from previous positions, and ask that you communicate your plan for this work with Gaurav during self-assessment/evaluation checkins.

3.1.3 Collaborative projects outside of the lab

Throughout your career you will get lots of opportunities for working with researchers outside our group on collaborative projects. I encourage you to seriously consider such opportunities, as they will help you develop new skills and build a professional network beyond our lab. Before you commit your time to working on an “external” project, please share your plans with Gaurav so that we can discuss how this project fits in with your long- and short-term goals.

3.1.4 Lab notebook

Undergraduate students are required to maintain a physical or digital lab notebook throughout their time in the lab. If you prefer to maintain a physical notebook, the lab will provide one; if you prefer to maintain a digital lab notebook, please create a Google doc and share it with Gaurav.

Everyone else is expected to maintain a lab notebook in the format of a Quarto book. Please start your lab notebook using the provided [lab notebook template](#). Before you are ready to start this lab notebook, you will have to [set up a GitLab account and SSH](#). Then, you can follow the steps in the [lab notebook index](#).

3.2 Graduate progress

Progress in graduate school is often nonlinear, and can never be the same for any two students. (This is why we do self-evaluations/checkins! To ensure that everyone is clear about their own unique paths). Nevertheless, the entry, progress, and exit checkpoints of graduate school can impose a considerable mental burden on students, and to help address this burden, [this document](#) lays out some guidelines to keep in mind as you progress through the years.

3.3 Work hours

I trust all members of the lab to be conscientious about setting your work hours and developing work habits in a way that enables you to progress towards the goals that we have discussed in our self reflection/evaluation conversations and in weekly meetings. In return, I ask that you **communicate regularly and openly with Gaurav** about your work hours/habits, including when you think that making adjustments to your working hours that will facilitate your progress. In general, please remember that my priority as an advisor is to help you achieve your professional goals, so you are always welcome to talk to me if you feel that something isn't working.

3.3.1 Gaurav's work hours

During the semester I expect to work from home for a few hours in the morning and on campus between ~10.30am-5pm. I will post a message in the lab discord on days when I have to be away from campus for extended periods.

Note: I often work on weekends, because this works for my lifestyle and tempo of work. This might include sending emails or messages on Discord. I definitely don't expect you to respond to these immediately; please take your weekends off!

3.3.2 Undergraduate students

Most undergraduate students will be earning course credit (Biol 3999) and/or hourly pay while working in the lab. In either case, we will agree upon weekly time commitments at the beginning of each semester, and I ask that you stick to these throughout the semester. That said, I understand that some weeks might be especially hard due to course exams and other assignments. In these cases, please give me (and more importantly, any graduate student with whom you might be working) a heads up about such busy weeks. For example, check your exam schedule as soon as you confirm your classes, and if you know that you have 3 difficult midterms back-to-back in a given

week, give us a heads up so that we don't schedule a big lab push during the same week.

Note that lab activities like lab meetings, individual meetings with mentors in the lab, attending SEE seminars, and time spent driving to field sites (as well as any time you might spend preparing/cleaning up after field visits) all count towards working hours.

3.3.3 Graduate students

As mentioned above, I expect graduate students to set your own work hours towards the goals that we discuss together. I ask that you are generally present in the lab and are an active participant in formal and informal lab activities. If for any reason you need to be away from lab for an extended period, please discuss with Gaurav well in advance so that we can make sure that we can maintain open communication during this time. I encourage graduate students to take vacations when possible (I trust you to judge what this means, and to let me know of your vacation schedule as soon as you can).

At the same time I also encourage graduate students to acknowledge that during your grad career, there will likely be periods during which you have to put in long hours to ensure the success of your dissertation studies. Please feel free to communicate with Gaurav about ways in which we can support you through these intensive periods.

Note about TAs

When working as teaching assistants, graduate students can expect to spend up to 20 hours a week on teaching-related duties. TA duties may extend slightly beyond 20 hours in some exceptional weeks (e.g. if all students submitted a big lab report), but in such cases, you should expect for this to be compensated with a reduced workload in a different work. If you find yourself consistently spending >20 hours/week on TA duties, please talk to Gaurav.

3.3.4 Postdocs

As mentioned above, I expect postdocs to set your own work hours (including days to work from home, etc.) towards the goals that we discuss together. I ask that you are generally present in the lab and are an active participant in formal and informal lab activities. If for any reason you need to be away from lab for an extended period, please discuss with Gaurav well in advance so that we can make sure that we can maintain open communication during this time. I encourage postdocs to take vacations when possible (I trust you to judge what this means, and to let me know of your vacation schedule as soon as you can; note that as full time employees at LSU, postdocs are contractually guaranteed 14 paid vacation days annually). The exact balance of work will change depending on various factors, but as a rough estimate, postdocs can aim to spend 60% of time on their primary research project, 20% of time contributing to the lab/department culture, and 20% of time on outside projects (e.g. finishing up PhD work, applying to future positions). I strongly encourage time-tracking as a way to maintain this balance and practice good time management.

3.3.5 Research staff

The time guidelines for research staff will vary based on exact project. In general everything written above applies to such positions: please ensure that your work schedule enables you to achieve the work goals that we discuss together, and that you communicate regularly with Gaurav about any expected or unexpected deviations. In general we will try to ensure that you don't have to work on any weekends or University holidays, some work may be unavoidable (e.g. if an experiment needs daily watering). In such cases, please count these as 1.5x hours.

3.4 Lab events

3.4.1 Lab meetings

I expect all graduate students, postdocs, and research staff to actively participate in weekly lab meetings, whose exact timing will be determined at the beginning of each semester. These meetings will last ~1.5 hours. Undergraduate students are encouraged to join these meetings, but it is not required.

3.4.2 Lab socials

We will try to have at least one lab social per semester, plus more for special occasions like major dissertation progress, new members joining, etc. We will aim to organize these at a time that is convenient for all members, but especially given that these will likely be held outside of traditional work hours, your attendance is not required. Note that if you would like to join these socials but cannot due to the hours, please communicate this to Gaurav and we will happily find another time!

3.5 Department events

3.5.1 SEE seminars

I encourage graduate students and postdocs to attend as many weekly SEE seminars as possible. These seminars are always held at *1pm on Mondays in LSA 101*. Please let Gaurav know if you consistently are unable to join seminars (e.g. because you need to be away from campus at that time every week). Lab members might also be interested in other departmental seminars, including those held on Friday afternoons in the Museum of Natural Sciences.

3.5.2 Department socials

The department generally hosts monthly socials, usually on Wednesday afternoons. These are great opportunities to get to know our colleagues, chat about science, and find out something new!

Part II

Life in the lab

4 Lab maintenance and cleanliness

As members of the lab community, it is our shared responsibility to maintain the cleanliness of our space and equipment.

4.1 Office/clean lab space (363)

4.1.1 Food

The common lab space includes a common use fridge and microwave. Both of these should be used for food only, and never for research samples. (If you need extra fridge space for holding samples for a short amount of time, please ask Gaurav). Please restrict food use to daily food; unlabeled boxes that seem to be on a path to become fixtures of the fridge will be mercilessly purged on a ~weekly basis.

No food or drinks are allowed into Room 363B (i.e. “clean lab room”). This is strict requirement.

4.1.2 Coffee

The common space has a Moccamaster coffee machine. Please watch [this video](#) that describes its use and cleaning. ***Please make sure to turn the coffee machine off*** after each brew, as the “intelligent” hotplate may not be as intelligent as promised. Gaurav will usually take coffee grounds home at the end of the day for composting; if Gaurav is away, please discard coffee grounds immediately.

4.1.3 Garbage

Please take any food waste (including empty packages etc.) to the garbage bin outside of the lab; only use the lab garbage bin for “dry” waste that we get from shipments etc.

4.2 Field lab space (127)

No food or drink is allowed in LSA 127.

This is a high-traffic space with lots of samples coming in and out. Please don't use it for long-term sample storage without prior discussion with Gaurav. Make sure to clearly label anything you leave in this room with your name, date, and project information.

5 Field safety

There are lots of components to consider for ensuring field safety. Over time, this page will grow over time to reflect our protocols for planning, executing, and debriefing after field trips. Everything on this page applies as much to local field trips to nearby sites, as it does to international trips.

Before going on any field trip, please ensure that your emergency contact information is up-to-date on the [lab information excel sheet](#) (requires LSU login).

5.1 Packing list

- First aid kit
- LSU Plant Biology car magnets – use any time when driving to remote sites in Louisiana
- Hydration, including electrolyte mix if needed
- Long sleeved clothing, sunscreen, and a hat
- Appropriate footwear (always carry rubber mudboots with you for local field work in Louisiana)

Before you go, make sure to message the appropriate channel on lab discord. Please indicate who is going, where, and ETA of return.

5.2 Other resources

- <https://besjournals.onlinelibrary.wiley.com/doi/10.1111/2041-210X.13970> (Rudzki et al. 2022)

Rudzki, Elizabeth N, Sara E Kuebbing, David R Clark, Burhan Gharaibeh, Mary J Janecka, Rachael Kramp, Kevin D Kohl, et al. 2022. “A Guide for Developing a Field Research Safety Manual That Explicitly Considers Risks for Marginalized Identities in the Sciences.” *Methods in Ecology and Evolution* 13 (11): 2318–30.

Part III

Computing resoures

6 Basic software

As you get set up with your computing environment, please install R, RStudio, and Git onto your machine:

- Download and install R from the CRAN website ([LINK](#))
- Download and install RStudio from the Posit website ([LINK](#))
- Download and install Git from the Git-Scm website ([LINK](#)). Note that if you are using Windows, please verify that this also installs GitBash onto your computer.

There are tons of resources online, including instructive videos on YouTube, which I encourage you to watch to get a better sense of what each of these programs do and how to use them. It will take sustained practice to develop expertise with these, so don't get discouraged if you feel lost in your early days.

7 Getting set up on GitLab

Our lab uses [GitLab](#) for developing code, collaborating, keeping track of lab notebooks, and much else.

There is a substantial learning curve to using Git and GitLab, so don't feel like you have to be an expert on day 1 (or even by the end of year 1!). But, stick with it, and the payoff will accumulate over time.

7.1 Making an account on GitLab

Please share your LSU email address with Gaurav, and he will generate an invitation for you to join the lab's Gitlab group. If you already have a Gitlab account, send your username to Gaurav.

In the newest version of Gitlab, you will be asked to specify a "role" and why you are creating an account. Your responses don't really matter - my suggestion is to respond with "**Other**" and "**I want to store my code**", respectively.

7.2 Connecting your computer to your GitLab account

Follow the steps in this video to connect your computer to your gitlab account³:

³ [here](#) is the direct link.

Part IV

Lab techniques/protocols

8 Watering fastplants seedlings

See web version of the book for a video.

9 Extracting seed counts from photographs

9.1 Overview

This documents how one can use [ImageJ](#) to extract seed counts from a clean picture of seeds on a white background.

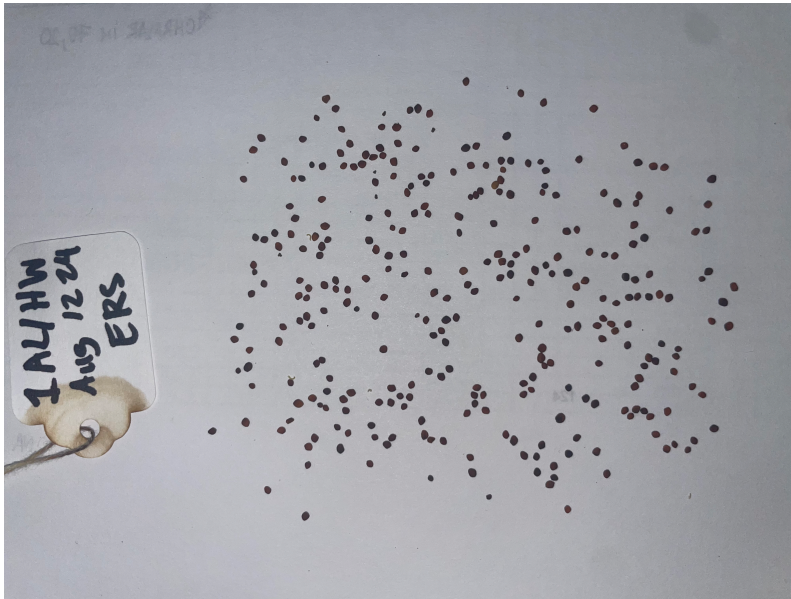
9.2 Taking the photo

This step is pretty straightforward: the goal is to get a clean photo of the seeds (with as few flower bits, dust particles, or other contaminants) on a plain white background. I find it easiest to spread seeds on a plain white sheet of paper (leaving them in plastic trays leads to shadows in the picture, which can lead to mistaken seed counts). Also ensure that the photo includes something to identify the sample from which the seeds were derived.

Factors to consider while taking the photo:

- Leave a ~1cm border around the seeds, as objects at the edge of a photograph can be difficult to process
- Try to minimize reflections/shadows
- Make sure that each photo has a unique identifying tag (“1 AL/HW...” in the example below)
- **Minimize instances in which two or more seeds are directly touching each other to make clumps**, as this has the potential to generate under-estimates (e.g. a group of 3 seeds that are all touching each other can get lumped as 1 object by the software).

- If there are so many seeds that you can't avoid clumping or leaving a border around the edge, split the batch into two photos (which are also to be uniquely identified)
- Save each photo with the same tag name that has been used for other measurements (e.g. the photo would be saved as "1_AL_HW.jpg").
- *If you are processing many samples in one go*, please read the batch processing section below for steps to increase consistency and efficiency.



9.3 Counting seeds

Before proceeding with the following steps, ensure that you have installed [ImageJ](#) onto your computer. These steps are also summarized in the video below⁴.

⁴ or at [this](#) direct link.

0. Before proceeding with any analysis steps, back up all photos into the lab "Raw data archive" on [Box](#) in an appropriately labelled folder. This ensures that even if we somehow mess up (or delete) an image through the imageJ processing, we always have a copy to return to.

1. Open the seed photo through ImageJ
2. [Optional, but recommended early in any project]. Make a duplicate of the photo using the shortcut “Control[/Command]+Shift+D”. Having this duplicate open helps to do “sanity checks” on the processed image.
3. Through the ImageJ menu, click on “Image” -> “Type” -> “8 Bit” checkbox. This converts the photo into Black-and-White.
4. Convert this into a Binary image by clicking on “Process” -> “Binary” -> “Make Binary”. Verify that the image looks to be OK; sometimes if the lighting is uneven across the image, the binary crops off some parts. In this case, you may want to change the thresholds.
5. Convert the image into a Binary Mask by clicking on “Process” -> “Binary” -> “Convert to Mask”.
6. In some cases, ImageJ might consider adjacent seeds as one object. You can check if this is the case by zooming into a clump of seeds and checking whether each seed is identified separately.
7. To avoid the issue described above, click on “Process” -> “Binary” -> “Watershed”. This process draws boundaries between clumps of objects that are likely to be composites.
8. We are ready to analyze the image to extract seed counts!
9. To do so, draw a bounding box around the area of the photo with seeds (so that the photo tag is not counted as an object)
10. After ensuring that the bounding box encompasses all seeds, click on “Analyze” -> “Analyze particles”. Make sure to select “Overlay” under the “Show” checkbox. Also select “Display Results”, “Summarize”, and “Exclude on edges”.
11. Check using the overlay that (a) all seeds in the image are identified as objects, and (b) no debris is identified as a seed. If you do notice debris identified as seeds, close the analysis results, and re-click “Analyze particles”. Give a minimum size threshold, and reanalyze particles. The right size threshold will depend on the species you are working with, and on your photographs. For the *B. rapa* image above, a threshold of 400 seems to work well.
12. Iterate step 11 until you feel confident that you are iden-

tifying an appropriate threshold.

13. Save the output as desired in the CSV datasheet. If you are processing a batch of images, you can directly save the summary box that includes the total particle (seed) counts.

Part V

What to do when things go wrong

10 Emergencies

In progress

10.1 Health emergency

10.2 Emergencies in the field

10.3 Natural disasters

11 Sickness and related concerns

In progress

The work culture in the US [glorifies](#) working through sickness (whether mental, physical, or otherwise). We don't do that here:

If you are sick, please go home to rest.
If you are sick with a potentially contagious infection, please stay home.

As brilliantly explained in the [CLEAR lab book](#), this will mean different things if you are experiencing an acute illness (e.g. a flu that can pass relatively quickly with proper care), or if you have a chronic illness or disability whose daily effects can be variable but persistent. Please talk to Gaurav so that we can set up ways for simultaneously maintaining our commitments to your health and wellbeing, and to your work in the lab.

11.1 Communication

If and when you get sick, please let Gaurav know when you are able. This will help us plan for what needs to be done to accommodate your commitments to work in the lab.⁵

In some cases, a sickness might get in the way of your other commitments, e.g. responsibilities as a TA. Please feel free to contact Gaurav if you need help navigating these commitments.

⁵ This is just one of many reasons why I insist on your maintaining an active lab notebook that lays out your daily and weekly plan - if you need to be away from the lab, other members will step in to minimize disruptions to your plan.

11.2 Medical resources

get help from people to fill this out

12 Support beyond the lab

In progress

This will be filled in through discussions with lab members about what support is available and/or needed beyond the lab.

Part VI

Misc documents

13 Graduate timeline

Progress in graduate school is often nonlinear, and are never the same for any two students. (This is why we do self-evaluations/checkins! To ensure that everyone is clear about their own unique paths).

Nevertheless, the entry, progress, and exit checkpoints of graduate school can impose a considerable mental burden on students, and to help address this burden, this document lays out some guidelines to keep in mind as you progress through the years.

13.1 First year

You can expect your first two semesters in grad school to revolve around a few goals:

- Develop your “graduate student identity”. This means I will be asking you to do a lot of thinking and writing about your values as a person and scientist, what kind of work you want to do, how you want to do it, and what intellectual muscles you want to develop during graduate school to prepare you for a fulfilling life on this path.
- Become comfortable with your “required” duties as a graduate student, e.g. completing graduate level coursework, working as a teaching assistant, participating as an active member of the lab.
- Start establishing your research interests and domain-specific knowledge, e.g. start identifying the overall scope of work in your dissertation, read classic and cutting-edge literature in your chosen field, propose ideas for specific

studies that you might conduct as dissertation chapters.

- Start developing skills that you will use throughout your dissertation (and beyond), e.g. learning the essentials of mathematical modeling in ecology, learning how to identify plants in your field site, building your computational toolkit for reproducible research.
- Take 2-3 courses in topics like population ecology, community ecology, quantitative ecology, bayesian statistics, or one of many course focused on computational skills

In the summer after your first year, you will have regular (at least weekly) meetings with Gaurav to start defining your dissertation studies. Depending on the scope of your research, you can also expect to start pilot studies in the lab or nearby field sites to help inform the details of your larger studies. During the summer, you should also start contacting other faculty in the department who you think might be ideal committee members.

13.2 Second year

13.2.1 First committee meeting (Typically Semester 1 of Year 2)

You should aim to have your first committee meeting during your third semester in graduate school. This meeting is what the department calls the “Qualifying Committee meeting”.⁶ The goal of this meeting is to share your overall vision for a dissertation with your committee, as well as the general approach you plan to take towards achieving this vision.

Committee composition: This committee should comprise at least 3 faculty members, at least two of whom are full-time members of Biological Sciences. You will need to file an official “Request for Degree Audit” form to the department at least 1 week prior to your scheduled Qualifying Exam; please visit <https://www.lsu.edu/science/biosci/programs/graduate/student-resources.php> for the form.⁷

⁶ I often confuse this with the what the department calls its “general exam”, which I simply call the “second committee meeting”.

⁷ As of Summer 2024: navigate to the link; expand the “Forms” section, click on “Request for Degree Audit/Qualifying Exam”

To ensure that you are ready for this meeting, I will ask you to:

1. Write a ~5 page (single spaced) document that acts as an informal dissertation proposal. This document should start with an overall introduction that explains the overarching theme of your dissertation, explain the questions/hypotheses that you will address in each of your chapters, and explain how you will address these questions (e.g. schematic of experimental design, etc.). *You should send this to your committee at least 1 week before your scheduled committee meeting*, and should aim to have a few rounds of feedback from Gaurav before this point - so please start early! ⁸
2. Prepare a ~20-30 minute presentation for your committee that goes over your dissertation proposal.

You will be encouraged to lead a lab meeting this semester where the goal is to give you feedback on your written proposal and presentation. Please give all lab members at least one full week to read your dissertation proposal and provide feedback.

⁸ You can look [here](#) for a similar document that Gaurav wrote during grad school, but note that Gaurav wrote this after his second year of grad school, so the document is substantially more advanced than what is expected of you at this stage.

13.2.2 Department entrance seminar (Typically Semester 2 of Year 2)

You should enroll in Biol 7921 and aim to present your department Entrance Seminar during your fourth semester in grad school. The Entrance Seminar typically lasts ~25 minutes, during which you present your dissertation overview, specific chapter, and progress to date.

As above, **you will be encouraged to practice your entrance seminar in lab meeting** at least one week before presenting to the department.

13.3 Third year

You should plan to complete your second committee meeting (AKA General Exam) in the first semester of your third year

(i.e. fifth semester in grad school). To prepare for the general exams, each student will be asked to revise/update the research proposal that was written for the first committee meeting. In addition, the general exam will entail an oral “exam”, the agenda for which will be determined by the committee as a whole. Students should arrange individual meetings with each committee member to get a sense of the scope of knowledge they expect the student to demonstrate in this exam.⁹.

This General Exam step can sound daunting! But remember that Gaurav and the lab are here to support you through it. One of the best ways to ensure success at this stage is to regularly check in with all committee members to ensure that we are on the same page about your progress and ideas.

The General Exam step also entails completing forms with the department and graduate school; please contact our departments graduate office at least 1 month¹⁰ in advance of your general exam.

⁹ Ideally, these one-on-one meetings with committee members should happen immediately after your Entrance Seminar or in the summer between the second and third year; that way, you will have enough time to complete any readings etc. that committee members may ask of you

¹⁰ ideally longer!

13.4 Fourth year onwards

I ask that you have a formal meeting with your entire committee at least once a year after your general exams. Use this time to get feedback from committee on your progress, advice on career progression, and anything else you might need.

In addition, you will likely have to take one-off courses/seminars as appropriate opportunities arise.

Resources

Texts about ecology

These are some texts that I and folks in the lab have found to be useful readings regarding the philosophy and general approach in ecology.

- [Wherefore and Whither the Naturalist](#) - Doug Futuyma's Presidential Address to the American Naturalist society.
- [Dialectics and Reductionism in Ecology](#). Also reprinted in "The Dialectical Biologist", a physical copy of which is available in Gaurav's office.
- [On Theory in Ecology](#)
- [The strategy of model building in population biology](#)
- [Integrating the underlying structure of stochasticity into community ecology](#)
- [An Empiricist's Guide to Using Ecological Theory](#)
- [Not Just a Theory—The Utility of Mathematical Models in Evolutionary Biology](#)
- [An Effective Mutualism? The Role of Theoretical Studies in Ecology and Evolution](#)

Papers/Essays about the process of science

- [Cultural amnesia in the ecological sciences](#)
- [CLEAR Lab Book](#)
- [Nature collection on Scientific Rigor and Reproducibility](#)

Health and wellbeing

- [We need to talk about mental health](#)

General advice on academia

Writing advice

- [Air and Light and Time and Space](#) by Helen Sword

Computing

- [A Beginner's Guide to Conducting Reproducible Research](#)
- [The Zen of Python](#)