



# Global Environmental Science

## Research and Thesis Guide for Students and Mentors

Effective Fall 2023

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## INTRODUCTION

The ultimate objective of the University of Hawai‘i at Mānoa (UHM) Global Environmental Science (GES) program is to produce a student informed in the environmental sciences at a rigorous level and who is able to go on to graduate or professional school; enter the work force in environmental science positions in industry, business, or government; enter or return to teaching with knowledge of how the Earth system works; or enter the work force in another field as an educated person with the knowledge required to become a wise environmental steward of the planet. GES majors are exposed to experimental, observational, and theoretical methodologies of research and complete an environmentally focused senior research thesis in environmental study using one or more of these methodologies.

This document is a synthesis of Graduate Student Mentoring Guide and Resources for UH Mānoa Graduate Faculty, University of Hawai‘i at Mānoa Honors Program Faculty Handbook, and resources retrieved from the University of Hawai‘i at Mānoa Undergraduate Research Opportunities Program, Council on Undergraduate Research, and University of Colorado Boulder Undergraduate Research Opportunities Program. The guidelines explicated here are specific to the research and thesis requirement for the GES degree.

There are two parts to this guide; one for students and the other for faculty mentors. Students and faculty mentors are encouraged to read the guide in its entirety so as to understand the program’s expectations of both parties and the final product. Refer to the GES Research and Thesis Roadmap (in Resources for Students) for a visual step-by-step guide to accomplishing these requirements.

### References:

Graduate Student Mentoring Guide and Resources for UH Mānoa Graduate Faculty. (2019). Retrieved at [https://manoa.hawaii.edu/graduate/wp-content/uploads/Manoa\\_Mentoring\\_Guide\\_2019.pdf](https://manoa.hawaii.edu/graduate/wp-content/uploads/Manoa_Mentoring_Guide_2019.pdf)

University of Hawai‘i at Mānoa Honors Program Faculty Handbook. (2022). Retrieved at <https://manoa.hawaii.edu/undergrad/honors/faculty-mentor-handbook/>

University of Hawai‘i at Mānoa Undergraduate Research Opportunities Program Retrieved at <https://manoa.hawaii.edu/undergrad/urop/>

Locating a Research Mentor Guide. Retrieved at [https://www.cur.org/assets/1/7/Locating\\_a\\_Research\\_Mentor\\_Guide.pdf](https://www.cur.org/assets/1/7/Locating_a_Research_Mentor_Guide.pdf)

Mentoring in Undergraduate Research. Retrieved at [https://www.cur.org/assets/1/7/Mentoring\\_in\\_UR\\_CUR.pdf](https://www.cur.org/assets/1/7/Mentoring_in_UR_CUR.pdf)

## **FOR STUDENTS**

Participating in undergraduate research is one of the most important and rewarding things that students can undertake during their time in college. In research, students can develop technical skills that make them more competitive for additional opportunities in school as well as after graduation. In addition, research helps develop transferable skills, such as critical thinking, problem-solving, and communication skills.

### **1. Who Can Be A Mentor?**

Students must work with research mentors who are UHM faculty members in Bargaining Unit 7 from Rank 3 to Rank 5 (Classification of UHM faculty; Executive Policy 5.221).

- Instruction ('I') faculty: assistant professors, associate professors, and professors
- Researcher ('R') faculty: assistant researchers, associate researchers, and researchers
- Specialist ('S') faculty: associate specialists, and specialists

Graduate students and/or postdoctoral researchers working in UHM faculty laboratories are allowed to mentor GES students only if they are sponsored by their principal investigators, i.e. if the UHM faculty member is the lead instructor/mentor on record and oversees the mentorship and project.

It may also be possible to work with UHM affiliate graduate faculty members as well as UH-system faculty members researchers if a UHM faculty member is willing to collaborate and be the lead instructor/mentor on record.

Faculty mentors may include SOEST faculty—global leaders in the fields of ocean, earth, climate, atmospheric, and space sciences—and other UHM faculty experts in botany, chemistry, coral reefs, economics, environmental anthropology, marine biology, natural resource management, physics, public health, sustainability, and water quality. Project field work can be carried out at the Hawai'i Institute of Marine Biology's Coconut Island facility, E. W. Pauley Laboratory, associated He'eia ahupua'a, Ka Papa Lo'i O Kanewai, or elsewhere.

### **2. How To Locate And Secure A Research Mentor**

The following provides detailed instructions for identifying interest, finding a potential research mentor, and then initiating a discussion.

#### **A. Identifying Your Interests**

The first step in seeking a research mentor is to consider your interests. Although you may be willing to participate in any research project, it is important to have an idea of what you would like to work on since the experience will require many hours of self-motivation to learn about the topic(s) and complete the research. It would be in your best interest to begin the brainstorming process as early as possible. It is ideal to start identifying topics that interest you in your first or second semester in GES, particularly as you are enrolled in **GES 100: Global Environmental Science Seminar**.

#### **i) Questions to ask yourself when considering interests and topics:**

1. Have there been inspiring topics from the courses you have taken?
2. What do you find yourself doing or reading about when you have 30 minutes to 1 hour of free time? Are there specific topics you gravitate towards?
3. Are there potential careers you would like to explore? What are possible fields of study that connect with those careers?
4. Do you have a personal connection to specific fields of interest that you have always wanted to make a difference?

**ii) Review resources for relevant topics/areas you have identified**

- GES Students' Co-Curricular Experiences  
<https://www.soest.hawaii.edu/oceanography/ges/student-experiences/>
- GES theses <https://www.soest.hawaii.edu/oceanography/ges/ges-theses/>
- UHM Undergraduate Research Opportunities Program  
<https://manoa.hawaii.edu/undergrad/urop/>
- [UHM Research Centers and Institutes](#)
- [UHM Research Units \(by college\)](#)

**iii) Questions to ask yourself to further narrow your choices:**

- 1) Do you prefer working in the field, the lab, or with a computer?
- 2) Do you work better with mathematical analysis, experiment design, or social science type investigations?
- 3) Do you need guidance every step of the way? Or do you prefer independent learning?
- 4) Can interests be merged or combined? At this stage, consider thinking about large, broad topics. It can also be valuable to think about how diverse interests can interconnect.
- 5) Do you have future interests that one type of project would benefit you? This is your opportunity to develop a professional “tool kit” that you can employ in your future career. Are there certain skills that you want to add to your tool kit?

**B. Identifying and Locating a Potential Mentor**

There are a few ways you could identify possible research and thesis mentors.

- If you are intrigued by any research topics you learned in **GES 100** (or any other STEM course), reach out to the professors to inquire about possibilities of joining their lab and/or learning about their research activities.
- Attending Department Seminars (e.g. Oceanography, Earth Sciences, etc.) to get ideas
- Meet with your GES major advisor to discuss your interests and concerns, and ask for a referral or introduction to potential faculty mentors.
- Browse the [GES Research Mentor Directory](#) for UHM faculty members who have mentored and/or are willing to mentor GES students.
- Seek employment opportunities on campus (typically as laboratory assistant) and nurture a mentor relationship with the Principal Investigator.
- Read faculty profiles and research interests on UHM department websites

**C. Connecting with Potential Mentors**

When approaching faculty members, students should conduct themselves in a respectful and professional manner at all times.

### **i) Do Your Research Before Contacting Anyone**

You are not expected to be an expert in the field of the faculty member that you want to connect with. However, you will be expected to know what they are working on and why you want to work with them if you expect to be taken seriously.

- Read the abstracts from their most recent publications
- Skim papers of recent publications
- Visit their websites

### **ii) Communicating With Potential Mentors**

Email is likely the best way to connect with a potential research mentor, but bear in mind that faculty members typically receive many emails throughout the day. Therefore, it is crucial to leave a positive first impression to increase the likelihood of receiving a timely response.

- Use an informative, yet concise, subject title. Instead of a general subject such as “Research Inquiry”, try “Seeking undergraduate research opportunity in coral reef ecosystem.”
- Introduce yourself. If you have a connection to them from a class or a friend include this in your introduction. You should also include specifically that you are interested in their research as a potential project for you to pursue. (1-2 sentences)
- Demonstrate you have done research on them. Use specific language from their research area. Avoid copying and pasting the same email message to multiple faculty members as this means it is too general. (1-2 sentences)
- Show passion. Tell them why your research area interests you and what you could bring to the project in regards to skills, experiences, and techniques. (2-4 sentences)
- Reference a résumé or curriculum vita. As you address your experiences, you can state “In my attached résumé, you will find...” to guide them to open your document.
- Provide times to meet. If you know the faculty member’s office hours, use those if you are free during those times. Otherwise, provide general times you are mostly available (for e.g., Tuesday and Thursday afternoons). It is best to provide multiple time and date options to reduce going back and forth.
- Close with your contact information, and thank them for their time and consideration.

It is not uncommon for faculty members to not respond quickly to your email. They may have missed it or they could have been out of the office. It is acceptable to follow up on your initial email after a reasonable length of time has passed (usually around two weeks). In your follow-up email, you should reiterate in different words your interest in their research area. If they have graduate students or undergraduate researchers, suggest that you would also be interested in meeting with them first to get an idea of their research area and how individuals get involved in their research.

### **D. Meeting with Potential Mentors**

Once you have scheduled an appointment, treat it as an interview. This means you should come prepared to make a good impression and to ensure they understand your interests and your skills. Be punctual to your appointment! If you need to reschedule for an unforeseen circumstance that is not within your control, make sure to notify them as soon as you are able.

### **i) The Interview**

The objective for you and your potential mentor is to determine if you are a good fit for each other. Focus the conversation on getting to know their research and expectations. This is also the time for you to decide if the research area, the mentor's personality, their expectations, and the working environment is suitable for you. Make sure to inform the mentor that they would be expected to sign a thesis proposal memo, provide guidance on completing the research and thesis, as well as assign you a grade. Guidelines for potential mentors are in the second half of this guide.

Make sure to end the appointment on a positive note regardless of the outcome, which could be one of three:

- Maybe – Most times, research faculty may want to discuss further before making an offer.
- Yes – Should the faculty member offer you a position in their research lab, great!
- No – If it is not a good fit or the timing does not work right now, that is OK! Depending on how the interview went, you could inquire if they would be willing to refer you to their colleagues who might be a better fit for you.

### **ii) Virtual Appointments**

If your appointment is over Zoom, you must ensure the following:

- Your internet connection is strong and reliable
- Your camera and microphone are working properly
- You are in a quiet space that is brightly lit with an appropriate background (i.e. not in a café or the park)

### **E. Follow Up**

Follow up with an appreciative email for their time. Consider this email as a continuation of the Relationship-building process. If there were items you two connected on or if there were questions you could not answer, address them. If they offered help or resources, show your appreciation and thank them for the support. If they offered you a position during the appointment, respond with an affirmative or denial within the timeframe (if given) but no more than a week later.

### **3. Thesis Proposal Memo**

The GES Thesis Proposal memo is a document that outlines all elements of the research project that you and your mentor must both agree on, including

- the project parameters and feasibility (consult GES program if in doubt)
- the tasks, resources required, and timeline specified in the GES Thesis Proposal memo
- expectations from each other (time requirements, performance, publications, etc.)
- deadlines specified on the Thesis Timeline

The memo also doubles as a contract between you and your research mentor. If the research project and thesis are not completed within the agreed-upon timeframe, you must renegotiate with your mentor for any extensions.

The Program has a Thesis Proposal Memo template for students to use as well as samples of previous memos to use as a resource. It is the student's responsibility to complete the memo, with the mentor's guidance, and submit it to the Program in a timely manner. The Thesis Proposal memo must be submitted to GES and approved before you start work on your thesis research.

When your Thesis Proposal Memo is approved, the Program will give you the following resources:

- Thesis and Presentation Timeline
  - Based on the projected completion date stated on the proposal
  - Includes all items and deadlines
- GES Thesis Style and Policy Guide
  - Includes thesis formatting requirements

These resources are also accessible on Laulima.

#### **4. Submitting Your Final Thesis and Presenting At The Symposium**

Students typically submit their thesis and present at the GES Symposium during their last semester. We advise you to begin writing your thesis the semester prior, even if you are still analyzing data. You should be far enough in your project to be able to write the Introduction and Methodologies sections.

The fully-formatted and mentor-approved thesis draft is due approximately six weeks before Symposium, and will be sent to another faculty member (as recommended by your mentor) for editorial assessment and suggestions for improvement. This draft should be proofread and completely free of grammatical errors. If you are not able to submit this draft on time, you will not be allowed to present at the Symposium, i.e. you will have to defer to the next term.

Prior to presenting at the Symposium, all students must participate in a presentation rehearsal, during which you will be assessed by a faculty member on your delivery.



## **FOR MENTORS**

Thank you for considering and/or agreeing to mentor GES students! We appreciate and recognize the resources and work you will put in as a mentor, and are grateful for your support. In an undergraduate research setting, the focus of mentor is to help their mentee(s) develop skills related to the discipline, which might include technical skills, writing skills, use of specific software, etc. as appropriate for the project and discipline. The objective of the GES program is to produce a student informed in the environmental sciences and who is able to go on to graduate or professional school; enter the work force in environmental science positions in industry, business, or government; and enter or return to teaching with knowledge of how the Earth system works.

### **1. Faculty Mentor Eligibility**

Faculty members who are UHM faculty members in Bargaining Unit 7 from Rank 3 to Rank 5 (Classification of UHM faculty; Executive Policy 5.221) are eligible to be a GES research project mentor.

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### **2. Faculty Mentor Responsibilities**

As a GES research project mentor, you are expected to

- discuss the project parameters and feasibility with the student (consult GES program if in doubt)
- assist the student with drafting the GES Thesis Proposal memo to submit for approval prior to beginning work on the project
- be aware of criteria for GES research projects, Thesis Timeline, and GES Thesis Style and Policy Guide
- be the lead instructor for GES 499 (Undergraduate Thesis); assign a grade at the end of the term(s)
- be clear with your expectations (time requirements, performance, publications, etc.)

- be clear with your availability, particularly around timeline deadlines
- adjust meetings and feedback according to a student's capacity for independent work
- facilitate the exploration of avenues for funding
- ensure the student is aware of ethical standards and best practice in pursuing discipline research/scholarship activities
- consult and collaborate with others regarding students' needs in research, advising, and mentoring relationships
- meet with the student regularly to discuss the project's development
- advise the student on their process (skill development for project, relevant literature, appropriate methodology, research ethics clearances, timeline)
- advise the student on problem areas that need to be addressed
- suggest relevant and appropriate faculty to provide editorial feedback on the student's thesis
- give timely feedback and approve the student's thesis draft before it is sent to an external reviewer
- give timely feedback on the student's oral presentation before their practice session with a reviewer
- introduce the student at the GES Symposium (scheduled at the end of each term)
- communicate with GES for questions or concerns

### **3. Faculty Mentor Support From GES**

The GES program will provide the following infrastructure to faculty mentors:

- Clear and regular communication including reminders
- Resources such as Thesis and Presentation Timelines, GES Thesis Style and Policy Guide, etc. sent via email
- Template for GES Thesis Proposal Memo with the required elements
- Assistance to apply for WI designation for GES 499 if student requests
- Meetings as needed to clarify expectations and/or concerns

### **4. Requirements for GES Research Project and Thesis**

- A clearly stated purpose/problem statement/set of research questions
- A clearly articulated significance
  - What's at stake? So what?
- A sustained study of a topic that uses appropriate sources to explore the topic
  - Sources can include, but are not limited to, laboratory results; case studies
- A demonstration of the student's clear understanding and articulation of the broader context and conversations in the discipline(s) and field(s) in which project is located (the literature review)
- A solid grounding in the theoretical framework(s) that the project is using
- A clearly explained and appropriate (justified) methodology/research design
- A robust critical analysis of the subject matter (does not merely present data or describe)
- Proofread and revised for grammatical errors
- Formatted according to the most current GES Thesis Style and Policy Guide
  - As appropriate, contains well-labeled and attributed tables and figures as supplementary material

- Has a complete Works Cited or Bibliography included in the proper format
- Recommended length (25 page minimum)

## **FACULTY MENTOR DOS AND DON'TS**

(Adapted from UH Mānoa Graduate Division)

### **Some specific things Faculty Mentors should do:**

- Know & follow UH policies and procedures.
- Ensure that responsibilities and expectations are made clear regarding: goals, work plans, meetings, progress reports, drafts, publishing and presenting/authorship, intellectual property rights, training, etc.
- Be responsive and provide appropriate feedback to students in a timely manner.
- Exemplify high professional integrity and behavior.
- Adjust your mentoring style to best help individual mentees and how they learn/work.
- Collaborate with individual mentees to set and advance their desired professional goals.
- Ensure students are aware of ethical and safety standards and best practices in pursuing research and scholarly activities.

### **Some specific things Faculty Mentors should NOT do:**

- Cause delay or inaction that adversely affects student research and thesis progress.
- Fail to provide the research or educational experiences students were led to believe they would receive when they joined the lab.
- Make tacit or explicit threats of retaliation (e.g. providing a poor reference).
- Make denigrating comments.
- Engage in action or inaction that adversely affects the learning and research environment.
- Expect students to work beyond stated hours.
- Expect students to work in uncomfortable or potentially dangerous environments with and without supervision.
- Expect students to run personal errands or do work unrelated to their degree requirements.
- Use one's position or power to justify negative or inappropriate behaviors.
- Engage in any exploitative, harassing, or discriminatory treatment

## RESOURCES FOR STUDENTS

- UHM Undergraduate Research Opportunities Program  
<https://manoa.hawaii.edu/undergrad/urop/>
- UHM Research Centers and Institutes <https://manoa.hawaii.edu/research/centers/>
- UHM Research Units (by college) <https://manoa.hawaii.edu/research/units/>
- GES Research and Thesis Roadmap  
<https://www.soest.hawaii.edu/oceanography/ges/research/roadmap/>
- GES Theses <https://www.soest.hawaii.edu/oceanography/ges/ges-theses/> and in the Oceanography Conference Room
- GES Research Mentor Directory  
<https://www.soest.hawaii.edu/oceanography/ges/mentor-directory/>
- GES Students' Co-Curricular Experiences  
<https://www.soest.hawaii.edu/oceanography/ges/student-experiences/>

## RESOURCES FOR MENTORS

- UHM Undergraduate Research Opportunities Program  
<https://manoa.hawaii.edu/undergrad/urop/for-faculty/mentorship-resources/>
- Sample Mentor Agreement Templates  
[https://docs.google.com/spreadsheets/d/1qykKue\\_izD4pBltQjcpUjnsh6hIGDrlda\\_GBZJ1bDw0/edit?pli=1#gid=0](https://docs.google.com/spreadsheets/d/1qykKue_izD4pBltQjcpUjnsh6hIGDrlda_GBZJ1bDw0/edit?pli=1#gid=0)