

SURG manual 2024

Program Introduction

The Shoals Undergraduate Research Group (SURG) at the Shoals Marine Laboratory (SML) is designed to create a productive and collaborative research environment that combines long-term monitoring efforts, observation-based inquiry, and research questions addressing new and emerging issues in ecology and marine biology. The program has a unique mentoring structure that combines an on-island team of mentors of SML staff and Scientists in Residence to provide day-to-day supervision and support for the field work conducted by SURG undergraduate researchers (you!) along with project mentors who provide oversight on experimental design, sample collection and analysis. All combined, the undergraduate research program allows you to contribute to on-going research programs at the lab and also encourages you to develop research to address specific questions that spark your curiosity.

Learning to communicate about the science you are conducting here at SML is a central component of the program. There will be multiple opportunities to talk with other researchers, students, and visitor groups about your research interests, the project you are working on and the primary questions and objectives of the project. These skills will be honed throughout the summer and will ultimately culminate with a presentation of the results of your project at our Undergraduate Research Symposium.

Mentors

On-Island Mentors

David Buck, SML Associate Director

Mike Sigler, SML Scientist in Residence

Rebecca Atkins, SML Scientist in Residence

Project Mentors

Marine Mammal Biology

Andrea Bogomolni (Woods Hole Oceanographic Institute)

Nadine Lysiak (University of Massachusetts at Boston)

Lisa Sette (Center for Coastal Studies)

Seabird Ecology and Conservation

Liz Craig (SML, Director of Seabird Research)

Gemma Clucas (Lab of Ornithology, Cornell University)

Sustainable Lobster Bait

Eugene Won (Cornell University)

Muskrat Ecology

Alexis Mychajliw (Middlebury College)

Dartmouth College

Celia Chen (Dartmouth College)

Intertidal Ecology

Kylla Benes (University of Montana)

Lauren Pandori (National Park Service)

Jennifer Dijkstra (University of New Hampshire)

Mentoring Structure

The program has a unique mentoring structure that combines on-island Scientists in Residence and off-island Project Mentors. The Scientists in Residence provide consistent in-person communication and support to the undergraduate researchers, serving as on-island mentors to the undergraduate researchers. Off-island Project Mentors are scientists from a variety of institutions who are usually involved in the design, stewardship, expansion or synthesis of historical datasets that are maintained by SML. The Project Mentors have specialized experience in their project area. In addition to training student researchers to contribute data to their focal long-term dataset, Project Mentors work with students to develop an independent research question that advances work in their focal area.

The Scientists in Residence meet daily with all of the SURG undergraduate researchers and the off-island Project Mentors meet weekly with 1-2 SURG undergraduate researchers. The Scientists in Residence provide day-to-day supervision and support for the field work conducted by SURG undergraduate researchers, one-on-one mentoring and lead SURG events and activities. The Project Mentors provide oversight to student researchers on experimental design, sample collection and analysis. The Scientists in Residence and Project Mentors work together to ensure that SURG learning objectives are met for all SURG undergraduate researchers. In addition, the undergraduate researchers live on the island with a self-contained science community with ready access to SML Teaching Faculty and visiting speakers and their wide range of research experience.

Learning objectives

1. Develop effective study design
 - a. Overall question
 - b. Testable hypotheses
 - c. Data visualization
2. Appropriately analyze data
3. Communicate defensible results
4. Collaborate with peers
5. Create welcoming research environment

Our job as mentors is to provide you with comprehensive experience conducting sound scientific research. Building a foundation in scientific inquiry is not only essential for academic careers, but it will also serve you in many professional settings ranging from private industry to the federal government. If you go on to graduate school, your SURG experience can be viewed as a kind of “mini-Masters”, which implies a high degree of intellectual ownership and engagement.

Activities to support learning objectives

1. Establishing community agreements
2. Research ethics
3. Team building
4. Reviewing the scientific literature
5. Making observations in the field
6. Writing hypotheses
7. Visualizing data
8. Choosing appropriate data analyses
9. Preparing an effective scientific presentation

Schedule

We will hold a weekly meeting at 7:00-8:30 pm each Monday evening. An island-seminar, the Rock Talk, occurs at 8:00-9:00 pm each Tuesday evening. Undergraduate researchers will help unload food and supplies at 4 pm each Wednesday afternoon (the food run). Students meet daily as a group for 5-15 minutes following breakfast with the Scientists in Residence to discuss their planned daily schedule and ask for assistance as needed.

Date	Activity
Jun 3	Community agreements
Jun 4	8:30 am - Full program briefing on island at the start of the program to establish effective and consistent communication among students, scientists in residence, support staff, and project mentors. Anyone off-site participates remotely (e.g., Dartmouth SURGs). 1:30 PM - Field trip(s) TBD
Jun 5	SURGs meet with individual Project Mentors
Jun 8	7:15 pm - Neuston net tow
Jun 10	Develop a testable hypothesis Introduction to Study Design
Jun 14	Intro to Data Management Dartmouth students arrive TBD (final exams end on June 4)
Jun 17	Introduction to Data Visualization in R Schedule 1-on-1 meetings this week to discuss your data management plan
Jun 24	Appropriately analyze data
Jul 1	Research ethics (Dave Buck)
Jul 8	Data Visualization 2.0
Jul 15	Presentation Formatting Analysis in R
Jul 18	Navigator Circle Presentations (presentations and then lunch together)
Jul 22	Communicate defensible results; How to make a scientific presentation
Jul 29	Career path examples; Job hunting; Linked In example Present draft presentations
Aug 2 TBD	Star Island Presentations
Aug 10	Research Symposium

Program Detail

Program orientation

Prior to arriving at Shoals Marine Lab, each summer's student cohort will participate in a virtual introductory meeting to review program logistics and ensure that all students feel equipped to meaningfully engage throughout the summer. We will also spend time connecting each student with both their Project Mentors and the on-island Scientists in Residence.

Shoals Marine Lab orientation

Once all students arrive at the marine lab, we will host a full program briefing and orientation to establish effective and consistent communication among students, Scientists in Residence, support staff, and Project Mentors. This will include several components: 1) introductions to the local ecosystems and project areas, 2) touring the marine lab facilities and reviewing safety protocols, 3) implementing mentor-mentee compacts, and 4) developing a community agreement to guide thoughtful interaction. Introductory field trips at the beginning of the program will support initial exploration of the shallow subtidal and intertidal ecosystems, tern and gull colonies, and broader Isle of Shoals archipelago. Each Project Mentor will also be present (in person if practical, remote if not) to participate with students in discussing their field observations and co-developing a conceptual model of the Gulf of Maine system, which will then be revisited and modified iteratively as students progress in their research. This model will also serve as a framework for understanding both collective (i.e. cross-project) and individual (i.e., within-project) ecological interactions and processes.

Weekly Meetings

We will hold weekly meetings every Monday evening from 7:00-8:30 pm. The weekly activity will vary from week-to-week (see schedule). There will be five core workshops offered each summer: Experimental Design and Data Management, Data Analysis in R, Data Visualization, Science Communication, and Ethics in Scientific Research. Some week's topics are left to be decided by interns' interests (to be determined, TBD). Some example topics are data accessibility, inclusion and representation in academia, science communication and career choices. It's up to you and your collective interest.

In addition, you will present regular updates of your research. These sessions should be viewed as brainstorming opportunities for the group to collectively think through topics related to their research programs including data trends and analysis, troubleshooting of data collection, feedback on ways to present data, etc. The goal of

frequent presentations by all interns in the weekly meetings is to develop your final 12 min presentation for the Science Symposium.

Daily check-ins

Students meet daily as a group with the Scientists in Residence to discuss their planned daily schedule and ask for assistance as needed. These daily check-ins foster collaboration across projects and ensure that mentoring matches individual student needs. This is particularly important at the marine lab given the shared use of boats, lab equipment, and field instrumentation. Daily check-ins last 5-15 minutes, occur after breakfast, and are led by the students, rotating each day.

Weekly Rock Talks

Each week, the Shoals Marine Lab hosts a visiting scholar in a variety of disciplines with a core theme of marine science (e.g., disease ecology, technological advancement in data collection, invasive species management, etc.) (“Rock Talk”). These scholars offer additional insight into career paths and expertise ranging from extension and outreach to basic research. In addition to attending a seminar offered by each visiting scholar, the SURGs are invited to sit with each visitor during the following morning breakfast.

Artist in Residence engagement

Across each 2--3 week rotation of courses, an Artist in Residence will also be invited to reside on Appledore Island. Each Artist in Residence is expected to blend personal creative time with art programming designed for students enrolled in marine lab courses and programs. The goal of the Artist In Residence (AIR) program is to cultivate and develop students' observational skills in order to foster deep inquisitiveness and creativity in the process of scientific inquiry. The SURGs will be encouraged to engage with each artist, and time will be offered to collectively participate in the AIR programming. The Artist in Residence program at the Shoals Marine Laboratory has been documented to provide support to participants to think creatively and to encourage peer learning (Jacobson et al., 2016).

Field trips

Throughout the summer, all students will be offered numerous opportunities to engage with different field and lab methodologies. These opportunities will include: banding terns on White Island, surveying seals on Duck Island, beach seining, performing and processing weekly neuston tows, and trawl net sampling.

Professional development sessions

In collaboration with visiting faculty, we will host two early career panels to introduce students to a range of career paths (e.g., non-profit, state and federal agencies, academia, etc.) and invite students to ask questions related to professional development, diversity, equity, and inclusivity, and career opportunities. These two sessions will be offered to the entire undergraduate body present at the marine lab, encouraging the SURGs to connect with other visiting classes. Towards the end of the summer, a third discussion will be organized for just the SURGs students to focus on preparation for graduate school (e.g., identifying graduate programs, finding a mentor, financial support, etc.).

Research Communication

Students are expected to communicate their research and results at several stages of their research. Midway through the summer they will be supported in presenting their research questions and preliminary results to visiting donors. Finally, towards the conclusion of the program, the students will visit neighboring Star Island to present 15-minute research talks; this event will be coordinated with Star Island staff to complement their summer conference programming. In accordance with building a supportive, constructive research community, the Scientists in Residence will facilitate frequent opportunities for peer feedback throughout these engagements.

Closing symposium

We will conclude SML's program each summer with a half-day symposium that brings together staff, students, and faculty across SML in addition to visiting members of the public. This symposium will feature 15-minute presentations from the students in addition to lightning talks from SML's 2-week Research In Biology course students. As with similar events in the past, we will also make this symposium available to virtual participants, expanding the reach of student research and enabling a diverse audience to engage. This symposium will emphasize the importance of defensible scientific results, creative and effective science communication, and collaboration. Verbal feedback will be provided by faculty and graduate student evaluators.

Scientific follow through

Following completion of the program, students will work with their Project Mentors to prepare a 2-page summary of their research experience and results to benefit the efforts of future cohorts. We also encourage students to complete their research

experience by presenting their research at scientific conferences (for example, the annual science meeting of the Regional Association of Researchers in the Gulf of Maine [[RARGOM](#)]) or writing a scientific paper (together with researchers from the host lab) to be published in a peer-reviewed journal. To promote these components of the research experience, the program will facilitate students to present their research at regional, national, and international conferences and agree to pay the page charges of articles resulting from program-sponsored projects.

Expectations and Conduct

All undergraduate researchers (variable week and 10-wk participants) are responsible for understanding all information presented in this manual. Additional questions should be directed to one of the Scientists in Residence or Project Mentors. Please take the first week of your internship to review, complete, and discuss the Mentor-Mentee Compact (see Appendix 1) with the Scientists in Residence and your Project Mentor(s).

Data Management Plan for student-collected data

Your project data must be given to your faculty mentor before you leave the island. The data should go through rigorous quality assurance and control, be in a mentor-approved format and be accompanied by a metadata spreadsheet that explains the nature of each variable in the data set. Long-term data sets are critical to the growth of scientific understanding by SML scientists and adhering to these rules ensures that your mentor can access and understand your data for years to come. You also will need to provide SML with a Quick-Look Report (see Appendix 2).

Code of Conduct and Community Agreement

Conducting research is often demanding, but we strive to make it always rewarding and often enjoyable. Success usually includes collaboration, mentorship, and friendship. While we strive for positive interactions, challenges will sometimes arise. Some challenges are natural results of differing workstyles and personalities, while others arise from poor understanding of personal boundaries.

Undergraduate researchers are responsible for their own behavior - specifically in being respectful and collegial to other interns/students and with mentors, faculty, and staff on Appledore. One of our first activities as a group will be to develop the structure of our shared community agreement. This agreement will help guide our time together on Appledore and as such, needs to be developed collectively with input and feedback from all of us. We can use SML's [guidelines](#) for this process and everyone is encouraged to bring their own experiences to this discussion as well.

Discrimination and harassment

Violations of University of New Hampshire's [Discrimination and Discriminatory Harassment Policy](#), as well as sexual misconduct must be reported to the The Civil Rights & Equity Office (CREO). This policy precludes discrimination and harassment that is *targeted at protected classes* (e.g., based on gender, sexual orientation, race, etc.). Harassment may take the form of unwelcome sexual advances or other verbal or physical conduct of a sexual nature, graffiti, jokes, pranks, slurs, insults, threats, remarks made in the person's presence, interference with the person's work or academic life, vandalism, assignment of unpleasant duties, or physical assault directed against any member of a protected class.

The University of New Hampshire and its faculty are committed to assuring a safe and productive educational environment for all students and for the university as a whole. To this end, the university requires faculty members to report to the university's [Title IX Coordinator](#) any incidents of sexual violence and harassment shared by students. If you wish to speak to a confidential support service provider who does not have this reporting responsibility because their discussions with clients are subject to legal privilege, you can contact SHARPP (Sexual Harassment & Rape Prevention Program) at (603) 8627233/TTY (800) 735-2964. For more information about what happens when you report, how the university treats your information once a report is made to the Title IX Coordinator, your rights and reporting options at UNH (including anonymous reporting options) [please visit student reporting options](#).

People are sometimes reluctant to seek advice from supervisors or report complaints because they want to protect their own identity. Although supervisors are mandatory reporters of policy violations and sexual harassment, there are also measures to ensure the greatest discretion possible. Ultimately, our goal is to make sure everyone is safe and supported, but when that fails, it is essential that everyone know how to seek help to ensure that problems are addressed and do not escalate.

Mental Health

Shoals Marine Laboratory cares about you and your well-being. Everyone on Appledore Island should feel safe, comfortable, welcome, and included at all times. If you experience unusual personal or academic stress during the course or need to talk with someone about a personal problem, seek support from SML staff who are available for consultation 24/7. Find staff in the office in the Hamilton House between 8am – 7pm or knock on the door of Bartels Hall after hours.

Personal Technology

Please do not use cell phones, smart phones, iPads, mp3 players, headphones, or similar devices during evening discussion sessions.

Academic Integrity

Any work submitted must be your own. Uncredited use of another person's words, data or images is considered plagiarism, a serious violation of the Code, whether the material comes from another student, a website, or a published paper. Students must adhere to Cornell's and UNH's Policy for Academic Honesty/Plagiarism and Discrimination

1. Cornell: [Essential Guide to Academic Integrity at Cornell](#)
2. UNH: [Student Rights, Rules and Responsibilities](#)

Personal Time

Every SURG member is entitled to one day off each week. Time can be spent in Portsmouth (subject to weather and vessel accommodations) OR as part of a group outing. Additionally, each SURG member is entitled to two overnight excursions off-island (e.g., over Monday, back Tuesday; off-island housing/meals at own expense), which can be taken sequentially, with prior permission and as long as Rock Talks and Seminars are not missed. Sign up for vessel space with the Island Coordinator and record your travel plans on the board in the SURG workspace (Commons basement).

General logistics

1. An acceptance package will be emailed to you in the spring. This package includes forms to complete and return to SML before your program begins. The package will confirm your start date, and when/where you should meet the vessel to Appledore Island. For travel information, please visit: <http://www.shoalsmarinelaboratory.org/getting-shoals> or contact the Island Coordinator (island.coordinator@unh.edu).
2. On the first day of your program, an SML staff member will meet you at the Appledore Island dock, direct you to your housing assignment, and provide additional information about your stay on Appledore.
3. Housing will be in a shared dorm room with 1 to 3 roommates on the first floor of Founders Hall. Undergraduate researchers reside in quarters separated from general students. If you have questions or concerns about your housing, please contact the Island Coordinator.
4. The period from 10 p.m. to 7 a.m. is 'quiet time' on Appledore Island. At any time, others may be sleeping so keeping sound at a low level in your living area is

expected. Academic buildings and the Commons are available at all hours, but again, please observe quiet time from 10 pm to 7 am.

5. Keep your room and common hallways/bathrooms clean and tidy. Sunday morning, before brunch, you and your fellow dorm-mates are expected to sweep, collect trash/recycling, and wipe down the bathrooms together. Please go to the Island Coordinator office in Hamilton second floor if you need cleaning supplies, more toilet paper, etc.
6. Undergraduate researchers may use the washer and dryer in Bartels basement once a week, but may not enter any other areas of Bartels Hall.
7. Island Staff reside in Bartels Hall, Faculty reside on the second and third floors of Founders and the Executive Director and Associate Director reside in Kingsbury House. These areas are off limits for all undergraduate researchers except in case of emergency.
8. SML has a ZERO TOLERANCE drug policy. If you are found in possession of, or using an illegal substance, you will be expelled from the island on the next available boat and at your own expense. SML also has a ZERO TOLERANCE alcohol policy for anyone less than 21 years of age. The Shoals Marine Laboratory is bound by Federal and State (Maine) laws, as well as policies of Cornell (New York) and UNH (New Hampshire). If you are under 21 and found to be drinking or in possession of alcohol, you will be expelled from the island on the next available boat and at your expense. Alcohol is not permitted in any dormitory/participant residence while participants who are younger than 21 reside in the same building. Those over 21 may be asked to leave SML if their behavior is deemed dangerous or inappropriate.

Undergraduate researcher guidelines

1. If you need small boat time, coordinate and plan ahead with the Island Coordinator who will then work with SML Captains (island.coordinator@unh.edu).
2. Bring a buddy if you are taking a walk (either for research or recreation) far from the center campus of the island. If you are near the water's edge, never turn your back on the ocean and keep a sharp eye out for swells/waves that can sweep you out to sea.
3. SML provides laboratory and work space for all Undergraduate Researchers. It is your responsibility to keep your laboratory space organized and tidy. At the end of your program, you are responsible for fully cleaning your laboratory space. Any supplies you brought to Appledore should be disposed of (if trash or recycling) or brought off-island with you.

SML SURG Mentor-Mentee Compact

Instructions: Mentors and SURG undergraduate researchers are encouraged to complete this compact, designed to help facilitate the discussion of expectations and goals. We also encourage you to refer to the [Ten simple rules for developing a mentor-mentee expectations document](#) as you work through this form. Be mindful that mentor-mentee relationships are an iterative process; as such, this compact should serve as a living document that gets updated throughout the summer!

- Step 1)** The mentor and mentee should electronically fill out their respective columns
- Step 2)** Set up a meeting to discuss the compact (within 1 week of arriving at SML)
- Step 3)** Work together to create a final compact
- Step 4)** Mentor(s) and mentee both sign the compact

The following compact includes some examples for mentees and mentors.

Mentee Name:	Mentor Name:
Pronouns:	Pronouns:
Goals of Mentee	Goals of Mentor
<p>Describe your goals for this research position:</p> <p>Examples: Obtain new research skills (e.g., field sampling techniques, data analysis, science communication), training/career advice, networking with other experienced researchers, and recommendations for next steps.</p>	<p>Describe your goals for this research position:</p> <p>Teaching undergraduate researchers how to be independent scientists and facilitating their research, professional development, and communication skills.</p> <p>Learning from you (the mentee)!</p>
Mentee Outlook for the Summer	
<p>Here is some space to describe what you're most excited (and/or nervous) about this summer and anything you'd like for us to be aware of that isn't mentioned in the below sections.</p>	
Mentee Communication/Norms	Mentor Communications/Norms

<p>What questions do you have about the norms for this research group (i.e. communication methods, addressing concerns, requesting meetings)?</p> <p>Day-to-Day</p> <ul style="list-style-type: none"> • I love in person meetings, but I also do not mind any other methods of communications either • I prefer to work/focus primarily in the morning- during this time, I will be less responsive to email and interruptions. <p>Meetings:</p> <ul style="list-style-type: none"> • I appreciate group meetings the most, as better ideas tend to be made when they are made in groups. 	<p>What norms are specific to your research group (i.e. communication methods, addressing concerns, requesting meetings)?</p> <p>Verbal and written communication:</p> <ul style="list-style-type: none"> • At Shoals, we prefer to communicate in person when possible (this can be during meals or daytime hours). • We have an open door policy and can often be found in the dining hall, dormitory common area, wet lab areas, or down by the tidepool. • We will respond to email between 9am and 5pm <p>Group dynamics:</p> <ul style="list-style-type: none"> • We expect undergraduate researchers to engage with each other in discussing their science during Monday evening meetings and informally throughout the day. • We expect undergraduate researchers to attend and engage with Island Seminar “Rock Talks”
<p>Expectations of Mentee Skill Building and Career Development</p>	<p>Expectations of Mentor Skill Building and Career Development</p>
<p>How can your mentor(s) help you to be most successful as researchers and professionals? What career path options are you considering? What might help advance you to those paths?</p> <p>Examples: I need my mentor to provide frequent feedback on ideas (e.g. I make the most progress with incremental revisions and suggestions).</p> <p>I will need the following to support my research project (time, materials, software, access to equipment, etc.). I would also like to discuss ethics in research, critical thinking, evaluating the scientific literature, interpreting results, writing an abstract or paper, presenting results, and general leadership skills.</p> <p>I plan to pursue a research career in... (academia/private industry/other setting).</p>	<p>How can the undergraduate researcher help you to be a supportive mentor? How will you assist the mentee with developing their academic skills and professional goals?</p> <p>We need you to communicate clearly and reach out when you are struggling, as we cannot reliably pick up on nonverbal cues.</p> <p>If frequent feedback is needed, then more frequent meetings and “check-ins” should be organized.</p> <p>We will facilitate access to research materials and supplies, and will provide opportunities for researchers to develop skills in critical thinking, evaluating the scientific literature, interpreting results, writing an abstract or paper, and presenting scientific results to different audiences.</p> <p>We are happy to discuss networking, early career development, and other goals that are of interest to you.</p> <p>We will be available to discuss Rock Talks and will encourage you to connect with other visiting researchers during your time at Shoals.</p>
<p>Mentee Conflict Resolution</p>	<p>Mentor Conflict Resolution</p>

<p>How will you respond to conflict/approach conflict resolution in this mentor-mentee relationship?</p> <p>Examples: Discuss conflicts and disagreements during regular advising meetings, reach out to XXXX if conflicts need outside mediation, etc.</p>	<p>How will you respond to conflict/approach conflict resolution in this mentor-mentee relationship?</p> <p>We encourage you to discuss conflicts and disagreements as they arise during our regular advising meetings. If a conflict requires outside mediation, we will communicate with the SML Director or Associate Director.</p>
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Space for other notes here:

Mentee Signature and Date

Mentor Signature and Date

Quick Look Report:

This summary of your research findings will be used as an archive of your work that can be shared with future researchers. Apply the lessons learned throughout the summer to describe your research findings in a succinct yet comprehensive manner.

Scientists Quick Look Report: Shoals Marine Laboratory

1. Project Title:
2. Period of Study:
3. Research Intern/Institution:
4. Principle Investigators/Institution:
5. Primary question(s) and hypothesis(es):
6. Accomplishments, Preliminary Results and their significance/relevance to the attainment of research goals
7. Plans for use of these data, including practical applications (if applicable) and plans for publications (potential journals and expected date of submission)
8. New research topics/questions/directions identified during your time at the Shoals Marine Laboratory
9. Comments and suggestions for the internship and research project

Submitted by:

Date submitted:

Accepted by: