USC Wrigley Institute for Environmental Studies

Research Experiences for Undergraduates (REU): Coastal Ocean Processes

2015 Program Handbook For Mentors and REUs


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THE WIES REU PROGRAM: COASTAL OCEAN PROCESSES

This NSF-funded Research Experiences for Undergraduates (REU) Program is run by the USC Wrigley Institute for Environmental Studies (WIES) and the USC Dornsife College of Letters, Arts and Sciences.

The WIES REU program will support ten highly motivated and talented undergraduate students to conduct independent but guided research that focuses on Coastal Ocean Processes during an intensive 8-week program at the Wrigley Marine Science Center (WMSC) on Catalina Island, CA.

The program will also provide undergraduate students with training in laboratory and field methodologies, special seminars in oceanography and marine science, academic and career advisement, networking opportunities with faculty and other professionals, and field trips to explore Catalina Island.

Eligibility
Applicants must be U.S. citizens, U.S. nationals or permanent residents of the U.S. to be eligible for this program. Students must also have completed at least one year of undergraduate study by the summer of 2015 and must plan to be enrolled in an undergraduate degree program during the Fall of 2015. For the 2015 WIES REU program, special consideration will be given to students who attend a university or college in Southern California and/or institutions with limited research training opportunities, but we encourage applications from all students nationwide who meet the NSF REU program’s requirements for eligibility. We especially encourage students from underrepresented groups in STEM fields to apply. This program will be especially beneficial for undergraduate students with a strong interest in pursuing graduate school or a career in marine science and research. Competitive applicants will have at least a 3.25 GPA, one semester of chemistry, one semester of biology, and one semester of calculus or statistics.

THE WRIGLEY INSTITUTE FOR ENVIRONMENTAL STUDIES

The Wrigley Institute for Environmental Studies (WIES) is USC’s hub for environmental research, education and outreach. Our main offices are in Los Angeles on the USC University Park Campus, and we proudly oversee the research laboratories and conference facilities at the Philip K. Wrigley Marine Science Center on Catalina Island, at Big Fisherman Cove near the community of Two Harbors.

The mission of WIES is to encourage responsible and creative decisions in society by providing an objective source of marine and environmental science and fostering an understanding of the natural world among people of all ages.
Wrigley Institute-affiliated faculty conduct research in all aspects of the environment, such as the biological adaptations to climate change, interactions among humans and natural systems, and the analysis and development of environmental policy. WIES works with foundations and the public to enhance environmental awareness. More information can be found at: http://dornsife.usc.edu/wrigley/.

THE WRIGLEY MARINE SCIENCE CENTER

The WMSC is located near the town of Two Harbors on Catalina Island, about 20 miles from the port of Los Angeles, California. The location is remote but beautiful, with easy access to open ocean and coastal ecosystems. We have a 5.5-acre campus with housing, a conference center, a dining hall, a common lounge, an administrative building, a laboratory…and an ocean!

The environment
Catalina sits in a mild, temperate maritime setting. The marine systems between Los Angeles and Catalina range from urban/impacted sandy and rocky shorelines, to deep canyon-cut continental shelf systems, to spectacular blue water environments, to pristine rocky intertidal and subtidal kelp forests. This is a perfect setting to examine diverse marine ecosystems with adjacent lands that include contrasting uses like commercial ports, substantial recreational activity, and marine protected areas. Catalina’s terrestrial landscape is also protected (through the Catalina Island Conservancy) and includes more than 400 native plants as well as non-native and invasive species. This landscape offers an opportunity to compare land-ocean interactions in heavily human impacted vs. natural settings.

WMSC Laboratories
The WMSC's 21,000 sq. ft., 3-story laboratory includes teaching facilities, six shared use research laboratories plus individual laboratories with bench space for visiting researchers; ultra clean flowing seawater, radioisotope analytical and molecular capabilities, a computer center, library, wired and wireless internet connectivity, and video-conferencing. By fall of 2014, a research greenhouse will be available for scientists to conduct plankton, aquaculture, biofuel, and terrestrial studies.

Networking and Collaborations
Visiting scientists and Fellows come from regional, national and international institutes, with many returning year after year. This will provide unique opportunities for REU Fellows to interact and network with a global scientific community.
FOR UNDERGRADUATE RESEARCHERS (REUs)

Overview

You will spend the first week of the 8-week program at the USC University Park Campus (UPC) in Los Angeles, CA and stationed at the USC Wrigley Marine Science Center (WMSC) on Catalina Island, CA for the remainder of the program. Research schedules can be very demanding and will vary from project to project. Expect to spend well in excess of a normal “40-hour/5-day week” on your research. During the 8 weeks, you will be expected to:

1. Plan and execute an independent research project under the guidance of a research faculty mentor and near-peer mentor (e.g., graduate student, postdoc). We anticipate that a minimum of 70% of your time during the program will be devoted to activities directly related to your research project.
2. Submit a written research proposal by the beginning of the third week of the program, which you will also present as a 10-minute oral presentation (time includes questions from the audience). Guidelines for the proposal and presentation will be provided during the first week of the program.
3. Submit a Final Report at the end of the program. Guidelines for the Final Report will be provided during the first few weeks of the program.
4. Present your research findings as a poster presentation at the USC Wrigley Institute REU Symposium, which will be held at the USC WMSC on August 7, 2015 and open to the USC community and general public.
5. Participate in other research activities in your mentor's lab.
6. Participate in the WIRES REU seminar series.*
7. Participate in REU program field trips.*
8. Participate in career- and skill-building workshops.*
9. Attend Mentee Lunches with the REU Director and/or Undergraduate Programs Director on Tuesdays (day subject to change).
10. Have fun and enjoy southern California and beautiful Catalina Island!

* The REU calendar of events can be found here. We ask that you try to plan around REU activities when possible, but research should take precedence. Please inform the REU Program Director and/or Undergraduate Programs Director of any conflicts in schedule as far in advance as possible.
The Research Project

1) **The Proposal:** During the first week of the program, you will work closely with your mentor(s) to design a project that will potentially yield or contribute to publishable results. Since good science often thrives on collaboration and interaction among researchers, you will present your research proposal to the WMSC science community for feedback at the end of the second week of the program (10 minute talk, including feedback and questions). You will also be responsible to turn in a written version of your proposal by the beginning of the third week of the program. *It is recommended that you turn in a draft of your proposal to your mentor(s) and go through at least one practice run of your presentation with your mentor(s) and/or peers prior to delivering your presentation to the WMSC science community.* You will receive guidelines for the written proposal and oral presentation during week 1 of the program.

2) **Execution of the Project:** The details of your project will define your work schedule for the summer. You will work with your mentor(s) to develop a research plan, which should include a timetable that outlines the tasks that must be completed in order to finish the project in the 8-week period. We encourage you to trade field and laboratory help with other REUs in the program as well as other members of your mentor’s laboratory to maximize your research experiences and to learn about other projects. Most researchers at the USC WMSC work 5 to 7 days each week, and 8 - 12 hours per day. Be prepared for potentially erratic or irregular and long working hours.

3) **Laboratory notebooks:** Each student will be given a laboratory notebook at the beginning of the program. Notebooks should be used to keep detailed notes of the research project, including experimental design of field work and/or lab experiments, results and other notes that are pertinent to the research project. Be diligent about taking detailed notes and, whenever possible, create a duplicate electronic copy of your notes (especially if you take your notebook out into the field). These notes will be critical during data analyses and preparation of final reports and posters. Mentor(s) may also ask to see your lab notebook and/or ask to keep your notebook at the end of the program if the project will be continued with other students.

4) **Weekly meetings:** You will be required to meet with your faculty mentor(s) at least once a week, even if you are working frequently with near-peer mentor(s). During the weekly meetings with faculty mentors, you should be prepared to provide a progress report of your research project, including results, issues, troubleshooting ideas, next steps, and other research-related matters. Each REU-faculty mentor pair will determine the best day to have these weekly meetings, which can be done in person or via video or phone conferencing. You should take very detailed notes during these meetings, and make sure that
you clearly understand any expectations, comments and/or suggestions expressed by your faculty mentor(s).

5) The Final Report and Poster Presentation: You should plan to end your data collection at least 10 days before the last day of the program. Data analysis and interpretation as well as the process of putting together a poster and final report usually take longer than planned, so we suggest you begin this process as early as possible. Keeping detailed notes as you conduct your research will help you develop your final report and poster. Your mentor will help you analyze and interpret your data, and further guidelines for the final report and poster presentation will be provided during the first few weeks of the REU program. Electronic versions of the final report will be due on the last day of the program, and will be bound together into a single volume that will be kept at the USC WMSC library. Your Final Report abstract will be “published” on the USC WIES-REU program web site. You will also present a poster of your research findings at the USC WIES REU Research Symposium, which will be held at the Wrigley Marine Science Center on August 7, 2015. The symposium will be open to the USC and WMSC community.

5) Lab Cleanup: It is important that your research activities do not result in additional cleanup work for other researchers after you leave. Before leaving the WMSC and the USC UPC, you must clean your workspace in your mentor’s or assigned lab space and dispose of any samples that your mentor does not plan to save using approved protocols. For WMSC lab spaces, you will receive a “Checkout List” that needs to be approved by the WMSC lab manager (Lauren Oudin) or the lab technician (Kellie Spafford) to show that your obligations have been met prior to your departure.

6) Acknowledgements: The National Science Foundation requires that any publication resulting from, or including, work supported by the NSF REU-Sites program include the following acknowledgement: “This material is based upon work supported by the National Science Foundation under NSF Award OCE-1263356.” You should also acknowledge the Wrigley Institute for Environmental Studies, USC Dornsife, your faculty mentor(s), near-peer mentor(s), lab mates, and anyone else who helped you during the summer.
WMSC Lab Supervision Policy
Draft date: 30 May 2013

To conduct research in a lab unsupervised, all undergraduate students must complete a 6-hour campus safety course (or the equivalent at your home institution) and a 1-hour WMSC-specific safety talk.

To work in a lab under supervision (by a graduate student or instructor/faculty), all undergraduates must complete a 3-hour safety course (or the equivalent at your home institution) and the same 1-hour WMSC specific presentation. All supervisors must complete the 6-hour training and the 1 hour WMSC-specific safety talk.

Undergraduate students enrolled in academic courses need only complete the 1-hour WMSC-specific safety talk.

No one is permitted in the Radiation Lab unless they have completed the Radiation Safety Course and are named on a current Radiation Permit.

Students under the age of 18 are not allowed to work unsupervised in the labs. If ANY students in a group are under 18, the group must have a supervisor (who has completed the six-hour training) and an adult chaperone to watch over each “bay” being used in the lab). Chaperones are not required to complete any formal training, but are encouraged to complete the 1-hour WMSC safety course.

Note: Students over 18 are allowed in the lecture hall, computer room and library at any time without supervision.

USC Lab Safety Course Information:

** REU students will complete the 6-hour laboratory safety training course during the first week of the program.
REU Professional Development, Training, Seminars and Socials

The USC WIES REU Seminar Series
Researchers and professionals from academia, industry, government and non-profits will be invited as guest speakers for the weekly REU seminar series. REU students will have an opportunity to network with speakers and learn about current marine and environmental research topics.

Career- and Skill-Building Workshops
Several career- and skill-building workshops will be organized for REUs. Topics may include: scientific communication (proposals, presentations, and scientific papers); applying to and choosing a graduate school and program of study; career opportunities in science; ethical issues pertinent to research; oceanographic research methods; and more. Workshops will be posted on the REU Calendar.

Mentee Lunches
The USC WIES REU Program Director, Dr. Karla Heidelberg, and REU Coordinator, Dr. Diane Kim, will meet with REUs over lunch on Tuesdays (day subject to change) throughout the summer. These meetings will provide REUs with an informal setting to openly discuss their progress, challenges, and/or questions they have about their research project or other REU-related matters. This will also be a time for the REU Director and Coordinator to make important announcements.

Field Trips and Orientation Activities
During orientation, REUs will get a tour of USC and WMSC campuses and research laboratories, have a “meet and greet” with other undergraduate researchers and mentors (faculty and near-peer mentors), receive laboratory safety training, visit the Natural History Museum, explore Catalina through hiking and kayaking excursions, network during beach cookouts, and more!

Activities will be updated throughout the summer on the REU Calendar.
Finances and Travel

Finances
REUs will receive a stipend of $4000 for the 8-week program. Stipends will be disbursed in two installments of $2,000. The first installment will be issued on June 26, 2015 and the second installment will be issued on July 24, 2015.

For non-USC students: you will receive an e-mail from USC’s Supplier Portal (technicalsupport@sciquest.com) to complete a new vendor application (non-USC students need to be set up as an ‘external vendor’ for payments). Please fill out the application, which will also include an option to set up direct deposits. If you have any problems filling out the application, please contact the Portal help desk at 213-740-2716.

Taxes: Non-CA residents will incur a 7% CA state withholding fee prior to stipend dispersal. This fellowship may also be taxable under Federal law. All tax matters are your responsibility. Please consult the Internal Revenue Service (IRS) (http://www.irs.gov/publications/p970/index.html, IRS help-line at 800-829-1040) and/or consult a qualified tax advisor.

Housing
Housing on the USC University Park Campus during the first week of the program (June 14-23, 2015) and at the Wrigley Marine Science Center on Catalina Island from (June 23 – August 7, 2015) will be provided. Students will be housed 2 or 3 people to a dorm. Dorms are furnished with bedding, towels, desks, chairs, and most also have mini refrigerators.

Meals
Meals at the WMSC on Catalina during weeks 2-8 of the program will be provided. REU students are responsible for their own meals during week one of the program at the USC UPC campus in Los Angeles.

Travel
Travel expenses will be covered by the program (up to $500 and excluding checked bag fees). The REU Director and/or REU Coordinator will contact you in early to mid-April to begin arranging your travel.
WMSC Information Guide
http://dornsife.usc.edu/wrigley/wmsc/

Housing
You will be housed two or three to a room, with two rooms sharing a bathroom. Our rooms are very comfortable! All rooms have windows, desks, lamps, and dressers. We will provide your linens, blankets, pillows and towels, but please bring a beach towel. We ask that visiting researchers please keep voices and noise levels low between the hours of 9:00 p.m. and 8:00 a.m. in respect of other visitors.

Transportation to the WMSC:
You will be traveling on the USC vessel, the Miss Christy, to cross the San Pedro Channel. The boat departs from the Southern California Marine Institute (820 S. Seaside Ave., Terminal Island, CA 90731). The transit takes approximately 90 minutes.

This boat is governed by USC policies and regulations of the U.S. Coast Guard.

- For service Monday through Thursday, the typical times of departure are 7:30 a.m. for the trip from San Pedro to the WMSC and 3:30 p.m. for the return trip from the WMSC to San Pedro.
- For service on Friday, the typical times of departure are 8:00 a.m. for the trip from San Pedro to the Wrigley Marine Science Center and 12:30 p.m. for the return trip from the WMSC to San Pedro.
- Advance reservations are required. (The vessel has a maximum capacity of 45 passengers.) To arrange for transportation, please send a message by email to: wiesboat@usc.edu and provide your name, a contact phone number, dates of travel, and your affiliation with the WMSC (i.e. REU student).
- The boat leaves on time, with or without all passengers listed on the vessel’s manifest.
- **Closed-toed shoes are mandatory for all passengers aboard USC vessels.** Anyone wearing open-toed footwear, such as sandals, will not be permitted to board.
- Smoking and consumption of alcohol are prohibited aboard USC vessels.
- For other information regarding the USC boat service, call the main office at the Wrigley Marine Science Center at (310) 510-0811.

Motion sickness
If you tend to get motion sickness, options include Dramamine and Bonine (which make some people drowsy), acupressure wrist patches, ginger (begin eating it several days prior to the trip). We also recommend that you eat before traveling, but avoid acidic foods like citrus or coffee.
**Dining:**
Our dining hall is right next to our housing facility. Meal times are as follows:

- Breakfast - 7:30 - 8:00
- Lunch - 12:00 - 12:30
- Dinner - 6:00 - 6:30

Our chefs, Phil and José, will do everything they can to accommodate all tastes. Prior to the start of the program, you will be asked if you have any special dietary restrictions or concerns (vegetarian, vegan, kosher, etc).

The dining hall will be open 24/7 so that you will have access to the soda and water fountain, coffee dispenser, tea, hot water, ice, fruits, cereals, and milk. There are also vending machines (soft drinks and candy) located in the dining hall and in the lab building.

**Lounge:**
The lounge is located just off the dining hall and is open 24 hours a day. We have satellite TV, DVD/VCR players, board games, ping-pong and pool tables.

**Smoking:**
Smoking is not permitted inside buildings or vehicles at the WMSC. There are designated smoking areas.

**Laundry:**
The laundry room is located to the left of the cafeteria door. Machines take quarters ($1.00 for the washers and $1.00 for the dryer). Soap is available in a vending machine, and a change machine is located in the laundry room.

**Main Office:**
The office is located in the trailer across from the lab building. The phone number is (310) 510-0811. Any mail delivered to the WMSC will be sent to this office. Xeroxing, FAX services, stamps, quarters and just about anything else you need may be found here!

**Gift Shop:**
The gift shop is located in the main office. Gifts, T-shirts, postcards, maps, etc. are available. The gift shop is open Monday-Friday, from 9 am to 5 pm. Please ask in the main office if you need something at another time.

**Library and Computer Facilities:**
Our small library has basic reference books and a good collection of local guides to marine life. We have two computer labs furnished with both Macs and PCs, CD/DVD drives, printers and a scanner. All computers are connected to the
Internet by a high-speed (T-1) cable. You'll definitely be in email contact with the world! If you have a laptop computer, you are of course more than welcome to bring it along. You will have access to USC’s wireless network from anywhere on the WMSC campus.

**Community:**
The northwest end of Catalina Island, where the Wrigley Marine Science Center is located, is wonderfully wild. Two Harbors, a tiny town, is less than 2 miles (and a lovely walk) away along a dirt road. You'll find a small general store with a few essential items for sale, a shop for renting a mountain bike or diving gear, a restaurant and a snack bar. About 150-200 people live there; you'll meet some of the residents immediately because they work at the lab. In the summer, Two Harbors hops with visiting boaters, who moor in Isthmus Cove or nearby in Fourth of July and Cherry coves.

**Forms we need from you before you arrive:**
- WMSC Medical Form
- WMSC Waterfront Waiver
- WMSC Supplemental Questionnaire

**Recreation:**
In addition to indoor fun such as ping-pong and pool, we suspect you’ll be very interested in some wonderful outdoor fun! We suggest snorkeling in our marine reserve or perhaps a relaxing early morning kayak through the kelp beds. And no, you don’t need to bring your own kayak...we have plenty for you to enjoy (both single and double kayaks. No experience necessary...just a quick training orientation)! Please see below for more information.

**Kayaking**
We have kayaks, paddles, and personal flotation devices (PFDs) for you to use while you kayak (PFDs are required). Prepare to get wet. There is always the chance that your kayak will capsize. You must wear captured-heel shoes with gripping soles. Old tennis shoes, Keen or Chaco sandals are good choices. The WMSC also has booties that you can borrow. Flip-flop style shoes without a heel strap are not allowed. We recommend that you wear a hat and sunscreen for sun protection. There is a place at the waterfront to store your belongings while you kayak.

**Snorkeling**
We have wetsuits, masks, fins, and snorkels for you to use. If you wear glasses, you’ll need to wear contact lenses or a prescription mask unless your eyesight is good enough to go without glasses. Bring a beach towel. There is a changing room and showers at the waterfront and a place to store your belongings while you snorkel.

**The following are required for all waterfront activities:**
- **Waterfront Orientation:** All students must participate in waterfront orientation and training before use of any waterfront gear or swimming in Big Fisherman Cove. This training will help you learn about safety and what to do in case of emergencies, where to find wetsuits and how to gear up, where to find kayaks, and how to properly put away equipment.

- **Medical Form**
- **Waterfront Liability Waiver Form**

**Hiking**
There is awesome hiking on Catalina! But be careful because trails on the island are rocky, uneven, and frequently steep. We recommend that you wear sturdy walking shoes. Many of Catalina’s plants have spines or seeds that can scratch your legs so long pants are best. We also recommend that you wear a hat and sunscreen for sun protection and that you bring a full water bottle with you on your hike. Have fun, but be aware of your surroundings – we have cacti, rattlesnakes, and bison (buffalo) on the island.

**Mountain Bikes**
Mountain bikes and helmets are available for check out at the main office.

**Volleyballs (and a volley ball court), Soccer balls, badminton sets, and frisbees are also available at the main office.**
*If you do any field activities (including swimming) on your own while at the WMSC:*

**Before you go, please**
- Familiarize yourself with your route or the area you’re going to so that you can return safely
- Let someone know where you’re going

**When you return, please**
- Put away WMSC gear properly

**PACKING HELP**

Los Angeles in the summer is dry and warm, with temperatures ranging between 70°F (in the evenings) and over 100°F. The island can be a little cooler and windier, especially in the evenings, so bring clothing that you can layer, including a good jacket or sweater. The island is not completely paved like LA either – we have some paved roads but also many dirt roads. Monitor weather and sea conditions ([http://www.ecatalina.com/weather.html](http://www.ecatalina.com/weather.html)) to better plan your packing. Please see the next page for suggested items to bring with you.
Some items to remember to bring are:
- Bathing suit (1-2)
- Beach towel (bath towels are provided, but must stay in your room)
- Shoes that can get wet that are not flip flops (although you can also borrow booties from the WMSC)
- Close-toed shoes (you must wear them on the Miss Christy)
- Windproof jacket
- Fleece or other warm jacket
- Hats – one with a brim and one for warmth
- Daypack for hiking
- Water bottles
- Mug
- All your toiletries
- Medications – no pharmacies nearby at the WMSC!
- Motion sickness medication
- Divers: Dive gear
- Snacks (optional)

You can bring snacks to the island, but all food should be sealed in Ziploc bags because Catalina ants love snacks! The ravens and foxes are also quite clever, so please don’t leave snacks outside and unattended (even if they’re in your bag – ravens have learned to unzip bags).

We have snorkel gear and wetsuits at the WMSC, but if you prefer to use your own snorkel gear, please bring it. Please label equipment with your name.

**Responsibilities, Policies and Problems**
Each participant should review our visitor information posted at [http://dornsife.usc.edu/wrigley/visitors/](http://dornsife.usc.edu/wrigley/visitors/). Please consult the REU Director or REU Coordinator if you have any problems or needs during the program. It is the job of the REU Director and REU Coordinator to make sure that your project is running smoothly and to be your advocate in any matter affecting your productivity and happiness at USC and the WMSC. The REU Director and REU Coordinator can also help you obtain supplies or equipment necessary for your project and can mediate any misunderstandings that might arise between you and your mentor, coworkers, Marine Center staff, or roommates. All residents at the WMSC are expected to conduct themselves in a responsible and respectful manner. The USC WIES Executive Director reserves the right to dismiss any person for inappropriate behavior or whose actions are judged to pose a danger to him/herself or others. Underage drinking and substance abuse are illegal and will not be tolerated.
FOR REU MENTORS

**Important dates and reminders:**

Before the program begins, please communicate with your REU student(s) about summer research plans by email, telephone or video conferencing. Please send students manuscripts and other “homework” so that they can hit the ground running when they arrive!

June 15-21 (week 1): REUs will be on the USC UPC and spend most of their time in mentors’ labs. Please work with students to develop a feasible research plan for the summer. Students will be stationed at the WMSC on Catalina for the remainder of the program (June 22 – August 7, 2015).

June 26 (Friday): REUs will give an oral presentation about their summer research plans at the WMSC on Catalina Island. The presentation will be open to the WMSC science community. Mentors are highly encouraged to attend!

July 27-August 6, 2015 (last 2 weeks): Mentors will be responsible to guide REUs in data analysis and preparation of posters and final reports.

August 7 (Friday): REUs will present their research at the USC Wrigley Institute Undergraduate Research Symposium at the WMSC on Catalina Island. The symposium is open to everyone. The Miss Christi is scheduled to depart SCMI at 7:30 am and WMSC at 3:30 pm for people attending the symposium.

**Time on the island:** REU mentors will have access to a one-bedroom apartment at the WMSC throughout the program to stay over on the island and work with their REU student(s). Please note that you may have to share the apartment with other mentors. The apartment can accommodate up to 3 people and will be available on a first-come, first-serve basis. Please email wies-reu@usc.edu to make arrangements as far in advance as possible and at least 3 days in advance of your expected stay. Space on the Miss Christy will be prioritized for REU mentors throughout the program. You can contact us or wiesboat@usc.edu directly to reserve space on the boat. If you make your own reservation, please mention that you are a REU mentor. REU mentors will be responsible for their own meals. Breakfast and lunch at the WMSC Dining Hall are $8 each, and dinners are $15 each. The mentor apartment has a full kitchen, so mentors can also bring their own food.

**A note about mentor teams and shared mentoring responsibility:**
The goal of this REU program is to provide the best mentoring situation for undergraduates, so please keep this in mind when developing a mentoring plan.
for your student(s). Team mentoring (faculty, postdocs, graduate students, and/or other members of the lab sharing mentoring responsibilities) can be very effective and is highly encouraged to expose REU students to researchers at different career stages and to provide mentor training opportunities for postdoctoral researchers and graduate students. However, if primary responsibility for undergraduate researcher(s) will be assigned to post-docs, graduate students and/or some combination of personnel in faculty mentors’ labs, please keep in mind that faculty mentors are still expected to directly engage with REUs at least once a week, either in person or via video/phone conferencing. We know from experience that this will have a significant impact on the REU student’s experience in the program! The faculty mentor’s role will be especially important during the first and last two weeks of the program.

**Lab Supervision**
REU students must be accompanied by near-peer and/or faculty mentors to work in the WMSC laboratories. The REU Director and Coordinator will be on site to provide supervision during times that mentors are not available.

**The Research Project**
Please think about a research project that an undergraduate student can execute and complete (semi-independently) during an 8-week period at the Wrigley Marine Science Center on Catalina Island. Ideally, the research project will contribute to or complement ongoing work for a dissertation, research grant, or proposal. REU students often produce high quality work and have the potential to make significant contributions to research programs, so please think strategically about what project to carve out for them. Please note that some mentors allow REUs to develop their own research questions, others provide options for summer projects, and some assign specific projects to students. Whatever the situation, please be sure to inform students about the research process, and engage them in as many stages of the research process as possible (e.g., decision-making about experimental design or explaining why a specific experimental design will be used).

**Expectations**
In addition to clearly laying out a road map of the research project and goals, mentors should also clearly articulate other expectations that they have for the REU student, including working hours, participation in other lab activities or projects, sharing data, authorship, and other relevant matters at the start of the program.

**Mentor Meeting**
The REU Director and Coordinator will organize a REU Mentor Meeting prior to the start of the program. This optional meeting will cover information provided in
this handbook and also address any questions or concerns mentors may have. We strongly encourage new REU mentors to attend the meeting (date TBD).

**Follow-ups**
Please inform the REU Program Director (Kheidelb@usc.edu) and/or the REU Coordinator (dianekim@usc.edu) of any publications or presentations at scientific meetings that you coauthor with your undergraduate researcher.

The National Science Foundation also requires that any publication resulting from, or including, work supported by the NSF REU-Site program include the following acknowledgement: "This material is based upon work supported by the National Science Foundation under NSF Award OCE-1263356."

**Thank you!**
Being an REU mentor has both some cost and some great benefits. We greatly appreciate your willingness to serve as a mentor. We hope that you find it rewarding as well as scientifically productive. Please feel free to reach out to the REU Program Director and/or REU Coordinator if you have any problems, concerns or suggestions.

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2015 REUs, Mentors and Projects

Jennifer Aldous
Mt. St. Mary’s University (Biology, Class of 2016)
REU Faculty Mentors: Dr. Randy Miller (Professor, Baker University Biology) and Dr. Karla Heidelberg (Director and Associate Professor, USC Environmental Studies)
REU Partner: Lauren Wilson
Project: Biodiversity survey of the microscopic marine tardigrades at Catalina Island, CA

Albert Chang
University of Southern California (Environmental Studies, Class of 2016)
REU Faculty Mentor: Dr. Mark Steele (Associate Professor, Cal State University Northridge Biology)
REU Near-peer Mentors: Sam Ginther (M.S. Student) and Griffin Srednick (M.S. Student)
REU Partner: Audrey Looby
Project: Effects of the invasive Sargassum horneri on fish assemblages at Catalina Island, CA

Amanda DeLiberto
University of New Haven (Biology and Marine Biology, Class of 2016)
REU Faculty Mentor: TBD
REU Near-peer Mentor: TBD
Project: TBD

James Duffy
Rutgers (Environmental Sciences, Class of 2018)
REU Faculty Mentor: Dr. Sergey Nuzhdin (Professor, USC Computational and Molecular Biology)
REU Near-peer Mentor: Nathan Churches (Ph.D. Student)
Project: Investigation of genetic traits that contribute to successful bivalve aquaculture

Matthew Jelloian
Cal State University Northridge (Marine Biology, Class of 2016)
REU Faculty Mentor: Dr. Larry Allen (Professor, CSUN Biology)
REU Near-peer Mentor: Brian “JR” Clark (M.S. Student)
Project: A study of the reproductive behavior of the critically endangered giant sea bass, Stereolepis gigas
Colin Keating  
Washington University in St. Louis (Environmental Earth Science and Computer Science, Class of 2018)  
REU Faculty Mentor: Dr. Kenneth Nealson (Professor, USC Earth Sciences and Biology)  
REU Near-peer Mentor: Bonita Lam (Ph.D. Candidate)  
Project: Extracellular electron transfer capabilities of microorganisms from marine sediment

Audrey Looby  
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REU Faculty Mentors: Dr. Mark Steele (Associate Professor, Cal State University Northridge Biology) and Dr. David Ginsburg (Assistant Professor, USC Environmental Studies)  
REU Near-peer Mentors: Sam Ginther (M.S. Student) and Griffin Srednick (M.S. Student)  
REU Partner: Albert Chang  
Projects: Effects of the invasive Sargassum horneri on fish assemblages at Catalina Island, CA and a subtidal benthic marine life survey in Big Fisherman’s Cove, a marine reserve

Vivianna Sanchez  
Mt. St. Mary’s University (Biology, Class of 2017)  
REU Faculty Mentor: Dr. Adriane Jones (Assistant Professor, MSMU Biology)  
Project: A study of marine microbial communities in coastal ecosystems

Natalianne Tuttle  
Humboldt State University (Oceanography, Class of 2016)  
REU Faculty Mentor: Dr. James Moffett (Professor, USC Marine Biology and Biological Oceanography)  
Project: A study of Fe(II) in aerobic and anaerobic marine systems

Lauren Wilson  
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REU Partner: Jennifer Aldous  
Project: Biodiversity survey of the microscopic marine tardigrades at Catalina Island, CA