

UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

**Specialized Research Equipment Required
for Undergraduate Research Activity in
Biology (Marine Biology)**

Title

**Dr. Sherry Kraysky-Self &
Dr. William Schmidt**

Name of Submitter
(Faculty or Staff Only)

ULL Department of Biology

Organization

Title: Specialized research equipment is required for undergraduate research activity in marine biology (phycology/marine botany) Date: 7/13/16

Name (Contact Person): Dr. Sherry Krayeksy-Self

Address: 103 Billeaud Hall

Phone Number: 482-6754 Email: slk5014@louisiana.edu

Department/College/Org: Biology

ABSTRACT:

Recently, several undergraduate students, my colleagues and I demonstrated unequivocally with electron, epifluorescence and light microscopy; cell cultures, whole genome amplification using REPLI-g on single cells, Sanger sequencing (*cob1*, *tufA*, 18S), and *tufA* metabarcoding that hitherto unknown benthic life history stages of marine bloom-forming microalgae are associated endolithically within the interior of calcifying rhodolith-forming crustose coralline algae. Such endolithic structures were previously mistaken for chloroplasts, bacteria, starch granules or vesicles. Our work opens the door to further explore and assess the universality of endolithic stages within bloom-forming microalgae spanning multiple phyla in marine ecosystems worldwide. The research will also have important implications in predicting the onset of harmful phytoplankton blooms.

Our department has increased its encouragement of undergraduate authentic research at the freshmen and sophomore levels. My research group has always included undergraduate students; however, I wish to increase the number of undergraduates exposed to authentic research experiences. In order to expand on the research and on the number of students working on the research's completion, I will need laboratory equipment. The Biology Department is currently seeking renovations to a room that will be used by our five undergraduate instructors, students enrolled in BIOL 410 Independent Study, and Biology Education majors learning to incorporate research into a high school curriculum. The equipment requested in this STEP grant will be housed in the new undergraduate laboratory once it is built. It will be housed in my office and a small, but functional storeroom until the room is built.

a. Purpose of grant and impact to student body as a whole: I propose the purchase of equipment that is required for the completion of research involving advanced microscopy sample preparation and DNA analysis. This equipment will be shared with other instructors who hold PhDs and who are working with undergraduate students. Last academic year, I worked with 3 scholarship students, 1 LAMP student, 1 Biol 410 student per semester (Undergraduate research course) and 2 volunteers (For a total of 7-10 undergraduate students exposed to research). During the 2016 academic year, I intend to increase the

number of students with whom I do research from 1 student to 5-10 students per semester who will be taking Biol 410, plus the 3 scholarship students and 2 volunteers. I will also work with 2 LAMP students versus 1 LAMP student, thus exposing 13 – 20 undergraduate students to research. Authentic research that results in publications and well-trained workers is time consuming and requires extensive direction and up to date equipment. Students must learn how and when to use specific equipment and protocols. The outcome is worth the labor. Increasing authentic undergraduate research experiences is a major initiative of the National Science Foundation (NSF) as well as other funding agencies. The impact of the research on the student body will be far-reaching: first due to the outreach for research activities that the undergraduate researchers will have on the student body at large; Second, the undergraduate researchers will share skills they have learned while completing laboratory research with students in the regular classroom and teaching laboratories; Finally, students who are able to participate in undergraduate research are more likely to gain entrance to their professional or graduate school of choice.

b. Projected lifetime of the enhancement:

My students and I will be utilizing the new equipment for years to come, and if the new undergraduate research facility is funded, many other instructors and students will use the equipment for years.

c. Person responsible for:

Dr. Sherry Krayesky-Self, Master Instructor & Dr. William Schmidt

d. Describe in detail each budgeted category.

We are requesting the following budgetary items:

1. Freezer – Fridgidaire 20 cu. Ft. up-right	\$650.00
2. Eppendorf thermocycler (PCR and sequencing experiments)	\$7280.00
3. Eppendorf 5424R centrifuge (refrigerated, for DNA, RNA and protein)	\$12,600.00
4. Variable volume pipets, Alkali Scientific \$220.00 each [(2x 20-200µl) (3x 2-20µl) (1x .01-2µl) (1x 1000µl)]	\$1540.00
5. Bioglow UV Transilluminator (with shield)	\$795.00
6. Fein Optic IRB40 epifluorescent inverted microscope (With phase contrast)	<u>\$11,775.00</u>
Total	\$34,640.00

Equipment we have or have access to:

1. Laptop for image or DNA sequencing analysis
2. Compound and stereo microscopes (x2 each)
3. Tabletop culture chamber for bacteria
4. Tabletop cold culture chamber (no light)
5. Amscope digital capture system for microscopes
6. Micromanipulator arm for microscope

e. Previously-funded STEP projects are (for Dr. Sherry Krayesky-Self):

2006: STEP Grant: *Stereomicroscopes (Dissecting microscopes) for upper and lower division student laboratories in the Biology Department*: \$181,253.40

2006: STEP Grant: *Computers required for Biology Study Room-Computer Lab*: \$8,744.00

2005: STEP Grant: *Technological Enhancement of the Biology Freshman/Sophomore Laboratories*: \$80,899.00 (complete remodeling of laboratory room 115 in Billeaud Hall)

Budget Proposal

1.	Equipment	\$ 34,640.00
2.	Software	\$ -0-
3.	Supplies	\$ -0-
4.	Maintenance	\$ -0-
5.	Personnel	\$ -0-
6.	Other	\$ -0-
TOTAL:		\$ 34,675.00