

Instructionally Related Activities Funds Request Spring 2018

▼ Submitter

Submitter Name

Jason Miller

Submitter Email

jason.miller@csuci.edu

▼ 1. Basic Details

Activity Title

Inquiry-Based Learning in Biostatistics: Bats of Santa Rosa Island

Activity/Event Date

March 2018

Date Funding Needed By

15 January 2018

Previously Funded?

- No
 Yes

Additional Proposers

Academic Program(s)/Center Name(s)

Mathematics

Estimated total Course Fee revenue

0

Amount Requested from IRA

17,093.95

Estimated Number of Students Participating

250

2. Brief Activity Description

Describe the activity and its relationships to the educational objectives of the students' program or major

Brief Activity Description

Students of statistics gain a deeper appreciation for data and remember course concepts longer when their learning includes hands-on experiences. This proposed IRA project will give about 30 students of statistics (e.g., in MATH 202 or MATH 352) this experience, and about 220 other statistics students a socially relevant, inquiry-based learning experience that builds off the work of the others. In addition to enhancing the learning experience for these students, the proposed project will lead to student research projects and publications.

The proposed IRA activity is to create a problem space related to identifying free-flying bats to species via statistical descriptions of their echolocation calls. This topic is important because bats are often affected by human development (e.g., wind turbine farms) and are difficult to survey, as they are nocturnal flying mammals who emit ultrasonic calls. Protecting threatened and endangered species of bats relies on our ability to know when they are present.

A problem space is a frame for problem-based learning that consists of data sets, questions about the data, and tools for exploration. Problem spaces organize a diverse set of resources to support student inquiry, and they are seen as ways to provide great numbers of students with research-like experiences. Our problem space will be designed for students in MATH 202 (expect 7 sections) and MATH 352 (expect 2 sections) in late Spring 2018, and the space can be used for subsequent sections of these courses, indefinitely.

To create the project space, teams of 10 students and 3 faculty will gather data on Santa Rosa Island through night surveys using specialized recording instruments. Each night, data will be downloaded, viewed, and organized by participating students in preparation for the next night's work and for curation of the data in the problem space. The team will also talk about the kinds of questions that could be asked about the data, and they may draft some initial assignment questions for use in the problem space. Three such visits to the island will occur. Back on the mainland, we will hold several group meetings where students will learn to use the open-source and free statistical tool, R, to explore the data. What they find will also inform homework assignments or projects that will be created for MATH 202 and MATH 352.

Tools in the problem space will include basic descriptive statistics, basic graphical representations of data, and basic data comparison tools. Tools will also include sophisticated classification methods such as linear and quadratic discriminant functions, and classification trees. The faculty will work together to design tools and assignments for the problem space that will enhance student learning, and support course objectives (including applying quantitative problem-solving skills to biological problems, applying and interpreting descriptive statistics, using statistical software, and writing up statistical results). Using the problem space will strengthen our students' data analytic skills and prepare them for further study in their data-rich majors.

3. Learning Outcomes and Relation of IRA to Course Offerings

All IRAs must be integrally related to the formal instructional offerings of the University and must be associated with scheduled credit courses.

1. Please list all classes that directly relate to the proposed activity.
2. For each class listed, describe in detail how exactly the IRA activity will be integrated with the class's activities, how often/ on what expected date(s), and to what extent

Learning Outcomes and Relation of IRA to Course Offerings

This proposed activity relates to MATH 202, which is cross-listed with Biology and Psychology, and MATH 352, which is an upper-level course. Participating students will be drawn from these courses.

The proposed IRA activity integrates with each class's activity through the creation of a problem space related to identifying free-flying bats to species via statistical descriptions of their echolocation calls. Homework sets or projects in the problem space will be assigned to students in MATH 202 and MATH 352 in late Spring 2018, and this proposed project space

can be used indefinitely once created.

This proposed problem space will focus on the bats of Santa Rosa Island. Different groups of students will collect recordings through three trips to the SRI Research Station (tentatively 3/30-4/1, 4/6-8, 4/13-15) where we will conduct active nighttime surveys that exhibit bat activity. While on the island, students will also clean the data and prepare it for curation in the problem space.

The collection activity and resulting inquiry-based learning project directly support the course learning outcomes of applying quantitative problem-solving skills to biological problems, of applying and interpreting descriptive statistics, of using statistical software, and of writing up statistical results.

Note that this proposed problem space will contribute to future sections of MATH 202 and MATH 352 with little or no maintenance. If assessment efforts show this project has a significant impact of students, it could be repeated to gather more data for the problem space using existing instruments and supplies.

▼ 4. Activity Assessment

Describe the assessment process and measures that the program will use to determine if it has attained its educational goals.

Please note that a report will be due at the end of the semester.

Description of Assessment Process

The proposed IRA project will be assessed qualitatively and quantitatively. Quantitative assessments will include (1) an impact survey on those students who traveled to SRI to gather call data, and (2) an impact survey on students who were assigned coursework from the problem space. We will also track the use of the problem-space and its materials through counts of page visits and document downloads. Students who help gather data will keep an experience journal that will be assessed using an ethnographic approach. Of interest in the assessment is how the proposed project impacts course learning outcomes and how it affected students' views on data and statistics.

▼ 5. Activity Budget

Please enclose a complete detailed budget of the entire activity. Indicate specific items that you are requesting IRA to fund.

You should use either the Regular Activity budget (for events on campus) or -- if your event involves any travel-- you MUST use the IRA Travel Budget Form.

You can download both of the IRA Excel Budget sheets at <http://www.csuci.edu/ira/application.htm>.

Activity Budget

[BATS-ira-travel-budget-form-ay16-17.xlsx](#)

▼ 6. International Trips

If your event is an international trip submitted through the Center for International Affairs, you must include copies of:

1. Complete Center for International Affairs/ UNIV 392 proposal
2. The program budget as submitted to the Center for International Affairs (to ensure congruency between the two budgets)
3. as well as a copy of the course syllabus

Center for International Affairs Budget

Copy of Center for International Affairs Proposal

Course Syllabus

Certification

I certify that students attending this trip are not previous or repeat attendees of a prior International UNIV 392 Trip

7. Sources of Activity Support

Please list the other sources of funding (including course fees), and exact expected amounts of additional support for the activity. Please indicate if there are no other sources of funding

Other Sources of Funding

None.

8. Promoting Participation

What is your intended audience and how do you intend to market this to your students?

The audience is students in MATH 202 and MATH 352, which typically consists of about 240 students. Teams that work on Santa Rosa Island will be drawn from these courses, and instructors will have an opportunity to participate as well.

Invitations will be shared by the instructor with his or her students verbally and through Canvas. Dr. Miller will also visit the classes to talk about the project, and he will email students encouragement to apply to be on a team.

If this is an event that is off campus, how do you plan to bring back the benefit of this event to campus?

This event is not off-campus.

9. Sustainability

If appropriate, indicate how the content or delivery of the project promotes sustainability at CI.

Sustainability

Students who visit Santa Rosa Island will be exposed to and affected by the sustainability ethic there. This has been shown to change student attitudes and enhance enthusiasm for sustainability at CI.

10. Approval and Acknowledgement

Program Chair/Director

Grzegorzcyk, Ivona

Dean

Adler, Mary

Conditions and Considerations

Artist/Performer/Speaker Fees & Honoraria: On the Activity Budget, please indicate whether the vendor's price was set by you/CI Representative, or is a fee that was set by the vendor.

Large Event: For a large event, consultation with the campus Event Coordinator's office at (805)437-8548 is required.



Field Trip: Sponsor must comply with all policies found at:

<http://www.csuci.edu/rm/programs/academic-field-trip-guidelines-and-forms.htm>. If approved, Identified Risks of Participation and Release Agreement must be submitted for each student to the Program Office (Public Folders-HR Forms).

Involves Human Subject Data Collection for Public Dissemination -Requires IRB Approval : If Project Sponsor proposes to conduct research with human participants, the proposal may be subject to Institutional Review Board for the Protection of Human Subjects (IRB) review. All research that involves any type of interaction with human subjects - from simple surveys to complex biomedical procedures - must be reviewed and approved by the IRB prior to starting the research. Data for "Public Dissemination" indicates interviews/surveys that result in a journal/poster session/newsletter, etc.

IT Requirements: If your activity has IT requirements, coordination with and approval from IT Administration is required.

International Travel: Requires International Travel application be submitted to Center for International Affairs. Include copy of CIA budget and course syllabus in your IRA application. Must utilize the University's Foreign Travel Insurance Program (FTIP) and follow all International Travel Guidelines listed at: <http://www.csuci.edu/rm/insurance/foreign-travel.htm>

Risk Management Consultation: Events that involve or engage students directly with a performer or artist (i.e. in a workshop or other than as a passive audience member) will require consultation with Risk Management. Requires proof of correspondence with Risk Management.

Space/Facilities Services Requirements: Consultation and coordination with Facilities Services is required.

Acknowledgement

I acknowledge that I have reviewed and accepted the Conditions and Considerations herein. Please check off boxes as appropriate.

Chair Review

Recommendation

- I recommend approval of the IRA Funds Request described on this page
 I DO NOT recommend approval of the IRA Funds Request described on this page

Comments

This proposal involves students in interdisciplinary research project that are of interest to our local community and fields of environmental sciences, biology and mathematics. I strongly recommend it for funding.

 Ivona Grzegorzcyk Oct 12 2017

Dean Review

Recommendation

- I recommend approval of the IRA Funds Request described on this page
 I DO NOT recommend approval of the IRA Funds Request described on this page

Comments

This project has great potential for student research and project-based learning. Additional faculty mentioned are not identified. Proposer may wish to investigate additional sources of funding given the large size of the budget request in relation to other requests for IRA funding.

 Marion Adler Oct 16 2017

