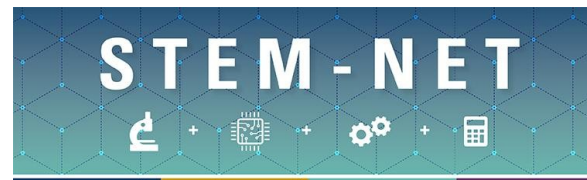


CSU NSF REU and IRES Programs and Awardees

Moderated by:

Dr. Frank A. Gomez
Executive Director, STEM-NET
Office of the Chancellor



<https://www2.calstate.edu/impact-of-the-csu/research/stem-net>

Speakers

Melissa Olson, Herman Sintim, & Sally E. O'Connor, NSF
The National Science Foundation Research Experiences for Undergraduates Site Program

Mehran Mazari, Cal State LA
Collaborative REU Proposals: Challenges and Opportunities

Betsy Read, CSU San Marcos
Reflections on CSUSM's REU Site: NGS from Beetles to Beer

Zair Ibragimov, Cal State Fullerton
Engaging Students in Research Internationally

Paul Laris, Cal State Long Beach
In it for the Long Run: Developing an REU-Site with a Private Landowner

Corey Garza, CSU Monterey Bay
Monterey Bay Regional Ocean Science REU



The National Science Foundation Research Experiences for Undergraduates Site Program

The National Science Foundation Research Experiences for Undergraduates Site Program

Melissa Olson, Sally O'Connor, Herman Sintim – National Science Foundation



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Sites Program Overview

Solicitation: [NSF 19-582](#) **Watch for potential updates in next REU cycle**

Goal:

Attracting students to, and retaining them, in science and engineering and for preparing them for careers in these fields.

How:

- *The REU program, through both Sites and Supplements, aims to provide appropriate and valuable educational experiences for undergraduate students through participation in research*
- *REU projects feature high-quality interaction of students with faculty and/or other research mentors and access to appropriate facilities and professional development opportunities.*



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Sites Program Overview

Basic Elements of REU Sites

- Must have a well-defined common focus that enables a cohort experience for students
 - May be based in a single discipline or academic department, or may offer a inter- or multi-department research opportunities under a coherent intellectual theme
- Should reflect the unique combination of the proposing organization's interests and capabilities and those of any partnering organizations
- Should involve students in research who might not otherwise have the opportunity
- Should provide high-quality research environment, mentoring and professional development opportunities

Directorate and Division specific norms exist – talk to the cognizant Program Officer



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Solicitation - Eligibility

Special PI and Student Eligibility Requirements:

- Only 1 PI and 1 Co-PI Allowed
 - 1 month summer salary support for ALL program management
- Undergraduate student who is enrolled in a degree program leading to a baccalaureate or associate degree.
- Undergraduate student participants supported with NSF funds in either REU Supplements or REU Sites must be U.S. citizens, U.S. nationals, or permanent residents of the United States
- For REU Sites, a significant fraction of the student participants should come from outside the host institution or organization

There are no restrictions or limits on the number of proposals per organization



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Solicitation – Project Description

Student Selection & Recruitment:

- Institutions where students will be recruited from
- Recruitment efforts to attract underrepresented groups
- Majority of students must be recruited from institutions with limited STEM research opportunities
- Significant fraction of students should come from outside institution
- Include quantifiable goals and describe how you will meet them

Student and Mentor Professional Development:

- Plans for student professional development, including responsible and ethical research conduct
- Training, mentoring or monitoring for research mentors
- REU Site's plans for communicating information on expectations of behavior to ensure a safe and respectful environment for all participants
- For additional information, see the NSF policies at <https://www.nsf.gov/od/odi/harassment.jsp> and the "Promising Practices" at https://www.nsf.gov/od/odi/promising_practices/index.jsp.



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Solicitation – Project Description

Nature of Student Activities:

- Detailed descriptions of example projects including
 - Significance
 - Framework
 - Hypothesis
 - Research Questions
- Plan that ensures student-faculty interaction and student-student communication
- Describe students' role in projects and desired student outcomes

Research Environment:

- Experience and record of PI and mentors in undergraduate research
- Sustained mentoring plans



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Solicitation – Project Description

Project Evaluation and Reporting:

- Plan to measure qualitatively and quantitatively the success of the project
- Structured means to track students beyond graduation
- Site *can* engage educational research specialist, but paid “external evaluator” is not a required
- Approach assessment like a scientist

Student and Mentor Professional Development:

- Plans for student professional development, including responsible and ethical research conduct
- Training, mentoring or monitoring for research mentors
- REU Site's plans for communicating information on expectations of behavior to ensure a safe and respectful environment for all participants
- For additional information, see the NSF policies at <https://www.nsf.gov/od/odi/harassment.jsp> and the "Promising Practices" at https://www.nsf.gov/od/odi/promising_practices/index.jsp.



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Sites Program in the Division of Chemistry

Typical CHE Site:

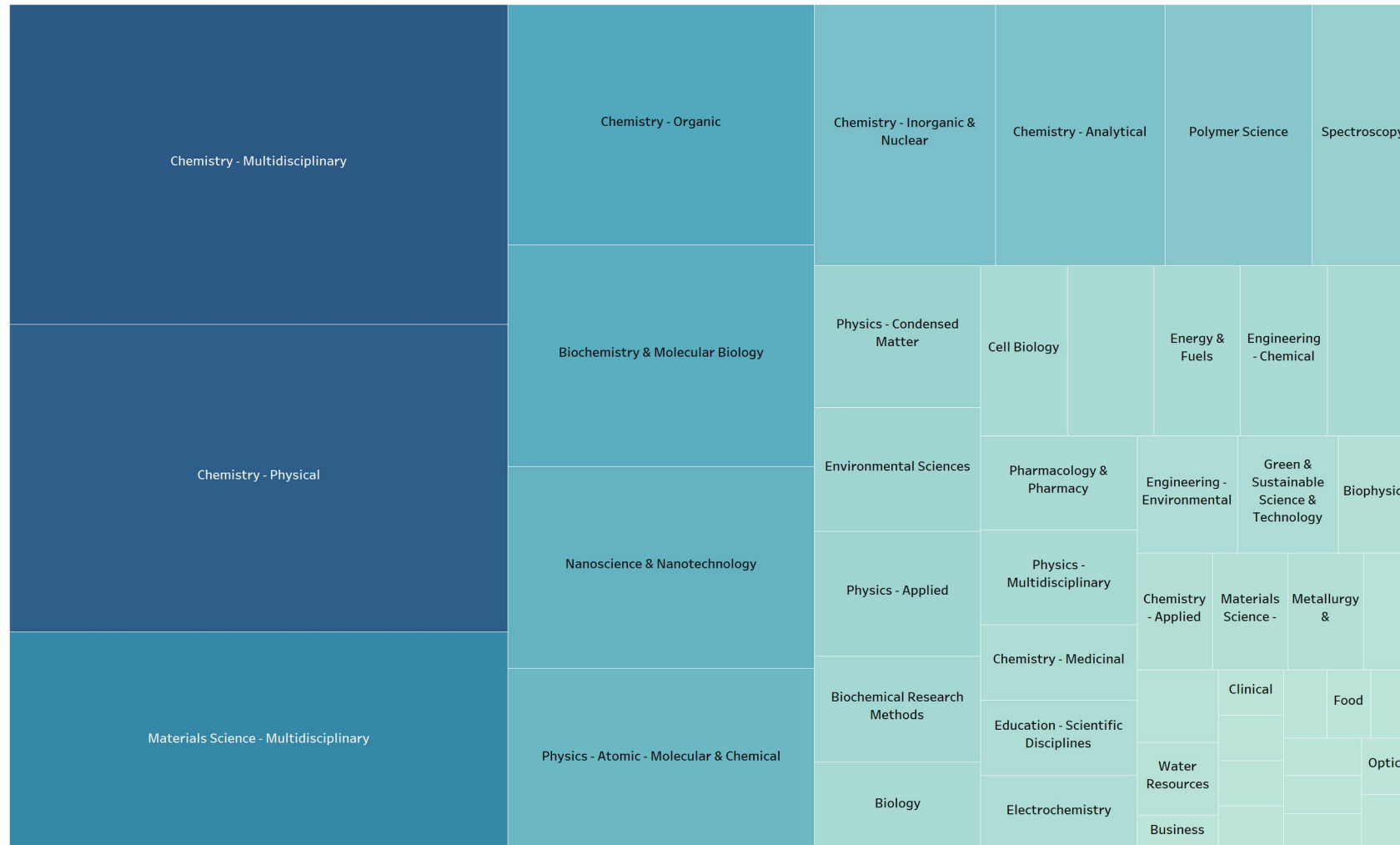
- Between 8 and 12 students/summer (10 is typical)
- Onsite 10-week experience
- ~80% of participants are external
- Typically, 3-year awards
- **Different REU Site models and themes are encouraged!**
- International Sites
- Distributed Sites or Faculty Partnerships
- Sites that engage students with disabilities
- Community college engagement
- Virtual sites



The National Science Foundation Research Experiences for Undergraduates Site Program

REU Sites Program in the Division of Chemistry

Publications Acknowledging CHE REU Site Awards by Subject





What makes a BIO-focused REU Site Proposal Competitive?

- **Overarching theme that resonates throughout the proposal**
- **Know the norm (not necessary to follow but make sure to justify if drastically outside the norm)**
- **Typical program: 10-weeks; 10 students; summer**
- **Funds predominantly go toward student costs, etc. (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505690)**
- **Main focus: research but recruitment and programming critical**
- **Ask: what is unique/special about your proposal or Site?**

- Recent Opportunities
- Small Business
- Transformative Research

Name	Email	Phone	Room
Sally E. O'Connor	soconnor@nsf.gov	(703) 292-4552	

SYNOPSIS

The Directorate for Biological Sciences (BIO) participates in the NSF-wide REU program. The Division for Biological Infrastructure (DBI) manages the REU Site program for BIO.

The NSF-wide Research Experiences for Undergraduates (REU) solicitation governs the overall competition. The following clarifications/explanations are specifically for REU Site proposals submitted to the BIO/DBI.

- A BIO-funded REU Site hosts on average 10 students for a summer program lasting approximately 10 weeks long.
- In BIO, at least 50% of participants must come from outside the host institution.
- Stipend, meal allowance and travel to and from the REU site must be budgeted. A small research allowance of \$1,000-2,000 per student can be added to Participant Support costs.
- Travel to conferences to present student research should NOT be included in the budget. Travel funds to students are provided through a Travel Award system administered in the <https://bioreu.org> website.
- Over the past several years, Site awards to institutions have the predominant costs under the Participant Support Costs (PSC); typically, PSC constitute 90% or more of the Total Direct Costs.
- Most awards provide 3 years of funding. Proposers wanting to request more than 3 years of support should contact the Program Directors.
- Assessment of BIO-funded REU Sites is done using the Student Assessment of Their Learning Gains Undergraduate Research Student Self-Assessment (SALG URSSA) tool (see the <https://bioreu.org> website for details).

Site Information	Site Location	Contact Information	Additional Information
Alabama State University REU Site: Research & Training in Multidisciplinary field of Regenerative Sciences for Undergraduates Biological Sciences	Montgomery, Alabama	Primary: Komal Vig (334) 604-8189 komalvig@alasu.edu Secondary: Shree Singh (334) 604-9160 ssingh@alasu.edu	Research Topics/Keywords: Biology, Biosciences, Biomedical Engineering, Chemistry, Physics Abstract of Award
American Museum of Natural History REU SITE: Systematics, Evolution and Conservation for the 21st Century	New York, New York	Primary: Cheryl Hayashi (212) 769-5073 chayashi@amnh.org Secondary: John Flynn (212) 769-5806 dean-rggs@amnh.org	Research Topics/Keywords: Biosciences, phylogeny, systematics, evolution, conservation, paleontology, neontology, museum, invertebrate, vertebrate, genomics, morphology Comments: Additional contact: Maria Rios mrios@amnh.org Abstract of Award
Auburn University REU Site: Warm-water aquatic ecology Fisheries, Aquaculture, and Aquatic Sciences	Auburn, Alabama	Primary: Alan Wilson (334) 246-1120 wilson@auburn.edu	Research Topics/Keywords: biology, biosciences, ecology, limnology, fisheries management, evolution, molecular biology, microbiology, invasive species, behavior, statistics, restoration, modeling, hydrology, remote sensing Abstract of Award
Boise State University REU Site: Raptor Research Raptor Research Center	Boise, Idaho	Primary: Jim Belthoff (208) 426-4033 jbeltho@boisestate.edu	Research Topics/Keywords: Biosciences, ecology, behavior, population biology, community ecology, wildlife management, anthropogenic impacts, parasitology,



The National Science Foundation Research Experiences for Undergraduates Site Program

Questions & Answers

Contact Information:

Name: *Melissa Olson, Sally O'Connor, Herman Sintim*

Campus/Department: National Science Foundation

Website: *www.nsf.gov*

Email: molson@nsf.gov, soconnor@nsf.gov, hsintim@nsf.gov



Collaborative REU Proposals: Challenges and Opportunities

Mehran Mazari – Cal State LA

*Cal State LA Collaborators:
Tonatiuh Rodriguez-Nikl
Jingjing Li
Mohammad Pourhomayoun*

Mehran Mazari, Associate Professor

Cal State LA, Department of Civil Engineering

mmazari2@calstatela.edu



Project Overview

NSF Award # 1950492

REU Site: Collaborative Proposal: Research Experience for Undergraduates in Underground Infrastructure

https://www.nsf.gov/awardsearch/showAward?AWD_ID=1950492&HistoricalAwards=false

NSF Organization: EEC - Division Of Engineering Education and Centers

NSF Program: EWFD - Engineering Workforce Development

Multi-site award to Colorado School of Mines, Lehigh University, and California State University, Los Angeles



REU Program Objectives

- **Attract, engage, and educate** undergraduate students from institutions that have limited research activities in underground construction and engineering research;
- Offer **hands-on** high-quality **research experience** in state-of-the-art laboratory and computing facilities in combination with a series of **professional development** activities; and
- Motivate undergraduate students to pursue and prepare themselves to succeed in advanced degrees in **STEM**, with an emphasis on women and minorities.



Our Story

It all started back in 2017... out of an idea from another collaborative multi-campus research center.

How it started (2017)



How it's going (2021)

The Engineering Education and Centers (EEC) program staff recognize the effort that went into this submission. However, I regret to inform you that the National Science Foundation is unable to support your proposal.

... and 2018



... and 2019





Collaborative Proposal

In our REU program, three campuses were involved:

- All team members from different campuses work on ONE collaborative proposal
 - Multi-site recruitment
 - 4 students per site
 - Geographically distributed campus locations
- Each campus submit the proposal indecently on FastLane but with their own PI(s) and senior personnel
- Plan for collaborative activities, workshops and events
 - In-person events (originally planned)
 - Online and hybrid events (modified later)



REU Site Challenges

- Advertising and Recruitment process
- Planning and Coordinating REU Summer Activities
 - Professional Development Workshops
 - Communication skills
 - Presentation practices and technical writing
 - Academic advancement
 - Group Research Exchange Sessions
- Implementation and Student Engagement
 - Virtual vs In-Person
 - Faculty Mentors (4 per each site)
 - Assessment and Evaluations



Summary and Highlights

- Leveraging campus educational and research resources
- Innovative and multidisciplinary research topics
- Engaging and encouraging other faculty to get involved in mentoring REU cohorts
- Recruiting students from diverse backgrounds
- Collaborative and multi-campus REU proposals
- Getting involved with other current REU sites



Collaboration Opportunities

- Multi-Campus Research Collaborations
 - NSF, USDOT, DOE, etc.
- Multidisciplinary research collaboration opportunities:
 - Infrastructure Resilience and Sustainability
 - Application of Data Visualization, Big Data Analytics and Machine Learning
 - Innovative and Sustainable Infrastructure Materials
- Collaborative workshops, training and certificate programs

Contact Information:

mmazari2@calstatela.edu

Let's connect:



@MehranMazari



Mehran Mazari



Mehran Mazari



Reflections on CSUSM's REU Site: NGS from Beetles to Beer

Reflections on CSUSM's REU Site: NGS from Beetles to Beer

Betsy Read– Cal State University, San Marcos

Betsy Read, Professor

Cal State University, San Marcos, Biological Sciences

bread@csusm.edu

CSUSM's REU Site: NGS From Beetles to Beer

- 10-week program
- 10 participants
- Enrichment Activities
 - Field Trip to USCD
 - NSPIRE Lecture Series
 - 3 Research Seminars
 - MentorFest
 - Career Panel
 - Poster Workshop
- Bioinformatics/Manuscript Writing Workshop
- Poster Showcase



Highlights from 2021 included writing and submitting a Genome Announcement to G3

Genome of a novel Sediminibacterium discovered in association with two species of freshwater stream Cyanobacteria in Southern California

David Castro¹, Clara Sanders², Sandy Laster³, Andrea Moron-Solano⁴, Briana Vega⁵, Hannah Hausknecht-Buss⁶, Simone Henry⁷, Andrew Zhang⁸, Haven Johansen⁹, Lakme Caceres⁹, Antoinette Kasler⁹, Isabelle Massaro⁹, Immanuel Mekuria¹⁰, Gretchen Vengrovsk¹¹, Rosalina Stancheva Hristova¹², Xiaoyu Zhang¹³, Betsy Read¹⁴, Arun Sethuraman¹⁴

ABSTRACT Here we report the discovery of a novel Sediminibacterium sequenced from laboratory cultures of freshwater stream cyanobacteria from sites in Southern California, grown in BG11 media.


KEYWORDS: Genome assembly, annotation, Phylogenomics

INTRODUCTION The phycosphere, or the area immediately surrounding cyanobacterial cells or colonies¹, is a resource-rich environment for heterotrophic bacterial colonizers. These colonizers often evolve mutualistically with their host cyanobacteria to provide nutrients and facilitate remineralization of organic material in the environment. The bacterial-cyanobacterial interactions in the phycosphere of lake planktonic cyanobacteria are relatively well studied^{2,3}, in contrast to stream benthic cyanobacterial mats. The mucilage of freshwater cyanobacteria and other algae represents a unique habitat and nutrient source, which is beneficial for heterotrophic bacterial³ and some mixotrophic endosymbiotic diatoms⁴. Here we report the discovery of a novel Sediminibacterium sequenced from laboratory cultures of freshwater stream cyanobacteria from sites in Southern California, grown in BG11 media. A de novo genome assembly of this bacterium yielded a complete chromosomal genome on a single contig of length 3.34 Mbps with a GC content of 39.4%. A first pass annotation identified 3000 protein coding genes, with 98% completeness when compared against all prokaryotic and cyanobacterial gene families in BUSCO. A comprehensive phylogenomic species tree reconstruction using 100 of these protein coding genes placed the novel bacterium to be sister to a previously identified Sediminibacterium, which is over 20% divergent from our novel genome.

WELCOME!

HOME BLOG COMMUNITY ABOUT CONTACT

WEEK 8
8/1/2021 0 Comments



Hello everyone! My name is Immanuel Mekuria. I am a senior majoring in biotechnology entering my final semester this fall at CSUSM. I've had such a great experience being a part of the NSF REU program and look forward to the next couple of weeks.

I have been a part of Dr. Read's Lab for just about a year now, where we are studying the growth algae under certain conditions. Specifically, I have been working with *Isochrysis Galbana*, which is a photosynthetic microalgae commonly used in the aquaculture industry. *I. Galbana* has significant value because of its ease to culture and harvest. It's also one of a few species that produce alkenones, which are long-chain fatty acids used as a valuable

WATCH THIS SPACE FOR WEEKLY UPDATES!

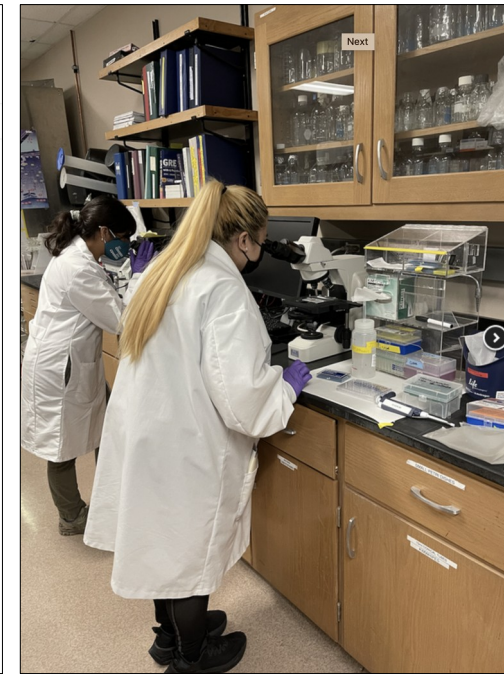
Every week, one of our CSUSM NSF REU students will post their blurb, summarizing their week, and chronicling our program.

ARCHIVES

- July 2021
- June 2021
- August 2019
- July 2019
- June 2019

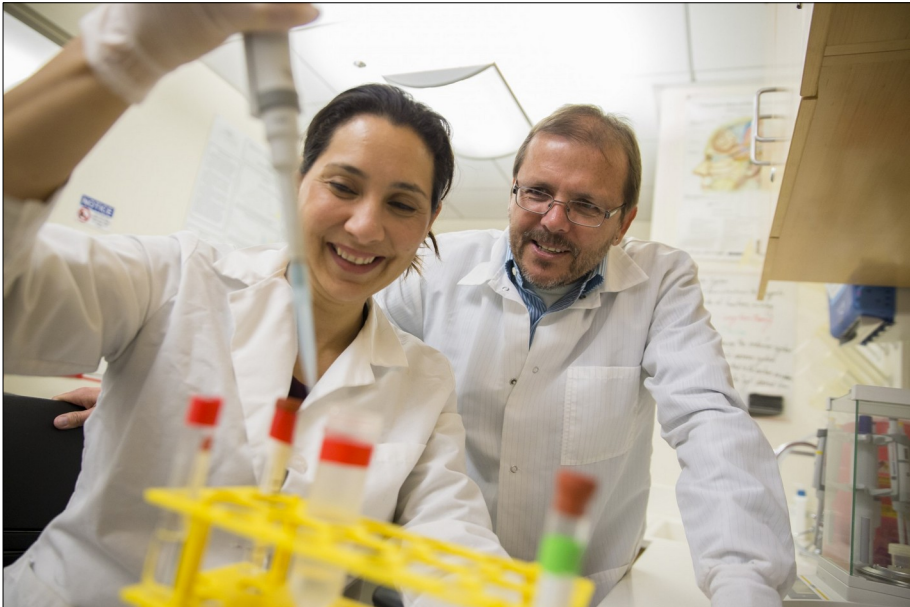
CATEGORIES

All



- Slack Page
- Blog Posts (<https://csusmbioreu.weebly.com/blog>)
- Graduate Student Mentor

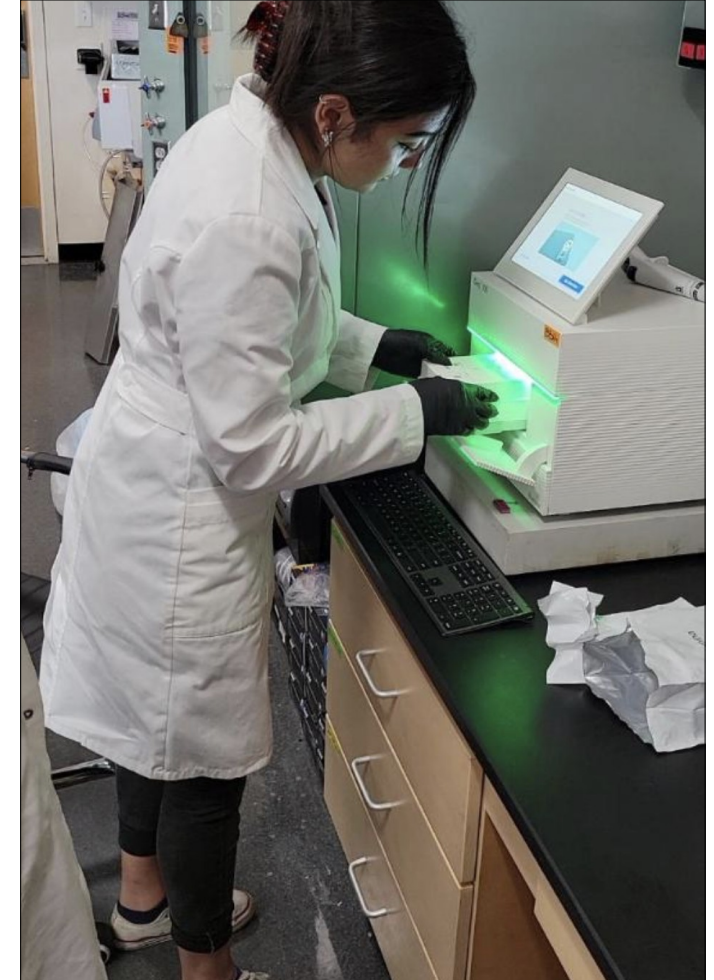
There are a couple of things we would like to do differently this next year



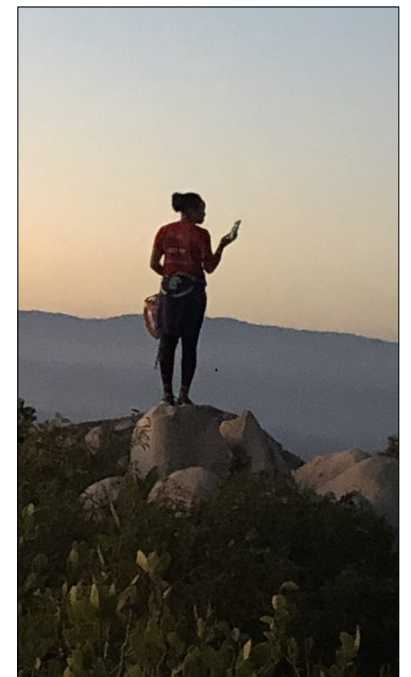
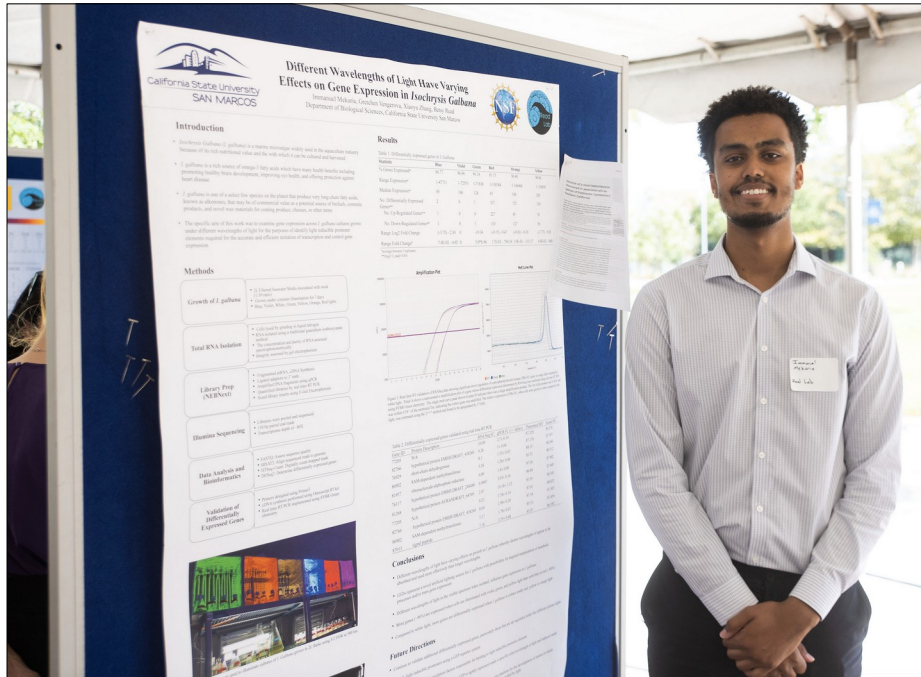
- Develop a more robust mentorship training program
- Reach out more frequently to younger members of the cohort
- Go grunion hunting on the 2nd or 3rd day of the run, not the 1st!

Benefits of the REU Program to CSUSM

- Leveraged to fund larger College Wide Summer Scholars Program
- REU projects integrated into the curriculum of several courses
- Donations from Illumina
- Secure an iSeq100
- Data generated to advance faculty research
- Stimulated new thoughts and ideas for faculty research



One of the biggest challenges is supporting students when they return to their home institutions



- Developing REU sites with a discrete partner
- Providing mentors resources during the academic year to continue to engage with mentees

Student assessment of learning gains (SALG) is easy to use and helpful, but including free response questions can be very informative

INSTRUMENT ANALYSIS

Instrument dashboard

On this page, you can view and download a summary of results from one or more SALG instruments. You can also view results across instruments.

Results displayed for the following instrument:

ID	Open	Instructor	Course	Semester	Description	N
93779	Sun Aug 22, 2021 Mon Aug 23, 2021	Betsy A Read	REU Site: From Beetles to Beer 2021	Summer 2021	REU Site: From Beetles to Beer 2021	12 download

If you'd like to aggregate data across instruments, you can [add another instrument to this analysis](#).

[Cross-tabulate questions](#)

[Sign out](#)

[My home page](#)

[Edit my profile](#)

[Privacy policy](#)

[Legal statement](#)

[User forum](#)

[Tips and tricks](#)

[Help](#)

Frequency distributions of scale results

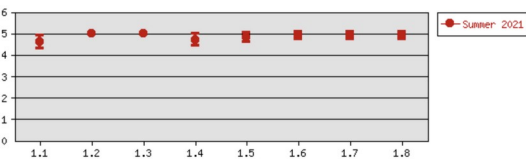
The table below lists the percentage of students responding in each category, along with the mean and number of responses for that item. If you'd like a more detailed analysis, click on the 'details' link to the right of that item.

Gains in THINKING AND WORKING LIKE A SCIENTIST: APPLICATION OF KNOWLEDGE TO RESEARCH WORK.

	1:no gains	2:a little gain	3:moderate gain	4:good gain	5:great gain	9:not applicable	Mean	N
1. How much did you GAIN in the following areas as a result of your most recent research experience?								
1.1 Analyzing data for patterns.	0%	0%	0%	42%	58%	0%	4.6	12 details
1.2 Figuring out the next step in a research project.	0%	0%	0%	0%	100%	0%	5.0	12 details
1.3 Problem-solving in general.	0%	0%	0%	0%	100%	0%	5.0	12 details
1.4 Formulating a research question that could be answered with data.	0%	0%	0%	33%	67%	0%	4.7	12 details
1.5 Identifying limitations of research methods and designs.	0%	0%	0%	17%	83%	0%	4.8	12 details
1.6 Understanding the theory and concepts guiding my research project.	0%	0%	0%	8%	92%	0%	4.9	12 details
1.7 Understanding the connections among scientific disciplines.	0%	0%	0%	8%	92%	0%	4.9	12 details
1.8 Understanding the relevance of research to my coursework.	0%	0%	0%	8%	92%	0%	4.9	12 details

Summary of scale results

The graphic below lists the mean and confidence interval (± 3 times the standard error) for each item.



- What are you most proud of having accomplished this summer?
- What did you learn that surprised you?
- What did you discover about yourself as a young research scientist?
- In what ways were the weekly meetings beneficial to you?
- What would you do differently if you had the opportunity to do the research again?
- What challenged you and how did you meet the challenge?
- What three words would you use to describe research?
- What did you like best about the program?



**Reflections on CSUSM's REU Site:
NGS from Beetles to Beer**

Questions & Answers

Contact Information:

Betsy Read

CSUSM/ Biological Sciences

Phone #:760-750-4129

Email: bread@csusm.edu

Engaging Students in Research Internationally

2017-2020 IRES Program in Mathematics

International Site: Uzbekistan Academy of Sciences

Dr. Zair Ibragimov

California State University, Fullerton

Zair Ibragimov, Ph.D.

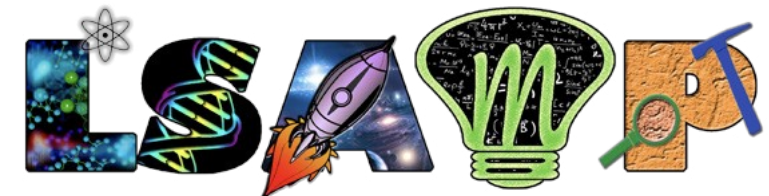
Professor, Department of Mathematics

Cal State Fullerton

zibragimov@fullerton.edu

Project Overview

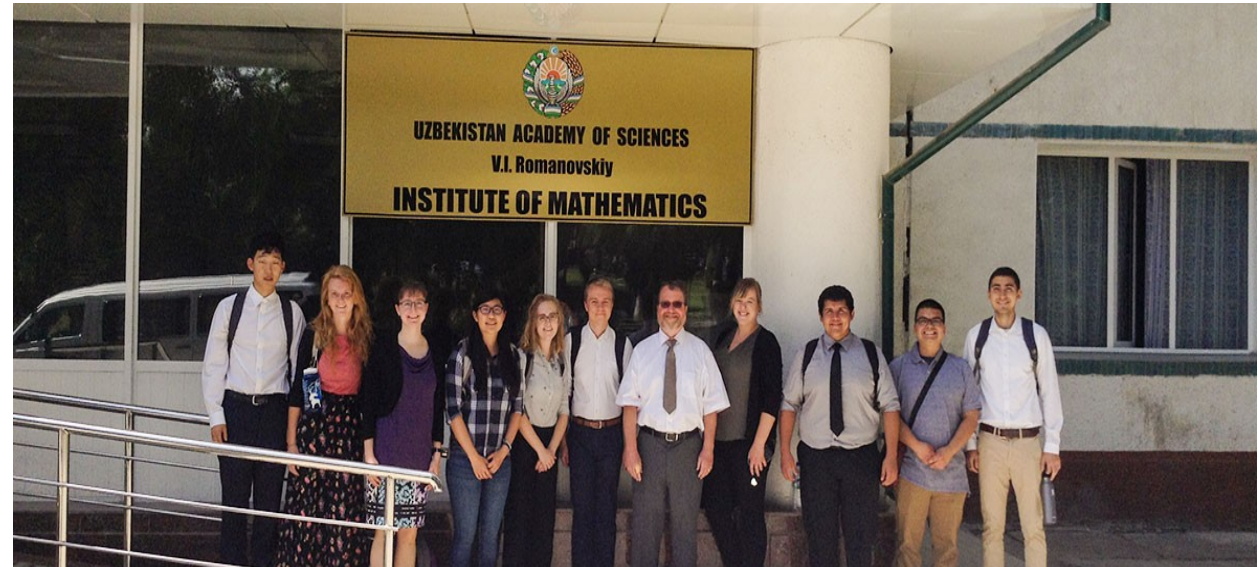
- Contemporary research in STEM fields has become a truly international endeavor and hence it is important that U.S. students grasp this early on and start cementing their international network of researchers.
- The aim of the IRES in Uzbekistan project was to give U.S. students 10-week, summer research experiences under the mentorship of prominent Uzbekistan scientists, who are leaders in various areas of STEM and are well qualified to mentor the U.S. students.
- The program was funded by the National Science Foundation (NSF Grant #1658672) and by the CSU-LSAMP program (NSF Grant #1826490).



Louis Stokes Alliance for Minority Participation

Project Overview

- Under the program, three separate cohorts of U.S. students over a three-year period (2017-2019) conduct research.
- Total of 29 students (25 Math, 2 Biology and 2 Physics majors) including 13 CSU students.
- The project gave the U.S. students an opportunity to expand their research skills while expanding their network of international connections.
- The project provided ample opportunities for U.S. students to learn about the benefits of engaging internationally.



Engaging Students in Research Internationally

Activities

- Working in a diverse and vibrant research environment and collaborating with their foreign peers on cutting-edge research.
- U.S. students were exposed to a unique style of teaching and mentorship enriching their learning experiences.
- Visiting several universities to meet with faculty and students, holding joint panels on international education, and presenting talks at seminars and conferences.
- Several students took language courses in Uzbek and Russian.



Cultural Activities

- Uzbekistan presents a unique opportunity when it comes to cultural enrichment activities.
- Four sites in Uzbekistan are listed as UNESCO World Heritage sites.
- Participants visited these places as part of their cultural enrichment activities as part of the cultural component of the project.



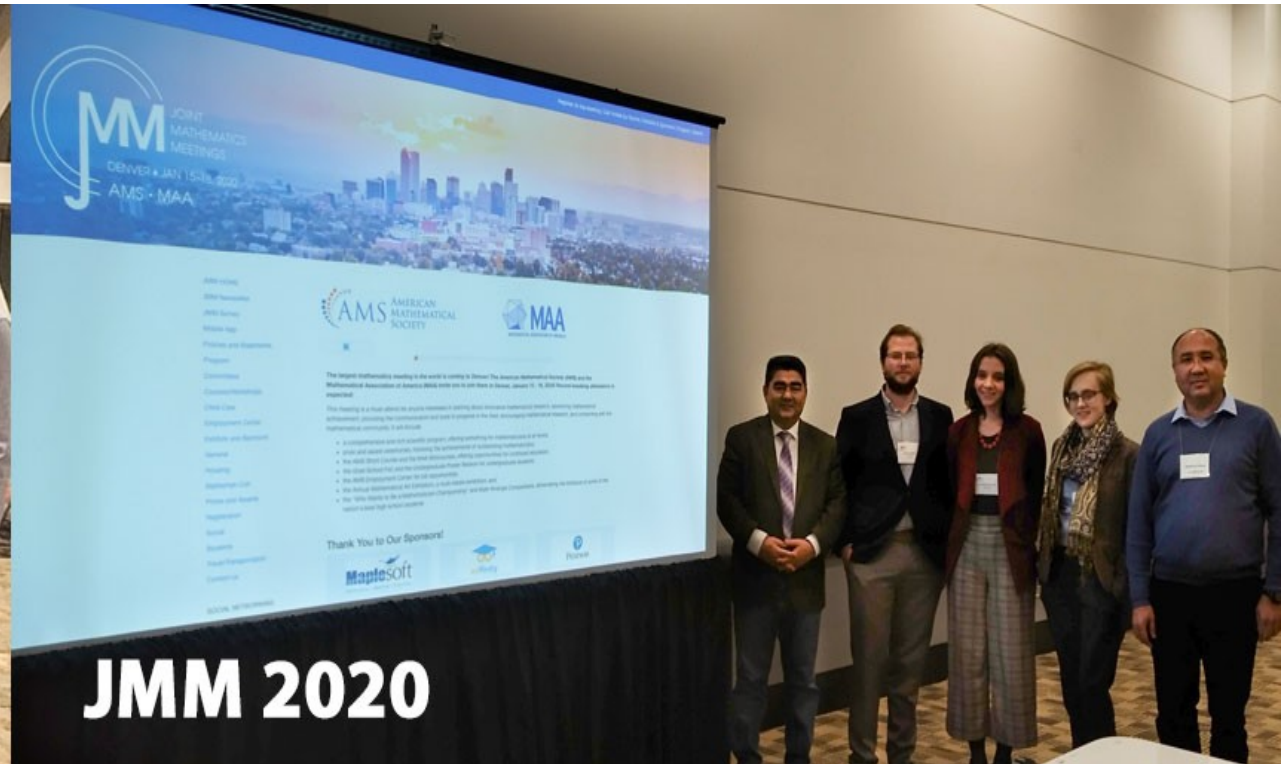


Engaging Students in Research Internationally



Results

- Participants made over 20 presentations at several national and international venues and published jointly with their foreign mentors/peers 17 papers in peer-reviewed journals, also available on our



Lessons Learned

- Engaging students in international research is considered as High Impact Practice, contributing to the pipeline of a more diverse, robust, and internationally trained of U.S. scientists.
- 14 are in Ph.D. programs and 6 are in Masters' program and 3 are planning to enter Ph.D. Programs.
- Inclusion of professional development and networking activities along with rich cultural components is a key for success.
- *To me, one of the most important and impactful parts of my IRES position was the opportunity to observe and appreciate Uzbek culture... to see all of this while simultaneously doing substantial mathematical research as an undergraduate was a terrific opportunity that would not have been nearly the same anywhere else. I feel that I have left this program both with a better picture of what graduate mathematics will be like and a substantially broader perspective to look at the world with.*



Next Steps/Long-Term Plans

- We plan to continue the IRES in Uzbekistan program and plan to apply for another NSF grant.
- Because of its success programs from other U.S. institutions are now placing their students with their own funding.
- In 2020 we selected 12 students from institutions/programs across the U.S. who were placed in our program funded by several LSAMP Alliances and similar programs.

Engaging Students in Research Internationally

International Research Experience for Students

June 20, 2021 – August 15, 2021



The International Research Experience for Students in Uzbekistan is a National Science Foundation funded program hosted at California State University, Fullerton. The program provides U.S. students with summer research experiences in Uzbekistan, the birthplace of algebra, under the mentorship of prominent Uzbek scientists. The U.S. students will spend 8 weeks at the research institutes of the Uzbekistan Academy of Sciences and at Urgench State University conducting research in Biology, Chemistry, Mathematics and Physics. The program has a rich cultural and professional development component including travel to the ancient Silk Road cities of Samarkand, Bukhara, Khiva, Urgench, Nukus to learn about cultural and scientific heritage of Uzbekistan as well as visiting several universities.

Program Benefits

- Up to \$3,500 Stipend
- Roundtrip flight to Uzbekistan (up to \$1,500)
- Housing, meals and local transportation provided
- Overseas health and travel insurance provided
- Opportunity to engage in cutting edge research
- Many professional development activities
- Trips to ancient Silk Road cities
- Opportunity to take a short course in Russian and/or Uzbek languages



Program Eligibility


- U.S. citizen or permanent resident
- Current junior or senior undergraduate students
- Must enroll as a college-level student in Fall 2020
- STEM majors with a minimum of 3.0 GPA
- Participants may not take courses during the program for academic credit
- No prior research experience required

How to Apply

Visit www.fullerton.edu/ires-uz for application and more information. Apply by May 14, 2021 for full consideration.

Questions? E-mail ires-uz@fullerton.edu








Program setting contingent upon travel restrictions. Otherwise, students will meet virtually.

Next Steps/Long-Term Plans



Advanced Studies Institute in Analysis on Fractal Spaces



Mario Bonk
ASI Lecturer
University of California,
Los Angeles

Overview

Recently, there have been a great progress in extending the classical results in analysis and geometry from Euclidean space settings to non-smooth or fractal spaces. This lecture series will explore latest results obtained by various groups of researchers and related challenging issues. More specifically, topics that lie at the interface of geometry and analysis, including classical complex analysis, the geometry of negatively curved spaces, geometric group theory, dynamics of rational maps, and analysis on metric spaces will be explored. Many results in this area often relies on an extension of classical results in geometry and analysis to a non-smooth or fractal setting.



Sergei Merenkov
ASI Lecturer
The Graduate Center,
City University of New York

Topics

- Uniformization of Sierpinski carpets
- Quasisymmetric rigidity of square Sierpinski carpets
- Gromov hyperbolic spaces
- Expanding Thurston maps
- Fractals in non-linear dynamics
- Parametrizations and non-parametrizations in higher dimensions
- Ahlfors regularity and Poincare inequality
- Wild Cantor sets and their constructions

Date and Venue

August 2-13, 2021
Institute of Mathematics,
Uzbekistan Academy of Sciences

Program Eligibility & Benefits

- Must be U.S. citizen or permanent resident
- Advanced Ph.D. students from U.S. institutions
- Travel expenses covered (up to \$1,500)
- \$500 stipend
- Housing, meals and local transportation provided
- Trips to ancient Silk Road cities
- Professional development activities

How to Apply

Visit www.fullerton.edu/ires-uz/asi for application and more information.

Application Deadline: June 14, 2021

For questions, e-mail Dr. Zair Ibragimov
ires-uz@fullerton.edu



- We have already expanded the program to IRES Track II – Advanced Studies Institutes in Uzbekistan funded by the National Science Foundation (NSF Grant # 1953471). This program is for advanced graduate students and will be running during 2022-2023.



Advanced Studies Institute in Mathematical Physics



Steve Zelditch
ASI Lecturer
Northwestern University

Overview

The mathematical theory of relativistic fluids has witnessed tremendous progress over the last decade, with many fundamental problems being addressed, such as constructive proofs of stable multidimensional shock formation without symmetry assumptions; global regularity of the Einstein-Euler system in the presence of a positive cosmological constant; estimates for solutions of fluid-vacuum models; causality and stability of theories of relativistic viscous fluids. These lectures will provide an up-to-date account of the mathematical theory of relativistic fluids, with focus on the techniques underlying and the conceptual underpinnings of recent developments. Open problems and future directions of research will also be discussed. Attention will also be given to problems suitable for a fruitful interaction between mathematicians and physicists.



Marcelo Disconzi
ASI Lecturer
Vanderbilt University

Topics

- Wave equation and eigenvalue problem on a Riemannian manifold. Hadamard parametrix method.
- Proof of the Weyl law. Trace of the wave group. Tauberian theorems.
- Semi-classical Schrödinger operators with quadratic potentials. Weyl law and trace of the Schrödinger propagator.
- Wigner distributions. Semi-classical limits of eigenfunctions of Schrödinger operators and their Wigner distributions.
- Geometric wave equations. The geometry of hyperbolic differential equations.
- Shocks in hyperbolic systems in several spatial dimensions. The big dichotomy; global solutions versus shocks.
- Asymptotics of eigenfunctions/eigenvalues on Riemannian manifolds. Asymptotics in Kahler geometry
- Some applications of Bergman kernel. Inverse spectral problems in Euclidean spaces. Future directions.

Date and Venue

August 3-14, 2020
Institute of Mathematics,
Uzbekistan Academy of Sciences

Program Eligibility & Benefits

- Must be U.S. citizen or permanent resident
- Advanced Ph.D. students from U.S. institutions
- Travel expenses covered (up to \$1,500)
- \$500 stipend
- Housing, meals and local transportation provided
- Trips to ancient Silk Road cities
- Professional development activities

How to Apply

Visit www.fullerton.edu/ires-uz/asi for application and more information.

Application Deadline: June 15, 2020

For questions, e-mail Dr. Zair Ibragimov
ires-uz@fullerton.edu



Summary

- The project gave the U.S. students international research experience in Uzbekistan under the mentorship of a prominent Uzbekistan scientists and presented them with unique professional development opportunities. Students participated in the research life of their respective Institutes.
- The students attended lectures on the history and culture of Uzbekistan and traveled to the ancient Silk Road cities to learn about the history and scientific heritage of Uzbekistan.

Foreign Mentors



Summary

- Students participated in many events which were highlighted by several local media outlets and brought much publicity to the program in Uzbekistan. Many program participants gave interviews to several media outlets of Uzbekistan.
- The project provided unique research opportunities to URM students and positioned them to pursue graduate degrees.
- 11 female, 8 Hispanics and 7 Asian/Pacific Islander students.

Foreign Mentors



Questions & Answers

Contact

Information:

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California State University, Fullerton

Website: <http://www.fullerton.edu/ires-uz>

Phone #: 657-278-2741

Email: zibragimov@fullerton.edu



In it for the Long Run: Developing an REU-Site with a Private Landowner

In it for the Long Run: Developing an REU-Site with a Private Landowner

Paul Laris— Cal State Long Beach



DEPARTMENT OF GEOGRAPHY
CALIFORNIA STATE UNIVERSITY LONG BEACH



Paul Laris, Professor & Chair

Cal State Long Beach, Department of Geography

Paul.Laris@csulb.edu



In it for the Long Run: Developing an REU-Site with a Private Landowner

REU-Site-Tracking Land Change (TLC): Working Ranch to Working Reserve



Experimental
prescribed fire

River Ridge Ranch,
Springville California



Points I'll Cover Today

- 1. History
 - Undergraduate research tradition at CSULB
- 2. Opportunities
 - Forge a solid partnership for long term research at the RRRanch
- 3. Constraints
 - How to fund your faculty mentors?



In it for the Long Run: Developing an REU-Site with a Private Landowner

Build on a Track Record of Undergraduate Research Projects



California State University, Long Beach
GeoDiversity
 Geoscience Diversity Enhancement Program
 Geology, Geography, Geoarchæology,
 Environmental Science and Policy



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- [Geography](#)
- [Archæology](#)
- [Env Science & Policy](#)

CSULB GDEP PERSONNEL

- [Dr. Courtney Ahrens](#)
- [Dr. Richard J. Behl](#)
- [Dr. Robert D. Francis](#)
- [Dr. Gregory Holk](#)
- [Dr. Tom Kelty](#)
- [Dr. Paul S. Laris](#)
- [Dr. Daniel O. Larson](#)
- [Dr. Christopher Tom Lee](#)
- [Dr. Carl Lipo](#)
- [Dr. Hector Neff](#)
- [Dr. Christine M. Rodrigue](#)
- [Dr. Lora R. Stevens](#)
- [Dr. Suzanne P. Wechsler](#)
- [Ms. Gabriela Valenzuela](#)

2010 PARTNER FACULTY

- [Avalon Schools](#)

GDEP PROJECTS, SUMMER 2010

This summer featured a more complex mix of activities than previous summers. There were two classic GDEP field and lab research projects, a research trip out to Rapa Nui (Easter Island), an extended field trip, and a teaching workshop. Here is a brief overview of each of these.

Palos Verdes Hydrogeology Project

Dr. Greg Holk led a classic GDEP field and lab research project out to the Palos Verdes Peninsula. There, the team collected well water samples around the Portuguese Bend landslide. In the lab, they did chemical isotope analyses to learn the sources of the water at depth, which lubricates the weak layers in the landslide. They found that quite a bit of this water is exotic, with isotope signatures suggesting exotic irrigation water. This would have been useful information back in the 1950s and 1960s, after the slide reactivated and suburban homeowners claimed that Caltrans' work on the Crenshaw Extension is what triggered it!

Recovering and Stable California Sage Scrub

Drs. Paul Laris and **Chrys Rodrigue** led a project that tried to find factors that might differentiate areas where CSS is recovering into exotic annual grassland from those in which it has been unable to make headway into the exotic grassland. The team took soil samples and did plant identification and coverage studies along several transects across that ecotone, mainly in the westernmost Santa Monica Mountains (which required campouts). Soil turned out not to be significantly different on either side of these boundaries, but the team was able to identify pioneering species that can lead the way into the grassland, which may be useful information for restoration projects.

GDEP INTERNS 2010

Research Assistants

- Mr. Koang Chea
- Ms. Nancy Ko
- Ms. Samantha Lough
- Ms. Trina Ming
- Ms. Karina Moguel
- Ms. Tierra Moore
- Mr. Darrell Peterson
- Ms. Hanna Vu

Geoscience

Immersion Participants

- Ms. Lee Torrence
- Mr. Torrence Lee
- Ms. Dominique Sum
- Mr. Troy Mars
- Ms. Serena Massrey
- Mr. Luis Deniz

CSULB RESEARCH ASSISTANTS

GDEP 2009 Mentors

- Ms. Terry Burns
- Ms. Jade Dean



In it for the Long Run: Developing an REU-Site with a Private Landowner

History of the REU idea: Build on a record of collaborative research at the “site”



Gary Adest, Ranch owner and biologist



Welcome to the pasture Valley Oak corridor.

We began this protection and restoration project in 2015 by fencing this “island” all the way to the Tule River. Then, we removed exotic and invasive plants by pulling, burning and spraying. Finally, once the Fall rains began, we planted native trees, shrubs and grasses. We will repeat treatments for several years. Our goal is to preserve and restore this beautiful and ecologically important population of giant oaks and to provide food and shade for our livestock, too. The oaks haven’t regenerated for several reasons: lack of natural ground fires, competition from exotic grasses and interference by cattle.

These signs were made with a grant from the Alta Peak Chapter of the California Native Plant Society.



In it for the Long Run: Developing an REU-Site with a Private Landowner

Took time to Develop our Partnership and Goals





In it for the Long Run: Developing an REU-Site with a Private Landowner

Built Bunkhouses together





In it for the Long Run: Developing an REU-Site with a Private Landowner

Began experimenting with tech at the ranch



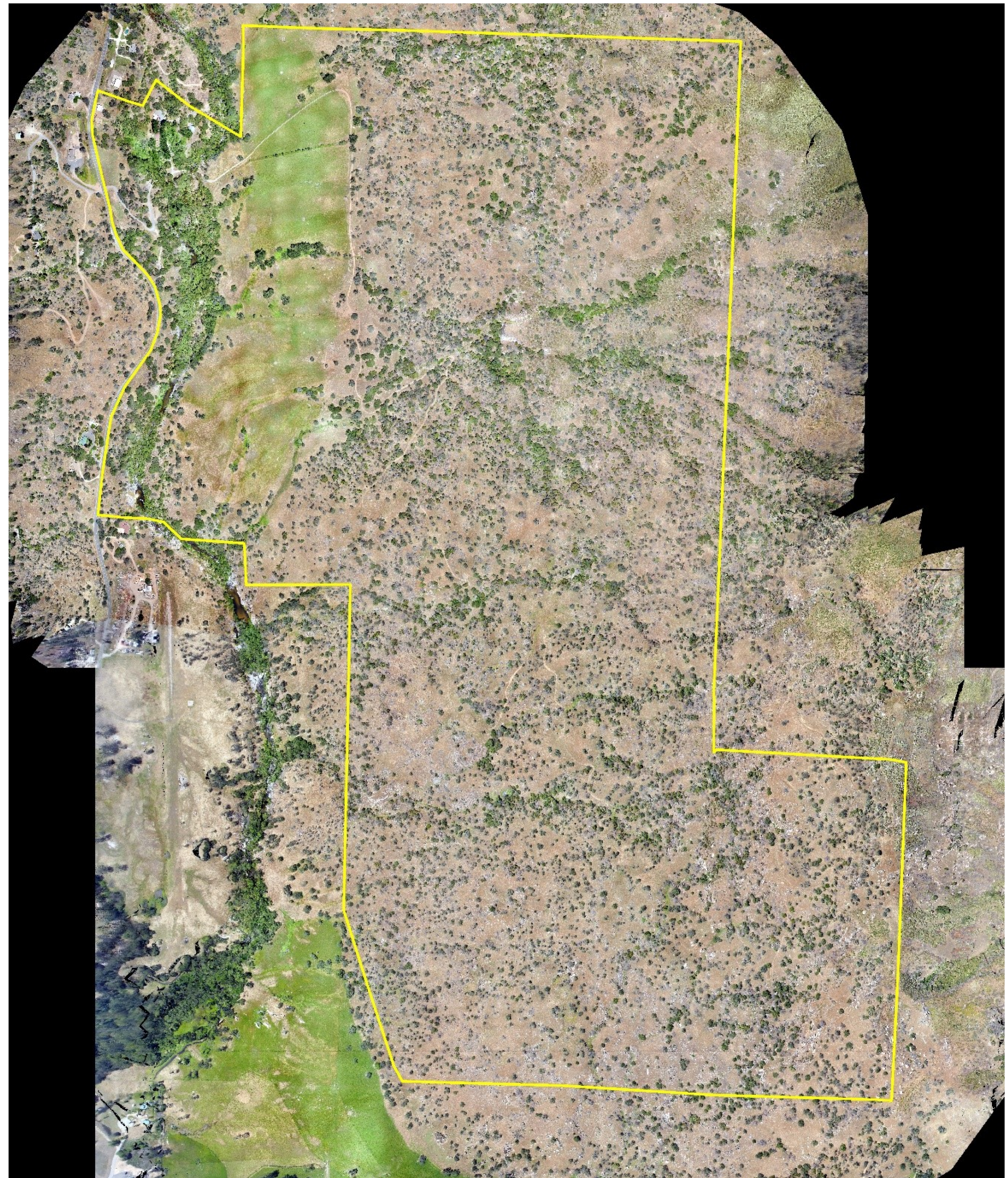


Some challenges

1. Format of proposal- be sure to read closely before you begin, especially if you have done traditional NSF proposals
 1. The trick is to have a broad intellectual focus or framework with plenty of room for students to **formulate their own research** questions.
2. How to support faculty?
 1. These are a labor of love but use every possibility you can find.
3. Surprise! We got dinged for failing to elaborate the things we do best!

What Now?: Building a student- oriented database and recruiting

River Ridge from a drone's eye view





My 3-year-old son watching a Drone launch at RRR



In it for the Long Run: Developing an REU-Site with a Private Landowner

Questions & Answers

Contact Information:

Paul Laris

CSULB/ Geography Department

Paul.laris@csulb.edu



DEPARTMENT OF GEOGRAPHY
CALIFORNIA STATE UNIVERSITY LONG BEACH



Monterey Bay Regional Ocean Science REU

Monterey Bay Regional Ocean Science REU

Corey Garza- California State University, Monterey Bay

Corey Garza, Professor

CSU Monterey Bay, Department of Marine Science

cogarza@csumb.edu



Project Overview

- Recent NSF statistics: Approximately **13%** of ocean science graduate students are underrepresented (NSF 2018).
- Biological Sciences slightly higher percentage, **18%**.
- Whole number comparison: **379** total underrepresented Geoscience, **9520** in the Biological Sciences.



No progress on diversity in 40 years

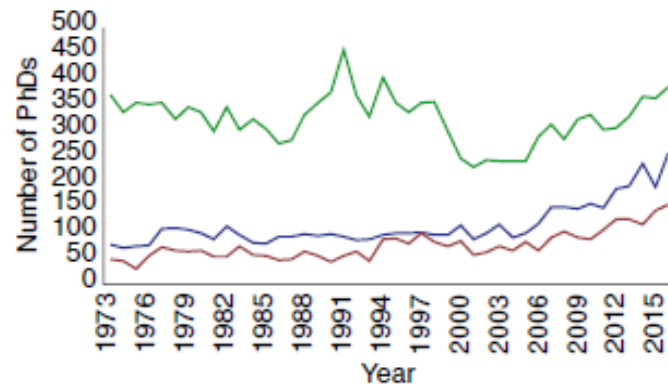
Ethnic and racial diversity are extremely low among United States citizens and permanent residents who earned doctorates in earth, atmospheric and ocean sciences. Worse, there has been little to no improvement over the past four decades.

Rachel E. Bernard and Emily H. G. Cooperdock

Nature Geoscience
2018

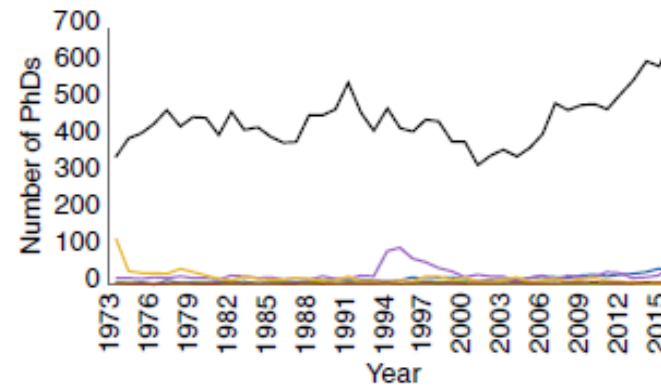
Total PhDs earned over time

a By subfield



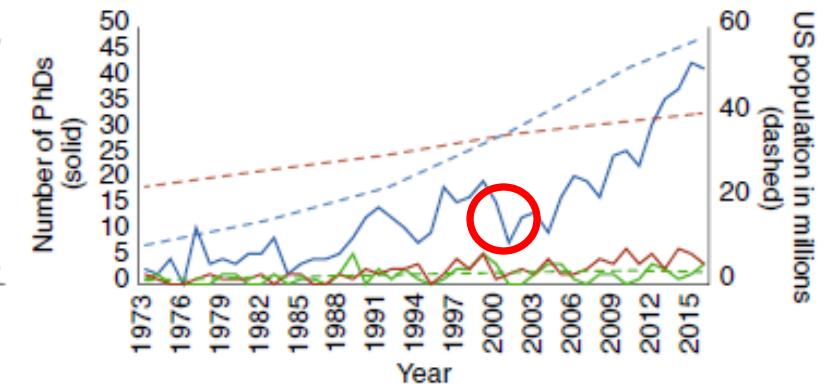
- Earth
- Ocean
- Atmospheric

b By race and ethnicity (subfields combined)



- White, non-Hispanic
- Native American, non-Hispanic
- Asian, non-Hispanic
- Black, non-Hispanic
- Hispanic or Latino
- Other or unknown

c For underrepresented minorities only (subfields combined)



- Geoscience PhDs
- US Population
- Hispanic or Latino
- Native American, non-Hispanic
- Black, non-Hispanic

Fig. 1 | PhDs earned by US citizens and permanent residents between 1973 and 2016. **a**, The total number of PhDs for all races, ethnicities and genders combined have fluctuated around 350 for the earth sciences, but have taken an upward turn from a stable base level in the last decade or so for ocean and atmospheric sciences. **b**, The largest race/ethnicity category by far is the White non-Hispanic PhD group. **c**, Focusing on what the NSF considers to be underrepresented minorities (that is, excluding White non-Hispanics and Asian non-Hispanics), and comparing with the increasing share of these groups in the US population (measured by decadal census and 2016 estimate), it becomes clear that gains in Hispanic or Latino PhDs largely reflect an increase in the relevant population in the US, and that there are no gains in PhDs earned among the other underrepresented groups. Data in **a-c** run from 1973 to 2016.





Low Student Diversity: Causes

- Lack of personal connection.
- Unclear understanding by students.
- Ineffective messaging and engagement, particularly at the early undergraduate stage.

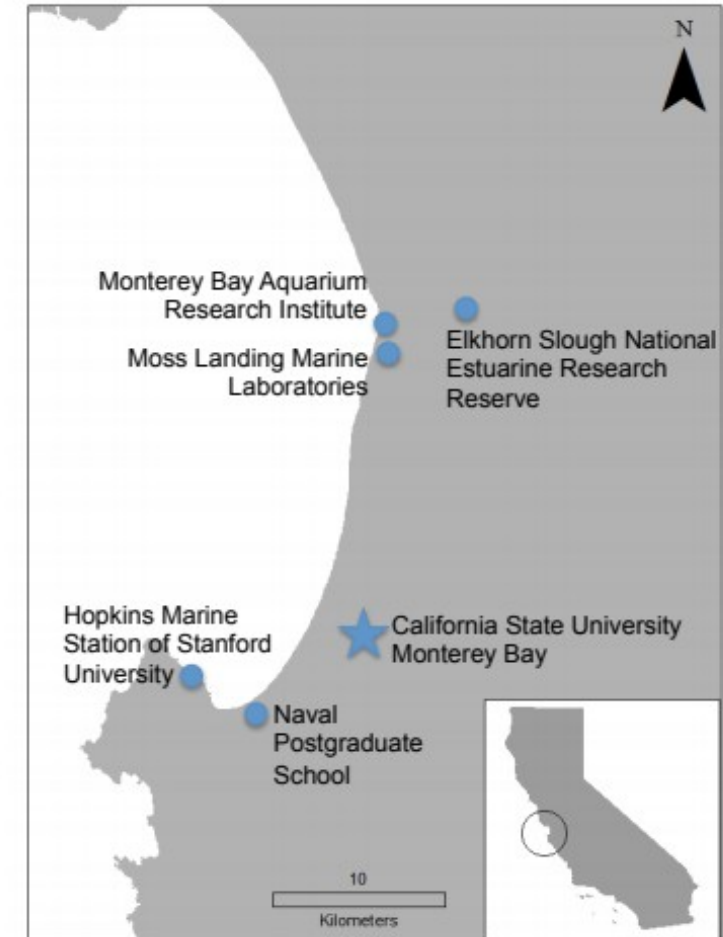
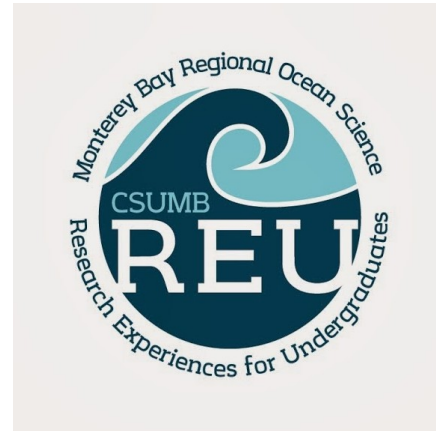


- Historic overemphasis of certain fields (e.g. biomedical).



Monterey Bay Regional Ocean Science REU: Engaging Students in Diverse Research Activities

- Distributed REU Model
- California State University, Monterey Bay
- Elkhorn Slough National Estuarine Research Reserve
- Hopkins Marine Station of Stanford University
- Monterey Bay Aquarium Research Institute
- Moss Landing Marine Labs
- Naval Postgraduate School
- **Focus on underrepresented students.**
- **Fall REU component.**





REU Overview

- First and still only Ocean Science REU in the CSU system.
- The Monterey Bay REU has a special emphasis on recruiting first generation, low income and underserved students coming from research limited institutions.
- We give preference to sophomores and juniors in the selection process.



Recruit: Actively Reaching Out

- **Community College visits.** Coordinate with programs at local CCs and give workshops on how to successfully apply to our program.
- **Email blasts.** Individual emails with flyer to colleagues, contacts at HSI, HBCU & Tribal schools, MESA programs, letter writers for past applicants
- **Conferences.** SACNAS, AGU, ASLO
- **REU Lists & Listservs.** Pathways to Science, webGURU, Marine Careers, ASLO, Ecolog-L
- Recruitment and program development supported by full time REU staff.

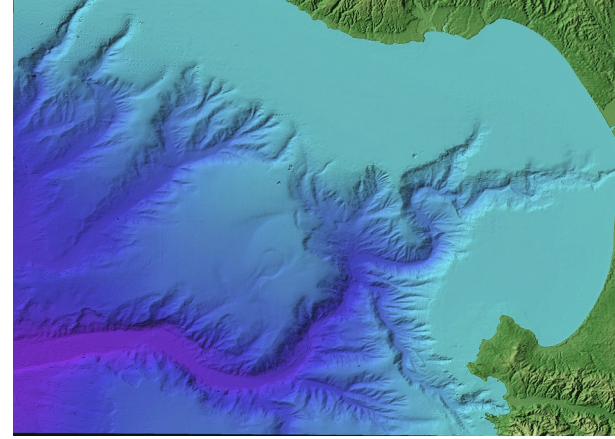


Monterey Bay Regional Ocean Science REU

Activities



Marine Biology and Ecology



Marine Geology



Ocean Engineering

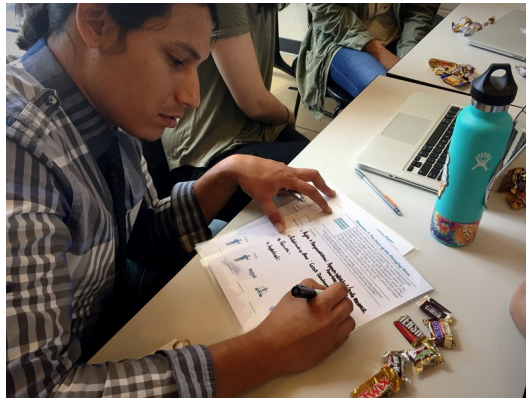


Oceanography



Monterey Bay Regional Ocean Science REU

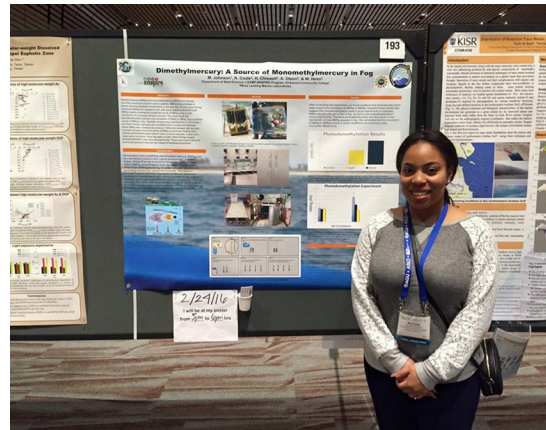
Activities



Technical Writing



Scientific Boating



Poster Preparation

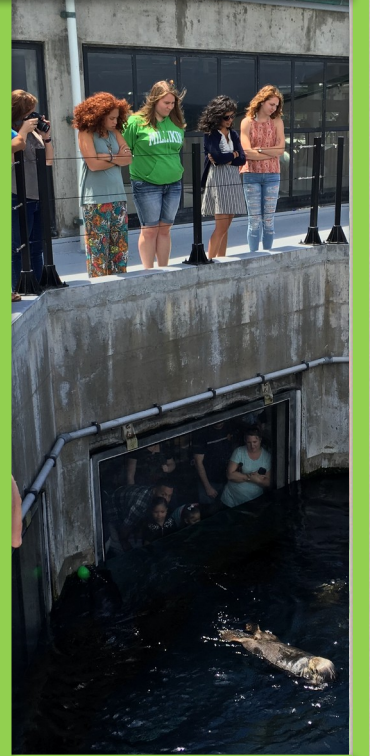
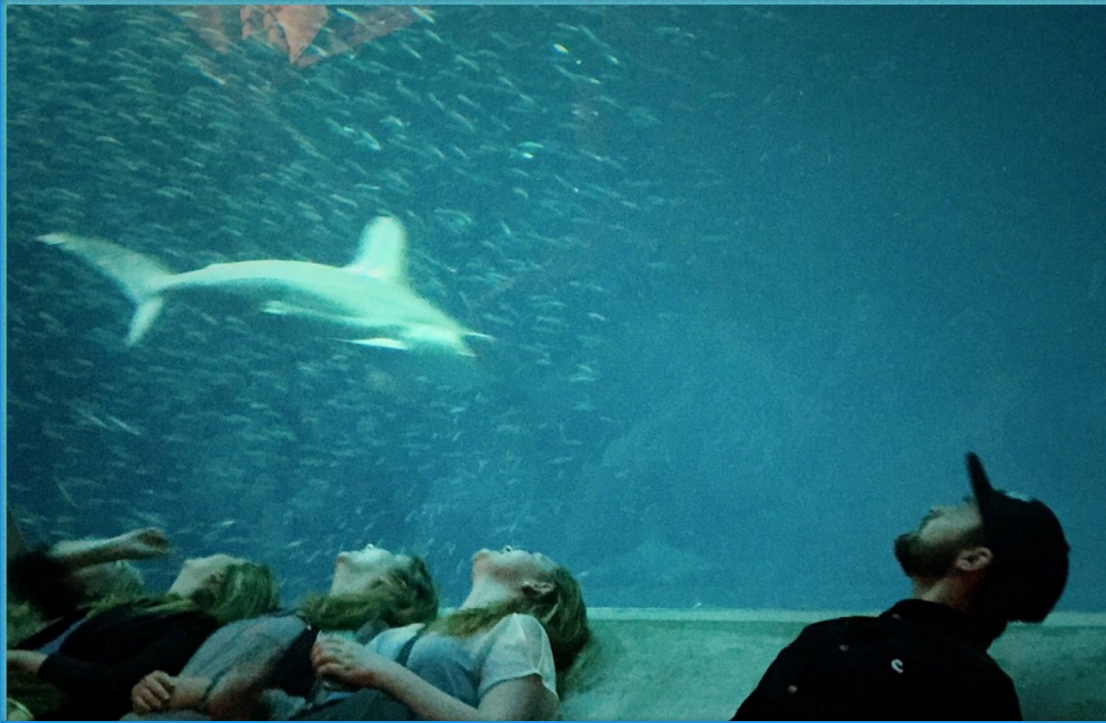


Conference Networking



The California State University

Engage: Cohort Building Structure & Activities





Results

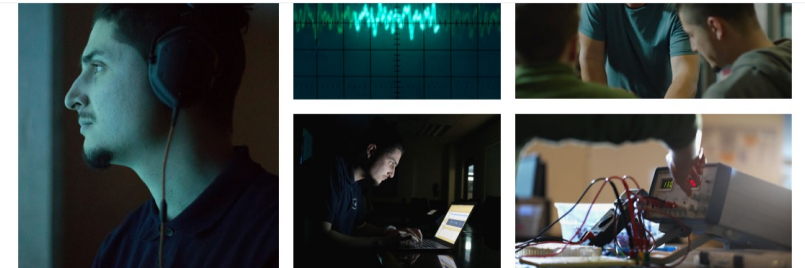
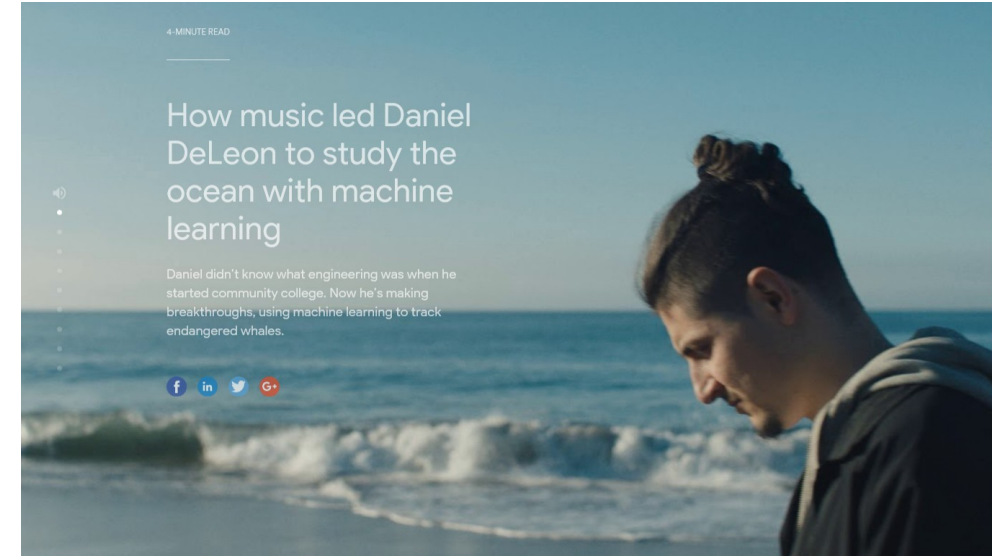
- 70 students in the program
- **3 Native American, 7 African American, 26 Hispanic/Chicano, 6 Pacific Islander, 25 Caucasian. (63% URM). 4 U.S. Veterans**
- 38 students from research limited institutions (**12 Community College Students**).
- 13 Engineering, 16 Oceanography, 5 Geology, 36 Marine Biology/Ecology
- 3 NSF GRFP Awardees, 3 NOAA Hollings Scholars.





REU Student: Daniel DeLeon

- Worked with Dr. John Ryan and Danelle Cline of MBARI to engineer software to detect different species of whales.
- Used Google software as part of the process.
- Featured as part of a Google campaign to demonstrate how people use their software.
- Transferred to the Engineering program at Cal Poly San Luis Obispo after receiving Associates Degree from Cabrillo College.
- Graduate program in Fisheries at Oregon State University.

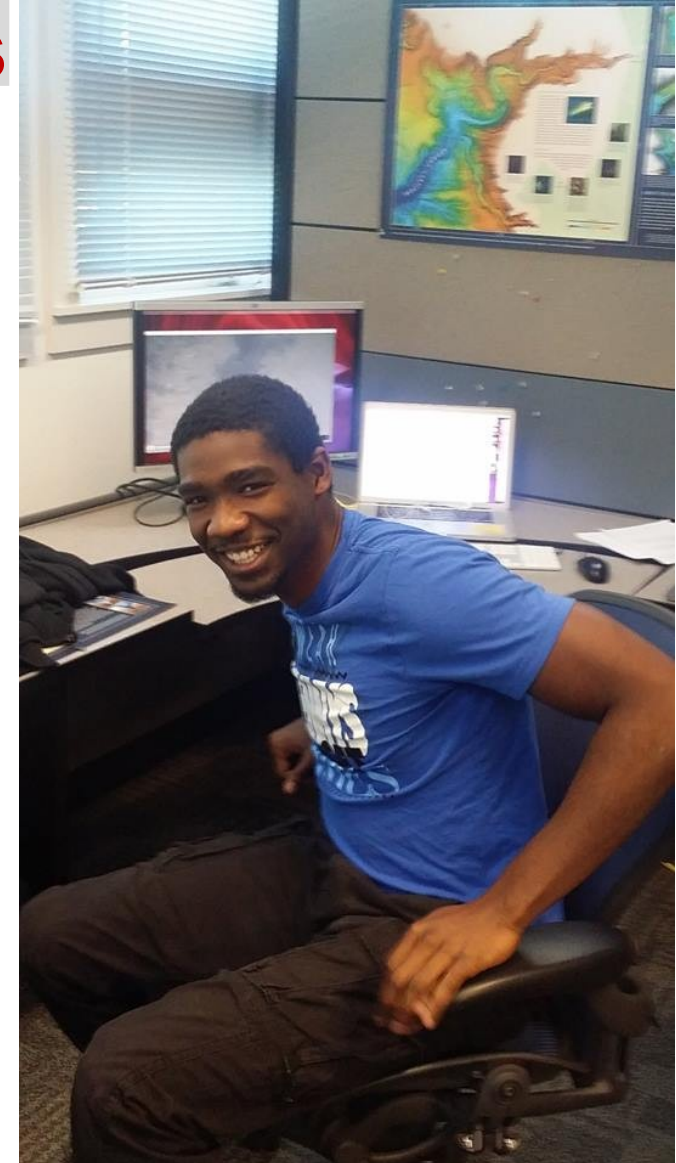


By tracking the calls of endangered blue and fin whales and their changing migration patterns, scientists can learn a lot about the broader implications of human influence on marine life. Given Daniel's passion for music, John and Danelle figured he wouldn't mind spending a summer listening to ocean sounds from the institute's hydrophone – an underwater microphone that sits 900 meters beneath the ocean. But the task ahead of Daniel was a little more complicated than just listening.



REU Student Profile: Paris Smalls

- Worked with Dr. Charlie Paull of MBARI.
- Used his interest in Math to examine the origin of seafloor scours around hydrothermal vent communities.
- Accepted to MIT/WHOI Joint Ph.D. Program in Oceanography.
- 2017 NSF Graduate Research Fellowship Program.
- 2020 Forbes 30 under 30 for his research on green energy.





REU Student Profile: Taylor Eddy

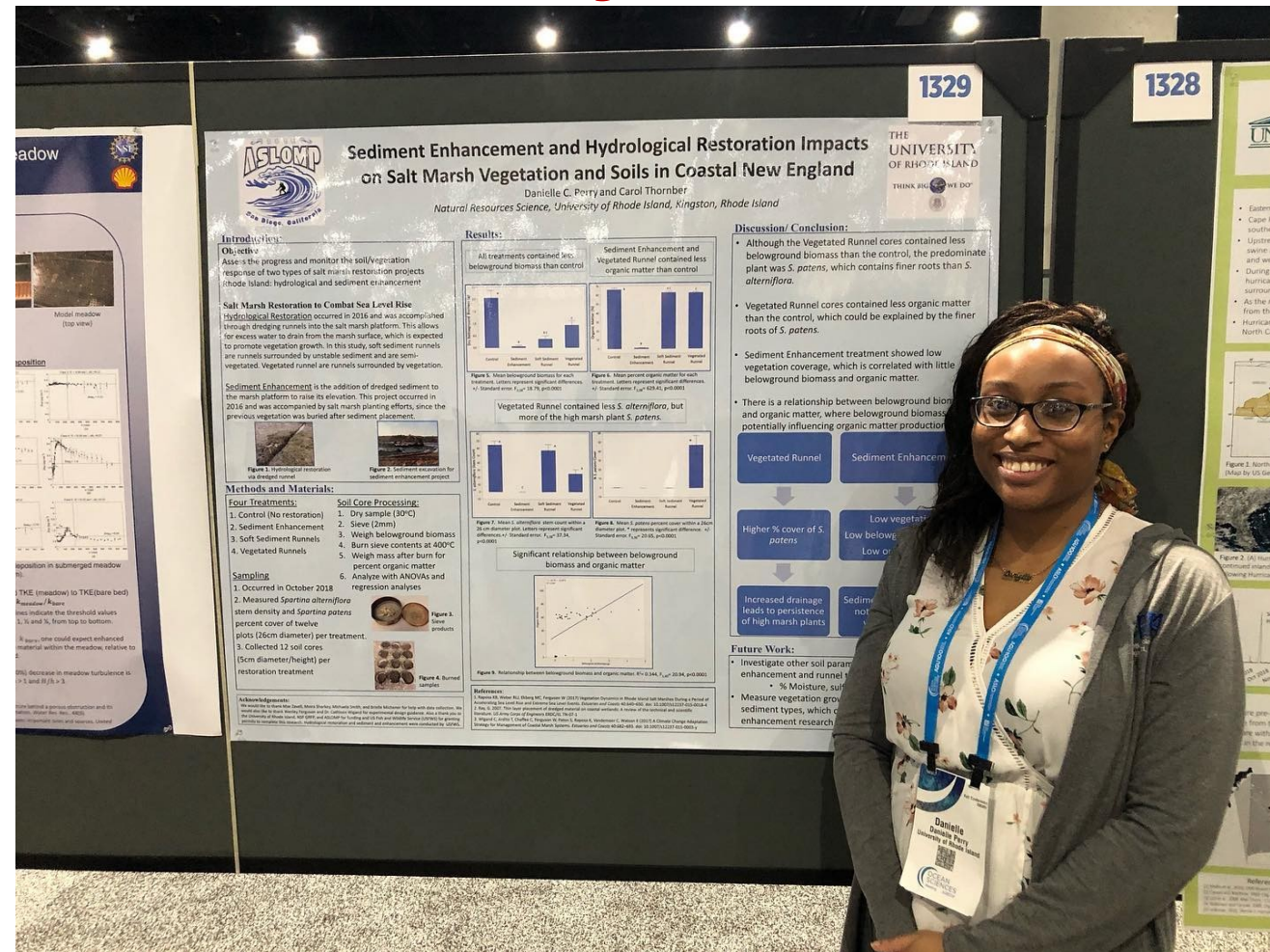
- Worked with Dr. Jim Harvey of Moss Landing Marine Labs.
- Examined marine mammal movement relative to shipping traffic in San Francisco Bay.
- Awarded NOAA Fellowship to undertake Masters Thesis at CSUMB. Studied trophic dynamics in and out of Marine Protected Areas.
- 2021 M.S. from CSUMB/MLML.
- Coastal research specialist with USGS.





REU Student Profile: Dr. Danielle Perry

- Worked with Dr. Kerstin Wasson and Dr. Rikke Jeppesen of Elkhorn Slough.
- Examined impact of nutrient runoff on marsh vegetation.
- Awarded top student presentation in ecology at 2014 SACNAS conference.
- 2020 Ph.D. from University of Rhode Island.
- Climate change adaptation scientist with Massachusetts Audubon.





Lessons Learned

- Leveraging multiple REU partners diversifies research opportunities and the pool of potential mentors.
- Multiple REU partners provides students diverse pathways to leverage their undergraduate coursework.
- Need active recruitments strategies, in person visits and social media.
- Staffing can support professional development goals for an REU program.



Questions & Answers

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Corey Garza, CSU Monterey Bay
cogarza@csumb.edu

Next Steps/Closing Remarks


Dr. Frank A. Gomez
Executive Director, STEM-NET
Office of the Chancellor



<https://www2.calstate.edu/impact-of-the-csu/research/stem-net>

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Begin a Conversation with Colleagues and Join our Private CSU STEM-NET Facebook Group
<https://www.facebook.com/groups/2629611737269292>

STEM-NET Virtual Research Café 10.0

- **September 17th 11AM-12PM**
Registration Here



Presenter 1/ Dr. Santosh KC

San Jose State University
Chemical and Materials Department
Presentation Topic:
Surface and Interface Properties of 2D Materials

Presenter 2/ Dr. Liz Kyonka

East Bay
Psychology Department
Presentation Topic:
Surface and Interface Properties of 2D Materials

Presenter 3/ Dr. Wing To

Stanislaus State
Physics Department
Presentation Topic:
Adaptive Interdisciplinary Research into Atmospheric Effects of California
Wildfires



Save the Date

STEM-NET October Webcast

- NIH-Funded CSU Institutional Training Grants & Research Education Programs Webcast, October 1st 10AM- 12PM

Registration Here:



STEM-NET Upcoming Events



THANK YOU FOR JOINING US TODAY!
For more information about STEM-NET visit our website:

