FALL 2022 | ISSUE 3

TRANSFORMING TOGETHER

The Newsletter of the SIRIUS II Project*

Biotech students from American River College check out fruit flies and learn about Dr. Kimberly Mulligan's research on their tour of Sacramento State chemistry and biology labs

SIRIUS YEAR 2: ALE-APALOOZA AND MORE

Welcome to the Fall 2022 issue of Transforming Together! The second year of the SIRIUS II project was busy with Authentic Learning Experience (ALE) implementations, a two-day summer workshop, various presentations, and a tour of Sac State labs (with a student panel) for American River College (ARC) faculty and students. In this issue, we will highlight a few of these activities, feature more ALEs from faculty in our community of practice and preview exciting events to come.

We named our summer workshop "ALE-apalooza," as we wanted this gathering to be a celebration of faculty efforts thus far and a source of inspiration for the coming year. While one day was virtual, we were finally able to gather as a group for a whole day on the Sacramento State campus, with President Robert S. Nelsen of Sacramento State and Chancellor Brian King of the Los Rios Community College District kicking off the event.

The 25 faculty attending heard from two guest speakers, Dr. David Alexander from Chico State (Engineering) and Dr. Jacob Wainman from University of Minnesota, Duluth (Chemistry), and from two Master's students, who shared data from their work related to SIRIUS II project outcomes (see back page). Twelve faculty shared insights from implementing their ALEs in Spring 2022. It was a busy two-days, but we still had some time to discuss, brainstorm, and network!

SNAKES, LIZARDS AND FROGS, OH MY!

Clint Collins, Biological Sciences, Sac State

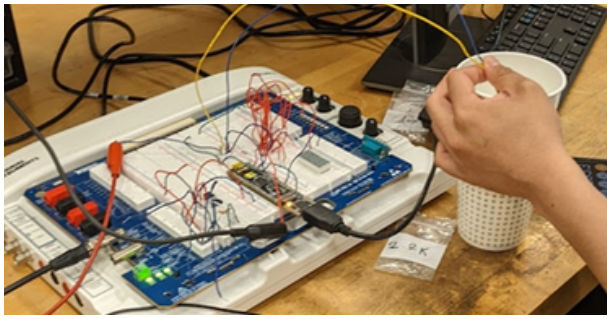
Specimens students cataloged for Collin's Reptiles and Amphibians class

Students in Professor Clint Collins' Amphibians and Reptiles class (BIO 164) got to explore and organize a "buried" treasure – Sacramento State's herpetology collection. Creating a database for the collection of preserved reptiles and amphibians allowed students to contribute to their department while exploring taxonomy and geographic distribution of these scaly (and smooth) creatures. The database contains an impressive 250 entries, with taxonomic data and information about how specimens were collected (who, where, when). Students also used GIS resources to investigate how the Sacramento region herp habitat has changed in the last century. Through the course, they learned how difficult it is to precisely measure ecological and historical change while gaining a greater sense of connection to the surrounding environment and a connection to past students and faculty who collected the critters.

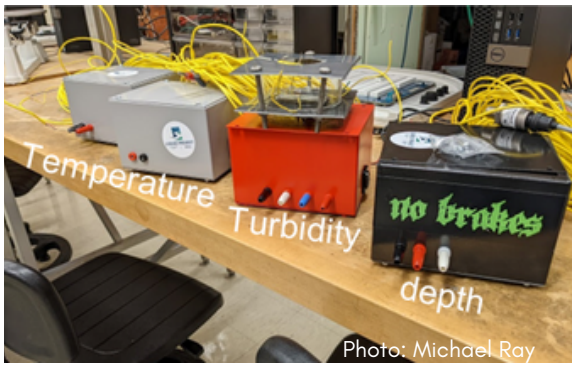
PROBING THE MURKY DEPTHS

Michael Ray, Mikkel Jensen and Eliza Morris, Physics, Sac State

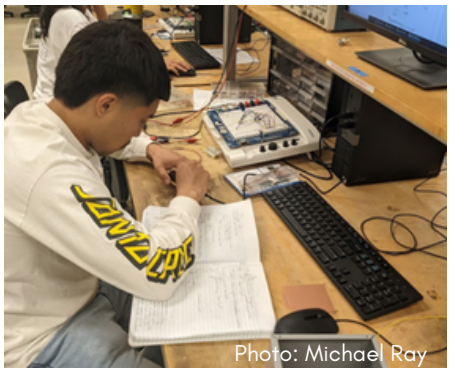
We don't often associate physics with improving the environment, but Professors Michael Ray and Mikkel Jensen are showing students how it is done. Students in an advanced Physics course (PHYS 116) designed instruments for measuring river properties (e.g., turbidity, temperature, depth, and flow). Successful instruments (pictured at right) were tested by students in an introductory Physics course (PHYS 11B) as they learned about optics, thermodynamics, and measures of instrumental uncertainty. Along with Eliza Morris, who helped to conceive the collaboration, Jensen and Ray are surveying students to gauge whether the ALE experience changes their view on physicists' role in solving environmental challenges. PHYS 11B students indicated that the project increased their awareness of how physics contributes to environmental research. We look forward to seeing how the next group of PHYS 116 students uses the testing data to improve designs that help us learn more about the physical properties of water in the American River!



PHYS 116 Student tests their sensor



The sensors PHYS 11B students got to test



PHYS 116 tudent designing sensor

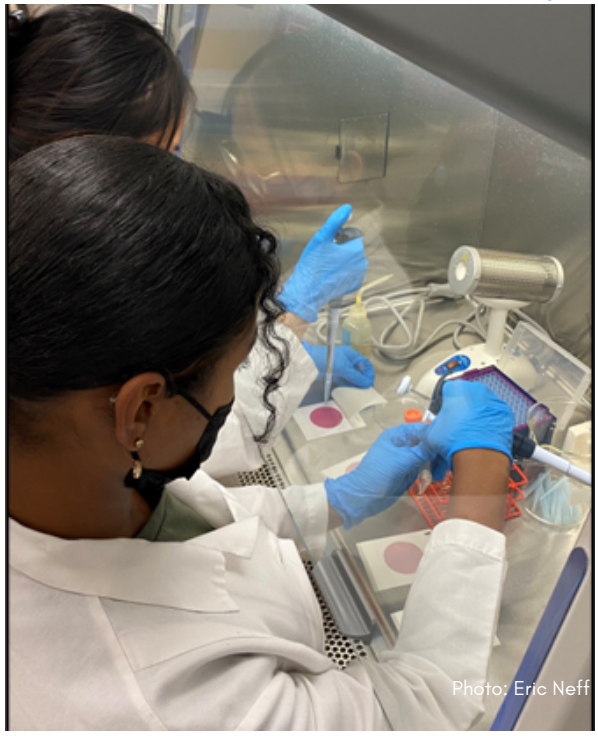
A LITTLE BACTERIA CAN GO A LONG WAY...

...more specifically, from a wastewater treatment plant and various local waterways into community college biology labs! Several SIRIUS II faculty are implementing ALEs related to bacteria in water. Read on to learn more...

Wastewater samples: primary, secondary, and fully treated effluent

Eric Neff and Eli Carlisle, Biology, CRC

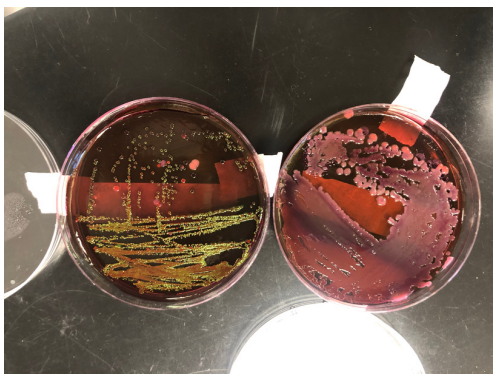
Professors Neff and Carlisle are collaborating to bring the water quality theme to students in two courses at Consumnes River College (CRC): BIOL 440 Microbiology for Allied Health and nonmajors and BIOL 400 Principles of Biology for Biology majors. In BIOL 440, students isolate and quantify coliform bacteria from water samples collected from a local treatment facility, both before and after treatment has occurred. They then evaluate the colonies for sensitivity or resistance to antibiotics and disinfectants. BIOL 400 students use these same samples, but take a molecular approach to further identifying the bacteria in their pre- and post-treated water samples by extracting the DNA and using tools to determine the genetic sequences, and thus the diversity of microbes in the samples.



Students plating their water samples

Janet Hanstad, Biology, ARC

Microbiology students in BIO 440 at American River College, most of whom are interested in nursing careers, used their aseptic skills and applied their knowledge about microbes to an ALE related to public health. After learning about coliforms, water testing protocols, and the roles of local agencies in monitoring water quality, students collected water from various creeks, rivers, lakes and irrigation ditches. Then they cultured coliforms on Petri plates and followed up with various biochemical tests to confirm coliform identity. Professor Hanstad uses this course to introduce students to health-related research, which could open up the possibility for new career paths.



***E. coli* from a sample of car wash water**

GOT DATA?

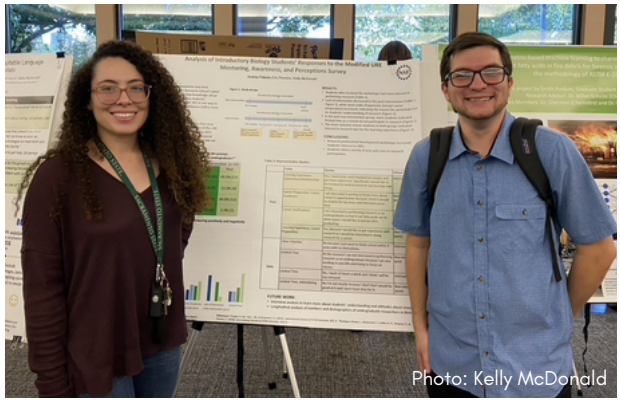
Hello Team SIRIUS II! Do you have datasets that need a home? Project ideas that involve collecting and organizing data? The GIS Data Acquisition and Management class can help! Please e-mail Anna Klimaszewski-Patterson at anna.kp@csus.edu to start your next collaboration.

ONGOING RESEARCH

Three studies related to SIRIUS project outcomes were presented at local symposia and national meetings last year. Posters can be accessed via the QR code or this link: https://padlet.com/cathish/SIRIUSII_Posters

- **Analysis of Introductory Biology Students' Responses to the Modified URE Mentoring, Awareness, and Perceptions Survey** (Undergraduate student Andrea Palacio, graduate student Eric Pennino, Kelly McDonald)
- **Identifying barriers faced by students with disabilities in STEM research courses** (Undergraduate student Abdullah Al-Janabi, graduate student Ethan Roberts, Cathy Ishikawa, Kelly McDonald and Joya Mukerji)
- **Discussing Differences: A Simple Activity to Foster Faculty Collaborations Across Diverse Disciplines and Institutions** (graduate student Ethan Roberts, recent MS graduate Bailey Von der Mehden, Cathy Ishikawa, Julie Fogarty, Enid González-Orta, Linda Zarzana, Susanne Gnagy, Kelly McDonald)

Ethan Roberts presents initial research on barriers ALEs may create for students with disabilities



Andrea Palacio and Eric Pennino present their research on student awareness and perceptions of UREs

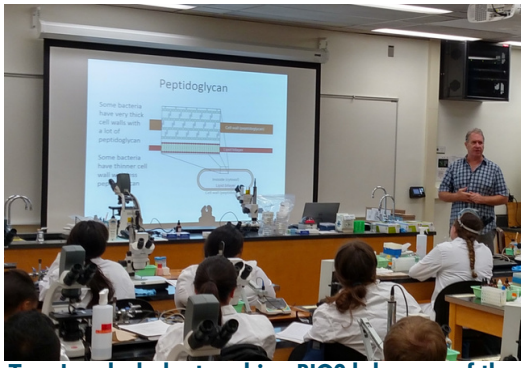
LOOKING AHEAD AND LOOKING BACK

SIRIUS STEM Conference April 20, 2023

Save the date for the first SIRIUS STEM Conference to be held on April 20, 2023 from 4:30pm - 7:00 pm in the Foothill Suite of the University Union at Sacramento State. This will be a time for students in SIRIUS courses to share their work with each other and the public through posters, demonstrations, project displays and more. This will be an informal gathering for networking and celebrating accomplishments with light appetizers and beverages.

A SIRIUS Loss

The SIRIUS II Leadership team would like to dedicate this newsletter edition and express our extreme gratitude to Dr. Tom Landerholm, whose vision for building community and promoting student success led to the creation of the SIRIUS Project. Tom passed away on 11/21/22 and will be deeply missed by his colleagues and students.



Tom Landerholm teaching BIO2 lab - one of the first of the SIRIUS courses

GOT DATA? **QUESTIONS? CONTACT US!**

https://www.csus.edu/college/natural-sciences-mathematics/sirius/ sirius@csus.edu