

An undergraduate cohort thermochronology research and mentorship experience documenting Northern California's response to Eocene Siletzia accretion

In Spring 2022, [Cal Poly Humboldt Geology](#) Professors Jacky Baughman and Melanie Michalak hatched an idea for an undergraduate-centered cohort approach to conducting original research on a major tectonics question in the Klamath Mountains. We were motivated by our experiences as undergraduates, graduate students, and professors; recognizing scientific problem-solving is often more productive, creative, successful, and rewarding as a collaborative effort. Our goal was to create an inclusive environment that supports six undergraduate students in authentic place-based research during the academic year, supported by a mentorship team of two professors. An inaugural [AGeS-DiG](#) award allowed us to successfully pilot our program over the 2022-2023 academic year, which we will continue to build on for the next several years thanks to a recently funded three year NSF Tectonics award!

Recruiting the cohort:

AGeS-DiG funding supported student stipends, analytical costs, and student conference attendance during the '22-'23 academic year. To recruit students to the cohort, we made an [informative video](#), sent emails, answered questions, and asked interested students to fill out surveys, eventually bringing together six **awesome** Cal Poly Humboldt Geology students to collectively work on a single comprehensive research project investigating the response of the Northern Klamath Mountains to collision with Siletzia, a young oceanic plateau, in the Eocene (~51 million years ago). GPA and class level (sophomore, junior, senior) were not solicited.

Introducing the 2022-2023 Cal Poly Humboldt Tectonics Research Cohort:

Dr. Melanie Klamath Mountains Expert Michalak

Dr. Jacky High Energy Baughman

Liz Gold Panning Pro Aparicio

Jane Sledge Hammer Guru Martinez

Dennis Positivity Force Lindelof

Emily Photo Magic Shiver

Jacob Yes Man Aguilera

Lisa Map Reading Whiz Elconin

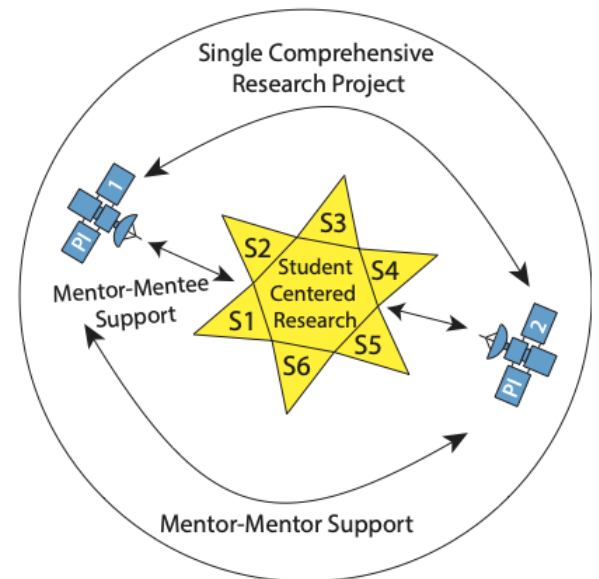


What the cohort did:

1. **Weekly group meetings during the semester.** The goals of this meeting varied from planning fieldwork, discussing scientific literature, and teaching/learning new scientific methods and laboratory techniques necessary to prepare our rock samples for geochemical analysis.
2. **Group field trip.** The eight of us traversed the northern Klamath Mountains and collected six samples from plutons for zircon and apatite U-Th/He thermochronometry. Pictured above is the group at a successful sample collection site.

3. **Small group task work sessions.** We worked in small groups throughout the week, to accomplish different aspects of the project, such as mineral separation, mineral picking, drafting figures, and collectively working on abstracts and posters to present the work at a conference in Spring 2023.
4. **Conference presentation.** Student members of the group presented two posters at the Cordilleran Geological Society of America conference in May, 2023 in Reno, NV. One poster focused on the [cohort experience from the student perspective](#) and another focused on the [thermal history of the Klamath Mountains](#) for which the students were awarded first-runner up in the undergraduate poster competition.

Throughout the 2022-2023 academic year we worked to support students as both members of a research team and individuals through shared mentoring. Students received one unit of course credit each semester toward their major by participating in the cohort, gained experience as scientific researchers, and were paid a stipend for their participation. Our model for support is depicted on the right: we envisioned the two faculty mentors as satellites, guiding the undergraduate students who are in the center.



Quotes from the cohort:

“Doing research through the cohort experience was a great alternative for me to doing an undergraduate thesis. It was reasonably integrated into my schedule, was paid, and I was able to gain confidence conducting research through each part of the process with multiple peers encouraging me and holding me accountable.”

“Being part of the cohort helped me gain insight into what research is and gave me an opportunity to participate in something bigger than myself as an undergrad.”

“This experience has been extremely rewarding, and I am so thankful I was able to become a part of this cohort. Being able to do a research project in my senior year has been immensely beneficial and would not have had the chance to do so without this group.”

“I’m very thankful to have had the opportunity to work with such brilliant professors and other passionate students as an undergrad at Cal Poly Humboldt. I hope to see the cohort continue to provide valuable learning experiences for future Humboldt Geology students.”

“The cohort has been an excellent opportunity for me to dive right into real geology research! I gained several new skills, worked collaboratively, and became more confident.”

“The cohort is less intimidating than a solo thesis project and more digestible than an intense internship. It was the ideal research opportunity for me as a busy student!”

“I’ve worked with many undergraduate students as a faculty member, and have always had more success when I mentor several students at once. Having a faculty team and a student team working together is the dream - for the accountability structure, creative approach toward problem-solving, and shared goal.” - Dr. Melanie Michalak

“What a blast - cohort meeting was one of my favorite hours of the week! I am proud of what the student members accomplished and having the mentorship and scientific research components of my job productively intertwined feels particularly valuable as a faculty member with a significant teaching load.” - Dr. Jacky Baughman



All members of the cohort after a successful sample collection field trip in September 2022. From left to right: Jacky, Dennis, Emily, Lisa, Jane, Liz, Jacob, and Melanie.



Dennis, Jane, Jacob, and Lisa presenting one of their two posters at the 2023 GSA Cordilleran Section meeting in Reno, NV. One of their posters earned an award for Runner Up Best Poster in the undergraduate division.