



NEWS FROM THE EARTH AND PLANETARY SCIENCES DEPARTMENT AT UC SANTA CRUZ

FALL 2022



Chair's welcome

Dear Friends of EPS,

The 2022-23 academic year is shaping up to be a time of renewal for us in Earth and Planetary Sciences. Although we've been teaching face-to-face in EPS for a few quarters now, campus was noticeably more bustling this fall as the overall in-person student population has returned to typical levels. The energy around campus has been a real pleasure this fall, although our building's coffee cart has yet to reopen, to the dismay of many!

The department will also be entering a renewal phase, as we've had a few recent retirements and are looking at a few upcoming ones this year. Dan Sampson, a long-time member of our outstanding technical staff, retired over the summer, although he's been helping out until we're able to bring a replacement on board. His technical wizardry has been invaluable over the years, and he leaves some big shoes to fill. Ru-Shan Wu also retired around the time last year's newsletter came out. Ru-Shan was a valued member of the geophysics wing of the department, and his international connections and links with industry were particularly important to us. We also anticipate a few faculty retirements this year, so keep an eye out for future announcements about retirement celebrations.

We're also looking forward to renewing our connections with you. As always, we'll be holding our annual alumni reception in conjunction with the AGU fall meeting, which this year is in Chicago. If you're at the meeting or in the Chicago area, we'd love for you to stop by Kroll's South Loop on Tuesday December 13 from 6-8 PM!

Finally, we're in the early stages of planning our next alumni reunion. It's been a while since we held an in-person reunion in Santa Cruz, and the pandemic disrupted our plans for one in 2020, but mark your calendars for a reunion in October 2023, likely on October 6-8! The exact events are yet to be determined, but rest assured we'll have some local field trips and plenty of opportunities for you to catch up with old friends, classmates, current students, and faculty from the department.

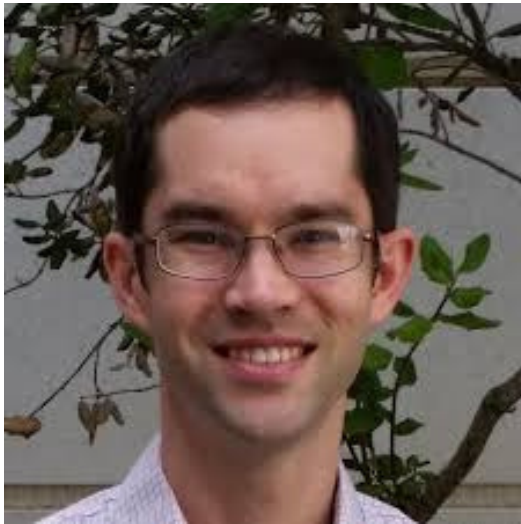


Table of Contents

- p.2 Chair's Welcome
- p.4 Department News
- p.5 EPS Research - Seismology
- p.6 EPS Research - Coastal Wetlands
- p.9 EPS Research - Saturn's Rings
- p.12 Undergrad Awards & Degrees
- p.14 Graduate Awards & Degrees
- p.16 Alumni Hall of Fame Recipients
- p.18 EPS Advisory Committee (AC)
- p.22 Development Update
- p.24 Lawton Endowment
- p.25 Ways to Give
- p.27 Who's that Professor?
- p.30 Alumni Updates
- p.58 Donor Acknowledgement

**Editors: Gary Griggs,
Amy Kornberg & Maya Meislahn**
Email: griggs@ucsc.edu



www.facebook.com/UcscEPS

Chair's welcome - continued

I hope you're enjoying success personally and professionally. It's fantastic to hear all of your updates, so thank you for sharing for our newsletter. Please stay in touch and let us know about your latest and greatest accomplishments. As always, we're pleased to share the latest news from the department, and I hope this newsletter sparks some fond memories about people or opportunities that made a difference to you while at UCSC.

Best wishes,



Matthew Clapham



Summer Field 2022

Please complete this [RSVP Form](https://tinyurl.com/epsagu2022) (<https://tinyurl.com/epsagu2022>) if you plan on attending the EPS Alumni Reception at the 2022 AGU Meeting



We hope you will join us for the

**EPS ALUMNI RECEPTION
AT AGU
IN CHICAGO!**

Tuesday, December 13th | 6-8pm

Kroll's South Loop
1736 S Michigan Ave, Chicago, IL 60616



Emily Brodsky

Department News

Professor Emily Brodsky was awarded the 2022 Nemmers Prize in Earth Sciences for her "fundamental, transdisciplinary contributions to understanding the physics of earthquake networks at at scales."

Professor Jim Zachos was awarded the distinction of AAAS fellow by the American Association for the Advancement of Science. He was recognized for "outstanding contributions in geology, paleontology, and climate science of the Cenozoic and Cretaceous oceans."

Researcher Adina Paytan was awarded the 2022 Vladimir Ivanovich Vernadsky Medal for outstanding contributions to ocean biogeochemistry in the Earth's present and past, and in particular, for leading the scientific community in linking the sulfur, phosphate and oxygen cycles.

Alumna **Kathy Sullivan** (B.S Earth Sciences 1973), a former NOAA Administrator and Space Shuttle Astronaut, was honored at a UCSC event on November 4 with the naming of an entire floor of the revamped Science Library in her honor. Kathy has established an endowment to support graduate and undergraduate student research, the Kathryn Sullivan Research Impact Award in Earth and Marine Sciences. This program supports research projects in Earth and planetary sciences, ocean sciences, microbiology and environmental toxicology, ecology and evolutionary biology chemistry or related disciplines as they pertain to Earth and marine sciences. Research teams must include one undergraduate and one graduate student mentor, and the project must address important problems in the chosen discipline.



www.facebook.com/UcscEPS



Adina Paytan



Kathy Sullivan

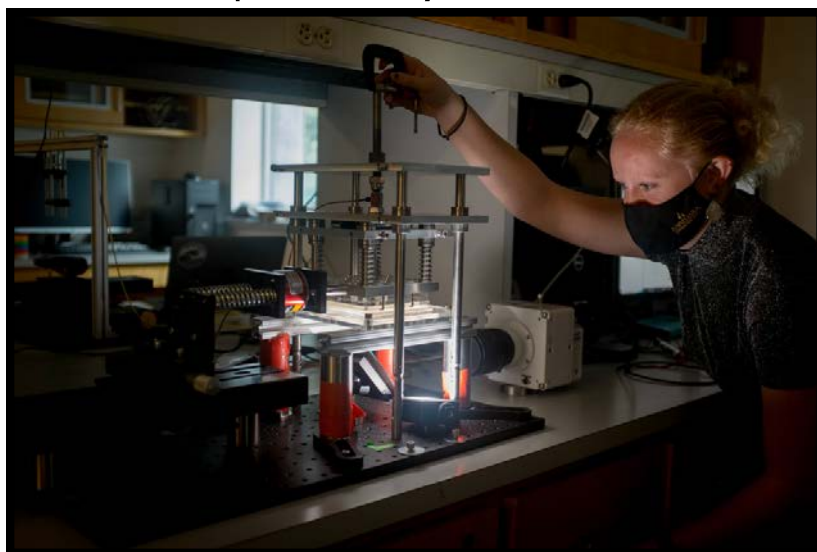
EPS Research

Seismology Group and the Earthquake Physics Lab

The UC Santa Cruz seismology group includes world experts on earthquakes, mantle structure, subduction zones, tsunamis and exploration imaging. Their research takes them to exotic locales like the ice streams of Antarctica, the shores of Costa Rica or the deserts of Namibia. However, some of the most exciting work happens right here at UCSC, where they use massive databanks of global data and state-of-the-art computing to develop new techniques to map the Earth's subsurface and unravel the workings of large earthquakes.

Professor Emily Brodsky is an earthquake physicist who studies the mechanics underlying earthquakes, addressing questions about the processes that trigger earthquakes and the constraining forces and processes that occur inside a fault zone during slip. These studies require expertise in a variety of geoscience disciplines, including seismology, hydrogeology, structural geology, and rock mechanics.

Professor Heather Savage's research focuses on earthquakes and faults. Using both laboratory experiments and field studies, she works on questions regarding the strength and stability of faults in order to improve our understanding of when and where larger earthquakes occur.



Undergraduate Sydney Haith in the Earthquake Physics lab modelling rupture and friction using scaled experiments.

She uses rock deformation and friction experiments at pressures and temperatures relevant to the seismogenic zone to study in situ fault conditions where earthquakes start.

In the Earthquake Physics Lab the members of the Seismology Group are able to recreate the conditions of an earthquake, including high pressure, high temperature and slow stress buildup that faults undergo in the months to years before they occur. They also have specialized testing machines that slide rocks against each other at the high speeds (meters per second) that occur during earthquakes. Because testing is carried out in a controlled environment, relevant properties are measured before, during and after the occurrence of laboratory earthquakes. These include strength and frictional behavior of rocks and fault zone materials, the velocity of seismic waves through rock, electrical resistivity measurements, as well as the role of fluids and fluid flow in fault zones.

Information on rock properties is combined with other geophysical observations to improve our models of the earthquake process, such as the timing and magnitude of earthquakes, earthquake triggering, recurrence, rupture propagation, and ground motion. This in turn is necessary to understand earthquake hazards and risk in earthquake-prone areas.



Undergraduate Jaden Zak in the Earthquake Physics lab modelling rupture and friction using scaled experiments.

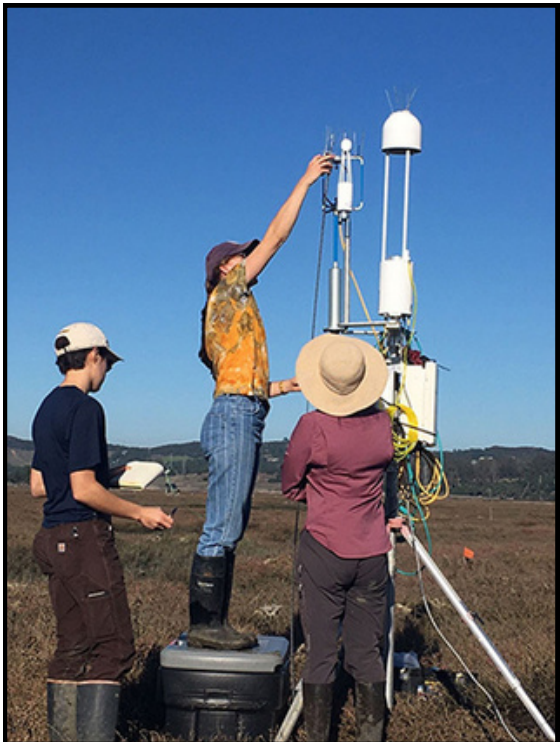
EPS Research

Optimizing coastal wetland restoration for carbon capture and storage

EPS Researcher and grad students lead a large collaborative effort to develop guidelines for maximizing the effectiveness of coastal wetlands as a climate mitigation solution with multiple benefits

Healthy coastal wetlands can help combat climate change by absorbing large amounts of carbon dioxide from the atmosphere and storing it for the long term. Coastal wetlands also provide habitat for fish and other wildlife, reduce erosion and coastal flooding, improve water quality, and support recreational uses.

Recognition of these “ecosystem services,” coupled with widespread loss and degradation of coastal wetlands, has spurred restoration efforts throughout California and around the world. Little is known, however, about how specific restoration and management practices influence the capture and storage of carbon (“carbon sequestration”) and other benefits of coastal wetlands.



UCSC researchers set up an “eddy covariance” tower in Elkhorn Slough with instruments for measuring environmental parameters, including the flux of carbon dioxide and methane into and out of the wetlands.



Elkhorn Slough is a biologically rich estuary on the coast of Monterey Bay that harbors the largest tract of tidal salt marsh in California outside of San Francisco Bay. Coastal wetlands like this can help combat climate change by capturing and storing carbon dioxide from the atmosphere. (Photos courtesy of Adina Paytan)

Now, a large interdisciplinary team of scientists is working to develop policy and management guidelines to maximize carbon sequestration in coastal wetlands along with other benefits for humans and nature. Led by Adina Paytan, a research scientist at the UC Santa Cruz Institute of Marine Sciences, the collaborative project involves researchers at five UC campuses and three national laboratories and is funded by a \$3.6 million grant from the UC National Laboratory Fees Research Program.



Adina Paytan leads an interdisciplinary collaboration to study coastal wetland restoration for climate mitigation and other benefits.

Optimizing coastal wetlands - continued

“Considering California’s goal of achieving carbon neutrality, there is no way we can do that without sequestering carbon dioxide from the atmosphere, and nature-based solutions like wetland restoration are among the most economical and effective strategies,” Paytan said. “This project will evaluate how coastal wetland restoration can be designed and executed in a way that will provide the most benefits for people and ecosystems.”

Components of the project include research on carbon dynamics in coastal wetlands; economic assessment of carbon storage and other ecosystem services from coastal wetlands; development of a policy and governance framework for wetland restoration; and incorporating carbon dynamics, restoration options, and climate trends in ecosystem models to improve projections of carbon sequestration benefits from coastal wetlands.

The project brings together UC experts in these areas at the Santa Cruz, Berkeley, Davis, Santa Barbara, and Irvine campuses, as well as scientists at Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory. Field research will take place at wetland sites in San Francisco Bay, the Delta, and Elkhorn Slough, taking advantage of existing research infrastructure where Paytan and other investigators have ongoing research programs.

Plants absorb carbon dioxide as they grow, incorporating carbon into organic matter. Burial of that carbon in soils and sediments can sequester it, but decomposition processes can release it back into the atmosphere as greenhouse gases. Understanding and quantifying the processes that govern the net burial rates of carbon in coastal wetlands is crucial for designing the most effective restoration and management practices.

“We have to know how to maximize burial and minimize emissions in a way that is sustainable over the long run, especially with sea level rise,” Paytan said. “You have to look at all the variables together to see the net effect, and none of this has been modeled in a holistic way. That’s where the national labs come in, because they have these wonderful ecosystem modeling tools that will be really useful.”

The contributions of social scientists to the project are also crucial, she said. Quantifying wetland ecosystem services will enable the economic value of carbon storage and other benefits to be included in decisions on wetland restoration and support wider use of nature-based solutions for climate mitigation. The project will also integrate environmental justice considerations, policy, and governance approaches to develop a framework and guidelines for incorporating coastal wetland restoration and conservation into local, state, and national plans for climate adaptation.



Erected three towers in three days.

Optimizing coastal wetlands – continued

“It’s one thing to know as scientists what we need to do, but we also need to understand what the implications are to people and how to navigate a complex regulatory system and actually achieve our goals,” Paytan said. “I’ve worked with some of the investigators before on wetlands research, but we realized this needed a bigger project involving social scientists as well. When I started reaching out, it was really nice because everyone recognized how important this is and they were excited to contribute.”

The close collaboration of researchers from different disciplines is essential for developing sustainable

climate mitigation solutions that enhance community resilience and environmental justice. The funding for this project will support graduate and undergraduate student researchers as well as education and outreach components such as an undergraduate course on climate and data literacy offered at the participating UC campuses.

The UC National Laboratory Fees Research Program enhances partnerships between UC researchers and scientists at national laboratories. Funds for these strategic investments derive from the net fee income UC receives for managing the Los Alamos, Lawrence Berkeley, and Lawrence Livermore National Laboratories on behalf of the U.S. Department of Energy.



The Elkhorn Slough is a magical place full of wildlife and beauty. Meandering seven miles inland from the coast in the center of the picturesque Monterey Bay, the Elkhorn Slough harbors the largest tract of tidal salt marsh in California outside of San Francisco Bay. This biologically rich estuary provides habitat for a diversity of resident and migratory birds, plants, marine mammals and fish, and has been identified as a Globally Important Bird Area by the American Birding Conservancy.

EPS Research

Saturn's rings and tilt could be the product of an ancient, missing moon

Swirling around the planet's equator, the rings of Saturn are a dead giveaway that the planet is spinning at a tilt. The belted giant rotates at a 26.7-degree angle relative to the plane in which it orbits the sun.

Astronomers have long suspected that this tilt comes from gravitational interactions with its neighbor Neptune, as Saturn's tilt precesses, like a spinning top, at nearly the same rate as the orbit of Neptune.

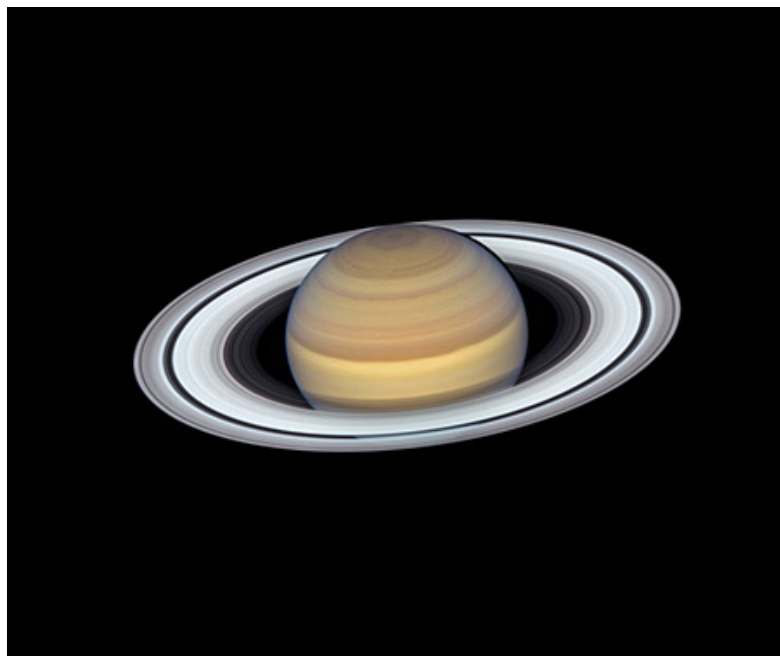
But a new modeling study by a team of astronomers and planetary scientists has found that, while the two planets may have once been in sync, Saturn has since escaped Neptune's pull. What was responsible for this planetary realignment? The team has one meticulously tested hypothesis: a missing moon.

"We had to figure out the implications of this hypothesis and explore the expected outcomes of a scenario in which an additional moon became destabilized as Titan, Saturn's largest moon, migrated outward," said Francis Nimmo, professor of Earth and planetary sciences at UC Santa Cruz.

Nimmo and UCSC graduate student Brynna Downey are both coauthors of a paper on the new findings, led by planetary scientist Jack Wisdom at MIT and published September 15 in *Science*.

The team proposes that Saturn, which today hosts 83 moons, once harbored at least one more, an extra satellite that they name Chrysalis. Together with its siblings, the researchers suggest, Chrysalis orbited Saturn for several billion years, pulling and tugging on the planet in a way that kept its tilt, or "obliquity," in resonance with Neptune.

But around 160 million years ago, the team estimates, Chrysalis became unstable and came too close to its planet in a grazing encounter that pulled the satellite



Scientists propose a lost moon of Saturn, which they call Chrysalis, was ripped apart to form the rings and contribute to Saturn's tilt. This view of Saturn from NASA's Hubble Space Telescope captures exquisite details of the ring system. (Source: NASA, ESA, A. Simon (GSFC), M.H. Wong (University of California, Berkeley) and the OPAL Team)

apart. The loss of the moon was enough to remove Saturn from Neptune's grasp and leave it with the present-day tilt.

What's more, the researchers surmise, while most of Chrysalis' shattered body may have made impact with Saturn, a fraction of its fragments could have remained suspended in orbit, eventually breaking into small icy chunks to form the planet's signature rings.

The missing satellite, therefore, could explain two longstanding mysteries: Saturn's present-day tilt and the age of its rings, which were previously estimated to be about 100 million years old — much younger than the planet itself.

"Just like a butterfly's chrysalis, this satellite was long

Saturn's rings and tilt – continued

dormant and suddenly became active, and the rings emerged,” Wisdom said.

The study's co-authors also include Rola Dbouk at MIT, Burkhard Militzer at UC Berkeley, William Hubbard at the University of Arizona, and Richard French at Wellesley College.

In the early 2000s, scientists put forward the idea that Saturn's tilted axis is a result of the planet being trapped in a resonance, or gravitational association, with Neptune. But observations taken by NASA's Cassini spacecraft, which orbited Saturn from 2004 to 2017, put a new twist on the problem. Scientists found that Titan, Saturn's largest satellite, was migrating away from Saturn at a faster clip than expected, at a rate of about 11 centimeters per year. Titan's fast migration, and its gravitational pull, led scientists to conclude that the moon was likely responsible for tilting and keeping Saturn in resonance with Neptune.



EPS Professor Francis Nimmo

But this explanation hinges on one major unknown: Saturn's moment of inertia, which is how mass is distributed in the planet's interior. Saturn's tilt could behave differently, depending on whether matter is more concentrated at its core or toward the surface.

“To make progress on the problem, we had to determine the moment of inertia of Saturn,” Wisdom said.

In the new study, the researchers looked to pin down Saturn's moment of inertia using some of the last observations taken by Cassini in its “Grand Finale,” a phase of the mission during which the spacecraft made an extremely close approach to precisely map the gravitational field around the entire planet. The gravitational field can be used to determine the distribution of mass in the planet.

Wisdom and his colleagues modeled the interior of Saturn and identified a distribution of mass that matched the gravitational field that Cassini observed. Surprisingly, they found that this newly identified moment of inertia placed Saturn close to, but just outside the resonance with Neptune. The planets may have once been in sync, but are no longer.

“Then we went hunting for ways of getting Saturn out of Neptune's resonance,” Wisdom says. The team first carried out simulations to evolve the orbital dynamics of Saturn and its moons backward in time, to see whether any natural instabilities among the existing satellites could have influenced the planet's tilt. This search came up empty.

So, the researchers reexamined the mathematical equations that describe a planet's precession, which is how a planet's axis of rotation changes over time. One term in this equation has contributions from all the satellites. The team reasoned that if one satellite were removed from this sum, it could affect the planet's precession.

Saturn's rings and tilt - continued

The question was, how massive would that satellite have to be, and what dynamics would it have to undergo to take Saturn out of Neptune's resonance?

The team ran simulations to determine the properties of a satellite, such as its mass and orbital radius, and the orbital dynamics that would be required to knock Saturn out of the resonance.

They concluded that Saturn's present tilt is the result of the resonance with Neptune and that the loss of the satellite, Chrysalis, which was about the size of Iapetus, Saturn's third-largest moon, allowed it to escape the resonance.

Sometime between 200 and 100 million years ago, Chrysalis entered a chaotic orbital zone, experienced a number of close encounters with Iapetus and Titan, and eventually came too close to Saturn, in a grazing encounter that ripped the satellite to bits, leaving a small fraction to circle the planet as a debris-strewn ring.

The loss of Chrysalis, they found, explains Saturn's

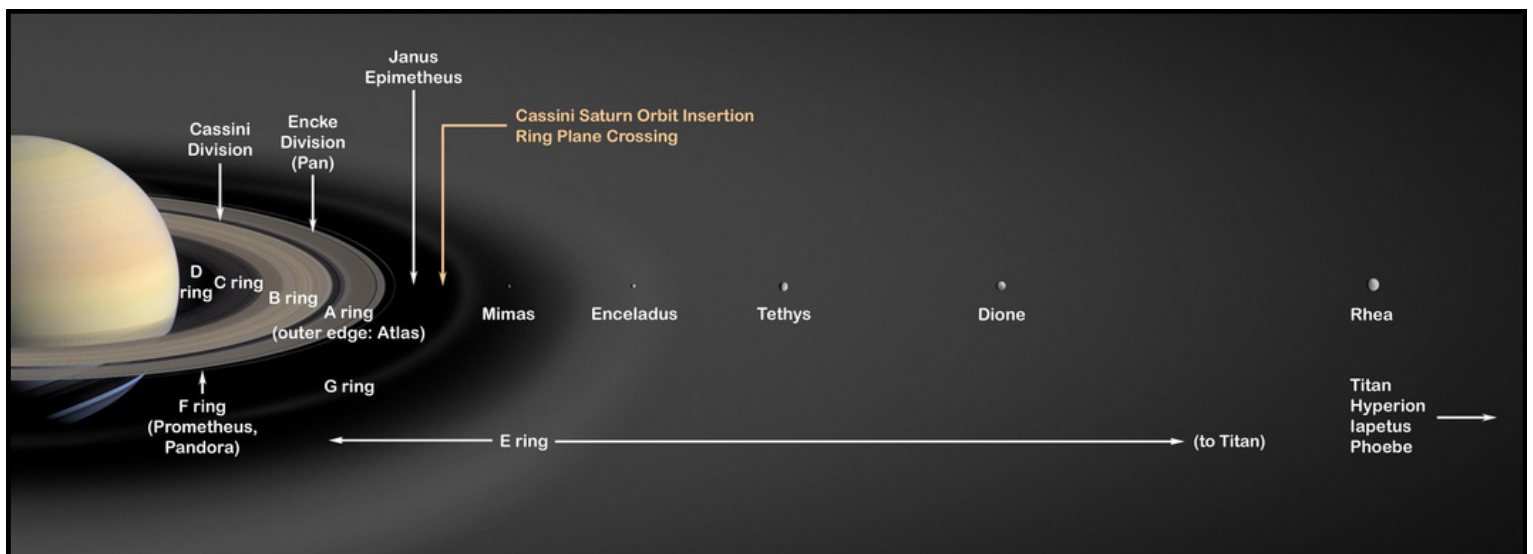


EPS Grad Student Brynna Downey

precession, and its present-day tilt, as well as the late formation of its rings.

"It's a pretty good story, but like any other result, it will have to be examined by others," Wisdom says. "But it seems that this lost satellite was just a chrysalis, waiting to have its instability."

This research was supported, in part, by NASA and the National Science Foundation.



An artist's concept of Saturn's rings and major icy moons. Credit: NASA/JPL

Undergraduate Awards

FUTURE LEADERS IN COASTAL SCIENCE AWARD:

JENNA MARTINEZ

**KATHRYN D. SULLIVAN RESEARCH AWARD FOR
UNDERGRADUATE RESEARCH IN SCIENCE AND
TECHNOLOGY:**

NOAH BRIGHAM

**KATHRYN D. SULLIVAN RESEARCH IMPACT AWARD
IN EARTH & MARINE SCIENCES:**

BROOKE SANTOS

GILMAN SCHOLARSHIP:

ANYA HYNELL

**BLOOM FELLOWSHIP FROM THE PARDES INSTITUTE
OF JEWISH STUDIES TO STUDY IN JERUSALEM IN
2023:**

GWYNETH HERNANDEZ

**FOREIGN LANGUAGE EDUCATION ABROAD FUND
AWARD:**

ANYA HYNELL

HISPANIC SCHOLARSHIP FUND SCHOLAR:

ARIAELI HERNANDEZ-VIERA

**JOSHUA, MARCIA, AND THEODORE ALPER
SCHOLARSHIP FUND:**

ANYA HYNELL

**KORET SCHOLARSHIP FOR UNDERGRADUATE
RESEARCH PROJECTS AT UCSC:**

NOAH BRIGHAM

JENNA MARTINEZ

CASEY VIGILIA

AMY WU

GEOPATHS INTERNSHIP:

DANIEL PEREA

**UNDERGRADUATE RESEARCH IN SCIENCE AND
TECHNOLOGY AWARD:**

AMY WU

HOLLY DAY BARNETT SCHOLARSHIP:

LESLIE SERAFIN

EARTH'S ENVIRONMENT FUND AWARD:

DANIEL PEREA

**ELI SILVER EARTH & PLANETARY SCIENCE
OPPORTUNITIES FUND UNDERGRADUATE
AWARD:**

LESLIE SERAFIN

**GARY GRIGGS ENDOWMENT FOR STUDENT
RESEARCH SUPPORT FUND AWARD:**

RHYTHM BECKETT-COOK

ANDREW LEE

**SUPPORT FOR UNDERGRADUATE RESEARCH IN
GEOLOGY AND ENVIRONMENTAL SCIENCE
(SURGES) FUND AWARD:**

CAMILA CASTANEDA CALZADA

JENNIFER OVERKLIFT

GERALD WEBER AND SUZANNE HOLT FUND:

SAGE MOORE

KRISNA SUPATRA-CAMPBELL

JACK SULLIVAN

RACHEL KRAMER

TREVOR DOBBINS

BRAIN GARCIA

CHANDLER CLARK

KATE WOLLMAN

NESSA FAKRAI

LINDSAY JONES

CATHERINE ALLEN

KIERNAN CLARK

MAX MAIER

LEXI SPENCER

BROOKE SANTOS

UNDERGRADUATE DEGREES

Elyse Alexandra Abramson*

Gwyneth Hernandez

Daniel Aguilar

Raymond Hess

Aidan Alberts**

Jared Hom

Catherine Allen

Claire Ivey*

Mia Raquel Alonso**

Lindsay Jones

Kathryn Anderson **

Rachel Kramer

Ani Chaudhary

Maximilian Maier

Kiernan Clark

Jenna Ann Martinez

Chandler Clarke

Priyanka Mathrani

Conor McNamare

Jack Connor Sullivan

Krisna Iwayan Supatra

Campbell*

David Cobar

Sage Moore*

Camryn Nichole Crowley**

Gloria Oliver**

Eva Cruz

Joanna Perez**

Zigmont Fafard

Sophia Pinter**

Yanming Feng

Theodore Marc Vachon Fischer

Mel Valdivia

Ember Vosmek-Park

Kenji Watanabe

Giselle Wendt

Kate Wollman*

Ali Fuat Yuvali*

Benjamin Tobias Pritikin*

Brian Garcia Briseño

Sarah Groff**

Natasha Rajesh Puri*

Justin Ha

Laura Ramirez

Madeline Kaliko Hawk*

Kaetlyn Ariana Rodriguez

Ariaeli Hernández-Viera**

Luisana Rodriguez*

Conner John Roebuck

Ethan Romo

Sierra Sakrison**

Ariel Santero**

Brooke Santos

Leslie Xiomara Serafin**

Michelle Elizabeth Siewert

Lexi Spencer

*Candidate for department honors **Candidate for highest department honors



Graduate Awards

AMERICAN GEOPHYSICAL UNION (AGU) OUTSTANDING STUDENT PRESENTATION AWARD

(OSPA):

RACHEL MAXWELL
ADRIENNE RICKER

MILDRED E. MATHIAS GRADUATE STUDENT RESEARCH GRANT SPONSORED BY THE UC NATURAL RESERVE SYSTEM:

NERISSA BARLING
LAUREN GIGGY

MYERS OCEANOGRAPHIC AND MARINE BIOLOGY TRUST RESEARCH GRANT:

MADDIE WOOD

2021-2022 FORSSGREN SCHOLARSHIP FOR AMERICAN INDIANS GIVEN THROUGH THE UCSC AMERICAN INDIAN RESOURCE CENTER:

AMANDA DONALDSON

INTERNATIONAL ASSOCIATION OF GEOCHEMISTRY, STUDENT RESEARCH GRANT:

MADDIE WOOD

EUROPEAN GEOSCIENCES UNION'S WATER PARTITIONING WORKSHOP TRAVEL GRANT TO TUSCANY, ITALY IN SUMMER 2022:

AMANDA DONALDSON

HONORABLE MENTION IN THE 2022 NATIONAL SCIENCE FOUNDATION (NSF) GRADUATE RESEARCH FELLOWSHIP PROGRAM (GRFP)

COMPETITION:

TERRA GANEY

ELI SILVER EARTH & PLANETARY SCIENCE OPPORTUNITIES FUND GRADUATE AWARD:

ADAM PRICE

NOAA CALIFORNIA SEA GRANT FOR 2022-2023:

JIM JACOBS

UCSC GRAD DEAN'S TRAVEL GRANTS:

AMANDA DONALDSON
TERRA GANEY
RYAN GREEN
ADAM HAYNES
MAYA MONTALVO
GRACIE PEARSALL
GAVIN PICCIONE
WILL RUSH
GARRETT ZEFF
DAISY ZHANG

DISSERTATION YEAR FELLOWSHIP:

HUAZHI GE
COLLEEN MURPHY
JENNY PENSKY
GAVIN PICCIONE

ARCS FOUNDATION FELLOWSHIP:

WILL CHAPMAN

EARTH'S ENVIRONMENT FUND AWARD:

ADAM HAYNES

CASEY MOORE FUND AWARD:

NERISSA BARLING
JIM JACOBS

ZHEN AND REN WU MEMORIAL FUND AWARD IN GEOPHYSICS:

KRISTINA OKAMOTO

AARON AND ELIZABETH WATERS AWARD: (2 RECIPIENTS THIS YEAR)

KEENAN HASSELL
MADDIE WOOD

EPS DEPARTMENTAL OUTSTANDING TA AWARD (EPS & ESCI STUDENT VOTED):

HONORABLE MENTION - WILL CHAPMAN
HONORABLE MENTION - GAVIN PICCIONE
WINNER! - RYAN GREEN

GRADUATE DEGREES

Wencheng Shao

Ph.D. (Spring 2022)

Variations of Atmospheric Chemical Systems on Venus and the Ice Shell on Enceladus

Emilio Grande

Ph.D. (Summer 2022)

Hydrologic and Biochemical Dynamics from Catchment Headwater to Coastal Groundwater

William Rush

Ph.D. (Summer 2022)

Comparative Regional Hydrologic Changes During the Early Eocene

Kelian Dascher-Cousineau

Ph.D. (Summer 2022)

Forecasting Landscapes and Earthquakes

Kellen Martin

M.S. (Fall 2021)

Alex Watson

M.S. (Summer 2022)

Pranvera Hyseni

M.S. (Winter 2022)

Maya Montalvo

M.S. (Spring 2022)

Seasonal changes in terrestrial freshwater inputs impact salt marsh hydrology

Jacquelyn Williams

M.S. (Summer 2022)

Stranded: Structural analysis of the northern transition zone of the central creeping section, San Andreas Fault



The Earth and Planetary Sciences Alumni Hall of Fame

The UCSC Earth and Planetary Sciences Advisory Council created an Alumni Hall of Fame in 2018 to honor the achievements of our fellow undergraduate and graduate alumni. The members of the Advisory Council wish to recognize our alumni colleagues annually for their contributions and achievements.

Recipients of this year's award include Mary Bannister (B.S. 1972), Timothy Byrne (Ph.D. 1981) and Ian Howat (Ph.D. 2006). We know that many more of our alumni are worthy of this recognition. Suggestions for nominations in future years are welcome and should be forwarded to Peter Vrolijk



Mary Bannister

(pvrolijk17@gmail.com) or Stefano Mazzoni (stefano00038@yahoo.com) for consideration in next year's award. Following is a brief description from each recipient about how their Santa Cruz education influenced their subsequent careers.

Mary Bannister, B.S. 1972

My extraordinary experience at the Earth Science Department (as it was called then) at UCSC went beyond the excellent academics. It was the humor (think Jerry Weber), the creativity (Othmar Tobisch's 6' by 6' thin section photos on the walls), the sincerity (Bob Garrison) and the connection to the subject (Gary Griggs – Oceanography) that lit a flame in me. My UCSC degree in hand, I spent 10 years in Alaska participating in engineering studies of the Trans-Alaska Pipeline and marine infrastructure. Starting in the late 1980s, I worked in California water resources. At the time of my retirement in 2016, I was General Manager of the Pajaro Valley Water Management Agency. To succeed in that contentious and important field, I needed a solid scientific background, but I also needed to be creative and gritty – skills honed during my time as an EPS undergrad. Solving the problem of groundwater overdraft in the Pajaro Valley (with a \$1 billion agricultural economy) required bringing industrial-scale agricultural and community interests together using science and common sense. Cutting edge studies of groundwater recharge by Dr. Andy Fisher, EPS, were part of that solution. I was succeeded as General Manager at PV Water by another accomplished Slug – Brian Lockwood, which felt like the icing on the stratigraphic layer cake. And the first person I called when I heard about this award was lifelong friend and fellow UCSC “Rockette” Alison Till, with whom I've shared a close friendship since 1972- a remarkable 50 years! I am grateful and so very honored to receive this award!

The Earth and Planetary Sciences Alumni Hall of Fame - continued

Timothy Byrne, Ph.D. 1981

Dr. Timothy Byrne celebrated his 30th anniversary last year as a Professor of Earth Sciences at the University of Connecticut and found it hard to believe that it had been that long since he had left the West Coast. He received his doctorate in Earth Sciences in 1981 from the University of California, Santa Cruz, and a good share of his research has focused on the deformation and tectonic history of convergent margins, particularly the western Pacific. He participated in numerous land- and sea-based geological expeditions along these margins and was a co-Chief Scientist on the first riser drilling-equipped expedition using the RV Chikyu. Most recently, he's been focused on understanding the active arc-continent collision in Taiwan.



Timothy Byrne

"I was surprised and honored to be inducted into the EPS Alumni Hall of Fame. My years at UCSC were way beyond formative. I grew up in Santa Cruz, not literally, but figuratively. My junior high and high school years were spent running four or eight-mile loops on the country roads of Oklahoma and hunting quail with my dad nearly every fall that I can remember. So moving first to Seattle (UW) and then to Santa Cruz, where oceans and mountains abound, opened my eyes, literally and figuratively. Santa Cruz, however, changed my life. I learned how to be a scientist and a human being. The faculty and graduate students were challengingly bright, and, as an "Okie," I felt like I had to work all the time; it seemed like we all did. We spent days and nights in Casey's lab, getting by mostly on "homemade" quesadillas using a hot plate and a recipe passed down from Bill Connelly, his first student. Some nights we camped under the redwoods because it was easier to get back to the lab in the morning, but it was also fun, and that says it all. Learning to think analytically through discussions and writing and learning to get along with colleagues through geo-adventures was fun and invigorating and set the stage for a lifetime of adventures. I feel fortunate to have had such a rich environment as a graduate student, and I've tried to pass the same lessons on to my students, who I hope recognize the source, the faculty at UC Santa Cruz, as they pass healthy learning on to their students."

Ian Howat, Ph.D. 2006

Ian is a glaciologist and professor in the School of Earth Sciences at Ohio State University. His research is focused on the dynamics of glaciers and ice sheets, and particularly their rapid response to climate forcing. He uses a wide range of observations from remote sensing, in situ data networks and field campaigns to constrain quantitative models of ice flow. These models are used to predict future changes in ice sheet mass balance and rates of sea level rise. Howat has been a participant and leader on numerous science expeditions to Antarctica, Iceland and Greenland. Howat is currently the Director of Ohio State's Byrd Polar & Climate Research Center.



Ian Howat on the Greenland ice sheet

The Earth and Planetary Sciences Advisory Council

The EPS Advisory Council (EPS-AC) was formed in 2012, providing a forum for accomplished alumni to help EPS achieve networking and fundraising goals. We are grateful to our EPS-AC members, who have generously agreed to share their time, energy, and expertise on behalf of our community. Your EPS-AC co-chairs continue to be Peter Vrolijk and Stefano Mazzoni - please let them know if you have ideas, questions or suggestions:

stefano00038@yahoo.com or pvrolijk17@gmail.com

We thank members of the current EPS Advisory Council for help in networking and development! Following are brief bios of current EPS-AC members, including backgrounds and interests.

Kevin Biddle, B.S. 1973

I received a B.S. degree in Earth Sciences from UCSC in 1973 and then, thanks to a recommendation from Gerry Weber, went to work for the USGS in Menlo Park. I stayed with the Survey for a year and a bit before moving to Rice University in Houston for graduate school. At Rice I acquired a MA degree (1976) working on modern lagoon sediments and a PhD (1979) focused on carbonates in the Dolomite Alps of northern Italy. After Rice, I went to work for Exxon in their Houston research lab in the Basin Analysis group. I stayed with Exxon (now ExxonMobil) for 36 years working in research, exploration, field development, and as an advisor at corporate headquarters. I finished my career as the Exploration Director of ExxonMobil International in London, retiring in 2014. I currently live in Houston and Taos, New Mexico, and am an adjunct professor at Rice University teaching classes that address risk and uncertainty in the subsurface. I also work with a colleague in Poland on natural-gas supply to eastern Europe.

Jon Erskine, M.S. 1998

I earned my MS in Earth Sciences from UCSC in 1998 working with Andy Fisher applying borehole geophysics and geostatistics to map a coastal aquifer system in the former Fort Ord area of Monterey, California. From there I became a California Professional Geologist and Certified Hydrogeologist in

2001 while working for Geomatrix Consultants of Oakland in the environmental industry. In 2008, I completely shifted gears and entered the mining and construction industry to work for Graniterock of Watsonville, where I have been ever since.

The move enabled me to return to live in the Santa Cruz area and learn a type of geology career that I previously knew nothing about while applying all the tools I have learned along the way. I find the geology of the Monterey Bay area fascinating and I've had the opportunity to share by leading field trips for UCSC's Geology Club and collaborating on San Andreas Fault hydrogeology research with EPS Professor Emily Brodsky and PhD student Lian Xue (2016). I've worked with numerous talented Slug geologists over the years and value the knowledge, enthusiasm, and professional camaraderie UCSC EPS has provided.

Richard Gordon, B.A. 1975

I graduated from UCSC (Stevenson College) in 1975 with a BA in geophysics, which was an individual self-designed major with Rob Coe, Eli Silver, and Bob Garrison as members of my committee. I then obtained an MS (1977) and PhD (1979) in geophysics from Stanford. After a year of post-Ph.D. teaching and research at Stanford, I joined the faculty of Geological Sciences at Northwestern University for 15 years. I have now been at Rice University for 26 years as the Keck Professor of Geophysics. My research interests are in global tectonics with my main tools being

Advisory Council Members - continued

Richard Gordon - continued

marine geophysics, space geodesy, paleomagnetism, and numerical modeling. Two of my former Ph.D. students have gone on to become fellows of the AGU. I am especially proud of my work with students and colleagues in recognizing and describing diffuse plate boundaries in the world's oceans, especially the Indian Ocean, which I believe fundamentally changed our understanding of how plate tectonics works in the oceans. My main non-science hobby in the past decade has been playing the trumpet---I perform with several bands including two Rice jazz bands. I am amazed and proud of the achievements of the UCSC EPS department and of my fellow alumni and have been delighted to serve on the Advisory Council.

James R. Hein, Ph.D. 1973

I received a Ph.D. in Earth Sciences at UCSC in 1973, as part of the first Ph.D. graduating class (three of us). I was Gary Griggs' first Ph.D. graduate and also worked with Bob Garrison. I sort of changed venues with Eli Silver as he was with the USGS before becoming a professor at UCSC. This was at the same time that I left UCSC for a position at the USGS after teaching the summer and winter quarters at UCSC post-Ph.D. Eli arranged meetings with David Scholl at USGS that resulted in my being hired. I have worked at the USGS for 45 years before retiring in December 2018, but then I was rehired the following day on a half-time appointment to mentor my replacements, write a few more papers, and see my last two Ph.D. students through completion of their work. During much of my career I studied deep-ocean mineral deposits, geochemistry, and paleoceanography, but also worked extensively on land-based deposits that were possible analogs to the marine deposits. I was scientific advisor to the DOS on issues related to deep-ocean mineral deposits and I

James R. Hein - continued

was part of their delegation to the International Seabed Authority, who I also worked with for 18 years teaching workshops and seminars. I am past president of the International Marine Minerals Society (twice), and a Fellow of GSA and the Society of Economic Geologists. I also enjoyed teaching Bob Garrison's Advanced Sedimentary Petrology class twice at UCSC through the years, when he was on sabbatical.

Shengwen Jin, Postdoc 2000

After obtaining a Ph.D in marine geology with concentration in reflection seismology from Tongji University, Shanghai, China in 1996, I came to UCSC as a postdoc and then was appointed as an assistant researcher in 1999. I moved down to Houston in 2000 and have worked in the oil and gas industry since then. I joined Halliburton Energy Services in 2008 through the acquisition of Screen Imaging Technology, Inc. which I co-founded. Throughout my career in the industry, I have been actively involved in the development of innovative seismic data processing and imaging technologies. Currently I am a Principle Advisor at Halliburton and am responsible for R&D in seismic imaging, modeling and inversion as well as applications of High Performance Computing. I hold several patents and author/co-author many technical publications.

Christy Kennedy, B.S. 2000 and M.S. 2002

Christy completed a B.S. in Earth Sciences at UCSC in 2000, is a Senior Water Resources Engineer & Hydrogeologist with Woodard & Curran, and serves as a Board Member of the Groundwater Resources Association of California.

Advisory Council Members - continued

Charles E. Lawson, B.S. 1973

I graduated with a B.S. from the department in 1973. After a year working for Bechtel, I headed to Princeton for graduate school (recommendations from Casey and Aaron helped), where I received my Ph.D. in 1982. For a couple of decades, I was not very good about keeping connections with the department, but the department (and the campus generally) still held a special place in my heart. Finally, in 1995, I got my act together and began to give back to the department, and in the years since, I have tried to increase my connections and my support for the department. My professional interests lie in water resources management. Before retiring from the federal government at the end of 2020, I served as Secretary of the U.S. Section of the International Joint Commission (IJC) for twelve and a half years. The IJC assists the United States and Canada in preventing and resolving disputes involving water bodies along the U.S.-Canada border. The two countries established the IJC under their 1909 Boundary Waters Treaty. Before serving with the IJC, I worked on Water and Environmental topics throughout the Middle East during my 21 years as science and technology advisor in the Department of State. Before my stint at State, I conducted research at the USGS and NASA. My personal interests are all over the map (so to speak).

Stefano Mazzoni, B.S. 2000 and M.S. 2002

After receiving my B.S. (2000) and M.S. (2002) working with Casey Moore on San Gregorio Fault Zone clay mineralogy, I moved to Houston and worked for four years at ExxonMobil on structural geology research, offshore West Africa, Gulf of Mexico, and offshore California. I joined Oxy in 2006 and worked Middle East projects for a year and half before moving back to California (Bakersfield) where I worked on a variety of projects in the San Joaquin and Ventura Basins. I left Oxy early 2015 when my wife (Chevron geologist) was relocated to the Bay Area. I worked for a small service

Stefano Mazzoni - continued

company called NEOS GeoSolutions on global exploration consulting projects. In the summer of 2017 my wife was relocated to Houston so we came back for our second “tour.” I have been working as a consulting geologist on a variety of projects with Sanchez Oil & Gas (Gulf Coast New Ventures), BHP (offshore Mexico), and some smaller short-term projects. My interests lie in structural geology, deepwater turbidites, California geology, coordinating field trips, and most important of all, being a father to our eight-year-old daughter.

Laura K. Stupi, B.S. 1997 and M.S. 2000

B.S. finished in 1997, MS finished 2000 with Elise Knittle. Professionally, I am interested in materials characterization and the application of scientific instruments to the Earth sciences. I have worked in electron microscopy, engineering geology, and scientific instrumentation. Within instrumentation, I have worked with the environmental, oil and gas, mining, and climate research sectors.

Kathryn Sullivan, B.S. 1973

I graduated with a B.S. from the department in 1973 and moved to Nova Scotia to pursue a PhD at Dalhousie University. My work involved bathymetric and geophysical mapping of the Newfoundland Basin (the area bounded by the Grand Banks and Flemish Cap shelf breaks, the Mid-Ocean Canyon and the Southeast Newfoundland Ridge). I also mapped, named and recovered the first rock samples from the Newfoundland Seamounts. After receiving my PhD in 1978, I joined NASA as a Mission Specialist Astronaut. I flew on three space shuttle missions over the course of my fifteen years with the agency. Two of these were multi-disciplinary Earth science missions (STS-41G in 1984 and STS-45 in 1992), and the third was the mission that deployed the Hubble Space Telescope (STS-31 in 1990). On my 1984 mission, I earned the distinction of being the first American woman to walk in space. Following STS-45, I moved to Washington DC to serve as

Advisory Council Members - continued

Kathryn Sullivan - continued

the Chief Scientist of the National Oceanic and Atmospheric Administration (NOAA). In 1996, I moved to Columbus, Ohio, to run COSI, one of the nation's premier science museums and direct the construction of its new, state-of-the-art facility. From 2006-2011, I served as the inaugural director of the Battelle Center for Science & Technology Policy at The Ohio State University. In 2010, I was asked to return to NOAA as Assistant Secretary for Environmental Observation and Prediction/Deputy Administrator, a position I assumed following Senate confirmation in 2011. I served as Acting NOAA Administrator from 2013-14 and Under Secretary for Oceans and Atmosphere/Administrator from 2014-2017. I was a Navy Reserve oceanographer from 1988 to 2006, retiring with the rank of Captain, and served on the National Science Board from 2006-2010. I'm currently on several corporate and non-profit boards, including Terra Alpha Investments, Accenture Federal Services, International Paper and the National Audubon Society.

Phil Teas, Ph.D. 1998

Received a PhD in 1998 in structural geology under Casey Moore. Went on to work for Unocal as a structural geologist supporting global exploration. Transferred to Indonesia expanding to regional geology, tectonics and sideline as a prospecting geologist. Drilled something like 7 wells for Unocal. Later worked for Chevron then became a founding partner at Black Gold Energy serving as chief geologist. Was an integral member of a team that surveyed over 1 million square kilometers of ocean floor looking for oil seeps. BGE became the largest acreage holder in Indonesia and did extensive frontier field work in support of prospecting. Drilled another 8 wells, providing structural interpretation and fluid pressure predictions. Transitioned back into pure seafloor mapping and have been integral in surveying around another 1.5 million square kilometers in the gulf of Mexico, Brazil and west Africa. Interested in 3D visualization of data, geologic field work, and structural geology.

Michael Underwood, B.S. 1976

I received a B.S. degree in Earth Sciences in 1976, after having completed a senior thesis on Franciscan rocks near Big Sur under the direction of Bob Garrison and Casey Moore. I worked for a couple of years at the USGS in Menlo Park (Branch of Pacific Marine Geology) before attending graduate school at Cornell University, where Ph.D. research brought me back to the Franciscan in Humboldt County. Beginning in 1982, I toiled as a professor at the University of Missouri-Columbia, and I've been happily retired since 2015. Research over the course of my career has focused on the sedimentology and tectonics of subduction zones, both onshore and offshore, and that work has yielded many opportunities to collaborate with a long list of UCSC graduate students, alumni, and professors. I currently enjoy Professor Adjunct status at New Mexico Tech, with a second home in Angel Fire, NM. I remain engaged in scientific ocean drilling, and I've been an active member of the EPS-AC since its inception.

Peter Vrolijk, Ph.D. 1987

PhD with Casey (1982-1987); thesis in Kodiak, Alaska; 24 years with Exxon Production Research Co./ExxonMobil Upstream Research Co. with interests in structural geology and subsurface fluid flow. Professional service to IODP (SSEP) and GSA. Hobbies include ultra-running.

Lisa White, Ph.D. 1990

Lisa joined the UC Museum of Paleontology (UC Berkeley) in July 2012 as Director of Education and Outreach. She came to the UCMP after 22 years at San Francisco State University, where she held positions of Professor of Geosciences and Associate Dean of the College of Science and Engineering. She taught undergraduate classes in paleontology, historical geology, and oceanography, and guided research projects with graduate students in Miocene diatoms of the Monterey Formation of CA, and fossil cold seep assemblages in the Franciscan Complex. Lisa completed her BS in Geology at SF State and PhD in Earth Sciences at UCSC, and worked with the USGS in Menlo Park during 1988-1995.

Update on EPS Development by Andy Fisher

More of the same, only different

The Earth and Planetary Sciences Department, like much of the rest of UCSC, has been slowly moving over the last year towards "more normal" conditions for teaching, research, and other activities. I used quotes in that last sentence because much of what we think of as normal now has shifted, and some parts of our professional and personal lives are not going back to what they were before 2020. Yes, classes, labs and sections in EPS are mostly being held in person, and some folks are traveling to conduct field work, collaborate with colleagues, or attend meetings. But there continues to be a mix of activities online and in person (why travel for two days to give a single seminar or to review proposals?), and we are growing used to delays, cancellations, and just being flexible with expectations.



Some of what we learned to do during the peak of the COVID epidemic remains useful (virtual office hours along with being available to meet in person, answering questions about assignments over Slack as well as in class), and there can be higher turnout for a Zoom meeting than for a meeting in person. Unfortunately, these modest benefits are often offset by reduced connection with students and colleagues, delays in acquiring supplies and equipment (see "supply chain"), and pervasive ennui. Plus there is inflation – maybe you have heard about this? We got used to low inflation, but suddenly many essential goods (from gasoline for vans, to batteries for data loggers, to chips for computers, to chemical reagents for laboratory analyses) have gotten significantly more expensive and, in some cases, are out of stock or no longer available. This too shall pass, but for now, it adds another level of disruption to already-disrupted lives. Students are especially impacted by these challenges. Those of us managing careers for the longer term can look ahead with confidence that conditions will improve – but for UC Santa Cruz students, their window of opportunity is limited.

Where does the money go?

Thanks to generous and thoughtful gifts from members and friends of the EPS community, endowed funds continue to grow and generate benefits. Having funds endowed is especially important because this means we can support undergraduate and graduate student success now, while retaining capital that will help to

generate new resources going forward. Over the long term, we anticipate that these and other EPS funds will support fellowships and scholarships. Multiple endowed funds currently support smaller awards, often in the range of \$1,000 to \$3,000/year.

Here is a brief summary of spending categories for selected funds over the last few years (U = undergraduate, G = graduate):

- J. Casey Moore Fund (G): meeting and research travel, software, computers, lab and field supplies.
- Zehn and Ren Wu Fund (G): computers, conference travel, field supplies, student summer salary.
- Earth's Environment Fund (U,G): travel for conferences and collaboration, lab analyses.
- Eli Silver Opportunity Fund (U,G): travel for conferences, lab analyses.
- Support for Undergraduate Research in Geology and Environmental Science (SURGES) Fund (U): lab and field expenses.
- Gary Griggs Fund (U,G): field and lab expenses.

It is hard to overstate how impactful these awards have been for their recipients, especially during the pandemic. Although many EPS faculty and researchers have been successful in recent years in securing external grant and contract support, we often engage more students in research than were included in the proposals that generated primary funding. Funding in some EPS disciplines remains both limited and highly competitive, and in many cases, funding entities limit or prohibit budgeting for conference travel, computers, and other categories that are especially

Update on EPS Development by Andy Fisher - continued

important to students. These categories are essential for professional development, education, and the successful conduct of research. Being funded with a modest research award is a motivating achievement and affirmation for students who have dedicated considerable time and energy to answering important research questions and/or are exploring STEM careers. These awards help students to demonstrate intellectual excellence, and provide valuable experience in writing proposals, budgeting, and general project management.

Of course, EPS students also benefit from the Gerald Weber and Susan Holt Fund, which supports undergraduates who attend summer field camp, and the Aaron and Elizabeth Waters Graduate Student Award, presented to one to three graduate students each year on the basis of excellence in their qualifying exam proposals. This is an ecosystem of student support that continues to evolve, with existing funds growing and new funds being added (see elsewhere in this newsletter), helping to enhance student experiences and promote success based on one foundational idea: our students deserve every opportunity they have earned.

As you likely know, many students in EPS (as at UC Santa Cruz in general) continue to grapple with rapidly escalating costs for housing, food, and transportation. We believe in our students and want to make opportunities available to all of them. Please consider contributing to one or more EPS funds that align with your priorities. Existing resources are modest, so your contribution of any size will make a difference (<https://eps.ucsc.edu/support-us/index.html>).

EPS Network Activities – EPS Reunion in Fall 2023!

We are planning for an EPS network event in Chicago in association with the Fall AGU meeting, 12/13 at Kroll's South Loop – if you will be attending AGU or are in the area, please consider adding this event to your calendar (and RSVP at tinyurl.com/epsagu2022 so we can be ready). We also plan to have a virtual meeting of the EPS Advisory Council (EPS-AC) in Spring 2023 and are looking ahead to an EPS Reunion at UCSC in Fall 2023, soon after the start of the next

academic year, likely the weekend of 6-8 October 2023. This will be the first major in-person event since the last EPS reunion in Spring 2015 – that was a fun weekend, and we hope that you will consider joining us and your friends in 2023. The novelty of virtual social events has worn thin and we are not currently planning to hold more of these, but an online teleconference with the EPS-AC in Spring 2023 should be helpful for strategizing and planning. We will have an additional in-person meeting with the EPS-AC at the start of the reunion.

Your EPS-AC co-chairs, Peter Vrolijk and Stefano Mazzoni, welcome suggestions regarding networking and development, regional events/activities, nominations for the EPS Hall of Fame, and other topics – please reach out to them: stefano00038@yahoo.com and pvrolijk17@gmail.com. Please be safe, take care of each other, and stay in touch.



(afisher@ucsc.edu)



Tim and Diana Lawton Establish an Earth Sciences Endowment

Tim Lawton (Earth Sciences B.A. in 1973) and his wife, Diana, have recently established the Tim and Diana Lawton Endowed Fund for Earth and Planetary Sciences. The annual interest generated by their gift can be used to support initiatives, special projects, or areas that require urgent support. This may include a variety of research, educational or alumni development needs.

While at UC Santa Cruz, Tim double-majored in Earth Sciences and Environmental Studies and received his BA in 1973. In particular, he acknowledges and appreciates faculty members who served as mentors and role models. He went on to earn an M.S. degree in geology at Stanford University in 1980 and then a Ph.D. in geology at the University of Arizona in 1983.

Tim initially worked as a sedimentologist at Sohio Petroleum from 1983 to 1986 and then joined the faculty of the geology department at New Mexico State University where he spent the next 26 years. He then moved to the Universidad Nacional de Mexico, Queretaro, Mexico, where he served on the faculty from 2012-2017. Most recently, Tim has been working as a Research Scientist at the Bureau of Economic Geology at the University of Texas at Austin from 2018 to the present.

Tim and Diana both strongly believe in the importance of higher education to a successful and fulfilling life. They met at New Mexico State University, where Tim was working as a professor of geology and Diana was completing her Bachelor of Science degree in education. Diana spent most of her career as a math and science teacher. As educators, their lives were greatly impacted by their access to higher education.

This award is a fitting tribute to honor the valuable education and ongoing mentorship he received during his time here. With this fund, Tim and Diana aim to support the Earth and Planetary Sciences Department with any needs it has.



Tim and Diana Lawton on Shark Bay in Western Australia



**Earth and Planetary Sciences Department
University of California, Santa Cruz**

1156 High Street
E&MS Building, Room A232
Santa Cruz, CA 95064
<http://eps.ucsc.edu>

Ways to Give to the Earth and Planetary Sciences Department at UCSC

Your contribution helps to build endowments that have enduring benefits for future generations of EPS students, and provide much-needed immediate support for teaching, research and service.

On the next page we describe current high-priority EPS development goals.

(1) Please Give Online

Please visit the EPS web site for information on current funds/endowments and EPS Department priorities: <http://eps.ucsc.edu/support-us/>

We recently updated this part of the EPS website. You can read about current development priorities, and after choosing the fund/endowment of your interest, you will be transferred directly to a page where you can enter the amount of your gift and credit card information.

This is the easiest way to support the EPS Department!

(2) Please Give by Check or Credit Card

Please use the form on the next page to prepare your donation. We list a variety of EPS development options; more information for each of these can be found at the website above.

(3) Please Call or Email for Information

We are glad to discuss your interest in supporting EPS at UCSC, and to provide information that may be helpful in directing your contribution to be consistent with your goals.

Please contact:

- Andy Fisher (EPS Development Coordinator): 831-459-5598, afisher@ucsc.edu
- Matthew Clapham (Department Chair): 831-459-4644, mclapham@ucsc.edu
- Lisa Stipanovitch (Department Manager): 831-459-4478, lms@ucsc.edu

(4) Please check with your employer to see if they will match your donation!

Please mail to: UC Santa Cruz, MS: PBSci Development, 1156 High St., Santa Cruz CA 95064

Donor Name(s): _____

Address: _____

Email: _____ Telephone: _____

Gift amount: \$ _____ Gift designation: _____

Please attach a check payable to the UC Santa Cruz Foundation (with fund/endowment designation written under "Memo"), or enter credit card information:

Credit Card Type: Visa ☐ MC ☐ Discover ☐ AmEx ☐

Credit Card #: _____ Expiration Date (Mo/Yr): _____

Name on Card: _____ Signature: _____

My company will match my gift (company name): _____

EPS Development Options (updated Spring 2020):

☐ **J. Casey Moore Fund**

The Casey Moore Fund supports current EPS graduate students as they conduct thesis-related research. *We are close to offering fellowships using interest from this endowment!*

☐ **Zhen and Ren Wu Memorial Award Fund**

The Wu Fund supports EPS graduate students in geophysics as they conduct thesis-related research, with an emphasis on students seeking careers in exploration industries.

☐ **Earth's Environment Fund**

The Earth's Environment Fund supports EPS graduate and undergraduate students conducting research involving water resources, climate change, and Earth's landscapes and aquatic systems.

☐ **Eli Silver Earth and Planetary Science Opportunities Fund**

The Eli Silver Fund supports EPS undergraduate majors and graduate students, contributing to costs for professional development, education, and living expenses.

☐ **Gary Griggs Fund**

The Gary Griggs Fund supports research and professional development for students completing degrees in EPS and ESCI, at both graduate and undergraduate levels.

☐ **Aaron and Elizabeth Waters Fund**

The Waters Fund honors the department's founding chair and his wife, supporting excellence in graduate research with awards for thesis proposals and fellowship support.

☐ **Gerald Weber and Suzanne Holt Fund**

The Weber-Holt Fund supports EPS majors while they participate in summer field camp, an iconic experience that satisfies the "capstone course" requirement applied to all undergraduates at the University of California.

☐ **Support for Undergraduate Research in Geological and Environmental Sciences Fund**

The SURGES Fund supports undergraduate students as they complete research projects, giving students a chance to consider career and graduate school options.

☐ **Holly Day Barnett Fund**

The Holly Day Barnett Fund supports an annual award to an outstanding EPS major with interests in Environmental Earth Sciences.

☐ **EPS Achievement Fund**

This unrestricted endowment generates interest that supports immediate EPS research, education, and development needs, directed flexibly as needed on short notice.

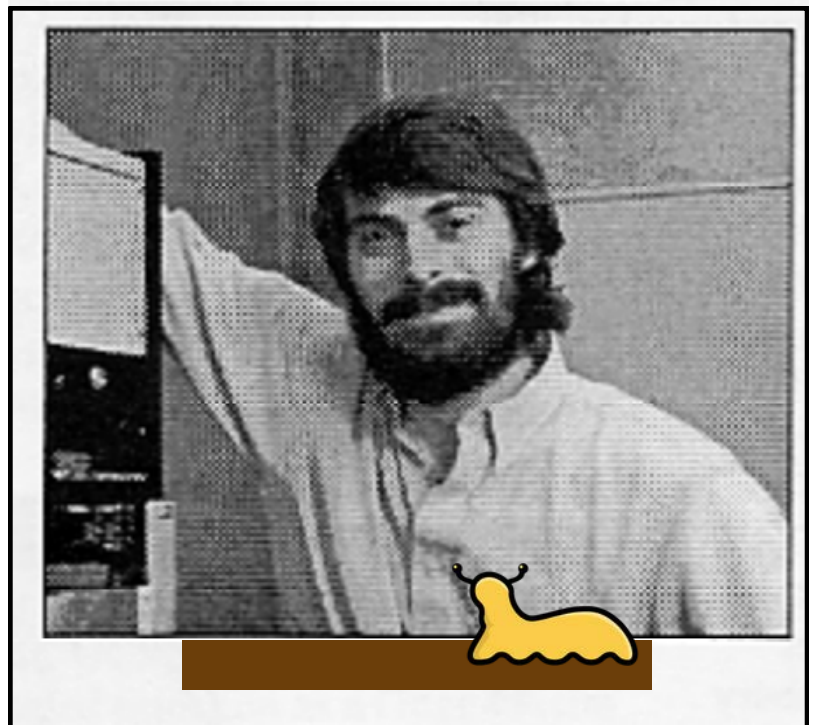
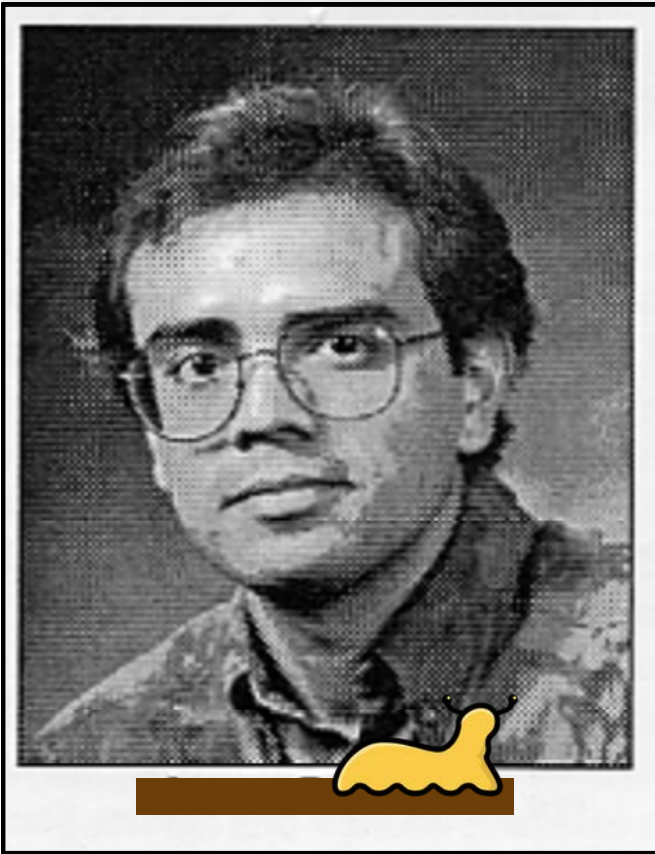
Please see <http://eps.ucsc.edu/support-us> for more development options

Please mail to: UC Santa Cruz, MS: PBSi Development, 1156 High St., Santa Cruz CA 95064

WHO'S THAT PROFESSOR?

From the 1994 EPS Newsletter:

NEW FACULTY




Alumni: The artist of this design is also "lost." We could use your assistance in locating "M.C. Jackson."

Top row: James Zachos and Susan Schwartz
Bottom: Quentin Williams

WHO'S THAT PROFESSOR?

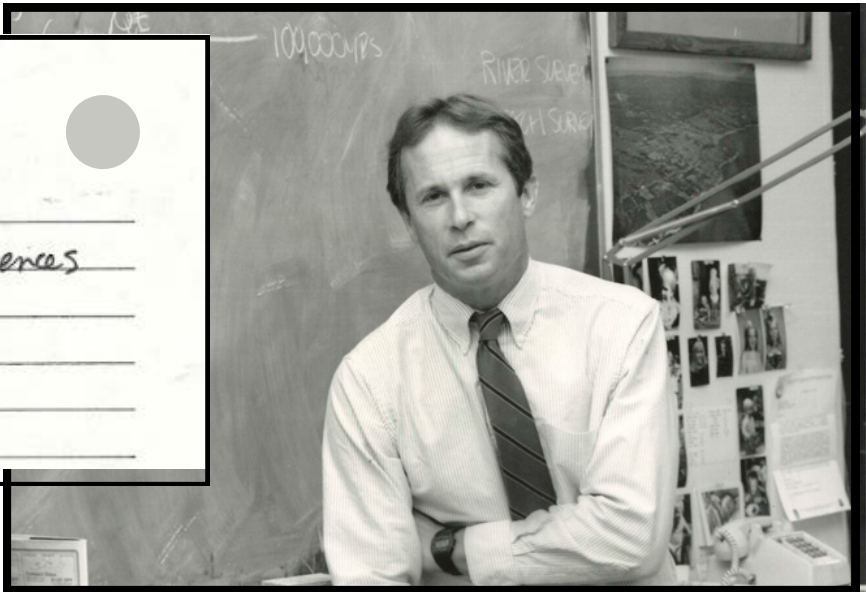
UCSC PUBLICATIONS PHOTO FILE

File under: _____

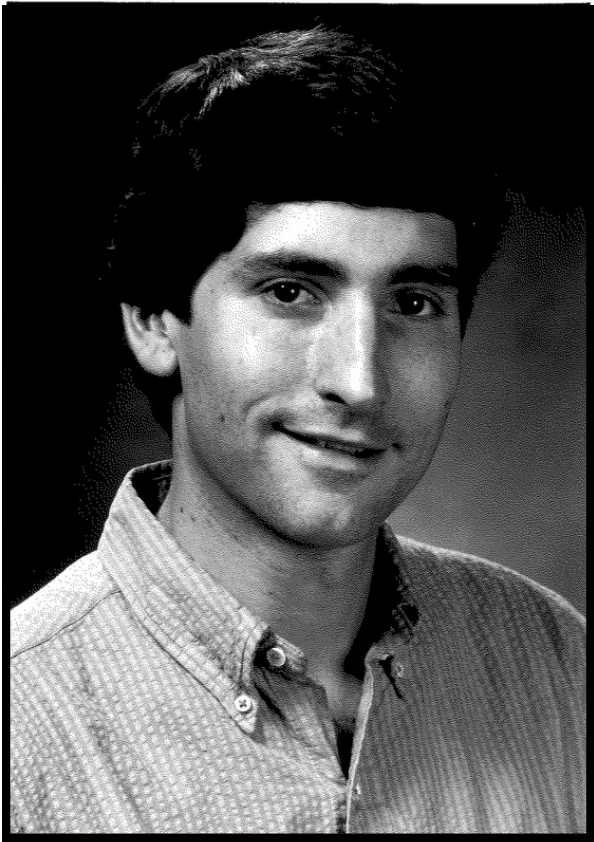
Description:  Earth Sciences

Photographer: Don Fukuda

Date shot: 6-7-89




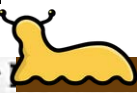

From the 1994 EPS Newsletter:



From the 1989 EPS Newsletter:



 research focuses on hydrogeologic characterization in a variety of environments, including shallow continental bedrock, accretionary complexes, and ridge-crest and ridge-flank hydrothermal systems on the sea floor. His work includes field, laboratory, analytical and numerical studies of fluid flow and coupled heat and fluid flow.

Also during this past year, faculty member  is the recipient of a prestigious Alfred P. Sloan Foundation Research Fellowship, an award given to outstanding and promising young scientists in the U.S. and Canada. One of twelve women to receive Sloan Fellowships this year,  plans to use her \$25, 000 fellowship partly to purchase new laboratory equipment but mostly to provide support for graduate students who will assist her experimental work aimed at deciphering the composition of the earth's deep interior.

Top: Gary Griggs,
Bottom: Andrew Fisher, Elise Knittle

WHO'S THAT PROFESSOR?

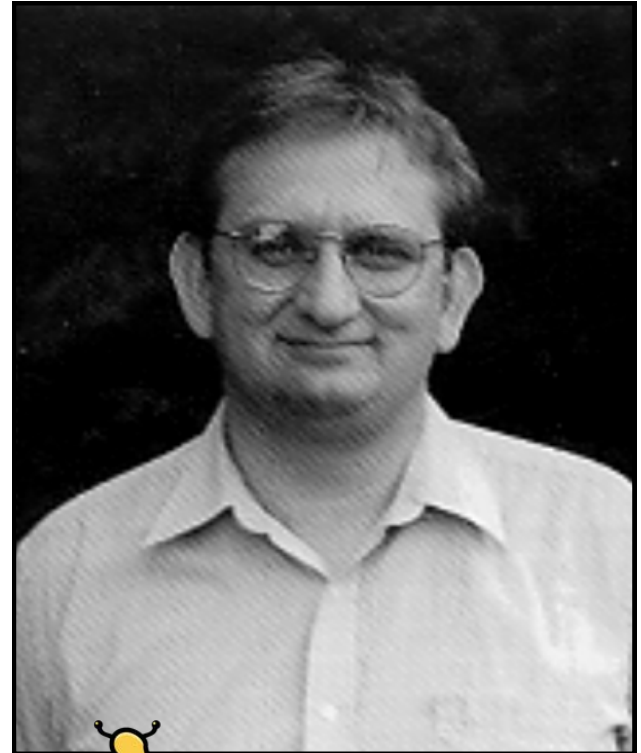
From the 2001 EPS Newsletter:

NEW FACULTY



is Earth Sciences's newest faculty member. He received his M.S. and Ph.D. at the California Institute of Technology. research is essentially focused on understanding what the atmosphere is made of, how it's changing, what processes are important in transforming it, and what effects will result from these changes. His primary research interest is in the interaction between aerosols (atmospheric particles) and climate, more specifically the interactions between aerosols and clouds, precipitation, radiation, atmospheric chemistry, and human and ecosystem health. His approach is mainly experi-

Patrick Chuang



joined the Earth Sciences faculty as assistant professor in 2000. received his Ph.D. in Geology from the California Institute of Technology with a research focus on glaciology and glacial geology, geomorphology, and soil mechanics. At UCSC

he focuses his research on ice sheets and glaciers as dynamic features interacting with geologic, hydrologic, and climatic processes on different timescales. Much of his glaciological work is based on recent behavior of the West Antarctic ice sheet. One of the important current goals of his research is to test the idea that this marine ice sheet may collapse and contribute significantly to ongoing global sea level rise. To test this, he

Slawek Tulacz

ALUMNI UPDATES

✿ 1970S ✿

Gary Holzhausen, B.S. Geology, 1971

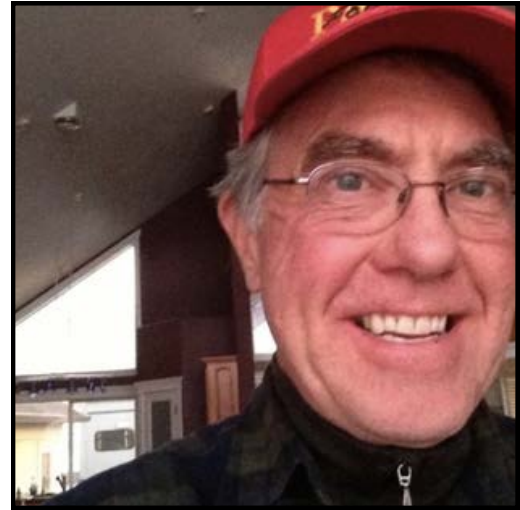
As a freshman in the spring of 1968 I took Aaron Waters' Geology 1 course to satisfy my curiosity about the natural world. I was immediately hooked and Aaron, who was busily building the Geology Department from scratch, asked me to be his field assistant while he studied tuff rings and maar volcanoes in Oregon and Washington that summer. He was training the early NASA astronauts to recognize volcanic features on the moon, and if volcanoes of this type were discovered, it would indicate the presence of water at the lunar surface! That summer was a wonderful adventure and the following year I became one of the first two or three geology majors at UCSC, graduating in 1971 along with Sue Levy.

Graduate studies at Stanford followed, where somehow I convinced the faculty that I merited M.S. and Ph.D. degrees in engineering geology and rock mechanics. I had summer jobs with oil and mining companies along the way. Every job was filled with excitement and new discoveries about this fascinating and unbounded field we call earth sciences. Graduate school provided the discipline and focus to undertake difficult research subjects and pursue them to completion.

After a few years of working for others, in 1982 I started a company right here in Santa Cruz, called Applied Geomechanics. For several years we ran specialized geophysical surveys to monitor and map large hydraulic fractures (fracs) in oil and gas wells. Most of our work was in the Bakersfield area, Texas and Louisiana. One of our main tools was a very high-precision tiltmeter, capable of measuring movements of the earth's surface as small as a few nanoradians. After several years the company changed course and made manufacturing of tiltmeters its primary business. In 2007 I sold Applied Geomechanics to an oil field services company based in Houston. By that time we had supplied many thousands of tiltmeters to customers in fields ranging from volcanology to experimental physics to astronomy, aerospace, civil engineering, medical devices and underwater navigation.

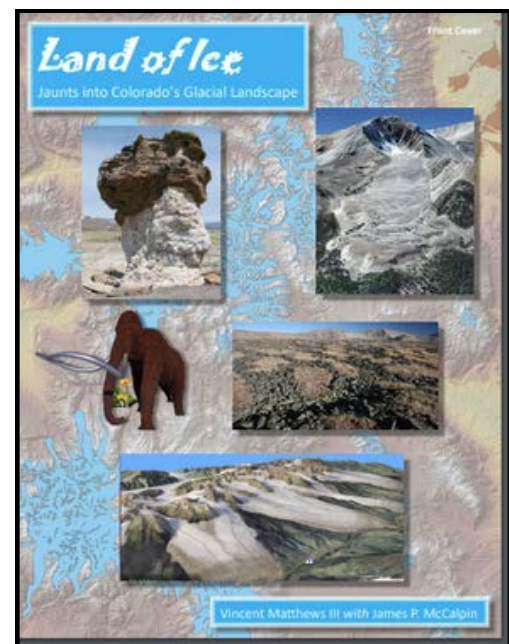
Now that I am retired I spend my time drawing closer to God, and I still spend as much time as possible in the field - hunting, fishing and observing nature. But I remember fondly my days as an undergraduate at UCSC and the beginnings of a fabulous life and career.

Gary Holzhausen



Vince Matthews, Ph.D. 1973,

At the age of 80, I am back in the classroom teaching "Earth Resources and Sustainability" for the Geology and Environmental Science Department at the University of Wisconsin-Eau Claire, where I have served on their Advisory Committee for the past five years. Two years ago, I also joined the Advisory Committee for the University of Georgia's Geology Department (B.S. 1965, M.S. 1967). I'm currently working on an exciting project on the rotational rifting of the Colorado Plateau Microplate which grew out of a Nature article I wrote that was published the year I graduated from UCSC. My book, *Land of Ice: Jaunts into Colorado's Glacial Landscape* is being published by the Colorado Geological Survey.



Vince Matthews' book, *Land of Ice: Jaunts into Colorado's Glacial Landscape*

ALUMNI UPDATES

1970S



Dr. Wes Myers

Wes Myers (aka Carl Weston Myers), Ph.D. 1973

After graduating from UCSC in 1973, I ricocheted around the U.S. for a few years doing various academic and research jobs before coming to rest at the Los Alamos National Laboratory in northern New Mexico. I worked at LANL for nearly twenty-five years, eleven as leader of the Earth and Environmental Science Division, before retiring in 2005. The LANL work was a fascinating and evolving multidisciplinary mix of projects and programs, most related in one form or another to LANL's national security mission. Since retirement, I've involved myself in two activities: advocating for greater use of underground space for siting critical infrastructure facilities, such as nuclear power plants, and with my wife, Gayla, spending several months each year back at our second home in the Blue Ridge of north Georgia to be closer to kids and grandkids, and to prowl around the roots of the southern Appalachians. UCSC was a great experience: excellent faculty, courses, and fellow grad students, and---of course--- great field trips.

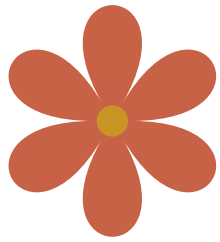
Coastal geology, the San Andreas, volcanic terrains, spending one summer as TA for geology field camp, and the experience of coastal California culture in the early 1970s all stand out.

Allan Krill, B.S. 1976

I got my BSc at UCSC in 1976, having never received a letter-grade for a course, and went on to a PhD in Norwegian geology at Yale in 1980. My American wife and I moved to Norway in January 1981 and we have 5 grown kids and 2 grandkids. We all finally got Norwegian citizenship this past year. One of my great academic interests has always been challenging accepted truths. My PhD results corrected some false beliefs concerning the age and stratigraphy of metamorphic rocks in western Norway. After that I worked 6 years at the Geological Survey of Norway, correcting other errors in Norwegian geology. That helped me to get a professorship in 1988 at the Norwegian University of Science and Technology (NTNU), with full tenure signed by the King of Norway. I love undergraduate teaching and especially field teaching. The job security here has given me the freedom to challenge many accepted truths in any field I choose. I worked on the history (and future) of place-value numbers, developing alternative number symbols (TNMRLJKFPS, which are far better than 1234567890). Then I researched and discovered some of the hidden reasons why Alfred Wegener's continental drift hypothesis was ridiculed for 40 years. I discovered that the leading American geology editor and textbook author of the 1920s understood that continental drift was more or less correct, but used dirty tricks to keep it down. (See krilldrift.com).

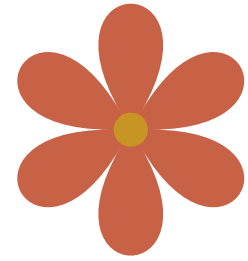


Geologist Allan Krill was hiking along the Grand Canyon National Park's Bright Angel Trail with a group of students in 2016 when he spotted prehistoric reptile footprints, where over 313 million years ago, two reptilian creatures crept over this boulder's surface.



ALUMNI UPDATES

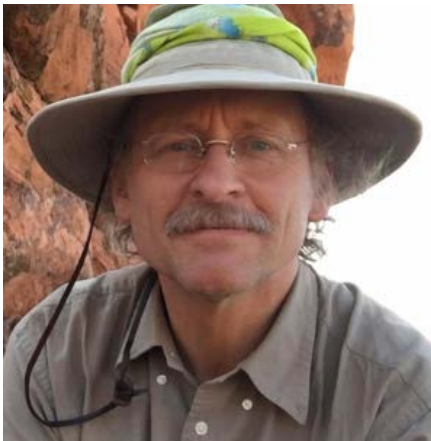
1970S



Allan Krill cont.

Now I am challenging false beliefs in the field of human evolution. (See Paleohuman.com) I am convinced that humans actually evolved from isolated chimpanzees on Bioko, a Galapagos-like island in western Africa. I expect that DNA will be needed to conclusively prove that, just as paleomagnetism was needed to conclusively prove continental drift. I have been enjoying working on that project for 5 years, and doubt I could enjoy life as much if my theory does suddenly get proven.

I have recently started a new project, challenging the age and origin of Scandinavian petroglyphs. (See VikingRockArt.com) I say those famous petroglyphs are from the Viking Age, not the Stone Age. The finely detailed petroglyphs could only have been chiseled using iron nails, not stone tools. And the motifs include Viking ships. It seems there are lots of accepted truths to question. But most professors don't have enough research security to even think some of the things I am allowed to spend my research time on. How lucky I have been — starting with four amazing years at UCSC, where my mind was opened without my brain being fried.



Allan Krill
Norwegian University of Science and Technology

Alan Howard, 1977

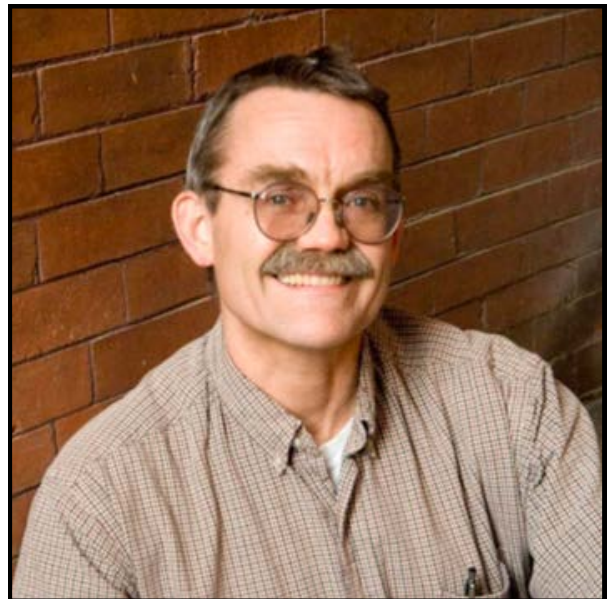
I just retired (after 45-year career as an engineering geologist).

Nick Johnson, B.A. Earth Sciences and Environmental Studies 1977, and Ph.D. Earth Sciences, 1994

After working several decades as a consultant, Nick now works for the San Francisco Public Utilities Commission as a hydrogeologist helping manage the City's first potable groundwater project since the 1930s as well as a groundwater storage and recovery project in San Mateo County.

Larry Smith, B.S. 1977

My wife Debbie and I are still living in Butte, MT, nearly 30 years in one city and home. I retired from the Geological Engineering Department at Montana Tech in January 2021, figuring I could get Medicare, I was tired of dealing with COVID-19 issues, and it was time for some new blood – although they haven't replaced me yet! I led a smallish Friends of the Pleistocene field trip to glacial Lake Missoula last fall, which was very satisfying (link to the guidebook on my Montana Tech webpage <https://www.mtech.edu/geological-engineering/faculty/larry-smith.html>). I've still got a few research irons in the fire – on glacial history in Montana and glacial Lake Missoula flood chronology. That work will dry up soon. It's time to let others carry on.



Larry Smith
Montana Technological University

ALUMNI UPDATES



Larry Smith cont.

We're still loving living in a small city with all 5 nearby mountain ranges have to offer for outdoor fun. While Debbie is busy in her pottery studio in the basement, I've gotten back into bicycling in the summers, going on 4 multi-day trips this summer and hoping for a significant trip on the Great Divide Mountain Bike Route in 2023. I've got my ski pass to our outstanding local ski area and still have 2 dogs that like to go cross country skiing in nearby areas once we get a snowpack. It is finally snowing as I write this.

Chris Metzler, B.S. 1979

I graduated from UCSC EPS with a Bachelors in 1979, worked in the oil industry as a Mud Logger for a couple of years, got my Masters and Ph.D. degrees from Scripps Institution of Oceanography (UCSD), I then worked as a Professor of Geology and Oceanography and also as Department Chair of the Physical Sciences Department at MiraCosta Community College in northern coastal San Diego County. I've been retired for 4 years now.

Curtis Obi, B.S. 1979

I should have graduated with my classmates in 1978 but needed another year to finish. Worked four years at USGS Menlo Park in Alaska and Western Regional Geology Branches. Three years at UMASS-Amherst (M.S. Geology, 1986). Two yrs at Nevada Test Site (Yucca Mtn investigations), two yrs in Newport Beach CA (enviro investigations), seven yrs at Bechtel Corp in San Francisco (geotech and enviro investigations), then last 22 yrs back at NTS (enviro, geotech, well drilling and plugging projects). Now retired in Las Vegas NV and Bozeman MT. Still landsailing, making wine, and caring for Dude and Sweet, my two desert tortoises.

Recollections? I recall an epic Spring 1978 field camp in Bishop CA and the Polleta Folds with Leo Laporte and Othmar Tobisch, and TAs Jeff Mount and Debbie Blefnik (see page 55 for pictures from this field camp). Nightly trips to Keogh hot springs and dancing at Whisky Creek bar. I remember we borrowed beat-up International Harvester Carry-Alls (think industrial-grade Chevy Suburbans) from U.C. Riverside that broke down repeatedly.

One lost ability to turn left going up a narrow mountain dirt road (to turn left, turn right and backup a bit, repeat). Mine broke a driveshaft u-joint (luckily the driveshaft didn't crash up into the passenger compartment nor pole vault the truck into the air) then lost a shock absorber, rear view mirrors, and at least one gear in the manual transmission.



Judy Parrish

Judy Parrish, B.S in Biology, M.A. in Biology, M.S in Earth Science, and Ph.D. in Earth Science, 1979

What's Judy Parrish up to?

After many years at the University of Arizona, I moved to the University of Idaho to be dean of the new College of Science. Eight years later, I "retired", but am still very active in research and service, with a project in the canyon country of southern Utah. I stayed in northern Idaho, and my husband and I have a cabin in northeastern Washington, where the fishing and kayaking are outstanding and we spend as much time as possible. I had hoped to get to the 50th reunion for Crown College, where I was an undergraduate, but intended to fly myself down in my Cessna 182; bad weather in the Bay Area (not in Idaho!) scotched those plans.

I recently was awarded the Sloss Award by the Sedimentary Geology Division of the Geological Society of America, one of the highest honors a sedimentary geologist can receive. I mention this not to brag but because the late Bob Garrison nominated me. I knew he was going to, but did not know the nomination was completed before he passed away. He did not know he was successful. I held Bob in the highest esteem and am humbled and honored that he felt the same way about me and my work.

Judy Parrish was also inducted into the EPS Department Alumni Hall of Fame in 2018.

ALUMNI UPDATES



Ken Johnson, B.S. Earth Science, 1979

This is Ken Johnson. I wrapped up my degree at UCSC in December 1978, but graduated with the June 1979 group. My update is as follows:

After a 5 year stint teaching Engineering Geology to undergrads in the Civil and Environmental Engineering department at UC Berkeley between 2004 and 2009, I took a position at a large engineering company in 2009 named Parsons Brinckerhoff. PB was purchased by my current employer WSP USA, but the nature of my work remains unchanged. I serve project teams in engineering geology and geological engineering for infrastructure projects of all kinds. I typically will lead the geotechnical discipline work on large projects such as San Francisco's soon to open Central Subway project, BART to Silicon Valley Phase II and the latest big one called Link 21 sponsored by BART and the Capital Corridor JPA rail service. In addition I have developed expertise in large landslide mitigation projects that take advantage of my knowledge of hillslope hydrology and hydrogeology developed during my PhD dissertation on rainfall induced landslides back in 1987.

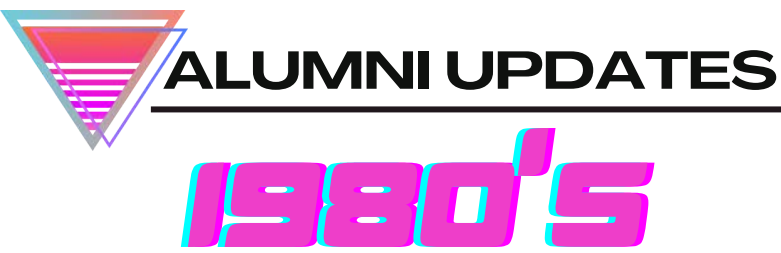
One of my favorite current projects involves the design of a new 16-mile long tunnel to transport the primary water supply for the East Bay Area beneath the seismically- and flood-challenged San Joaquin-Sacramento River Delta to create a much more resilient means of conveying the East Bay water supply.

My favorite thing about my work is actually employing all the knowledge I gained in my Earth Science B.S. degree to understand how the geology affects nearly all aspects of these major infrastructure projects. When I was teaching in university I always told the students - mostly engineering students - that if they could understand the geology of a given project clearly, that goes a long way to making sure the projects are successful in the end. If you mess up the geology you are bound to have unwanted surprises and problems!

There is never a dull moment in this work!!

Photo below is taken during the excavation of the Chinatown Station of the Central Subway Project. Completed in a melange unit of the Franciscan Complex, the station was excavated using the sequential excavation method where multiple small tunnels are excavated before combining them all into the final large cavern!





ALUMNI UPDATES

1980's

Richard Slack, B.S. Earth Science, 1980

After graduating with my bachelor's in Earth Sciences in 1980, I went to work in seismic processing in the oil and gas industry in Australia. Upon returning to the states in 1987, I completed my MS Geophysics at University of Houston. I worked at a number of oil and gas service companies before moving into CEO roles at several oil and gas software companies. I retired in 2018 in Denver, CO, and now my wife, Cathy, and I spend as much time as we can with our two grown daughters, and the rest, skiing, golfing, and travelling. I have many fond memories of my days at UCSC - the people, the professors and staff, and the campus. I only wish I could turn the clock back and do it all again - well, everything but that Mineralogy class!

Mike Veseth, class of 1980

I'm reading USGS Bulletin 612, published in 1915, which describes the geology along the route of the original transcontinental railroad. The text includes foldout maps of the geology along with stratigraphy and cross sections and a description of the local history. Using the Google Earth app, the route comes to life as a rolling field trip. There are six volumes for different routes. My favorite so far is the old Santa Fe route through New Mexico, Arizona, and southern CA. The Bulletins are available free on the USGS website, and on eBay as the original printings. Also of interest, is "Annals of the Former World" by John McPhee. It is a compilation of five field trips "in the company of geologists" crossing the continent from east to west on Hwy 80. Book 4 is like stepping back in time to my education in the late 70's at UCSC. Again, using Google Earth, you can find the outcrops and routes that they are visiting in the text. I'm still riding my bike, and just got a new 29" mountain bike and trying to stay in shape. Some paddle boarding, but not too much windsurfing any longer.

Geoff Caras, 1980

I squeaked out of graduation in 1981 (of course I was class of '80)...

After a long career as a software engineer and management of technology, then running a consulting firm for 16 years, and a couple of stints as CIO of Credit Unions - Bay Federal Credit Union and Stanford Federal Credit Union, I have landed at the Monterey Bay Aquarium, I am a charter member there and I am managing the technology operations teams.

Stephen D. Rosen, B.A. Earth Sciences, 1980

- Co-Founder / Chairman / Director / CEO of Various Companies
- Graduated BA in Earth Science from UCSC / Kresge 1980
- Graduated MS in Geology from New Mexico Institute of Mining and Technology 1987
- Organizer and Executive for Boxing at the 1984 Olympics in Los Angeles
- 30+ years in broadcast and multi-platform technology, production, content creation and content distribution
- Founder of US recognized A/V System Integration Company with major international clients
- Inventor/Patents Granted: PATENT #9,058,375 B2 / PATENT #9,726,479 B2 / PATENT #9,715,506
- Consultant to major international Broadcast and Video clients developing infrastructure, production, streaming and predictive analytics.
- Developer of multiple softwares for desktop and mobile
- K-12 educational philanthropist and educational Foundation co-founder and executive
- <https://www.linkedin.com/in/stephenrosen1/>
- <https://www.facebook.com/stephen.d.rosen>



Stephen D. Rosen

ALUMNI UPDATES

Debbie Bliefnick, Ph.D. Earth Sciences, 1980

Glad to hear that another newsletter is being put together. My update (grad student, 1980) is not terribly exciting. After a 36 year geosciences career in several countries (Norway, England, Oman, Qatar), I'm retired and living in Redmond, OR, which is a great place for weather and outdoor activities. I have 2 dogs and 2 cats. Walks with the pups (Cricket and Remy) get me out and about and keep me reasonably fit. Most of the friends I have made here have been through their pets. I also volunteer at a couple of animal shelters which is both a good and a bad thing (I want to take them all home!). I loved my time at UCSC and want to visit again (last time was about 20 years ago). Just need to make it happen!

Maya Elrick, B.S. 1981

I graduated with my BS from the Dept in 1981 and went on to get my MS and PhD in sedimentary geology and taught at the University of New Mexico for 30 years. My research focused on deep-time (pre-Quaternary) paleoceanography and geochemistry using field-based cyclostratigraphy and stable and radiogenic isotopes. I retired in 2019 and live with my partner in the foothills of Albuquerque and enjoy hiking, running, yoga, horseback riding, and am volunteering with our local homeless shelter and tutoring elementary school kids. Several times a year, I visit my 91 year-old mother who lives in Santa Cruz and we love walking in the redwoods of UCSC campus. My rather random stumble into the Earth Sciences at UCSC was the best decision I ever made-- thanks for the great start in exploring and appreciating our planet!

Ray Wells, Ph.D. Geology, 1982

I'm still working half time for the USGS on a seismic hazard study of a Bureau of Reclamation dam west of Portland, Oregon and on geologic mapping the the Columbia River Gorge. At the GSA annual meeting in Denver, I will be receiving the George P. Woollard Award from the Geophysics and Geodynamics Section for the application of geophysics to geologic problems. I'm grateful to Rob Coe, Eli Silver, Rob McCaffrey and EPS for the tools and collaborative efforts that provided a foundation for the award. Meanwhile, Sally and I are enjoying our garden here in Portland. We are going to have lots of tomato sauce.



1980'S



USGS geologist Ray Wells (on Bainbridge Island where researchers have cut away a Seattle fault offshoot).

Linda Angeloni, B.S. 1982

Dear Slugs,

After family, kids, and mid-lives, I now work at the University of Illinois in the Helium Analysis Laboratory (H.A.L.). Working with Willy Guenther, I manage the lab where we use thermochronology, specifically the (U-Th)/He system, to date zircons and apatites. <https://geology.illinois.edu/helium-analysis-lab>



Linda Angeloni

ALUMNI UPDATES

1980's



Janis (Minor) Stokes, B.A. 1980s

Following graduation, I worked for the USGS in their Water Resources Division for 1 year. I, then, had an epiphany that I could have a positive impact on the environment if I became a teacher. Ha! Fifteen years later, I became a mom of 2 daughters. The best “job” ever! I now work in the field of career services for a company that I am part owner of. I live in NH and am an AMC hike leader. Just back from Nepal and picked up a great rock for my collection. Rohatyn15@gmail.com

Chris Obert, B.S. 1982

Nothing has really changed, see last year’s newsletter. Covid is still out there, and I am overly cautious. Jeff, one of my geology buddies who had a Sunday radio show on KZSC has retired from his show. He still wants me to drop by his winery. So much to do, so little time. I have started attending most of the Saturday morning cars and coffee events at the old Capitola mall. I show up just after 8, and leave after 9. I also attend a lot of the DWA cars and coffee events on the last Sunday of each month at the old Wrigley's factory parking lot on the west side. I'll be the old long haired guy in the classic Fiat.

I still plan on going back to Iceland. I saw UCSC was sponsoring a trip there, but it's financially beyond me.

Michael Ort, B.S. Earth Science, 1984

After finishing at UCSC and working for the USGS in Menlo Park, I did my PhD at UCSB in volcanology. I was a professor at Northern Arizona University for thirty years or so and retired from there in 2021. Since then, I continue to work on research in the Campi Flegrei in Italy, the distributed volcanism of North America, and on a probabilistic volcanic hazards assessment of Idaho National Laboratory, where the US does nuclear energy research in an active volcanic field. Retirement has simply meant being able to choose to do the things I enjoy, many of which are volcanic. I also get to backpack and bike tour a lot more.



Michael Ort

Parke Snively, PhD Earth Sciences, 1984

Claire and I were saddened by the loss of Bob Garrison last Fall. He was such a lovely man, a patient teacher and mentor, and an intrepid field partner in the Western Desert of Egypt. We will miss him. On a personal note, after retiring from ExxonMobil in 2017 I kept busy with consulting work and teaching overseas. But, when the Pandemic put the kibosh on work requiring international travel, it allowed me to re-focus my time and energy toward the domestic front – mostly home renovation and landscaping projects.

As things have opened back up, I've run the occasional field trip for friends and colleagues who may be less familiar with the natural wonders of the western US; the latest being “Vino and Volcanoes” in southern Oregon and northern California.

ALUMNI UPDATES

1980'S

Parke Snavelly cont.

The family remains well. Claire continues to work for an environmental consulting firm in Houston and Rachel has launched a successful career with the EPA in Dallas. And, after 2 years of rescheduling owing to Covid restrictions, Allison was finally married this September and still lives and works in Colorado. I continue to work with the GSA Foundation to steward the scholarship named for my father, the Parke D Snavelly, Jr. Cascadia Research Award. Since 2004, this award has annually supported field-oriented graduate student research that contributes to the understanding of geology of the Pacific Northwest convergent margin.

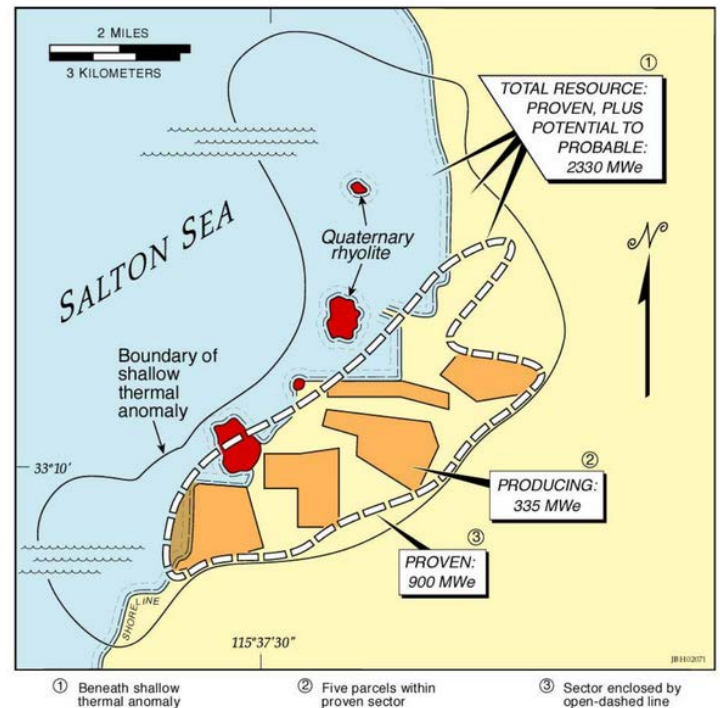
Edwin A. Romanowicz, B.S. in Earth Science (Geophysics) and B.A. in Mathematics, 1985

I graduated from UCSC in 1985. I went to graduate school in geology at Syracuse University. I completed both my MS and PhD degrees at Syracuse. I taught for one year as a visiting assistant professor at Colby College in Maine. I then went to Duke University as a research faculty studying changes in the hydrology in Everglades and how those changes affect the ecology. Since 1999 I have been at the State University of New York at Plattsburgh (just south of the Canadian border, near Montreal) in the Center for Earth and Environmental Science. I teach courses in hydrology, hydrogeology and structural geology. Since 2014 I have been the director of the center. I still maintain a very active research program focusing on borehole geophysics. Over the past several years I have been working with the Vermont Geological Survey studying the transport and distribution of PFOA in groundwater at several locations in Vermont. As for interesting recollections, I took structural geology from Othmar Tobisch. On one of the day long field trips, traveling in several different vehicles, the vehicle I was in got separated from others. We had a field trip guide, so we continued the field trip on our own. We assumed that Othmar would wait for us at the next stop. We kept missing him.

We completed the trip on our own, returning to campus at night. When we got to the main entrance on High Street, there was Othmar waiting for us, and happy to see we returned safely. I don't remember why Othmar didn't wait for us at one of the field trip stops. In closing, my experience and education at UCSC has served me well. I am very proud to have graduated from UCSC.

William Osborn, B.S. Geology, 1985

I'm a BSc Geology grad from UCSC in 1985 and MSc from UCR in 1988. Having been involved in the U.S. and global geothermal industry for the past 35 years, I recently joined Controlled Thermal Resources (CTR) as General Manager. CTR is developing the Hell's Kitchen Project at one of the world's largest geothermal energy and dissolved lithium resources at the Salton Sea Geothermal Field in Imperial County, California. The first stage of development, set to start construction in 2023, will produce 50 MW of renewable electric power and up to 25,000 metric tons per year of battery-grade lithium hydroxide monohydrate for use in electric vehicle manufacturing. It's an exciting time for the Salton Sea Geothermal Field and the State of California!



Map showing estimated ultimate conventional resource potential for the Salton Sea geothermal field as of July 2002.

Judi Radloff, B.S. Earth Sciences, 1986 (Crown)

After UCSC graduation I helped Al Bol and Peter Haeussler do field work in Prince William Sound, Alaska and then moved to Vancouver, Canada, earning a master's in geology at UBC with a structural geology thesis. After a year mapping rocks and structures amongst the brown bears and dahl sheep of Yukon Territory, I resettled in Seattle WA, eventually marrying my longtime banana slug partner Dean Wilson (Crown 1984). I pursued a colorful career in geologic consulting and we raised 2 kids who are now (mostly) launched. In consulting I worked in mineral exploration (briefly), environmental soil and groundwater investigations and cleanup (dug up and reclaimed an entire landfill!), geologic hazards and now am living the dream as an engineering geologist and fluvial geomorphologist working on flood risk reduction and river restoration projects in beautiful King County WA (we are hiring!). I love to do volunteer work in urban forest restoration and am serving on the board of River Restoration Northwest, a regional nonprofit scientific and educational organization that puts on the best annual symposium I have ever attended. (Gary Griggs, keynote speaker February 2024??) I have many, many favorite moments of my time at UCSC: field camp mapping the Poleta fold belt, Othmar Tobisch's thin section art work in the halls, ice cream at BJs, jogging amongst the campus redwood trees, playing ultimate frisbee and flying down the bike trails on my commute home from school!



Judy Radloff and the current board of directors of the River Restoration Northwest.

ALUMNI UPDATES**1980's**

Mark Reagan

Mark Reagan, Ph.D. Geology, 1987

After 35 years, I retired from teaching at the University of Iowa, where I am now Professor Emeritus. Guidance from Jim Gill and the great overall education I received from the small but stellar faculty in Earth Science at that time (particularly Jim, Ken Cameron, Karen McNally, Rob Coe, Casey Moore, & Eli Silver) and through myriad discussions with my fellow graduate students (particularly Chris Nye, Ross Williams, Tom Bullen, Mike Sawlan, Eduardo Malavassi, Debbie Schwartz, Dan Sampson, Pat Kelleher, Fred Hochstaedter, Liz Widom, & Mike Clynne) provided an ideal background for establishing my career at Iowa. I am still conducting research part time and plan to participate in one last research expedition in 2023: IODP Expedition 399, Building Blocks of Life, Atlantis Massif.

ALUMNI UPDATES



Jonathan Stock, B.S. Earth Science, 1992

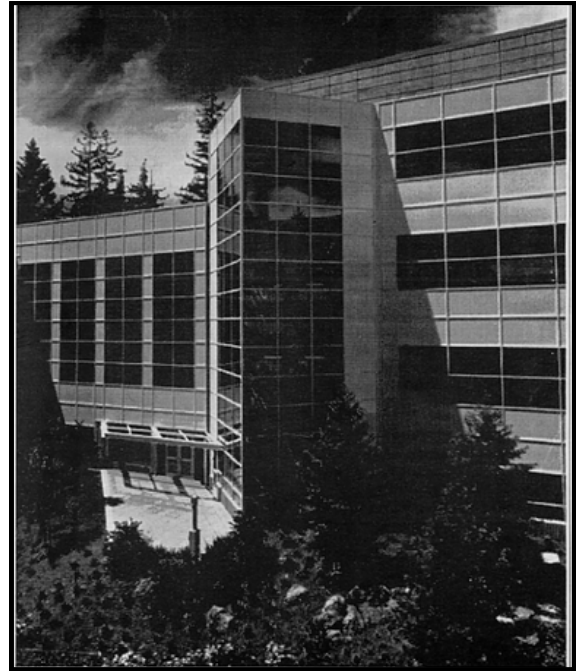
Dr. Jonathan Stock founded and runs the U.S. Geological Survey's National Innovation Center (NIC). The Center's goal is to identify national scientific challenges, and to pursue them with technology partners using scarce federal dollars to best serve the public. NIC partners with industry, non-governmental organizations, other Federal Agencies and academia to improve the Nation's ability to map, monitor and forecast its resources and hazards. Stock holds degrees from University of California, Santa Cruz, University of Washington, and University of California, Berkeley. The Center is located at the U.S. Geological Survey in Moffett Field, California, USA.



Jonathan Stock

Cliff Gill, M.S. Geology, 1992

After finishing my geology MS, I ended up working as a pilot in Alaska, great use of all that geology education! But I eventually ended up starting my own little company doing Aerial Mapping, with some photogrammetry, lidar, thermal, and hyperspectral work, so it was actually useful. I also worked a bit with Jessica on Okmok volcano in Alaska providing flight support for a volcanology project. I live seasonally in Alaska in the summers and Kansas City area in the winter. 2 kids and a wife as well. I miss living out of my VW bus for the summer helping teach field camp.



Airborne Scientific Inc.

Aerial Photography, Remote Sensing, and Flight Support

Cliff Gill's company, Airborne Scientific Inc.

Ryan Seelbach, BA Earth Sciences, MS Earth Sciences 1993

Here is a brief summary of my story since leaving UCSC:

- I have a BA and MS (1993) from the UCSC Earth Sciences Dept with Gary Griggs as my Advisor.
- I moved to Ocean Beach in San Francisco (1994-2020) and worked for the Presidio Trust (a Federal Agency managing the land in the Presidio) in their Environmental Remediation Dept and then as a Geologist for Geosyntec Consultants.
- In addition to work, I developed a huge passion for big wave surfing and traveled all over the world chasing giant waves in remote places. I was invited to compete in the Mavericks surf contest for nearly 20 years in addition to some other big wave contests in Hawaii and Mexico.
- I now live in Half Moon Bay and still work as an environmental consultant at ETIC.

Ryan Seelbach cont.

- I still enjoy teaching and presenting coastal geology lessons to share some of the joys of our beautiful and dynamic shoreline to students and other scientists. Gary instilled a certain level of joy and desire to share knowledge as Gary had done for me in college.
- Oh, and I forgot to mention that I was on the Board of Directors for Save the Waves Coalition for 10 years.



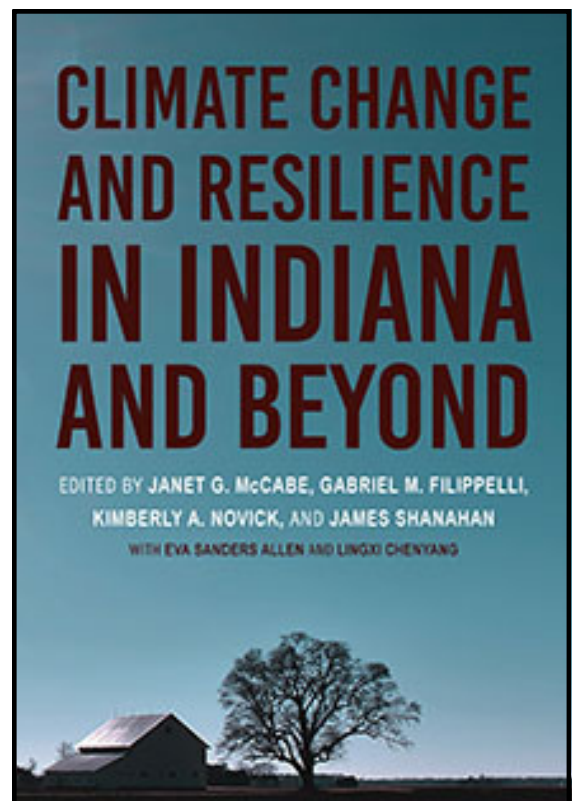
Ryan Seelbach

Gabriel Filippelli (PhD Earth Sciences, 1994)

I started a position as the Executive Director of the Indiana University Environmental Resilience Institute (www.eri.iu.edu) in April 2021. The Institute focuses on research-informed, equitable, and community-forward solutions to the myriad environmental challenges that climate change causes, and has research support spanning traditional NSF grants to family foundations. In a classic case of poor timing, I was also awarded a Fulbright Distinguished Chair in Australia starting about seven months after assuming the position. But, as always, the seat of my pants approach worked out, and managed that while spending an extremely productive five months Down Under (accompanied by my long-suffering wife Sally from UCSC days), doing research on environmental contamination and human health, and undertaking several national speaking tours around Australia.

ALUMNI UPDATES

I managed to finish my COVID-delayed book while there, and it will soon be available as an overpriced textbook called *Climate Change and Resilience in Indiana and Beyond* should any prof out there feel compelled to torture their students with it.



Gabe Filippelli's book.

Stuart Gilder, 1994

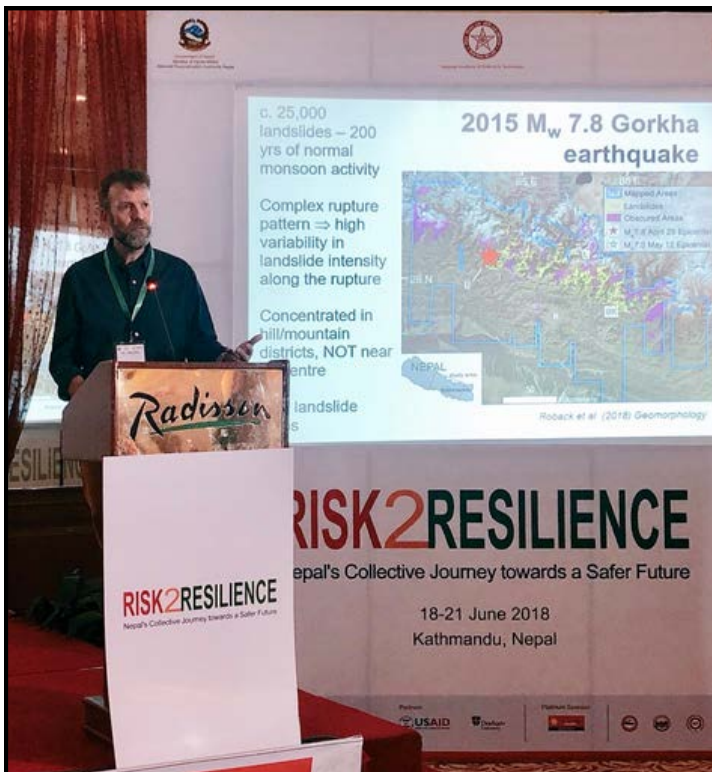
I left UCSC in 1994 for a one-year post doc at IPGP (Paris). That turned into a permanent job until 2006 when I joined the faculty at the University of Munich. I am now happily drinking Bavarian beer and travelling the world drilling rocks for paleomagnetic studies. Besides almost burning down Rob Coe's lab, my fondest memories were trying to enter any lab or office at any time of the day—especially after 10 pm when Jonathan Glen and I were breaking diamonds in Elise Knittle's lab. The "open-door" policy at Santa Cruz made my career- many thanks!

ALUMNI UPDATES



Alex Densmore, Earth Science PhD, 1997

(PhD 1997) married Melissa Swartz (BSc 1993) in 1997 and we lived and worked for a number of years in Ireland and Switzerland before settling in the UK in 2006. I'm a professor in the Department of Geography at Durham University, while Melissa works in the Future Funding team at the Environment Agency. Our time at UCSC coincided with the move to the 'new' Earth and Marine Sciences building, which was a revelation compared to being stuck on the ground floor of Applied Sciences.



Professor Alex Densmore at the 2018 Risk2Resilience conference in Kathmandu, Nepal. His keynote address stressed the need to have a relationship & trust established between scientists & users of hazard information to better understand the earthquake-triggered landslides.

Joshua Caulkins, B.S. Earth Sciences, 1998

Joshua Caulkins (grad 1998) started a new position in January 2021 as the Director of the Center for Teaching & Learning Excellence at Embry-Riddle Aeronautical University in Prescott, Arizona. In his new position Josh supports all faculty and teaching staff at the institution, and was awarded the Staff Person of the Year for the 2021-2022 academic year. He previously supported teaching and learning initiatives at Arizona State University, the University of Rhode Island, and the University of British Columbia, Vancouver, Canada. Josh is loving life with his family in Northern Arizona, enjoying the landscape, sunny weather, fabulous geology, and now two, rescued mini-donkeys. Kiko and Dusty are now happily grazing the acre lot, keeping the grass down and rolling in the dirt. Please swing by to feed the donkeys if you are driving near Prescott, AZ!



Joshua Caulkins' donkeys.



Philip H. Stauffer, Ph.D. Earth Sciences, 1999

I have been living in the mountains above Los Alamos since I finished my PhD in 1999. My wife, three boys, and three dogs love hiking on the trails around our house. My work involves flow and transport of gas through porous media. I continue to mentor students with Andy Fisher and just signed off on Adam Price's dissertation. Another one of my students, John Ortiz, is working on his PhD at Johns Hopkins and we recently published a GRL paper on methane releases to the atmosphere on Mars.

ALUMNI UPDATES

2000'S

Curt D. Storlazzi, Ph.D. Earth Science, 2000

I am a Slug Earth Sci PhD from 2000 (under Gary Griggs) and besides being a USGS senior research geologist, am a research associate with UCSC's Institute of Marine Sciences.

USGS Research Geologist Dr. Curt Storlazzi was honored by the U.S. Coral Reef Task Force with a Scientific Achievement Award, presented by Department of the Interior Assistant Secretary Carmen G. Cantor on September 2, 2022. Curt has been a member of the Task Force since 2005 and has served on the Task Force's Steering Committee since 2013. His team's work across the U.S. and its Trust Territories to assess land-based pollution impacts to coral reefs and measure the flood protection benefits of coral reefs have been key contributions supporting Task Force goals for coral conservation.



USGS Research Geologist Curt Storlazzi from the Pacific Coastal and Marine Science Center was presented with the USCRTF Scientific Achievement Award for significant contributions to the advancement of science, willingness to collaborate with managers, and exceptional communications of research to make findings actionable.

In collaboration with many partners, Curt and his team's coral reef research has led to new insight into the influences of natural processes and impacts of human activities on coral reef health that is changing federal, state, and territorial policy to protect and conserve the biodiversity, health, and social and economic value of these remarkable habitats.

Bruno Lopez, B.S. Earth Science, 2000

My name is Bruno and I graduated from the EPS department in 2020. My degree was Earth Sciences and I had an emphasis in data analytics. After finishing at UCSC I got a job as an intern at MBARI thanks to the Geopaths programs. Then I got a job at Stanford as a Research Data Analyst for the Center on Food Security and the Environment. I used open access satellite data + Machine Learning to predict crop type and biomass. I did a majority of other things but a lot of my main focus was on Spectroscopy, Machine Learning and Automation. I left Stanford after a year to work in a Space Tech Startup called Orbital Sidekick where I do much of the same stuff I did at Stanford, except a lot harder. Here I helped build some internal analytic tools, automate processes, speed up slow code. I also did some field work where we verified ground truth in real life.

Lisé Whitfield, M.S. Earth Science, 2001

I graduated with an M.S. in Earth Science in 2001. I have been a science curriculum designer and research scientist since then for several academic institutions in a few countries. Currently I am the on-board teacher for Seven Seas in Indonesia that sails through the Indonesian archipelago with K-12 students and their families for 2-8 week long educational trips in which we engage in place-based earth and environmental science learning (photo attached). Whether I'm underwater or on land, on a remote atoll or atop a smoking volcano, I carry the inspiration and passion for Earth Science that was shared with me at UCSC!



Lisé Whitfield

ALUMNI UPDATES

2000'S

Tara Matthews, B.S. Earth Sciences, 2002

My name is Tara Matthews (Howard) and I am a 2002 graduate from UCSC. I currently own a community development consulting firm in Southern California and live in sunny San Diego. We consult to cities and counties across the State in the areas of affordable housing, economic development, fiscal health and real estate. While its not 100% related to my B.S. in Earth Sciences and goal of studying the affects of global warming on coral reefs and production of fossil fuels, I still feel like I am contributing to future generations by helping to shape the communities we live in. My time at UCSC is a time I will always cherish. My oceanography class with Mr. Griggs changed my life - what prompted me to get a degree in Earth Sciences and fueled my love of islands! You will find me on an island at least once a year...even if it's just Catalina in some cases.

Stefano Mazzoni, M.S. 2002

In the last year or so I've been continuing my geoscience consulting career, working on subsurface characterization projects ranging from hydrocarbon assessment to carbon capture & storage (CCS) evaluation along the Texas-Louisiana Gulf Coast basin. In May, I started a long-term contract with a Calgary-based company (Canacol Energy) with field operations in Colombia; I am building geocellular reservoir models and coordinating the geoscience team responsible for developing gas fields in the Lower Magdalena Valley. On the personal side, we are still living in Houston; my wife is completing her EMBA on renewable energy in Winter 2023 and my daughter is now in Upper Elementary (4th grade) at her public Montessori school. This fall I received a GRIT Award from Ally Energy in the Professionals category; I'm actively volunteering for the AAPG Women's Network, the IMAGE Diversity & Inclusion Committee, and our school PTO.



Tara Matthews

Maris Densmore, B.S Geological and Earth Sciences/Geosciences, 2002

Matt Densmore, B.S Geological and Earth Sciences/Geosciences, 2002

Maris and Matt Densmore (both 2002)- have recently settled in Sebastopol, CA with their two kiddos to spend more time playing in the dirt. After immensely enjoying field camp and graduating from UCSC, Maris earned a masters in geology at UCD and headed out to do some environmental consulting in Ann Arbor, Michigan, while Matt finished his PhD at UM. Both joined the oil industry in 2008, drilled some wells and had a baby in Texas, escaped Houston to Pennsylvania to put a few more holes in the ground and have another baby, and managed to get back to California in 2014. Matt is currently working regulating geothermal operations in California after teaching at CSUS and doing landslide mapping at the CGS. Maris works on developing carbon credits through geologic sequestration, plugging orphan wells, and other industrial processes. Twenty years after graduation, Matt and Maris are still big rock-nerds. All their family vacations are geo-centric, every bag and backpack contain at least a couple rocks or fossils, and now they geek out about soil chemistry so they can grow giant nectarines and avocados.

ALUMNI UPDATES

2000'S

Brian Lockwood, B.S Earth Science/Geology, M.S Geological and Earth Sciences/Geosciences, 2004

Brian Lockwood, M. Sc. 2004 (Griggs) is the General Manager of the Pajaro Valley Water Management Agency, where he leads a dedicated team of water resource enthusiasts working tirelessly to achieve a sustainable Pajaro Valley Groundwater Basin. Water management activities include the implementation of PV Water's projects and programs which focus on conserving existing water supplies, recycled water production and delivery, managed aquifer recharge and recovery, hydrologic monitoring and modeling, and more. Stakeholder outreach, engagement, and education is a key component of PV Water's activities. Brian is a California Professional Geologist and Certified Hydrogeologist and lives in Santa Cruz.



PV Water Board Member, Mary Bannister (UCSC EPS Alumni, see page 16), and General Manager, Brian Lockwood, receiving a \$7.6 million grant from the California Department of Water Resources' (DWR) Sustainable Groundwater Management Grant Program in May 2022. The funding, which shows DWR's support of this important project, will reimburse PV Water for a portion of College Lake Integrated Resources Management Project expenses including planning, design, environmental compliance, and property procurement costs.

Eugene Morgan, B.S. Earth Science, 2005

I'm Eugene Morgan ('05) and I'm now at Penn State, serving as Associate Head for Undergraduate Education, as well as Associate Teaching Professor, in the Department of Energy and Mineral Engineering. In this role, I often reflect on my undergraduate studies at UCSC and what made the experiences in my EPS courses so memorable. The remarkably dedicated faculty, amazing field experiences, and the wealth of extracurricular opportunities stand out in my mind. I am eternally grateful to have done my senior thesis field work in Papua New Guinea for one of Eli Silver's projects, where the land was amazingly rich in geologic activity, and Simon Day and I got ourselves out of several dicey situations. As a faculty member, I strive to provide similarly meaningful experiences for the current students in my department at Penn State. Besides teaching, I am currently focusing my research on geologic carbon storage, in particular geophysical monitoring of such operations.

Kristen Buck, Ph.D. in Ocean Sciences, 2006

CEOAS welcomed marine biogeochemist Kristen Buck in September 2022, when she joined the faculty as an associate professor. Buck specializes in the study of the biogeochemical cycling of trace metals in marine ecosystems, especially of bioactive trace elements like iron and copper.



Kristen Buck

Kristen Buck - continued

She holds a Ph.D. in ocean sciences from the University of California at Santa Cruz and a B.S. in chemistry and a B.A. in French from Pacific Lutheran University. She has held appointments as a postdoctoral research fellow at Scripps Institution of Oceanography, as well as appointments at the Bermuda Institute of Ocean Sciences and the University of South Florida.

Justin Peterson, M.S. Earth Sciences, 2007

G'day from Australia where I've been living the last 4 years, primarily in Brisbane but spending a lot of time across the country. I'm the Operations Manager for Stantec's Australia-wide Environment and Geosciences Business, which consists of about 275 geologists, environmental scientists, sustainability engineers, and a range of other associated disciplines. We're at the forefront of a rapidly growing and developing country with a focus in energy transition infrastructure, and a presence in every state and territory. One of my favorite recollections was hitchhiking and giving lots of rides to strangers during the great Santa Cruz bus driver strikes of 2006!



Picture day with Yingcai Zheng and his students.

ALUMNI UPDATES**2000'S****Mike McDonald, B.A. Environmental Studies/ Earth Science, 2007**

I'm currently in Bakersfield. I spent 11 years as an environmental consultant performing contaminated site remediation, safety, and regulatory compliance. About 5 years ago, I was hired by one of my global energy clients to manage environmental compliance for part of the business in California. However, about a year ago, I moved into a role to manage the software applications that enable our environment and sustainability work worldwide by partnering with our IT group.

It's an interesting perspective to see how technology has improved to support earth and environmental science. At UCSC, I was the only one in my Intro to Field Geology that attempted to enhance my geologic mapping using a simple handheld GPS and desktop satellite imagery - it seemed more of a novelty than an aid. During summer field, our whole group worked to test handheld computers to locate a random geologic feature in the Owens Valley. Now, smart devices are routine aids and we're able to gather high-resolution aerial imagery and generate 3D models in the field with drones. We've come a long way from making a squiggly GPS line by walking a contact at New Idria or trudging in the Owens Valley with a smartphone precursor! Those early lessons in adopting technology to improve earth science studies helped shape the opportunities I've had in my career.

Yingcai Zheng, Ph.D. Seismology, 2007

I am still teaching at University of Houston. Mainly working on gigatonne CO₂ storage and geothermal projects. Inherited a rock physics lab of ~20 years. Started to do lab experiments to measure physical properties of various subsurface liquids and gases: CO₂, CH₄, brine, oil/heavy oil/condensate, and their mixtures, for energy and energy transition.

ALUMNI UPDATES

2000'S

Corina Allen, B.S. Earth and Planetary Science, 2008

Corina Allen (formerly Forson) graduated in 2008 with her B.S. from UCSC. She has fond memories of field camp with Hilde, the magical UCSC campus, and the great classes and teachers there. She is now living in beautiful Olympia, Washington working as the Chief Hazards Geologist for the Washington Geological Survey. She and her team work on understanding earthquake and tsunami hazards and communicating their modeling, research, and evacuation maps to emergency managers, policy makers, and the public so that they can make informed decisions. <https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards-and-environment>



WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES
HILARY S. FRANZ | COMMISSIONER OF PUBLIC LANDS

Josiah Failing, B.S. 2008

I graduated UCSC in 2008 after finishing an amazing Summer Field experience with Hilde Schwartz and Casey Moore. For the next eight years I worked as a mudlogger and wellsite geologist in the upstream energy biz. During this time, I had the opportunity to work in the Central Valley CA, Coso Volcanic Field CA, North Slope AK, and eventually Musandam, Oman – a geologist's paradise!

Eventually I made it back to my hometown of Portland OR, where I currently work in realtime operations for the Bonneville Power Administration, helping run the unique Federal hydropower system on the Columbia River. I think back to my time in the EPS department often and fondly. Lifelong friends were made. Unforgettable experiences were had. I'm thankful to my professors for nurturing my geologic curiosity!



Bonneville
POWER ADMINISTRATION



Brina Mocsny, 2008

Class of 2008 (or is it 2007?)

I am living and working in Yosemite National Park (since 2011) working for the National Park Service. I worked in Physical Sciences for eight years and recently transitioned to Vegetation and Ecological Restoration where I am the crew lead of a seasonal work group doing riverbank and meadow restoration in Yosemite Valley. This season we worked on restoration of a headcut in Bridalveil meadow and a floodplain restoration in eastern Yosemite Valley. Lucky to be living in such a beautiful place!

Eva Tanner, B.S. Earth Science, 2008

Since graduating in 2008, I earned a Master of Public Health and PhD in Environmental Health Sciences from SUNY Albany. I then completed a postdoctoral fellowship at Mount Sinai School of Medicine in New York City. My research focused on how exposure to organic chemical contaminants from industry and consumer products (e.g., bisphenols, PFAS, etc.) impacted cognitive health in children and older adults. I am now a Staff Scientist at the Health Effects Institute, a Boston-based nonprofit specializing in air pollution and health research. I oversee research contracts, assist in RFA development, coordinate peer reviews, and communicate science. What I enjoyed most about my time at UCSC was the outdoors! I miss the world class surfing and hiking, and UCSC has the most beautiful campus.



Eva Tanner

ALUMNI UPDATES

2010'S

Jake Kramarz, B.S. Environmental Geology, 2010

I live with my wife, Nasim (also a Slug Alum), in Oakland, CA. I am now working for FlowWest, a water resources consulting firm, based here in Oakland. I work as a hydrologist and project manager, working on creek restoration/bank enhancement projects, hydrologic studies, an open space and park expansion feasibility study, and fish passage/habitat projects. Previously, from 2017 through 2021, I worked for Clearwater Hydrology, located in Berkeley. At Clearwater, I managed many creek restoration and bank stabilization/enhancement projects for mostly private clients. These projects were mainly in the East Bay and North Bay. As Clearwater was a very small company, I worked on almost all pieces of the projects including, but not limited to: topographic surveying, digital elevation model development of existing conditions/proposed design in AutoCAD Civil 3D, Basis of Design report writing, permit application submission, client communication, construction oversight, post-construction monitoring.



Jake Kramarz

Kristen Whitney, B.S. Environmental Geology, 2011

I am graduating this semester with a Ph.D. in Geological Sciences from Arizona State University. For my dissertation, I employed a land surface model to assess the impacts of forest disturbances (wildfire, drought, insect outbreaks) on future Colorado River water supplies under climate change. I led meetings with water managers to gather and incorporate their expert perspectives into my modeling approach, and ensure applicable results for decision-making. I was awarded the NASA Postdoctoral Program fellowship to fund my research proposal and join as a post-doc at Goddard Station early next year. I will be combining machine learning with satellite-based Earth observations and land surface modeling to quantify future wildfire risks and post-fire hydrologic system recovery across the Western U.S.

I am thrilled for this opportunity to work on a project that could help us better prepare for the climate challenges ahead! I am forever grateful that my college journey began in the Earth and Planetary Sciences department at UCSC, where I was first inspired to study hydrology and remote sensing. Go slugs!



Kristen Whitney after submitting her final draft of her dissertation.

Jackie Liu, B.S. Earth Science, 2011

I'm living in Denver, Colorado and still keep in touch with lots of Slug EPS friends! A few of us went rockhounding in Canon City, CO and I, of course, forgot the guidebook. We walked right over the mineral bearing formation. Oops. I recently changed careers and am a pilot flying private jets. I still love seeing fault lines and clusters of cinder cones etc...except now it is at 41,000'!



Jackie Liu

Chrissy Rogers, B.S. Earth Science, 2012

I am now a meteorologist for the Army and I am now living in the SLC area in UT. Living here reminds me of Summer Field regularly as I am in the basin and range extension.



Chrissy Rogers

ALUMNI UPDATES

2010'S

Jessica Howard, B.S. Environmental Geology, 2011

I earned an MS degree after graduation and have settled in Colorado. I am working for an aerospace company as a payload lead, designing and commissioning earth imaging payloads; and have worked in this area for the last 10 years. In addition to work, I still manage to get out rock climbing, snowboarding, backpacking, and mountain biking as much as possible. My favorite recollection from UCSC is going into the caves on campus with the geology class, one of my favorite courses. I was fortunate to attend school on such a beautiful and interesting campus. And, who can forget the smell of the redwoods on a rainy day?

Astrid Leitner, B.S. Marine Biology, B.S. Earth and Planetary Sciences, 2012

Astrid Leitner's teaching and research interests are at the intersection of ecology and oceanography, with a focus on the impacts of abrupt and complex bathymetry on the ecology and behavior of marine animals in the deep sea. She holds a Ph.D. in biological oceanography from the University of Hawai'i, Manoa, and B.S. degrees in biology and in Earth science from the University of California at Santa Cruz. She will come to CEOAS from her current position as a postdoctoral fellow at the Monterey Bay Aquarium Research Institute in February 2023.



Astrid Leitner

ALUMNI UPDATES

2010'S

Emily Edwards, B.S. Earth Sciences, 2013

After completing my Earth and Planetary Sciences BSc degree from UCSC in 2013, I went on to receive my master's degree in Hydrologic Sciences from UC Davis. At UC Davis, I expanded on the work I'd done for my senior thesis at UCSC with Professor Andy Fisher on managed aquifer recharge. My master's work was part of a state-funded project investigating the efficacy of drywells—stormwater infiltration wells used to replenish groundwater. For my thesis, I used contaminant transport modeling to estimate whether contaminants found in stormwater could pose a threat to groundwater quality. After I finished my master's degree I began working as a hydrogeologist at Lawrence Livermore National Laboratory, helping to remediate the lab's groundwater Superfund sites. In 2021, after four years at Lawrence Livermore, I moved to Vancouver, Canada, where I'm now in the second year of my PhD at the University of British Columbia. Under my advisor at the Institute of Resources, Environment and Sustainability, I'm exploring decentralized water management as a means to increase water supply and empower people to find their own ways to address unsustainable resource use. I honestly don't think I would have gotten as far as I have in my water-centered career and education without the mentorship and encouragement I received from faculty and graduate students in EPS at UCSC, and I'm so grateful for my experiences in the department.



Emily Edwards



Matthew Wilbur, B.S. Earth Sciences, 2015

After graduating with the class of 2015, I decided I wanted to continue living in Santa Cruz for the many friends I made here, the redwood climate, and for it being an ideal place to pursue my favorite hobby of mountain biking. I started this lifestyle by getting an entry level job at Santa Cruz Bicycles in their Production Assembly department. I quickly moved up the ranks of the assembly line and moved to the Wheel Assembly department where I learned the skill of building wheels by hand and machine. In both departments, my talents for attention to detail, memorizing components, and catching errors helped me advance and be promoted to Quality Control Inspector for the entire factory, a position I've now held for 4 years. During my time in this position, I've had the opportunity to travel for work overseas twice, once to China for a quality summit with two of SCB's carbon fiber fabricators/suppliers, and once to Germany to assist our European assembly factory with a major inventory inspection.

Even though I did not find myself in a career related to my EPS major, the cognitive training and problem solving skills I developed as an EPS major no doubt played a major role in my ability to advance and grow for 7 years in a company that produces world renowned performance mountain bikes.

On the side, I have also volunteered and developed close friendships within the Santa Cruz Mountains Trail Stewardship (SCMTS) whose mission is to promote and increase sustainable trail access for all user groups throughout Santa Cruz County.

The intellectual and social growth I underwent during my time at UCSC forever changed my life and I will always be proud to be a Slug for life.

ALUMNI UPDATES

2010'S

Andrew Kruger, B.S. Earth and Planetary Science, 2016

Greetings Slugs! I am recently married and living with my amazing wife in Los Angeles. We take care of two rabbits, named Butter and Scotch. I have been working for JPL in a few roles on operations for the Mars 2020 Project, planning the science observations and engineering activities of Perseverance. In my time at UCSC I recall having great difficulty in interpreting stratigraphic columns to 100% accuracy. It is reassuring to see in my career that indeed even expert scientists can and will debate on sedimentary history, with sometimes quite imaginative interpretations similar to my midterm answers.



Basia Marcks, B.S and M.S Geological and Earth Sciences/Geosciences, 2017

I graduated from UCSC with a BS in 2016 and MS in 2017 and have many fond memories of my time in Santa Cruz.

Many of my favorite memories at UCSC involved teaching courses and engaging with students in the EPS department. I fell in love with science communication lecturing as a TA during my MS and creating schematics of earth and ocean processes as a note taker in undergrad. This passion followed me throughout my PhD in Oceanography which I completed this summer at the University of Rhode Island Graduate School of Oceanography. During my PhD I sailed aboard the EV Nautilus conducting deep ocean research off the coast of Hawaii as part of NASA's SUBSEA mission. I also collaborated with artists from the Rhode Island School of Design, creating an immersive projection installation which we exhibited in Providence, Rhode Island last summer. This summer we were invited to submit a publication documenting our process. More recently I was commissioned to create schematics for the US Science Support Program's Science Mission Requirements report to NSF. Each of these experiences fostered the appreciation for science communication which I discovered at UCSC and have led me to a new role in Washington DC.

Last month I moved to Arlington, VA to prepare for a Knauss Marine Policy Fellowship. I was selected as a legislative finalist and will begin work in February 2023. As a Knauss Legislative Fellow I will work on Capital Hill serving as a subject matter expert and working on Marine Policy. I am very excited to start this new role and share the knowledge I learned at UCSC and URI.

Happy to answer an additional questions or chat with current students and alumni about my experiences at UCSC, URI, or as a Knauss Fellow (once that starts).

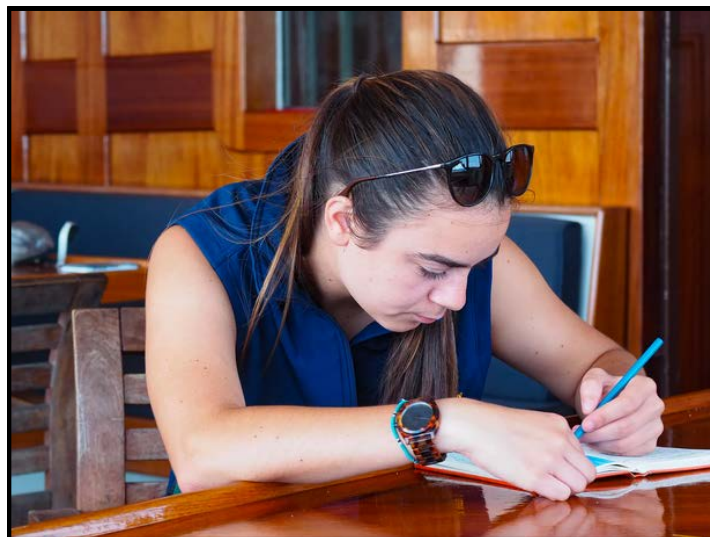
Tyler Paladino, B.S. Earth Sciences, 2017

I'm Tyler Paladino, graduated 2017 with a Planetary Concentration:

I'm currently finishing up my PhD at Idaho State University in Pocatello, ID. Planning on graduating Spring 2023 if all goes to plan. After that, I'll be a Mendenhall Fellow at the USGS Cascades Volcano Observatory! I'll be working on Volcano monitoring using InSAR and machine learning. Missing Santa Cruz everyday, all my banana slugs, and the countless hours spent in S&E! If you're in Vancouver, WA, come say hello!

Wills Tuthill, B.S. Earth science 2012, M.A. Education 2017

I live in Santa Cruz. The day after I graduated I started working as a geologist for an environmental engineering and remediation firm where I stayed for 5 years. I was then offered a Noyce scholarship to do a masters in education. Now I'm a science teacher and loving it!



Basia Marcks on board the Exploration Vessel Nautilus during the 2018 Lōihi Seamount Expedition, a joint project between Ocean Exploration Trust, NASA, NOAA, and a number of academic institutions.

ALUMNI UPDATES

2010'S

Dr. Esteban J. Chaves, Ph.D. Geophysics and Seismology, 2018

This came in an excellent time. I have just been elected (10/4/2022) president of the Latin American and Caribbean Seismological Commission (LACSC), celebrated in Quito, Ecuador, from October 3 -5. This commission is part of IASPEI, the International Association of Seismology and Physics of the Earth's Interior. My presidency for this commission will be for the next two years, and we are responsible for organizing the next LACSC meeting in San José, Costa Rica, which will be celebrated in June 2024.



Dr. Esteban J. Chaves will be working with Dr. Xyoli Pérez Campos from UNAM, Mexico, the executive Secretary for the next term of the LACSC commission.

Flor Vanessa Maciel, B.S. Earth Sciences, B.A. Environmental Studies, 2019

I'm a 2019 graduate of the EPS department at UCSC. I'm now living in Los Angeles and attending UCLA where I'm a PhD student in the Atmospheric and Oceanic Sciences department. I'm studying cirrus clouds and dust in Dr. Jasper Kok's research group. I loved attending UCSC and think back to my time in undergrad there fondly!

Joel Edwards, Ph.D. Earth Sciences, 2018

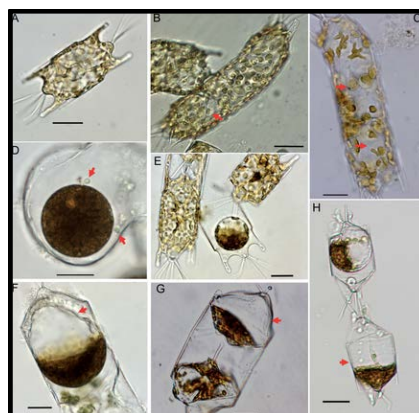
Since graduating at the end of 2018, I partnered up with an old geology friend and started a geothermal exploration company. During 2019, we worked out of Santa Cruz, but have since moved to Utah. Over the last few years, we have raised some VC funds, expanded the team, have built some new tools to improve exploration outcomes and are testing and iterating on those tools across the western USA. It's all onshore work, unlike my time at UCSC with Eli Silver and Jared Kluesner, where I got to hang out on research cruises and think about subduction zones and seafloor processes. I miss those days and am very grateful for the UCSC people I got to rub shoulders with; I would do it all over again.

Monica Appiano, B.S. Earth Sciences, 2018

Hello there! My name is Monica Appiano and I graduated from the UCSC EPS Program in June of 2018. While at UCSC, I pursued an Ocean Science concentration, produced a senior thesis manuscript and recently had this work with Marilou Sison-Mangus et. al published

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0276305>

Immediately after graduating from UCSC, I pursued a master's degree in marine science at Moss Landing Marine Labs with a geological oceanography focus, learned marine sediment analysis techniques and gained many wonderful professional and scientific skills. Currently, I am living in Miami, Florida and am attending University of Miami Rosenstiel school of Marine, Atmospheric and Earth Sciences pursuing a Professional Science Master's degree with a coastal zone management concentration. For those reading my blurb, I want to encourage you that life may not follow a clear path you try and plan out for your future career, but if you continue to believe in yourself, pursue your career goals and network with others within your field of interest, you will be successful and your contributions (mine for marine and ocean science conservation for example) will make an impact towards society!



From the paper published by Monica Appiano, Marilou Sison-Mangus et. al: Figure 1: Reproductive stages and the auxospores of *Odontella* sp. diatom.

ALUMNI UPDATES

2010'S

Michael (Mikey) Nayak, M.S. and Ph.D. Earth and Planetary Sciences, 2019

Since graduating UCSC, I've been fortunate to serve as Chief of Research for a large telescope, deploy to the South Pole as a PI, graduate from Test Pilot School, fly an X-plane, and work flight test for the newest jet in the US Air Force fleet. Earlier this year, I moved across the country to start my dream job as a Program Manager at DARPA, one of the world's most innovative agencies. To quote a phrase, once you're there, "if you don't invent the Internet, you get a B".

I'm in the Defense Sciences Office, "DARPA's DARPA", which focuses on fundamental research for breakthrough scientific advances, and one of my investment themes is "applying advances in astrophysics and planetary science to difficult problems in defense". I'm always interested in new ideas! And keep an eye out for Topic 12 on this year's DARPA Young Faculty Award announcement.

I returned to UCSC for the first time since graduating to attend the "Breakthrough Discuss" conference earlier this year. It included a talk by Prof. Francis Nimmo, whom I was fortunate to have on my dissertation committee. The talk flashed me back to Francis's EART265 "Order of Magnitude Estimation" class. In my current job, I get several pitches about new ideas, most of which are unproven. Which means I need to quickly determine if an idea is impossible (we may never), or merely improbable (we cannot today). The ability to do a little order-of-magnitude math on the side has exposed more than one encroachment on the basic laws of physics, sometimes in the face of dazzling black-box modeling results! So shoutout to Francis's EART265 ("how many piano tuners in New York City") as one of my most mentally stimulating memories from UCSC, and probably the most useful class I've ever taken.



Michael Nayak delivering a keynote address titled "Around the World in 80 Steps". He was selected as a member of the AFRL Inspire 2022 cohort, commemorating the 75th anniversary of the US Air Force.

Maddy Salazar, B.S. Earth Sciences, 2019

After graduating in 2019, I've stayed in Santa Cruz and have been working as a Construction Materials lab technician at Blue Planet Systems in Los Gatos, CA for a little over a year now.

Blue Planet Systems is a carbon sequestration startup founded by UCSC Master's and PhD alum, Brent Constantz. Our technology utilizes flue gas containing carbon dioxide which is reacted with calcium from waste concrete (and/or other industrial wastes) to produce calcium carbonate. This calcium carbonate is densified and hardened into rocks to replace quarried limestone for concrete. Within my first year, I've been able to help with the scale up process as we develop our first commercial scale plant, San Francisco Bay Aggregates, in Pittsburg, CA. I have had the pleasure of working together with several incredible scientists and have gained numerous valuable experiences in both the lab and with the scaling up process. I cannot wait to see what the next few years holds the company and for my growth as a researcher!



Redmond Walton, B.S. Earth Science, 2019

I graduated from UCSC in 2019 with a degree in Earth Science with a concentration in Ocean Science. I am now attending California Western School of Law in Downtown San Diego. I was recently published in Cal Western's scholarly journal, the California Western Law Review. The article relates to injury liability (the risk of being sued) that California's public entities face as public lands become increasingly dangerous to hikers, beachgoers, drivers, etc. as a result of climate change. Here is a link to the article:

<https://scholarlycommons.law.cwsl.edu/cwlr/vol58/iss2/7/>. It's titled "Not Bluffing: Resolving Doctrinal Ambiguities in California's Natural Condition Immunity as Climate Change Heightens Risks of Injuries on Public Lands." While attending law school, I have been working for the Carlsbad Fire Department's Ocean Lifeguard division as a Lifeguard I. I live in Oceanside by the beach and surf as much as I can when the waves are good.

My experience as a student in the Earth Science department was wonderful. I frequently see friends that are also graduates of the program and we reminisce about our trips to the field during our upper division Earth Science classes. I miss being an earth sci slug!

CALIFORNIA WESTERN
SCHOOL OF LAW | San Diego

Gita Kushwaha, B.S. Earth Science/Geology, 2020

I'm currently getting my MS in Geology at Sac State, and I am working on research related to changes in erosional patterns in hillslopes impacted by wildfire.

Otherwise I'm just enjoying working as a TA and hopefully when I graduate I can work part time as a lecturer at local colleges while I figure out what to do next!

ALUMNI UPDATES

2010'S

Emily White, B.S. Earth Science, 2020

I'm Emily (Em) White, I graduated with my Bachelor of Science in Earth Science with a concentration in Planetary Science back in the Spring of 2020! After my time at UCSC, I moved on to work at the U.S. Geological Survey in Menlo Park, CA as a student contractor for the Soil Microbial Ecology Lab, where my primary project was compiling an accessible physical and digital archive of famous terrace chronosequence soil samples for future and current radiocarbon research. Currently I am living in State College, PA where I am attending the Pennsylvania State University for my Master of Science in Geoscience. My work here at PSU is in igneous petrology and geochemistry, focused on continental crust evolution during the Neoproterozoic. One of my most memorable moments at UCSC was the 2019 GEODES camping trip to Big Sur, where we got to camp above the marine layer.

Marcos Perez, B.S. Earth Science, 2020

My name is Marcos Perez. I graduated from UCSC with my Earth Science B.S in 2020. I worked in the bay area as a staff geologist for a year after graduating and am now working as a field geologist for Applied Earth Sciences in Los Angeles. Working as a geologist and applying what I learned at UCSC has been a dream come true. I am currently studying/reviewing for my GIT exam in the Spring of 2023 and plan on pursuing my PG and CEG down the line. None of this would have been possible without great professors like Emily Brodsky and Gary Griggs, to name only a few.



Marcos Perez

1978 EPS FIELD CAMP

Photographs curtesy of Curtis Obi, B.S. 1979



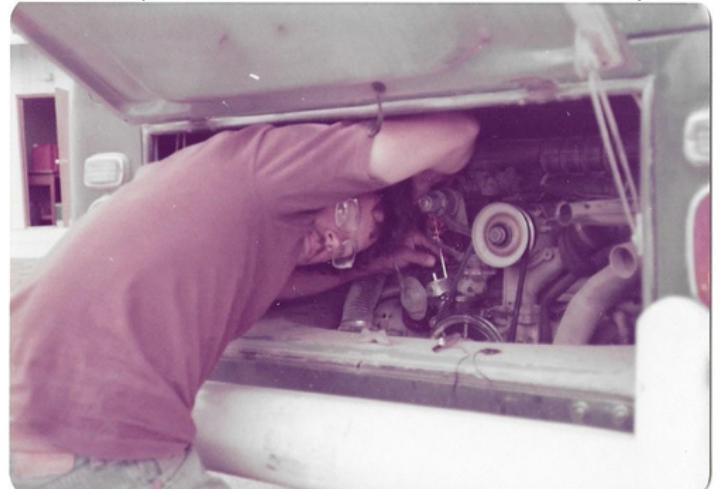
Prof Othmar Tobisch, with Mt Whitney in background.



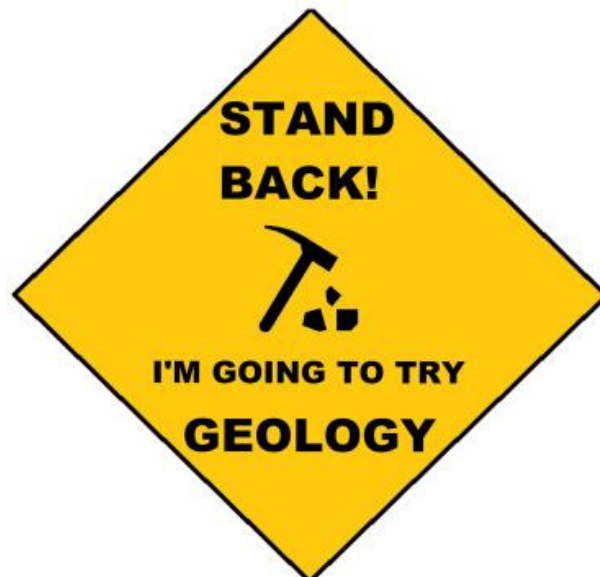
Prof Leo Laporte, with Red Rock (CA) cliffs in background.



TA Debbie Bliefnick, at White Mountain Research Station in Bishop (CA)



TA Jeff Mount, at WMRS working on VW bus engine.



EPS Alumni Memorials

Rich Fink, B.S. 1976

Rich got his B.S. in geology from UCSC then received his M.S. in geology from the University of Nevada Reno. Rich was employed by Provost & Pritchard Consulting Group as a Principal Environmental Specialist. He spent his career facilitating the cleanup of contaminated environmental sites in both California and Nevada. Here is a link to his obituary:

<https://www.legacy.com/us/obituaries/fresnobee/name/richard-fink-obituary?id=35160628>.



Deborah Ann Pembroke, B.S. 1995

After graduating from UCSC Deborah became deeply involved in transformative human rights work. She formed a team of survivors to work with United Way Worldwide's Center to Combat Human Trafficking to bring anti-trafficking live learning sessions to United Way offices and communities across the United States. She also managed Rising's Safe and Sound Human Trafficking Prevention Program in Santa Cruz and Monterey county schools. Her husband believes she made this stretch of earth her home because of her love of rocks and science. Her favorite pastime was to look at rock formations in Santa Cruz; she was in perpetual awe of their unique geology. Her remembrance can be found here:

<https://lookout.co/santacruz/community-voices/opinion-from-community-voices/story/2022-09-22/remembering-deborah-pembroke-santa-cruz-anti-trafficking-matriarch>

Stuart Camenson, B.S. 2016

Stuart received his B.S. in Earth Sciences and Chemistry from UCSC. His family said "He was a lifelong learner and sought out learning and improving himself, which he did joyfully each and every day of his life,"

He was practicing liftoffs and touchdowns at the Watsonville Municipal Airport near Santa Cruz on Aug. 18, 2022 when he was killed in a collision with a second plane.



EPS Alumni Memorials

Kiara Broudy, B.S. 2018

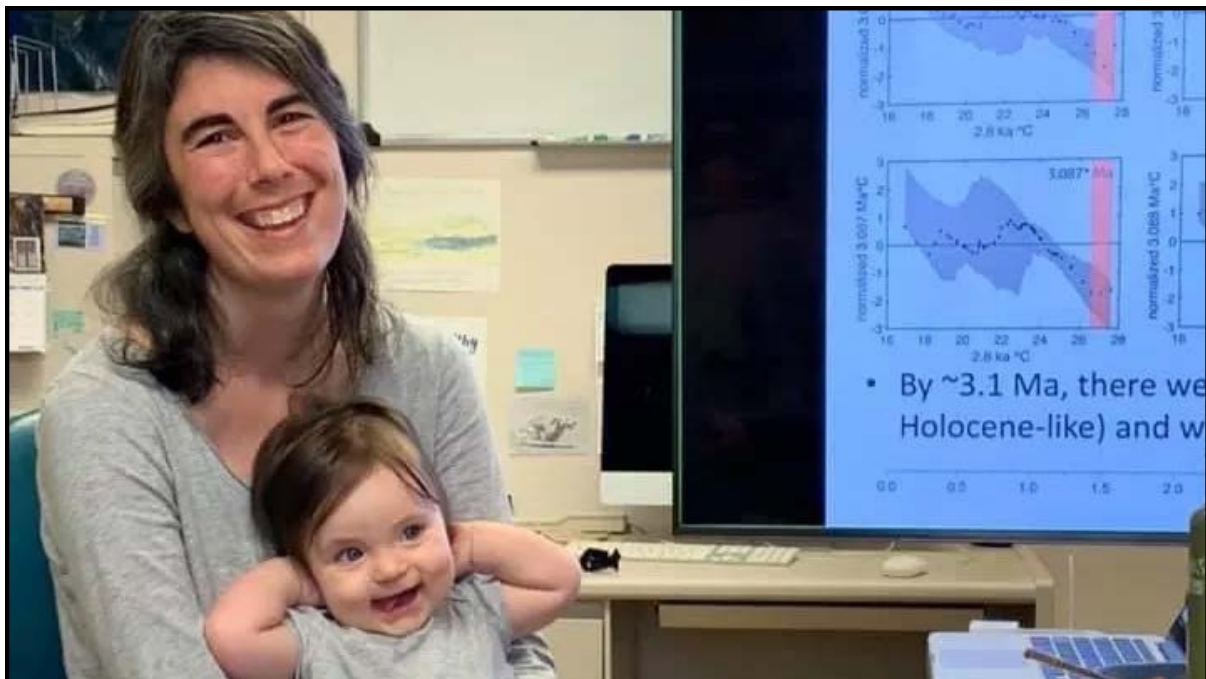
Kiara received a BS degree with highest honors and was an accomplished sailor on the UCSC sailing team. She resided in San Francisco from 2018-2022, working as a geologist for Langan Engineering. Kiara had a passion for excellence in her career, and often worked independently on field projects in Montana and Utah. She was an avid skier, backpacker, sailor, swimmer, cyclist, and musician (trumpet and piano). The dedication and love she had for these activities were surmounted by the immense care, compassion, and joy she brought to the relationships she built through those endeavors. <https://www.legacy.com/us/obituaries/pressdemocrat/name/kiara-broudy-obituary?id=36529577>



Sarah White, Ph.D. 2019

Sarah was a brilliant climatologist and paleoceanographer. Her Ph.D. Research was on Tropical Pacific climate variability from the Pliocene to the Holocene under Prof. Christina Ravelo. She went on to be a President's Postdoctoral Fellow at University of California, Berkeley.

EPS alumni, Karla Knudson, who went to graduate school with Sarah, noted that "Sarah was a compassionate and adventurous soul, beloved mother to two young children, endearing friend, and bright scientist. It is without a doubt that she left this world too soon—with so much more left to love and discover. To me, the saddest loss is that Sarah will not be here to see her children grow up in the world that she worked so hard to make better."



The Earth and Planetary Sciences Department and Institute for Geophysics and Planetary Physics proudly acknowledge their many advocates and supporters. The following people and organizations have made gifts to the department in 2022. Thank you one and all!

Ms. Doreen Clark
Mrs. Vanessa Sequeira
Dr. Donald L. Reed
Ms. Gwyneth N. Hernandez
Mr. Yingcai Zheng
Ms. Suzanne McCarron
Dr. Parke D. Snively
Mr. Eric J. Oleynick
Mr. Yaofeng He
Heising-Simons Foundation
Mr. Christopher R. Hundemer
Dr. James R. Hein
Mr. John W. Warrick
Ms. Donna Shillington
Ms. Diana Roman
Dr. Peter J. Vrolijk
Ms. Odette Hinds
Ms. Melodie French
Dr. Kirsten M. Menking
Ms. Rosemary W. Jenckes
Dr. Mark T. Brandon
Ms. Natasha L. Vokshoori
Ms. Mindy Feldman
Ms. Autumn Arias
Ms. Hayley Farr
Mr. Edward Everett
Mr. Damon F. Brown
Mrs. Sarah Brown
Mr. Chuck J. Miller
Dr. Léo F. Laporte
Dr. Richard G. Stanley
Dr. Bruce A. Buckingham
Dr. Fredrika C. Moser
Mr. Merrill E. Newman
Dr. Peter J. Schubart
Mr. Roger Samuelsen
Ms. Tabitha Doniach
Ms. Deborah D. Pembroke
Mr. Gary M. Pischke
Mr. Lawrence M. Freilich

Mrs. Jo Lynne T. Jones
Dr. Antonette M. Zeiss
Ms. Lisa H. Wright
Mr. Edward D. Salt
Ms. Kathleen Ort-Duffield
Mr. Marc A. Bond
Dr. Tim F. Lawton
Mr. Kent M. Screechfield
Ms. Maryann B. Jones
Ms. Candace E. Walker
Ms. Laura K. Stupi
Mrs. Laura Parra
Dr. Peter C. Lippert
Dr. Stephen D. Lewis
Mr. Charles H. Crocker
Mr. Marc H. Brodsky
Ms. Kathleen B. Espana
Ms. Heidi Hoffower
PG&E Corporate Foundation, Matching Gift Program
Dr. Charles A. Lawson
Gordon and Betty Moore Foundation
Mr. Matthew E. Clapham
Ms. Alice M. Baldridge
Artium Technologies, Inc.
Mrs. Claudia Webster
Dr. Gerald E. Weber
Ms. Maya M. Meislahn

Mr. Robert N. Stephens
Mr. Richard W. Mead
Dr. Laura J. Moore
Dr. Walter E. Schillinger
Mr. Thomas E. Burns
Mr. John Rusev
Ms. Gail I. Bakker
Mr. Grant A. Marshall
Ms. Jessica Moreno
Dr. Maya Elrick
Dr. Gregory F. Moore
Mr. Roger L. Koopmann
Dr. Margaret E. Rusmore
Mr. Jordi P. Vasquez
Ms. Judy A. Van Leuven
Ms. Leslie T. Sweeney
Chevron Matching Gift Program
Dr. Larry N. Smith
Mr. Michael F. McGroder
Ms. Lori J. Ingram
Dr. Emily E. Brodsky
Dr. Ray E. Wells
Dr. Jacob O. Sewall
Ms. Sora Kim
Ms. Lisa Stipanovich
Mr. Robert Holo
Dr. Harvey M. Kelsey
Dr. Alan O. Allwardt
Dr. Demian M. Saffer
Dr. Harold J. Tobin
Mr. Victor Bautista
Mr. Dimitri P. Voytan
Ms. Schon S. Levy
Dr. John B. Simpson
Dr. Mark K. Reagan
Professor Gary A. Glatzmaier
Dr. Neil S. Lundberg
Dr. Brian R. Globberman
Dr. Lisa D. White
Professor Andrew T. Fisher

