PIONEERING *in the* PAST YEAR



Dr. Diane Thompson and team working on coral research in the Marshall Islands.
Read more on page 12.

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THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Geosciences

From the Department Head

Greetings GEOS family and friends,

A department is its people. This year reminded us of that more than most, in both loss and celebration.

We mourned the passing of Jay Quade (see page 20): a brilliant scientist, a real-life Indiana Jones, and a generous mentor whose influence reached across the globe and across Earth science. We gathered to honor both Jay and our late colleague Andy Cohen at celebrations of life, which reminded us how dedicated each was to GEOS, to science, and to their friends and families. Both are also being recognized in topical sessions at conferences and in special volumes published in their memory.



We lost two other giants. Dr. Edgar McCullough, Department Head from 1970 to 1982, grew Geosciences from a program of regional strength into one of international prominence. Dr. Denis Norton, a former faculty member, did research in petrology and hydrothermal systems that was decades ahead of its time. (See pages 20-22.)

We also marked the retirements of Susan Beck, Mihai Ducea, George Gehrels, and Joaquin Ruiz. Together they represent generations of scholarship, teaching, and leadership, and we are grateful for all they built here and for their continued engagement as Emeritus faculty.

Amid these transitions, the department moved forward at full speed. Thanks to everyone who contributed to a successful cluster hire search for four tenure-track positions across three complementary areas: Earth Resources, Earth Physics, and Earth-Life Connections. We interviewed nearly 20 candidates, with Associate Head Jonny Wu chairing the committee. Please join me in welcoming Dr. James (Jimmy) Atterholt as our new Assistant Professor in geophysics. We were also proud to see GEOS alum Dr. Robert Bodnar named Director of the new university-wide Mining and Earth Resources Innovation Institute.

GEOS celebrated many achievements this year. GeoDaze 2026, co-chaired by Holly Thomas and Madison Tuohy, was a great success. Ananya Mallik received the Outstanding Faculty Award, and Dr. Lisa Park Boush received the Distinguished Alumni Award. Our SESS, LaserChron, and GEOS booths welcomed the public at the Tucson Gem and Mineral Show. Graduate Advisor Rocina Garcia earned the College of Science Staff Excellence Award for going above and beyond for our students. And GEOS alum and advisory board member Mark Zoback received the COS 2026 Outstanding Alumnus Award.

We welcomed 16 new graduate students in the fall, and student life is thriving. Our AWG and SEG chapters, along with SESS and GeoClub, keep our community connected through outreach, field trips, and social events.

The Lowell Program in Economic Geology now offers a new accelerated master's program along with a graduate certificate in mineral resource geology, strengthening our pipeline into the mineral resources workforce.

This year's outstanding graduate students were Luke Basler for scholarship, Alexandra O'Keefe for service, and Isaiah Spring for teaching. Among undergraduates, Angela Tatsch and Alma Reasoner won the COS Outstanding Senior Awards for Fall and Spring and En-Chi Lee won the COS Excellence in Undergraduate Research Award.

A special thank you to Susan Beck, who wrapped up more than a decade as Director of Graduate Studies. We are glad to welcome Luke McGuire into the role. Thank you also to our exceptional business office and staff, the backbone of GEOS.

I am grateful to our Advisory Board. Thank you to outgoing chair Larry Archibald, and welcome to incoming chair Stacie Gibbins. Finally, thank you to our donors, whose support makes so much of what we do possible.

It has been an honor to serve as your department head this year.

Bear Down and best wishes,

Paul Kapp
Professor and Department Head

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GO PAPERLESS

Scan the QR code to be added to our email listserv and receive a digital copy of our annual newsletter and our weekly e-newsletter.

Update from Associate Department Head Jonny Wu

Our department conducted multiple faculty searches in the Spring 2026 semester to hire new tenure-track faculty in the fields of Earth Physics, Earth-Life Interactions, and Earth Resources. The new faculty positions were designed to fit around the broad theme of Critical Frontiers in Earth Science and to enhance our capacity to address urgent societal challenges. Our searches were led by an energetic committee that included faculty members Diane Thompson, Eric Kiser, Luke McGuire, Mauricio Ibanez-Mejia, Ananya Mallik, and myself (chair). Marlise Bourland from our GEOS staff expertly provided administrative support. Many other GEOS faculty and graduate students also joined our efforts to extend hospitality to our visiting candidates. All in all, it was an amazing opportunity to learn about cutting edge science from top scientists in their fields. One of our new hires, observational seismologist James Atterholt, will be coming to us from a Mendenhall Postdoctoral Fellowship at the USGS Geologic Hazards Science Center (see page 14). We hope to announce other hires shortly. Please join us in welcoming the new faculty as they arrive!



On the research side, in April 2026, four members from my research group (MS students Parker Comisac and Will McCraine, postdoc Edward Clennett, and myself) joined the GSA Cordillera 2026 meeting in Loreto, Mexico. Many past and present U of A geoscientists attended the meeting and made significant contributions. Dr. Clennett and I co-led a GSA Short Course entitled 'North America Cordilleran Plate Tectonics using GPlates paleo-GIS software'. Our class featured exercises on Baja-BC terrane translation along western North America and on the Guerrero terrane-Arperos Basin of Mexico. Bilingual course materials in English and Spanish were provided to maximize international participation. In May 2026, Dr. Clennett and I traveled to Japan to present our research on subduction zones along East Asia and the northwest Pacific. While in Japan, I received some good news – our GSA Penrose meeting proposal was accepted! Our Penrose meeting will be held in Japan in May 2027 and is entitled 'East and West: Integrating multi-disciplinary views of Japan and California subduction processes within the circum-Pacific'. The meeting will be co-led by Simon Wallis, myself, Kathleen Surpless, and Asuka Yamaguchi. We welcome you to Japan in 2027!◆



Participants in the GSA Short Course on North American Cordilleran Plate Tectonics co-led by Jonny Wu and Edward Clennett of University of Arizona.



University of Arizona faculty, graduate students and alumni at the GSA 2026 Cordilleran meeting in Loreto, Mexico. From left to right: Joel Saylor, Jonny Wu, Emma Boeman, Will McCraine, Parker Comisac, Paul Kapp, Edward Clennett, Emilia Caylor, Haiyang Kehoe.

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Updates on the Graduate Program

From Director and Associate Professor Luke McGuire

Our graduate program enters the 2026–2027 academic year with continued momentum. We are excited to welcome 16 new graduate students (9 PhD, 4 MS, and 3 Professional Science Masters) in August of 2026, up from the 15 new students that started in August 2025.



We are operating in a time of substantial uncertainty and change with respect to funding challenges and opportunities, but our graduate students continue to play invaluable roles in projects funded by federal and state agencies as well as industry, with nearly 70% of our graduate students funded by research grants and contracts. The breadth and success of these research efforts give us continued optimism about the bright future of our graduate program.

Thank you to all the alumni who have donated to our graduate student scholarships. These scholarships make an enormous impact on our graduate students' research, professional development, and overall well-being. The Department gave out nearly $90,000 in graduate student scholarships during the 2025-2026 academic year with half of the scholarship funds slated for summer research activities. We had 14 graduate students receive College of Science Galileo Circle Scholarships that were also donated by alumni and friends of the College of Science. We recognize and appreciate that we are very fortunate to have this type of support for our students. Your contributions make a big difference to the health of our graduate program and success of our students!

The strength of our graduate program is reflected in the accomplishments of our students. Our graduate students continue to make outstanding contributions to Earth and Planetary science through innovative research. From field sites around the globe to laboratories and computational facilities, they are advancing our understanding of the Earth system from the clouds to the core. They are making impacts in seismic tomography, thermochronology, climate modeling, earth resources, tectonics, and many other areas.

We had 6 PhD students, 2 MS students, and 2 PSM students graduate in fall/spring of the 2025-2026 academic year. We have 2 PhD, 8 MS and 5 PSM students that are planning to graduate this summer, giving us a total of 25 graduates since the last newsletter. Congratulations to all the graduating students and their advisors!

I also want to highlight a few of our outstanding graduate students. Congratulations to Luke Basler, Alexandra O'Keefe, and Isaiah Spring for being recognized as the 2025-2026 Department of Geosciences outstanding graduate students in scholarship, teaching and service, respectively. Congratulations to graduate students Holly Thomas and Madison Tuohy who co-chaired GeoDaze 2026! It is always amazing to see the student work that is highlighted at GeoDaze. I hope to see many of you at next year's GeoDaze celebration!◆



GeoDaze 2026 Recap

As co-chairs of the 2026 GeoDaze symposium, we want to start by extending our deepest gratitude to everyone who contributed to this year's event. The donors, visiting speaker, organizing committee, administrative staff, volunteer judges and of course - student presenters - made this year's GeoDaze an event we'll never forget! Over the course of two days, we saw 52 student presentations from undergraduate through PhD students, on a breadth of topics ranging from arc magmatism to the climate signals contained in the shell of the humble geoduck. We were honored to host Dr. Lisa Park Boush, University of Arizona Geosciences alum and former student of Dr. Andy Cohen, as our opening keynote speaker. Lisa's talk, 'From Gould Simpson to Beech Hall: Lessons Learned from a Life in Geosciences,' traced her journey as a geoscientist (and as an artist!). We're so grateful she could join us in person and that we got to celebrate her Distinguished Alumni Award alongside her.



GeoDaze is a true celebration of the breadth and talent of our department, and this year was no exception.

Geodaze runs on the generosity of people who believe in what our students are doing and we couldn't be more grateful for your continued support. Every donation goes directly towards student scholarships and keeping the symposium running each year. If you'd like to see the full results from this year, including award winners, abstracts, and photos, head to geodaze.com. We hope to see you at GeoDaze 2027!

Thank you for making GeoDaze 2026 possible and for your ongoing commitment to our students' success!

Sincerely,
GeoDaze 2026 Co-Chairs, Holly Thomas & Madison Tuohy

2026 GEODAZE WINNERS

Best Overall Talk: Tomás Guerreiro

Reactive Crystallization Driving Ultramafic To Mafic Differentiation In The Deep Crust: Insights From Las Juntas Complex, Famatinian Arc, Argentina

Best Undergraduate Poster: Zachary Pecha

Detrital Zircon Analysis of the Gravina-Nutzotin Basin Southeast Alaska

Runner-up Undergraduate Poster: Art Tello

Derelict Fossil Collection of UA's Gould-Simpson Building Comprises Pan-Phanerozoic Assemblage of Many Phyla in Need of Modernized Curation

Best Graduate Poster: Hunter Bailey

Imaging the San Francisco Volcanic Field Using a Joint Active- and Passive-Source Inversion

Runner-up Graduate Poster: Wayne Allen

Improving Recovery Prediction of Sediment-Hosted Vanadium with Geometallurgical and Hyperspectral Mapping

Best Geochemistry, Petrology, and Volcanology Talk: Vrinda McBride

Understanding Grain Size Effects on Primitive, Hydrated Asteroids

Best Geophysics Talk: Sankha Subhra Mahanti

Detachment-Involved Deformation in the Santa Barbara System in NW Argentina Revealed by Seismicity and Receiver Functions

Best Economic Geology Talk: Camila Sojo-Aguero

Disequilibrium sulfide crystallization as a key controlling process for metal enrichment at the giant Filo del Sol Cu–Au–Ag deposit, Argentina-Chile

Best Climate & Paleoclimate Talk: Leila Fischer

Three millennia of northeast Pacific sea surface temperatures from growth increments of the long-lived bivalve, Pacific Geoduck

Best Tectonics & Geochronology Talk: Priscilla Martinez

Timing and drivers of Cenozoic marine phosphogenesis in the southeastern Pacific Ocean

Best Geoscience & Society Talk: Alec Martin

The Fe-Au-(Cr-Ti-V-PGE) deposits of the Khazad-dûm layered mafic intrusion in the Mines of Moria: a potential geologic model for the occurrence of Mithril ore

Best Undergraduate Talk: Oliff Doiron

Insights from Individual Foraminiferal Analyses on Deepwater Formation in the North Pacific During the Pliocene

The Nicéa Wilder Best Graduate Talk: Amanda Manoogian

Reconstructing Holocene export productivity in the Gulf of Mexico: integrating modern observations, foraminiferal assemblages and individual foraminifera analyses



Department Wows

The University of Arizona has climbed 5 spots in the *TImes Higher Education* World University Rankings for physical sciences. Last year we were at #50 and this year we're at #45. The disciplines considered in the physical sciences are Physics, Chemistry, **Earth Sciences**, Space Sciences, Mathematics, and Computer Science. This is our highest ranking ever. Based on this ranking, we are now at #20 in the U.S. and at #8 among public U.S. universities. This is our first placement among the top 10 public U.S. universities. **Earth sciences** was also featured in a University News article that highlighted current graduate program rankings. "Earth sciences, housed in the College of Science, ranked No. 2 among public universities and No. 4 overall." Finally, in another U of A News article highlighting Space Science ranking No. 1 among public universities, Geosciences was listed at No. 13 in the nation. Geos rocks!

STUDENTS

Over the course of the last year, our students, both Graduate and Undergraduate, have accomplished some exciting things!

14 Geosciences students were named Galileo Circle Scholars. "The Galileo Circle awards scholarships to undergraduate and graduate students who demonstrate exceptional potential in the physical, mathematical, environmental, cognitive, and life sciences." (https://science.arizona.edu/galileo-circle)

- Arkadeep Roy
- Isaiah Spring
- Angel Tatsch
- Joses Omojola
- Tumaini Kamulali
- Mudith Weerabaddanage
- Julia Zigray
- Aniket Dhar
- Priscilla Martinez
- Sankha Subhra Mahanti
- Camila Sojo
- Guido Merino
- Asiya Badarunnisa Sainudeen
- Ainsley Carling

Congratulations to the 3 Geosciences students who were recognized at the **College of Science Outstanding Graduate Student Awards** ceremony. Recipients of these awards are then eligible for the college level awards in the same categories. The awardees were:

Scholarship: Luke Basler
"Luke combines originality, productivity, and scientific vision at a level that is rare for a graduate student. He is already making meaningful contributions to the geosciences, with a trajectory that promises continued high-impact work."
- Dr. Barbara Carrapa

Service: Alexandra O'Keefe
"Alexandra is very deserving of this recognition. Her service record is substantial, steady, and community-focused. She has contributed to student life, departmental programming, outreach, and undergraduate mentoring in ways that I feel have made a real difference."
- Dr. Kaustubh Thirumalai

Teaching: Isaiah Spring
"I would like to state that Isaiah shows early signs of becoming a very creative and promising researcher in his field and we are fortunate to have such a brilliant and promising graduate student in our department at the University of Arizona."
- Dr. Ananya Mallik

NASA's Solar System Exploration Research Virtual Institute (SSERVI) awarded graduate student **Pratik Santra**, pursuing a PhD in the U of A Geosciences Volcanology group, as the joint second-place winner for his research presentation at the 2025 NASA Exploration Science Forum.

Economic Geology PhD student **Camila Sojo** gave one of the four best oral presentations at the Society of Geology Applied to Mineral Deposits (SGA) international conference. Her talk was about the occurrence of Silver in her area of study (Filo del Sol mining project).

The College of Science Outstanding Seniors for Geosciences were **Alma Reasoner** (Fall '25) and **Angela Tatsch** (Spring '26). **En-Chi Lee** was also awarded the Excellence in Undergraduate Research Award.

Graduate student **Aniket Dhar** won "honorable mention" runner-up at the International Conference on Paleoceanography for the best poster award in the Monsoon Session.

MS student **Parker Comisac** received an Honorable Mention award for his poster presented at the Houston Geological Society Student Expo: "Unfolding the Alaska-Aleutians slab and its implications for Kula-Pacific plate tectonic reconstructions and regional geology". Co-authors are Jonny Wu and Jeffrey Benowitz.

Pedro Brito, student under Marta Codeço, received the 2025 AGS Scholarship.

FACULTY & RESEARCHERS

Associate Professor and Co-Director of LaserChron, **Mauricio Ibañez-Mejia**, was elected by the GSA Geochronology Division membership as their new 2nd Vice-Chair! This is a 4 year term. Students and postdocs can reach out to Mauricio if you'd like to learn more about the GSA Geochronology Division and possibly get involved. (ibanezm@arizona.edu)

The University of Arizona's New Frontiers of Sound Science and Technology Center (NewFoS) research team won the Governor's "Innovator of the Year – Academia" award! (Tech Launch AZ) Geosciences Professor Emeritus **Susan Beck** and Postdoc **Bingxu Luo** work on environment seismology for the center. The center is a group of interdisciplinary engineers and scientists at U of A and 8 other Universities and Colleges around the country working on ways to apply Topological Acoustics methods to everything from computers to environmental problems. This news was also featured in the University's Lo Que Pasa newsletter.

Professor Emeritus **Joaquin Ruiz**, previously Thomas R. Brown Chair and director of Biosphere 2 and executive director of the France-Arizona Institute for Global Grand Challenges, was named a knight of the National Order of Merit by the French Ministry for Europe and Foreign Affairs. The appointment in the National Order of Merit is a French equivalent of a British knighthood and is reserved for non-citizens who have made considerable contributions. In addition to his work with the France-Arizona Institute for Global Grand Challenges, which connects the university with the French academic community on international research, the French government cited Ruiz's leadership with the iGLOBES International Research Laboratory, where university researchers collaborate with the French scientific community to address global environmental challenges.

Associate Professor **Kaustubh Thirumalai** was selected as a member of the National Fellowship on the Future of Liberal Education (NAFFLE). NAFFLE is sponsored by the Teagle Foundation and brings together 24 newly tenured faculty from research universities across the country. These faculty are nominated by their institutional leaders for a multi-year program focused on curricular innovation, the future of higher education, and faculty leadership. This is a significant distinction and national recognition of Kaustubh's standing as both a scholar and an educator.

GSA held a topical session in honor of **Andy Cohen** titled "Integrating 20 Years of Scientific Drilling in the East African-Syrian Rift: A Session In Honor of Andrew Cohen, Parts I and II". Several awards were named for Andy including the GSA Continental Scientific Drilling Division Andrew S. Cohen Award. Several special volumes were also announced.

- GSA Special Paper—focused on Afro-Syrian Rift drilling projects Journal of Great Lakes Research Volume—focused on Lake Tanganyika.
- Springer Synthesis in Limnogeology Volume. Edited volume

STAFF



Meet our new Geosciences Senior Research Administrator, **Savannah Allshouse**. Savannah (she/her) was born and raised in Oklahoma, received her Master's degree in public administration from Texas A&M, and then spent six years in Hawai'i working as a grant-writer, project finance manager, and running a local non-profit. Most recently, she spent the last 5.5 years providing proposal support at Colorado School of Mines. She lives in Denver, CO with her husky named Laszlo. She spends her free time reading, crafting, playing Dungeons & Dragons, hiking, and lifting weights. Savannah, we look forward to working with you!

This year's College of Science staff advisory council employee excellence award winner for Geosciences was Graduate Student Advisor, **Rocina Garcia**.



"Rocina was honored for her tireless dedication to our grad students and her service to the department. Guiding our grads through their programs with knowledge and compassion, she's become a valued and respected employee. Rocina assists with all departmental needs and never fails to bring her enthusiasm and joy to work each day. We are all grateful to have Rocina on our team!" - Pat Waters, Business Manager



Shout out to Communications Consultant **McKenzie Meza** who hosted this year's College of Science Staff Excellence Awards Brunch.

Front desk admin **Melissa Shockley** received a College of Science Staff Advisory Council Star Award! The program is intended to thank staff members for their valued efforts by increasing the opportunity and frequency for them to receive a public pat on the back. "She is hardworking, dedicated, and always excited to learn new things," shared Grant and Contract Admin Heather Alvarez in a letter of nomination, "She is the ultimate team player. She is always willing to lend a hand and chip in when things are stressful. She never hesitates when asked to come in early to assist with coverage or help with departmental events."◆





News

Geosciences faculty, students, and staff have had an amazing year. From published papers and media features to awesome field trips and conferences, we are proud of the people under our roof and the work that is being done here.

FACULTY & RESEARCHERS

RETIREMENTS

- Professor Susan Beck
- Professor George Gehrels
- Professor Mihai Ducea
- Professor Joaquin Ruiz

PAPERS AND PUBLICATIONS

- Associate Professor **Patricia Persaud**: "Detecting Urban Earthquakes with the San Fernando Valley Nodal Array and Machine Learning" This study presents a new method to identify earthquakes occurring beneath major cities that are not being captured by traditional seismic networks. **Katleho**, **Joses**, and **Ben** in our department were involved in collecting the dataset. The data collection team included 29 individuals from universities in Arizona, California, Louisiana, Texas, and Mexico, as well as nonacademic volunteers.
- Professor Emeritus **Vance Holliday** in *Science Advances*: "Paleolake geochronology supports Last Glacial Maximum (LGM) age for human tracks at White Sands, New Mexico." Co-authors Jason Windingstad and Jordon Bright. The paper is dedicated to Andy Cohen.
- Associate Department Head **Jonny Wu** and team in *Geophysical Research Letters*: "Analysis of Shear Wave Splitting Patterns in Alaska: Evidence for Strong Intra-Slab Anisotropy. Article on Alaska seismology." Also featured in the AGU EOS newsletter, research on the Alaska slab, led by Dr. Sharmila Appini and Dr. Yingcai Zheng at the University of Houston, suggests that subducting plates are stronger in certain directions than in others.
- Professor **Jess Tierney** and team's Phanerozoic temperature reconstruction was featured in *Quanta Magazine*'s special issue on climate science
- Associate Professor **Diane Thompson** in *Science Advances*: "Reconstructing Eocene Antarctic river drainage from provenance analysis of Amundsen Sea embayment sediments"
- Joint Associate Professor **Christopher Hamilton** in U of A News: "Life on lava: How microbes colonize new habitats"
- Professor Emeritus **Mihai Ducea** in *GSA Bulletin*: "The role of crustal magmatism in the formation and the evolution of orogenic plateaus"
- Associate Professor **Marcus Lofverstrom** in *JGR Atmospheres*: "Towards a Realistic Representation of Katabatic Storms in Greenland in Reanalysis Data and Global Earth System Models"
- Regents Professor Emeritus **George Davis** made significant contributions to a new volume of the *Journal of the Southwest*. This was a collaborative effort with David Yetman, a research scientist with the U of A Southwest Center. The volume also archives some departmental history.
- Professor **Barbara Carrapa** and Associate Professor **Kaustubh Thirumalai** have a new paper and blog out that were featured in U of A News: "Andes volcanoes – the missing link between algae blooms, whales and climate millions of years ago." Barbara and Kaustubh were also interviewed about their work on Arizona PBS Horizon.
- Associate Professor **Kaustubh Thirumalai**:
  - "Ecological heterogeneity in the early Pleistocene Siwaliks: Insights from stable isotope analysis of fauna from the Haro River Quarry hyena den, Pakistan", led by postdoc **Dr. Anubhav Kaur** in *Science Direct*
  - "Arabian Sea stratification and deoxygenation driven by weakening monsoon winds over the Holocene" in *Communications Earth & Environment*
  - "Opposing hydroclimate extremes in Central and mainland Southeast Asia over past millennium" in *Nature Geoscience*

OTHER HIGHLIGHTS

- All SOCCOM3 funding through 2027 has been forward funded from NSF, big thanks to our amazing program managers. —University Distinguished Professor **Joellen Russell**
- Famous in Yuma, Professor Emeritus **Karl Flessa** was interviewed for a story in AZ Family News about Arizona farmers adjusting to water restrictions as Colorado River cuts continue. His research was also featured in U of A news in a story about revitalizing the Colorado River Delta. Additionally, he was featured in an Arizona Daily Star story about cuts to scientific research and their effects in Arizona.
- The Alfie Norville Gem and Mineral Museum now has a display on experimental petrology and how it is used to interpret rock and mineral records to understand our Earth

better. The display showcases the Earth-based research in our group. This is one of the broader impacts **Ananya Mallik** had proposed for an earlier NSF grant. This display was developed by **Bridgett Holman** who is a former undergraduate student from our department who is now a PhD student at Lamont.

- The collaborative work of Associate Professor **Luke McGuire** on landslide hazards with AZGS was featured in the New York Times. The article covers how "research in the U.S. Southwest could expand lifesaving efforts for hazards that follow wildfires across the globe." Two U of A graduate students and one undergraduate student presented related work at GSA.
- The research proposal of Associate Department Head **Jonny Wu** and Associate Professor of Practice **Amanda Hughes**, entitled "Stress-Strain Evolution during Strike-slip Faulting from 3D Discrete Element Models", was recommended for funding by the Petroleum Research Fund New Directions grant for $125,000. The research will investigate whether strike-slip faults formed in diverse boundary conditions share a similar stress-strain evolutionary history. The work will help understand 4D deformation patterns during strike-slip faulting.
- Associate Professor **Diane Thompson** was recently featured in U of A News highlighting the corals being added to the Biosphere 2 ocean habitat. This project "may help save reefs around the world"! She was also featured on the Biosphere 2 instagram account highlighting her work in the Marshall Islands alongside the Marshall Islands Marine Research Authority to unlock the history stored inside massive Porties corals.
- Professor **Jess Tierney**'s postdoc **Dr. Elke Zeller** was featured in the Research & Partnerships Postdoc Affairs' Biweekly Newsletter. The story highlighted how her research centers on interactions among vegetation, climate, and ecosystems.

STUDENTS

This year we'd like to highlight the Arthur Mirsky Geology Fellowship which defrays tuition costs for graduate and undergraduate students.

Learn more at giving.arizona.edu/news/fire-opals

PAPERS AND PUBLICATIONS

- "Understanding the 3D Hydrodynamics of Lake Tanganyika: Insights From Modeling Circulation Patterns Using a 3D ROMS Model": **Tumaini Kamulali**, **Paul Goodman**, **Joellen Russell**, and **Andy Cohen** in *Geophysical Research Letters*.
- **Anna Rebaza**, a recent PhD from **Ananya Mallik**'s group, just published another chapter from her dissertation in *JGR Solid Earth*. **Bridgett Holman**, a former undergraduate researcher, is a co-author along with Ananya Mallik.

  "In this publication, we use a combination of high pressure-temperature experiments, thermodynamic and geodynamic modeling to investigate the fate of sediment-rich mélanges upon subduction, and the mass transfer processes involved at sub-arc depths. We find that the release of aqueous fluids and low-degree mélange partial melts near the slab-mantle interface are the dominant agents of mass transfer. If buoyant diapirs may occur from the slab (an additional mass transfer mechanism), they are most likely in warm and slow subduction zones rather than cold and fast ones." —Ananya Mallik
- Graduate student **Isaiah Spring** published a paper from his PhD Dissertation. The study develops a model to explain the formation of secondary crust on the Moon using grain separates from one of the most pristine crustal samples in the Apollo collection.
- Former grad student **Eytan Bos Orent** had 2 new publications: First, an update to the Database for Mineral Districts in the State of Arizona, and "Episodic copper mineralization in sedimentary basins: evidence from the Paradox Basin, USA" with co-authors Mark Barton and Jason Kirk.
- College of Science Outstanding Senior for Geosciences **Angela Tatsch** this spring conducted research with Dr. Jessica Barnes at LPL and a paper she co-authored was published in *JGR: Planets*: "Two Slowly Cooled and Chemically Diverse Basalt Clasts Identified in ANGSA Core 73001"
- Grad student **Sankha Subhra Mahanti** in *Geology* along with Jim Bradford, Eric Kiser, Susan Beck, Martin Fernandez, Sebastian Tauber, Ryan Porter, Gustavo Ortiz, and Mauro Saez: "Detachment-involved deformation in the Santa Bárbara system in NW Argentina revealed by seismicity and receiver functions"

OTHER HIGHLIGHTS

- College of Science Outstanding Senior for Geosciences last Fall, **Alma Reasoner**, presented research at the Slope Stability in Mining 2025 conference in Vancouver. This work was conducted in collaboration with NIOSH at the Geotechnical Center of Excellence (GCE), a part of the School of Mining Engineering and Mineral Resources (SMEMR). She presented a talk & paper on using thermal imaging for rockfall detection and coauthored another on the expansion of the Modified Ritchie Criterion. "I want to thank the GEOS department scholarship Evans B Mayo fund, for supporting some of this travel - I had a great experience!"
- The **Southern Arizona AWG** (Association for Women Geoscientists) BOOs fundraiser raised a record $945 this year! All proceeds benefit the AWG scholarship fund.
- The department hosted yet another successful ExxonMobil recruitment event for students. The event brought together students from U of A and surrounding southwestern institutions, giving insights into internship opportunities and what the industry is like. The department also had a very successful graduate program recruitment breakfast and dinner. Prospective MS and PhD students got to visit campus and the department to meet with faculty, researchers, current grad students, and tour our labs. They also embarked on a field trip to Sabino Canyon as well as the Gem and Mineral Museum.

- Peter Larson of the Black Hills Institute of Geological Research visited our Dinosaurs class, speaking about his decades of work as a commercial fossil collector. He is best known for his team's discovery of "Sue" in 1990, the largest and most complete T Rex fossil ever found to date.

STAFF



Meet Ben Mcelhaney. Many, if not all, members of the Department of Geosciences know Ben. He's been with the department since the 80s. On any given day you can find him working on a new lab, moving in new technology, improving current labs and offices, or simply walking the halls to make sure everything in the building is up to par.

> ***"Since I joined the Department of Geosciences, Ben has been my go-to person for questions about space, equipment, renovations, Facilities Management requests, and knowing who to contact for just about anything," shared Executive Assistant Marlise Bourland, "He is always willing to help. His experience and institutional knowledge are irreplaceable."***

Ben writes,

I started working for Geosciences in November, 1984 as an Electronic Technician I, working under Electronic Engineer David Steinke and Electronic Technician Larry Simpson. Our job was to repair and maintain all the equipment in the department. We were located in the Harshbarger building back then, along with the College of Mines.

It wasn't long before everyone started getting excited about the new Gould Simpson building being built. We were going to move there and would go to check the progress on our lunch breaks. Once it was finally finished and the movers moved most of the stuff, it was up to us to move the rest. We ended up walking the fragile instruments and glass sample prep lines over to the new building. It took around 2 years to upgrade everything and get it all up and running again.

Since then, Geosciences has expanded, adding new faculty and researchers, most of them needing labs. We had plenty to spare, but they were just empty rooms - blank slates. It was up to us to build specialized infrastructure to fit their research and instrumentation needs.

Over the years the department continued to expand and modernize, adding new state-of-the-art instruments and new faculties. Ironically, I find myself tearing out and rebuilding labs that we built 30 years ago that, at the time, were cutting edge.



Ben dismantling and getting ready to move an old Sector 54 TIMS unit to make way for Arizona LaserChron's new Element 2 ICPMS.

But that's one of the best parts of my job, seeing the first successful experiment or an analysis from a new mass spectrometer in a lab I helped build.

In summary, I don't just build these labs, but I keep the instruments and equipment in the labs working. In addition to that, I am also the building and property manager.

"Not only is Ben a permanent fixture in the department, joining the department even before the opening of the Gould-Simpson building in 1986, he is one of the nicest people you will ever meet," shared Grants and Contracts Admin Heather Alvarez, "He's always willing to lend a helping hand when needed and always with a welcoming smile on his face. Geosciences is lucky to have such an amazing guy roaming the halls of Gould-Simpson. He is an asset not only to the department but to the University of Arizona."◆

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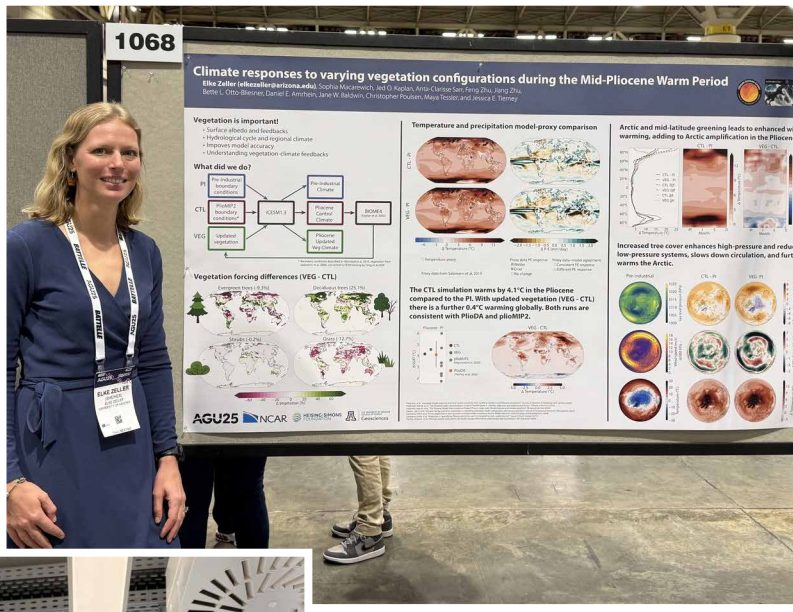
COLLEGE OF SCIENCE **LUNAR & PLANETARY LABORATORY**

POSTDOCTORAL RESEARCH SPOTLIGHT

Climates, Vegetation, and People of the Past

By Dr. Elke Zeller

Three million years ago, during the Mid-Pliocene Warm Period (MPWP), the global distribution of vegetation was different than today. Overall, there was more vegetation, the boreal forest extended further north, and the Sahara was greener. However, exactly how far north the forest extended or how green the Sahara is remains unclear. Developing a clearer picture of past vegetation is important because vegetation can alter the climate system through two key pathways: it changes the surface albedo (darker forests absorb more sunlight than bare or snow-covered ground) and it affects the exchange of moisture and heat between the land surface and the atmosphere. These local changes can have far-reaching effects on temperature, precipitation, and atmospheric circulation, contributing to uncertainty in past climate model simulations. Pollen data offer some constraints on past vegetation distributions but are too sparse to produce reliable global estimates on their own. Vegetation models are used to fill in the gaps in our knowledge. However, there is uncertainty associated with both models and proxies that is not always considered when climate models incorporate vegetation information as a boundary condition.



Presenting at AGU

As part of the "paleoWeather" project that Prof. Jessica E. Tierney is leading, we are investigating the drivers and statistics of climate extremes using paleoclimate data assimilation (paleoDA). To perform paleoDA, we need an ensemble of climate states that sample the range of plausible past climate conditions, since the spread across these states is what allows us to estimate the uncertainty in our prior knowledge of the climate. For this purpose, Jess gave me the opportunity to explore vegetation as one of the ways to change the climate. I developed a new global MPWP vegetation distribution to use as updated boundary conditions to model the climate within the Earth System model (CESM). Comparing the new run to our standard (aka control) simulation showed that by changing the vegetation alone, the global temperature increased by 0.5°C! Not only that, we also see enhanced Arctic warming and a major slowdown of the atmospheric jet stream. All of this led me to take a deeper dive into these two topics. Since my PhD research focused on the influence of climate and vegetation changes on early humans, rather than on atmospheric dynamics, I had a lot of literature research to do. With the expertise of Assoc. Prof. Marcus Lofverstrom, we are starting to understand where and when vegetation influences and slows down the jet stream. I presented this work at AGU and EGU, and we are now in the final stages of writing up the comparison of the two model runs with different vegetation boundary conditions.



Lab visit in Vienna

In addition to working on the paleoWeather research project, I was a Postdoc Pathways Fellow last year, taking classes in pedagogy and co-teaching ENVS270 Critical Zone Sciences with Dr. Katrina Henry during the spring semester. I taught two modules to a class of 45 undergrad students, which was a valuable experience and a big step towards my future career. I also visited the colleagues in the Department of Evolutionary Anthropology in Vienna, with whom I recently published a paper in PNAS, to learn more about collagen extraction from bones and how it can be used for species attribution, dating, and palaeodietary reconstruction. Together, these teaching and research experiences have broadened my skill set and have been important steps in preparing me for the next stage of my career.◆

RESEARCH HIGHLIGHTS

Coral Research from the Marshall Islands to Biosphere 2

From Dr. Diane Thompson

Field Work in the Republic of the Marshall Islands

The coral atolls forming the Republic of the Marshall Islands (RMI) were settled over 4000 years ago, but the Marshallese's future is in jeopardy due to the projected impacts of climate change. The shallow ground-water resources are vulnerable to sea-level rise and storm surge, and El Niño-related droughts deplete the already limited water supply. These impacts may be further exacerbated by the loss of coral reefs, which protect the islands from waves, leading to more land erosion and saltwater inundation.

Corals, the animals forming the biodiverse habitat known as coral reefs, are declining globally due to their sensitivity to warming oceans. The induced stress causes the expulsion of their photosymbionts, which provide the coral energy through symbiosis, in a process called coral bleaching. Repeated bleaching events are limiting the ability of coral reefs to support the diet, safety, and livelihoods of the people reliant upon them, further jeopardizing island nations like the Marshall Islands.

Fortuitously, Marshallese corals have been faithful recordkeepers of past climate conditions. Coral skeletons grow in bands, like tree rings, and as they grow, trace amounts of chemical elements from seawater are incorporated, allowing us to infer the climate at the time of growth. Associate Professor Diane Thompson and her team (including Geos PhD student Mikayla Deigan, and Geos alumni Drs. Emma Reed and Mudith Weerabaddanage) have previously collected cores from fossil corals, thrown on beaches by rogue waves. In April 2026, they returned to the Marshalls to collect cores out of living coral colonies.

These living coral colonies allowed the team to extend the historical climate record more than 200 years (from the mid-1700s to present day), documenting a trend towards overall dryer conditions in the region and higher year-to-year variability in rainfall. This work will help improve predictions of water availability and inform local water management plans, in collaboration with the Marshallese EPA.

Sampling live corals also allows us to assess coral health and physiology, connecting colony health with its growth and climate history, allowing us to understand the processes that shape the structure and function of the reef. For instance, the team collected coral tissue samples to identify the types of photosymbionts hosted by these corals, which plays a critical role in heat tolerance and thus resilience to climate change. Along with water quality data, these data will be used to assess how changes in climate and nutrient availability from local runoff are affecting coral health. This research supports the aims of Marshall Islands Marine Resource Authority (MIMRA) and Marshall Islands Conservation Society (MICS) to identify the most resilient reefs to prioritize for reef conservation and restoration.

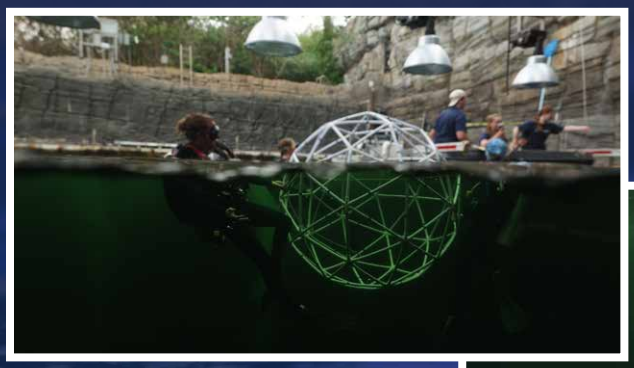
Finally, the team collected additional interviews for their documentary short film illustrating the impacts of climate change in the low-lying atolls of the Marshall Islands. The film, directed by Research Technologist/ Media Producer Aaron Bugaj, highlights the team's ongoing study of historical climate and the accelerating impacts of human-caused warming in the region, as told through the voices of the amazing female-led team of Marshallese coral reef stewards. The goal of the film is to raise awareness of the impact of climate change on coral reefs and low-lying atolls like the Marshall Islands.



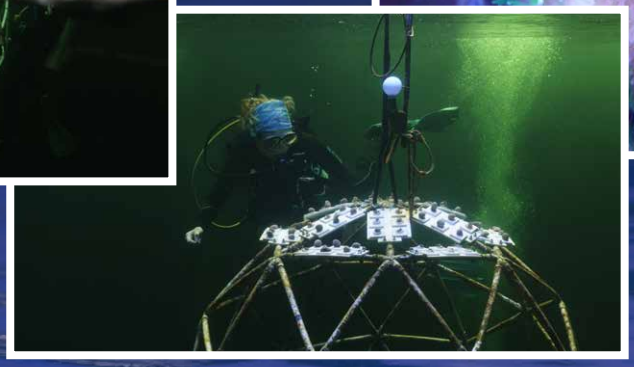




Photos by Aaron Bugaj.







Experimentation in Biosphere 2

For the first time during the University of Arizona's tenure at Biosphere 2, corals were introduced into the Ocean Habitat as part of a temperature-resilience experiment designed to better understand how corals respond under predicted higher future temperature conditions.

A team led by Associate Professor Diane Thompson, Director of Marine Research at Biosphere 2, installed young corals on a dedicated "Coral Ark" structure suspended from the newly installed lighting system over the Biosphere 2 Ocean. Coral Arks are a platform for restoring coral reefs, which increase coral growth and community health by lifting the restored reef off of the degraded ocean bottom. In ongoing work, we are leveraging the Biosphere 2 to optimize ark design for restoration success in deployments worldwide, and have transplanted more than 100 fragments of Caribbean coral species (Orbicella faveolata) from the Gulf of Mexico and FL Keys. The team is conducting a year-long heat stress experiment, and using a suite of genomic and geochemical tools to identify the drivers of heat resilience at ecosystem scale.

Recent upgrades—including a new heat exchanger that regulates temperature, circulation pump and water-turbulence devices for water flow, and the lighting structure—were critical in enabling this type of experiment. This experiment involves strong collaboration with several external institutions, further strengthening the scientific value of the Biosphere 2 facility and highlighting its unrivaled capacity for large-scale, controlled ecosystem research.◆

CLUB UPDATES

Southern Arizona Chapter of the Association for Women Geologists (AWG)



Now in our 8th year as a chapter, Southern Arizona AWG has had an incredible 2025-2026 academic year, and we are so grateful to everyone who made it possible. We raised $1,000 for our Annual Undergraduate Field Experience Scholarship, awarding 1 scholarship to a student attending field camp during Summer 2026. Our events this year included colloquium breakfasts with diverse professionals, our AWG-GeoDaze breakfast featuring Dr. Lisa Park Boush, a community potluck, yoga in the park, and elementary outreach at the International School for Peace. Our gear closet has fulfilled over 75 equipment requests, supporting an estimated 70+ students, more than half of them undergraduates, since its launch in late 2023. We are deeply grateful to the U of A Department of Geosciences and our broader southern Arizona community for their continued support. None of this would have been possible without our wonderful officers and the participants who show up and make this chapter what it is. Thank you, truly!

—Madison Tuohy, *on behalf of AWG*
2025-2027 Southern AZ AWG President



Society of Earth Science Students

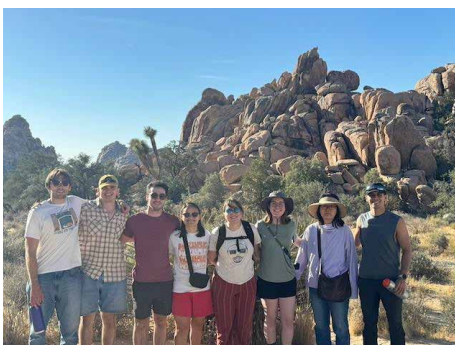
This summer, several of us SESS Club members have been keeping busy! Field camps, summer camps, research opportunities, working, or just enjoying our summers, you name it! Each of us is making new memories and finding new stories to tell of our adventures.

SESS Club had a strong showing at the UA Field Camp 2026, which went on without a hitch (minus a few missing hammers and some mysterious trouble)! Students learned from expert professors, Dr. Pete Decelles and Dr. Barbara Carrapa, as we scoured mountains and ridges, camped in below-freezing temperatures, and mapped the geology of several states.

The VP of SESS, Erin McCafferty, has been doing a summer REU at UT-Austin. Stemming from her current research at the Laboratory of Tree Ring Research here on campus, she has been working in organic geochemistry, extracting waxes from tree leaves to create paleoclimate proxies.

To learn more about what other club members are doing or have done in the past, attend a SESS Club meeting this school year and see how you, too, can have fun or explore a potential future with the geosciences!

GeoClub



GeoClub is a graduate student organization dedicated to fostering community between grad students in the department. We host annual events such as our Halloween party and GeoProm. This year we are also implementing monthly happy hours on the first Friday of each month, with the first round on GeoClub! We also organize biannual trips. Last year, we went to Joshua Tree and San Diego for a week and had so much fun! To give back a little to our community, GeoClub also runs an “Intro to Grad School” event to demystify the application process for our undergraduate students. This year will be our third year hosting this event! We hope to see more grad student engagement this year, as we have several events planned including some new stuff!

—Alexandra O’Keefe, *on behalf of GeoClub*
GeoClub President

Update on the Undergraduate Program

From Associate Professor of Practice and Senior Undergraduate Advisor Jess Kapp

Our undergraduate program welcomed 18 new students this fall, both transfer students and new incoming freshmen! Many are Arizona locals and some are coming from states far and wide. They have chosen to pursue all four of our Geosciences BS subplans as well as our Planetary Geosciences BS, which continues to grow in popularity. We graduated 30 students this spring and while we were sad to see them go, they are off to bigger and better things including graduate studies at universities across the country! Two of our Planetary Geosciences and Geophysics double majors won the College of Science Undergraduate awards this spring: Angela Tatsch was our Outstanding Senior, and En Chi Lee received the Excellence in Undergraduate Research award. They represent what makes our students special – passion, perseverance, and dedication to research, outreach, and academics.



Our number of majors is holding steady at just under 200. We continue to foster close collaborations between our program and others such as Hydrology and Atmospheric Sciences and Mining Engineering, where many of our students pursue minors. In AY 25-26, the department awarded thousands of dollars in undergraduate scholarships to support them in pursuits such as field work, research, educational costs, and travel to academic meetings (see page 20). Our faculty provide excellent opportunities to work alongside them on their many projects, and many of our students presented their work at our annual GeoDaze Symposium this spring. (see page 5) We are so proud of their achievements.



We are always striving to provide a curriculum that is relevant for today's world, and we value our students' feedback! This past year, the Undergraduate Policy Committee worked hard to adjust our Geophysics curriculum in response to both student input and in anticipation of the changing teaching landscape as new faculty join us. We successfully updated our Introduction to Geophysics course to be 4-units, which will better prepare undergraduates for their upper division geophysics courses. We eliminated the Math 322 requirement in the geophysics subplan, thereby allowing students in the geophysics subplan to take three more units of emphasis in an upper division geoscience course of their choosing. It will also give them the flexibility to choose what final upper division math course they take to complete a math minor. Geophysics will continue to be a very strong program, with courses being developed to address the future of resources, such as geothermal energy.

The General Education Program has updated its requirements with a new category called Civic Institutions. Students will be required to take one course in this area (and one less course in the interdisciplinary area of Building Connections). This will apply to all students starting this fall.

The SESS club has a new set of officers this fall, headed by President Bennett Greenfield! They had another amazing trip to Utah over spring break and represented geosciences at the Tucson Gem and Mineral Show with their annual Junior Education outreach area. SESS provides our students with a strong community of peers who study together, socialize, and make an impact in our community through school visits and other events. We encourage all our new students to attend SESS meetings and get to know each other!

From academic achievements to representing U of A Geosciences out and about in Tucson and beyond, we continue to be proud of our geosciences undergraduates: they ROCK!◆



NEW FACULTY SPOTLIGHT

Meet James “Jimmy” Atterholt

Assistant Professor of Geophysics

I’m excited to join the U of A Geosciences Department as a faculty member this year. I’m a seismologist interested in great earthquakes, the evolution of fault zones, and the structure of the crust. I was born a Hoosier and studied applied math and geology at Indiana University, where my undergraduate advisor, a seismologist, introduced me to the magic of waveforms and the Linux terminal. From there I went to Caltech for my PhD, where I was fortunate to arrive as two developments were shaking up geophysics: fiber-optic sensing and machine learning. I spent those years applying both to problems of the solid Earth. I then headed to Colorado for a postdoc at the USGS, where I found myself surrounded by U of A alumni. There I applied what I’d learned during my PhD to a whole host of problems in geohazards and earthquake science.

I put seismic instruments in dynamic regions of the Earth and follow the most interesting paths the data reveal. My favorite sensing technique turns ordinary fiber-optic cables, including the telecommunications fibers that crisscross the Earth like a spiderweb, into dense networks of seismic sensors. That density improves our view of the Earth’s interior. It lets us image the detailed structure of fault zones, observe the complexity of earthquake rupture propagation, and track processes taking place near the surface, all at remarkable resolution and in places that are otherwise hard to reach, from the seafloor to the middle of a city. Beyond this, I’m always looking to apply new techniques from other fields, especially applied mathematics, that can help us solve some of the problems we face in solid Earth geoscience.

At U of A, my group will use these tools to solve problems of crustal structure, earthquake science, and near-surface monitoring. The Southwest is an excellent natural laboratory for all three, with plenty of fiber already in the ground waiting to be put to work, and lots of opportunities for students to get some experience in field geophysics. I’m also looking forward to teaching, and I hope to teach a wide range of courses that mix math and geoscience, from introduction to geophysics to inverse methods. The breadth and warmth of the Geoscience department were a big part of what drew me to Tucson, and I can’t wait to collaborate with the faculty and students there.

Outside of work, gardening is a passion of mine, and I’ve been reading up on what can be done in Tucson (planning on lots of peppers and citrus). I like watching baseball, and I have decided to adopt the Diamondbacks as my team. I love to read, and lately I’ve been enjoying lots of locked room mysteries and ancient histories. Old movies are a weakness of mine. I’ll be living near The Loft Cinema, and you’ll reliably find me at their Hollywood Classics showings. I won’t be arriving alone: my wife, Hannah, our 8-month-old son, Arthur, and our 7-pound poodle, Bento, are all making the move. How the latter two will handle the heat is an open question. Please come say hi.◆





SUMMER FIELD CAMP 2026







Reading the Rocks

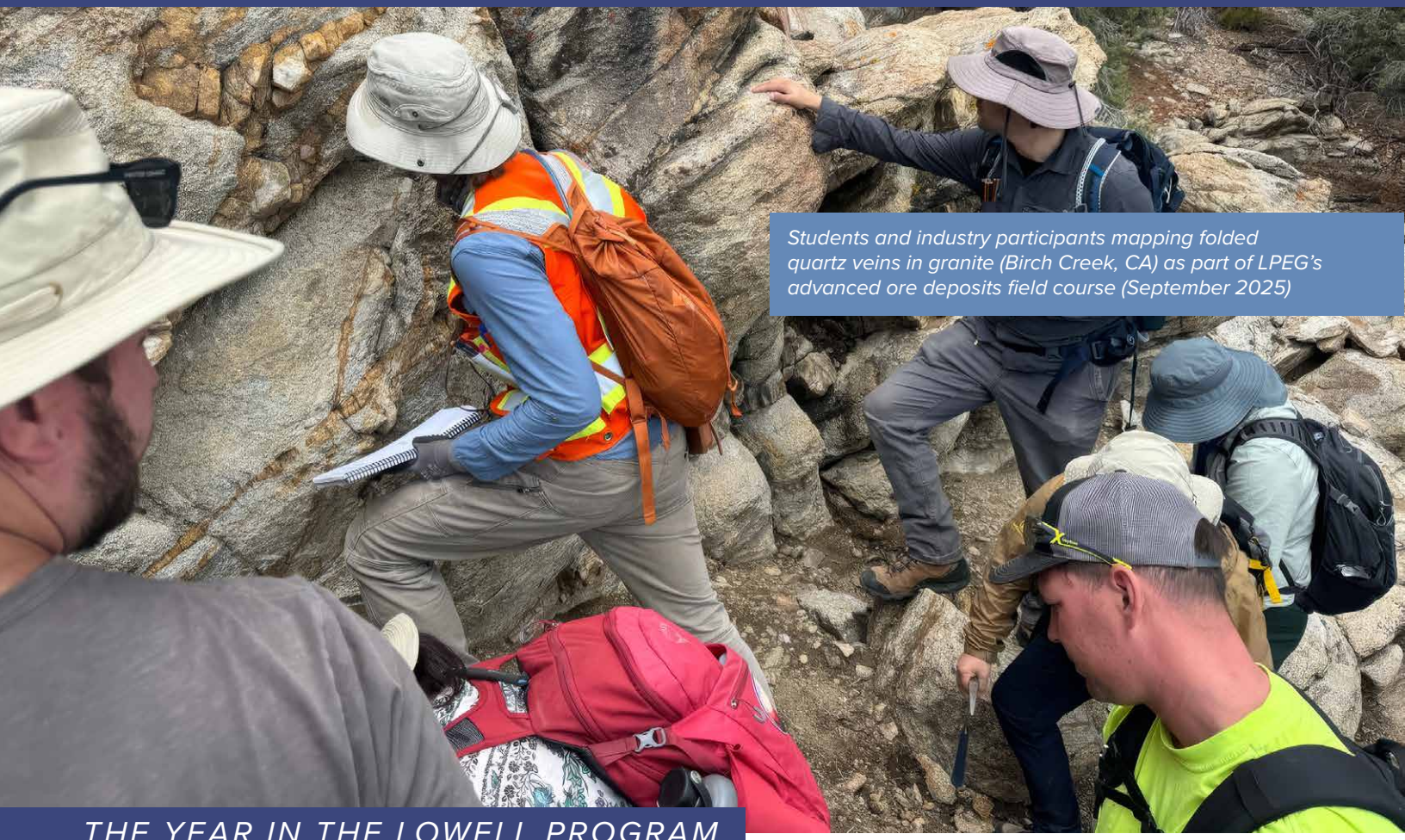
Summer 2026 saw another successful rendition of GEOS 414, our undergraduate field camp. Fifteen intrepid students from the U of A and three other universities joined professors Barbara Carrapa, Mauricio Ibañez-Mejia, and Peter DeCelles, AZGS Research Scientist Mark Holland, TAs Luke Basler and Priscilla Martinez, and cook Lily McGrath to learn the geological history and processes of formation of the western Cordilleran orogenic belt.

> *"At the U of A field camp every day was spent seeing something new ...These places were geologically astounding on their own but I also learned to have a greater appreciation for the regional story based on what we saw. Developing that perspective was such an incredible opportunity!"*
>
> —Jewel "Mica" Waas de Czege, University of Washington '27

Beginning with a mine tour at Sierrita, courtesy of Freeport McMoRan geologists, we traveled in six Motorpool vehicles from Tucson to Utah, Wyoming and Nevada. Highlights included the Grand Canyon, Uinta Mountains, Wyoming overthrust belt, Utah Basin-and-Range, and the East Humboldt core complex. Students mapped large complex regions, studied arclogite xenoliths, learned Precambrian through Cenozoic stratigraphy, worked with a wide range of rock types and geologic structures, mapped glacial moraines, and pulled it all together in a final synthesis that integrates all their observations into a single, moho-scale cross-section from Wyoming to central Nevada. The course continues to evolve as several study areas were done for the first time ever. Camping in wilderness settings remains the standard. Cooler than average temperatures and no forest fires made for ideal working conditions.

> *"Field camp turned me into a thrust-fault-mapping, sing-along-hiking, steak-and-salmon-eating machine! ...I'm so excited to move forward, completely capable of whatever geology has in store for me."*
>
> —Maci Merrell, U of A '26





Students and industry participants mapping folded quartz veins in granite (Birch Creek, CA) as part of LPEG's advanced ore deposits field course (September 2025)

THE YEAR IN THE LOWELL PROGRAM

A Year of Growth & Innovation

From Director Mark Barton, Assistant Professor Marta Codeço, and Manager JD Mizer

In addition to 4 PhD students, 2026 has seen the largest group of new and continuing masters students (PSM and MS) in the history of the program. Ten will complete degrees this year and are headed on to PhDs or jobs in industry and government. We started the academic year with the departure of Herve Rezeau but gained JD Mizer (PhD '14) who returned from a decade in mineral exploration. JD has taken on the role of LPEG manager where he manages the revised PSM (Professional Science Masters) program. As part of that he will teach a couple of courses while taking on overall responsibility for several of the 10-day short courses.

With project support from Freeport-McMoRan (and we hope others to come!), the PSM program has been restructured to offer a cohort-based approach that would facilitate completion in 1 year. This becomes a natural fit with the Accelerated Masters in Economic Geology which is now officially underway with the first group of students. In both cases, the goal is to make robust mineral resources training easily available (including online) to a larger number of students – and readily affordable, if we can generate student support.

Activities this year included offerings of the 10-day advanced courses (ore deposit mapping; porphyry deposits; structure for exploration and mining geology) and several related courses through the Lowell IMR professional education efforts. Our students were heavily involved both in taking and helping to run them. This allows us to fill most of the courses to capacity (~40) with industry participants. Revenues in turn help support students and their activities. The SEG student chapter has been quite active with mineral sales and helping with outreach. Their highlight this year, with help from Marta, was organizing and leading a May field trip to the ore deposits of Portugal.

Research activities have spanned multiple areas from basic geochemistry to field-based projects including several large ($M+) projects on critical minerals. Many continuing and new projects, such as the new cohort-based PSM effort, are collaborative with Freeport where Simone Runyon, Bill Stavast and other alumni have been key partners. The Lowell Mineral Characterization Facility, a partnership of LPEG, MGE, and LIMR (see https://minerals.arizona.edu/facilities/lowell-mineral-characterization-facilities) among other things acquired its third mass spectrometer with a new SEM-EDS system in the works. This collection of labs, made possible by mining-related state funding, supports several dozen individual and collaborative projects across campus and beyond.◆

Alumni News



Mark Zoback

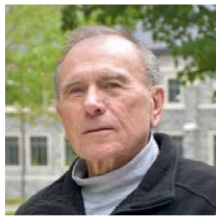
Alumni Profile

This year's College of Science Outstanding Alumnus for 2026 was Mark Zoback, who earned his bachelor's in geophysics from the U of A. Mark "credits the university for launching his lifelong passion for geoscience". He is now a Benjamin M. Page Professor of Earth Sciences and Professor of Geophysics Emeritus at Stanford University. He also founded and directed the Stanford Natural Gas Initiative, founded and co-directed the Stanford Center for Induced and Triggered Seismicity, and held other leadership roles during his long tenure. He received the award "for his scientific leadership, his scholarly contributions and his dedication to the university and the college, the University of Arizona is honored to name Mark D. Zoback the 2026 Alumnus of the Year for the College of Science." Visit science.arizona.edu/alumni for more.

Brooke Clements (MSc 91) shared a photo from **the annual Vancouver alumni gathering**. U of A Economic Geology graduates have important positions in the mining and exploration industry, governments and universities and they are all happy and busy with the current commodities super-cycle. Every year at the Exploration Roundup conference in Vancouver, the U of A folks gather to talk shop and recount old times. 14 people participated in the reunion in late January.



Front Row L to R: *Michael McCarrel (MSc 12), Tom McCandless (PhD 94), James Lang (PhD 91), Jennifer Roskowski (MSc 07), Brooke Clements (MSc 91)*
Back Row L to R: *David Lajack (94-96), David Maher (PhD 08), Kitt Marrs (MSc 79), David Johnson (PhD 00), Brigitte Martini (BSc 97), Matthew Gray (MSc 88), Wolfram Schuh (PhD 93), JD Mizer (PhD 18), Lance Miller (PhD 94)*



Bob Bodnar (MS, 1978) has returned to the U of A as the Executive Director of the Mining and Earth Resources Institute in the Office of Research and Partnerships, following a 40-year career as a faculty member in the Department of Geosciences at Virginia Tech. It is great to be back in Tucson and to give back to the place that set me on a path to a successful career as an earth scientist. "Securing a sustainable supply of critical minerals is essential as we prepare for a future defined by the AI revolution, the energy transition and evolving national security needs," said Tomás Díaz de la Rubia, senior vice president for research and partnerships at the U of A. "Bob Bodnar's vision and integrity will be instrumental as we lead the way in resource discovery and advance our land-grant mission." Read more at news.arizona.edu.

Geosciences Alumni showed up to alumni events during AGU, GSA, and in Houston. Thank you to the College of Science and Dean Carmala Garzione for helping coordinate these events. We hope to host more in the future!



Associate Professor of Practice **Amanda Hughes** represented the department at an Aramco event in Saudi Arabia. Here is a group photo that contains some of our alumni.◆

From the Field





Amanda Hughes in Saudi Arabia at Aramco, standing with some of our U of A alum





A cave visit in Andhra Pradesh with Associate Professor Kaustubh Thirumalai and team.



U of A Ph.D. candidate Aniket Dhar and Associate Professor Kaustubh Thirumulai in Morocco last October at the S4: Summer School on Speleothem Science. Aniket is the chief organizing member of S4. The U of A GEOS flag flew high.



Prospective graduate students on a field trip to Sabino Canyon led by Professor Emeritus George Davis





Professor Peter DeCelles and GEOS 456/556 students (Thrust Belts and Synorgenic Sediments) in the greater Las Vegas region mapping and camping in remote locations



Ananya Mallik's Experimental Petrology Group conducted fieldwork in California, collecting lower-crustal xenoliths from Miocene volcanic rocks of the Sierra Nevada. These xenoliths provide rare samples of the deep continental crust, offering a unique opportunity to investigate the volatile budget of the lower crust beneath the Sierra Nevada batholith.







Geos 251: Physical Geology Field Trips



The Society for Earth Science Students (SESS) on their annual spring break field trip. This time they visited the Chiricahua National Monument, Gila National Forest and Gila Cliff Dwellings, as well as White Sands National Park.







Geos 304: Structural Geology field trip to the Tucson Mountains







The business office on a field trip to Agua Caliente Park in Tucson's Eastside to enjoy the nice weather and see some wildlife.





Ocean Sciences (GEOS 412A/B) field trip led by Associate Professor Diane Thompson and Postdoctoral Fellow Elke Zeller (photographer) to the southern California coast.







SEG Student Chapter at BHP's Globe mine to take a tour of their Legacy Assets and learn about what happens with mines when they are no longer operational

In Memoriam

Jay Quade (1955-2025)

In memoriam, shared by Dr. Peter DeCelles.

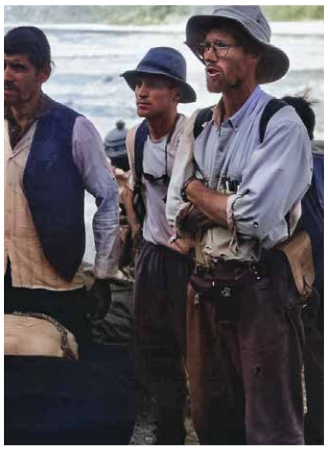


Extricating a vehicle from the Salar de Antofalla, in the ultra-remote Puna Plateau, Argentina, 2011. Jay is mostly hidden underneath the chassis.



In Wyoming during field camp, photo by Martin Pepper, 2011.

Professor Jay Quade passed away October 17, 2025, having spent his entire academic career in the Department of Geosciences at the University of Arizona. We have lost a preeminent geoscience pioneer and visionary scholar in isotope geochemistry, stratigraphy, field geology, and geochronology. Jay joined the department in 1992 as an Assistant Professor and rose to Full Professor with a dedicated following of dozens of successful former students, postdocs, and collaborators in numerous disciplines. Jay was renowned for the impact he made in so many parts of the Geosciences as well as Anthropology. He put his scientific stamp on every continent except Antarctica, from sea-level to summits higher than 6000 m, in deserts, jungles, on high plateaus and remote mountain peaks. He explored some of Earth's last remaining great wildernesses in search of geological truths. A consummate field geologist, Jay was also a brilliant laboratory innovator and practitioner. He had a genius for leveraging stratigraphic archives as records of long-term geochemical 'experiments'.



Jay and grad student Nathan English, tattered, but near the end of an ~500 km foot traverse in the western Nepal Himalaya, 1997.

Jay employed many tools in his myriad projects, but isotope geochemistry was particularly dear to his heart. Some of his most important papers address soil isotope geochemistry as a recorder of surface conditions, strontium isotopes as an indicator of chemical weathering and sediment provenance in the Himalaya, isotopic tracers of paleo-elevation, isotopes in hydrated glass as a record of rainfall isotopic composition, in-situ cosmogenic production of 14C in quartz, environmental indicators in spring deposits, pluvial lakes in the desert southwest and in the Atacama and Bolivian Altiplano, and the history of the monsoon in southern Asia.

In the lab Jay pursued innovation in isotope geochemistry, often with students and post-docs. He was instrumental in building a system that extracted small amounts of cosmogenically induced 14C in quartz. He also worked on the construction of an ultra-low-level 14C extraction line, which extended 14C ages back to >50,000 years. He got involved in clumped isotope systems early, publishing a major paper on clumped isotopes in soil carbonates. In his last decade Jay was part of a group in the Environmental Isotope Laboratory developing an instrument for the simultaneous measurement of clumped isotopes and triple oxygen isotopes in carbonates based on infrared laser absorption analysis. Jay was equally capable in doing outcrop sedimentology, mapping, and collecting rock and water/ice samples for isotopic analysis, petrography, geochronology, detrital zircon geochronology, micropaleontology, paleoanthropology and archeology, among others.

Jay received numerous awards throughout his extraordinary career, including the GSA's Farouk El Baz Award and Arthur L.



Jay with grad student Delores Robinson enjoying the view of the high Himalaya in far west Nepal, 1997.



Jay after taming a forest fire high in the Monitor Range, 2008.



UA fieldcampers at the summit of Wheeler Peak in eastern Nevada, with Jay in the center (2011).

Day Medal, GSA Fellow and AGU Fellow, Geochemical Society Fellow, and Membership in the U.S. National Academy of Sciences.

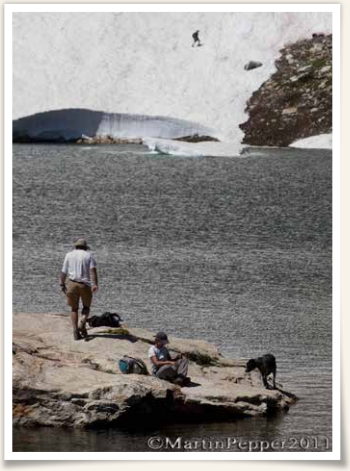
Jay was a gifted teacher at all levels, from rigorous graduate level courses to Introductory Geology. He was a legendary field camp instructor, able to map and teach at expert level in any type of geologic terrain and rock type. His relentless pace in the field was rooted in his high school and collegiate record-setting and All-American efforts in middle distance track events. Jay brought the same level of tenacity and stamina required to win footraces into his work life, on hundreds-of-kilometers-long wilderness field traverses, in late-night lab sessions, and in mundane committee jobs in the department.



Jay consulting with local villagers in western Nepal, 2019. Graduate student Anthony Krupa is in the left foreground.



Jay with his son Emeric on top of Mt. Waas (12,337') in the Lasal Mountains, ca. 1999.



At Lamoille Lake in the Ruby Mountains, Nevada on a day off at fieldcamp, 2011. That's Jay on the snow in the background. Photo by Martin Pepper.

Jay worked in wild places and became a pivotal actor in many wild stories. He and a graduate student were swept hundreds of meters downstream while swimming across the raging Seti River in far-west Nepal to collect a sample from a tributary on the other side of the river. He put out a several-acre forest fire in Nevada. He found and rescued a student lost for two days in remote western Nepal. And he found the remains of a long-buried homicide victim in the remote Monitor Range in Nevada while working for a mining company. His knack for finding bodies emerged while he was still in high school in his hometown of Reno, Nevada. On a trans-Sierran backpacking trip, he discovered a small plane crash high in the trees, with a carpet of silver dollars sprinkled about the site. Jay had countless stories about vehicular breakdowns or mishaps in places far too remote to expect any assistance. And there was that time he serendipitously surfed atop a wobbling boulder during an earthquake amid a field of other wobbling boulders with polished girth rings in the Atacama Desert (Geology, 2012, 40: 851–854). Jay's involvement in such tales was an outgrowth of his adventurous spirit.

Jay was a quiet, peaceful man who never sought the limelight. He was a learned, multi-faceted scholar, with a penchant for history. He mastered Spanish and gained the ability to communicate well in Nepali and French. He was a skilled carpenter, a competent auto mechanic, a prolific gardener, and a persistent angler. If a decision had to be made and he was in a leadership role, he sought advice and never acted rashly. He had an ironic, playful, and occasionally irreverent sense of humor.

Jay enjoyed life in every respect. He had much more science on his agenda, and many projects that he was unable to complete owing to his illness. We have lost a wonderful colleague, mentor, teacher and dear friend. Our condolences go out to Jay's wonderful family.

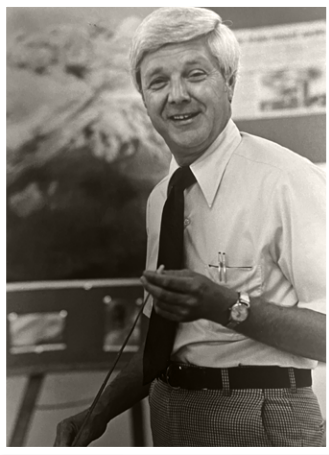
Dr. Ed McCullough (1931 - 2026)

In memoriam, shared by George Davis, Regents Professor & Provost Emeritus Geosciences, University of Arizona

A Tribute to Edgar J. McCullough, Jr.
Especially To The Alumni of UofA Geosciences

As some of you know, Ed passed away at age 94 on January 29, 2026. Whether you realize it or not, if you graduated from a degree program in Geosciences any time after 1970, you benefited immensely from Ed McCullough's leadership. He shaped our department. We reside in the 'thin air' of national rankings today because of him. Your degrees mean more because of him. And he is one of you, for he earned his PhD degree in U of A Geosciences in 1963, specializing in structural geology under the mentorship of Evans B. Mayo.

Serving as Department Head from 1970 to 1982, he advanced the shift from "Geology" to "Geosciences" and in so doing elevated chemistry, physics, biology, and mathematics in matters of Department of Geosciences curriculum and research. This was a



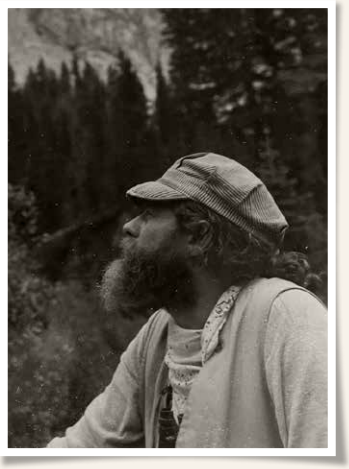
natural inclination for him because his B.S. and M.S. degrees were in physics and geophysics. While Department Head, Ed also persuaded the faculty to identify core areas of strength that would be continuously emphasized, and that bridges be maintained between the core areas. Above all, Ed set new and higher standards at a time in which UofA's President and Provost were watching and rewarding. Not surprisingly, based on his accomplishments, Ed was appointed as the very first Dean of a newly established UofA College of Science, serving from 1982 to 1992.

As a teacher, Ed taught physical geology, first through in-person lecture, labs, and field trips, but then through public television. He taught at a scale other faculty avoided. He reached countless students and Tucsonans. When Ed was Department Head the notion of "environmental geology" was just gaining traction, but Ed was already there, teaching it and working with local government to build policy and zoning controls addressing the folly and dangers of building on floodplains. His passion and care for broader communities led him, during his so-called retirement years to walk ~3000 to 4000 miles of the border region mapping trail networks used by migrants. As Carmie Garzione, Dean of Science describes: "Based on Ed's mapping, Humane Borders and Tucson Samaritan volunteers were able to make better informed decisions on where to leave life-saving water supplies, thus addressing the mitigation of suffering and loss of life."

Speaking more personally, I'm proud to have been his first faculty hire. After I made the short list, he scheduled my flight into Tucson after dark, knowing that my first view in the morning would be the Catalina Mountains and not the highway stretch, as it looked then, between the airport and campus. With similar attention to detail, immediately following my late-afternoon job talk the next day, Ed whisked me away to the end of North Campbell Avenue, where he hiked me to Campbell Cliffs. This was the first time, and last time, I ever went to the field wearing a 3-piece wool suit and wingtip shoes. I became spellbound by the folds and realized what outcrops like these, so close to campus, would mean for teaching! Most department heads would simply take a candidate, such as me, out to the requisite dinner, and keep it at that. Not Ed. He layed a trap!

There was a particular moment when I witnessed the essence of Ed as a leader. It happened right before he became Dean. He took me to lunch to encourage me to be open to my becoming his successor as Department Head. He didn't stage a 'full court press.' He simply said that the most important question you have to consider is whether you are someone who derives deep satisfaction in the accomplishments of others. I believe this was at the core of Ed's attraction to academic leadership and life. Putting it frankly, if as an administrator you are thinking constantly about how much research you are not getting done, you are in the wrong job. It is advice I have passed on to any faculty member 'on the fence' wondering about whether to consider a position in university or college administration.

Ed's life was a model of being fully engaged and purposeful for a lifetime. He threw himself into noble tasks and reinvented himself for whatever was required. 'Retirement' never changed his behavior. Ed is the rare kind of example we need in life, as individuals and as a community.



Denis Norton (1939 - 2025)

In memoriam, shared by Professor Emeritus Jiba Ganguly.

It is with a feeling of great sadness that I inform you that Denis Norton, one of our former faculty members and one of my closest friends in the department, passed away.

Almost anything that I can say about Denis' contributions to science, mentoring of students and helping out colleagues in their research in the most unselfish way would be an understatement. He was a scientist much ahead of his time. It will be many years to come before someone with his command of the fields of fluid-rock interactions, heat and mass transfer, fracture mechanics and thermodynamics shows up in our field again.

Denis is survived by his wife, Dana, and his daughters.

Richard (Dick) Jones (1932 - 2025)

On behalf of AGS: Long-time AGS member Richard (Dick) Jones passed away on Saturday 12/27/2025. Dick served AGS as a councilor from 2013 to 2015. Over the years Dick donated thousands of dollars to AGS' student scholarship funds. He contributed regularly to the University of Arizona Geosciences Dept. GeoDaze, too. Before retiring Dick was Senior Geologist with the Reynolds Metals Co. Dick was an AGS stalwart and a regular attendee of AGS monthly presentations for years.



Scholarships & Donations

The Department of Geosciences disbursed over $150,000 in both scholarship and non-scholarship student support over AY25-26 and summer 2026. Below you will find a list of all scholarship and non-scholarship award recipients as well as a highlight of donor support.

Firstly, thank you to Montgomery & Associates for their sponsorship of the Montgomery Associates Best Overall Talk winner and graduate student **Tomás Guerreiro**. Another thank you to individual donor John Wilder, who sponsors the Nicea Wilder Best Graduate Talk - winner and graduate student **Amanda Manoogian**.

UNDERGRADUATE PROGRAM

SCHOLARSHIP AWARDS

Geosciences General Scholarship
Alexa Guadalupe Valenzuela

David L. Moore Memorial Scholarship
Cameron Scott Seebeck

Evans B. Mayo Scholarship
Joshua Molong
Danna Sophia Nichols Alcala
Erika Perez
Alma Reasoner

George H. Davis Research Fund
Olivia Doiron
Devinl Maroney
Delia Riley
Alexa Valenzuela
Tony Zhang

Marie S. Pearthree Scholarship
Caitlin Beener
Malinee Cooper

Chernoff Family Geosciences Field Experience
Jorge Santiago Jr
Tiago Wakefield

John and Nancy Sumner Scholarship
Brendan Tierney

Wilson R. Thompson Scholarship
Kimberly Avila

A W Voorhees Geology Scholarship
Jasper Jones
Jonathan Redfearn
Brendan Tierney

Diane Ferris Field Camp Scholarship
Malinee Cooper
Danna Sophia Nichols Alcala
Jorge Santiago Jr.

Arthur Mirsky Geology Fellowship
Kimberly Avila
Olivia Cox
Danna Sophia Nichols Alcala
Cameron Seebeck
Sarala Ventry

Zoback Family Scholarship
Kimberly Avila
Ainsley Carling
Olivia Cox
Emily Ladensack
Jaxsoni Luke
Devin Maroney
Cameron Seebeck
Jacob Stevens
Alexa Valenzuela

NON-SCHOLARSHIP AWARDS

GeoDaze Winners
Oliff Doiron
Zachary Pecha
Art Tello
Vrinda McBride

GRADUATE PROGRAM

SCHOLARSHIP AWARDS

David J. Lowell Graduate Scholarship
Guido Merino
Maria Camila Sojo Aguero

John and Nancy Sumner Scholarship
Anca Barla
Emma Boeman
Katleho Ramotso

Peter J. Coney Scholarship
Luke Basler

Bert S. Butler Scholarship
Amanda Manoogian

Sulzer Earth Science Scholarship
Asiya Badarunnisa Sainudeen
Mikayla Deigan
Joaris Del Mar Hernandez-Morales
Amanda Manoogian
Holly Thomas

Mark and Mary Lou Zoback Scholarship
Alexandra Grace O'Keefe

Spencer R. Titley Grad Fellowship
Carolyn Drake
Weiwei Ma
Isaiah Spring
Madison Tuohy

Marie S. Pearthree Scholarship
Priscilla Martinez

Wesley Pierce Graduate Scholarship
Luke Basler
Owen Purcell

Arthur Mirsky Geology Fellowship
Aniket Dhar
Alexandra O'Keefe

Tiger Fellowship
Owen Purcell

NON-SCHOLARSHIP AWARDS

GeoDaze Winners
Amanda Manoogian
Leila Fischer
Camila Sojo-Aguero
Sankha Subhra Mahanti
Priscilla Martinez
Alec Martin
Wayne Allen
Hunter Bailey
Tomás Guerreiro

GeoDaze Chairs
Holly Thomas
Madison Tuohy

Recent Graduate Degree Recipients

MASTER'S DEGREES *Fall/Winter 2025 - Summer 2026*

Name	Title	Advisor	Employer	Position
Michael Padilla	Petrochronologic Constraints on the Timing of High -Grade Metamorphism in the Jubrique Unit, Western Betics	Ibañez-Mejia		
Michaela Schnell	Mineralogical and Trace Element Characterization of the Bruce and United Verde Volcanogenic Massive Sulfide Deposits, Arizona	Codeço		
Pamela Doig	Zircon Petrochronology insights into the magmatic evolution at the Tyrone Cu-mo District, New Mexico, USA	Codeço		
Leila Fischer	Three Millennia of Northeast Pacific Sea surface temperatures from growth increments of the long-lived bivalve pacific geoduck	Black	Swiss Federal Institute for Forst	PhD Student
Guido Merino	Ore Characterization of the Refugio, Bonita and Maranceles Areas, Filo del Sol Cu-Au-Ag Porphyry-Epithermal Deposit, Vicuna Belt, Argentina	Codeço		
Amanda Manoogian	From Marine Snow to Sediment: Holocene Export Productivity Changes in the Gulf of Mexico Estimated from Planktic Foraminifera	Thirumalai	University of Arizona	PhD Student
Joaris Del Mar Hernandez-Morales	Reconstructing hydroclimate variability from heavy-metal discharge at Majuro and Arno Atolls, Marshall Islands	Thompson		
Parker Comisac	Eastern Aleutians slab gap and its impact on Kula-Pacific tectonic reconstructions and Alaska geology	Wu		
William McCraine	Plume-slab interactions at a warm subduction zone, Cascadia, USA	Wu	University of Arizona	PhD Student

PROFESSIONAL SCIENCE MASTER'S *Fall/Winter 2025 - Summer 2026*

Name	Title	Advisor
Taylor Parker		Barton
Eyn Phillips		Barton
James Sun	Pyrite Compositional Variation at the Morenci Porphyry Copper System, Arizona	Barton

DOCTORAL DEGREES *Fall/Winter 2025 - Summer 2026*

Name	Title	Advisor	Employer	Position
Brendan Fenerty	Quaternary Paleohydrology, Soil-Geomorphology and Hillslope Processes in the Basins and Piedmonts of Southwestern North America	Holliday/McGuire		
Tumaini Kamulali	Understanding Lake Tanganyika: Insights into Climate, Circulation Dynamics, and Fishery Productivity Across Time Using Paleolimnological and Modeling Approaches	Russell	Tanzania Fisheries Research Institute	Researcher
Eytan Bos Orent	Basin-related fluid systems and metasomatism of the Colorado Plateau	Barton		
Sankha Subhra Mahanti	Analysis of Crustal Structures and Crustal Deformation Processes of the Central Andes Using Seismicity and Seismic Imaging	Kiser	IGPP, Scripps Institution of Oceanography, UC San Diego	Postdoctoral Scholar (Green Scholar)
Asiya Badarunnisa Sainudeen	Climate-Modeling Insights into Tropical South American Precipitation Dynamics: Moisture Sources, Pathways, and Key Drivers	Lofverstrom	University of Albany	Postdoctoral Scholar
Mudith Weerabaddanage	Reconstruction of Last Millennium Climate and Hydroclimate Variability In the Tropical Western Pacific Using Modern and Subfossil Corals from the Marshall Islands.	Lofverstrom	University of Arizona Lunar and Planetary Laboratory / Tree Ring Laboratory	Postdoctoral Scholar





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Society of Earth Science Students

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Gould Simpson room 203

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Please be sure to note the specific scholarship or fund you'd like to support.

Join Leading Geoscientists on Campus & Online – UA Colloquium Series 2026

This year's colloquium series will consist of a mixture of researchers across the University of Arizona as well as visiting scientists! The colloquium series will kick off on **September 3rd, 2026**.

Visit geo.arizona.edu/colloquium for the most up-to-date details.