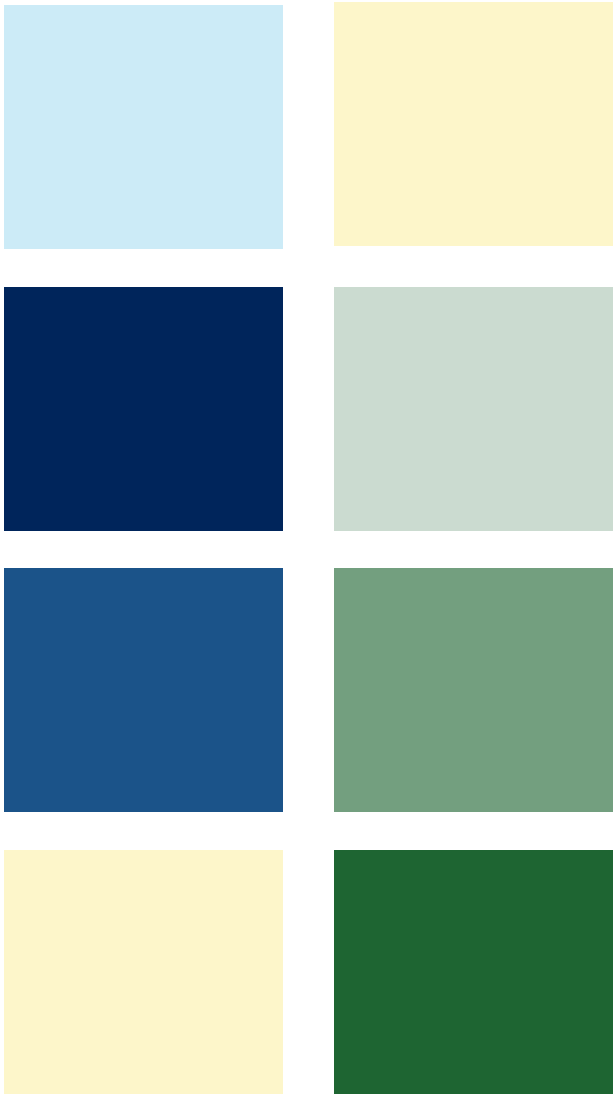
COLLEGE OF SCIENCE
Geosciences



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PO BOX 210077
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EDITED BY: JOJO BRADFORD (with help from Michelle Garcia)

A NOTE FROM THE DEPARTMENT HEAD

Dear colleagues, students, alumni, and friends!

I want to use this opportunity to thank all of you for your support and service to the Department of Geosciences over the years. I was honored to be the Department Head of Geosciences for the last 5 years, and I am looking forward to rejoining my colleagues as a regular faculty member in Geosciences starting in Fall 2023.

Over the last 5 years, I had the pleasure of interacting with amazing faculty, researchers, students, staff, alumni, and friends and together we made significant strides. I started as Department Head of Geoscience in the Fall of 2018 under the leadership of Dean Joaquin Ruiz, a tireless and visionary Dean who contributed to making the College of Science one of the strongest colleges on campus. To this day, I feel lucky to have had the opportunity to work under his leadership and later under the leadership of our current Dean Carmala Garzione. Although we started strong in 2018 with a lot of new initiatives, many of these efforts were severed by budget cuts and ultimately COVID throughout 2019-2022. I was amazed by the resilience of the Department of Geosciences during these challenging times. Everyone came together as a community and worked together to make the best of it. Because of our unique ability to function as a unified and collegial unit, we were able to accomplish many things together despite the challenges, including hiring 7 amazing new faculty members: Ananya Mallik, Hervé Rezeau, Mauricio Ibañez-Mejia, Advait Jukar, Patricia Persaud, Pranabendu Moitra and Jonny Wu.

Our staff worked tirelessly to help the department thrive under the most challenging circumstances. Our faculty continued to do cutting edge and transformational science which contributes to our top rankings. Our commitment to high quality and forward-looking education led us to start new educational programs such as a new track in Gem Science, a new BS program in Planetary Geosciences, in collaboration with the Department of Planetary Sciences

starting in Fall 2023, and a new BA in Geosciences and Society (currently under review).

We would not have been able to come out of the challenging last few years as strong as we did without the support of alumni and friends who provided essential continuous support. Thanks to your support, we were able to launch important initiatives, including, but not limited to, the Geodiscoveries fund to support cutting edge research in the department, the Marie Pearthree summer research scholarship, and Mélange fellowship to support underrepresented students. We are looking forward to continuing to work together to make new discoveries, to address significant scientific and societal issues and foster diversity, equity, and inclusion under the leadership of new Department Head Professor Joellen Russell who will start this Fall.

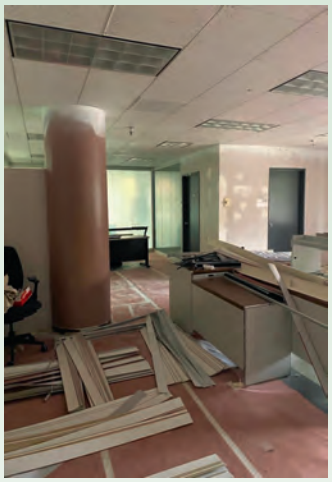
Sincerely,

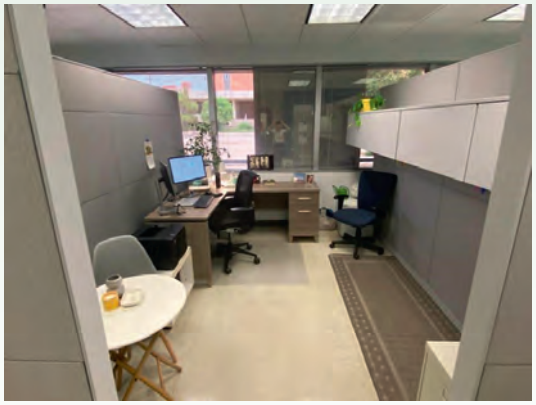
Barbara Carrapa
Professor

DEPARTMENT NEWS

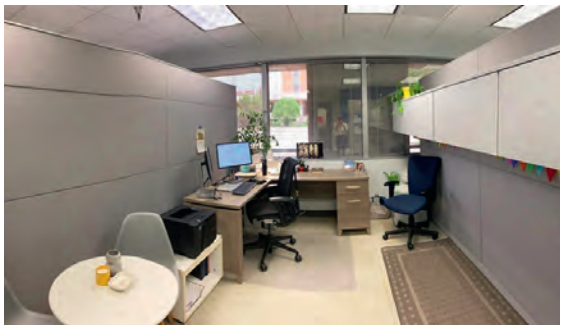
STAFF NEWS

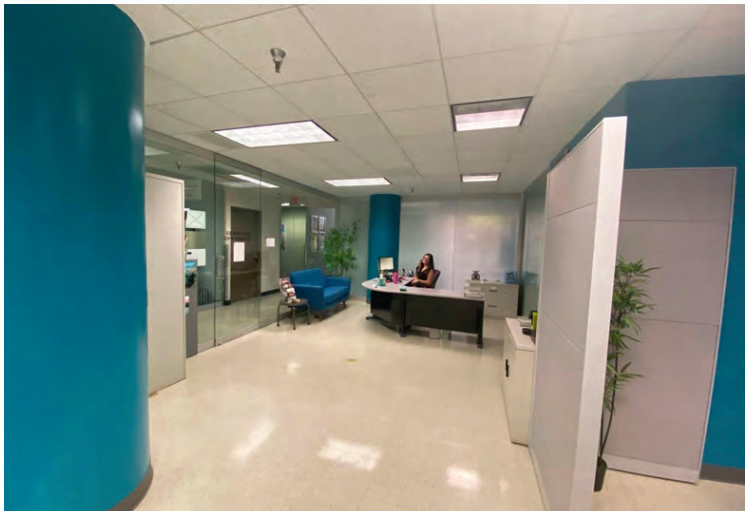
1. The Geosciences business and advising offices visited Tohono Chul Park as part of their annual team building effort during the week of Spring Break. Pictured left to right: Hilda Aboytia, Michelle Garcia, Pat Waters, Christine Duddleston, Denise Carrillo, Gavin Nelson, and Heather Alvarez. (Missing: Rocina Garcia}





2. In summer of 2022, the Geosciences business office underwent a full-scale renovation after many years. The upgrade provides more privacy and space in a much-improved work environment. Staff are appreciative and visitors are impressed.





3. **Heather Alvarez**, Accountant, Senior (2nd from left) was nominated by the Department of Geosciences and awarded the Star Award in March 2023 by the College of Science Staff Advisory Council (CoSSAC). The Star Award is presented to staff members in the College of Science who perform job duties "above and beyond" what is normally expected, improve efficiency in the workplace, and demonstrate, through attitude and actions, a willingness to help others and work as a team. Starting as a student worker back in 2001, Heather has been an indispensable member of the Geoscience staff who continues to motivate and inspire.

Congratulations Heather!

4. **Michelle Garcia**, Sr. Program Coordinator was chosen to receive the 2023 College of Science Staff Excellence Award from the Department of Geosciences. Award recipients were honored at the annual College of Science Staff Advisory Council (CoSSAC) Staff Excellence Awards Brunch in April 2023. She was nominated by professors Jay Quade and Pete Reiners (former department heads), Barbara Carrapa (current department head), and Professor Pete Decelles.

The award is presented to outstanding staff members who perform their duties with an extraordinary degree of pride and reliability, goes the extra mile, performs extra duties substantially beyond those normally assigned, performs other roles when the department is short-staffed, volunteers to serve on a department or University committee and contributes to its success, has developed new work methods that reduce waste or stretch resources, makes creative suggestions that save the department time & money, and provides services to others that are beyond assigned responsibilities. Michelle has been working in the department since 2012.

Congratulations Michelle!

5. Congratulations to the following people for their service commitments 2022-2023

- **Michelle Garcia - 10 years**
- **Martin Pepper - 10 years**
- **Alexander Pires - 10 years**
- **Patricia Waters - 10 years**
- **Rocio Bramila De Zamora - 15 years**
- **Frank Mazdab - 15 years**
- **Stuart Thomson - 15 years**
- **Denise Carrillo - 20 years**
- **Uttam Chowdhury - 20 years**
- **Paul Kapp - 20 years**
- **Peter Decelles - 30 years**
- **Jay Quade - 30 years**

STUDENT NEWS

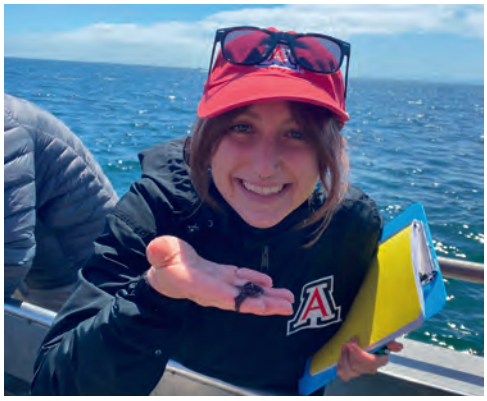
This spring, Departments in the University of Arizona's College of Science nominated an outstanding senior who went above and beyond during their time as a Wildcat. We are pleased to share their stories as they reflect on their time at UArizona. Our final outstanding senior is Danielle Schwartz from the Department of Geosciences.

COS: **Why did you choose your area of study?**

Schwartz: I chose Geosciences after taking Intro to Oceanography in my Freshman Spring semester. I actually came in as a freshman studying English, which goes to show just how much of a 180 you can do in college. Sitting in that class, suddenly everything just clicked. Growing up, I was never really encouraged to pursue sciences outside of standard math, biology, physics, chemistry, etc., so I never really took much interest in one in particular. There were aspects of each that I liked, but none that drew me in. completely. With Geosciences, I can do all these sciences while connecting them to the physical world around us and how we can make a difference in it. I love Geosciences because it combines all my passions into one.

COS: **Tell us about a class or research project you really enjoyed.**

Schwartz: Working with Dr. Diane Thompson in the Tropical Climate & Corals Reefs Laboratory has been the highlight of my undergraduate career. Similar to tree rings and ice cores, we can use cores collected from corals to reconstruct and learn about past climates. For my research project, I was analyzing the skeletal geochemistry of corals grown in the Biosphere 2 ocean during an experimental ocean acidification event. From this work, we have more deeply understood how coral growth responds to stress and a changing environment. This project has taught me to think smarter, work harder, and truly find and pursue what I love.



COS: **What is one specific memory from your time at UA that you'll cherish forever?**

Schwartz: I'll always cherish my first time standing on the Biosphere 2 scientific beach, looking out at the ocean. As someone who grew up in Tucson and never lived near an ocean, I was so overcome with gratitude and love that I really started to cry. I cried because I knew I found part of my life's purpose.

COS: **What is next for you after graduation?**

Schwartz: After graduation, I'll begin working on Catalina Island with the Catalina Island Marine Institute as a Marine Biology instructor. In addition to ocean sciences, I've always had a passion for youth education, and I cannot wait to combine these two passions working in a beautiful location.

GRADUATE AWARDS

1. Dr. Maria Teresa Velez Diversity Leadership Scholarship Award 2023-2024

Emilia Caylor

Ph.D. candidate Emilia Caylor was selected as the recipient of the Dr. Maria Teresa Velez Diversity Leadership Scholarship which is awarded annually to 2 domestic doctoral students at the University of Arizona in honor of Dr. Maria Teresa Velez, former Associate Dean of the University of Arizona Graduate College. This year-long award is given annually to a doctoral student who, through their teaching, research, or outreach and service, has demonstrated a commitment to furthering diversity in education, and the community at large. Emilia applies sedimentology and stratigraphy, geochronology, thermochronology, and geochemical techniques to study the paleogeographic and tectonic evolution of the western U.S.A. She is also an active member of the Southern Arizona AWG chapter and works with them to make field work and outdoor experiences more accessible to everyone.

2. Dr. Maria Teresa Velez Diversity Leadership Scholarship Award 2022-2023

Alice Chapman

3. AGS M. Lee Allison Scholarship 2022

Emilie Bowman

4. AGS J. Harold Courtright Scholarship 2022

Maria Camila Sojo Aguero

5. College of Science 2022 Graduate Student Awards

Service: **Tshering Lama Sherpa**
Teaching: **Emilia Caylor**
Scholarship: **John He**

6. College of Science 2023 Graduate Student Awards

Scholarship: **Alexander Gorr**
Teaching : **Emilie Bowman**
Science: **Caden Howlett**

7. ARCS (Achievement Rewards for College Scientists) 2022-2023

Catherine Hanagan
(Anne Spychala Family Charitable Foundation)
Emily Bowman (Kucera Scholar)
John He (Papadopouloss Scholar)

8. The Gaileo Circle Awards to Undergraduate and Graduate Scholarship 2023

Sadie Huggler
Alexander Gorr
Priscilla Martinez
Mudith Weerabaddanage
Alec Martin
Chance Ronemus
Isaiah Spring
Sydney Acito
Rebecca Fulton
Gianna Duberek (Undergrad)

This Galileo Circle awards scholarships to undergraduate amd graduate students who demonstrate exceptional potential in the physical, mathematical, environmental, cognitive, or life sciences.

9. Melange Award 2023

Asiya Badarunnisa Sainudeen (Graduate)
Maria Paula Marroquin Gomez (Graduate)
Tumaini Kamulali (Graduate)
Genevieve Bergin (Undergrad)
Oddisey Knox (Undergrad)
Jeffrey Carvalho (Undergrad)
Gianna Duberek Undergrad)

This is a scholarship to promote diversity, equity, and inclusion within the Department of Geosciences. This fellowship is intended to help offset costs for research, labratory and field related activities and remove barriers associated with such activities for undergraduate and graduate students to enhance the student experience.

10. David Moore Memorial Scholarship Fall 2022
Luis Carlos Montijo Cheno

11. Lofverstrom Memorial Scholarship Fall 2022
Kaelyn Abriel Robertson

12. Sumner Geosciences Memorial Scholarship Fall 2022

Pamela Doig
Lauren Gilmore
Luis Carlos Montijo Cheno
Kaelyn Abriel Robertson

13. Wilson Raynor Thompson Memorial Scholarship Fall 2022

Luis Carlos Montijo Cheno

14. Winslow Memorial Scholarship Fall 2022

Lauren Gilmore

15. Field Camp Various Scholarships

Luis Carlos Montijo Cheno
Boyd
Robert Morse
Zack Leisemeyer
Michael Padilla
Austin Allmeyer
Tristan White

16. Marie S. Pearthree Summer Research Scholarship 2022-2023

Tshering Lama Sherpa

17. Mineralogical Society of America's Grants for Student Research in Minerology and Petrology
Arkadeep Roy

"Investigating the urKREEP Origin of Lunar Silicic Magmas"

Congratulations UA GEOS graduates!

MS Graduates:
Holly Thomas (MS)
Porfirio Ascencio (MS)
Brook Runyon (MS)

PhD Graduates:
Haiyang Kehoe (PhD)
Brandon Tober (PhD)
Emily Rodriguez (PhD)
Lauren Reeher (PhD)
Alice Chapman (PhD)
Alexander Prescott (PhD)
Catherine Hanagan (PhD)
Felipe Rodriguez Ferroni (PhD)

CONGRATULATIONS
UA GEOS GRADUATES!

Summer 23

Amy (Tekla) Dominguez
Robert Morse
Genevieve Bergin
Luis Montijo Cheno
Minzhuo Huang
Andre Ferrara
Ari Dettman
Oddisey Knox
Hussain Almarzooq
Zack Liesemeyer
Nicole Kerrison
Abigall Boyd
Austin Allmeyer

Spring 23

Sean Piehel
Connor Jensen
Ali Khader Bu Arish
Ben McNabnay
Jingnan (Tom) Zhang
Morgan Cryder
Maddie Brown
George Fabian
Mujtaba Almusharraf
Duke Ozamah
Mohammed (Blowi) Albalawi
Caelen Burand
Ahmed Alsafran
Jeffrey Carvalho
Madeline Williams
Abdulrahman Alajaji
Noor Hodyah
Katie Slaughter
Norina Zadro-Young
Joshua Fox
Matt Doyle
Dana Assudmi
Abdulrahman Kurdi
Zainab Almubarak
Saud Almaghlouth
Fahad Alhussaini
Ahad Alhamrani
Zainab AlMarhoon
Sultan Jawad Alabdulmuhsin
Danielle Schwartz
Luke Ouko
Katy Flor
Jack Konguthaithip

FACULTY NEWS

1. Congratulations to **Dr. Joellen Russell!** She will be the new Geosciences Department Head starting in August 2023. Dr. Joellen Russell is an oceanographer and climate scientist, a Distinguished Professor, and the Thomas R. Brown Distinguished Chair of Integrative Science. Dr. Russell's research uses robot floats, supercomputers and satellites to observe and predict the ocean's role in climate and the carbon cycle. She is in New Zealand this summer for her Fulbright working on all things Southern Ocean.

You can follow her on twitter.com/deepblueseanext

2. **Dr. Robert J. Bodnar**, University Distinguished Professor of Geochemistry was recently elected as a member of the National Academy of Sciences. Members are recognized for their distinguished and continuing achievements in original research. Bodnar's work has used fluid chemistry to help decipher clues about the earth's processes by researching tiny amounts of fluids trapped in rocks. He has created new techniques for studying the trapped fluids and melts in everything from granites to meteorites.

Geosciences Professor Emeritus George Davis was Dr. Bodnar's advisor. Bob came to Tucson in 1975 to pursue a MS degree after having had only two geology classes as an undergraduate. With Dr. Davis' help and support, Bob attended graduate school in geology. In a message to Dr. George Davis, he stated, "As we get older and look back on the path we took to get where we are today, we start to recognize important events that shaped those paths. Among the most important and significant for my career was your support that got me into the U of A program."

3. **Dr. Paul Kapp** enjoyed checking out geology in new field areas this past year. He went on a tour of Namibia with Dr. Alex Pullen (former UA Ph.D. student, currently at Clemson University) to explore potential research targets in the Namib Desert, Kalahari, and Neoproterozoic – Cambrian Damara orogen. Dr. Kapp was also awarded a new NSF grant to investigate Mesozoic ophiolitic and subduction complex rocks exposed on the Vizcaíno Peninsula and Cedros Island of western Baja California. The first field investigation this spring included Ph.D. students John He and Jordan Wang and collaborators Drs. Robert Holder (U. Michigan), David Hernández Uribe (U. Illinois, Chicago), and Jamie Worthington (former UA Ph.D. student). Highlights included awesome blueschist, eclogite, and ophiolite metamorphic sole rocks within spectacularly exposed mélanges, a wild boat ride to Cedros Island, and great seafood!

Namibia offers a wealth of primitive and developed campsites from which the spectacular geology, landscape, and wildlife can be explored using a rented safari-like vehicle. Here, Paul Kapp is enjoying dinner adjacent to the Spitzkoppe inselberg. Photo by Alex Pullen.

A group selfie of Jordan Wang, John He, and Paul Kapp while doing field-work on Cedros Island, Baja CA, Mexico.

4. Dr. Jessica Tierney
Alan T. Waterman Award, National Science Foundation 2022

The U.S. National Science Foundation has named its awardees for this year's Alan T. Waterman Award, the nation's highest honor for early-career scientists and engineers. Dr. Jessica Tierney is one of three awardees this year. Congress established the Alan T. Waterman Award in August 1975 to mark the 25th Anniversary of the National Science Foundation and to honor its first Director. The annual award recognizes an outstanding young researcher in any field of science or engineering supported by the National Science Foundation. In addition to a medal, the awardee receives a grant of $1,000,000 over a five year period for scientific research or advanced study in the mathematical, physical, biological, engineering, social, or other sciences at the institution of the recipient's choice. Anyone can be nominated for it, but in the almost 50 years of the award, a geoscientist has never won it. Also, it has never gone to a climate scientist. This is not only a first for Geosciences and Climate Science but for the University of Arizona as Dr. Tierney is the first University of Arizona Researcher to receive such an honor. Congratulations Dr. Tierney!

5. Dr. Jessica Tierney
Thomas R. Brown Distinguished Chair in Integrative Science 2022

Dr. Jessica Tierney is an Associate Professor in the Department of Geosciences at UArizona and an internationally distinguished organic geochemist and paleoclimatologist, having already established herself as a world leader in both of these disciplines. She has made fundamental contributions to the development of new organic geochemical methods for interpreting the history of climate change. She has used organic geochemistry, together with other data and modeling approaches, to transform our understanding of Earth's recent paleoclimate history, particularly in Africa and the Indian Ocean region.

"I am extremely honored and humbled to be named the Thomas R. Brown Distinguished Chair in Integrative Science," Dr. Tierney said. "The Chair will enable my research group to explore exciting new projects studying past and future climate change, and will provide key support for students, postdocs, and my laboratory manager."

Dr. Tierney has been at the University of Arizona since 2015. She earned a bachelor's, master's and a doctorate in geology from Brown University. She is a Packard Foundation Fellow, an American Geophysical Union Fellow and a lead author on the Intergovernmental Panel on Climate Change Sixth Assessment report. Dr. Tierney's body of research demonstrates that she has exceptional ability to identify ways of making important advances in some of the most pressing and hotly debated problems in paleoclimatology. Her work on such diverse topics as the relationship of tropical climates to high latitude forcing during the Pleistocene, the tempo of the African Humid Period, and the effects of anthropogenic climate warming on African lakes are lasting contributions to science (often with deep societal implications) and have established her as a preeminent leader in paleoclimatology.

"This endowed chair honors Thomas R. Brown, co-founder of the Burr-Brown Corporation, who demonstrated the power of sci-

ence and engineering to advance humanity," said Dr. Carmala Garzione, College of Science Dean. "The endowment is designated to support a faculty member in the College of Science who is recognized among peers as preeminent in the field of climate change research."

Dr. Tierney has received several national and international awards including: the 2015 Packard Fellowship in Science and Engineering, which is awarded to "the nation's most promising early-career scientists and engineers;" the 2015 Pieter Schenck Award from the European Association of Organic Geochemists, given "to a scientist normally under 35 years of age who has made a major contribution in any specific area of organic geochemistry or a related field," and the 2014 James B. Macelwane Medal from the American Geophysical Union awarded to recognize "significant contributions to the geophysical sciences by an outstanding early career scientist."

"Dr. Tierney is an excellent representative for this endowed chair because her research is recognized as highly impactful in understanding what Earth's recent climate history tells us about modern and near future climate change," Dr. Garzione said. "In addition to her research excellence, Dr. Tierney is a tireless advocate for climate change mitigation and shares her message with the general public in a hopeful way that encourages everyone to be part of the solutions."

In May, Dr. Tierney will receive the National Science Foundation's Alan T. Waterman Award. The award is the nation's highest honor for early-career scientists and engineers, and recognizes outstanding individual achievements in NSF-supported research. She is the first climatologist to win the award since Congress established it in 1975. She is also the first from UArizona to ever receive the honor.

"The Department of Geosciences is excited and proud to have Dr. Tierney as the Brown Chair," said Dr. Barbara Carrapa, Professor and Department Head of Geosciences at UArizona. "She has made important advances in some of the most pressing and hotly debated problems in paleoclimatology. Dr. Tierney's outstanding and impactful science, and her contributions to solving global climate challenges through research, service and effective public engagement demonstrate her worthiness of this prestigious honor."

6. Dr. Joellen Russell
Thomas R. Brown Distinguished Chair in Integrative Science 2022

Dr. Joellen Russell's appointment as the Thomas R. Brown Distinguished Chair in Integrative Science has been extended five years.

Dr. Russell is an oceanographer, climate scientist, and Distinguished Professor at the University of Arizona. She joined the UArizona faculty in 2006 and has joint appointments in the Departments of Geosciences, Planetary Sciences, Hydrology and Atmospheric Sciences, and Mathematics in the College of Science.

"I am delighted and honored to contribute to the legacy of Thomas R. Brown through my research on the ocean's role in climate using robot floats, supercomputers, and satellites," Dr. Russell said. "UArizona graduates were a key part of Burr-Brown's successful business model, and

we've continued that tradition by making our desert home a launch pad for top-notch oceanography and climate scientists around the country and the world. Our research, creative support for undergraduates, and local outreach are part of a renewed focus on what we Arizonans can do to predict, mitigate, and adapt to climate change – and are all part of ongoing efforts to serve our community in the tradition of Thomas R. Brown. I am committed to ensuring that this additional five years of support will provide lasting value to our community in southern Arizona and across the nation in our fight against climate change."

Dr. Russell's research on the westerly winds led to the creation of a new paradigm in climate science, namely that warmer climates produce poleward intensified westerly winds. This insight solved one of the long-standing climate paradoxes, the mechanism responsible for transferring one-third of the carbon dioxide in the atmosphere into the ocean and then back out again during our repeated glacial-interglacial cycles. Dr. Russell is one of the 14 scientists who wrote the climate science amicus curiae brief cited in the landmark Supreme Court decision of Massachusetts v. Environmental Protection Agency that ruled that carbon dioxide is a pollutant covered under the Clean Air Act and must be regulated by the EPA.

"Funding for this chair was made possible by the Thomas R. Brown Foundation in honor of Thomas R. Brown, co-founder of the Burr-Brown Corporation, who demonstrated the power of science and engineering to advance humanity," said Dr. Carmala Garzione, College of Science Dean. "We are fortunate to now have two Thomas R. Brown Distinguished Chairs in Integrative Science in the College of Science – Drs. Jessica Tierney and Joellen Russell. The faculty appointed to these chairs are recognized for their innovative and integrative research to address global climate challenges that impact people. Dr. Russell is a leading expert in the ocean's role in the carbon cycle and how the oceans both store and release CO2, a greenhouse gas that influences global temperature. She has been a long-standing advocate for climate action, and her research and outreach are contributing to CO2 mitigation from the levels of individual action to policy change."

Dr. Russell is the co-chair of the National Oceanic and Atmospheric Administration's Science Advisory Board Climate Working Group and chair of UArizona Research Computing Governance Committee. She is the lead for the modeling theme of the Southern Ocean Carbon and Climate Observations and Modeling project including its Southern Ocean Model Intercomparison Project, in active collaboration with colleagues at the National Ocean and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory.

"The Department of Geosciences is so pleased Dr. Russell will continue her work as a Brown Chair," said Dr. Barbara Carrapa, Professor and Department Head of Geosciences at UArizona. "Dr. Russell is a leading oceanographer whose innovative approach has led to important and significant discoveries, which have improved our understanding of the role oceans play in affecting climate. Dr. Russell has also been instrumental in educating the public on issues related to climate change. For all these reasons, she is fully deserving of this prestigious award."

Among her many notable accolades, Dr. Russell has served on the UA Faculty Senate, the Honors Faculty Advisory Council and is a cofounder of the College of Science's Women in STEM Leadership. She is an executive committee member of the UArizona Space Institute, an

executive committee member of the Applied Math Graduate Interdisciplinary Program (GIDP), and a faculty member of the Global Change GIDP. She received her A.B. in Environmental Geoscience from Harvard and her PhD in Oceanography from Scripps Institution of Oceanography, University of California, San Diego.

"Joellen Russell is brilliant, focused, and dedicated to understanding the drivers of climate change," said Sarah Smallhouse, President of the Thomas R. Brown Foundations. "Our trustees are deeply impressed with her research and how she communicates its significance for all of us. It is essential society pays close attention to scientists like Dr. Russell if we are to navigate the future intelligently."

7. **Ananya Mallik**
Distinguished Lectureship by the Mineralogical Society of America, 2022-2023

8. **Mark Barton**
Prazen Living Legend of Mining, National Mining Hall of Fame and Museum, 2022

9. **Barbara Carrapa**
William R. Dickinson Medal Award, Society for Sedimentary Geology, 2022

10. **Mauricio Ibañez-Mejia**
CAREER Award, NSF, 2022

11. **Carmala N. Garzione**
Fellow, American Association for the Advancement of Science, 2023

12. **George Gehrels**
Excellence in Postdoctoral Mentoring, University of Arizona 2022

13. **Christopher Harig**
CAREER Award, NSF, 2022

14. **Kaustubh Thirumalai**
Paleoceanography and Paleoclimatology Nanne Weber Early Career Award, AGU, 2022

PROMOTIONS

Diane Thompson, promotion to Associate Professor

RETIREMENTS

David Dettman, Research Scientist, 1995-2023

Hexiong Yang, Research Curator for UA Mineral Museum, 2006-2023

ALUMNI NEWS

1. **Tekla Harms** (Ph,D., 86') was nominated Professor Emeritus George Davis for the 2023 Distinguished Alumni Award in recognition of Outstanding Achievement presented by the Department of Geosciences Advisory Board at the GeoDaze awards ceremony on March 31, 20233. Tekla is a Massachusetts Professor in Chemistry and Natural History at Amherst College.

Her stated research interests are a follows: "I have a number of long-term research projects located around the globe. While they may seem disparate, each in its own way seeks to understand the evolution of mountain belts and the interaction of plate boundaries in creating those belts. Detailed structural analysis, looking at the small-scale evidence of major crustal displacement, is one of the tools I use to investigate mountain belts.

Work in northern British Columbia and Yukon Territory addresses the Late Paleozoic (350 to 250 million years ago) history of the Cordilleran Mountain belt, a time when oceanic terrains that would later be accredited to the edge of the continent were developing offshore. What was their character, and their paleogeographic position leading up to collision with North America? The collision of various micro-plates with the Pacific margin of North America through the Mesozoic and early Cenozoic (150 to 50 million years ago) caused the growth of mountains by shortening and thickening the crust. A series of research projects in northeastern Washington seeks to quantify the amount of shortening involved in mountain building by looking at deformed markers, like trilobites, preserved in the strata." Together with a team of geology faculty and students from Amherst, Smith, and other liberal arts colleges, I have been seeking to understand the dynamics of the margin of a micro-plate involved in continental collision 1,790 million years ago. Evidence for this is preserved in highly metamorphosed and severely strained rocks exposed in the heart of the much younger Rocky Mountain ranges of southwest Montana. Did mountain building early in earth's history occur by the same processes we observe in younger mountain ranges? Sheath folds, a unique form of deformed rock layers, developed in these metamorphosed rocks during collision. How did they form and what can their presence tell us about the mechanisms of mountain building? We are analyzing microstructures in none prominent sheath fold to address these questions."

2. **Grace Windler MS '18, PhD '21**
Former PhD student of Prof. Jessica Tierney, now working for the Bureau of Reclamation

3. **Philip McFarland BS '13, MS '20**
Former PhD student of Prof. Rick Bennett, now working for NOAA

4. **Kat Compton PhD '16**
Former PhD student of Prof. Rick Bennett, now working for NOAA for EPA

5. **Kelly West MS'91**
Deputy Director UN Environment Programme Science Division Nairobi, Kenya, Geosciences Advisory Board member https://www.geo.arizona.edu/geosciences-advisory-board

6. **Moira Smith PhD '90**
VP of Exploration and Geoscience Liberty Gold Corp, Geosciences Advisory Board member: https://www.geo.arizona.edu/geosciences-advisory-board

7. **Edgar J. McCullough, Jr PhD ‘63**
Professor Emeritus Awarded College of Science Alumni of the Year by Arizona Advisory Council, 2022-2023

8. **Carmala Garzione MS ‘96, and PhD ‘00**
Dean, College of Science and Professor of Geosciences Awarded AAAS Fellow by American Association for the Advancement of Science 2023

9. **Pablo Yañez MS ‘89**
In Holbox, Mexico to celebrate our 30 year wedding anniversary (we had our honeymoon in Yucatán), the 35 year anniversary of my field work in Acatlan, Mexico, and 65-some million years without a major planetary “mishap” (pointing towards the Chicxulb crater 130 miles to the east).

10. **Andy Frassetto, PhD,** Seismologist, Interim Portable Program Manager (Seismic Instrumentation), EarthScope Consortium Incorporated.

Following the merger of IRIS and UNAVCO into the EarthScope Consortium at the end of 2022, I have been serving as the Program Manager for Portable Instrumentation operated as part of NSF’s SAGE facility, which includes seismic, magnetotelluric, ground penetrating radar, and other sensors. We live in Northern Virginia, where we have been since 2011, but overseeing this program means I make occasional trips to the EarthScope Primary Instrument Facility (EPIC) in Socorro, NM. It’s nice to have the opportunity to spend more time in the Southwest.

GEOSCIENCES NEWEST FACULTY MEMBERS

Pranabendu Moitra is a physical volcanologist and Assistant Professor in the Department of Geosciences. Dr. Moitra did his PhD from Rice University. Following his postdoctoral research at the University at Buffalo and the Lunar and Planetary Laboratory (UA), he joined the Geosciences department. His research focuses on understanding the effects of volatiles on the dynamics of volcanic eruptions and their explosivity with implications for volcanic hazards on Earth, as well as volatile cycling and evolution of planetary interiors. Dr. Moitra primarily integrates experimental and numerical approaches to tackle his research problems, with the aid of field/remote observations.

Advait Jukar is the Lecturer of Paleontology in the Department of Geosciences. He came to Arizona from Yale where he was a Gaylord Donnelley Postdoctoral Associate at the Yale Institute for Biospheric Studies and Department of Anthropology. Earlier, he was a Deep Time Peter Buck Postdoctoral Fellow at the Smithsonian's National Museum of Natural History. He received his masters and PhD in Environmental Science and Policy from George Mason University and a BA in Biology from Reed College.

Advait currently teaches two General education courses—Life on Earth and Dinosaurs and the upper division Paleontology course. He is very passionate about undergraduate education. His research focuses on the evolution, biogeography and extinction of mammals, predominantly in South Asia, but also in North America. He also conducts field and analytical research on dinosaur biogeography and paleoecology. His field research has taken him from Montana to India and he has a soft spot for extinct elephants and their kin.

Just this year, Advait led a Smithsonian-Indian Institute of technology Roorkee joint expedition to Western India to look for Middle Jurassic dinosaurs and hit the jackpot! At Arizona, he is stewarding a collection of fossil mammals from Pakistan and actively works with undergraduate students to catalogue the collection and study it.

In addition to his academic pursuits in science, he has published on the history of Paleontology in South Asia and is actively involved in several education and outreach projects at museums in the country. He is on the curatorial team at the Yale Peabody Museum building exhibits and in the past has worked on the Deep Time Fossil Halls at the Smithsonian's National Museum of Natural History and the Peale Mastodon exhibit at the Smithsonian's American Art Museum. Advait also serves as a consultant to the Government of India on Museum projects and is passionate about promoting the science in India, his home country.

Patricia Persaud is a physical volcanologist and Assistant Professor in the Department of Geosciences. She completed her PhD in Geophysics at California Institute of Technology. There her research focused on unraveling crustal deformation beneath the Gulf of California rift using both onshore and offshore recordings of earthquakes and explosions, as well as geodynamic models. She was a Postdoctoral Science Fellow at Columbia University, NY, where she worked with colleagues in Astronomy, Ecology and Climate Change to develop a new multidisciplinary course, Frontiers of Science, which has now become a standard part of Columbia University's core curriculum.

Her recent research has been developing detailed 3-D velocity models for the Salton Trough, southern California, the anticipated epicenter of the next "Big One," a magnitude 7.8 earthquake on the San Andreas Fault. The models and the identification of buried unmapped faults will help improve earthquake hazard assessments for the region. Dr. Persaud and collaborators have also deploy 30 broadband seismometers in Myanamar as part of the Bangladesh-India-Myanmar Array (BIMA) project to determine the crustal structure of the northward continuation of the Sumatra-Andaman subduction zone as it comes onshore beneath the densely populated Ganges-Brahmaputra Delta. Patricia welcomes the opportunity to talk to prospective students and postdocs.

Patricia Persaud - Santa Monica Mountains

Jonny Wu joins the Department of Geosciences at the University of Arizona as an Associate Professor in Tectonics, Structural Geology, and Geodynamics. His research primarily focuses on reconstructing Earth's history in 4D by analyzing geologic structures at different scales, ranging from upper crustal folds and faults to massive rock slabs in the Earth's mantle that were once lost tectonic plates. Prior to joining the University of Arizona, he was a faculty member at the University of Houston Department of Earth and Atmospheric Sciences for seven years, where he earned tenure in 2022.

Dr. Wu received the National Science Foundation CAREER award for his work on reconstructing the plate tectonics of the Panthalassa Ocean, a vanished ancient ocean that once covered a large portion of Earth during the Mesozoic era. His research findings have been published in journals such as Nature, Nature Communications, Earth Science Reviews, Geology, and Earth and Planetary Sciences. Additionally, his work has also been featured in publications related to energy, such as AAPG books, SEG Interpretation, and Marine and Petroleum Geology.

His overarching research goal is to reconcile Earth's deep subsurface structures with its surface geology, leading to collaborations across various fields like seismology, igneous geochemistry and geochronology, detrital zircons, machine learning, and global geodynamics. Some of the techniques employed in his research include subsurface mapping, geophysical image interpretation, retrodeformation, plate tectonic reconstructions, analog modeling, and geodynamic modeling.

Dr. Wu's current research projects include:

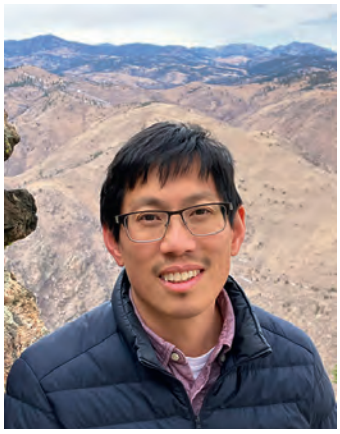
• Enhancing global plate tectonic reconstructions through the study of lost tectonic plates in the

Earth's mantle.

• Advancing our understanding of the geology and geodynamics of East Asia, an area with limited knowledge,

• Investigating sedimentary basin evolution and fault growth, and,

• Studying Earth's mantle circulation and its impact on warping the Earth's surface, paleoclimate, and tilting the Earth relative to its spin axis, known as true polar wander.



Dr. Wu is a Canadian who completed his Bachelors in Geological Engineering at the University of Waterloo, Canada. After graduating, he worked for Shell Canada in Calgary as an exploration geologist in the Canadian East Coast and Arctic regions. He then left industry to pursue his MS and PhD at Royal Holloway, University of London, UK, under the guidance of advisor Ken McClay, specializing in seismic interpretation and structural modeling of fold and thrust belts. After earning his PhD, he completed a postdoctoral fellowship at National Taiwan University with John Suppe. Outside of academia, he enjoys camping, fishing, ice hockey, talking about his Christian faith, listening to jazz, and playing the guitar.

OBITUARY

Dear Geosciences Community,

it is with a very heavy heart that I inform you that **Marie S. Pearthree** passed away Wednesday evening after battling cancer.

Marie was an alumna of Geosciences, received a MS from our Department, and served on our advisory board for several years.

Marie's energy, positivity and passion for Geosciences and water resources was contagious. She was instrumental in helping our department and our students. She was an incredible role model for me and many others. She worked hard to establish the Marie Pearthree summer research scholarship to support undergraduate and graduate students in Geosciences. She was particularly invested in the advancement of women in Geosciences.

Marie did not only make a significant impact on our Department, CoS and University of Arizona but also on the community. In her role as Deputy Director of the Tucson Water Department she led the important effort of bringing Colorado River water in the Tucson area and she was author, with Michael J. McGuire, of an important book: "Tucson Water Turnaround: Crisis to Success" published in 2020 by the American Water Works Association.

I feel very lucky to have had the opportunity to know her and work with her on our board and I know that she has similarly impacted so many of you.

Marie will be deeply missed.

GEOSCIENCES PROPOSALS AND AWARDS FY23

Since July 2022, faculty and staff in Geosciences have received 17 grants and awards with a total anticipated value of $5,618,752, on par with 17/$4,163,817 in FY22. Of note, postdocs **Jordan Abell (co-PIs K. Thirumalai and D. Thompson), Will Struble,** and **Matthew Osman (co-PIs J. Tierney and M. Lofverstrom)** were awarded NSF grants (Will's and Matthew's first NSF grant). **Mauricio Ibañez-Mejia** was awarded an NSF MRI grant. Current NSF CAREER award holders are **Diane Thompson** (2020), **Patricia Persaud** (2021), **Mauricio Ibañez-Mejia** (2022), and **Christopher Harig** (2022). In May 2022, **Andrew Cohen's** and **Kaustubh Thirumalai's** newly proposed REU program, "From the Clouds to the Core: A Place-Based REU for Southwestern US Community/Tribal College Students to Increase Under-Represented Group Recruitment to the Geosciences" was awarded funding for three years. This program partners with Community and Tribal Colleges in and around Arizona to help introduce students to the many opportunities for a career in geosciences, and the possibilities of transferring at the completion of their AA degree to the UA majoring in Geosciences. Over the past year (FY23) faculty and staff in Geosciences have led the submission of 49 proposals, exceeding FY22's total of 44. Of the 49 submitted to date, 11 have been awarded, 26 are pending, and 12 were not awarded (FY22's numbers: 27 awarded, 2 pending, 15 not awarded). Of note, **Luke McGuire** and **Barbara Carrapa** submitted the most proposals at 6 and 5, respectively, and **Hervé Rezeau** and **Allen Schaen** submitted their first NSF proposals as lead PIs. Additionally, faculty in Geosciences participated in 11 proposals led by faculty in other departments, and were participants in 6 awarded grants **(A. Hughes, M. Lofverstrom, L. McGuire (2), H. Rezeau, K. Thirumalai).**

Geosciences-led pending proposals of note include:

NSF FRES, "Collaborative Research: Pliocene paleoclimate in the North American monsoon belt and implications for future climate change in the region", UAz PIs: **A. Cohen, J. Quade, K. Thirumalai, D. Thompson, M. Lofverstrom,** Total Request: $2,121,479 (UAz request)

- With partners at Penn State Univ., Indiana State Univ., and Univ. of Oklahoma the total program request is $2,996,326.

- NSF 23-509, "SOCCOM3: Science to predict the future of the Southern Ocean and its global impacts", UAz PIs: **J. Russell, R. Stouffer,** Total Request: $1,596,599 (UAz subaward)

- Led by UCSD Scripps Inst. of Oceanography with partners at Monterey Bay Aquarium Research Institute, Univ. of Arizona, Princeton Univ., Rutgers Univ., Univ. of Washington, and Univ. of Hawaii, the total program request is $20,934,100.

- NSF ERC, "NSF Engineering Research Center for Re-Imagining Engineering Systems for Coral Underwater Ecosystems (RESCUE)", UAz PIs: **D. Thompson, J. Hackett,** Total Request: $849,664 (UAZ subaward)

- This application was led by Virginia Commonwealth Univ.

- NSF EAR/IF, "ITD: Development of laser (TILDAS) system for simultaneous and rapid measurement of clumped and triple-oxygen isotopes in carbonates," PIs: **J. Quade, D. Dettman, Z. Wang,** Total Request: $599,137

GEODAZE 2023

This past March, we held the 51st annual student-run GeoDaze symposium in a hybrid setting (in-person and over zoom) on Thursday, March 30th and Friday, March 31st. All of the presenters delighted us with updates from their outstanding research. This included 26 oral and 15 poster presentations from both graduate and undergraduate students. These presentations spanned five different geoscience disciplines, and each session was followed by a live question and answer period.

Dr. Emily Cooperdock and Anahi Carrera from the University of Southern California joined us at this year's GeoDaze as our keynote speakers. Dr. Cooperdock is a Gabilan Assistant Professor of Earth Sciences at USC. Anahi is a PhD candidate working with Dr. Cooperdock, as well as an alumna of the department who presented at two previous GeoDaze seminars during her time as an undergraduate! Our speakers presented a keynote talk titled "On the margins: Unlocking plate boundary dynamics with thermochronology." In addition, they gave a DEI talk called "Exclusion of Marginalized Groups in the Geosciences: Highlighting First-Generation Students" during a breakfast hosted by the department's chapter of the Association of Women Geoscientists.

We concluded the 51st GeoDaze symposium with a live awards ceremony, where we presented awards to 12 students for their excellent presentations. In order to celebrate our presenters, we held an after-party hosted by Prof. Jon Pelletier on the evening of Friday, March 31st. We capped off the GeoDaze weekend with a field trip led by Dr. Jon Spencer up Mount Lemmon on Saturday, April 1st. Over 100 in-person and 30 virtual participants joined us for this year's GeoDaze. We are incredibly grateful for all the support we received, especially from our donors, faculty members, student volunteers, attendees, and participants who made GeoDaze a success this year!

Cheers,

Tshering Lama Sherpa

Ken Gourley

CONGRATULATIONS TO THIS YEAR'S WINNERS!

Oral Presentation Awards:

Best Overall Talk: **Holly Thomas**

Best Graduate Talk: **Emilia Caylor**

Best Undergraduate Talk: **Danielle Schwartz**

Best Economic Geology Talk: **Sadie Huggler**

Best Climate & Paleoclimate Talk: **Priscilla Martinez**

Best Geophysics Talk: **Sankha Subhra Mahanti**

Best Tectonics & Geochronology Talk: **Jordan Wang**

Best Geochemistry & Petrology Talk: **Lisa Zieman**

Poster Presentation Awards:

Best Graduate Poster: **Emilie Bowman**

Runner-up Graduate Poster: **Jenna Biegel**

Best Undergraduate Poster: **Katie Slaughter**

Runner-up Undergraduate Poster: **Kay Poonawala**

Above photo from right to left: Ari Dettman - Geosciences undergraduate presenting his work with Arizona Laserchon Center. Mauricio Ibanez-Mejia (recipient of this year's Outstanding Faculty Award) and Jordan Wang (Geoscience PhD graduate student)

Right photo: GeoDaze poster session held at Gould Simpson Lobby

Left photo: GoeDaze Saturday fieldtrip to Mt. Lemmon, led by Jon Spencer

AWG CELEBRATE FIFTH YEAR ANNIVERSARY AND AWARDED 2022 CHAPTER OF EXCELLENCE

This year was an especially big one for Association for Women Geoscientists (AWG) Southern Arizona as we celebrated the fifth year anniversary of our chapter and were also awarded the 2022 Chapter of Excellence of the AWG National Chapter at the GSA Annual Meeting in Denver, CO. Our success is a big testament to all the officers, present and past, who have over the past five years, built a strong community that continues to expand and thrive.

We started off the year with our AWG Mentorship program spearheaded by Mentorship co-chairs, Alice Chapman and Asiya Sainudeen. The mentorship program has become a bridge for undergraduate students to engage and learn with graduate students, and we hope to continue this program in the upcoming years! We also offer an AWG undergraduate scholarship for students from underrepresented groups who want to attend field camp. Last year, the award committee led by Emilia Caylor, AWGF Foundation coordinator and Scholarship Chair, was able to award the scholarship to two undergraduate students, Duke Ozamah and Lauren Gilmore. Duke and Lauren attended field camp via Summer of Applied Geophysical (SAGE) in New Mexico and UA's Accessible Earth Program in Italy, respectively. This year our fundraising chair Aubrey Bennett again helped us meet our fundraising goal by organizing a "Boo a geoscientist-Halloween candy gram" and "Valentine Rock Candy-gram." We also hosted a spin class fundraiser led by one of our undergraduate leaders, Lindsey Frenia and a Yoga in the Park event in Himmel Park, led by Caden Howlett.

Our AWG Breakfast with female colloquium speakers continues this year led by Cassie Hanagan, our Vice President. The goal of the breakfast is to provide an informal space (with bagels and coffee!) for graduates and undergraduate students to have open conversations with female identifying speakers. In the spring, we also collaborated with Geodaze to host a breakfast panel with the keynote speakers for Geodaze, Dr. Emily Cooperdock and Anahi Carrera from University of Southern California.

For the second year in a row, members, led by Outreach chairs Emilie Bowman, Jenna Biegel and Priscilla Martinez, directed a rock and mineral ID session with the International School for Peace (internationalschoolforpeace.com) in Tucson. AWG Secretary Lisa Zieman and members Holly Thomas, and Jenna Biegel also volunteered as science fair judges at St. Michael's school and the Southern Arizona Regional Science Fair (SARSEF). Another educational outreach event with a Title 1 School in Tucson Unified School District is planned for May! We have also collaborated with Women in STEM and Engineering (WiSE) at the University of Arizona at a 'open-house' where our undergraduate liaison officers, Lindsey Frenia and Dana Assudmi represented the chapter.

Finally, we want to congratulate Dr. Audrey Dunham (our founder and President 2018-2020), Dr. Lydia Bailey (President 2020-2021) who graduated in the past year. Another big shoutout to our webmaster Dr. Emily Rodriguez and treasurer extraordinaire, Dr. Rob Hayes, who successfully defended in the spring leading our website and treasury in the capable hands of our current webmaster, Jordan Wang and treasurer, María Marroquín.

We look forward to growing our mentorship program, organizing more exciting fundraising events, and continuing with our community outreach to hopefully inspire geoscientists of all ages!

If you are interested in joining or donating to our chapter, please contact us at awg.arizona@gmail.com, our website geo.arizona.edu/awg or Tshering Lama Sherpa, AWG Southern Arizona President, 2021-2023

AWG Officers with the AWG Chapter of Excellence Award. Left to Right: Tshering Lama Sherpa, Emilia Caylor, Dana Assudmi, Alice Chapman, Aubrey Bennett, Lydia Bailey, Emilie Bowman, Cassie Hanagan, Asiya Badarunnisa Sainudeen.

AWG-Geodaze Breakfast with Geodaze keynote speakers, Dr. Emily Cooperdock and Anahi Carrera. Anahi (current PhD candidate at University of Southern California and UArizona undergraduate alumna), presented a talk titled “Exclusion of Marginalized Groups in the Geosciences: Highlighting First-Generation Students” during the breakfast.

Local opinion: The Colorado River needs modern management

The Colorado River's Lower Basin states of Arizona, California and Nevada have agreed to save water and have sent their proposal to the Federal government. During the next three years, the states will refrain from using 3 million acre-feet of Colorado River water in exchange for $1.2 billion in Federal funding.

Hold your applause.

Paying people not to use water is just short-term therapy.

The Lower Basin states have done what they know how to do: Kick the can down the road.

We have a wicked problem. The facts are simple: There's not enough water to do what we are used to doing. Moreover, the 20th-century rules for allocations are no longer suitable for a 21st-century river and the 21st-century West. Colorado River water managers need to face up to the problem rather than just bargain for more cash from taxpayers.

All the Basin States have had plenty of warnings that over-use, bad management, drought and climate change would bring us to this point.

Too many politicians and managers have buried their heads in the sands of a disappearing river.

Many government officials have excused their inaction, like the cocaine addict who sings in the blues song, "The doctor says it'll kill me, but he won't say when." But here, the addiction is to the fantasy of unlimited water. Are the water managers who drove us into this ditch the best qualified to get us out?

This past winter's weather was an answer to managers' prayers.

They got lucky on a long-shot bet. But wishin' and hopin' for a deep snowpack is not a plan. Depending on luck is no way to manage this critical resource for our long-term future.

There will be less water in the future. Old-fashioned water laws, including the first-in-time-first-in-right rule, fixed allocations and traditional notions of beneficial use, are no way to manage the Colorado River in the 21st century. Fear of running out of water should motivate change. Lawsuits from disgruntled users should not stand in the way.

The Federal government has stepped up with funding from the Bipartisan Infrastructure Law and the Inflation Reduction Act. These funds will: compensate users for using less, build water-recycling facilities, repair water-delivery systems and pay for ways to improve efficiency.

The U.S. Bureau of Reclamation continues to provide superb modeling and other technical advice to the Basin States.

The current rules for managing the river expire at the end of 2026.

The river has changed, and the West has changed. It's time for the rules to change and time for the Basin States to get to work.

Karl Flessa is an Arizona resident since 1977, an emeritus professor of geosciences at the University of Arizona. He has been studying the Colorado River since 1992.

Fieldwork in the Atacama Region of Chile

In December 2022, Dr. Barbara Carrapa and PhD student Priscilla Martinez conducted fieldwork in the Atacama Region of Chile to investigate the effect of Andean volcanism on the paleoenvironmental conditions leading to the mass deaths of marine megafauna during the late Miocene. Alongside collaborators, they measured stratigraphic sections and collected samples for U-Pb zircon geochronology from the Bahia Inglesa Formation in the Caldera Basin, which preserves over 40 intact baleen whale skeletons. Priscilla will return to the field in Summer 2023 to gain further insight into the stratigraphic evolution of the Caldera Basin and major climatic-biotic events occurring along the Chilean coast in the late Miocene.

Chile research team at Cerro Ballena (from left to right): Dr. Carolina Gutstein (University of Chile, Santiago), Dr. Mark Clementz (University of Wyoming), Dr. Barbara Carrapa, PhD student Whitney Worrell (University of Wyoming), PhD student Priscilla Martinez, and undergraduate student Fabían Muñoz (University Central de Chile).

SOLAMS PROJECT

By Associate Professor Patricia Persaud

Patricia Persaud joined the department as an Associate Professor in January 2023. Her group's latest research aims to expand our understanding of how human-driven processes during the energy transition and can lead to earthquakes. Finding ways to safely store fuels such as hydrogen in massive salt domes is critical for the global and US energy security. Storage allows energy resources to be stockpiled for emergencies and shortages and reduces the gap between renewable energy supply and power demand. Underground long-term storage of CO2 is also required to meet net zero emission targets. Salt domes in the southern US passive margin represent the most widely used geological structures for underground storage. Although the hazards and frequent accidents related to storage are documented, the difficulty imaging salt has limited our ability to identify anomalous zones that can be problematic for storage infrastructure. Persaud and graduate student, Joses Omojola are developing new earthquake detection algorithms that can rapidly and accurately process terabytes of continuous recordings. Exploiting data from modern seismic networks they installed at the Sorrento salt dome underground storage facility in the energy intensive corridor of the US Gulf Coast, the goal is to detect the smallest earthquakes possible that will help illuminate anomalous shear zones. Their algorithms make use of neural networks that are trained on global earthquake recordings but can accurately analyze new or unseen data. More importantly, their approach can distinguish recordings of noise sources such as planes, boats, and trains from earthquakes, allowing them to pinpoint the source regions of tiny earthquakes within the salt itself.

The group is further building on their experience installing seismic networks and imaging in urban settings such as Los Angeles and Yangon Myanmar by collaborating with residents and business owners in the Gulf Coast on the SOLAMS project. The project started with twenty-seven volunteers, mainly students from Texas, Louisiana, and Mississippi. The group setup a 432-seismic node array in October 2022 to study the hydraulic and seismic properties of an unusual set of regional growth faults that slip but do not produce large earthquakes.

Undergraduate student, Ashlyn Schneida, and postdoctoral researcher, Alan Juarez-Zuniga are analyzing the seismic data from five profiles that cross the faults. The field group also combined deep Earth geophysical research with a critical zone geochemical study by simultaneously collecting soil samples. They launched the first large scale study of urban pollution by heavy metals in the region. Samantha Rios, an undergraduate student, is using lab-based X-ray fluorescence (XRF) analysis to determine the metal contaminants in the soil samples. Persaud is currently expanding on the SOLAMS project by designing a 3-month long broadband magnetotelluric study across the growth fault system focused on identifying and mapping temporal changes in deep fluid pathways. Connecting fault slip behavior with the hydromechanical properties of faults will help to explain why some regions have induced earthquakes and others do not.

Members of the SOLAMS group installing seismic instruments "nodes" across the regional Baton Rouge-Tepetate growth fault system.

Joses Omojola is from Engineering, Math and Geoscience departments.

From left to right: Michael Attia, Sachin Kumar, Patricia Persaud, Sandra Rosero-Rueda, Hunter Shepard and Ben Sadler

Delton Samuel is from Engineering, Math and Geoscience departments.

College of Science PhD candidate Caden Howlett shares his love for Geosciences and Astronomy one social media post at a time

Feb. 16, 2023
By Scott Coleman,
College of Science

"The most rewarding part of having the social media platform is when high school and early undergrad students tell me that their interest in geoscience is increasing," said Caden Howlett, PhD candidate in UArizona Department of Geosciences. "It is a magical feeling. I was recently telling my mom that I think the biggest impact I'm having on the community is through my videos."

With more than 100K followers on Instagram and tens of thousands of views on Youtube, Geosciences PhD candidate Caden Howlett is sharing his love for the sciences to audiences everywhere.

Now in his third year at the University of Arizona, Caden has built an expansive social media following while recording and documenting his field work. Whether it's a "Day in the Life in the High Andes" or "Reacting to the stunning images of the James Webb Space Telescope," his passion for scientific exploration is contagious.
Get to know Caden more in this Q&A with the College of Science.

Why did you choose to study Geosciences?

Howlett: I had a somewhat unusual upbringing, splitting my year between Montana and Utah in the summer and winter, respectively. My parents owned a whitewater raft company on the Lower Flathead River of northwest Montana and worked at Alta Ski Area, and they made the seasonal lifestyle work for our family. Really, water was the backdrop of my entire childhood, just in different forms—fluid in the north and frozen in the south (clean, big rivers and Utah pow pow). Common to both locations were mountains. The almost perfectly north-south oriented Mission Range bound the eastern edge of my hometown in Montana, and enormous ridges of the interior Wasatch Range rose above our employee housing at Alta. I just wanted to play and ski as a kid and was not that interested in science or school, but being constantly exposed to the topography and climate of the northern Rockies absolutely set the stage for an interest in geosciences.
Going into my undergraduate at Montana State, all I knew was that I wanted to be outside as much as possible. With absolutely no idea of its beauty and complexity, I chose geology as a major. I've never looked back on that decision, but a handful of inspiring scientists exposed me to what was possible as a geology researcher and are the reason I've continued studying the Earth at UA (Dr. Dave Lageson, and UA Geosciences alum Dr. Drew Laskowski and Dr. Devon Orme). I am forever grateful for those people.

Now that you're in your third year, what is the most interesting aspect of Geosciences in your opinion?

Howlett: Oh, so hard! Perhaps unsurprisingly, I am biased towards the subdiscipline that I'm studying for my PhD. Put simply, I research the origins of major mountain belts. Our group is interested in the tectonic processes that create topography and the erosional surface processes that destroy it. When tectonic plates collide, how is stress transferred through the Earth's crust? What structures are responsible for uplifting and exhuming rock and when were these structures active? We commonly attempt to answer these kinds of questions in a specific region and then consider our results in the broader context of an entire mountain belt (such as the Andes). We have remarkable laboratories within UA Geosciences and adjacent departments that enable

us to probe these questions deeply once we return from field campaigns. A specific question we are investigating within our research group is how the continental crust thickened in the Andes over the last 100 million years and why the crustal thickness is variable "along strike" (moving from the north to the south). Our project, titled TransANdean Great Orogeny (or TANGO), is an international, interdisciplinary study that seeks to shed light on this long standing issue (read more about this project here).
One other problem in geosciences that I find extremely interesting and important is the mechanism responsible for reversals in Earth's magnetic field over time. It is well understood that the magnetic north and south poles have switched places numerous times but there doesn't appear to be any cyclicity to it. It's a big, beautiful mystery.

Why did you decide to start creating social media content around your studies?

Howlett: My science outreach efforts began in astronomy, well outside of my current study area. The platform originated as "Astro-Daily" in March of 2016 and I used it to share my favorite images from various spacecraft (primarily Hubble and the Curiosity Rover). I would spend about an hour each morning crafting a caption containing updates on Martian science and deep space astrophysics and cosmology. I was wildly consistent when I first started; I think I posted daily for something like 250 straight days. Over time, I started experimenting with injections of my personal life and offering more philosophical perspectives that I learned were conducive to meaningful interactions in comment sections. Things evolved, and the platform is now just my name (@cadenhowlett) and the focus has shifted from IG to YouTube after I realized that there were virtually no geoscience graduate students/geologists that were sharing a behind the scenes look at how our science works. YouTube holds massive potential for increasing the reach of our science, and most importantly to me, giving prospective students a realistic view into what it means to be a physical scientist. It would be great if similar channels were started by graduate students in every department within the College of Science. Go for it!

What has the response been to your content?

Howlett: Overall, the response has been good! It takes a long time and lots of effort and attention to detail to set yourself apart in the vast sea of social media. But the IG has >100k followers now and it fills my heart to see people enjoying and discussing science when so much other vacuous content could be capturing their attention. I'm most inspired by the response thus far on YouTube (it is relatively new; I started making videos in January 2021). Literally dozens of early undergraduate students have reached out to me and expressed that the videos have cemented their decision to study geoscience. And I don't want that to sound like I'm bragging—I really just want to emphasize how much potential there is for graduate students in physical sciences to share their work and inspire younger students.
I deal with the occasional flat-earther, people arguing that mountains are structures created by ancient civilizations, etc., which adds to the excitement!

Have any prominent scientists reached out to you?

Howlett: I have gotten some responses from NASA and the European Space Agency, which is always fun. One person that I have had sustained conversation with for many years is actor

and activist Gustaf Skarsgård (of Vikings, Westworld, etc.). He is a deep thinker and we like to exchange book and film recommendations. Two other names that come to mind are Dr. Nick Bostrom at Oxford and Dr. Donald Hoffman at UC Irvine. They have both written exceptional books that inspired a lot of discussions on my platform (Superintelligence: Paths, Dangers, Strategies by Bostrom and The Case Against Reality: How Evolution Hid the Truth from Our Eyes by Hoffman). It was exciting to talk to them.

What is your goal of your Instagram and YouTube channel?

Howlett: Broadly, the mission is to expose as many people as possible to physical sciences. Images from the James Webb Space Telescope, new data hot off the mass-spec in Gould-Simpson, the normal basecamp operations of a field geologist—the scope is wide but the goal is always the same. The YouTube channel is a bit more targeted towards studying geoscientists and geology enthusiasts. I share what I consider to be important advances in the science, as well as tips on how to succeed as a student of the Earth system. "Day in the Life" videos are popular and intend to reveal the lifestyle that prospective graduate students can expect if they pursue a higher degree. I want the videos to be chill and transparent—I think that a lot of the scripted geoscience content online is just flat and boring to younger students. There is a place for it, but I want to keep it more fluid and relatable.

What is the most rewarding part about having a large following and creating this content?

Howlett: The most rewarding part is when high school/early undergrad students tell me that their interest in geoscience is increasing. Perhaps I sound like a broken record at this point, but it is a magical feeling. I was recently telling my mom that I think the biggest impact I'm having on the community is through my videos. This is an interesting feeling because such a large majority of my time and energy is dedicated to my actual PhD research. It has shown me that in science communication there can be a very large reward for a relatively small commitment of time.

Geological Field Work in the High Andes | DAY IN THE LIFE
https://www.youtube.com/watch?v=1RXS7plp3SM

Geologists Climb a 6700m Peak in the Andes | Cerro Mercedario
https://www.youtube.com/watch?v=uiKT0mtfYO4

PhD DAY IN THE LIFE | Lab work at UArizona
https://www.youtube.com/watch?v=TWP0XFomXGY

Follow Caden on Instagram: https://www.instagram.com/cadenhowlett/

Follow Caden on Youtube: https://www.youtube.com/@cadenhowlett

“The most rewarding part of having the social media platform is when high school and early undergrad students tell me that their interest in geoscience is increasing” said Caden Howlett, PhD candidate in the UArizona of Geosciences. “It is a magical feeling. I was recently telling my mom that I think the biggest impact I’m having on the community is through my videos.”

Fall fieldwork in Nepal

Peter G. DeCelles
Professor of Geosciences

During October and early November, GEOS faculty Peter DeCelles and Jay Quade and graduate students Tshering Lama Sherpa and Nitzan Yanay, along with University of Toronto graduate student Josh Wolpert, traveled to western Nepal to carry out work on a high-elevation/low-relief (HELR) surface. Their goals were to establish the origins of this surface by additional geochronological work and surficial mapping. The surface sits at 4300-4800 m elevation, and is surrounded by deeply incised and rugged fluvial landscape with >1.5 km of topographic relief. Their previous work (Sherpa et al., 2022, GSA Bulletin) shows that the surface was likely formed at high elevation and has subsequently been dissected into remnant patches. The low relief owes to a combination of low-angle structure, rock type, and glacial beveling. They suspect that much of the Himalayan thrust belt was occupied by this type of landscape since about 8 Myr ago, and that a huge amount of erosion has degraded the landscape since that time. All of Nepal was plagued by a late-running monsoon, with torrential rainfall that destroyed most of the roads in western Nepal. After being marooned for more than 10 days in Surkhet, they decided that flying would

The view from 4600 m on the Balu Lekh Range, western Nepal. Photograph by P.G. DeCelles.

be safer, and certainly more successful, than trying to negotiate the hundreds of active landslides, bridge collapses, and road failures. This turned out to be a good option, and they landed safely in the mountain town of Jumla. From there they walked eastward into the high mountains, helped by a crew of porters and mules. While it was raining at low elevations, it was snowing at the high elevations they intended to get into, and they quickly realized that it would be impossible to get back up to the HELR plateau they had aimed for. Luckily, they were able to access a smaller nearby 'satellite' plateau, and establish camps at 4000 m to work on this new objective. The work went well under sunny skies, but night-time temperatures were well below freezing. It was an adventurous several weeks, and they collected a useful set of samples and mapped out new areas in the Himalayan thrust belt. At the end of the expedition, they caught another flight out of Jumla and arrived safely back in Kathmandu. This type of exploratory work always comes with a variety of risks, and this time they got to see the monsoon at full throttle and the amazing damage it can create.

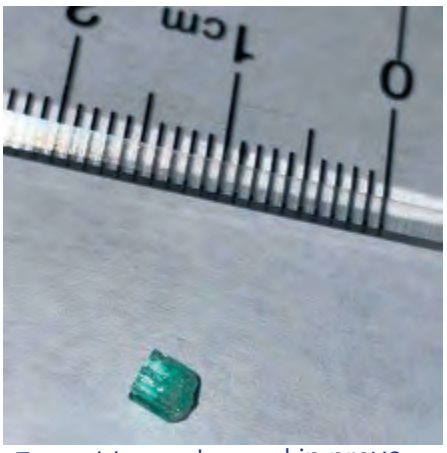
Newest Geoscience Track Meets the Needs of the Gem Industry

April 20, 2023
by Ami Jones, student writer

Over millions of years, the Earth has evolved through a changing climate and geological events. Gems are windows to the past, showcasing how Earth's history has led to their composition.

At the University of Arizona, the highly-ranked Geosciences program features a one-of-a-kind track in Gem Sciences. In this program, students can focus their skill sets to become gemologists and work toward their passion in the gem industry.

The track was created through the leadership of **Dr. Ananya Mallik, Assistant Professor in Geosciences and The RealReal, Inc. Endowed Chair in Gem Science.**



Emerald sample used in provenance testing

"There is a need in the gem trade and industry for people who are trained in hardcore science and apply them to problems that are of relevance in the gem industry," says Mallik. Six students are now in the major track which was created in Fall of 2021.

Danny Svoboda, first graduate of the gem sciences track, switched to the track from geology because of his interests in gems and crystals and how they're formed. "I enjoy the natural color and beauty of gemstones and I am also a rockhound and collect minerals and crystals in the field, and wire wrap them into jewelry, so I am naturally interested in the gem industry as a career path," says Svoboda.

He now works at TheRealReal Inc. as a Jewelry Lab Technician where he tests and examines certain gems. "I utilize the XRF (x-ray fluorescence) machine to test the metal content of jewelry and to test certain stones like turquoise, pearls and corals. I also use the Raman spectrometer to authenticate the gemstones set in the jewelry. I also regularly use the tools of the gem trade like a gem microscope, polariscope and refractometer."

The track is interdisciplinary. While its main focus is geology, there are also classes that students can take from other fields, such as art, retail, chemistry, engineering, and more. Some of the skills students learn involve

provenance determination research (determining where gems originate from).

In this track, students will have a lot of opportunities to learn about various aspects of the gem industry, as well as meet with guest speakers. In some of the classes offered, the Alfie Norville Gem & Mineral Museum provides students with hands-on experiences in their classroom, allowing students to practice gem identification.

While many students interested in gem science wish to go into the gem industry upon graduation, there are countless opportunities with this track. Students could go beyond their undergraduate studies, pursuing higher education, and even finding ways to get involved in research with national institutions with a focus in geology. “At the end of the day, you’re a geologist,” says Mallik.

More info - link to external websites:

gemandmineralmuseum.arizona.edu

www.geo.arizona.edu/gem-science

Undergraduate student Tom Zhang uses the Raman spectrometer for identifying gems and minerals

Shaunna Morrison Named 2022 Recipient of MSA Aw

The Mineralogical Society of America (MSA) has named Earth and Planets Laboratory (EPL) mineralogist Shaunna Morrison as the 2022 recipient of the MSA Award. This award recognizes outstanding contributions to the science of mineralogy by early career researchers.

Shaunna Morrison MS 13', PHD 17' builds on her technical and theoretical background in crystallography, crystal chemistry, and Martian mineralogy, to explore new techniques in multidimensional, multivariate analysis and visualization by employing a range of advanced analytics and machine learning techniques better to understand the complex relationships between Earth and planetary materials, their formational environments through deep time, and their coevolution with the biosphere.

Morrison is the Co-Director of Carnegie's 4D (Deep Time Data Driven Discovery) Initiative, former Project Manager of the Carnegie-led Deep-Time Data Infrastructure (DTDI), a Co-Investigator of the CheMin X-ray diffraction instrument on the NASA Mars Science Laboratory (MSL) mission, a collaborator on the NASA Astrobiology ENIGMA Project, a Co-Investigator of the NASA Astromaterials Data System, and a data contributor and collaborator of the RRUFF Project, including the Mineral Evolution Database (MED), Mineral Properties Database (MPD), and the Evolutionary System of Mineralogy Database (ESMD).

Morrison will be honored at the Geological Society of America meeting in Pittsburgh, PA, USA, in October 2023.

WARD FOR OUTSTANDING CONTRIBUTIONS TO MINERALOGY

MIS, Earth Sciences at U of A ranked among nation's best by US News and World Report

By Nick Prevenas, University Communications

April 25, 2023

Updated May 11, 2023

Several University of Arizona graduate programs across a variety of disciplines have been recognized among the best in the nation in U.S. News & World Report's latest rankings.

The annual list, released April 25, again ranked the Eller Management Program in management systems No. 1 among public universities and No. 3 overall, behind Carnegie Mellon University and the Massachusetts Institute of Technology.

Programs in the UArizona Department of Geosciences, the College of Science also continued to rank among the nation's best. UArizona's doctoral program in Earth sciences rose five spots to tie for No. 4 overall and rank No. 2 among public universities. The following Earth sciences subspecialties also earned strong scores: geology (tied for No. 5 overall, No. 3 among public universities), geochemistry (tied for No. 6 overall, tied for No. 4 among public universities) and geophysics/seismology (No. 15 overall, No. 8 among public universities).

The university's rehabilitation counseling program in the College of Education was also ranked a top-10 program, tied for No. 10 overall and tied for No. 9 among public institutions. The College of Education also had a strong showing in higher education administration (No. 17 overall, No. 11 among public universities) and education psychology (No. 21 overall, No. 16 among public universities). The college's overall ranking was tied for No. 58 overall and tied for No. 44 among public universities.

"I am proud to see such a wide variety of our graduate programs deservedly recognized among the nation's best," said University of Arizona President **Robert C. Robbins**. "Graduate students are essential to all of our research initiatives and teaching programs. Those who choose to take part in a University of Arizona graduate program do so knowing they will be given the opportunity to excel in scholarship, teaching and career preparation."

Eller's McGuire Center for Entrepreneurship tied for No. 17 overall and tied for No. 7 among public universities. The college's accounting program tied for No. 40 overall, while the part-time MBA program tied for No. 56 overall and the full-time MBA program tied for No. 53 overall.

The University of Arizona College of Medicine Tucson earned its best ranking on the U.S. News & World Report diversity index (No. 17 overall and No. 12 among public universities). The College of Medicine – Tucson also earned strong marks for its programs in primary care (tied for No. 53), rural health (No. 72) and research (No. 63).

U.S. News & World Report also ranks colleges and universities by the percentage of 2014-16 graduates practicing direct patient care in geographic regions that are experiencing health professional shortages. The College of Medicine - Phoenix was ranked No. 64 in this category and College of Medicine – Tucson was ranked No. 69.

The colleges also secured strong placements in the number of 2014-16 graduates who are now practicing as primary care physicians (tied for No. 77 overall for the College of Medicine – Tucson and ranked No. 132 for the College

of Medicine – Phoenix). The College of Medicine – Phoenix was ranked No. 115 in the rural health category.

The UArizona College of Veterinary Medicine earned recognition in U.S. News & World Report's first ranking of veterinary medicine doctoral programs, placing No. 30 overall and No. 26 among public universities.

The School of Government and Public Policy housed in the College of Social and Behavioral Sciences tied for No. 39 on the list of public affairs programs, with a subspecialty in public management/leadership also earning recognition at No. 30 overall.

Other College of Science graduate programs ranked this year were in the Department of Chemistry and Biochemistry tied for No. 51, with a No. 13 overall ranking in the analytical chemistry subspecialty, the Department of Physics tied for No. 35 overall, the Department of Computer Science tied for No. 50 overall and the Department of Mathematics tied for No. 43 overall.

The Mel and Enid Zuckerman College of Public Health tied for No. 43 in the publication's ranking of public health programs. The College of Nursing tied for No. 31 in doctoral programs and tied for No. 41 in master's programs on the annual Best Nursing Schools list.

The James E. Rogers College of Law earned its best mark in the legal writing specialty, tied for No. 8 overall and tied for No. 4 among public universities. The college tied for No. 54 overall on the Best Law Schools list. The following specialties also were ranked:

- Health care law (tied for No. 29)
- Dispute resolution (tied for No. 34)
- Constitutional law (tied for No. 35)
- Business/corporate law (tied for No. 36)
- International law (tied for No. 38)
- Environmental law (tied for No. 39)
- Criminal law (tied for No. 45)
- Clinical training (tied for No. 45)
- Contracts/commercial law (tied for No. 59)
- Tax law (tied for No. 62)
- Intellectual property (tied for No. 67)
- Trial advocacy (tied for No. 80)
- The College of Engineering tied for No. 63 on the Best Engineering Schools list, with rankings in the following subspecialties:
- Industrial/manufacturing/systems (tied for No. 21)
- Environmental (tied for No. 31)
- Aerospace/aeronautical/astronautical (tied for No. 32)
- Civil (tied for No. 41)
- Material (tied for No. 51)
- Biomedical/bioengineering (tied for No. 50)
- Electrical/electronic/communications (tied for No. 54)
- Mechanical (tied for No. 53)
- Chemical (tied for No. 55)

Each year, U.S. News & World Beyond the categories ranked annually, U.S. News also

periodically ranks programs in the sciences, social sciences, library sciences, humanities, health and many other areas based solely on the ratings of academic experts.

Previous rankings:

Several other UArizona graduate programs appear on the U.S. News list, but their rankings were not subject to review this year. In previous updates, UArizona earned top-10 placements in photography (tied for No. 3 overall, No. 2 among public universities), speech language pathology (tied for No. 6 overall, No. 3 among public universities) and audiology (tied for No. 10 overall, No. 6 among public universities).

In other previous updates, the College of Social and Behavioral Sciences' graduate program in Latin American history tied for No. 10 overall and tied for No. 5 among public universities. UArizona earned top-30 rankings for the School of Sociolology (No. 26 overall, No. 13 among public universities) sociology.arizona.edu and the Library and Information Science program grad.arizona.edu (No. 27 overall, No. 24 among public universities). The Department of Psychology psychology.arizona.edu tied for No. 35 overall.

The doctoral program in political science was ranked No. 50. UArizona's doctoral program in Biological Sciences tied for No. 50 overall and tied for No. 12 in the ecology subspecialty (tied for No. 5 among public universities). The Statistics and Data Science graduate interdisciplinary program tied for No. 54 overall. The Department of History's graduate program tied for No. 54 overall, and the Department of English's graduate program tied for No. 69 overall.

For a full list of rankings, visit https://www.usnews.com/best-graduate-schools.

B.A. IN GEOSCIENCES AND SOCIETY

We are excited to announce a new Geosciences B.A. degree program entitled Geosciences and Society. This degree is designed for students who are interested in using a foundational understanding of geosciences in pursuit of careers in areas that are of major importance in today's changing world, such as science outreach and communication, environmental policy, science writing, environmental law, municipal planning, geological hazard mitigation, and K-12 education, to name a few.

The program combines a tailored geoscience CORE curriculum centered around topics of considerable societal and applied interest, with a solid foundation in one of several social science options: Law; Journalism; Public Policy. Geosciences course requirements include classes such as Global Change, Ocean Science, and Energy and Mineral Resources, all of which present critical content for someone looking to apply geoscience principles to a public-facing career. The offerings in each of the three social science areas have been chosen to build basic knowledge in an interface field that will allow students to be competitive at either entry-level positions (for example in municipal government or science communication), or as they pursue further education in law, policy, or (with certification) secondary science education.

Curricular requirements in this degree allow for more flexibility in a student's pursuit of other interests, with plenty of open elective credits to provide the opportunity for double-majoring, minoring, or simply exploring other course work to enhance one's educational experience, career training, or preparation for graduate studies. The degree is open to all students with no minimum GPA or other academic restrictions.

GEOSCIENCES DEPARTMENT PARTNERS WITH PLANETARY SCIENCES TO DEVELOP NEW UNDERGRADUATE MAJOR IN PLANETARY GEOSCIENCE

On the eve of a new era of human exploration of the solar system, the Departments of Geosciences and Planetary Science (LPL) at the University of Arizona have established a new undergraduate B.S. major in Planetary Geoscience (PTGS) which will begin during the fall, 2023 semester. The rationale behind this development is that Planetary Geoscience is a growing field in need of scientists with rigorous, comprehensive and systematic training in Geoscience fields to work on Planetary topics. The University of Arizona is uniquely poised to take a leadership role in developing a first-of-its-kind B.S. major in PTGS, by combining courses and research opportunities in two top-ranked departments: Planetary Science with a global ranking of #11 in Space Science and Geosciences with a national ranking of #2 in Geology (2022 U.S.News and World Report). PTGS is a field of increasing practical societal importance, with a growing focus on the development of planetary resources, and planetary protection from natural and artificial space-based threats (e.g., asteroid impacts). Commercial investment and government funding (chiefly NASA, DOE, DoD) are projected to increase dramatically over the next decade, with strong emphasis on exploration of rocky planetary bodies (including planets, moons, and asteroids) for scientific and economic purposes.

The new B.S. in PTGS will prepare students for science and industry careers in the rapidly expanding field of planetary science and exploration (including Earth and its Moon, the planets, their satellites, and myriad minor bodies in the solar system; as well as exoplanetary systems). The new B.S. will train a cadre of Geoscientists with Planetary Science expertise to work in a variety of exciting emerging fields, including Planetary Research, Earth-based and space-based observing, Robotic and Human Planetary exploration, Planetary Resource Recovery, Commercial Spaceflight, and Science Education and Journalism. The proposed degree curriculum is designed such that students will learn foundational skills that will prepare them for a wide range of science-related careers, including graduate programs in any physical science, traditional jobs in the Geosciences, and jobs in rapidly growing private sector companies involved in space-based approaches and technologies to help governments and businesses solve problems on Earth and beyond (e.g., Earth-I, Maxar, Capella Space, Spire, Planet Labs, many others). NASA is actively collaborating with privately owned and industrial spaceflight companies, and this is paving the way for private sector investments. As a result, funding and investment in “New Space” companies is accelerating. The curriculum will build on a foundation of mathematics, physics and chemistry; it will comprise fundamental training in Earth materials, structures, and processes; and it will provide advanced study of the physical and chemical evolution of the Solar System and advanced course options focused on particular planetary bodies and planetary topics. The curriculum will culminate in a capstone research experience and advanced fieldwork in relevant Earth settings.

It's all systems go, and the first class of PTGS majors is already enrolling. The Geosciences Department will be taking the curricular lead in teaching these students GEOS 300-level core courses in preparation for 400-level courses in Planetary Science.

ARTEMIS

HUMANITY'S RETURN TO THE MOON

That is a hammer and she is a geolo-gist!

REGIONAL TRANSECT FIELD TRIP ACROSS ARIZONA, NEVADA, UTAH, AND WYOMING

This summer, our University of Arizona Department of Geosciences field camp was led by professors Paul Kapp, Hervé Rezeau, and Mauricio Ibañez-Mejia, with Emilia Caylor as the teaching assistant and Liam O'Connor as the camp chef. The class consisted of 10 students that embarked on a one month regional transect across Arizona, Nevada, Utah, and Wyoming. This transect involved exercises at key geologic localities for the Basin- and-Range, Transition Zone, Metamorphic Core Complex, Sevier, and Laramide provinces. These field exercises put students' classroom knowledge to the test while pushing them to discuss the tectonic implications of their observations. By the end of field camp, the students were able to use what they had learned to piece together the geologic evolution of the entire western U.S.A. from 2,500 million years ago to the present day!

Day one at the Angel Lake mapping area in the East Humbolt Range of Nevada. This year, there was a record snowfall which made our mapping sites colder and more scenic.

The Department of Geosciences and Lunar and Planetary Laboratory are excited to announce a new Planetary Geoscience major at the University of Arizona. The Planetary Geoscience major builds on a foundation of math, physics, and chemistry; establishes core knowledge and skills through a set of geoscience courses; advances through upper-level planetary science classes; and culminates in a capstone research or field experience.

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UPCOMING EVENTS

GEOS MEET & GREET MIXER

FRIDAY AUGUST 25TH

5:00 - 7:30PM

ENR2 COURTYARD

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Submit a secure online gift to the University of Arizona Geosciences. Here you can donate anonymously, make a corporate gift, indicate a matching gift company, make a tribute gift, and make a joint gift. To learn more about making a gift using cryptocurrency and to see other ways to give, click link.

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Geosciences

The University of Arizona
The Department of
Geosciences
PO Box 210077
Tucson, AZ 85721-0077

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