



THE UNIVERSITY OF ARIZONA  
COLLEGE OF SCIENCE

Geosciences

Summer 2018

**In this Issue:**  
**Arizona Field Camp**  
**through the Ages**  
**Remembering**  
**John Gilbert**  
**and much more**



## From The Department Head

Dear Geosciences Alumni and Friends:

The end of the academic year here in Tucson means the saguaros are in bloom and the ice is breaking up on the Rillito River. As classes wrap up, faculty and graduate students are heading for the field, and Jay Quade is getting ready to lead an intrepid group of undergrads into the wilds of field camp.

It's been a great year here in Geosciences. Professor Jack Holt, an expert in radar imaging, ice sheets, and field geophysics just joined us from UT Austin, and will help us build bridges with Planetary Science and UA's new Earth Dynamics Observatory. And next year new Assistant Professor Kaustubh Thirumalai will join us from Brown University, adding to our strengths in paleoclimate and paleoceanography. We are really excited about our new colleagues and the new perspectives and insights they will bring to UA Geosciences.

Congratulations to our faculty for well-deserved honors: Pete DeCelles for election as AGU Fellow, Andy Cohen for winning the Bradley Medal, the top award of the International Limnogeology Association, and Mihai Ducea for being named science co-editor for GSA Today. Our fantastic graduate students are also winning grants and awards, including a SCEC grant to Katherine Guns, and PEO Scholarships to Jessie Pearl and Becki Beadling.

At the end of fall semester 2018 Professor Randy Richardson will retire. Over the years I have received many grateful and positive comments from UA alumni about his transformational and incredibly valuable courses in inverse theory, geodynamics, and gen ed topics. Watch for more in subsequent newsletters about Randy. And we're happy to announce that Assistant Professor and gravitational/ice sheet expert Chris Harig and spouse Dana just welcomed their new baby boy Miles to Tucson.

This summer brings to an end my five-year term as department head of Geosciences. It has truly been an honor and privilege to serve this amazing department, its five-decades legacy, and all the faculty, staff, researchers, students, alumni, and friends who make it great, including all those still here and those who have moved on. In the waning days of my term, my colleagues have reminded me of why our program is so special: it really is characterized not only by great science (including research, teaching, and public service), but by remarkable respect, collegiality, and collaboration. We have a long tradition of choosing faculty from within the department to step up as heads, and I am confident and optimistic about the future.

Finally, while UA Geosciences is healthy and strong, your continued support of our program means more than ever. Please consider an additional gift this year to one of your favorite funds in our department (including the new Arizona Computational Geosciences Center fund, the George Davis fund, the Dickinson fund, and of course the discretionary fund for greatest needs). But ALL of our funds are immensely valuable to our students, faculty, and our shared legacy.



Department Head Peter Reinert cuts the cake at his "farewell as department head" faculty, staff and student gathering. Photo J. Kapp

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Cover photo by Martin Pepper

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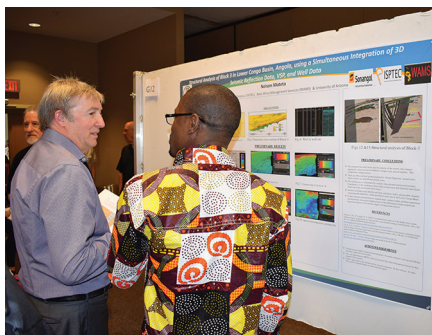
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GeoDaze co-chairs Katherine Guns and Brendan Fenerty at the awards ceremony.



Advisory Board chair and poster judge Ray Leonard, BS '75, (l) talks with geophysics student Nelson Mateta at the poster session.



Triffon Tatarin, BS '17, (r) returned for GeoDaze and met up with Professor George Davis.

# GeoDaze 2018!

Thank you to **Isabel P. Montañez**, University Distinguished Professor & Chancellor's Leadership Professor at the University of California, Davis, and President of the Geological Society of America (July 2017 - June 2018) for giving the GeoDaze keynote address, *Deep-Time insight into Earth's future*.

And thank you to **our wonderful GeoDaze sponsors!** GeoDaze would not happen without you! GeoDaze sponsors are listed on the donors pages of this newsletter.



PhD student Daniel Portner (r) receives the Best Overall Presentation award from Megan (Rheaume) Zivic, BS '10, of Montgomery & Associates, the award sponsor.

## GeoDaze 2019: March 28 - 30

### GeoDaze Awards

Award	Recipient	Prize	Award Sponsor
Best Overall Presentation	Daniel Portner	\$2,000	Montgomery & Associates
Best Graduate Talk	Jessie Pearl	\$200	Edgar & Deborah McCullough
Best Undergraduate Talk	Jessie McCraw	\$200	Peter Kresen
Best Geochemistry Talk	Jordan Jensen	\$200	Arizona LaserChron Lab
Best Tectonics Talk	Susana Henriquez	\$200	Arizona Radiogenic Helium Dating Lab
Best Geophysics Talk	Emily Rodriguez	\$400	Rayleigh Taylor Instability
Best Climate Talk	Gloria Jimenez	\$200	Sonshine Exploration
Best Overall Poster	Haiyang Kehoe	\$200	Jessica & Paul Kapp
Best Graduate Poster	Grace Windler	\$100	Edgar & Deborah McCullough
Best Undergraduate Poster	Mikayla Gerdes	\$200	Peter Kresen



# A Spirit of Adventure and Discovery



*UA student Jesse McCraw (foreground) and other field camp students measure sense-of-shear indicators on the summit of Greys Peak in the East Humboldt Range in Nevada.*

## Arizona Field Camp

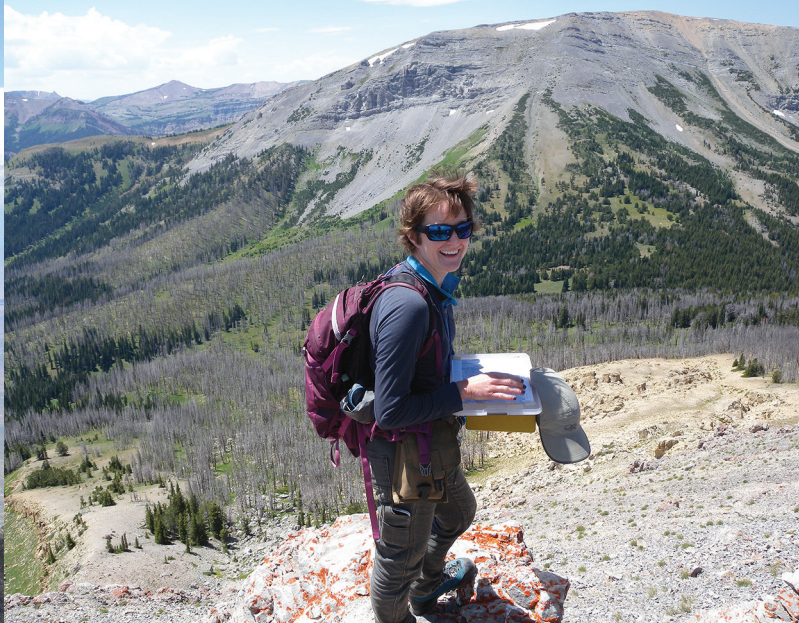
*by Peter DeCelles*

**I**n 1996, consistent with a department known so widely for its strength in continental tectonics, we decided to teach a tectonics-oriented field camp based on the principle that tectonics controls virtually all aspects of geology. Since that time, the UA field course has taken to the road, partly to get out of the heat, but more importantly to gain access to the broader Cordilleran orogenic belt. We chose to transform the course into an orogen-scale teaching lesson for several reasons.

First, the science of geology has come a long way over the last 50 years, which is the time frame during which most of the faculty themselves took field camp as an undergraduate student. During those years enormous new understanding has accumulated about orogenic systems, and the faculty decided it was time to start teaching students, even relatively inexperienced ones, that geology can be done in a regionally interconnected way; that individual exercises, if chosen carefully to demonstrate key aspects of orogenic belts, could be synthesized into a transorogenic cross-section. It's not much different from teaching students about the solar system as a system rather than focusing only on Earth and other individual planets.

Second, faculty were interested in working in geology somewhat more coherent than what we find in the complex, chopped-up southern Arizona desert. Why not take students into the Sevier thrust belt and Wyoming Rockies to study thrust faults and upper crustal shortening? Why not visit other classic geological regions, such as high-grade metamorphic terranes of eastern Nevada that formed at the same time the Sevier belt was forming, and the Roberts Mountains allochthon, the Sevier Desert basin (an intact low-angle detachment system), and the classic Basin-and-Range of central Nevada? And





*What could be better? UA student Natalie Speaks maps in the Wyoming Range, western Wyoming. The smile says it all.*



*University of Wisconsin-Milwaukee student Logan Shihata gathers structural data in the East Humboldt Range, Nevada.*

why not finish in the Sierra Nevada, studying the Cordilleran magmatic arc, the hinterland of the Antler orogenic event, the amazing glacial geology of the high Sierra, and the lower crustal rocks that record the same tectonics that helped to build the rest of the Cordillera? It was an outrageous idea, but UA undergraduates, who learn advanced tectonics concepts in many of their courses, were up to the challenge.

Third, we had a faculty education motive for taking the course on the road: there is just too much spectacular geology and gorgeous scenery sitting out there in the Cordillera, within a few days' drive of Tucson. Why teach the same local mapping exercises year after year, when as faculty we could be learning new geology? And that particular year we had a teaching crew that included **Mark Barton**, **Susan Beck**, **Clem Chase**, **Judy Parrish**, **Jay Quade**, and **Pete DeCelles**, with **Brian Currie**, PhD '97, as T.A.; all of these folks were interested in shaking things up and trying something new both geographically and intellectually. Thus was born UA's roving field camp operation.

The course begins in Tucson and travels to the North Rim Campground at Grand Canyon. From there, the route varies dramatically: sometimes we head west through southern Utah, then north into eastern Nevada, and finally west to the Sierra Nevada. Other years we head north across central and eastern Utah, into western Colorado or Wyoming and then west across the Basin-and-Range of northern Utah and Nevada, again finishing in the Sierra Nevada. Over the years we have created at least four different transects of the region. Different faculty members prefer certain routes, sometimes for active research reasons but also just to learn new geology. At the end of our first attempt, we asked the students to create a regional cross-section from western Colorado to eastern Nevada, integrating all of their mapping areas into a regional framework, and extending the geology to the Moho. Students had access to seismic reflection profiles and the wealth of stratigraphic data that has been published on the region. Initially incredulous, the students settled into the task and emerged with a new level of understanding. Many expressed gratitude, especially for this final integrative exercise, and we knew we had discovered a new technique for teaching students about geology in the field.

Individual exercises are designed to fit into a regional transect, and students update their personal geologic time-vs.-space chart after each exercise. Gradually the students begin to understand the connections between, for example, the ductilely deformed mid-crustal metasedimentary rocks in Nevada and the brittle deformed upper crustal rocks in the Sevier belt. Many of the exercises incorporate cross-cutting relationships among well dated rocks that provide useful information about tectonic history. Students grow to appreciate that the Cordillera has a history, which they can resolve for themselves.

The course involves continuous camping, mostly in "primitive" campsites, in some of the continent's most beautiful places. We carry our

*(Continued on page 6)*



The course involves continuous camping, mostly in "primitive" campsites, in some of the continent's most beautiful places. We carry our

*At left, UA Professor Peter DeCelles explains flower structures in the northern Uinta Mountains of northeastern Utah. The students are wondering about that cliff in the background.*



## Arizona Field Camp, continued from page 5

own water, so the choices are limitless and in many cases we can gain access to the heart of wild country with spectacular geology. The course is physically demanding, requiring long days of off-trail hiking in rugged mountains. A key to success has been finding the right person to be the cook, a job that requires remarkable creativity, resilience, and good humor.

Twenty years on, our little teaching experiment is working well. New challenges arise each year, but a spirit of adventure and discovery pervades the operation. In many respects, the present manifestation of the course is a natural progression from the days of detailed plane-table mapping at El Coronado, to a regional Arizona-based field camp, to the present tectonic-systems approach. Geoscience is evolving, and students' needs and interests are changing as career opportunities evolve. These days our students learn how to sweat the details, but also how to see the broader connections among the details, and how to make meaningful generalizations.

Field camp stories are evolving, too. Among the memorable ones is the Monitor Range Mystery, a real-life who dunnit, in which eventual UA Professor and field camp instructor **Jay Quade** cracked the code of the mysterious disappearance of a local ranch hand back in the 1980's. It did not end well for the missing ranch hand, as Jay discovered while out mapping in the Monitors in remote eastern Nevada in the employ of a mining company. The local police already knew who did it, but had never been able to find the body, until Jay came along. Still missing was the poor man's horse, and many details of motive and procedure. Motive has become a staple topic of discussion and debate around the campfire at our campsite, a mere quarter mile from the grim burial site (up in Dead Man's Wash). The whereabouts of the horse finally surfaced in 2013, some 30 years after the crime, when UA field camp students out mapping came across what remained of the old horse's skeleton, with the saddle and reins still in recognizable condition. Case closed?



**Arizona's roving field camp was born in the 1990's...**

*l to r: Brian Currie, PhD '98, Tina Wells, BS '94, Professor Susan Beck, and Dan Sims, PhD '96 at field camp 1994.*



Photo: Martin Pepper



Photo: Martin Pepper

**... and continues to rove today!**



# Looking Back:

## Field Camp in the 1960's with Spencer Titley . . .



JUNE 1964

*Field camp carry-alls parked at El Coronado Ranch. June, 1964.*



JULY 1967

*Students use a plane table to create maps in Turkey Creek. July, 1967.*

In 1961, the University of Arizona acquired a guest ranch in Turkey Creek, on the western side of the Chiricahuas. “It was called ‘El Coronado’—built in the 1930’s in the time of cottage camps.” This is how Professor Emeritus Spencer Titley (PhD ’58) tells it. Titley then led field camp at El Coronado every summer until 1969, when he had the opportunity to go to Peru for several months.

“Before I took over, **Rob DuBois**, a petrologist, led field camp in the Colorado Plateau. They worked out of a nunnery or church school doing layer-cake geology,” Titley said. “The field camp I taught at Turkey Creek was a mix of methods and rock hammer geology. We mapped in rather small areas.” The students used plane tables and alidades to create their maps.

Up until 1964 or ’65, Titley explained, Arizona field camp was only geology. But when the department added a geohydrology component, hydrologists began attending the camp, spending half their time on geologic mapping and the other half on hydrology.

“**Jerome Wright** ran the hydrology side of things,” Titley said, “and the hydrology students were almost entirely from the Middle East.”

Unlike today’s field camp, which is camping-based with all cooking done at the campsite, field campers in the 1960’s ate lunch in the field but had breakfast and dinner in the dining hall at El Coronado Ranch. Yet other aspects were remarkably the same: “We’d meet up on campus on a Sunday, load the carry-alls, drive to Turkey Creek and spend five weeks mapping,” Titley said.

One of Titley’s favorite stories? A participant from New York—piled into the carry-all with the other students as Titley drove to El Coronado—suddenly started shouting. Titley was alarmed at first, until he realized what she was saying. “‘It’s a cow! It’s a cow,’ she was yelling! She’d never seen a cow before.” Titley laughed at the memory. “I taught field camp for the love of geology,” he said. “I still love geology. I still love students.”



JUNE 1964

*Students meet for breakfast in El Coronado dining room before heading out for a day of mapping. June, 1964.*



## ...and field camp in the early 70's with George Davis

When I joined the faculty as an Assistant Professor in 1970, even I could sense the relief on the part of some of my new colleagues that I would be the new director of geology field camp, and that the responsibility would not fall on them. Of course I heard right away about El Coronado Ranch as the traditional base of operations to access cool geology.

My tour of duty included summers of 1971 through 1975. In the first field season I realized that we could take fuller advantage of Arizona geology, and start students off in simpler stuff. So I designed field camp so that we would work out of NAU for nearly two weeks (Grand Canyon, Wupatki, San Francisco Peaks), several days in the Mogollon Rim country (Precambrian geology), and then take on the formidable challenges offered by the Basin and Range, using El Coronado Ranch as the base.

Back in those days, most Geosciences faculty were on 12-month appointments, and part of the justification was fieldwork/field camp. Consequently, many faculty participated each year, notably **John Guilbert**, **Bill Bull**, **Joe Schreiber**, **Dietmar Schumacher**, **John Anthony**, **Don Livingston**, **Jiba Ganguly**, and **Don Bryant**.

Around 1973 the University of Arizona decided to sell El Coronado Ranch, which was never really budgeted by any unit. Thus, there was uncertainty in future planning. It may have been in 1974, as a result of this concern, that I based the southern-Arizona part of camp in Patagonia High School. Cots lined up around the periphery of the basketball court!

Overall, we can see a slow transition from a site-specific based field camp, to one that moved around a bit (through the major provinces of Arizona), to what is led today: research-oriented, skills-based inquiry of geology in brand new territory each year, never thinking about sleeping indoors!

A final note. **J. David Lowell**, in about 1985, set up a fund that permitted the Department to invite a geologist from industry to participate in our geology field camp, thus emphasizing some practical objectives. The very first such geologist was **Tom Heidrick**, a superb student advised by **Spence Titley**.

Some good memories include the faculty-student interaction at the end of the day. One such example follows.

- George Davis

### "Leaving in a Carry-All" (Sung to "Leaving on a Jet Plane")

[composed in field camp, 1972, by Susan Hunt, Mark Phillips, and George Davis]

All my gear is packed, I'm ready to go;  
I'm standing outside El Cor-o-nad-o,  
I hate to wake up now and start to map.  
But the dawn is breaking, it's early morn;  
The Carry-All's waiting, Doc's blowing his horn,  
Already it's so hot my lunch is shot!

[Refrain]

But kiss off and let me sleep,  
Believe me, Doc, that map will keep

Tell me that I'll never have to go,  
But I'm leav'n in a Carry-All,  
Don't know if I'll get back at all.  
Oh Doc don't make me go.

There's so many times I've walked around,  
Staring at this messed up ground  
Tell me, Doc, what's it all about?  
Every place I go I take my map,  
Every tree I find I take a nap,  
When I get back I won't have done a thing.

[Refrain]

Now the time has come to leave here,  
One more map and I'll be through here,  
I'll close my eyes; it'll look better that way.  
Think about my double-ought pen,  
Never have to use it again,  
It's about time to turn my Brunton in.

[Refrain]



In the mid-1980's, UA Geosciences Professor **Karl Flessa** and New Mexico State University Professor **Tim Lawton** (PhD '83), directed Arizona field camp in southern Arizona. Photos courtesy of Karl Flessa.



# Lowell Institute for Mineral Resources News

## Hyperspectral sensing from the drone's-eye view

by Isabel F. Barton, Research Scientist, Lowell Institute for Mineral Resources

A new UA project may soon put drones next to hammers and compasses in the field geologist's toolkit. An interdisciplinary UA study is exploring the use of drone-mounted hyperspectral and LiDAR scanners in field geology, remote sensing, geotechnics, and geometallurgy. LiDAR (Light Detection And Ranging) sensors use laser scanning to detect detailed topographic and surface features at scales from centimeters to kilometers. Hyperspectral sensors operate at similar scales and detect sunlight absorption at particular electromagnetic wavelengths, caused by vibration of different chemical bonds specific to individual minerals and chemicals. Put together, hyperspectral and LiDAR sensors can detect surface topography, identify minerals, delineate wet or snowy areas, distinguish different vegetation types, measure snowpack, and many other applications.

There's just one hitch: most sensors are too big and clunky to travel with geologists in the field, and they can't handle the often dusty, low-light, and GPS-denied environments of mining and geotechnics. Now an interdisciplinary UA-industry team including Mark Barton and Rick Bennett (Geosciences), Isabel Barton (Lowell Institute for Mineral Resources), Johnny Lyons-Baral and John Kemeny (Mining and Geological Engineering), and Bill Smith and Stuart Marsh (Natural Resources and the Environment) is working with Headwall Photonics, Hexagon Mining, Lisbon Valley Mining, Barrick Gold, Freeport-McMoRan Inc., and Golder Associates to solve those problems. Mounting sensors on drones, combining hyperspectral and LiDAR data, and developing new data collection and reduction algorithms to help handle challenging environments were the subjects of a two-day lab- and field-based workshop in March. This June the group headed to southeastern Utah for a field test of hyperspectral imaging at sites around the Lisbon Valley mine. Stay tuned for the results. And watch out for sensor-bearing drones overhead... or underground!



Carson Roberts of Headwall Photonics lines up a computer-controlled, tripod-mounted short-wave infrared sensor during the IMR's workshop on adapting hyperspectral remote sensing for use in exploration geology and mining.

## New UA-industry initiative focuses on interdisciplinary collaboration in mining

by Isabel F. Barton, Research Scientist, Lowell Institute for Mineral Resources

At Arizona's copper mines, up to 1,000,000 tons of rock have to be excavated and moved around each day. Some of it goes to the mill for crushing, grinding, and copper extraction, some to the dumps for acid treatment, some to the waste facility – and it's crucial to get the right rock to the right process stream. Digging up and moving that much material to the right places at the right times takes a lot of teamwork among geologists, engineers, metallurgists, logistical specialists, and all the other professionals in the mining industry. But all too often, jobs become silos, workgroups don't communicate, and teamwork breaks down.

That's exactly the sort of problem that the Lowell Institute for Mineral Resources was founded to fix. Created in 2006, the LIMR is an interdisciplinary, academia-industry consortium that involves 26 UA departments in 10 UA colleges. Breaking down silos is the LIMR's specialty. Now the LIMR, with support from Freeport-McMoRan Inc. and Newmont Mining, has a new initiative: the **Integrated Planning series** of short courses, offered for the first time this academic year. The courses draw on the applied and theoretical expertise of UA professors from three departments, as well as on the decades of experience of current and former industry geologists and engineers in the Tucson community.

In November 2017, 22 metallurgists and mining engineers took part in the first course, *Geological Inputs to Integrated Planning*. Participants learned about what geologists do and why, starting with exploration to discover vital metal deposits and progressing through mineralogical and geological characterization, geometallurgy, ore control, and the integration of geology into mine planning.

The second course, *Mine Engineering Inputs to Integrated Planning*, wrapped up in April 2018. Amid presentations and discussions by engineers from Freeport-McMoRan's Central Mine Planning Group, 38 participants ranging from geologists to accountants learned the fundamentals of short- and long-range scheduling, pushback design, geomechanics, and reserve reporting – and even completed a Lerchs-Grossman open-pit optimization algorithm without missing a beat.

Everyone at the LIMR is looking forward to the third course, *Metallurgical Inputs to Integrated Planning*, in fall 2018. All three courses will be offered annually in future.



# Supporting our Students: The Arizona Geological Society

The Arizona Geological Society is a scientific society open to anyone with a professional interest in the geology of Arizona. Its membership includes geoscientists from across the country and around the world. AGS members work in mining, petroleum, environmental and engineering geology, education and more. As part of its program, AGS members generously established and sustain student scholarships that have helped support many of our graduate and undergraduate students over the years. All of us in UA Geosciences are grateful for our continued relationship with AGS and for their generous support through the following scholarships, detailed here by **Robert Powell**, chair of the AGS scholarship committee.

## **J. Harold Courtright Scholarship**

Harold Courtright had a life-long interest and career in mining and geology in the Cordillera of North and South America. His field mapping skills and exploration expertise led to the discovery of now well-known porphyry copper deposits in Arizona and Peru. The scholarship fund, set up after his death in 1986, is designed to promote graduate research in the Cordillera and, while the Society may support exciting studies in any geologic discipline, we do place special emphasis on field geology, economic geology, and the study of ore deposits.

## **Arizona Geological Society Scholarship**

The Arizona Geological Society Scholarship was established in 2013 to recognize a graduate or undergraduate student at an Arizona university who demonstrates

exceptional achievement in pursuit of a degree in the Earth sciences and shows a balanced record of academic excellence, a passion for research, outstanding professional and general community involvement, and who has shown leadership in his or her undertakings.

## **M. Lee Allison Scholarship**

Lee Allison began his career in the oil industry but soon transitioned to public service. Before his life was tragically cut short in August 2016, Lee served with distinction as State Geologist in Utah, Kansas, and Arizona, successively. A dynamic and visionary leader and a gifted mentor, Lee combined innovative scholarship and consummate people skills with enthusiasm and optimism to drive his passion for making geologic information available to the public and for rendering it understandable. He was an articulate spokesman on scientific issues of societal importance and was dedicated to communicating their significance and impact in ways that resonated locally, regionally, nationally, and internationally. As a measure of his far-reaching public service efforts, Lee was honored by the American Association of Petroleum Geologists, the Association of Women Geologists, and the American Institute of Petroleum Geologists.

In recognition of his many contributions, the Arizona Geological Society Scholarship was renamed in Lee's honor following his death.

## **UA Geosciences AGS Scholarship Recipients, 2011 – 2017**

### **Courtright Scholarship**

**2017 - Michael A. Kassela** (\$3000)  
Austin Pluton and Reese River Mining District, Central Nevada: Magmatism, Alteration, Ore Formation, and Post-ore Dismemberment and Tilting

**2016 - Daniel A. Favorito** (\$3000)  
Characterization and Reconstruction of Laramide Contractual Deformation Near Porphyry Copper Deposits in Southeastern Arizona

**2015 - Alexandra S. Macho** (\$3000)  
Eocene Intrusions and Associated Hydrothermal Systems in the Egan Range, White Pine County, Nevada

**2014 - Jason (J. D.) Mizer** (\$3000)  
Geology of the Cerro Colorado and Las Guijas Districts, Pima County, Arizona

**2013 - Simone Runyon** (\$3000)  
Alteration Mapping in the Yerington Batholith, Yerington, Nevada

**2011 - James Girardi** (\$2000)  
Jurassic Volcanism and Magnetite-Apatite Mineralization in the Southern Palen Mountains, Southeastern California

### **M. Lee Allison Scholarship**

**2017 - Jessie K. Pearl** (\$3000)

**2016 - Inaugural co-recipients**  
**Anna Katharina Schuh** (\$3000)  
**Phillip K. McFarland** (\$3000)

### **Arizona Geological Society Scholarship**

**2015 - Enrique Rodolfo Chon** (\$3000)

**2014 - Kathleen Compton** (\$3000)

**2013 - Inaugural recipients**

**Lily Jackson** (\$1500)

**Jason (J. D.) Mizer** (\$3000)

*For more information about AGS, please see [www.arizonageologicalsoc.org](http://www.arizonageologicalsoc.org)*

*For a list of UA Geosciences AGS award citations, please see [www.geo.arizona.edu/AGSScholarships](http://www.geo.arizona.edu/AGSScholarships)*

## The College of Science Galileo Circle

We are grateful to the following donors to the College of Science Galileo Circle, who provided \$1,000 scholarships to the Geosciences students listed below.

Anonymous

John He, MS student

Emily Rodriguez, PhD student

George and Merrily Davis

Christopher Clinkscales, PhD student,  
*Peter J. Coney Award*

Thomas Earl

Lisa Jose, PhD student, *Susan G. Earl Award*

Joshua Smith, BS student

Kenneth and Karen Evans

Grace Windler, MS student

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Rebecca Beadling, PhD student

Ray Leonard and Cheryl Phillips

Daniel Favorito, PhD student

Christopher and Joan Marrs

Daniel Collins, BS student

Anna Schuh, BS student

Marc and Helene Sbar

Jordan Jensen, MS student

John Sutter and Elaine Padovani

Daniel Basabe Triana, MS student



# A chance to make a lasting difference for Geosciences: UA's Innovative Space for Learning and Engagement Matching Grant and the ACGC

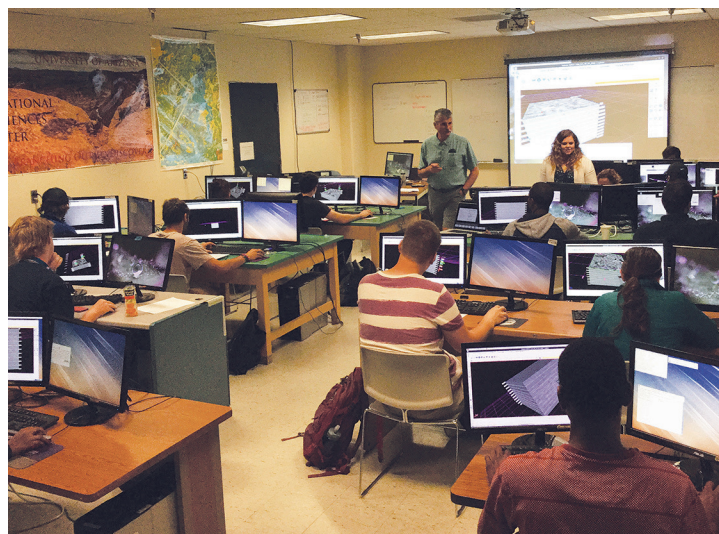
by Kiriaki Xiluri-Lauria, Geosciences Senior Staff Technician

The Fourth Industrial Revolution (4IR) and its merging of the physical, biological and digital worlds brings both challenges and opportunities to student learning and engagement in top-notch programs like UA Geosciences. Programs that successfully rise to the 4IR challenge will distinguish themselves by their modern, dynamic, and versatile learning spaces that actively engage students and provide them with the experience and skills they will need to lead their fields; spaces such as these will also attract and retain the most talented and innovative faculty.

Thanks to the creativity and resourcefulness of Geosciences staff and faculty, as well as alumni, friend, and corporate support, the teaching and collaborative learning space of the Arizona Computational Geoscience Center (ACGC) has gained momentum as it completes its second year of operation. Instructors have used the ACGC for more than 19 courses, engaging students in guided hands-on learning and collaborative projects, leveraging the fast computing resources and licensed software.



Assistant Professors Chris Harig and Luke McGuire teach Programming and Data Analysis in Geosciences, a recently developed course designed around the ACGC.

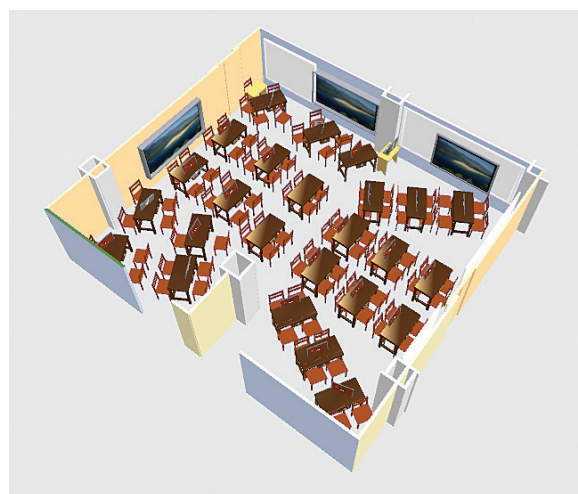


Geosciences Research Scientist Amanda Hughes complemented her Petroleum Geology and Geophysics course with a workshop on 3D structural visualization and interpretation, led by Robert Krantz, PhD '86.

While the ACGC is on a promising path as a modern teaching and collaborative learning space, it is currently space limited and hindered by aging, repurposed instructional technology. As part of its Strategic Investment plan, the University of Arizona recently initiated the **Innovative Spaces for Learning and Engagement (ISLE)** grant, providing matching funds to Departments to renovate spaces that will promote student engagement in both formal, credit-bearing courses and informal collaborative workshops. This grant will match up to \$50,000 dollar-for-dollar for cutting-edge instructional equipment, furnishings, and renovation costs. The ACGC is well positioned for such a grant and could be expanded to provide a combined collaborative learning space of 1400 square feet, tripling its current capacity, if successful in raising the required matching funds by December 2018.

Succeeding in this endeavor heavily depends on support from alumni and friends to make the ACGC a facility that will influence geoscience pedagogy for generations to come. We would love to include you, your company, or the memory or legacy of an individual or institution that is important to you in a prominent display of supporters of the ACGC. Please consider being part of this exciting opportunity to benefit so many students and our collective legacy. Support the ACGC and help secure the \$50,000 match for this program today.

To help Geosciences secure matching funds from the Innovative Spaces for Learning and Engagement Grant, please donate on line at [www.geo.arizona.edu/support](http://www.geo.arizona.edu/support), noting ACGC, or send checks (made out to University of Arizona Geosciences) to UA Geosciences, Development Office, PO Box 210077, Tucson, AZ 85721, with "ACGC" in the memo line. Thank you! (Please note that gifts of \$1,000 and more incur a 6% fee from the UA Foundation.)



An artistic view of the combined Innovation and Learning Space we envision for the ACGC.



# We are delighted to recognize our donors for their generosity

*The following list reflects gifts processed from May 1, 2017 to April, 30 2018. Gifts processed after April 30, 2018 will be recognized in the 2019 newsletter. Thank you for your support!*

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## WITH YOUR SUPPORT

### The William R. Dickinson Field Trip Support Fund



### Deploying Seismometers in Joshua Tree

*by Eric Kiser, Assistant Professor*

In fall 2017, the students of Earthquakes and Volcanic Systems: Processes and Hazards (GEOS 436/536) deployed 41 seismometers over a section of the Blue Cut Fault in Joshua Tree National Park, California, a trip financed through the William R. Dickinson Field Trip Support Fund. The seismometers recorded ground motion for approximately 30 days.

Following retrieval of the instruments, the students worked as a group to pick P and S wave arrival times and amplitudes from local earthquakes. This information was used to model the locations and focal mechanisms of the events, allowing the students to infer the orientation and sense of slip on the active portion of the Blue Cut Fault.

Interestingly, the orientation that the students found for the active portion of this fault is almost perpendicular to the fault's surface trace. These results were combined with additional wavefield and stress perturbation modeling and summarized in a final presentation and written report at the end of the semester on the seismic hazards of the Blue Cut Fault.

*At left: This trip to deploy seismometers in Joshua Tree National Park was paid for by the Dickinson Field Trip Support Fund.*

*(Dickinson Fund field trips continued on page 15.)*



# Geosciences Departmental Scholarship Awards, 2017-2018

***Thank you to our donors for making these scholarships possible!***

**(Non-departmental scholarships can be found on pages 9 and 17.)**

## Fall Scholarships

Walter Afonso, MS student  
Sulzer Scholarship  
\$4,500

Emilia Caylor, MS student  
Economic Geology Scholarship  
\$4,500

Audrey Dunham, PhD student  
Geosciences General Scholarship  
\$4,638

Claire Getz, MS student  
J. David Lowell Scholarship  
\$4,500

Tanner Grose, BS student  
George Davis Undergraduate Research  
Scholarship  
\$750

Michael Kassela, MS student  
J. David Lowell Scholarship  
\$4,500

Haiyang Kehoe, PhD student  
Sulzer Scholarship  
\$368

Jessie McCraw, BS student  
George Davis Undergraduate Research  
Scholarship  
\$500

Scott Meek, PhD student  
Peter J. Coney Scholarship  
\$2,476

Economic Geology Scholarship  
\$1,550

Sulzer Scholarship  
\$612

David Moussa, PhD student  
Geosciences General Scholarship  
\$2,075

BP Scholarship  
\$2,563

Sarah Patterson, BS student  
George Davis Undergraduate Research  
Scholarship  
\$750

Emily Rodriguez, PhD student  
Bert S. Butler Scholarship  
\$3,357

Sulzer Scholarship  
\$1,281

**Fall Total: \$38,920**

## Spring Scholarships

Walter Afonso, MS student  
Sulzer Scholarship  
\$2,628

Bert S. Butler Scholarship  
\$1,972

Matthew Banaszynski, BS student  
George Davis Undergraduate Research  
Scholarship  
\$300

Emilia Caylor, MS student  
Geosciences General Scholarship  
\$739

Kartchner Caverns Scholarship  
\$3,861

Chris Clinkscales, PhD student  
Sulzer Scholarship  
\$4,766

Daniel Collins, BS student  
George Davis Undergraduate Research  
Scholarship  
\$800

Brendan Fenerty, PhD student  
Sulzer Scholarship  
\$4,766

Matthew Gabriel, BS student  
George Davis Undergraduate Research  
Scholarship  
\$500

Katherine Guns, PhD student  
John & Nancy Sumner Scholarship  
\$4,802

Scott Meek, PhD student  
Peter J. Coney Scholarship  
\$3,294

Sulzer Scholarship  
\$1,472

David Moussa, PhD student  
John & Nancy Sumner Scholarship  
\$4,766

Arthur Osakwe & Alex Pritika, BS students  
George Davis Undergraduate Research  
Scholarship  
\$800

Joshua Smith, BS student  
George Davis Undergraduate Research  
Scholarship  
\$800

**Spring Total: \$36,266**

## Summer Scholarships

Walter Afonso, MS student  
Chernoff Family Field Experiences Scholarship  
\$2,000

Daniel Alberts, MS student  
Chernoff Family Field Experiences Scholarship  
\$2,000

Daniel Basabe, MS student  
Chevron Summer Scholarship  
\$1,400

Matthew Banaszynski, BS student  
David L. Moore Memorial Scholarship  
\$1,900

Anne Billingsley, PhD student  
Wilson Thompson Scholarship  
\$1,000

Alejandro Blanco-Ocampo, PhD student  
Spencer R. Titley Scholarship  
\$4,165

Rachel Cajigas, PhD student  
Keith L. Katzer Scholarship  
\$1,600

Emilia Caylor, MS student  
Chevron Diversity Scholarship  
\$1,300

James Chapman, PhD student  
Chernoff Family Field Experiences Scholarship  
\$2,000

Christopher Clinkscales, PhD student  
Maxwell N. Short Scholarship  
\$1,500

Audrey Dunham, PhD student  
Chernoff Family Field Experiences Scholarship  
\$2,000

Lauren Furphy, BS student  
Diane C. Ferris Scholarship  
\$787

Chernoff Family Field Experiences Scholarship  
\$1,113

Scott Gallo, BS student  
David L. Moore Memorial Scholarship  
\$1,900

Anthony Guajardo, BS student  
Evans B. Mayo Scholarship  
\$1,900

Katherine Guns, PhD student  
Dr. H. Wesley Peirce and Maxine W. Peirce  
Scholarship  
\$1,500



John He, PhD student Chevron Scholarship \$1,400	Keeley Lyons-Letts, BS student Evans B. Mayo Scholarship \$1,000	Carson Richardson, PhD student Dr. H. Wesley Peirce and Maxine W. Peirce Scholarship \$1,500
Susana Henriquez, PhD student Chevron Scholarship \$1,400	Scott Meek, PhD student Chernoff Family Field Experiences Scholarship \$2,000	Emily Rodriguez, PhD student Chevron Diversity Scholarship \$1,300
Zakaria Jibrin, BS student David L. Moore Memorial Scholarship \$1,900	Arthur Osakwe, BS student Evans B. Mayo Scholarship \$1,900	Zida Wang, BS student Evans B. Mayo Scholarship \$1,900
Sebastian Jimenez, PhD student Chevron Scholarship \$1,400	Elizabeth Patterson, MS student Chevron Scholarship \$1,400	Kyle Wojahn, BS student David L. Moore Memorial Scholarship Chernoff Family Field Experiences Scholarship \$496
Lisa Jose, PhD student Spencer R. Titley Scholarship \$4,165	Jessie Pearl, PhD student Wilson Thompson Scholarship \$1,000	Chad Yost, PhD student Bert S. Butler Scholarship \$1,200
Michael Kassela, MS student Dr. H. Wesley Peirce and Maxine W. Peirce Scholarship \$6,000	Daniel Portner, PhD student Chevron Scholarship \$1,400	<b>Summer Total: \$47,630</b>
Jennifer Kielhofer, PhD student Keith L. Katzer Scholarship \$1,600	Shelby Rader, PhD student Chevron Scholarship \$1,400	<b>Total 2017-2018 Departmental Scholarships Awarded: \$122,816</b>

## Congratulations to our recent graduates!

Please see a complete list of our summer 2017, fall 2017 and spring 2018 graduates at

[www.geo.arizona.edu/grads17\\_18](http://www.geo.arizona.edu/grads17_18)

### The William R. Dickinson Field Trip Support Fund

(continued from page 13)

#### Introducing New Graduate Students to the Arizona Outdoors

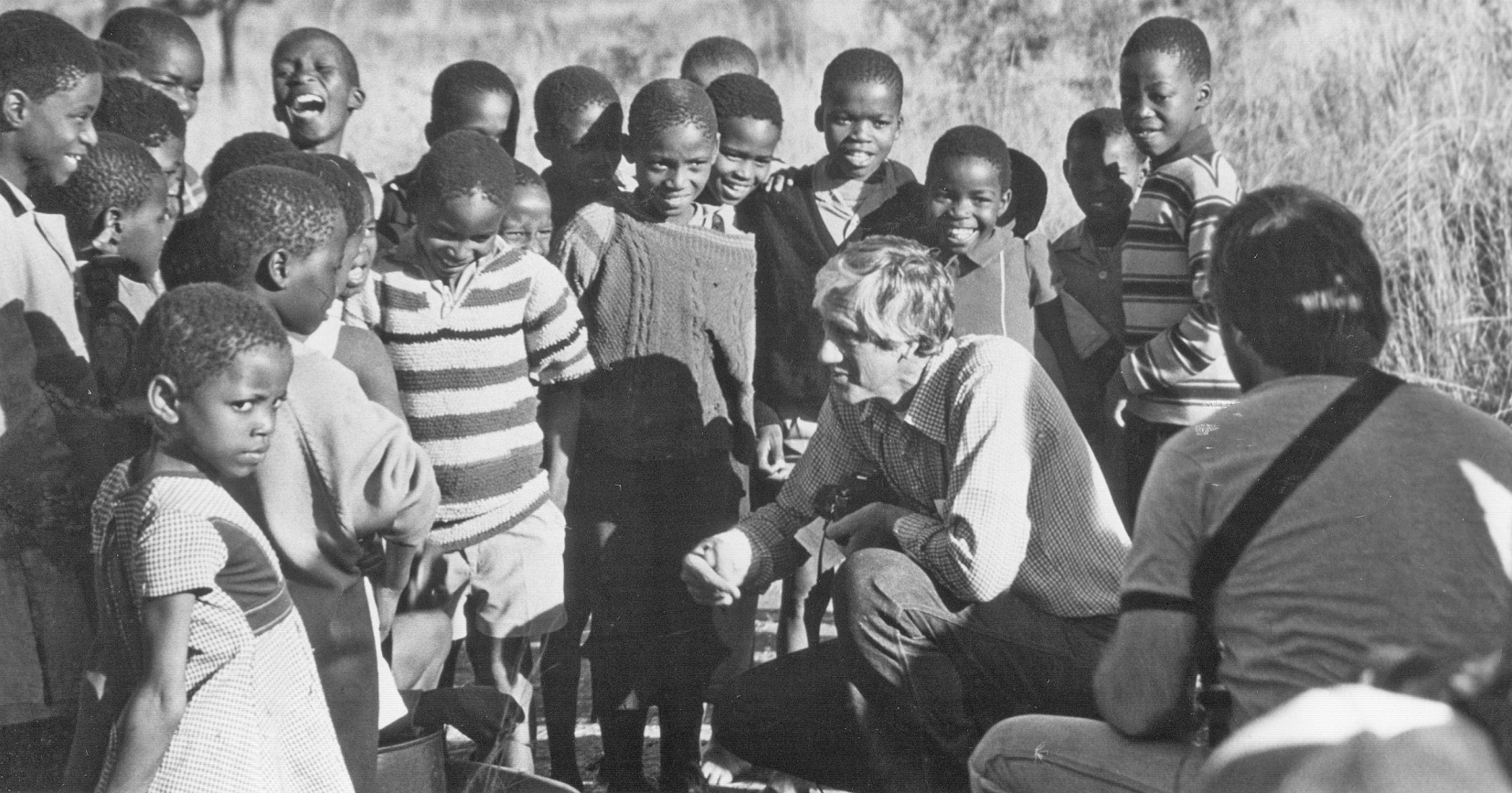
by John He, MS student

Thanks to the Dickinson Field Trip fund, on August 18th, 2017 we welcomed another year of incoming graduate students with a weekend camping trip. As has been the tradition for several years, we drove to Parker Canyon Lake, just two hours from Tucson, to introduce the newcomers to one of Arizona's top and only lakes. (In the past, incoming trips had gone to the Grand Canyon, but we hoped that the proximity of Parker Canyon Lake would attract more of the older graduate students to come meet the new students.) The new graduate students may not have appreciated it at the time, but for the rest of us, it was a pleasant respite to enjoy a relaxing day by a body of water larger than a swimming pool, get to know the newest residents of Gould-Simpson, and introduce them to some geology and features of the Southwest.





# Remembering Professor John M. Guilbert



*Professor John Guilbert talks with a group of children returning to their village from school. Steynsdorp, South Africa. Summer 1980.*

Professor John M. Guilbert passed away in October, 2017 at the age of 86. From teaching field camp and leading international field trips, to his cutting-edge research, his teaching, and mentorship, to sponsoring the economic geology prize at GeoDaze for many years, John Guilbert's contributions to UA Geosciences are immeasurable. We invite you to remember and learn about Dr. Guilbert through these memories from his former colleagues and students.

John arrived at the UA just as I was finishing my degree; I never had him as a professor. I knew him and his family well, however, and worked with him on a number of projects over the years.

John's knowledge of ore deposits was encyclopedic and he developed a classification of alteration intensity that was both useful and easy to understand and apply in both the field and lab. The paper he coauthored with Dave Lowell in 1970 will forever be hailed as a beacon in the understanding of porphyry copper systems.

I was very fond of John but working with him could be an experience . . . he was the quintessential "absent minded professor." Meetings, appointments, and especially deadlines, were flexible, fluid sorts of things for John. When eventually completed, however, his work was consistently excellent.

John had a mild, sunny kind of personality. I don't recall ever seeing him angry or upset. He was also a very strong resilient person. I saw this early on at the time of his son's tragic death, again when Mary died and finally as I watched him deal with difficult medical issues near the end of this life.

Overall, for the course he completed between 1931 and 2017, I believe Professor Guilbert clearly earned an A+.

- Clark Arnold, PhD '71

There were few Earth science educators who had John's ability to impart knowledge. His field trips were an incredible adventure—not only for the students but especially for me. I still remember how I would always be amazed at not only his knowledge but his ability to explain even complex geological events. I would go out of the way to hear one of John's lectures and tag along on his field trips.

- John Sturgul



I have such warm memories of John Guilbert. When I arrived as a brand new Assistant Professor of Geosciences in 1970, John and I connected very early, in part because of mutual interests in ore deposits geology, but primarily because we spent two or three weeks together each summer teaching geology field camp. John was among several participating faculty who engaged deeply in both the geological challenges of the mapping and the students carrying out the mapping. John was a 'born teacher,' as evidenced by the popularity of courses he taught, the respect his students held for him, and by the large numbers of quality graduate students he advised. His bright-eyed enthusiasm for teaching was ever present during field camp, as he carried out the one-on-one guidance that is the trademark of field camp settings. What fortified Dr. Guilbert's presence was his strong, articulate, concise, emphatic, and—commonly—humorous language. He spoke with precision and authority, and even in jeans and a work shirt had a certain erudite presence, stemming in part from an academic background that included serious study of language and literature.

In university settings, not enough can be said about the importance of mentoring of new faculty, so-called 'development' of new faculty. For me those 'developers' were primarily **Ed McCullough** (Department Head), **Bill Bull** (next-door office mate), and **John Guilbert**. They took it upon themselves to open my eyes to the expectations held by the department and the university; and they gave excellent advice on how to create a degree of balance in my academic life, so that both teaching and research could receive the required attention. When I think of John, I think of him as an important foundational support for me at a critical stage of life.

John set the bar high on integrating teaching, research, and practical outreach. The international trips he organized and led are wonderful examples, for he blended a mix of faculty, graduate students, and industry colleagues and went on the road to inspect legendary ore deposits in distant parts of the globe. And he would bring back stories from these trips, including how the silver miners in a deep Ontario mine would check ore grade by tossing their tossle caps against the mine wall to see if they would stick on wire silver!

To capture John's winsome humor I like to repeat and repeat the story of when one day he walked into my office and declared he was about to give me a "bad case of belt-buckle envy." I told him I had never suffered from that malady. He then raised his shirt a little and revealed the belt buckle he was sporting, which was a JMG-cut and polished argillite exposing a beautiful normal fault! I then said to John, "I now have a bad case of belt-buckle envy." He responded with a gift in hand: one for me! Such was his thoughtfulness.

At times like this I feel the inadequacy of attempting to share the substance of spirit of the many amazing colleagues, such as John, who have enriched this department, through a passing of batons over time. Papers, books, abstracts, class syllabi don't quite do it. It is more related to a certain rapport: "That close and harmonious relationship in which the people or groups concerned are 'in sync' with each other, understand each other's feelings and ideas, and communicate smoothly." And yes, in our business, ardent pursuit of scholarship as well, which of course John M. Guilbert demonstrated daily.

- George Davis

I first met Dr. Guilbert in the summer of 1968, at the UA's summer field camp. He was fairly new to the department, and students quickly took a liking to him and were impressed by his knowledge and experience in the field.

When I started graduate school in 1969, I asked Dr. Guilbert if he would be my advisor, and he consented. During the next two years, I took a number of his courses, and loved the way he explained ideas and facts and allowed students to participate as equals.

Once a year, as I remember, Dr. Guilbert entertained his advisees with a cookout at his home, and made us feel very welcome.

Many people, in both academia and the mining industry, have great respect for his knowledge and accomplishments. He will be missed.

- Steve Applebaum, MS '75



John Guilbert (center, plaid shirt) on a 1975 field trip in Santa Rosalia, Baja California. **J.L. Christman**, MS '78, sent in the photo and wrote, "The trip went to Hermosillo then on a ferry to Santa Rosalia, then up and down the Baja and then on a ferry to Matzalan and over the Sierra Madre Mountains and back up to El Paso."

Professor John M. Guilbert will be a 2018 inductee into the Mining Hall of Fame in Leadville, CO. His daughter, **Linda Guilbert Johnson**, writes, "I wish he was here to make this announcement himself, but since he isn't, it is my highest honor in representing him and what he achieved during a lifetime that prospered and one in which he loved so much."

The induction ceremony will be held Saturday, September 29, 2018 at 6:00 PM at the Ritz-Carlton, Denver.

For more information and event registration, please go to [www.mininghalloffame.org/page/31st-annual-national-mining-hall-fame-induction-banquet](http://www.mininghalloffame.org/page/31st-annual-national-mining-hall-fame-induction-banquet) or call (719) 486 - 1229.



# Department News

The University of Arizona Department of Geosciences is tied for #3 with California Institute of Technology in the 2018 US News and World Report geology rankings. In addition, we earned #8 overall in the broader Earth Sciences category and #11 in Geochemistry!



## P.E.O. Scholars

**Jessie Pearl** (above l) and **Becki Beadling** (above r), PhD students, both received 2018 P.E.O. Scholar Awards from the Philanthropic Educational Organization. The P.E.O. Scholar Awards Program provides competitive, merit-based awards for women who are pursuing a doctoral level degree at an accredited college or university in the United States or Canada. In addition to recognizing and encouraging excellence in higher education, these awards provide partial support for study and research for women who will make significant contributions in their varied fields of endeavor.



*Geosciences' new Association for Women Geoscientists (AWG) student chapter gets together for some mutual support at a "writing accountability" night.*

## NSF Graduate Research Fellows

Three Geosciences students received awards from the NSF Graduate Research Fellowship Program. The students are **Hannah Herrick**, MS '18, Charlotte Pearson faculty advisor; **Jordan Jensen**, MS '18, Peter Reiners faculty advisor; and **Alexander Prescott**, PhD student, Jon Pelletier faculty advisor. NSF Graduate Research Fellows receive a three-year annual stipend of \$34,000 along with a \$12,000 cost of education allowance for tuition and fees paid to the institution, as well as opportunities for international research and professional development.

## GEOS has New AWG Chapter

*by Audrey Dunham, PhD student*

This past semester, graduate students in the Geosciences department have come together to form a chapter of the Association for Women Geoscientists (AWG). AWG is a national, non-profit organization, whose aim is to *"encourage the participation of women in the geosciences; to exchange educational, technical, and professional information; and to enhance the professional growth and advancement of women in the geosciences."* The main goal of our chapter is to grow a community of both women and men, from undergraduates to alumni, that share in these values. As a chapter, we plan to promote the participation of women in STEM fields through outreach in the community and department.

Starting this year, we plan to work with organizations such as the Girl Scouts of Southern Arizona to inspire young women to join a STEM discipline by hosting science discovery nights and volunteering with local troops. Within the department, we will be organizing informal meetings with women colloquium speakers to learn about different paths that women take within academia and/or industry and their struggles and successes to help students formulate their own paths. This fall, we will be creating a mentorship program that will consist of graduate mentors and undergraduate mentees. This program will include individual meetings between mentor/mentee pairs as well as events to support undergraduates in the process of applying for internships, graduate school, and jobs, such as graduate student panel discussions and application writing support. We also are planning smaller events throughout the year, including potlucks and writing accountability nights (pictured at left).

We are super excited for the upcoming year and would love any involvement from the alumni community! Please contact Audrey Dunham at [amd95@email.arizona.edu](mailto:amd95@email.arizona.edu) with any suggestions for the club or contributions to support our efforts.



## Student News

**Audrey Dunham**, a first-year PhD student studying seismology, was awarded the GSA graduate student research grant to deploy 96 nodal seismometers along the Teton fault in Grand Teton National Park in Northwestern Wyoming. Audrey writes, "This fault has not had a large earthquake in recent history and we want to use micro-seismicity detected with a dense array of nodal seismometers to define the fault geometry and calculate a maximum earthquake magnitude of the fault."

**Katherine Guns**, PhD student, received a \$21,000 award from the Southern California Earthquake Center (SCEC) for her project, "Understanding strain accumulation and transfer between the SSAF, San Geronio Pass, and the ECSZ Part II. Geologic and geodetic observations along faults of the Eastern Transverse Ranges, Joshua Tree National Park, CA." The SCEC involves over 1,000 scientists at more than 60 institutions in its investigator-driven research program. SCEC funding supports research and education in seismology, tectonic geodesy, earthquake geology, computational science, and many interdisciplinary studies in earthquake science.

**John He**, MS '18, received the Katheryne B. Willock research award from the University of Arizona libraries. This summer he is working with George Davis and a Saguaro National Park team to create an interpretive exhibit about the geologic history of the Catalina/Rincon Core Complex.

**Michael Kassela**, MS student, received the 2017 J. Harold Courtright Scholarship from the Arizona Geological Society.

**Jessie McCraw**, BS '18, received the Geosciences Excellence in Undergraduate Research Award.

**Jessie Pearl**, PhD student, received a 2018 P.E.O. Scholar Award and a 2018 Laboratory of Tree Ring Research nomination for the College of Science award for Scholarship. She received the 2017 Arizona Geological Society's M. Lee Allison Scholarship and the Past Global Changes Youth Science Meeting Peer Choice Poster Prize, sponsored by Nature Geoscience. Jessie was author/co-author of two papers this academic year and attended the AGU Fall Meeting in New Orleans and Past Global Changes Open Science Meeting and Youth Science Meeting in Zaragoza, Spain.

**Anna Schuh**, BS '18, received the Geosciences Outstanding Senior Award.

## Faculty News

**Andrew Cohen** was awarded the Bradley Medal, the top award of the International Limnogeology Association. Andy received his award during a ceremony at the combined IAL/International Paleolimnology Association meeting this June in Stockholm. The Bradley Medal is awarded to a limnogeologist who shows dedication and service to the field of limnogeology and has contributed outstanding ideas and innovation to the field, including seminal publications. The medal is named after the geologist Wilmot Hyde Bradley.

**Peter DeCelles** is a 2017 American Geophysical Union fellow.

**Mihai Ducea** was appointed science co-editor of *GSA Today*.

**Chris Harig** and his wife, Dana, welcomed baby son Miles.

A new book by **Peter Reinert** and team, *Geochronology and Thermochronology*, was recently featured in the American Geophysical Union's *Eos*. Published by Wiley, the book pres-

ents the current state of this science including its concepts, approaches, methods, and applications. Pete also received the 2018 Outstanding Faculty Award from the Geosciences Advisory Board.

**Joellen Russell's** solicited OpEd was published in *Nature's* March 13 World View piece. Russell's OpEd is titled "Ocean sensors can track progress on climate goals."

**Spencer Titley** was featured in the Veterans Heritage Project, "Since You Asked, XIV" University High School (Tucson) edition.

## Staff News

Led by **Heather Alvarez**, senior accountant in the Geosciences business office, a team of staff members and graduate students from Geosciences, Ecology & Evolutionary Biology, and Arizona Athletics teamed up for Walk Across Arizona. Sponsored by UA Cooperative Extension and UA Life & Work Connections, Walk Across Arizona brings faculty, students and staff together in an eight-week competition to earn team points by increasing their physical activity. Heather's team, the Joggernauts, included Geosciences graduate students **Anne Billingsley** and **Jessie Pearl**, researcher **Xiaoyu Zhang**, Lowell Program coordinator **Rocio Brambila de Zamora**, and business office members **Heather Alvarez**, **Denise Carrillo** and **Pat Waters**. Pat writes, "The outstanding leadership of our team captain totally energized our entire team. Without Heather's support, enthusiasm and motivation, we never would have placed fourth. She's a force of nature and Geosciences is lucky to have her."



Over spring break, the Geosciences business office took its annual team-building retreat—a trip up Tumamoc Hill. Pictured (l to r) **Annet Rich**, student worker; **Sharon Bouck**, principal accountant; **Michelle Garcia**, senior program coordinator; **Maria D'Ugo**, student worker; **Sylvia Quintero**, business finance manager; **Denise Carrillo**, senior accountant; **Heather Alvarez**, senior accountant; **Pat Waters**, senior accountant.

The following Geosciences faculty, researchers and staff members received University of Arizona employment service awards at the annual campus reception on April 19.

40 years  
**Randall Richardson**

30 years  
**Sharon Bouck**

25 years  
**Peter DeCelles**

15 years  
**Uttam Chowdhury**

10 years  
**Frank Mazdab**  
**Stuart Thomson**



# Alumni News

**Mohammad Gasem Alidan** (BS '17) invented and obtained a patent for a vehicle tire track system to prevent vehicles from getting stuck or stranded in certain geographic areas and under certain conditions. Mohammad hopes that his invention will help geologists doing field work, among others! To learn more, see [patents.google.com/patent/US9796434B2/en?q=Tire+vehicle+track+system](https://patents.google.com/patent/US9796434B2/en?q=Tire+vehicle+track+system).

**Julio Betancourt** (MS '83, PhD '90) retired in April after 35 years of service at USGS, all but the last year with the National Research Program. Julio is known for his research on how climate variability and change drive regional drought, flood, and fire frequencies in the U.S., and for his efforts in defining baselines of environmental change at interannual to millennial timescales in the Americas. He authored two well-reviewed books and 180 technical papers, including 18 in *Science*, *Nature*, and *PNAS*. Julio also co-founded the USA National Phenology Network and helped forge an interdisciplinary community of practice focused on seasonal timing in environmental systems. He mentored and employed postdocs, graduate students, and undergraduates. Over his extensive career he has received numerous awards and recognitions. Julio and his wife, Terry, will stay in the DC area, and he will maintain dual appointments as scientist emeritus in USGS and as a visiting scientist at the University of Maryland. Julio's goal in retirement is to spend a lot more time outdoors, honing his skills as a naturalist, and less time in front of a computer.



*Julio Betancourt*

**Ray Brady** (BS '70) received a Lifetime Service Award for excellence in public land management from the Public Lands Foundation. Ray has more than 40 years of professional federal public service in the management of public lands and mineral resources. He has served as BLM Deputy State Director for Minerals in Arizona; BLM District Manager at Safford, Arizona; Deputy Mining Supervisor with the U.S. Geological Survey in New Mexico; Mineral Specialist with the Federal Oil Shale Program, and Chief, Division of the Lands and Realty, in the BLM's Washington, D.C. office. Ray was a BLM staff leader in the Department of the Interior's efforts to increase the development of renewable energy projects on Federal lands by helping and leading the development of new policies and best management practices, screening priorities for environmental resource conflicts, and streamlining procedures for review and approval of renewable energy projects on federal public lands.

**Enrique Chon** (BS '16) writes, "I started a PhD at the University of Colorado at Boulder Geological Sciences Department. Specifically I have been working in earthquake seismology. I help maintain a network of seismometers to monitor induced earthquakes in northeast Colorado. These earthquakes are associated with the management and deep-injection of wastewater from oil and gas production. I also study earthquakes from the Hikurangi subduction zone, North Island, New Zealand. I am currently in Seward, AK, preparing to depart for a ~3-week deployment of ocean bottom seismometers along the Aleutian arc. I was chosen as part of the Apply 2 Sail program through the Alaska Amphibious Community Seismic Experiment. For more information, see [geoprisms.org/research/community-projects/alaska/](http://geoprisms.org/research/community-projects/alaska/)

**Kelly Cluer** (MS '87) writes, "My major news for the 2018 season is continuing to guide a global greenfield team here at Kinross to a new gold discovery and continuing a mission in Mongolia tracking Roy Chapman Andrews across the Gobi marking the centennial of the early 20<sup>th</sup> century Central Asiatic Expeditions. You can find some introductory info here: [expeditionnews.com/Archives/EN\\_Latest.html](http://expeditionnews.com/Archives/EN_Latest.html)."

**M. Stephen Enders** (PhD '00) was named Department Head for Geology and Geological Engineering at the Colorado School of Mines in November 2017.

**Brian Horton** (PhD '98), a professor at University of Texas, Austin, is the inaugural winner of the Dickinson Medal from SEPM, the Society of Sedimentary Geology. This is a new award for "recognition of a mid-career research geoscientist who is significantly influencing the sedimentary geology community with innovative work; with a track record of impactful publications, pioneering approaches and the establishment of an influential research program. Contributions to major shifts in scientific thinking, via original and innovative data genera-

**Thomas Biggs** (PhD '97) writes, "Main news with me: retired in May 2017 from the University of Virginia, Department of Environmental Sciences after 18 years. To celebrate, my sister Boo and Cousin Tom Howard took a nice week-long cruise down the Colorado. Deer Creek Falls provided a much-needed shower!"

*Thomas Biggs (far left)*





At right: **Sarah Ivory** (PhD '13) is a new assistant professor in the Department of Geosciences at Penn State University.



tion, tools, and analyses, which help solve broad geological questions are hallmarks of a Dickinson Medal awardee. The Award is named in honor of **William R. Dickinson**, a sedimentologist, but his success and 'fame' was achieved through integration of sedimentological analysis into numerous areas of research. He was a true pioneer in terms of using sedimentological data to solve problems related to tectonics and basin analysis. Bill was a true giant and it would be an honor for any person to be recognized with his medal from the SEPM."

**Charles Kiven** (MS '76) writes, "I retired in July of 2017 after 40 years as a consulting and petroleum geologist, which took me around the world. I fill my time by tutoring geology at Lone Star College in Houston, Texas, volunteering for the Bayou Land Conservancy and volunteering for Child Advocates of Harris County representing the best interests of children in the Harris County Child Protective Services."

**Leslie McFadden** (MS '78, PhD '82) writes, "After a 35-year career in academia in the Department of Earth & Planetary Sciences at the University of New Mexico, I retired in July of 2016, and am now an emeritus professor. A few highlights include serving as Department Chair for eight years (1999-2006), head of the Department's Quaternary program throughout most of my time at UNM, chair of the Quaternary and Geomorphology Division of GSA, received the Farouk El Baz Award for Excellence in Desert Research in 2000, and will be the recipient of another GSA award at the upcoming GSA annual meeting in Seattle ('the Council of the Geological Society of America named you the 2017 recipient of the Kirk Bryan Award for Excellence. The award is given annually in recognition of outstanding contributions to the interdisciplinary field of quaternary geology and geomorphology and for your publication: 2013. Strongly dust-influenced soils and what they tell us about landscape dynamics in vegetated aridlands of the southwestern United States, in Bickford, M.E., ed., The Web of Geological Sciences, Impacts, and Interactions: Geological Society of America Special Paper 500. P. 501-532.)"

**Shaunna Morrison** (MS '13, PhD '17) is Carnegie Deep-Time Data Infrastructure Program Manager/Postdoctoral Researcher at the Geophysical Laboratory of the Carnegie Institution for Science. Shaunna writes, "Building on my work in mineralogy, crystallography, and the application of advanced analytics to mineralogical systems, my recent work focuses on data-driven discovery in the co-evolution of the geosphere and biosphere. My projects include: applying machine learning martian X-ray diffraction data to predict complex mineral composition, market basic analysis to predict new mineral localities, and a recent collaboration with EarthByte to visualization mineral deposits through geologic time with the GPlates platform." To learn more and see Shaunna's recent publications and invited lectures, see [www.carnegiescience.edu/smmorrison](http://www.carnegiescience.edu/smmorrison).



Shaunna Morrison (r) and Cherie Achilles (PhD '18). Cherie will be a NASA postdoctoral fellow. See Shaunna's news above.

# Join us!

## UA Geosciences Receptions at

### AGU

Tuesday, December 11, 2018

6:00 - 8:00 pm

Fado Irish Pub

808 7<sup>th</sup> St. NW

Washington, DC

### GSA

Date & Venue TBA

Indianapolis, IN

More alumni news on the next page →





*Nancy Beckvar, Susan Kidwell, and Richard Norris*

**Susan Kidwell** writes, "I am a former faculty member in sed/strat from the early 1980s, now at University of Chicago, with many happy memories. Had a mini-alumni reunion in the Salton Trough, California, with grad-program alums **Nancy Beckvar** (MS '86) (NOAA/Seattle) and **Dick Norris** (MS '86) (USCD/Scripps). Nancy had stopped off in Oregon to see **Arlene Anderson** (MS '87) en-route. We were missing a bunch of others from that generation of UAZ, most notably **Charlie Winker** (PhD '87) but it was a start!

## We'd love to hear from you!

*Please share your news*

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*Rob Sternberg*

**Rob Sternberg** (MS '77, PhD '82) has retired after 33 years at Franklin & Marshall College. Rob writes, "Life hasn't changed radically, but there is now more time for reading, watching films, organizing meals, napping, and leisurely travel such as a cross-country trip with one of my sons this January, including a short stop at the Grand Canyon, previously visited with Cam Mosher's historical geology class in 1974 and Joe Schreiber's field camp in 1976. For now, there are no plans to leave Lancaster, PA."

**Sarah Truebe** (PhD '16) has returned to Arizona and is the Cave Resource Manager at Kartchner Caverns State Park.



**Brooke Clements** (MS '91) sent in the annual photo from a UA alumni gathering at the Exploration Roundup conference in Vancouver in January. Brooke writes, "A fine looking bunch I might add."

*Front row, left to right:* Moira Smith (PhD '90), Jennifer Roskowski (MS '07), John-Mark Staude (PhD '95), Tom McCandless (PhD '94), Wolfram Schuh (PhD '93), John Balla (PhD '72), Brooke Clements (MS '91).

*Back row:* Lance Miller (PhD '94), Bill McClelland (PhD '90), Gary Jones (MS '80), Patrick Wood (BS '15), Greg Anderson (JD '82), Kit Marrs (MS '79), Eric Jensen (PhD '03), Joe Piekenbrock (MS '83), Matt Gray (MS '88), Brigitte Martini (BS '97), Clancy Wendt (MS '74), James Lang (PhD '91), David Maher (PhD '08), Phil Nickerson (PhD '12), David Lajack (94-96), David Johnson (PhD '00).



**Rick LeVeque** (MS '81) writes, "**Jeff Grover** (MS '82), the animated leader of the field trip in the photo, led his Cuesta College geology class to study the regional geology of the Death Valley region. Former Wildcats **Tony Murer** (MS '82), **Dee Trent** (PhD '73), and I joined in to enjoy Jeff's enthusiastic description and unraveling of the area geology. Jeff is about to retire from 29 years teaching a range of classes (Intro, California, Historical, Environmental Geology with a smattering of Astronomy). It was a great trip and it was an honor for us to appreciate Jeff's contribution to the discipline. Jeff's infectious enthusiasm, his love and knowledge of geology combined with his care and regard for his students will be sorely missed at Cuesta College. The high regard with which he is held by his students is obvious to anyone who sees their interaction. He even manages to excite and enthuse old geologists who are lucky enough to be included on his field trips. We are sure this will not be the end of his geological career but only the beginning of his next phase.



*Jeff Grover leads a Cuesta College field trip. Jeff is retiring after 29 years of teaching.*

## We hope to see you at a reception soon!







THE UNIVERSITY OF ARIZONA  
COLLEGE OF SCIENCE  
**Geosciences**

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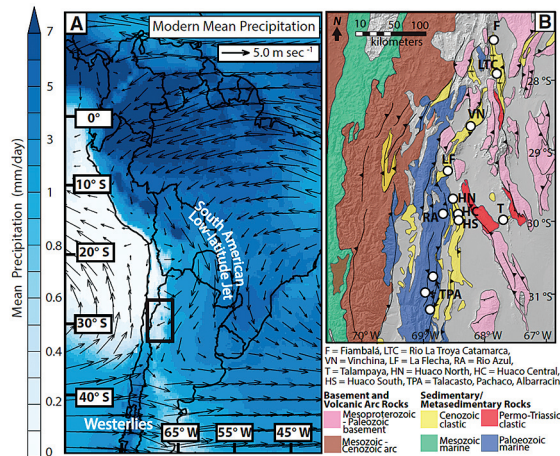
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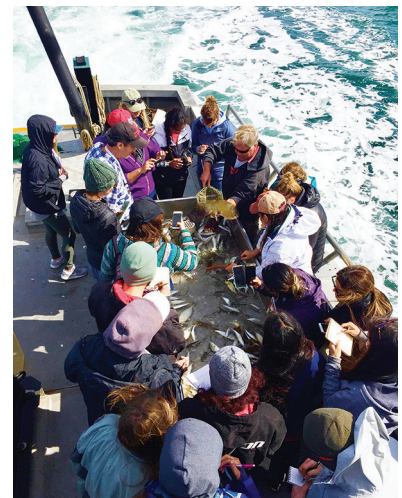
## From UA Geosciences Social Media. Join us!



Year-end Structural Geology party at the Davis home.



New Stevens-Goddard/Carrapa publication in Geology.



Andy Cohen's Ocean Sciences class goes to California. (Photo: Chad Yost.)



Local elementary students win a prize: Time in the ACGC with Roy Johnson!



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Geos Advisory Board makes YouTube career videos for students.