

# *Down to Earth*



**Newsletter of the Geology and Geophysics Department  
University of Utah, Salt Lake City, Utah**

**Fall 2019**



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**Front Cover:** Summer 2019 undergraduate students working hard in the field.

Sawtooth National Forest, Utah

Photo credit: Steve Rondina

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Layout: Michelle Tuitupou

**Message from the Chair**

For the final six months of 2019, it is my pleasure to be the acting chair of the Department of Geology & Geophysics. Our permanent chair, Dr. Thure Cerling will be pursuing his world-class research program in Africa and Europe during this time.

This summer, I completed my 30th year as a faculty member at the University of Utah. Never over these three decades have I been so bullish about our department's long term future. Our faculty is now a balanced mix of old-timers like me and dynamic young assistant and associate professors many of whom are winning national awards and recognition. The department recently celebrated the 10th anniversary of our marvelous, state-of-the-art Frederick Albert Sutton Building which continues to draw rave reviews from visitors across the country.

Several noteworthy awards came our way during the 2018-2019 academic year. Dr. Marjorie Chan was promoted to University Distinguished Professor and she also won the 2019 Laurence Sloss Award in Sedimentary Geology from the Geological Society of America. Our academic advisor, Michelle Tuitupou, was named outstanding advisor at the inaugural Asian Pacific Islander Drive-In for student affairs professionals working in higher education. The student chapter of Association of Engineering and Environmental Geologists (AEG) was named Outstanding Student Chapter by the national organization.

The department continues to attract excellent students into our undergraduate majors and graduate research programs. By all means, if you know of a promising high school student who is looking for a challenging and interesting education, have them contact me personally.

As always, we welcome hearing from friends and alumni of our department and encourage you to visit when possible. We will host an alumni reception at September's Geological Society of America annual meeting in Phoenix. I hope to see many of you there and if you cannot attend, please stay in touch during this year.

**Dr. Paul Jewell**  
**Acting Chair, Fall 2019**



## Departmental Activities

### *Celebrating 10 Years of the Sutton Building*

**Shanna Futral**, GEO Admin Program Coordinator

The Spring Open House corresponded with a two-day (April 5-6, 2019) Alumni Reunion and 10th Anniversary Celebration of the Frederick Albert Sutton Building (FASB). Over 100 alumni from the Department of Geology and Geophysics, major donors who helped fund the building of FASB, and many friends of the department attended the April 5th Open House then returned the next day for additional activities. These included building tours, a formal presentation, archival displays, and distribution of an updated booklet about the building and its geological art.

One major component of the day was a student poster session sponsored by the Department's student chapter of AAPG and ConocoPhillips. Over two dozen undergraduate and graduate students participated. In addition, as part of the special topics course, Countertop Geology, ten posters were presented focusing on some of the newer rock slabs decorating FASB's halls.

Another big component of the day were regional fieldtrips led by faculty and graduate students.

- NHMU, led by Dr. Randall Irmis: Participants were able to explore the interactive exhibits that fill the museum, including dinosaur finds from southern Utah and behind-the-scene tours.
- Wasatch Front, led by Dr. David Dinter: Participants visited several geologic sites along Utah's Wasatch front from Red Butte Canyon to Gilbert Park (mouth of Little Cottonwood Canyon). While on the trip, they also learned about recent research on the quartz monzonite of the Little Cottonwood Stock.
- Limekiln Gulch, led by graduate students Zach Wistort, Nick Hebdon, and Peter Maxeiner: Participants learned about marine fossils and the geology with our invertebrate paleontologist, at a locality on the north side of the U campus.
- Antelope Island, led by Dr. Erich Petersen and his wife, Nancy. Participants visited Antelope Island State Park, with stops at the Visitor Center and Bridger Bay. They were able to explore the island's geology as well as Great Salt Lake ooids and microbialites



*It was a pleasure to have major FASB donor, Marta Sutton-Weeks, in attendance at our 10th Anniversary Celebration for the Sutton Building, which is named in honor of her father.*







*Frederick  
Albert  
Sutton  
Building  
10-Year  
Anniversary  
Celebration  
(April 5-6,  
2019)*









## ***Graduate Student Highlight:*** ***What is Biodiversity?***

**Courtney Wagner**, Geology PhD Candidate

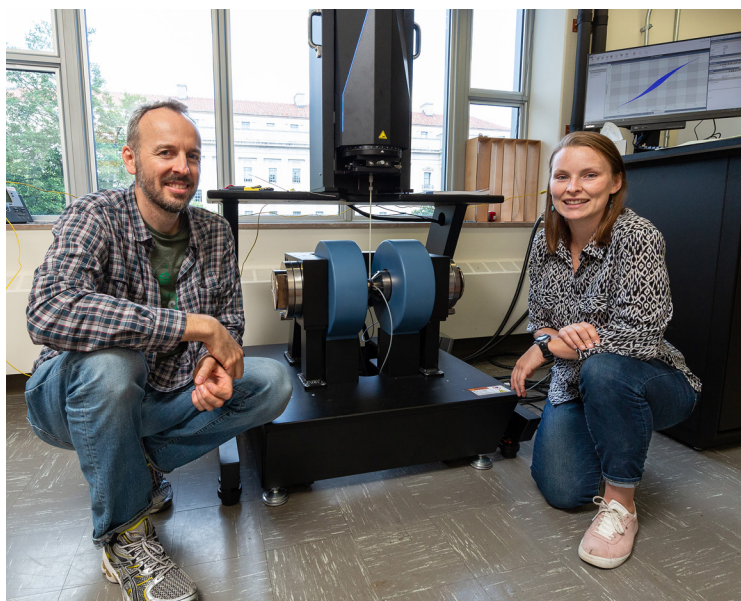
This summer I was a visiting scientist at the Smithsonian Institution's National Museum of Natural History (NMNH) thanks to the generous support of the Robert Hevey and Constance Filling Fellowship. My morning bike commute brought me across the middle of the National Mall, in between the Capitol Building and the Washington Monument. I entered through the center of the museum, walked through the quiet atrium, and made my way toward a "secret" door in the geology section of the museum. Enroute, I listened to the exhibits come to life and observed new details, information, and questions displayed in the halls.



The oceans exhibit asked in big bold letters, "What is biodiversity?" I got goosebumps every single time I read it. The display is beautiful and inspiring: the lighting, the placement of oceanic critters, the dissemination of information to the public, and the questions that the display asks you. It is just one of many exhibits in the NMNH that are the epitome of science communication, leaving you asking yourself questions and yearning to learn more. Every morning I also asked myself "What is biodiversity?" By the time I reached the secret door to my office, after passing world-renowned meteorites and continental plate displays, I was stimulated and ready to figure out how I would answer this question with my own work. What did biodiversity look like at 56 million years ago? How I can then disseminate my research findings to the public so that everyone can benefit and

I went to the NMHH to work with Dr. Ioan Lascu, an expert in mineral magnetism, to hone my skills in processing and interpreting very specific subsets of magnetic measurement data, and to learn and modify new techniques in rock magnetism and electron microscopy. These magnetic measurements help distinguish between different shapes and sizes of tiny magnetic particles made by microorganisms. These particles are so small (50 nanometers, or 1/1000 the width of one of your hairs!) that we need to use electron microscopy to image them. Working with Dr. Lascu I also had the opportunity to mentor an undergraduate student entering the captivating world of magnetotactic bacteria and to design and lead my own science outreach demonstrations at the NMNH. My summer experience at the Smithsonian helped me solidify a budding collaboration with Dr. Lascu: Dr. Lascu, Dr. Peter C. Lippert (my advisor at Utah), and I presented our preliminary findings at the leading rock magnetic conference in June and we are preparing manuscripts for publication. I am brimming with new ideas and insights into successful mentorships and science communication, piggybacking off a successful and enlightening Science Communication Fellowship I completed last year at the Natural History Museum of Utah.

At the end of my workday, I exited the museum the same way I came in: through the secret door, but at this time of day into a zoo of people and the halls teeming with hundreds of museum visitors. This was a warm reminder of how the hard work we put in behind the scenes makes it to the public through well-thought-out science communication. It is beautiful to see so many excited people, from families to the elderly to summer camps, traveling to the Smithsonian museums every day to learn more, to ask themselves "What is biodiversity?"





## ***Faculty Highlight: Water Sampling Adventures***

**Dr. Gabe Bowen, Professor**



Leaving Salt Lake, I am able to climb through some wispy layers without trouble. The shimmer of crystalline ice particles surrounds me as I punch through the clouds. Some of these find their way through the porous shell of my 50+ year old airplane, appearing in the cockpit as a sparse but festive flurry of glitter. Paradoxically, these ice clouds signal no danger...frozen water will not adhere to an airplane. It is areas where super-cooled droplets of liquid are lofted from below that present the real hazard. Occasional billows over the mountains suggest this possibility, but I am able to make my way over them to my first destination, Vernal Utah. There, a spring tapping a shallow aquifer provides drinking water to the community. My first sample!



Viewed from an aeronautical chart or from six thousand feet, it becomes apparent that the White River as it flows through Branson is in fact just a transient narrowing in a string of reservoirs spanning nearly half of the Arkansas/Missouri border. The dams clotting the flow of the river were installed by the Army Corps of Engineers during a flurry of activity in the mid-20th century. Among other purposes they serve to regulate the levels of downstream reaches of the river, allowing the cycle of flows and flooding to be engineered with precision. Of relevance to my travels, they also provide drinking water for a large number of communities in the surrounding region. One of the major challenges for our project will be accounting for such features of the water supply infrastructure.

*To read more about Gabe's adventures, visit his [BLOG](#).*

## ***Undergraduate Student Highlight: Imaging & Analysis of Altered Basaltic Glass***

***Surtsey Volcano, Iceland***

**Dr. Marie Jackson, Research Associate Professor  
Jeremy Fisher, Geoscience Undergraduate**

Surtsey Volcano is an oceanic island formed offshore of Iceland's SE rift zone in 1963-1967. Drill cores through the pyroclastic deposits provide a time-lapse record of alteration of basalt in a young hydrothermal system. Jeremy Fisher scanned thin sections from the 2017 SUSTAIN drill cores with the Zeiss Axio Imager.M2m optical microscope in the Paleoecology Laboratory of the Department of Geology and Geophysics. Under plane polarized light many tephra particles appear bright yellow and translucent (Figure 1A). Most geologists believe this material to be glass. However, using the high-resolution scans and the image-editing software Adobe Photoshop, which can zoom down to the pixel scale, he has discovered large amounts of heterogeneity in what was thought to be fresh glass (Figure 1B). These observations are being correlated with X-ray microfluorescence and microdiffraction studies using synchrotron-radiation at Advanced Light Source beam-line 12.3.2 (Figure 1C, D). The analyses demonstrate a range of glass, zeolite and clay mineral compositions in tephra particles, and include protrusions that are thought to be bio-mediated features. Studies for Jeremy's UROP will inform the rates and type of alteration processes in Earth's oceanic crust.



*Photo: Core sample from the 2017 SUSTAIN drilling project, Surtsey Volcano, Iceland*



## Outreach

### *Spring 2019 Open House*

**Shanna Futral**, GEO Admin Program Coordinator

On the evening of April 5, 2019, the Frederick Albert Sutton Building was bustling with excitement as the department's bi-annual Open House was in full swing.

Over 400 community guests, including students from local schools, area families, prospective students from SLCC, and department alumni, roamed the halls while engaging in 29 different hands-on activities, including; virtual reality, augmented reality, video gaming, licking salt, inspecting rocks and gems with microscopes, 3D images, drones, and so much more! Topics encompassed earthquakes, volcanoes, dinosaurs, fossils, meteorites, commercial products that use minerals and rocks, sustainability strategies, earth science careers, the power of metals, Utah rocks.



The evening also featured themed tours of the two buildings; General Building Tour, Journey to the Center of the Earth, Fun with Fossils, Countertop Tectonics, and Hot Rock Tour.

Many guests (kids and adults alike!) participated in a building-wide scavenger hunt that ended at a prize station where they could pick out rocks/minerals and geology books to take home. They could also take their rock/mineral to the Rock Identification Station. Our lucky scavenger hunt winners received a certificate with information about their treasure.

The event also featured a silent auction where two dozen rocks from the department archives were sold. Through this activity, GeoClub was able to raise \$1400 for student activities!

One of the biggest activities of the evening was the keynote presentation, "We Are Earth Walking: How chemistry links all living things to their place and environment," by Dr. Gabe Bowen, Professor in the U of U's Department of Geology & Geophysics.



The evening's activities were led by students and faculty within the Department of Geology and Geophysics, including its Global Change and Sustainability Center and Seismograph Stations, and ten university and community partner organizations (Bureau of Land Management, Clark Planetarium, EGI Mineral Collectors of Utah, Natural History Museum of Utah, Titan Forged Siege, U of U Youth Education, Utah Friends of Paleontology, Utah Geological Survey-Hazards Division, and Utah Student Robotics). Student groups were also among those represented; Association of Environmental & Engineering Geologists (AEG), and GeoClub. In total, 140 volunteers donated approximately 425 hours the day of the event in order to make it a huge success.

### SAVE THE DATE:

## Geology & Geophysics Open House

**Friday, October 18 @ 6-9pm - Free & Open to the Public**

Fun for the entire family! Tour our amazing building & collections! Over two dozen hands-on activities about arches, fossils, dinosaurs, meteorites, earthquakes, water, volcanoes, & more! Lots of prizes! Buy rocks, maps, and cool department swag! Bring rocks in for identification!

Featured Presentation by Professor Emerita Dr. Barbara Nash



Sutton Building (U of U), 115 S. 1460 E, SLC UT (Limited, free parking: 100 S 1455 E)

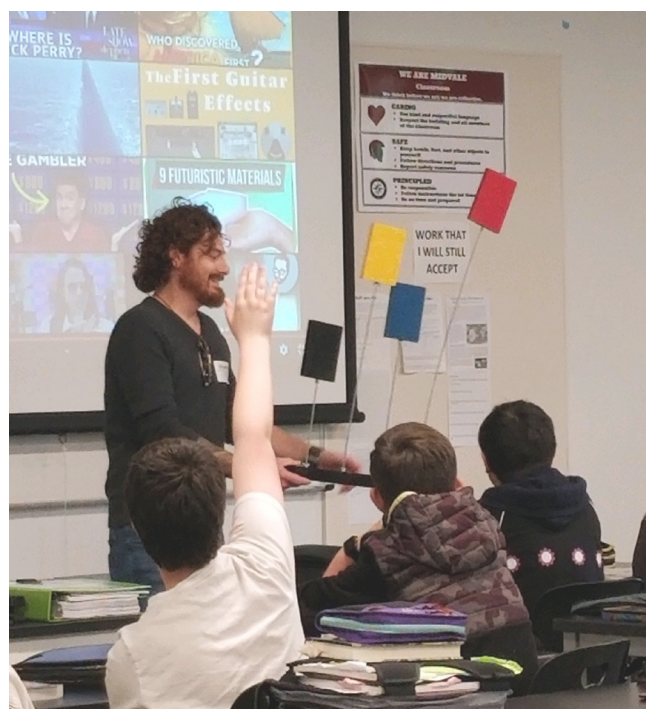


## *A Visit to Midvale Middle School*

Travis Parsons, Geoscience Undergraduate

This past May I had the opportunity to be a guest speaker for Mr. Bob Violano's 8th grade science classes at Midvale Middle School. Mr. Violano has approximately 150 students in 6 periods. We discussed earthquake mechanisms and how earthquakes occur, in addition to how the magnitude scale is used. We next talked about harmonic resonance as a result of earthquakes and other natural phenomena and used the BOSS resonator to demonstrate how buildings of different height resonate at different frequencies. The kids enjoyed the hands-on nature of the BOSS resonator and took turns creating their own earthquakes to "destroy" the buildings of differing heights. Finally, we discussed natural disaster preparedness and how they could involve their whole family in creating a plan, putting together emergency kits, and where they could get additional information on their own hazard plans.

I was thankful for the outreach opportunity and Mr. Violano's students were engaged, curious, and thoughtful. I highly recommend others taking the opportunity when it arises to talk about geology, or science in general, with younger school kids as well as seeking out opportunities to involve the community at large. It is especially important to get children engaged in science at a young age and encourage their natural curiosity to ensure the next generation of scientists and voters.



## *Williamson Science Communication Fellowship*

Through the generous gift from Dr. Chuck and Cathy Williamson, the department was able to leverage additional funds from the University of Utah graduate school and the College of Mines and Earth Sciences to start a new outreach program that will sponsor two *Williamson Science Communication Fellows*. Our two new fellows are graduate students **Riley Finnegan** (Geophysics PhD) and **Peter Maxeiner** (Geology MS). They are both excited to share STEM information and activities in Salt Lake City middle and high school programs, under the guidance of Laura Meyer, College of Mines and Earth Sciences Outreach Coordinator. Stay tuned for new developments coming this 2019-2020 academic year.





## Faculty Focus

### Faculty Awards

#### University of Utah Distinguished Professor



**Marjorie Chan** has had a banner year! In November 2018, she was honored with the Utah Geological Association's Lehi Hintze Award for outstanding contributions to Utah geology. In Spring 2019, she received the title of University of Utah Distinguished Professor, an honorary rank for select faculty whose achievements exemplify the highest goals of scholarship. This honor was recognized at the May commencement ceremony. Most recently, Dr. Chan was named the Geological Society of America (GSA) Laurence L. Sloss Awardee for Sedimentary Geology. This is the GSA Sedimentary Geology Division's highest honor, given annually to a sedimentary geologist whose lifetime achievements contribute widely to the field of sedimentary geology, and for service to the society. This award will be bestowed at the September 2019 GSA annual meeting in Phoenix, AZ.

#### Faculty Teaching Award



**Holly Godsey** was awarded the 2018-2019 *Faculty Teaching Award for Innovation in General Education*. Holly has created six new courses in her time at CSME and was honored in September 2019.

#### 2018-2019 GG Outstanding Faculty Teaching Award *Peter Lippert*



#### 2018-2019 GG Outstanding Faculty Research Award *Kristine Pankow*



### Grant Awards

#### Holly Godsey

##### *NSF Noyce Teacher Scholarship Program*

One year capacity building grant to develop the framework for a BS/MED program for secondary science teachers. She will submit for a 5-year grant once the framework is in place.

#### Marie Jackson

##### *DOE ARPA-E Grant*

In collaboration with industry partners and DOE Savannah River National Laboratory scientists, the project will develop extremely durable concretes with engineered foam glass aggregates that mimic the reactive volcanic glass of 2000-year-old Roman architectural and marine concretes.



**2018-2019 Guy F. Atkinson Distinguished Lecture Series****Dr. David Sandwell**, SCRIPPS*Direct Measurement of Seismic Moment Accumulation Rate from Space Geodesy***Dr. Meghan Miller**, UNAVCO*Global Geodesy for Science and Hazards***Dr. Michal Kowalewski**, Paleontological Society

Distinguished Lecturer, Florida Museum of Natural History, University of Florida

*Fossils, Strata, and Dates Come Together: Stratigraphic Paleobiology of Sedimentary Basins***Dr. Allan Glazner**, Mineralogical Society of America

Distinguished Lecturer, Geological Sciences, University of North Carolina at Chapel Hill

*A Twenty-First Century View of Plutons***Dr. Zhaoxia Pu**, Atmospheric Sciences, University of Utah*Data Assimilation and Big Data in Earth Science: Concept, Application, and New Frontier***Dr. Andrea Brunelle**, Geography, University of Utah*An arid lands paleoenvironmental sampler: Sites from the Western U.S.***Dr. David Boutt**, Geological Society of America Birdsall-

Dreiss Distinguished Lecturer of Hydrology, Geosciences, UMass Amherst

*Groundwater as a Buffer to Climatic Change: Dynamic Subsurface Storage of Glaciated Landscapes***Dr. Ioan Lascu**, Smithsonian Institution*Into the Vortex: Unlocking Geological Mysteries using Nanoscale Tomography and Magnetism***Dr. Kristine Pankow**, Seismograph Stations,

University of Utah

*Developing an Induced Seismic Mitigation Plan for the Utah Frontier Observatory for Research in Geothermal Energy (FORGE)***Dr. Bonnie Baxter**, Great Salt Lake Institute, Biology,

Westminster College

*Microbiology of the Great Salt Lake***Dr. Kristine Larson**, Aerospace Engineering Sciences,

University of Colorado, Boulder

*How GPS Has Changed the Geosciences***Dr. Francis Albarede**, Ecole Normale Supérieure de Lyon,

Northwestern University

*Archeoceanography***Dr. Cin-Ty Lee**, Earth, Environmental, and Planetary Science, Rice University*Mountains to Basins and the Making of a Continent***Betsy Mason**, Science Journalist*The Stories Maps Tell***Dr. David Polly**, Earth and Atmospheric Sciences, Indiana University*Punctuated equilibrium and Earth system processes: A new look at Gould's Pleistocene snails from Bermuda***Dr. Frank Forcino**, Geosciences and Natural Resources, Western Carolina University*The general public's understanding of geology compared with belief in pseudoscientific abilities of gemstones and crystals***Dr. McKenzie Skiles**, Geography, University of Utah*Implications of a shrinking Great Salt Lake for dust on snow deposition in the Wasatch Mountains***Dr. Cecilia Bitz**, Atmospheric Sciences, University of Washington*Special Lecture: Arctic Amplification: Local versus Remote Causes and Consequences***Dr. Ali Bramson**, Lunar and Planetary Laboratory, University of Arizona*The Icy Mid-Latitudes of Mars***Dr. Aradhna Tripathi**, Institute of the Environment and Sustainability, University of California Los Angeles*Frontiers in the study of past climate and environmental change: From new tracers to piloting a new inclusive science model***Dr. Eric Lindsey**, Earth Observatory of Singapore*Portrait of an earthquake: Dense geodetic data reveal the physics of faulting in the Himalaya***Dr. Tonie VanDam**, Research Unit in Engineering Sciences, University of Luxembourg*Geodesy Research***Dr. Lujendra Ojha**, Earth and Planetary Sciences, Johns Hopkins University*Insight into Geological Evolution of Terrestrial Planets from Remote Sensing Data***Dr. Timo Heister**, Mathematics, University of Utah*An Introduction to the Mantle Convection Community Project ASPECT***Dr. Jade Star Lackey**, Geology, Pomona College, CA*Andradite Skarn Garnet: Unusual Insight into the Hydrothermal Realm & World Above***Dr. Jerry Schuster**, KAUST*Machine Learning in the GeoSciences***Dr. Jamie Barnes**, GeoPRISMS Distinguished Speaker, Geological Sciences, University of Texas-Austin*A geochemical glimpse into hydrothermal systems*



## Faculty Updates



Congratulations to Dr. Barbara Nash on her retirement and appointment to Professor Emerita!

**Dr. Barbara Nash** is also a newly-elected Fellow of the Geological Society of America in recognition of contributions to the study of the Earth through geochemical and mineralogical investigations of igneous rocks, characterization of new minerals formed only in the Anthropocene, correlation of volcanic Neogene and Quaternary ashes and obsidians, and LGBT advocacy and service to GSA. Highlights for Dr. Nash include:

- Professor, Department of Geology & Geophysics, University of Utah, 1978-2019
- Associate Dean for Research, College of Mines and Earth Sciences
- Director, Electron Microprobe Laboratory, University of Utah, 1970-present
- Chair, Department of Geology & Geophysics, University of Utah, 1980-1985
- PhD Geology 1971, University of California, Berkeley
- Outstanding Faculty Research Award, Department of Geology & Geophysics, University of Utah, 2016
- “Mineral of the Year” award, 2015, by the International Mineralogical Association, recognizing the “most interesting new mineral published in the previous year.” The mineral “ophirite” was described by Kampf, Hughes, Marty, Nash, and Wright American Mineralogist, 99, 1045-1051 (2014).
- Designation of the new mineral “nashite” (Nashite  $\text{Na}_3\text{Ca}_2[(\text{V}_4+\text{V}_5+9)\text{O}_{28}] 24\text{H}_2\text{O}$ ) by the International Mineralogical Association, 2012.
- Outstanding Faculty Research Award, Department of Geology & Geophysics, University of Utah, 2010
- College of Mines and Earth Sciences Outstanding Teaching Award, 1998
- Department of Geology & Geophysics Distinguished Teaching Award, 1991 & 1989
- 75 new minerals approved by the International Mineralogical Association
- Supervised or served as committee member on approximately 500 graduate student committees
- Devised and instituted 14 new courses
- Has actively presented on science, diversity, and gender
- Has been an active citizen at the department, college, and university level as well as in the broader community

## Congratulations to our new Associate Deans College of Mines and Earth Sciences

Dr. Marjorie Chan,  
Associate Dean of External Relations  
Dr. Cari Johnson,  
Associate Dean of Research

**Dr. Sarah Lambart** was selected for the Research Incentive Seed Grant Program by the College of Mines and Earth Sciences. She will be supervising her new graduate student, Otto Lang, in the MagMaX Lab building a new experimental setup for this purpose. During Spring Break 2019, Dr. Lambart was able to join Dr. Fan-Chi Lin and Dr. Jamie Farrell in Hawaii to collect xenoliths from the Hualalai volcano and basalt samples from the 2018 eruption. Thin sections are currently being processed on these samples and will be used in both petrology classes and as topics for undergraduate research projects. Finally, Dr. Lambart was featured in a UNews article titled “How Earth’s Mantle is Like a Jackson Pollock Painting.”

*“If you look at a painting from Jackson Pollock, you have a lot of different colors. Those colors represent different mantle components and the lines are magmas produced by these components and transported to the surface. You look at the yellow line, it’s not going to mix much with the red or black.”*

Click [HERE](#) to read the full article





## *Isoscapes Course Final Run*



Since 1996, the 2-week course in Stable Isotope Biogeochemistry and Ecology, affectionately known as IsoCamp, has trained 850 students from 250 institutions in ~39 countries across a multitude of scientific disciplines in stable isotope techniques and applications. **Thure Cerling** and **Jim Ehleringer** were honored by the American Geophysical Union with the 2017 Excellence in Earth and Space Science Education Award in recognition of their “sustained commitment to excellence in geophysical education.” Not only did these scientists pioneer stable isotope studies that have proved invaluable to biogeochemistry, ecology and paleoecology, forensics, and the climate sciences, but they also trained generations of young researchers through IsoCamp.

Over 24 years, IsoCamp has had a significant impact on students’ research and teaching careers. A former student wrote that IsoCamp “stands out as one of the great experiences I’ve had in my journey through science. It was by far best short course I’ve experienced, and I can’t imagine how you could really improve it.... I look back at the two weeks in Salt Lake City with such fondness. The experience that you created has had a significant influence on the way I ask and approach questions, and really opened up a new world of science to me. I feel so lucky to have been a part of it. Thank you for putting in the all the time, energy and resources to make it such a great experience.”



Consistent with their decades of developing young researchers, Ehleringer and Cerling are now passing the IsoCamp torch to Seth Newsome, Associate Director of the Center for Stable Isotopes at the University of New Mexico. The Utah IsoCamp staff will be actively engaged with the folks at UNM to ensure the continued success of this very special program.



## ***UGS:UU:CSME STEM Teaching***

The Utah Geological Survey and The University of Utah Department of Geology and Geophysics teamed up with the Center for Science & Math Education to present to 32 Granite District K-6 teachers for a week of their Science Technology Engineering & Math (STEM) Practices certification course. Jim Davis (UGS) gave an overview of rocks and minerals, including many highlights of unique types from Utah. Then **Dr. Pete Lippert** gave a tour of the Sutton Building rock slabs that tell the story of oxygen and life on Earth through rocks. The award-winning Sutton Building contains a world-class collection of rock slabs, rocks, and fossils and is free and open to the public.



## ***A More Informative Way to Name Plutonic Rocks***

A collaborative GSA Today piece written by **Dr. John Bartley** along with colleagues from the University of North Carolina, Chapel Hill, discussing the need for a better system of rock classification.

Read the entire article [HERE](#).

## **Congratulations to Dr. Lauren Birgenheier!**

She published in GSA Bulletin: Climate impact on fluvial-lake system evolution, Eocene Green River Formation, Uinta Basin, Utah, USA. The paper includes 10 years of data and can be read [HERE](#).

## ***Groundwater Training - Jamaica***

During the first week of June, 2019, **Dr. Kip Solomon** taught a National Training Course on Principles of Hydrogeology and Isotopic Methods for Dating Groundwater, in Kingston, Jamaica. Groundwater in Jamaica, and in particular in the Kingston Hydrologic Basin (KHB) is an underutilized resource. Like many urban areas, Kingston relies heavily on surface water resources, but this system has limited storage capacity. As a result, the surface water resource is vulnerable to drought and changes in climate. In contrast, large amounts of groundwater are stored within the KHB, and this source, if protected from contamination, represents a more stable source for future development. Limitations to expanded groundwater use appear to be mostly related to water quality, in particular rising levels of nitrate in many wells. Isotopes have the potential to characterize the groundwater flow system such that key recharge areas can be protected and efficient monitoring programs can be established. The International Atomic Energy Agency sponsored the training course. This was part of an international effort to teach water professionals about isotopic techniques that will help them better manage their water resources.



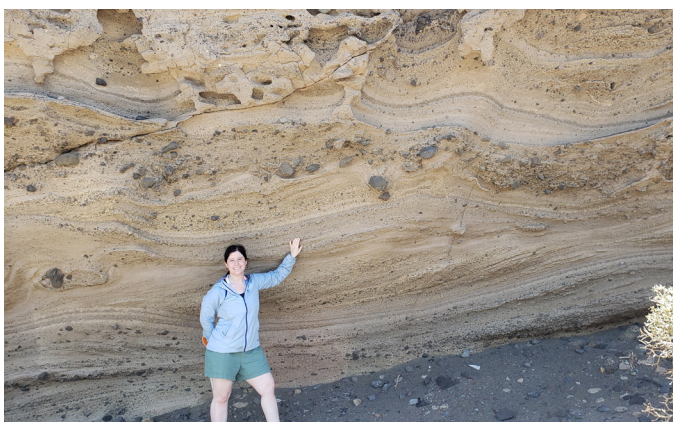
*Dr. Solomon, and staff from the National Water Commission in Jamaica that participated in the National Training Course on Principles of Hydrogeology and Isotopic Methods for Dating Groundwater; in Kingston, Jamaica, June 2019.*



## Student Happenings

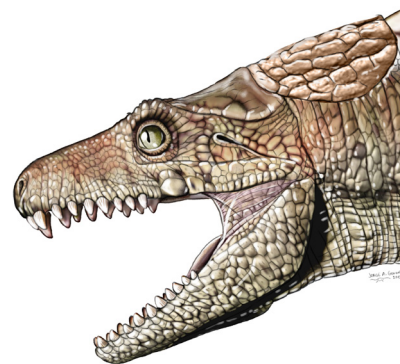
### *Surface Geothermal Exploration*

**Amy Record** (Masters-Geophysics) attended the International Training Course on Surface Geothermal Exploration, hosted by the Instituto Volcanológico de Canarias (INVOLCAN) on the island of Tenerife, Canary Islands. The course consisted of three days of lectures on the characteristics of geothermal systems and how to identify them using a variety of geological, geochemical, and geophysical techniques, two field trips focused on the volcanic history of the island, and two days of field work learning to set up an MT experiment and soil-gas testing on the slopes of Tiede, the third largest volcano in the world.



### *Repeated Evolution of Herbivorous Crocodyliforms*

**Keegan Melstrom** (PhD Candidate-Geology) recently published his research investigating the teeth of extinct crocodyliforms. The study shows that many groups of extinct crocodile and alligator relatives independently evolved herbivory during the time of the dinosaurs. This research was reported by over a hundred news outlets including the New York Times, National Geographic, NPR, and the Salt Lake Tribune. Additionally, Keegan was awarded a Postdoctoral Researcher position at the Dinosaur Institute of the Natural History Museum of Los Angeles. He is planning on starting in early 2020.



*Armadillosuchus*





## *Utah Trout Unlimited Internship*

**Lily Bosworth** (Geological Engineering/Geoscience Undergraduate) served as a summer intern for Utah Trout Unlimited in Summer 2018. She is an honors undergraduate student double majoring in Geological Engineering and Environmental Geoscience. Lily writes about her experiences with Trout Unlimited, a program that has been working with Snowbird to clean up mine waste in American Fork Canyon since 2006. “Each person offered suggestions through the lens of their own specialty, which balanced the conversation and brought out details that may have otherwise been missed. Throughout the summer I found discussions across specializations are important because they ensure that restoration and conservation happen in a holistic way to benefit not only trout, but also economic interests and entire ecosystems. By working with so many different groups, many of Trout Unlimited’s projects go beyond in-stream well-being to better whole systems, where water is usually a critical element.” Click [HERE](#) to read the entire blog entry.

Also, congratulations to Lily for receiving the Tilford Scholarship through AEG for the 2019-2020 academic year! Applicants must be a student member of AEG and only two to three awards are given, typically one to an undergraduate and two to graduate students.



## *New addition to the Sutton Building*



The most recent addition of geology as art to the Frederick A. Sutton Building has arrived! Moki marbles of the Jurassic Navajo Sandstone from the Grand Staircase Escalante National Monument are embedded into Triassic “Kanab Goldenstone.” This sculpture highlights a few of the many sedimentary and fluid flow processes that have helped make southern Utah’s iconic landscape. The Moki marbles were recovered by the federal Bureau of Land Management during an investigation into illegal collection of these protected resources and were then donated to the Department of Geology & Geophysics for educational use. The Goldenstone was acquired through collaboration with Ken Brown and Western Hills Rocks & Gems Inc., and the stone relief marbles were embedded by Susan Judy of Stone Quilt Design. Visit the Confluence of the Sutton Building to see it yourself!

## *Karoo Basin Research*



PhD Candidate **Ellen Reat** on the top of Katjiesberg, a plateau in the Karoo basin of South Africa, where she is studying Permian deltaic stratigraphy.



## ***STEAM Seas***

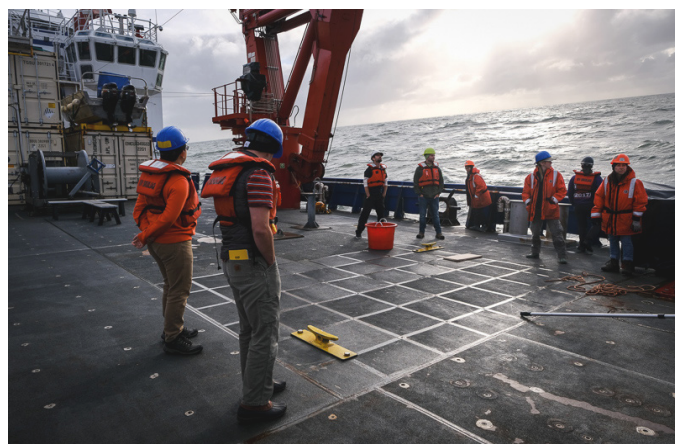
**James Kowalski**-Geoscience Undergraduate

Last October I was chosen to participate on a scientific research cruise on the R/V Sikuliaq through the Bering Sea. The NSF-funded program, STEMSEAS, exposes undergraduate students to geoscience-related topics and research in various seas. Moreover, the cruise I participated on sailed from Nome, AK, to Seward, AK, via the Bering Sea. On-board we participated in geology, oceanography, and biology lectures paired with hands-on activities throughout the day along with a week-long research project. As part of the biology portion of the experience we were able to test out Oxford Nanopore Technologies' MinIon, a portable DNA sequencer that is designed to endure harsh, backcountry field conditions. In addition, during this cruise the MinIon was used for the first time on a research vessel and both a videographer and photographer were there to document the milestone.



*Photo credit:  
Elisabeth Rull*

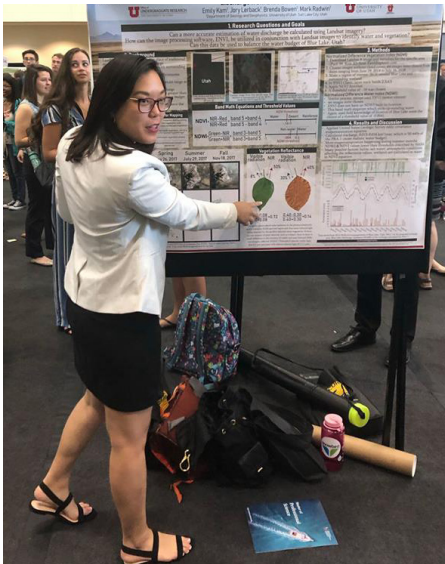
Although the STEMSEAS curriculum is centered around science, the program also gifts their students a vessel experience. During each day we had time to interact with the Sikuliaq crew through night watches with the 2nd mate, engineering watches, safety drills, daily meals, and even watching movies at night during down time. The entire Sikuliaq crew was so welcoming that being on the vessel felt like being at home; they were all eager to socialize and share their sailing experiences with us. Another aspect that added to the vessel experience was the weather. During the month of October, the seas around Alaska begin a rough transition to the winter season and this STEMSEAS cruise experienced it first-hand by sailing through two typhoons. For multiple days no one was allowed to step outside due to the rough seas, leaving many of the students and educators sea sick. Thankfully, I was not affected by the “plague” that hit the R/V Sikuliaq, but the loss of my peers and educators to their cabins left me and three other non-sea sick students with little to do for two days. Nevertheless, throughout the hardship my peers and I kept moral high and grew very close, which lead to lasting friendships back on land. Throughout this week at sea I have discovered that I love being out on the open ocean, especially when conducting geoscience research, and strive to board another research vessel on a longer research expedition in the near future.





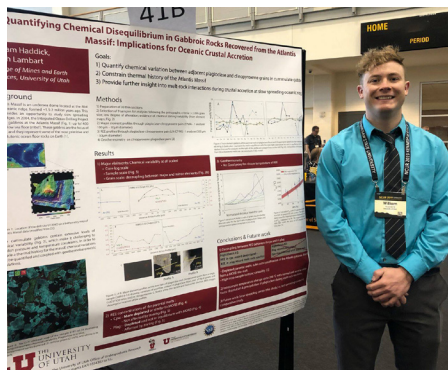
## Undergraduate Research Presentations

April 2019: Department of Geology & Geophysics undergraduate students present their research at the National Undergraduate Research Conference at Kennesaw State University in Georgia.



**Emily Kam**  
Geoscience BSG  
Chemistry BS  
*Landsat and image processing software can be combined to calculate the water budget of Blue Lake, Utah.*

**Will Haddick**  
Geoscience BSG  
*New results from laser data suggesting different melt-rock interaction processes between fast and slow-spreading centers.*



**Baylee Olds**  
Geoscience BSG  
Geography BS  
*Black carbon analysis of snow samples from the Wasatch Front using the single particle soot photometer.*

## GEO de MAYO

The inaugural Geo de Mayo, celebrated on May 8, 2019, was created through a student initiative and funded by the GeoClub to create cross collaboration and connection with students and faculty within the department.





## Field Trips

### *Getting Out There - Learning in the Field* Dr. Erich Petersen

In collaboration with Society of Economic Geologists (SEG) Student Chapters world-wide, Dr. Petersen and colleague Dr. W.X. Chavez, continue to provide outstanding opportunities for students in Economic Geology to visit type-localities of diverse mineral deposits in the Americas and Europe and interact with their peers and leading industry mentors.

The SEGF-18 (SEG Foundation) 2019 International Field Trip Course visited copper ± gold ± silver systems in Northern Chile. Twenty-three participants from 11 countries and 16 universities visited the Punta del Cobre Cu-Ag Breccia – Vein – Manto System, Las Luces Andesite-hosted Cu-Ag Manto System, El Guanaco High-sulfidation Au System, and the Miramaca Vein – Manto System. Douglas Kerwin (Current SEG President), and consultants Francisco Azevedo and Darryl Lindsay provided a unique perspective on exploration from their long and successful careers as well as first person accounts on career pathways.



The outcome of much discussion regarding practical mapping skills among recent graduates and early career industry geologists in late 2017 resulted in three dedicated field mapping courses (Chavez, Petersen, Gonzalez), two in the Mineral Park Mine in Arizona and one in northern Chile in 2018. Early this year the Society of Economic Geologists in major initiative announced the offering of the first Michael J. Fitzgerald Student Mapping Course, a week-long course open to active SEG student members. This inaugural course will be held Nov. 3-9, 2019 at the Cooper Flat porphyry-breccia system, New Mexico. The course was promptly filled. The first cohort of 16 students hail from 12 countries.





## Spring Break Hilo Trip

**Jonthan Voyles**

Geological Engineering/Geoscience Undergraduate

The typical college student spring break consists of going to a tropical paradise and getting some sun, sand, and salt on your skin. University of Utah geophysics students did just this, while being exposed to world class igneous deposits and actively contributing to research on volcanic hazards. Over spring break 2019, thirteen Geology and Geophysics students and faculty explored the big island of Hawai'i, experiencing firsthand the aftermath of a large eruption.

Immediately following the 2018 Kilauea volcano eruption, Dr. Jamie Farrell and Dr. Fan-Chi Lin worked together to organize the deployment of a dense seismic array with 81 stations (Summer 2018) across the volcano system on the Big Island of Hawaii. The experiment was supported by the NSF RAPID grant and assisted by the USGS Hawaiian Volcano Observatory (HVO). It was designed to record unprecedented seismic data during the major volcanic eruption that will lead to better understanding of subsurface magma plumbing structure and volcano eruption dynamics.



Following success from the initial deployment, our Geophysics Club became interested in a follow up experiment. The second experiment was conducted Spring 2019. A total of 50 stations were deployed across the same volcano system in order to collect data within a short period right after the eruption so that co-eruption and post-eruption signals can be compared studied. Support for the experiment and geological field trip was facilitated from the Department, the organizations behind the first deployment (NSF and HVO), PICP, as well as individual student contributions for expenses.

Three undergraduate and seven graduate students returned with Jamie Farrell and Fan-Chi Lin along with Sarah Lambart to learn about geological structure associated with the volcanos across the Big Island. Over the course of a week, the group was able to assist in the seismic array deployment, visit Hawai'i Volcanoes National Park with an HVO seismologist as a tour guide, explore lava tubes while hunting for samples for petrological experiments, see roads covered with fresh lava, drive to the highest point of topographic relief on the planet, observe historical tsunami impacts on Coconut island, as well as relax and snorkel on green sand and black sand beaches alongside sea turtles, shop at local farmers markets, listen to roaring waterfalls, and tour Kona coffee farms. The students reported back to the department on what they learned through a seismo-tea seminar and thanked all parties for their support.





***Summer 2019 Field Geology***  
***Sawtooth National Forest, Utah***  
 Steve Rondina-GG Accountant (Photo credit)





## Student Achievements

### UROP Recipients

Fall 2018

William Haddick (Sarah Lambart)

James Kowalski (Peter Lippert)

Spring 2019

Samuel Carter (Gabe Bowen)

Sarah Cronin (Nicholas Hebdon)

William Haddick (Sarah Lambart)

Sean Hutchings (Brenda Bowen)

Owen Kahn (Rose Smith, Biological Sciences)

Kate Nicponski (William Johnson)

Jason Parsons (Peter Lippert)

Shakir Shaharudin (Paul Jewell)

Richie Torney (Marjorie Chan)

Summer 2019

Jeremy Fisher (Marie Jackson)

Jason Parsons (Peter Lippert)

### Outstanding Undergraduate Student Awards

Geology Katherine Worms

Geophysics Sean Hutchings

Environmental Geoscience Emily Kam

Geological Engineering Joe Potter

### Excellence in Undergraduate Research Award

Roselyn Hurlow

### Ronald Terrill Award-Geological Engineering

Paola Alcala Villalobos

### CMES Citizenship Award

Emily Kam

### Outstanding Graduate Student Awards

MS Anna Stanczyk

PhD Aubrey DeReuil

### Outstanding Teaching Assistant Award

Nick Hebdon



The **University of Utah Student AEG Chapter** was awarded first place in the Outstanding Student Chapter competition. They were commended for their hard work promoting AEG and the geosciences in general. Geological Engineering faculty member, Paul Jewell stated, "The award is a testament to the hard work, organization, and vision shown by Anna Stanczyk, Andrea Chica, and the rest of the AEG Student Chapter officers during the 2018-2019 academic year. I am so very proud of all of them!" The group was awarded a \$350 prize to be put toward future chapter activities.



**Katherine Worms**, undergraduate student majoring in Geoscience with an emphasis in Environmental Geoscience, and **Aubrey DeReuil**, PhD student in Geology, were awarded this year's AWG Salt Lake Chapter's Outstanding Female Geology Student Award. This award is intended for a woman who is considered outstanding by a nominating geoscience professor at a Utah university.





## ***Graduate Presentations & Highlights***

**Carl Beno** (PhD Geology): UTA award for Countertop Geology; presented at GSA 2018

**Elizabeth Berg** (PhD Geophysics): Presented at AGU 2018; Assisted in creating and executing GEO 2500 Wasatch in the Field; Expanding Your Horizons presenter 2018

**Jeremiah Bernau** (PhD Geology): Summer 2019 Internship with ConocoPhillips; Geochronology Workshop in Switzerland; GeoClub Vice President

**Benjamin Breeden** (PhD Geology): Presented at the Society of Vertebrate Paleontology Annual Meeting, Albuquerque, NM; Lewis and Clark Fund for Exploration and Field Research award

**Samantha Couper** (PhD Geology): Presented at AGU 2018

**Casey Duncan** (PhD Geology): Presented at GSA 2018, Co-Instructor for NASA Endeavor Exploring Mars online course, US Satellite Laboratory

**Riley Finnegan** (PhD Geophysics): Sorenson Legacy Scholar; Mentored Freshmen ACCESS Students; SeismoTea Organizer

**Kendall Fitzgerald** (MS Geology): Member of Coalition for Utah Science Policy; Attendee at Salt Lake County Watershed Symposium and Red Butte Creek Symposium

**Robin Fults** (MS Geology): AAPG award; AAPG Secretary; Attended ExxonMobil Geophysical Short Course

**Paul Geimer** (PhD Geophysics): Winner of a 2018 SSA Student Presentation Award for "Spectral Monitoring of Rock Arches"; Mentor assistance for ACCESS Program for Women in Science & Mathematics

**Nicholas Hebdon** (PhD Geology): Presented at 2018 GSA Annual Meeting

**Eric Humphrey** (MS Geology): Hydrogeological consulting for Engineers Without Borders; Hydrogeological assessment for Guatemalan NGO

**Logan Jamison** (MS Geology): Presented preliminary results at Weber Basin Water Conservancy District

**Jory Lerback** (PhD Geology): Presented at AGU Fall Meeting 2019; GCSC Student Research Grant; Graduate researcher for NEXUS; Led a UROP application writing workshop

**Ke Li** (PhD Geophysics): Second Langmuir paper published 2019

**Clay Jones** (PhD Geology): Presented at Geothermal Resources Council annual meeting

**Michael Jorgensen** (PhD Geophysics): Presented at SEG 2018

**Samuel Lopez** (PhD Geological Engineering): FLAS Fellow; Attended 3rd Annual Conference on Environmental Conditions of the Animas and San Juan Watersheds; UofU AEG Student Chapter President

**Nicole Rinaldi** (PhD Geology): Chapman Awardee for IsoCamp

**Joshua Marquardt** (MS Geophysics): Presented at UofU GG Poster Session; Stokes Memorial Scholarship recipient; Central Utah STEM Fair Judge

**Peter Maxeiner** (MS Geology): Williamson Fellow; Presented at the GSA Annual Science Meeting 2018; Presented at Chevron Poster Session 2019

**Keegan Melstrom** (PhD Geology): Presented at the Society of Vertebrate Paleontology 2018; Student Collections Study Award, Natural History Museum LA County, 2018

**Kevin Mendoza** (PhD Geophysics): Presented Electromagnetic Induction Workshop, Helsingor, Denmark 2018; Presnell scholarship recipient for SACNAS 2019; Inclusive Earth Co-President 2019

**Raul Ochoa** (PhD Geology): GCSC Fellow; AAPG Grants-in-aid recipient; NSF GRSP; Latin American Field Research award

**Guanning Pang** (PhD Geophysics): Attended AGU 2018 Fall Meeting

**Grant Rea-Downing** (PhD Geology): Presented at GCSC Symposium 2019 and Structural Geology & Tectonics Forum, Tempe, AZ; Runner Up-Outstanding Graduate Student Poster, UofU and GG Spring Poster Symposium

**Ellen Reat** (PhD Geology): Presented two posters at AAPG ACE 2019; SEPM Funding; AWG Brunton Awardee; Chevron Intern, Energy Technology Company, Earth Sciences Department, Summer 2019

**Amy Record** (MS Geophysics): DLS Committee Member; Geothermal Research Council Student Committee Member

**Cesar Ron** (PhD Geological Engineering): Published 2019

**Monique Scales-Holt** (PhD Geophysics): Presented at AGU Fall Meeting 2018; Organized seismology workshop for Expanding Your Horizons Conference

**Gabriela St. Pierre** (PhD Geology): Presented at GSA 2018; Chevron Corporation Summer Internship 2019

**Cheng Tarng** (MS Geology): Society of Vertebrate Paleontology Annual Meeting 2018 Attendee

**Catherine Valery** (MS Geology): AAPG Grant-in-aid; UofU CLAS Predissertation Field Research Grant Awardee; Fall 2018 Chevron Fellow

**Courtney Wagner** (PhD Geology): Scientist in the Spotlight NHMU; Santa Fe Conference on Rock Magnetism Travel Grant

**Daniel Wells** (PhD Geophysics): NSF GRFP Funding; AEG, GeoClub, Inclusive Earth Member

**Zackery Wistort** (PhD Geology): Presented at GSA Annual Meeting 2018; GG Dept Field Trip Lead

**Meg Wolf** (MS Geology): Utah Watershed Symposium Attendee; GG Open House Poster Session Presenter

**Sin-Mei Wu** (PhD Geophysics): 2019 University Graduate Research Fellow; Presented at AGU Fall Meeting 2018



## ***Undergraduate Scholarship Recipients***

We thank the College, the Department, and our many friends who made substantial and important support possible for the following students:

### **Dorothy Goode Scholarship:**

Lily Bosworth, Jacia Abplanalp

### **Marta S. Weeks Legacy Scholarship:**

Lily Bosworth, Sarah Stropkai

### **GG Scholarship:**

Sean Hutchings, Jenna Chamberlain,  
Will Haddick, Ivan Gaichuk (SLCC Transfer)

### **Hellmut H. & Gerda A. Doelling Scholarship:**

Jacob Peterson

### **University of Utah T53 Scholarship:**

Emily Larson, Hayley Lind, Andrew Stropkai

### **Mineralogical Society of Utah Memorial Scholarship:**

Samuel Carter, Miles Haynes, Mitchell Poen,  
Shakir Shaharudin, Jenny Hambleton

### **Kenneth & Nedra Bullock Keller Scholarship:**

Jonathan Voyles, Baylee Olds, Jessica Jensen, Aiden Beukema

### **Wasatch Gem Society Scholarship:**

Sarah Hamilton

### **Dr. Ricardo Presnell Memorial Scholarship:**

Selena Nielsen, Amin Hamidat, Sarah Cronin,  
Paola Alcala Villalobos, Cole Ramos

### **Mikulich Endowed Scholarship:**

Andreas Cordova

### **Frischknecht Scholarship:**

Alysha Armstrong, Tiffany Boyce

### **M. Dane Picard Scholarship:**

Cash Stallings

### **Kenneth W. Larsen Scholarship:**

Elena Bodkin, Clayton Russel

### **Matthew P. & Katharine G. Nacowki Memorial Scholarship:**

Rachel Jorgensen

### **G. Frank & Pamela Joklik Scholarship:**

Gregory Mancini

### **Hiromi Honda Endowed Scholarship:**

Paul Eubanks

### **UGA Field Camp Scholarship:**

Baylee Olds, Benjamin Ackerman

### **Orlo Childs Field Camp Scholarship:**

Max Jin, Alysha Armstrong, Jacob Peterson, Samuel Carter,  
Roselyn Hurlow, Shakir Shaharudin

### **Earls Family Endowment for Field Studies:**

Lyric McClelland, Richie Torney, Hannah Finley, Owen Kahn





## Alumni & Friends

### Updates

**Dave Braxton** (MS 1997) received the Brian J. Skinner Award for his *Economic Geology* paper title, "Geology of the Boyongan and Bayugo Porphyry Cu-Au Deposits: An Emerging Porphyry District in Northeast Mindanao, Philippines." He is currently working as Head of Discovery Strategy at Anglo American in London.

**Kent C. Condie** (BS 1959, MA 1960) received the 2018 Penrose Medal, the oldest and most prestigious award recognized by the Geological Society of America. He has been an international leader in the Precambrian, especially the formation of continental crust.



**Anke Friedrich** (BS 1990, MS 1993) is Professor and Ordinaria of Geology at the Department of Geo and Environmental Sciences of the Ludwig-Maximilians University in Germany. She is an amazing field geologist who has worked and led field trips all over the world, and is particularly responsible for the training of students in field geology, tectonics, and sedimentary basins. She recently received the 2019 Distinguished Alumni Award from the Department of Geology and Geophysics and presented the final DLS presentation titled "Trends in Intraplate dynamics: Linking paleogeological hiatus mapping to the plume mode of mantle convection." She spent time in the department earlier this year and all who spent time with her benefitted from her expertise.



L to R: Margie Chan, Anke Friedrich, Thure Cerling (chair), John Bartley (Anke's M.S. advisor)

**Katie Kovac** (BS 2001, MS 2005) is now Senior Exploration Geologist at Signal Hill Petroleum, Inc. She is also the Past-President of the Association for Women Geoscientists.



**Greg Overtoom** (MS 1994) is the Office Data Coordinator at the Indiana Department of Environmental Management. Representatives of the Department enjoyed reconnecting with him in Indianapolis at GSA 2018.

**Jon Primm** (MS 2016) is now working as a geologist for XTO Energy in Houston, TX.

**Jay Quade** (PhD 1990) was honored by the Geological Society of America with the Arthur L. Day Medal for three decades of implementing new isotopic methods to conduct research in climate change, evolution, and tectonics.



**Ellen Rosecrans** (MS 2015) is now a Petroleum Geologist for EOG Resources, which has given her experience working in oil field development, well operations, and regional exploration.

**Tekla Taylor** (BS 1994) recently retired as Principal/Owner at Peakview Resources LLC and Inhouse Consultant at Ramboll. She and her husband moved to Walden, CO and enjoy having more time for travel and the outdoors.

**Crystal Tulley-Cordova** (PhD 2019) is a Principal Hydrologist with the Navajo Nation Water Management Branch. She conducts watershed and ground water studies in collaboration with tribal, state, and federal agencies.



**Jonathan Wynn** (MS 1998) is now a permanent NSF program director in Paleoclimate in Arlington, VA.

**Adolph Yonkee** (PhD 1990) was bestowed the honor of Society Fellowship in recognition of his distinguished contributions to the geosciences and the Geological Society of America. Congratulations, Adolph!

*Your fellow alumni and colleagues in the department would like to hear about your professional accomplishments, job promotions or changes, or any other news you would like to share. Please send updates to [michelle.tuitupou@utah.edu](mailto:michelle.tuitupou@utah.edu).*



## Thank you to our generous Donors!

### Your support is vital to our mission

We received generous gifts from the following from  
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email [travis.mcmullin@utah.edu](mailto:travis.mcmullin@utah.edu) to update  
your recognition preferences.*





### ***Faculty Fun:***

John Bowman and Dave Chapman visited Ron Bruhn this past July in Hansville, Washington for a reunion of the class of 1976 (all three were hired that year and have all made their careers here at the University of Utah). Dave retired in 2012, and in 2015, Dave and Inga moved to Vancouver, BC, where they are close to their two daughters, Kristine and Andrea. After retiring in 2013, Ron and his wife Sandy moved to Hansville, which is located on the north tip of the Kitsap Peninsula in the Puget Sound. They have been enjoying sailing (they take their sailboat out for excursions weekly), crabbing, kayaking, hiking, gardening, eating fresh seafood, enduring drizzly winters (but also enjoying glorious summers). Sandy still enjoys singing and is part of a local choir, and Ron has been active in the management of their homeowners' association. Ron, Dave and John are standing on the dock next to Ron and Sandy's sailboat.



### ***Giving to the Department***

Please consider making a gift to the Department of Geology and Geophysics by clicking on the link below or contacting TJ McMullin, Development Director for the College of Mines and Earth Sciences.

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