GEOLOGICAL SCIENCES

ALUMNI NEWSLETTER NOVEMBER 2017

University of Missouri

ALUMNI NEWSLETTER 2017

On the cover: Doctoral student Stuart Kenderes admiring the sunset of Horseshoe Lake, Mammoth, CA, after a long day of field work at Obsidian Dome.

Roster

Assistant Professors
Noel Bartlow (Stanford University, 2013)
Geophysics andTectonics
John W. Huntley (Virginia Tech, 2007)
Paleontology and Paleoecology
James D. Schiffbauer (Virginia Tech, 2009)
Paleontology and Geochemistry

Associate Professors
Martin S. Appold (Johns Hopkins University, 1998)
Hydrogeology
Francisco G. Gomez (Cornell University, 1999)
Paleoseismology and Neotectonics

Professors
Mian Liu (University of Arizona, 1989)
Geophysics
Kenneth G. MacLeod (University of Washington, 1992)
Paleontology and biogeochemistry
Peter I. Nabelek (SUNY, Stony Brook, 1983)
Trace-element geochemistry
Eric A. Sandvol (New Mexico State University, 1995)
Seismotectonics
Kevin L. Shelton (Yale University, 1982)
Economic geology
Alan G. Whittington (Open University, 1997)
Crustal petrology

Director of Field Studies
Miriam Barquero-Molina (University of Texas, 2009)
Field methods

Professors Emeriti
Robert L. Bauer (University of Minnesota, 1982)
Precambrian geology
Raymond L. Ethington (University of Iowa, 1958)
Conodont biostratigraphy
Thomas J. Freeman (University of Texas, 1962)
Carbonate petrology
Glen R. Himmelberg (University of Minnesota, 1965)
Chemical petrology
Cheryl A. Kelley (University of North Carolina, 1993)
Aquatic geochemistry
Michael B. Underwood (Cornell University, 1983)
Sedimentology

Staff
Tammy Bedford, Office support assistant IV
Marsha Huckabey, Business support specialist II
Stephen Stanton, Library information specialist II

From Our Department Chair . . .

It has been another busy and exciting year in the department, with an influx of talented new students to replace the successful graduates, major changes to several rooms in the building, faculty success in awards and grant funding, and one faculty retirement.

The department's top priorities are teaching and research, and these come together in the training and successful graduation of students. Our students continue to succeed after graduation, with several undergraduates headed to graduate programs, and master's students hired in a range of industries (engineering and environmental, minerals, oil and gas) and academic positions. Part of that success comes from having a varied and in-depth set of upper-level and graduate classes, taught by experts in the field. Sometimes this involves going beyond the usual faculty roster, and our alumni have been a huge help with teaching this year. In January, Tim McHargue taught his intensive week-long course on clastic sequence stratigraphy, for a second time. At field camp, Mark Sutcliffe and Drew Thomas offered a week 6 option in subsurface geology. Both were enthusiastically received by students, and we greatly appreciate Drew, Mark and Tim giving back to the Department in this way.

It goes without saying that a lot of graduate student training involves research, but we take pride in involving undergraduates in research, whether informally or through senior thesis projects. In recent years, undergraduate students have done fieldwork in places as far-flung as California, Colorado, Wyoming, Ontario and Ethiopia. In the lab, undergraduates work alongside graduate students to get experience in hands-on techniques, as well as the more philosophical aspects of research. One exciting development this year was the installation of the new MizzoμX facility, including a state of the art Scanning Electron Microscope (SEM), designed by Jim Schiffbauer and funded by NSF, and an X-ray Computed Tomography (CT) instrument. These instruments have diverse applications in geology, biology, materials science and engineering, and our students get the opportunity to learn how they work in a dedicated semester-long class taught every Fall. This experience is a great asset to our students in applying to graduate school and in seeking employment.

Perhaps the highlight of the year was the news that the National Science Foundation has bestowed prestigious early-career research awards to both John Huntley and James Schiffbauer. The hallmark of a successful CAREER proposal is the harmonious fusion of research and teaching, so that the two mutually reinforce, rather than competing for resources and time. For a geoscience department to receive two CAREER awards in the same year is remarkable, but to have them come from the same NSF panel in times of such budgetary constraint is unprecedented, and speaks to the outstanding quality of their research and education plans. As I write, it is gratifying to note that 90% of our faculty have current funding from the National Science Foundation, another statistic of which we should be proud.

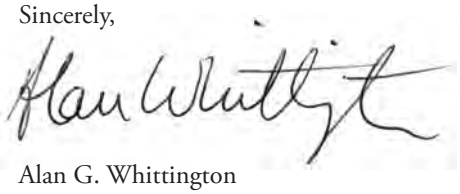
The Department took a bold step in recognizing and retaining outstanding faculty this year, with the inauguration of the Raymond Ethington Professorship in Geological Sciences. The first of these three-year awards is to Professor Eric Sandvol, in recognition of outstanding research, teaching, and service. The Professorship is funded by the Geological Sciences Endowment. In other faculty news, Prof. Cheryl Kelley retired in August after 20 years of service to MU, and was awarded emerita status. Cheryl's expertise in chemistry and marine science broadened the department's scope in research and teaching. Cheryl will be staying in Columbia and keeping the stable isotope mass

spectrometry lab running this year.

The Fall semester started on a high note with the Sun and Moon doing exactly what they were supposed to, and lining up from 1.12 to 1.15pm on Monday August 21. In downtown Columbia the clouds parted at just the right time, giving everyone the chance to appreciate both the awesomeness of nature, and the power of science to predict and explain such an event. It was a national outreach phenomenon, that attracted thousands of visitors to Columbia, and sparked the imagination of millions, especially schoolchildren, but also university students, staff and faculty. Many of us who experienced totality for this first time on this occasion now have firm plans to do it again in 2024.

Finally, I wish to thank Marsha and Tammy for their hard work on this newsletter and on so many things throughout the year. They play a vital but often unacknowledged role in the Department, and we couldn't manage without them. We are also very grateful to the alumni and friends who have provided the support to make the Department's continued success possible. Please keep us informed of your activities, and "like" us on Facebook at "MU Geology" and "MU Geology Field Camp" to get more frequent updates on our activities.

Sincerely,



Alan G. Whittington
Chair and E.B. Branson Professor

Alan Whittington (left) and Stuart Kenderes (current doctoral student on the right) at Mt. Saint Helens.

Faculty News

(In their own words)

Martin Appold returned to his regular research-teaching-service schedule in the 2016-17 academic year, after a research leave the previous year. Three of Martin's students graduated during 2016-17. Doctoral student, Joshua Field, completed his dissertation on the geochemistry of trace Mississippi Valley-type (MVT) Zn-Pb occurrences in the U.S. mid-continent. Josh is now working for Proto Engineering in suburban Detroit. Master's student, Sarah Smith, completed her thesis on the theoretical prediction of the partitioning of metals between brine and calcite in the Illinois-Kentucky and Central Tennessee MVT ore districts. Sarah is continuing to work with Martin as a doctoral student. Her dissertation involves measuring fluorine in fluid inclusions from a suite of MVT deposits across North America, conducting experiments of Zn partitioning between water and dolomite under hydrothermal conditions, and synchrotron nano-tomography to determine the nature of occurrence of metals in fluid inclusions. Undergraduate student, Cale Diehl, completed his research project on fluid inclusions in the Vazante (Brazil) and Star (Zambia) Zn districts. Cale is now working for the U.S. Bureau of Land Management in Lander, Wyoming. Master's student, Riaz Khan, is continuing his research on reactive transport modeling of CO2 sequestration and enhanced oil recovery in the Farnsworth, Texas hydrocarbon field. Emmy Glastetter began working on a senior thesis project in which she is trying to quantify sulfur concentration in fluid inclusions hosted by fluorite using SEM-EDS. Martin taught three courses last year—Principles of Geology, Groundwater Hydrology, and Groundwater Modeling. He also served a second year as co-editor of Hydrogeology Journal.

Miriam Barquero-Molina taught two sections of Planet Earth during the fall, 2016 semester. During the spring 2017 semester she taught Sedimentology and a new class, Geology 2220H, Geology of the National Parks, offered to students in the Honors College and to our own majors. This class gave students the chance to participate in a voluntary field trip over spring break, and when that time came, Miriam and about 17 students headed out west and visited the Colorado Rockies, Arches and Canyonlands National Parks in Utah, Grand Canyon National Park, Wapatki, Sunset Crater and Walnut Canyon National Monument, Petrified Forest National Park and Meteor Crater in Arizona, and Sand Dunes National Park in Colorado. In late May Miriam headed out to Wyoming to run our geology field camp.

Noel Bartlow has survived her first year as new faculty, teaching both Structural Geology and Physical Geology. Her research group has been working hard studying slow earthquakes in Cascadia and Hikurangi, New Zealand. This past spring, Noel visited GNS Science New Zealand along with graduate student Ryan Yohler to visit and work with collaborators Drs. Laura Wallace and Charles Williams, as part of an NSF grant. Noel also attended the Earthscope National Meeting this past May in Anchorage, Alaska where she gave a plenary talk and graduate students Ryan Yohler and Nick Benz presented posters on their research. Ryan also received a competitive NSF East Asia and Pacific Summer Institutes (EAPSI) fellowship to conduct research at GNS Science New Zealand for two months this past summer, so Ryan went to New Zealand twice this year. As part of his EAPSI experience, Ryan participated in a research cruise off the coast of the North Island of New Zealand, depositing Ocean Bottom Pressure instruments on the seafloor to study slow earthquakes in the Gisborne region. The cruise also conducted coring of turbidites created by the November 2016 Kaikoura earthquake. Graduate student Nick Benz is working on understanding stress and strain changes caused by slow earthquakes in the Cascadia region, near Seattle, Washington. This work is funded by a new Research Board grant, and Nick is collaborating with Dr. Evelyn Roeloffs of the USGS Cascades Volcano Observatory (CVO). Nick plans to visit Dr. Roeloffs at CVO in the Portland, OR area this fall. Noel is also currently working with two undergraduates on their senior theses. Amrit Bal is completing work studying noise removal from GPS data in Cascadia to better constrain tectonic uplift rates. Nick Gilbert is just beginning work assisting with a new citizen science project Noel is starting, tentatively titled "Slow Earthquake Hunters". Public participation in the project is welcome, please participate at https://www.zooniverse.org/projects/noelbartlow/slow-earthquake-hunters-alpha/classify. Noel also added a new graduate course to the department this semester, Crustal Deformation. This class provides a technical overview of various physical models of displacements, stresses, and strains within the earth's crust due to faulting and volcano sources under a variety of conditions. Lastly, Noel is working on understanding the spectra of slow earthquakes in collaboration with Dr. Abhijit Ghosh at University of California - Riverside and Dr. Jessica Hawthorne at Oxford University.

Bob Bauer is enjoying retirement, but he continues to work with the Campus Writing Program and continues his research in Wyoming. He and Karen are enjoying traveling and visiting friends and relatives.

Ray Ethington has issued a moratorium on birthdays, noting that they just make you older and he thinks 88 of them is quite enough. Meanwhile he continues refining his collections of facsimiles of rose thorns and cat's claws assembled from Ordovician rocks during the past 60 years. Perhaps he will fully understand them some day in the future.

Tom Freeman and Peggy continue to enjoy the occasional trips to Arkansas and South Carolina to visit family and friends. Sons Tom and Rob, and wives Dawn and Nancy, have been lending a hand with downsizing in preparation for a move to Lenoir Woods around the end of October. Tom continues to enjoy success from his lab manuals, Geoscience Laboratory and Environmental Geology Laboratory via John Wiley Publishers. Eldest son Tom continues publishing and distributing the pocket booklet, Geology Field Methods. They are excited to be moving to Lenoir Woods, with lots of new faces and friends to be made. Lastly, as stated last year in the newsletter "the Geology life has been a blessing for the entire Freeman family."

Paco Gomez and his neotectonics research group had a good year. In the classroom, Paco taught his regular course offering of Surficial Geology (undergraduate), as well as his occasional offering of Engineering Geology. Paco also collaborated with faculty at UMKC in developing a course applying small unmanned aerial systems for the geosciences. A major research emphasis is the NSF-funded project for the Afar rift in Ethiopia. Doctoral student Sean Polun continued his research on extensional tectonics in the Afar. Master's student Charlie Miles is studying rock fall monitoring using ground based radar and lidar. Master's student Kelly Hickcox is studying mass wasting and rockfall problems in western Colorado. Master's student David Nymberg is conducting a neotectonic and structural analysis of the southern Death Valley fault zone in California. George Davis has initiated research on loess deposition in central Missouri. Undergraduate students have also conducted research with Paco. During the summer of 2017, Grant Elliot conducted a 3-day survey of the Slumgullion earth flow in Colorado using ground-based radar interferometry and other survey data. Daniel Clapp has initiated research into the kinematics and hydrology of a rock glacier in Colorado. Last, but not least, Paco's research group welcomes Kimberly Moore as a new master's student. Kimberly will pursue a project involving neotectonics and structural geology.

Glen Himmelberg reports that he and Marilyn are enjoying the quiet life of retirement.

John Huntley has had another good year with the paleobiology group. Their students have produced compelling research, completed degrees, and have new folks coming on board. Liane Linehan and Matthew Jeffrey successfully completed their master's degrees this year. Liane, in collaboration with Kenneth De Baets (Erlangen, Germany), compiled the most comprehensive database of parasitism among marine invertebrates across the Phanerozoic to date. Her initial analyses indicate promising new insights that will likely make a splash in the literature. Matt utilized the unique Cambrian geology of Missouri to determine how a globally-recognized late Cambrian perturbation to the carbon cycle (the so-called Steptoean Positive Carbon Isotope Excursion, SPICE) was recorded stratigraphically and how it was strongly influenced by depositional conditions along depth gradients. His first manuscript was published this spring in Science Advances and they are currently preparing a longer format follow up manuscript for submission. Mikaela Ruga is making great progress toward completing her master's degree. She continues to collect trace element data from bivalves of the Pearl River Delta in order to reconstruct environmental change during the Holocene. Additionally, Mikaela participated in a taphonomy and paleoecology field course on San Salvador this summer where she sampled human middens of Strombus gigas, the Queen Conch. She is currently preparing samples for radiocarbon dating in order to quantify historical trends in prey body size and population demographics of this important fishery from pre-Columbus time until today. Gabriel Jacobs (B.S. University of Chicago, M.S. Midwestern State University) and Ranjeev Epa (B.S. University of Peradeniya, M.S. Ohio University, and current G. Ellsworth Huggins Scholar) started their doctoral studies this fall and will be pursuing a variety of paleobiological and chemostratigraphic projects in the coming years. In other good news, they also published papers in Gondwana Research, Scientific Reports, and Science this year. John received an NSF CAREER Award that, over the next five years, will support graduate and undergraduate students, fund his research efforts, and allow him to develop a new curriculum called Geology of the Columns. These are exciting times for the department and John appreciates the continued support.

Cheryl Kelley officially retired September 1, 2017, although she will be seen around the

department for a while yet. She and Ken MacLeod have been co-directors of the Biogeochemistry Isotope Laboratory since its inception. While Ken is off sailing on an IODP cruise off Australia this fall while on research leave, Cheryl will make sure that the isotope lab continues to run smoothly.

Mian Liu has continued to study earthquakes and continental tectonics – he realizes that continued is a boring word, but having continued to do these kinds of things for 25 years at Mizzou shows endurance. He worked with Jiyang Ye, one of his former doctoral students, on a recent JGR paper that shows how faults have evolved in the San Andreas plate boundary zone in southern California during the past few million years. They are working on a sequential paper on the geodynamics that drives the fault evolution and strain partitioning. Other projects Mian worked on during the last year include a study of crustal deformation around stepovers and bends of strike-slip faults, a project on strain partitioning and transformation in northwestern Tibetan Plateau, a study of the 2016 Nepal earthquake, and a study of gravity changes before and after the 2016 Nepal and 2008 Wenchuan earthquakes. He presented these studies at international conferences in China, Japan, and Singapore. The most unusual meeting Mian attended was an international geoneutrino workshop held in Beijing – although he knew almost nothing about geoneutrino, he was invited to give a keynote talk because of his previous studies of the South China craton and because China is building the world's largest neutrino detectors in south China. Visiting scientists have been a dynamic part of Mian's research program. In 2017 two Chinese visitors completed their work here, and a new visitor, Dr. Yujiang Li from China Earthquake Administration, has been working with Mian on earthquakes and crustal deformation in southeastern Tibetan Plateau. This fall Mian welcomes two new students: Yuxuan Chen is going to work on intraplate earthquakes for his doctorate, and Yifei Li, a visiting doctoral student from the University of Chinese Academy of Sciences, is working with Mian on modeling of landscape evolution in regions of active tectonics.

Ken MacLeod will be at sea for most of the fall on an IODP Expedition. The expedition will leave Hobart, Tasmania in September, drill at a site in the Australian Bight south of the continent before spending most of the expedition at sites in the Mentelle Basin and on Naturaliste Plateau (west of Fremantle, Western Australia. Ken is sailing as the stratigraphic coordinator, and doctoral student Shannon Haynes is sailing as a sedimentologist. Cruise objectives include investigation of Late Cretaceous greenhouse climates, carbon cycling, and ocean circulation. Shannon, in addition to sailing on Expedition 369, started a full-time job as the lab manager for a stable isotope facility at Princeton University. She hopes to defend her doctoral degree later this year. Master's student Kate Ferguson will be defending her degree addressing an assemblage of very well preserved Late Cretaceous fossils from an exposure of the Owl Creek Formation in Mississippi in early September. Finally, Ken welcomed Laura Spier, an alum of the MU field camp and graduate from Missouri State University, as a new master's student. Laura will be working on oxygen isotopes in conod onts as a means of studying Paleozoic climates.

Peter Nabelek was on research leave during the past academic year. He spent the winter and spring in Lausanne, Switzerland, where he had a view of the Alps from his office. He learned new things about Alpine geology, started new collaborative projects with Swiss colleagues, and did lots of skiing. Yanying Chen has graduated with a doctoral degree and is now teaching at the James Madison University in Virginia. Ashraf Gafeer is finishing his dissertation on volcanism in the circum-Mediterranean region and Elizabeth Gammel is progressing with her work on radiogenic isotope and trace element geochemistry of Mesozoic arc granitoids in the White-Inyo Range of eastern California. Her results are yielding new ideas about nature of the lithosphere during arc magmatism in the region.

Eric Sandvol and the seismology research group have begun work on two major field projects at either end of Asia. The most recent project was just funded this summer and will involve a deployment of seismic stations in the country of Myanmar starting in March of 2018. The combined seismic stations from our international partners will cover nearly the entire northern half of the country. In addition they have a new project that involves the deployment of a large seismic array that spans the Greater Caucasus mountains including the countries of Azerbaijan, Armenia, Georgia, and Russia. They deployed 52 stations and integrated these stations with another 90 permanent stations. This is a very large effort that will involve scientists from three US Universities and a large number of scientists from all of the countries involved. Wenfei Ku successfully defended his thesis and is now working at FM Global a company that focuses on help to reduce seismic hazard across the

world. Wenfei's thesis work focused on the seismic attenuation in the Iranian and Tibetan plateau. This work is important to be able to better predict seismic amplitudes of the seismic phase Sn across Anatolian, Iranian and Tibetan plateaus. Rayan Yassminh has continued her work on understanding the site amplification across the central and eastern U.S. using USArray data. She has recently begun to measure both horizontal and vertical amplification that should help us better understand far field seismic hazard across the central and eastern U.S. Hongjun Hui is continuing his work on modelling of high frequency wave propagation through the Earth's crust and uppermost mantle. Hongjun has been able to increase the frequency that we can model seismic waves and has used this new ability to better understand strongly azimuthally dependent attenuation of these waves. Mike Gunnels spent most of the spring and early summer helping to deploy our seismic array in the Greater Caucsaus. Mike deployed more stations than anyone else in the field team and was the only team member to deploy stations in Georgia, Azerbiajan, and Armenia. He has also nearly finalized a model of three dimensional Vp and Vs in Azerbiajan. Eric has three new students who joined the group this fall. Anna Kulynych is a new master's student from the Ukraine. Anna will work on our new project in Myanmar and help to install stations there in March. Duyi Li is a new student from China and she will focus on a newly funded project focusing on the stability of high frequency seismic amplitudes that is supported by the Air Force Research Lab. Finally Utku Kocum has joined us from Istanbul Technical University and he will be working on many aspects of the Greater Caucasus project.

James D. Schiffbauer reports a busy year, and there have been several important happenings to report… and will touch on the highlights. First, in addition to spending the summer preparing his tenure dossier, the new microscopy lab is very, very close to up-and-running. They are just days away from officially "opening" for business as he writes this, and has already been collecting data and building a client base. There is an official lab name: the X-ray Microanalysis Core Facility (which we call MizzoμX in short). Jim's current doctoral student and development board student member, Tara Selly, will serve as the lab manager. He also has a newly funded grant to report: an NSF CAREER Award. Both John Huntley and Jim received CAREER Awards from the same program in the same year—this is apparently a first, and Jim personally likes to think it speaks to the growing strength of the Mizzou Paleobiology program! Even more, they will be having two postdoctoral scholars joining the paleo group in the near future as well. Dr. Evan Anderson from the University of Colorado will be joining as of October 1, supported by a prestigious NSF EAR Postdoctoral Fellowship. Jim is excited that Evan has chosen Mizzou as his destination and will be working with Jim as he could have taken this fellowship anywhere in the country, but we are certain that our new lab was a big selling point. A taphonomist by training, Evan will be working on taphonomic experimentation to replicate various Cambrian conditions for fossil preservation. Dr. Sarah Jacquet from Macquarie University will also be joining Jim (Jim will be her lead mentor, and John Huntley will serve as her secondary mentor). She was one of five selected from a competitive campus-wide program, the Preparing Future Faculty Postdoctoral Fellowship, supported by the Office of Research. Sarah will be arriving from Australia in mid-October, with an official start-date of November 1. Sarah is a (carbonate) sedimentology expert, with research interests in microfossil taxonomy in the early Cambrian. She's also quite excited to start using our in-house, top-of-the-line μCT. The lab has opened many new doors, for sure. In addition to these postdocs, Dr. Simon Darroch (Vanderbilt University) has been awarded an SEC Faculty Travel Grant to spend a couple of weeks in in lab during the spring semester. Jim also welcomed a new master's student, Bailey Anderson, from the University of Wisconsin Oshkosh. She'll be working on the CAREER-supported research, specifically on taphonomic experimentation complementary to Evan's fellowship research. In sum, there are several new faces in the paleo group, and Jim is sure this will lead to many more great projects and publications. Without a doubt, these are exciting times for Mizzou Paleobiology! As Sarah so eloquently stated during their last conversation, "I can't wait to do all the science!"

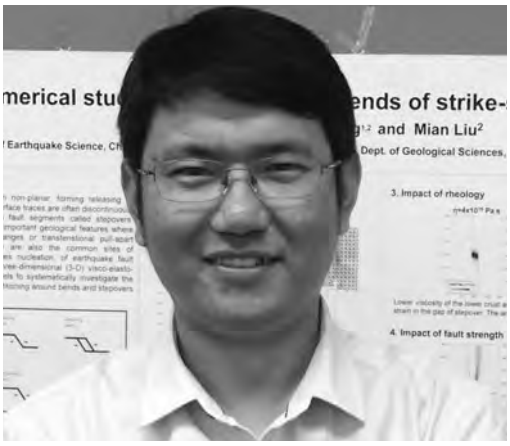
Kevin Shelton enters his 35th academic year at MU. He is spending his time working on several manuscripts and conducting fieldwork in Canada and in southern Missouri. Master's student Matthew Jeffrey (co-advised with John Huntley) completed his degree this summer with a thesis entitled "Stratigraphic variation of the Late Cambrian SPICE Event in Upper Cambrian Carbonates of southern Missouri." Tyler Adelstein completed his senior thesis on geochemical studies of the zinc-rich West Fork mine in southeast Missouri. This fall, Kevin is teaching Mineralogy and Economic Geology while advising with Stu Webb's senior thesis on the Lucky Lake W-Zn skarn deposit in Canada's Northwest Territories. On the home front, Lois and Kevin celebrated the arrivals of their two new grandsons.

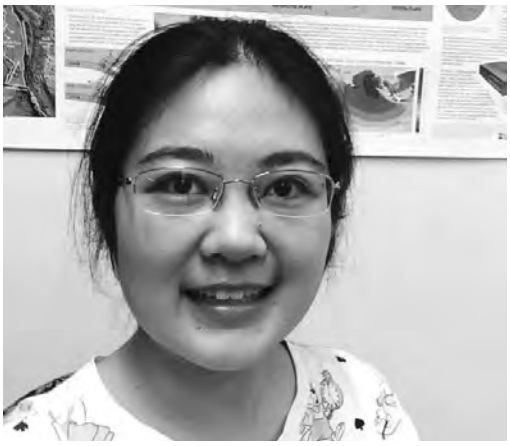
Mike Underwood remains very happily retired. He and Gail spend as much time as possible in the mountains of northern New Mexico.

Alan Whittington taught a Themes class on the Geology of Minecraft in the Fall of 2016. Stuart Kenderes completed a master's degree with Martin Appold and moved to higher temperatures for his doctoral degree, joining current doctoral students Jesse Merriman, Aaron Morrison and Arianna Soldati. Conference travel included both GSA in Denver and AGU in San Francisco. The alumni reunion in Denver was a great success. Derick Roy completed his senior thesis, and submitted it as a manuscript while moving to Washington University in St Louis for graduate school. Former doctoral students Genevieve Robert and Alex Sehlke both visited the lab to do some rheology experiments. In the spring, Alan gave a public lecture at the Pompeii exhibit at Union Station in Kansas City, and was elected a GSA Fellow. In June, Alan led the Teton-Yellowstone field trip from Field camp. In August, Alan did fieldwork at Obsidian Dome (Long Valley caldera, CA) with Stuart, followed by a field trip to similar domes at Newberry (OR), South Sister (OR) and Medicine Lake (CA), before the IAVCEI conference in Portland, with a mid-conference field trip to Mt St Helens. Alan, Stuart and Aaron completed the 2000-mile drive home in 50 hours, with just one new tire needed on the way. Alan watched the Total Eclipse with Hamish (10) at his school. Xander (13) went to the National Quiz Bowl tournament in Dallas. Angela's year was mostly consumed by duties as the co-chair of the American Astronomical Society's eclipse task force.

Stephanie Rosbach (left) and Mikaela Ruga (right) at the Gerace Field School in the Bahamas, summer 2017. Mikaela shows a displace of her excavation of human shell middens. Both Stephanie and Mikaela are working on their master's theses under the supervision of Jim Schiffbauer and John Huntley, respectively.

Visiting Scientists and Students





Dr.Yujing Li (left) s a visiting scholar from the Institute of Crustal Dynamics,, China Earthquake Administration. Yujing is here to work with Mian Liu on crustal deformation and earthquakes in southeastern Tibetan Plateau.

Yifei Li (right) is a visiting doctoral student from the University of Chinese Academy of Sciences. Yifei is working with Mian Liu on numerical modeling of how active faulting affect landscape evolution.

Evan Anderson, the newest postdoctoral arrival here at the department received his master's degree from Virginia Tech and his doctoral degree from the University of Colorado at Boulder. He has spent most ofhis graduate career studying how non-bony and non-shelly organic materials make their way into the fossil record. After studying late Proterozoic fossils for his master's thesis Evan moved quite a bit forward in time to study primarily Cenozoic insects for hid doctoral dissertation. He is now moving back to the Paleozoic to look at Burgess Shale-type preservation. For his NSF-funded Postdoctoral Fellowship, Evan will be studying recorded occurrences of this preservation type around the globe, comparing the geochemical parameters of classic Burgess Shale-type localities with similar sites later in the Paleozoic, and performing decay experiments that test different hypotheses explaining this type of preservation. Evan chose the University of Missouri for his fellowship due to its expanding paleobiology program and new microscopy facilities led by Dr. Jim Schiffbauer, who has also studied late Proterozoic and Paleozoic soft-bodied preservation..

Stuart Kenderes, current doctoral student, at Obsidian Dome, California, studying silic lava flow emplacement. This research work is funded by an National Science Foundation grant with Alan Whittington.

Active Research Grants

American Chemical Society

Jim Schiffbauer	$100,000
Alan Whittington	$110,000

National Science Foundation

Martin Appold	$230,000
Noel Bartlow	$243,000
Paco Gomez	$300,000
Paco Gomez	$290,000
Paco Gomez with MU Engineering	$350,000
John Huntley	$522,000
Mian Liu	$245,000
Ken Macleod	$225,000
Peter Nabelek	$226,000
Eric Sandvol	$129,000
Eric Sandvol	$328,000
Eric Sandvol	$363,000
Eric Sandvol	$176,000
Jim Schiffbauer	$867,000
Jim Schiffbauer	$599,000
Alan Whittington	$317,000
Alan Whittington	$316,000

University of Arizona

Alan Whittington	$13,000

UM Research Board

Noel Bartlow	$24,000
Paco Gomez	$21,000

U.S. Department of Defense

Eric Sandvol	$479,000

U.S. Department of Energy

Martin Appold	$252,000

U.S. National Park Service

Paco Gomez	$39,800

ETHINGTON PROFESSORSHIP

Professor Eric Sandvol of the MU Department of Geological Sciences has been awarded the inaugural Raymond Ethington Professorship in Geological Sciences. The award is for a three-year period and is named in honor of Professor Emeritus Raymond Ethington, whose remarkable career exemplifies internationally award-winning geological research, outstanding teaching and professional service. Donors to the endowment that funds the professorship intend for the award to assist in retaining outstanding MU Geological Sciences faculty. Prof. Sandvol has been a faculty member at MU since 2002 and is an internationally recognized expert in seismology, a branch of geophysics that uses seismic waves to explore the structure and behavior of the Earth's interior. He previously was honored with the MU Provost's Outstanding Junior Faculty Research and Creative Activity Award in 2007.

The award recognizes Prof. Sandvol's outstanding research, teaching, and service. "Eric is a great colleague. He is a world-class researcher, a devoted teacher, and a caring mentor to undergraduate students, graduate students and junior faculty," stated Prof. Kevin Shelton. "He exemplifies the legacy of Prof. Ethington's career and I can think of no better person to be the first Raymond Ethington Professor."

Raymond and Leslie Erthington enjoy the development board dinner at the Whittington's home in April, 2017 where the newly established professorship was announced.

Geological Sciences Snags Two NSF CAREER Awards

Assistant professors John Huntley and Jim Schiffbauer (picture below)of the Department of Geological Sciences both recently won NSF CAREER Awards, the organization's "most prestigious award in support of early career-development."

2017 is turning out to be a very good year for MU's Department of Geological Sciences. The department is in the process of installing the first micro-CT scanner on campus, which will allow researchers across campus to analyze samples three-dimensionally without destroying them, as well as a highly customized scanning electron microscope. These instruments will be housed in a new lab overseen by Assistant Professor Jim Schiffbauer, who also has the distinction of being one of two members of the department to receive the National Science Foundation's (NSF) Faculty Early Career Development (CAREER) Award, which the NSF calls "its most prestigious award in support of the early career-development activities of those teacher–scholars who most effectively integrate research and education within the context of the mission of their organization." Assistant Professor John Huntley, a friend and close associate of Schiffbauer's, received the other NSF CAREER Award this year.

"It is highly unusual for two members of the same department to receive the honor at the same time—from the same review panel for that program," Huntley says.

Their Five-Year Mission

Both professors will receive over $500,000 to support their research efforts over a five-year period, and both must develop a strong educational component that is well-integrated with their research.

For Schiffbauer, that means introducing elementary students to the time period he specializes in—the Cambrian Period, the first geological period of the Paleozoic Era that spanned approximately 541–485 million years ago. It is the time when most of the major groups of animals first appear in the fossil record.

"We're going to bring the Cambrian into elementary school classrooms to try to get younger kids—when they are starting to get a push for STEM education—to get them interested in paleontology outside of dinosaurs," Schiffbauer says. "Everybody goes through that fascination with dinosaurs, but we want them to also be fascinated by the really weird things that we see in the Cambrian—all kinds of cool stuff existed then, including our earliest animal ancestors." He says the awards also provide support for graduate students and undergraduates, who will write the text for a coloring book about the Cambrian Period Schiffbauer's team will develop for students at Lee Expressive Arts Elementary School in Columbia, Missouri. Schiffbauer's research plans to examine how fossils of the Cambrian were preserved, from perspectives of paleobiology, geochemistry, and sedimentology, and using both field- and lab-based approaches. Analyses will rely heavily on the new electron microscope, which was acquired through a grant from NSF Instrumentation & Facilities to Schiffbauer.

A New Look at an Old Icon

Huntley's research has focused on exploring the link between sea-level rise and increasing parasitism. "That's what the research portion will help us better understand—how does the biota and the environ-

ment respond as you go through climate and sea-level cycles? We're going to introduce some geochemical techniques to what we've being doing to try to reconstruct what is happening with temperature, nutrient availability, and salinity, and see if we can figure out if there is a correspondence between some of these factors and the increase in trematode (parasite) prevalence," Huntley says. One of the basic concepts his team will focus on is "deep time" or geologic time—looking at biotic responses to environmental change and climate change to see how organisms respond. That exploration of deep time is the basis of a new course Huntley is developing as part of the educational component of his award, Geology of the Columns. "When you look at MU's columns, they are made up of fossil material that was deposited in a shallow tropical sea around 350 million years ago when Missouri was a very different place," Huntley says. "The idea is there are students who are not science-inclined, but perhaps we can increase their scientific interest and literacy. We can teach them the fundamentals of earth and life history through the stories preserved in this beloved Mizzou icon."

Schiffbauer and Huntley both say they also will encourage their grad students to pursue teaching by asking them to enroll in a minor in college teaching, so part of the professors' responsibilities during the next five years will include mentoring the next generation of educators and researchers.

These NSF CAREER Awards apply toward Association of American Universities metrics. The University of Missouri is one of 62 AAU member institutions in the U.S and Canada. On a historical note, their department chair E.B. Branson Professor Alan Whittington previously received an NSF CAREER Award.

Written by Jordan Yount
College of Arts & Science

John Huntley, Assistant Professor.

Jim Schiffbauer, core research lab administrator, gives a tour of the new lab to the geology development board members in April, 2017.

Progress in natural sciences relies on access to the best available technologies in order to collect, analyze, and disseminate the highest quality data and facilitate new discoveries. With recent advancements in high resolution micro-computed X-ray tomography (μCT) systems, as well as continued improvement in electron imaging and X-ray analytical capabilities in scanning electron microscopy (SEM) platforms, these two instruments are becoming cornerstones in high-tech imaging/analytical facilities. The newly established X-ray Microanalysis Core Facility (MizzoμX), directed by Dr. Jim Schiffbauer and managed by PhD candidate Tara Selly, brings a world-class research facility to the Department of Geological Sciences and the broader MU community. Already opening new doors for the department, we are sure that this facility will help to foster discovery and interdisciplinary collaboration across many academic fields—and we are excited for what the future holds!

The major instrumentation at MizzoμX includes: (1) a highly customized, field-emission, variable-pressure Zeiss Sigma 500 VP scanning electron microscope—outfitted with dual, co-planar Bruker energy dispersive X-ray spectrometers, a Bruker microspot X-ray fluorescence source, and a suite of high-definition imaging detectors. And (2) a Zeiss Xradia Versa 510 micro-computed X-ray microscope, which is a premier solution for non-destructive, three-dimensional volume imaging at resolvable scales of 0.7 μm. The X-ray source is powerful enough (with an operation range from 30–160 kV) and the system provides innovative phase contrast solutions to enable accommodation across a variety of sample materials, from "soft" materials, such as bones, polymers, and soft tissues, to "hard" materials, like metals, alloys, and rocks. We additionally have a full complementary suite of preparation equipment and supplies. In sum, the instrumentation in this facility totals nearly $2M.

Visiting Speakers

A rich and varied program of visiting speakers was funded by our Williamson Family Endowment Fund. Last year's Williamson Family Colloquia and other seminars included:

Miriam Barquero-Molina, MU Geological Sciences
Study abroad Spain summer, 2016

Carey Bridges, Missouri Geological Survey
Geological careers in state government

John Cottle, MSA Distinguished Lecturer; UC Santa Barbara
Taking the pulse of the Himalaya: insight into orogenesis from the roof of the world

Toby Dogwiler, Missouri State University
Developing a collaborative, relationship-based approach to addressing agricultural water resources issues in the driftless area of southeastern Minnesota

Robert Dymek, Washington University, St. Louis
Prospects in analytical paleobiology: applications of advanced microbeam instrumentation in the study of life's history

David Fike, Washington University, St. Louis
Depositional controls on d34S records: rethinking stratigraphic trends and geobiological interpretations

Allison Graettinger, UM of Kansas City
When magma meets water: using experiments, field work, and remote sensing to unravel explosive volcanic processes

Sarah Jacquet, Macquarie University
Deep time down under: palaeobiology, biostratigraphy, and lithostratigraphy

Camelia Knapp, University of South Carolina
Carbon sequestration on the eastern North American margin

Liliana Lefticariu, Southern Illinois
The role of nano- and micronscale detrital particles in coal mine contaminant dynamics

Virginie Renson, MU Research Reactor
Lead Isotopes - a tool for provenance study in geoarchaeology.

Evelyn Roeloffs, Cascades Volcano Observatory
Borehole strainmeters: What are they, and what can they tell us about earthquakes?

James (Jim) Schiffbauer
Prospects in analytical paleobiology: applications of advanced microbeam instrumentation in the study of life's history

Steve Semken, Arizona State University
EarthScope education and outreach: transcontinental, yet place-based

Carey Bridges (MS '99), the Director of the Missouri Geological Survey Program, and a current geology development board member, gave a departmental presentation on careers in the state government.

It was a great summer at the University of Missouri Branson Geology Field Camp. We received 43 students from seven different institutions: University of Missouri, Sam Houston State, Central Michigan, Missouri State, Northwest Missouri State, Missouri S&T and The University of Texas-San Antonio.

We were pleased that 12 out of our 43 students qualified for scholarships from our alumni contributions to the camp's scholarship funds (see photo). If you have a chance, visit our field camp website (http://fieldcamp.missouri.edu/) which is the main venue through which potential students learn about our camp. You can also "like" us and follow on Facebook at https://www.facebook.com/Camp.Branson.

Curricular changes

This summer we offered a new advanced project during the last two weeks of camp, in order to complement our already very strong, and very sought after, projects in shallow reflection and refraction geophysics and surface and groundwater hydrogeology. Two of our department and field camp alumni, Drew Thomas and Mark Sutcliffe, joined our camp faculty and developed a project on interpretation of subsurface geological methods. Students were introduced to well log analysis utilizing geophysical logs (gamma ray, neutron, density, resistivity, SP, PE), and also to lithologic identification of logs, as well as lithostratigraphic and sequence-stratigraphic correlation of units, and estimations of in-place reservoir volumes.

Students worked with data from the Wind River Basin, from areas that they had already worked on during our sed-strat and mapping projects in camp. Having the ability to work on surface exposures and then subsurface interpretation with the same units in the same area allowed students to really gain a deeper understanding of the geology of the Wind River Basin, and contributed to the development of their 3D- and even 4D-thinking and visualizing skills.

Thanks to all the faculty, instructors, teaching assistants, staff, alumni and friends whose contributions continue to help Camp Branson move forward.

Miriam Barquero-Molina
Field Camp Director

Field camp students investigating a dike cuting Eocene volcaniclastic sediments in the Absaroka mountains between Yellowstone and Cody, Wyoming.

FIELD CAMP

FIELD COURSE

Summer, 2017 field camp scholarship recipients: Back row (left to right): Nicholas Gilbert (MU) and Samuel Cameron (CMU). Middle row (left to right): Heidi Harwick (UTSA); Rachel Jackson (MSU); Austin Ray (MU); Brendan Talbert (MU). Front row (left to right): Kim Moore (SHSU); Chelsea Sobnosky (SHSU); Edward Kleeman (MU); Grace Allison (MU S&T); Geoffrey Webb (MU); Kurt Oberreither (MU).

William B. Allen Scholar
Kurt Oberreither

Donald S. Garvin Scholars
Allison Grace
Samuel Cameron
Heidi Harwick
Edward Kleeman
Kimberly Moore
Austin Ray

Clayton H. Johnson Memorial Scholars
Nicholas Gilbert
Rachel Jackson
Brendan Talbert
Geoffrey Webb

George W. Viele Memorial Scholar
Chelsea Sobnosky

Undergraduate Research Program

It is now 10 years since the Department funded its first proposal to the undergraduate research program, supporting research by students enrolled in Senior Thesis credit hours. The program is funded from four Opportunities for Excellence in Geology Endowments (the Walter D. Keller, John and Betty Marshall, Gene and Thelma Schmidt, and Norman E. Smith funds). This unique program provides funds to enable undergraduates to conduct meaningful field- and laboratory-based research as part of their MU education, benefiting students in several ways:

- It encourages and rewards research early in students' academic careers, often before senior year.
- It is a great recruiting tool to attract students to our program.
- Our students will be more competitive and better prepared for graduate school and the work force.
- The program increases our visibility on campus and beyond.
- Integrating meaningful research into our undergraduate curriculum emphasizes the unique role our Department plays in developing the geoscience workforce in Missouri

The number of requests averages about 4 per year, and most students request the maximum amount of $3,000, which can be used for field and analytical expenses. Students receiving these awards have done fieldwork throughout the US and abroad, for example in Canada and Ethiopia. Several projects have resulted in student-authored papers in peer-reviewed journals. Many students who have completed senior thesis research have gone on to graduate school at MU or elsewhere, and some are now faculty members themselves.

We are extremely grateful to the donors to the Opportunities for Excellence in Geology Endowments who have provided research opportunities for so many students.

From left: Charlie Miles, Dan Clapp and Kelly Hickcox surveying the Debeque Canyon (Colorado) landslide (background) with the ground-based radar as part of Kelly's thesis research, May 2017.

Alexis Dickinson investigating a volcaniclastic breccia at Johnson's Shut In's, southeast Missouri.

Dan Clapp and David Nymberg operating the ground-based radar interferometer to measure movement of a rock glacier on Mt. Mestas (Colorado) as part of Dan's undergraduate research, August 2017.

PHOTO GALLERY

AWARDS

Clarke Delisle received the Geology Development Board Outstanding Undergraduate Award from Miriam Barquero-Molina, our director of undergraduate students.

Jesse Broce received the James H. Stitt Graduate Teaching Award from Tanya Heath (middle) and Merilee Barta (right). Tanya and Merilee were at a department function to present this award in honor of their father.

Will Kleeman received the Estwing Hammer Award from Miriam Barquero-Molina, our field camp director.

PHOTO GALLERY

AWARDS/RESEARCH

Arianna Soldati received the Outstanding Graduate Student Award from Paco Gomez, our director of graduate studies.

From left to right: Arianna Soldati, John Huntley and Tara Selly at the Humboldt Conference in Washington, DC, spring, 2017.

Noel Bartlow (center) with master's students Nick Benz (left) and Ryan Yohler (right) visit a ghost forest created by the 1964 Alaska megathrust earthquake and tsunami on a field trip associated with the 2017 Earthscope National Meeting. This ghost forest, located outside of Anchorage, Alaska subsided and was inundated by seawater after the earthquake, killing the trees and leaving a record of deformation in the area.

PHOTO GALLERY

FIELD CAMP

Group photo of our summer, 2017 field camp students on top of Mt. George.

2017 MU past/present/future at the Tetons, summer 2017.

Field camp students jumping into the Popo Agie River at 6:30 am.

PHOTO GALLERY
CLASSES

Tim McHargue and his Clastic Sequence Stratigraphy Class, January 2017.

Miriam Barquero-Molina's class field trip enjoying a break at Arches National Park, near Moab, Utah.

Charlie Miles, Dan Clapp and Kelly Hickcox flying a small UAV for the summer, 2017 class "3D Imaging of the Environment" taught in collaboration with UMKC.

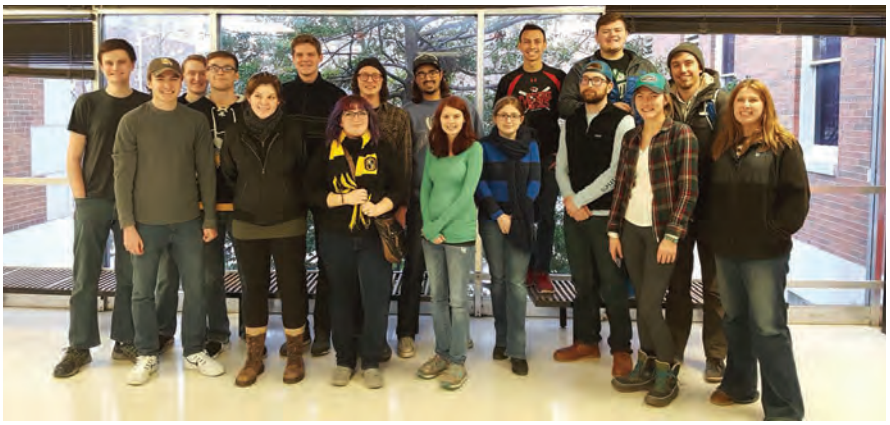
PHOTO GALLERY

OUTREACH

March For Science event, held in Peace Park, on the MU campus, spring, 2017.

Soda volcanoes at Lee Elementary School's Fall Festival. Alan Whittington spends time sharing science activities with the students.

The MU Geology Graduate Society (MUGGS) geology display renovation on the MKT Trail.



Geology Club is a blend of both undergraduate and graduate students, and some non-major students as well. Each fall the Geology Club pairs up with other students and faculty to host a youth night where kids in surrounding schools are invited to learn more about the richness of our planet. From volcanoes to fossils, and from earthquakes to minerals each student teaching a class does their best at conveying what they find fascinating about their subject while keeping it comprehensible for children. Last year the club attended many local mineral shows ranging from Kansas City to St. Louis. Each was a wonderful experience where students could talk to other geologists and learn as well. The club also went on a few hikes, and on one hike students found a calcite deposit with beautiful crystal structures tucked within. Whether it's a meeting during the school week or an activity during the weekend, Geology Club is a great place to meet new people and learn new things while having fun too!

WIll Kleeman climbing at Elephant Rocks..

The American Association of Petroleum Geologist (AAPG) student chapter has had a successful year and a bright future. For the start of this academic year, they hosted a BBQ in Peace Park in order for the new graduate students and faculty members to meet and greet returning members of the department. Over Labor Day weekend in 2016, AAPG sponsored a 3-day fieldtrip to northern and central Arkansas, where they went to the Crater of Diamonds SP, Hot Springs, and fluorite mines. Dr. Martin Appold led the trip. The trip went very well and was no cost to members! As a club they worked concessions at home football games, which provided their main source of income. They continued to subsidize a discounted rate for HAZWOPER training, allowing the members to receive a significant discount. Over this past year, at least five people have completed the training. They have created a Google Drive for all meeting minutes and documents in order to reduce waste and make transitioning easier. Additionally, they are looking forward to the upcoming year, with another field trip in the works as well as an invited AAPG distinguished lecturer seminar speaker for the spring. The club will also continue to subsidize HAZWOPER.

The MU Geology Graduate Society (MUGGS) is entering its third year as the student organization promoting professional development for graduate students interested in pursuing careers in academia as well as fostering community among the graduate students within our department. It has been a busy year for MUGGS. Earlier this spring, 11 graduate students shared their research with their fellow students during the second annual Geology Student Research Forum. MUGGS also invited the Mineralogical Society of America Distinguished Lecturer, Dr. John Cottle from the University of California--Santa Barbara, who presented his talk "Taking the Pulse of the Himalaya: Insight into Orogenesis from the Roof of the World". The club has also been active in scientific outreach events in and around Columbia, including a science festival in Peace Park at the end of Columbia's March for Science. Since the start of the fall semester, the club continues to actively raise funds through our monthly fundraiser at Shakespeare's Pizza. We also just participated in a series of team building exercises at MU's own high ropes course, Venture Out. This year the group will continue to support the graduate students in the department. Including supporting five students traveling to the annual Geological Society of America meeting in Seattle, Washington. They are also considering sending graduate students to participate in workshops hosted by the Science Education Research Center (SERC) at Carleton College. These workshops will hopefully help the graduate students who wish to become educators help fulfill their career goals.

Undergraduate Degrees

Bachelor of Science, Cum Laude
Patterson, Anna

Bachelor of Science, with Department Honors
Adelstein, Tyler
DeLisle, Clark
Roy, Derick
Talbert, Brendan

Bachelor of Science
Asher, Ura
Cermak, Keith
Craig, Kollin
Diehl, Cale
Gregory, Daniel
Hogan, Taylar
Hunt, Taylor
Ray, Austin

Senior Theses

Tyler Adelstein
Zinc-rich ores of West Fork mine: multiple-fluid involvement in the southeast Missouri mining district..
Advisor: Kevin Shelton

Amrit Bal
Exploration of seasonal trend loess applied to Cascadia GPS data.
Advisor: Noel Bartlow

Nicholas Gilbert
Initial deployment of slow earthquake hunters.
Advisor: Noel Bartlow

Parichat Laphim
Sn velocities in the Central and Eastern U.S.
Advisor: Eric Sandvol

Derick Roy
Heat transfer of intrusive igneous rocks in the Kapuskasing Zone..
Advisor: Alan Whittington

Awards

American Geophysical Union Student Travel Grant
Amrit Bal

Estwing Hammer Award
Edward Kleeman

Geology Development Board Outstanding Undergraduate Award
Clark DeLisle

Scholarships

Boyd Scholar
Kurt Oberreither

Edmond & Mary Raymond Scholar
Daniel Clapp

Mrs. Pat Geology Scholars
Jaime Clark
Jacqueline Sheffer

Raymond E. Peck Undergrad Scholars
Nicholas Gilbert
Edward Kleeman

Quearry Scholar
Emalyn Glastetter

Pearl T. Sando Scholars
Samuel Finnegan
Casey Thater

Gene Schmidt Scholar
Alex Calvalco

Fred Strothmann Scholar
McKenzie Bowman

Graduate Degrees

Master of Science

Katherine Ferguson
Testing for poss ible migration among ammonites baculites and scaphites from the Late Cretaceous (Maastrichtian) Owl Creek Formation via isotopic composition.
Advisor: Kenneth MacLeod

Matthew Jeffrey
Stratigraphic variation of the late Cambrian spice event in upper Cambrian carbonates of Southern Missouri..
Advisor: John Huntley

Stuart Kenderes
Fluorine concentrations of ore fluids in the Illinois-Kentucky district: evidence from SEM-EDS analysis of fluid inclusion decrepitates.
Advisor: Martin Appold

Liane Linehan
Meta-analysis of parasitic-interactions in Phanerozoic marine settings.
Advisor: John Huntley

Sarah Smith
Prediction of Mississippi Valley-type ore fluid concentrations from solid solution metal concentrations in ore-stage minerals.
Advisor: Martin Appold

Doctor of Philosophy

Yangying Chen
Influences of pluton growth on magma crystallinity, aureole rheology, chamber stability and metamorphic fluid flow: umerical modeling of the growth of Papoose Flat Pluton, White-Inyo Range, California.
Advisor: Peter Nabelek

Joshua Field
ITrace Mississippi Valley-type lead-zinc mineralization: origins and relationship to mid-continent MVT ore districts.
Advisor: Martin Appold

From left: Stuart Kenderes, Elizabeth Gammel, Mark Volkman (Science Education - retired), and Paco Gomez attended the award ceremony, where Elizabeth received the MU Abell Science Education Award.

Scholarships

Burst Grad Fellow
Stuart Kenderes

Davies Scholar
Jesse Broce

Ethington Scholar
Stephanie Rosbach

Freeman Scholar
Yuwan Epa

GSSF Scholars
Grace Allison Kelly Hickcox

Harris Scholar
Stephanie Rosbach

Himmelberg Scholar
Elizabeth Gammel

Johns Scholar
Thomas Herbst

Hal & Ruth Johnson Scholar
Charles Miles

Walter D. Keller Scholar
Riaz Khan

Knotts Scholar
Sarah Smith

Knox Scholar
Nicholas Benz

M. G. Mehl Field Geology Scholar
Laura Speir

Miles Scholar
Michael Gunnels

Peck Graduate Fellowship
Jesse Broce Arianna Soldati
Yuwan Epa

Steyaert Scholar
Arianna Soldati

James H. Stitt Geology Scholar
Bailey Anderson

Thomasson Scholar
David Nymberg

Tlapek Scholar
Gabriel Jacobs

Viele Scholar
Stuart Kenderes

Grants and Awards

American Geophysical Union Student Travel Grant
Arianna Soldati

Geological Society of America Travel Grant
Mikaela Ruga

MU Abell Science Education Award
Elizabeth Gammel

MU Dissertation Year Fellowship
Elizabeth Gammel

MU Graduate Professional Council Travel Grant
Stuart Kenderes
Aaron Morrison
Ryan Yohler

MU Graduate Professional Council Research and Creative Activities Forum, First Place
Arianna Soldati

NSF East Asis and Pacific Summer Institutes New Zealand Fellowship
Ryan Yohler

Society of Economic Geologists Hugo Dummett Mineral Discovery Student Research Grant
Sarah Smith

Student Publications

Broce, J.S., and Schiffbauer, J.D. 2017. Taphonomic analysis of Cambrian vermiform fossils of Utah and Nevada, and ramifications for chemistry of Burgess Shale-type preservation: Palaios 32: 600–619.

Muscente, A.D., Schiffbauer, J.D., **Broce, J.**, Laflamme, M., O'Donnell, K., Boag, T.H., Meyer, M., Hawkins, A.D., Huntley, J.W., McNamara, M., MacKenzie, L.A., Stanley, Jr., G.D., Hinman, N.W., Hofmann, M.H., and Xiao, S., 2017. Exceptionally preserved fossil assemblages and soft tissue preservation through geologic time and space: Gondwana Research 48:164-188.

Brown, M., Liu, M., 2016. Injection-Induced Seismicity in Carbon and Emery Counties, central Utah: Geofluids, doi: 10.1111/gfl.12184.

Haynes, S.J., MacLeod, K.G., Huber, B.T., Warny, S., Kaufman, A.J., and Pancost, R.D., 2017. Depositional environments, marine and terrestrial links, and exceptional preservation in the Turonian of southeastern Tanzania: Geological Society of America Bulletin, v. 129, p. 515-533, doi: 10.1130/B31432.1.

Huber, B.T., Petrizzo, M.R., Watkins, D.K., **Haynes, S.J.,** and MacLeod, K.G., 2017. Correlation of Turonian continental margin and deep-sea sequences in the subtropical Indian Ocean sediments by integrated planktonic foraminiferal and calcareous nannofossil biostratigraphy: Newsletters on Stratigraphy, v. 50, p. 141-185, doi: 10.1127/nos/2017/0373.

He, J., Wu, Q., Sandvol, E., Ni, J., Gallegos, A., Gao, M., Ulziibat, M., Demberel, S., 2016. The crustal structure of south central Mongolia using receiver functions: Tectonics, 35 (6), pp. 1392-1403.

Schiffbauer, J.D., Huntley, J.W., Fike, D.A., **Jeffrey, M.J.**, Gregg, J.M., and Shelton, K.L., 2017. Decoupling isotopes and extinction: the SPICE event is time-transgressive and facies dependent: Science Advances, v. 3, e1602158, DOI: 10.1126/sciadv.1602158.

Joshi, A., Appold, M. S., 2017. Numerical modeling of porosity waves in the Nankai accretionary wedge décollement, Japan: implications for aseismic slip: Hydrogeology Journal, v. 25, p. 249–264.

Kenderes, S.M., Appold, M.S., 2017. Fluorine concentrations of ore fluids in the Illinois-Kentucky district: evidence from SEM-EDS analysis of fluid inclusion decrepitates: Geochimica et Cosmochimica Acta, v. 210, p. 132-151.

Malone, D.H., Craddock, J.P., Schmitz, M.D., **Kenderes, S.**, Kraushaar, B., Murphey, C.J., Nielsen, S., Mitchell, T.M., 2017. Volcanic initiation of the Eocene Heart Mountain slide, Wyoming, USA: Journal of Geology, v. 123, n. 4, p. 439-457.

Malone, D.H., Craddock, J.P., and **Kenderes, S.**, 2017. Detrital zircon geochronology and provenance of the Middle Cambrian Flathead Sandstone, Park County, Wyoming: The Mountain Geologist, v. 54, n. 2, p. 86-103.

Schiffbauer, J.D., Huntley, J.W., **O'Neil, G.R.**, Darroch, S.A.F., Laflamme, M., Cai, Y., 2016. The latest Ediacaran wormworld fauna: Setting the ecological stage for the Cambrian Explosion. GSA Today 26(11):4-11.

MacLeod, K.G., **Quinton, P.C.**, and Bassett, D.J., 2017. Warming and increased aridity during the earliest Triassic in Karoo Basin, South Africa: Geology, v. 45, p. 483-486, doi:10.1130/G38957.1.

Nabelek, P.I., **Stephenson, S.K.**, Morgan, S.S., and Student, J.J., 2017. Properties of fluids attending variable recrystallization of quartzite during contact metamorphism in the White-Inyo Range, California: Journal of Metamorphic Geology, doi: 10.1111/jmg.12235.

Ye, J., Liu, M., 2017. How fault evolution changes strain partitioning and fault slip rates in southern California: Results from geodynamic modeling: Journal of Geophysical Research: Solid Earth 122, doi:10.1002/2017JB014325.

Student Oral Presentations

Anderson, B.M., Peterson, J.E., Lenczewski, M., and Schiffbauer, J.D., 2017. Carbonate precipitation during vertebrate decomposition in a hyperalkaline aquatic setting: A case study in experimental taphonomy: Geological Society of America, Abstracts and Programs.

Broce, J.S., and Schiffbauer, J.D., 2017. Putative eldonioids from the Cambrian Gibson Jack Formation, Idaho: Geological Society of America, Abstracts and Programs.

Gammel, E., Nabelek, P., 2016. Spatial and temporal changes in sources of Mesozoic arc plutons in the White-Inyo Range, California: Geological Society of America, Abstracts with Programs, vol. 48, no. 7.

Haynes, S.J., Martin, E.E., and MacLeod, K.G., 2016. Pacific Ocean circulation during the Late Cretaceous,: Geological Society of America, Abstracts with Programs, vol. 48, no. 7.

Jeffrey, M.J., Huntley, J.W., Schiffbauer, J.D., Fike, D.A., and Shelton, K.L., 2017. Influences of environmental variation and sedimentation rate on the recording of the Steptoean Positive Carbon Isotope Excursion (SPICE) in Missouri: Geological Society of America, Abstracts and Programs,

Huntley, J.W., **Linehan, L.C**., De Baets, K., 2017. Phanerozoic trends in parasite-host interactions among common marine benthos: Mounting risk or spurious consequence of a biased record? Geological Society of America, Abstracts with Programs, vol. 49, no. 6.

Merriman, J.D., Whittington, A.G., and Hofmeister, A.M., 2017. Re-evaluating thermal conductivity from the top down: Thermal transport properties of crustal rocks as a function of temperature, mineralogy and texture: 42nd Workshop on Geothermal Reservoir Engineering, Stanford CA.

Merriman, J.D., and Whittington, A.G., 2017. Continental lithosphere was a warm blanket on the Archean Earth.: GAC-MAC, Kingston ON.

Morrison, A., **Sehlke, A.,** and Whittington, A., 2016. Rheology of crystallizing basalts from Nyiragongo and Nyamuragira volcanoes, D.R.C.: Geological Society of America Meeting.

Morrison, A., Zanetti, M., Hamilton, C.W., Lev, E., Neish, C., and Whittington, A., 2017. Liquid viscosity measurements of lunar highland and mare impact melt simulants: JSC-1a, Stillwater anorthosite, and Stillwater norite: IAVCEI, Portland OR.

O'Neil, G.R., Tackett, L.S., Schiffbauer, J.D., Huntley, J.W., Cai, Y.. 2017. Changing ecosystem dynamics in the terminal Ediacaran vermiform fauna: An analysis using sedimentological and diversity data from the Gaojiashan Lagerstätte of South China: Geological Society of America, Abstracts with Programs, vol. 49, no. 6.

Quinton, P.C., Miller, J.F., Ethington, R.L., and MacLeod, K.G., 2016,. Early Ordovician climate fluctuations inferred from conodont oxygen isotopes: Geological Society of America, Abstracts with Programs, vol. 48, no. 7.

Rosbach, S.A., **Selly, T.**, and Schiffbauer, J.D., 2017. Influence of ionic strength on the preservation potential of the black-backed land crab, Gecarcinus lateralis, San Salvador, Bahamas: Geological Society of America, Abstracts and Programs.

Ruga, M.R., Huntley. J.W., 2017. Conch fritters through time: Human predation and population dynamics of Strombus gigas, San Salvador Island, the Bahamas.: Geological Society of America, Abstracts with Programs, vol. 49, no. 6.

Schiffbauer, J.D., and **Selly, T.**, 2017. Prospects in microanalytical paleobiology: Applications of scanning electron microscopy in the study of ancient life: Geological Society of America, Abstracts and Programs.

Soldati, A., Gurioli, L., Harris, A., Rhéty, M., Villeneuve, N., and Whittington, A., 2016. Topographic constraints on lava flow patterns at Piton de La Fournaise (La Réunion): American Geophysical Union Meeting.

Soldati, A., Harris, A., Gurioli, L., Rhéty, M., Villeneuve, N., and Whittington, A., 2017. Does lava remember its own thermal history? A new experimental approach to investigate subliquidus rheology applied to the December 2010 eruption of Piton de La Fournaise (La Réunion): IAVCEI, Portland OR.

Student Poster Presentations

Bal, A., and Bartlow, N.M., 2016. Application of Seasonal Trend Loess to GPS data in Cascadia: American Geophysical Union Fall Meeting.

Benz, N., Bartlow, N.M., and Roeloffs, E., 2017. cGPS and Borehole Strainmeter Measurements of the September 2013 ETS Event: Earthscope National Meeting.

DeLisle, C., and Gomez, F., 2017. Using low-altitude drone photogrammetry to identify and quantify subtle Quaternary surface faulting in the northern Wind River Basin, Wyoming: Annual Meeting of the Association of Environmental and Engineering Geologists

Elliott, G., Gomez, F., 2017. Ground Based Radar Interferometry Measurements of the Slumgullion Earth Flow (San Juan Mountains, Colorado): Annual Meeting of the Association of Environmental and Engineering Geologists.

Hickcox, K., and Gomez, F., 2017. Analysis of the Debeque Canyon Landslide using Ground-Based Radar and Aerial Photogrammetry, Mesa County, Colorado: Annual Meeting of the Association of Environmental and Engineering Geologists.

Hui, H., and Sandvol, E., 2016. Source depth and Azimuth dependent synthetic Lg attenuation: American Geophysical Union Fall Meeting.

Jeffrey, M.J., Huntley, J.W., Schiffbauer, J.D., Fike, D.A., Shelton, K.L.,. 2017. Influences of environmental variation and sedimentation rate on the recording of the Steptoean Positive Carbon Isotope Excursion (SPICE) in Missouri.: Geological Society of America, Abstracts with Programs, vol. 49, no. 6.

Kenderes, S., Hofmeister, A.M., **Merriman, J.D.**, and Whittington, A.G., 2017. Exploring the thermal effects of country rock type on the mobility of magma through conduits: IAVCEI, Portland OR.

Khan, R.H., Appold, M.S., McPherson, B.J., Balch, R., White, M., 2016,. Evaluation of geologic CO2 sequestration potential of the Morrow B Sandstone in the Farnsworth, Texas hydrocarbon field using reactive transport modeling: American Geophysical Union.

Marti, N., 2016. Seismic Anisotropy in the Aegean Sea and Eastern Mediterranean Sea: Seismological Society of America meeting.

Merriman, J.D., Hofmeister, A., and Whittington, A., 2016. Conductive thermal transport properties of carbonate minerals and rocks across a range of crustal temperatures. Geological Society of America Meeting..

Miles, C., and Gomez, F., 2017. Comparison of Ground Based Interferometric Radar and Lidar for Detecting Rockfall Hazards: Annual Meeting of the Association of Environmental and Engineering Geologists.

Morrison, A., Zanetti, M., Hamilton, C.W., Lev, E., Neish, C., and Whittington, A.G., 2016. Liquid viscosity measurements of lunar highland and mare impact melt simulants: JSC-1a, Stillwater anorthosite, and Stillwater norite: Geological Society of America Meeting.

Nymberg, D., Gomez, F., Cochran, W.J., and Sandvol, E., 2017. Relating neotectonic indicators to subsurface structural geometries in the Noble Hills flower structure along the Southern Death Valley Fault Zone (California): Geological Society of America Annual Meeting.

Polun, S., Horrell, D., Tesfaye, S., and Gomez, F., 2017. New kinematic constraints on the Quaternary tectonic evolution of the Afar triple junction: Geological Society of America Annual Meeting.

Roy, D., Hofmeister, A., Merriman, J., Nabelek, P., and Whittington, A., 2016. Thermal diffusivity of calcium-rich rocks: Geological Society of America Meeting.

Selly, T., Smith, E.F., Nelson, L.L., Thater, C.A. [undergraduate major], and Schiffbauer, J.D. (2017) Taxonomy of the terminal Ediacaran vermiform biota, Wood Canyon and Deep Spring formations, Nevada. Geological Society of America, Abstracts and Programs.

Selly, T., **Hale, K.E.**, Schiffbauer, J.D., **Clapp, D.A.** and Huntley, J.W., 2017. The influence of environ-

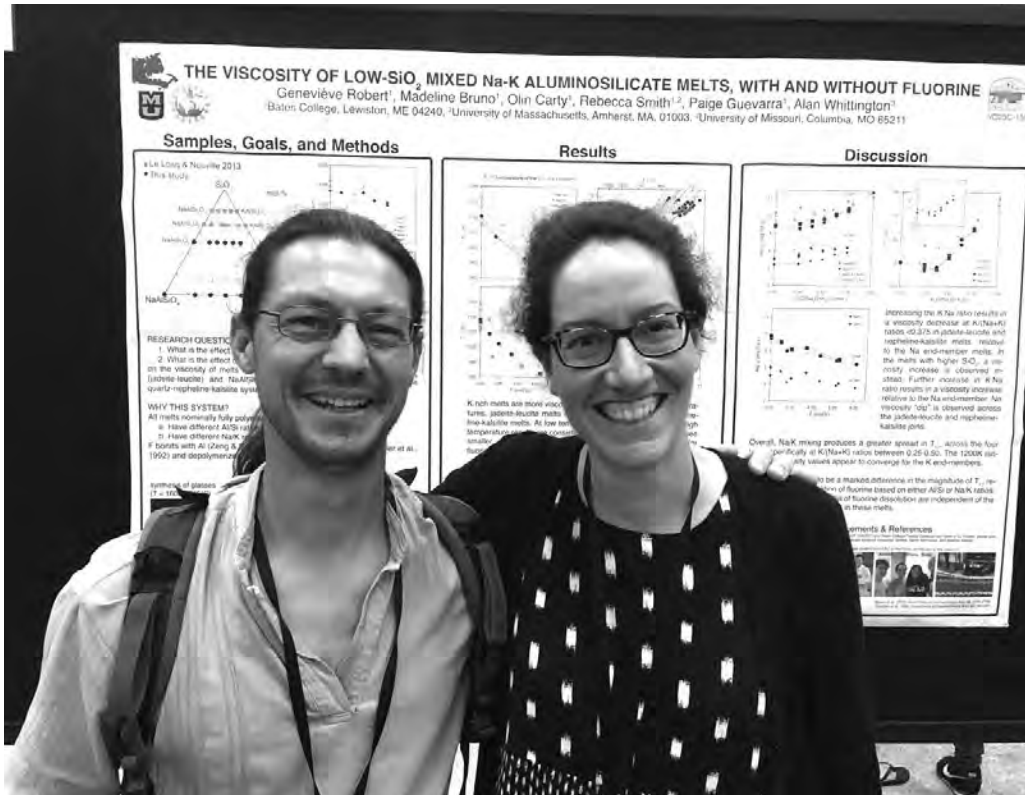
mental gradients on molluscan diversity, community structure, body size, and predation in a carbonate tidal creek, San Salvador (The Bahamas): Humboldt Colloquium: Global Research in the 21st Century: Perspectives of the U.S. Humboldt Network.

Soldati, A., Beem, J., Gomez, F., Huntley, J.W., **Robertson, T.**, Whittington, A.. 2017. Emplacement dynamics and timescale of a Holocene flow from the Cima volcanic field (CA): Insights from rheology and morphology: Geological Society of America, Abstracts with Programs, vol. 49, no. 6.

Smith, S.E., Appold, M.S., 2016. Metal concentrations of Mississippi Valley-type ore fluids predicted from solid solution metal concentrations in ore-stage calcite and implications for ore formation: American Geophysical Union.

Yassminh, R., and Sandvol, E., 2016. Sn Attenuation in Central and Eastern U.S.A.: American Geophysics Union Fall Meeting.

Yohler, R., Bartlow, N.M., Wallace, L., and Williams, C., 2017. In the land of HOBITSS where the Slow Slip Events lie: Earthscope National Meeting.



Former doctoral students (left to right), Geoffroy Avard (PhD 2010) and Genevieve Robert (PhD 2014) at IAVCEI.

Investments in the Future

The Department of Geological Sciences gratefully acknowledges the financial support of alumni and friends who promote the recognition, welfare and progress of the Department of Geological Sciences and the University of Missouri. The University of Missouri's Jefferson Club recognizes donors whose cumulative cash gifts or pledges to MU, including corporate matching contributions, total a minimum of $25,000 or whose deferred gifts total $50,000 or more.

MUGGS (The MU Geology Graduate Society) students participating at Venture Out.

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Board members, faculty and students enoying lunch and good conversation at the geology development board meeting.

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Cale Diehl (front),followed closely behind by Dan Gregory at the May, 2017 Arts & Science graduation at Mizzou Arena.

ENHANCEMENT/RETENTION AWARDS

Geology Faculty Enhancement and Retention Funds

We are fortunate to have loyal alumni and friends who have supported many aspects of the academic mission of our department (e.g. student academic scholarships and Camp Branson). Our department is stronger than ever.

Our students' lives have also been shaped by caring faculty mentors in the classroom, in the laboratory, and in the field. To continue this legacy, we ask you to help us recognize and maintain the high quality of the faculty of our department.

Toward this end, two new funds have been established through lead gifts from members of our Geology Development Board: (1) the Geology Faculty Enhancement Endowment and (2) the Geology Faculty Retention Awards Fund.

It is possible to donate to either the principal or distribution side of these endowments. An advantage of a gift to the distribution is that your gift is available for immediate use.

We hope that alumni and friends will recognize the value of supporting our faculty and contribute to these funds.

Geological Sciences Faculty Enhancement/Retention Awards
John Huntley
Eric Sandvol
James Schiffbauer

Raymond Faculty Enhancement Award
Ken MacLeod

Ed and Connie Williamson Retention Award
Miriam Barquero-Molina

Miriam Barquero-Molina, the recipient of the Ed and Connie Williamson Retention Awards.

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From our Geology Development Board Chair …

Greetings! I can recall my father, a WWII vet, typing "now is the time for all good men to come to the aid of their country" on a typewriter whenever we happen upon the typewriter sales section at Sears (remember typewriters?). This remembrance moves me to write;

"Now is the time for all good alumni to come to the aid of their Geology Department".

Yes, difficult times have befallen Mizzou and the department. Missouri's legislators have cut support yet again. Now at record lows! The State of Missouri now provides less than 20% of Mizzou's budgetary needs! Declined enrollment, mainly due to demographic changes, only exacerbates the problem. The good news is the Geology Department remains strong on campus thanks to excellent teaching and strong research, evidenced by sizeable grant money awarded to the faculty. Generous donations of time and money from the many alumni who learned geology from the department's professors continue to make a significant impact. Also, thanks to Alan Whittington, Chair, for guiding the department through these difficult times.

As a member of the Geology Department Development Board for a number of years and current Chair, I have seen the results of contributions by alumnus and friends:

- I remember the outpouring of support to improve Camp Branson. Not surprisingly Camp Branson was awarded the 2014 GSA/ExxonMobil Field Camp Excellence Award. The award is given in recognition of safety awareness, diversity and technical excellence of a field camp program.
- Students continue to benefit from a number of endowed geology scholarships, often created to honor a family or individual by an alumnus.
- A faculty retention fund was established to help keep our excellent faculty from being "cherry picked" by other universities! Retaining the department's excellent faculty, especially when replacement funds are hard to come by, is a major concern.
- Some alumni return to present geologic short courses to students.
- Many make yearly monetary donations to aid projects of interest.
- Some earmark money in their will.

Yes, "now is the time". Please consider donating your time. Would you like to serve as a member of the Development Board? Do you have a geology short course or seminar that you could present? If so, please contact the department. If you elect to continue or begin providing monetary support, choose an area of interest and donate. If you want to know what area most requires funding please contact the department. I am convinced that alumni and friends have and will continue to keep the department strong during the good times and the difficult times.

If you have not been on campus for some time, consider planning a visit. The columns are still standing proud and the campus is more beautiful than ever.

Best regards,

Mike Quearry

Mike Quearry

Alumni News

Christopher Adams (FC '93, BS '95) writes, "I have been working in IT for about 15 years and loving it." Chris is a network engineer with Ideolity in Mission, Kansas.

Rachel Barker (**FC '07, BS '08, MS '12)** resides in Sand Springs, Oklahoma.

Charles Beierle (FC '62, BA '64, MA '77) reports that he is active in the Austin Geological Society and Highland Lakes Master Naturalists.

Jack Berkley (MA '72) is retired from SUNY-Fredonia. He reports that his most recent accomplishment is seeing that the observatory he advocated to be built is being used effectively by students and faculty.

Bill Berthold (FC '84, BS '85) resides in St. Louis where he is the president of Frontenac Engineering.

Shane Bird (FC '79, BS '77) writes, "I retired last year from Devon Energy. Patty and I have been busy visiting grandkids in Dallas and family in St. Louis, a mission trip to Guatamala, and relaxing at our place in Utah. I need to go back to work to rest! Hope all is well."

Joseph Born, Jr. (Graduate Student '68-'70) writes, "I recently defended, geologically, an oil and gas client in a legal matter concerning proper maintenance and drainage of an oil and gas resevoir. I had to use my geologic expertise in a uniquely different way than I ever had before, and the ensuing geologic debate was challenging as well as interesting, and ultimately rewarding."

Wayne F. Canis (MA '63, PhD '67) reports he is adjusting to life in North Virginia. Wayne write, "Congrats to all the faculty for their activities!"

Cynthia J. Carroll (MA '83) has retired from the Missouri Division of Energy in Jefferson City, Missouri.

Robert Cochran (Undergraduate Student '55-'57) writes, "I didn't finish but the geology courses served me well. I really appreciated Professors Mehl, Peck, Holmes. Bradley, et al. Robert has been trying to get in contact with Ralph Pendleton and says "any help would be appreciated."

Wendell Cochran (FC '53, BA '53, MA '56) writes, "I am studying the Chinese language, cooking Chinese food, deploring the decline of news reporting and of writing thereof."

Tony Daus (BS '81) reports that he is still consulting but enjoying more time for travel and fly fishing.

Ansley B. Davies (FC '94) resides in Los Angeles, California. Ansley works as the associate curator for the Los Angeles County Department of Parks and Recreation.

George H. Davis (FC '86, MS '89) reports that he is back at Mizzou to pursue a PhD. He is still active in AEG, AIPG and GSA. He writes, "I am having fun with new challenges daily! MU's Geology can-do ethic is still alive and flourishing."

Xinhua Deng (PhD '97) is the principal architect/ director of Freddie Mac in McLean, VA.

Farouk El-Baz (PhD '64) is the director of the Boston University Center for Remote Sensing, and was elected to the prestigious committee of the TWAS-Lenovo Science Prize in March. Congratulations!

Stanley C. Fagerlin (PhD '80) has enjoyed a trip on the Mississippi River (where he met Kenneth and Linda McGee), and to California over the past two summers. Stan writes, "I hope all of my old friends who are in the Houston area and their families came through Hurricane Harvey okay."

Robert Foster (FC '50, MA '62 , PhD '66) reports that he continues work on the Great Western skarn system, Lander County, Nevada.

J**ames R. Frank (FC '75, BS '76, MA '79)** writes, "We are still in Houston almost two years after retiring from Chevron and have just survived about 30" of rain from Hurricane Harvey. We were lucky that our house was located near the divide between two bayous although water did rise to within 10" vertically of entering our house. I am looking forward to visiting Columbia for development board meetings, football games, and to visit our son Jack Frank, a sophomore."

Paul Gebhard (MA '73) reports that he retired as the senior geologist from Environmental Resources Management in 2014. He continues to work part time on projects that were part of his full-time portfolio.

Richard Gentile (BA '56, MA '58) writes, "I am still teaching and doing research-my 51st year!" In June he took a class in vertebrate fossill hunting in the Badlands, South Dakota.

James P. Grady (FC '80, BS '81) writes, "After three years in Los Angeles I left California right before the rains returned and the state greened up. I am now back in my Dallas home working on a new commuter transit project, TEXRail. No tunnels but plenty of geology along the 27-mile alignment."

Dana Downs-Heimes (MS '86) writes, "I hope to start guiding Grand Canyon backpacks in 2018. Let me know if you are in the area!"

F.D. Holland, Jr. (MA '50) reports he is still working with colleagues in North Dakota on late cretaceous shark teeth.

William C. Hood (FC '58, BA '59) writes, "I am still enjoying my position as adjunct professor at Colorado Mesa University, doing some research and helping some students with theirs."

Art Kasey (Graduate Student '65-'71) writes, "My thanks to Dr. Walker Keller and Clayton Johnson for supporting my decision to end my quest for a PhD in geology in order to become a high school geosciences teacher. After teaching over 10,000 high school and college teens, I would gladly do it over again!" Art is on the board of three civic organizationsand is the city commissioner in Arnold, Missouri. He is also very active as a "guest teacher" at Fox High School.

David King, Jr. (PhD '80) has been working on impact structures including Flynn Creek in Tennessee. He writes, "I've been studying Belize stratigraphy for 20 years now. I am presently extending that work into Southern Belize, which was a tectonic basin."

David Leach (PhD '73) reports he is still active in ore deposit research. He is a research professor at the Colorado School of Mines. David writes, "I am still having fun but I miss hearing from Frank."

Lowell Lischer (FC '7, BS '72, MA '74) reports that as of March 25, 2017 he is now a full time resident in Columbia, Mo. He writes, "Full-time except for fishing trips, photo ops, an Alaskan cruise, and generally seeing the country and fulfilling a long bucket list. I finally have come full circle"

Robert Mason (FC '50, BA '51, MA '52) writes, "I am still trying to get one of the best locations drilled in my entire career. Can anyone help getting a Corps of Engineering Permit? "Robert resides in Houston.

Earle McBride (FC '54, MA '56) reports he had two papers published in the Rocky Mountain Geology Journal last year. Earle continues to teach a non-credit course on general geology twice a year for retired folks. He says it's more fun that university students!

Arthur Merkle (PhD '67) writes, "This past year has been nice. I do what I want-whenever." Arthur is a founding member of the Microanalysis Society, and says that this year is the 50th anniversary meeting.

John C. Miller (FC '65, MA '68) and wife Mary spent three weeks on a Smithsonian tour of Australia and New Zealand. John published "The Gatherers", th sequel to "Citrus White Gold". Mary continues her Eastern bluebird monitoring program, which is now in it's 10th year with 51 bird boxes on a 7-mile trail.

Gary C. Mitchell (FC '67, BS '70, MA '71) writes, "Retirement is a blast. I am busy with getting married, selling two houses, buying one house and combining two households. My military history is suffering but it is worth it. Stop by if you are ever in the Denver area! Dia leibh h-uile duine!"

Russ Murphy (BS '86) resides in Conroe, Texas and is a project geology advisor for Anadarko Petroleum. Russ writes, "All the best to Kevin Shelton, Wes McCall, John Rockhold and Andy Macias."

William D. Payne (FC '49, BA '50) is retired and resides in Columbia, Mo.

Richard Pearl (MA '63) repots he is still retired and resides in Lakewood, Colorado.

Mike Quearry (FC '72, BS '73, MA '75) reports he is enjoying retirment after 40-plus years in the oil and gas industry. Mike writes that he and Eva enjoy traveling and are blessed with good health. As a member of MU Geology board he also visits the department twice a year.

Audrey (Lipke) Rule (FC ’74, BA ’75, MA ’78) is currently a distiguished scholar at the University of Northern Iowa. She writes, “Hi to all my friends from field camp and the geology program. I would love to hear from you (audrey.rule@uni.edu).”

Jo Schaper (FC ’01, BA ’02) reports she owns Geo Communications in Pacific, Mo. Jo spent much of 2017 coordinating total eclipse events in Missouri.

Cecil Slaughter (FC ’76, BS ’76) writes, “Sara and I are still enjoying life in Alexandria, Virginia. I amworking for the Office of Surface Mining Reclamation and Enforcement as a hydrologist.”

Gordon Smith (FC ’59, BA ’59) is retired and resides in Loveland, Colo.

Jesse (Joe) Snowden (FC ’61, MA ’61, PhD ’66) recently moved to Marshall, Texas. He writes, “I can’t believe I will soon be 80! Seems like yesterday we were roaming around Swallow Hall and then the ‘new’ Geology Building. Best wishes to everyone from that era!”

George J. Ulmo (MA ’79) reports he is staying busy exploring for new opportunities and eveloping Wolfcamp and Leonardian shale oil properties.

Patrick Vezeau (FC ’78, BS ’80) continues as a partner at Oral Surgery and Implant Specialists in Dakota Dunes, South Dakota. Daughter Anne is a Navy flight surgeon. Daughter Grace is a doctoral student in biological engineering at Penn State, and son Neil started veterinary school at Iowa State.

Robert “Bud” Weiser (FC ’57, BA ’58, MA ’60) reports all is well on the lake north of Charlotte, North Carolina. Bud says he looks forward to the department newsletter each year.

James Williams (FC ’50, BA ’50, MA ’52) writes that he is a member of the Missouri Geological Consortium. Jim still conducts limited amounts of consulting and is farming grain, corn and soybeans.

E**d Williamson (MA ’73)** writes, “Connie and I have found that being retired with two grandkids five miles away is a full-time job. He writes, “Kudos to the department for national faculty recognition. Don’t forget that ongoing financial support by alumni and friends helps keep this going.”

In Memoriam

Richard P. Hamilton- (MS ’55) passed away on March 20, 2016 while residing in Williamstown, Massachusetts.

C. Frederick Lohrengel II (MA ’64) passed away on December 17, 2015) while residing in Cedar CIty, Utah. He had taught at Snow College for 17 years and the State University of Utah for three years. He loved to teach his wife reported.

Marshall “Clay” Parsons (former Geology Development Board Member) passed away on-June 18, 2017, at the age of 89. As a petroleum geologist, Clay and his family moved to many areas including Venezuela, New York, Turkey, Libya and Colorado. He was also a member of the American Assocition of Petroleum Geologists. Following his retirement age the age of 55, Clay took up a second career, non-till farming on Southfork Road in Sweet Springs, Missouri.

Carl B. Rexroad (**FC ’48, BA ’49, MA ’50)** passed away on October 27, 2016 in Bloomington, Indiana. Carl was an internationally recognized conodont paleontologist with the Indiana Geological Survey and Indiana University. Carl formally retired from the Survey after more than 50 years, but continued as a research affilite, publishing scientific research into 2016.

Jerry Vineyard (**FC ’57, BA ’58, MA ’63)** passed away on March 31, 2017 in Ozark, Missouri. Jerry spent his childhood explorating the hills of Pulaski County, which led to a lifelong passion for geology and made him a tireless advocate for conservation projects all over the world. After receiving his master’s degree, he begin teaching at Kansas City Junior College, followed by a 40-year career with the Missouri Department of Natural Resources in Rolla, Missouri, retiring as Assistant State Geologist. Jerry also served as a member of our Geology Development Board.

Taking The Show On The Road

Earlier this year, Arianna Soldati was stuck in the Syracuse airport filled with grumpy and flustered passengers during a long flight delay. Luckily, she had a bag full of volcanic rocks. Soldati took the opportunity to lighten the mood and entertain her fellow travelers by teaching them about her passion — volcanoes.

Soldati is a doctoral student in volcanology at MU. After she came to MU, she worked on outreach programs with her adviser, Alan Whittington, and she decided that she wanted to start her own program. Soldati founded Science on Wheels, a program that specifically focuses on bringing science to rural communities. While Columbia has a lot to offer, she feels that science is really missing in rural communities, and it can be a hassle to travel to Columbia.

"For a change, we would like to take the science to them," Soldati said.

Science on Wheels, which is run by MU graduate students, will travel to counties around the state. Each meeting will be a large overview of different scientific fields with about five or six speakers. For example, Soldati wants to teach about fun and interesting parts of volcanoes, but she also wants to focus on things applicable to those attending such as pest resistance for crops and other agriculture and health-related topics.

"Science isn't just something that happens in labs," Soldati said. "It's something that's used in everyday life."

At the first meeting, to be held in Fulton on Sept. 21 at the MU Callaway County Extension Center, one of the speakers will discuss agroforestry and how corn and oak trees can grow and benefit the other. Soldati hopes that people will come to learn about how the world around them works.

"I want everyone in the state to meet a scientist," Soldati said. "Most people never actually meet a scientist and don't necessarily know what they look like or what the actually do."

She hopes that Sciences on Wheels can help bridge the gap between people and scientists. Hopefully, the program will make people see scientists differently and trust them more.

Originally from Milan, Soldati has always known that she wanted to study volcanoes. When she was a little girl, Soldati watched on TV as a volcano erupted in the Philippines and was fascinated. With encouragement from her parents, she began learning as much as she could and has never looked back.

Soldati is one of approximately 1,500 volcanologists worldwide. When it came time to choose a school, Soldati found a Ph.D. position at MU, and it was perfect. At MU, Soldati has the opportunity to use one of only three viscometry labs in the world. In this lab, Soldati melts rocks back down to lava, measures the viscosity, and from there, she can speculate how fast the lava will flow and determine the hazards to the people that live in areas around volcanoes.

Soldati is set to graduate next spring, and while she hopes to continue in academia, science communications is also an option. Soldati is using Science on Wheels as a good learning opportunity.

In addition to meeting in Callaway County this week, Science on Wheels also will be stopping in Moniteau, Cole and Howard counties later this fall.

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