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2014 EPS Field Trips

Last year it was Scotland and Arizona; this year we visited Italy and California. The department again had two fascinating field trips to exciting places on our globe. The undergraduates were accompanied by David Fike, Phil Skemer and Catherine Rose to Gubbio, Italy during spring break of 2014. In May, the all department trip, which included grad students, undergrads and faculty, trekked around Mono Lake and Yosemite, California under the guidance of Bob Dymek, Randy Korotev and Brad Jolliff.

On March 7th, 2014, three faculty and 14 undergraduate students started their Italian field experience with a flight to Rome and a train ride to Castelplanio. They traveled to the Geological Observatory at Coldigioco and settled in for the next six days, taking daily excursions to view the Cretaceous-Tertiary (K-T) or as presently known Cretaceous-Paleogene (K-Pg) boundary. The K-T Boundary, which defines the end of the Mesozoic Era, is usually estimated to be 66 million years old. At the Geological Observatory, the group first learned the



Speleothems in the Frasassi caves

geological history of the Apennines; then it was off to field sites over the next few days to visibly observe and sketch different exposures of Mesozoic-Cenozoic strata. They traveled to Gubbio to see several spectacular outcrops and to San Vittore to walk across the syncline, see the sulfidic spring, the carbonate platforms and visit the famous Frasassi show caves. On Friday, March 14th, they traveled by train to Rome in order to investigate the stratigraphy of the “eternal city.” The next day it was back to the airport to fly home with notebooks full of drawings, cameras loaded with photos, stomachs full of pasta, and minds overflowing with memories.



Looking for the K-T Boundary

On Friday, May 23rd, a group of 27 faculty, undergrads and grad students left McCarron airport in Las Vegas for a week long field trip to Death Valley National Park, the Owens Valley and Yosemite National Park. Their goal was to see as many sites in the valley and high sierras as their seven days would allow. Some of them even wanted to hike up Half Dome, a treacherous 8.5 mile cable hike some 4,737 feet from the Yosemite Valley floor. They started

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Overview by Slava Solomatov

Greetings from Earth and Planetary Sciences. The 2013-2014 academic year was quite eventful. Ray Arvidson's fortieth and Rich Heuermann's thirtieth anniversary celebrations illuminated the department's outstanding history. Ray joined the department around the time of the establishment of the McDonnell Center for the Space Sciences, a major turning point in the history of the department. Since then, the number of faculty members increased by a factor of three and the amount of external funding increased by a factor of a hundred. Ray played a key role in the extraordinary success of the department by being one of its most productive members and by serving as the Department Chair for nearly two decades. Rich Heuermann has served as the Administrative Officer of the department for over 30 years and is now retiring. The position of Administrative Officer was created at the time of the establishment of the McDonnell Center and was an integral part of the department's future. As Administrative



Officer, Rich managed the financial, academic, and personnel activities of the department and advised the chairs and faculty on numerous and ever growing policies and guidelines. The department will miss Rich's resourcefulness and unsurpassable expertise. We were very fortunate to find Rich's replacement, Robert Gemignani, who moved to the Danforth Campus from the School of Medicine to take over this important position.

Starting this year, Rudolph Hall will host a revived Environmental Studies Program. David Fike, one of our geobiology faculty, recently promoted to an Associate Professor with tenure, will direct the program. We are very grateful to all our supporters and donors. Many thanks to Peggy Fossett, Marie Oetting, and Carl Bewig for their generous donations last year. We will continue our tradition with our sister department at Northwestern University and will hold a joint reception for our alumni and friends at the Fall AGU Meeting in San Francisco. Hope all of you can attend!

Rich Heuermann to Retire after 31 Years

Rich Heuermann retired this November as Administrative Officer of the Department of Earth and Planetary Sciences, after almost 31 years in the position. He began work in December, 1983 as the department's first administrative officer. At that time, Larry Haskin was the Chairman and the department was housed solely in Wilson Hall. Rich recalls that he has "experienced" 7 Deans of the Faculty, 6 different offices, 5 official snow days, 4 Department Chairs (Larry Haskin, Ray Arvidson, Doug Wiens, and Slava Solomatov) 3 Deans of the Graduate School, 2 Deans of the College - and (key of C) a cartridge in a spare p (printer).

He also notes that, when he arrived on campus that wintry December day:

- there were only nine teaching faculty, four of whom are still here
- there were basically three offices for graduate students – The Tower, The Pit, and The Zoo
- there was only one office computer (a word processor), fiercely guarded by an Ogre



- "Windows" had not yet been invented
- Ronald Reagan was (sometimes) in the White House
- all the paperwork was – paper. And carbon paper, usually 8 copies or so, all done on a typewriter.

"I knew that I had been around a long time," Rich comments, "when I realized that I had started in the department before most of the current undergraduates were even born. Then a few years later, before the graduate students were born. But when I watched a student graduate who was the daughter of a person I remembered as a first-year graduate student, I figured it was probably time to leave."

A reception was held in his honor on October 17th, where many of his former colleagues wished him well and toasted to his future life as a man of leisure. The department wishes him well and hopes he will email us every once in a while with one of his infamous, occasionally humorous, memos on The State of Things. Regarding the use of levity when describing administrative policies and regulations, Rich says, "Sometimes you gotta laugh to keep from cryin'." Keep laughing and good luck, Rich.

Environmental Studies Program *by David Fike*

In July of 2014 David Fike, Associate Professor in Earth & Planetary Sciences, was named the director of the Environmental Studies Program. Barb Winston, the administrative assistant of the program has moved her office from Rebstock to Rudolph Hall and will continue to assist the new director in operating the program.

The Environmental Studies Program in Arts & Sciences has a strong tradition of training interdisciplinary students. Currently, there are 81 majors distributed roughly equally among Environmental Earth Science, Environmental Policy, and Environmental Biology, as well as 30 associated minors. The program is working to increase the offering of interdisciplinary environmental courses in order to better integrate the different majors with each other and with other areas of environmental research on campus. To this effect, several new courses have been developed for Spring 2015, including: Earth's Future: Causes and Consequences of Climate; Ecological Economics; Sustainability Exchange; and Urban Ecosystems Principles Integration. In the future the program hopes to offer an additional Senior Seminar course that would bring

together students from the different majors for interdisciplinary coursework in their final year.

Historically, the Environmental Studies program has been based in Arts & Sciences, and currently is connected most strongly with Earth & Planetary Sciences, Biology, and Political Science. It is Prof. Fike's hope to broaden connections across Arts & Sciences, particularly strengthening ties to Anthropology and their Global Health & Environment track. In addition, the program may move beyond the School of Arts & Sciences and engage with environmental initiatives in other schools on campus, including particularly Engineering, the Sam Fox School of Design, and the Brown School of Social Work, but also Medicine, Law, and Business. The addition of interdisciplinary graduate and postdoctoral programs could be a fruitful way to foster these new collaborative ties. Only by harnessing the activities of faculty across all the schools can we truly take advantage of the diverse strengths that are present at Washington University in St. Louis.

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off with a brief visit to Death Valley National Park where they visited sand dunes and hiked in Mosaic Canyon. That was followed by a long drive to the Manzanar WWII internment camp and finally Mammoth Lakes just in time

to set up camp and make dinner. The next two days they saw Devils Postpile, Long Valley Caldera, Convict Lake and Mono Dome. On May 26th they drove over Tioga Pass with stopovers at Mono Lake, the Tuolumne River

area, and Lembert Dome (*see photo at left*). The next four nights were spent in Yosemite National Park. On May 27th, fourteen brave souls ventured up the granite rock trail of Half Dome and ten even made it to the top! The next two days the group explored Mariposa Grove, the top of the Yosemite Valley, and the Hetch Hetchy valley in northern Yosemite. The trip would have been a marvelous success except for the norovirus that swept through camp and caused quite a bit of discomfort to 50% of the participants. All in all it was a trip to be remembered!



Classroom on Lembert Dome, Yosemite

The Role of Geoscience in the New Next Generation *By Michael E. Wysession*

A quiet but crucial revolution occurred in 2013. Quiet at the university level, although not at the K-12 level, where elementary, middle, and high schools have been turned upside down. America's primary and secondary educational system has been revolutionized with the release of the Next Generation Science Standards (NGSS), the first set of science standards (Achieve, 2014) to be adopted by multiple states (12 states and the District of Columbia, as of September, 2014). Based on a National Research Council (NRC) report, "A Framework for K-12 Science Education," and written in conjunction with twenty-six of the nation's states, the NGSS provide America's best opportunity yet in its almost 240-year history to educate its citizens about the complex and critical issues of Earth science.

The new NGSS have a K-12 learning progression for Earth and space science that includes a full year in high school, taught at an advanced level that not only focuses on the complexities and feedbacks among systems, but highlights the role of humans as the dominant force of change on Earth's surface. A future generation of Americans, educated within this framework, would not only provide an eager workforce for the much-needed future research into Earth's systems, but would demand a political landscape that both funds and responds to the discoveries of this research.

The NGSS are remarkable for their innovative structure, which weaves together three dimensions of science and engineering practices, content, and crosscutting concepts into a small set of broad, big-picture performance expectations (PEs) that all students should be able to achieve. They are not a list of what students must know, but rather a set of PEs that students should be able to do. The science content is taken from the NRC Framework, and in the case of Earth science, is based upon four important geoscience community literacy frameworks that have culled and vetted the big ideas in the areas of Earth, atmospheric, ocean, and climate science. The eight different science and engineering practices are also based

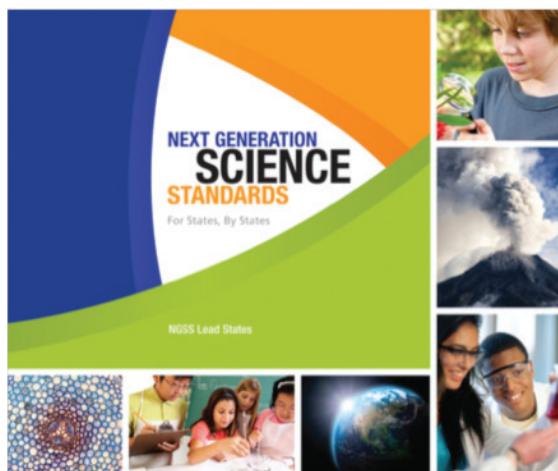


Figure. The Next Generation Science Standards (cover shown here) represent an innovative approach to teaching K-12 science education that offers tremendous opportunities for Earth and space science.

upon current research, but in the areas of education and child psychology. The third dimension of the crosscutting concepts is an innovative way to teach science, by building upon broad transdisciplinary themes such as "Patterns," "Energy and Matter," "Cause and Effect," and "Systems and System Models," which extend across all STEM disciplines (details can be found at <http://www.nextgenscience.org/next-generation-science-standards>).

The biggest changes proposed by the NGSS, however, are clearly in the area of Earth and space science (ESS),



in both quantity and quality. A year of ESS is proposed for high school, compared to roughly a semester of chemistry and a semester of physics. Just as importantly, ESS is presented at a very advanced level based upon an Earth Systems Science approach, stressing student understanding of the interconnections and feedbacks among the geosphere, hydrosphere, atmosphere, and anthroposphere.

Those of us who do research in Earth and space science will need to focus some of the "Broader Impacts" activities required by funding agencies such as the National Science Foundation toward the creation of relevant, accurate, chal-

lenging, interesting, and up-to-date data-based educational materials that can be brought into K-12 classrooms to meet the new demand for ESS evidence-based learning. This is a once in a lifetime opportunity. Finally, after 120 years, modern research-based Earth and space science is poised to become part of the high school education of most American students. The geoscience communities need to become fully aware of this revolutionary development and to organize to help make this a reality for as many states as possible. The process of state adoption and the implementation within states will last for years, and so will the opportunities for participation by the ESS community. Geoscientists from the research and education communities will be needed over the next several years to (1) create data sets and data products usable in K-12 classrooms, (2) help construct NGSS-aligned educational materials, (3) participate in the development of NGSS-aligned curricula

and textbooks, (4) become involved in the professional development (in both geoscience content and pedagogy) for current K-12 ESS teachers as well as for instructors of pre-service training, (5) help in the creation of Earth science teaching certificate programs, (6) carry out educational research that assesses the efficacy of NGSS-aligned curricula, (7) continue research into learning progressions to work toward an optimal K-12 progression of Earth and

space science education, (8) work with state and local school boards to convince them of the necessity of including ESS courses in their curricula, and (9) work with universities to make sure that high school ESS courses qualify as pre-collegiate preparatory courses. The opportunities are here now, and it is incumbent upon geoscientists to make the most of them.

GRADUATE STUDENT RESEARCH

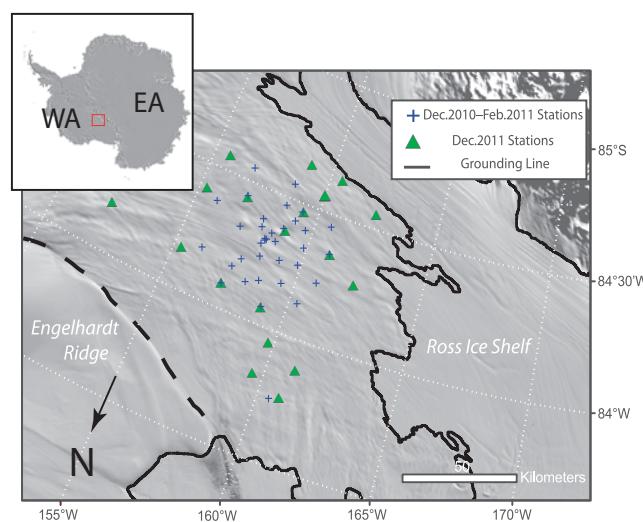
The Whillans Ice Stream in West Antarctica *By Martin Pratt*

The study of ice sheet dynamics has been of increasing interest and concern in recent years with regards to sea level rise. The West Antarctic Ice Sheet is incredibly sensitive to increases in ocean temperature, as the majority of the ice sheet is grounded well below sea level. As the ocean warms, it melts the underside of the ice sheets at the point where the ice begins to float, known as the grounding zone. As the ice melts, the grounding zone retreats further inland and can do so very quickly when the bed slopes towards the center of the ice sheet, as is the case in West Antarctica. This leads to faster moving glaciers and ice streams, and the ice sheet rapidly losing mass to the oceans. Current estimates have put the collapse of the West Antarctic Ice Sheet due to oceanic warming within

200–900 years. Understanding both the dynamics of ice flow and the characteristics of the grounding zone are important in providing more accurate models of ice sheet mass balance.

During the first three years of my PhD studies, I centered on understanding the dynamics of the Whillans Ice Stream in West Antarctica. This particular region of West Antarctica has been relatively stable with respect to grounding zone migration and ice loss. The Whillans also appears to be unique in its earthquake-like properties of a large scale, cohesive block of ice (about twice the size of Rhode Island) moving by half a meter in 20–30 minutes, twice a day. This perhaps doesn't seem all that significant, but every time the ice stream moves it emits seismic waves equivalent to a small earthquake that we can record up to 1000 km away. Unlike an earthquake, however, the duration of the slipping phase can last upwards of 25 min. This allows us to monitor how the ice stream initiates slip and how the rupture front develops throughout the event.

This project also involved two seasons of fieldwork in Antarctica, deploying seismic and GPS instruments on the ice stream itself, in order to study the rupture dynamics. In this



Location of the Whillans Ice Stream and instrument stations. Inset: West Antarctica (WA) and East Antarctica (EA), red box shows region of the main figure. Confusingly, with this projection the South Pole is towards the top of the main figure.



Removing a buried seismometer. Digging is a required field of expertise for any field seismologist.

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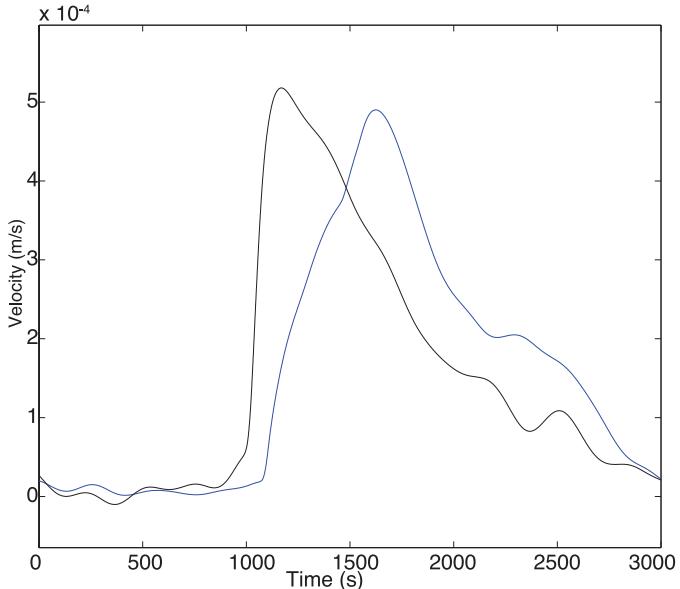
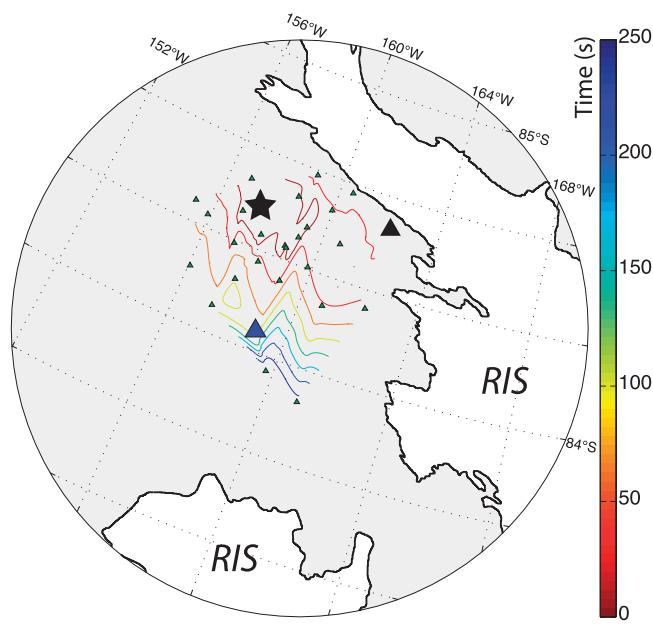
particular system we are able to tie together the mechanics of earthquake generation to the observations of far-field vibrations in a natural setting. This is very rare to accomplish with normal rock-on-rock earthquakes due to their unpredictability and often lack of surface rupture.

Determining how far the Whillans Ice Stream slipped and how fast provides an interesting problem. The GPS sensors we use are not sensitive enough to pick up sharp accelerations in ground motion, and the seismometers cannot tell you how far you have moved in space, but each can do what the other cannot. We combine these complementary time series so as to be able to accurately display the velocity of the slipping phase from the fast accelerations at initiation to the offset in space that the ice stream undergoes.

What we noticed from these combined time series is that the rupture front, which delineates the region of the ice stream that is moving to the region that has yet to begin moving, propagates at different velocities throughout the slip phase. When the rupture front reaches the grounding zone we observe that the rupture velocities increase significantly. So much so, that it is these regions that are

producing the seismic signals that we see at seismic stations throughout West Antarctica. This tells us that the ice bed interface in this grounding zone region is relatively strong compared to other regions beneath the ice stream, most likely due to the tidal flexure (as the Ross Ice Shelf rises and falls) in this region acting to strengthen the wet sediments in this area. This strengthening is also helped by having a relatively stable grounding zone that many other regions throughout West Antarctica do not have.

As a seismology student, a lot of time is spent at a computer: writing and troubleshooting code, downloading data from online repositories, and worrying about carpal tunnel syndrome. Thankfully, the Earth & Planetary Science Department here at Washington University has allowed many of us to get out from behind the desk and go collect our data around the world. Whether it is on a boat in the Pacific, battling the cold and wind of Antarctica, or driving around on outback roads in Africa and Madagascar, the opportunities for hands-on experience have been invaluable, for which I'd particularly like to thank my supervisors Profs. Douglas Wiens and Michael Wysession.



Above: Isochrones showing the passage of the rupture front through time during the slip phase. The wider the contours, the faster the rupture front is propagating. The black star marks the slip initiation location. RIS – Ross Ice Shelf. Right: combined GPS and seismic time series showing variations in velocity. Line colors correspond to the velocity time series recorded at the large triangles in the left hand figure. Note the sharp ramp up in velocity at the black station located near the grounding zone compared with the inland blue station.

Phil Skemer wins NSF award

Assistant Professor Phil Skemer has won a prestigious Faculty Early Career Development Award from the National Science Foundation. The award will support experimental research in rock deformation using the large Volume Torsion apparatus which is designed to subject rock samples to the temperatures, pressures and strains in the Earth's asthenosphere. The goal is to be able to simulate rock mechanics that occur deep within the Earth roughly 60 to 155 miles beneath the surface.

Solomatov and Arvidson selected by graduate student senate

Chairman Slava Solomatov was selected in April to receive the Graduate Student Senate Outstanding Faculty Mentor Award. This award is given to faculty who are nominated by their graduate students and voted on by the Graduate School Senate. In addition Professor Ray Arvidson was a Graduate Student Senate Special Recognition Recipient. Congrats to Slava and Ray for their excellent student mentoring.

Alian Wang hosts GeoRaman Conference

Research Professor Alian Wang chaired the 11th International GeoRaman Conference and RLS Science Team Meeting for the ExoMars mission at Washington University during June, 2014. The conference included ten sessions of oral and two sessions of poster presentations in three days, and a day-long field trip to historic lead mining sites in Missouri. Approximately 120 scientists and students from four continents attended the conference. The conference was supported by WUSTL, the EPS department and the McDonnell Center for Space Sciences.

SIMS Laboratory dedicated

The Grossman Family SIMS Laboratory was dedicated in April, 2014. The state-of-the art Cameca SIMS (secondary-ion mass spectrometer) is tailored for the analysis of geological samples as well as material samples studied by the Institute of Materials Science and Engineering. Housed in the basement of Rudolph Hall, it will be used to identify chemical secondary ions and different isotopic elements located in marine sediment and sedimentary rocks. The build-out of the laboratory was funded by a gift from Jerrold and Marsha Grossman and their son, Matthew Grossman and his wife, Katalin French.

Doug Wiens received Cody Award

Professor Doug Wiens was selected to receive the 2014 Robert L. and Bettie P. Cody Award in Ocean Sciences from Scripps Institution of Oceanography at UC San Diego. The biennial Cody Award recognizes outstanding scientific achievement in oceanography, marine biology and Earth science. Doug gave the Cody Lecture in September, 2014

at the Robert Paine Scripps Forum for Science, Society and the Environment in La Jolla, California. The lecture covered recent discoveries made with advanced seismological technologies, including mountain ranges found beneath eastern Antarctic ice and an active volcanic magma system detected beneath a western Antarctic ice sheet.

Students receive NSF fellowships

Former EPS undergrads Natalie Accardo, Hannah Rabnowitz, Beth Hoagland and Dan Johnson have all received an NSF Graduate Research Fellowship this year. Natalie and Hannah are studying at Lamont College, Beth Hoagland is at Penn State and Dan Johnson is at Caltech. One of our current first year grad students, Elaine Flynn, who got her BS in geology and chemistry at Western Kentucky University, has also received an NSF fellowship. Congratulations to all our former and current students!

Professor promoted

David Fike was promoted to Associate Professor with tenure effective July of 2014. He is now also the director of the Environmental Studies Program.

Arvidson celebrates 40th anniversary

In January of 2014, the EPS department celebrated Ray Arvidson's 40th year in the department with a colloquium and dinner at the St. Louis Club. Ray gave a special presentation entitled, "Exploration of Mars by Opportunity and Curiosity, a Tale of Two Rovers" at Whitaker Hall which was followed by a reception in Ginsburg Atrium. Faculty, staff and guests including Chancellor emeritus William Danforth and John S. McDonnell, attended a dinner hosted by the department in honor of Ray's contributions for the last 40 years.

McKinnon receives Gilbert Award

Bill McKinnon received the prestigious G. K. Gilbert Award on Oct. 21, 2014 at the annual Geological Society of America Meeting in Vancouver. A special session was held at the GSA titled "Geophysics across the Solar System" in honor of Dr. McKinnon and his accomplishments. Professor McKinnon's presentation was titled "How was Ganymede resurfaced?" Former advisees and EPS students Paul Schenk (PhD 1988), Andrew Dombard (PhD 2000), Michelle Kirchoff (PhD 2006), and Kelsi Singer (PhD 2013) also gave presentations in the Gilbert session. This award is made for outstanding contributions to the solution of a fundamental problem of planetary geology in its broadest sense. Such contributions may consist either of a single outstanding publication, or a series of publications that have had great influence on the field. The award is named for G. K. Gilbert, who over one hundred years ago clearly recognized the importance of a planetary perspective in solving terrestrial geological problems.

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Michael Wysession chosen for Ambassador Award

In July, Michael Wysession was named one of the five recipients of the AGU Ambassador Awards for 2014. Established in 2013, the Ambassador Award honors members whose achievements extend beyond those recognized by traditional scientific discipline awards. The award honors those who promote collaboration and innovation, inform society about Earth and space science, and build the global talent pool. Prof. Wysession was also made an AGU Fellow in 2014.

Korotev wins A & S “Webby” Award

Randy Korotev was selected as the winner of the 2014 Arts & Sciences Webby award for the “Best Use of Art/Photography” on the Arts & Sciences Web pages. Specifically this is in recognition of our department “Photo of the Week” feature that Randy produces. Randy was praised for building community and showcasing the department as well as his outstanding execution of relevant photographs. While many of the photos are submitted, some are taken by Randy, our resident meteorite specialist.

PhD's Awarded 2014

Abigail Fraeman

Materials and surface processes at Gale Crater and the moons of Mars derived from high spatial and spectral resolution orbital datasets.

Zhen Li

Mineralogy of hypermineralized bone.

Amanda Lough

Studies of seismic sources in Antarctica using an extensive deployment of broadband seismographs.

Randal Paniello

Volatilization of extraterrestrial materials as determined by zinc isotopic analysis.

Stephen Seddio

The diversity, relationships, petrogenesis, and geochronology of evolved lunar lithologies.

Kun Wang

Iron isotope cosmochemistry.



Cole Edwards

Postdoctoral Research Scholar

Cole Edwards grew up in Oshkosh, Wisconsin but most of his family hails from Montana. He attended the University of Wisconsin-Oshkosh where he majored in geology and then moved on to Acadia University in Nova Scotia for his master's degree. He recently received his doctoral degree in geological sciences from The Ohio State University. In August of 2014 he started his postdoctoral research with Dr. David Fike working on better constraining environmental and biogeochemical evolution of the Ordovician using the new SIMS instrument. He especially enjoys working in Dr. Fike's lab because of all the instrumentation and laboratory facilities in the department. Cole also likes having the flexibility to work on several projects at the same time. As to his new home in St. Louis, he doesn't know much about it yet but certainly enjoys the wide range of restaurants in his neighborhood (University City and the Loop). When he is not occupied in the lab you might find him camping, hiking or playing golf. Another hobby is coin collecting, which he started when he was 13 years old. As many Wisconsinites, Cole is an unabashed Green Bay Packers fan and we can pretty much guarantee he will have more fun watching them than the St. Louis Rams.



Wil Leavitt

Stephen Fossett Postdoctoral Research Fellow

Will Leavitt is the Stephen Fossett Postdoctoral Fellow working in Prof. Alex Bradley's biogeochemistry and natural systems geobiology group since

July of this year. He was born in Tucson, AZ but grew up in Reno, NV and Jeddah, Saudi Arabia due to his field geologist parents' occupations. He is an alumnus of Hampshire College in Amherst, MA (B.A. in microbial ecology), and Harvard University (masters in organismic & evolutionary biology). After having earned his Ph.D. at Harvard in isotope biogeochemistry, he was thrilled to get the Fossett Fellowship because, “St. Louis and WashU are awesome!” Will particularly likes his colleagues within his lab group and he is definitely excited about his research, cultivating anaerobic bacteria, coaxing them to live in the lab and then making isotopic measurements. In his off-time, he enjoys rock climbing, ultimate Frisbee, running in Forest Park during odd

hours, and snowshoe racing. Will, you are not going to see a lot of snow here so you might go back to Massachusetts for that. He is also an avid San Francisco Giants fan, and is happy they are the National League division champs in 2014.



Lyndsay Troyer

Postdoctoral Research Scholar

Lyndsay Troyer was born in Los Angeles and spent her childhood in Alhambra, CA which is located in the western San Gabriel Valley region of Los Angeles County. She received her undergraduate degree from Whitman College in Walla Walla, WA and her graduate degree in chemistry from Colorado State University in Fort Collins. Lyndsay started working in Dr. Jeff Catalano's lab in April of 2014 and is currently researching the nucleation of uranium phosphates on mineral surfaces. She enjoys that her job allows her to be constantly learning and to travel to hear about the work of other scientists. She is excited to live in a big city again and already is taking advantage of walks in Forest Park, watching the plants change with the seasons. She is looking forward to enjoying the Missouri Botanical Gardens when she has time to sightsee. In her spare time Lyndsay is an occasional rock climber, biker (manual not motor) and budding chef. She loves trying new foods and is especially glad our fair city has its variety of cuisines.



Stephanie Moore

Laboratory Technician

Stephanie Moore spent her childhood in De Soto, Missouri, a small town about 46 miles south of St. Louis. She graduated with a bachelor's degree in forensic biology from Maryville University. She started working part-time in David Fike's lab in April, 2014 and became a full-time employee in June. She is having great fun doing geoscience and is learning something new every day as Earth Sciences was not her first love. Stephanie's favorite things about St. Louis include experiencing all four seasons and, naturally, Cardinals baseball. She also enjoys trying many of the great restaurants in town and spending time with her family, most of whom live in the area. When she is not processing and analyzing rock samples for sulfur isotopes, she loves cooking, going to the theatre and decorating her new house. Stephanie is also an avid reader who likes a wide variety of books and music.



Robert Gemignani **Administrative Officer**

Robert Gemignani spent his childhood in the San Francisco Bay Area after being born in Redwood City, CA. He completed his undergraduate studies in biology at San Francisco State University and completed his MBA in finance at the College of Notre Dame in Belmont, CA. He relocated to the Midwest in 2003 and most recently worked in the Dept. of Medicine at the WashU medical school campus. Robert is getting familiar with the Earth & Planetary Sciences department and is very interested in the variety of research done here. When asked about his favorite things about St. Louis, Robert replied, "The Hill (Italian neighborhood), Forest Park and the weather." He likes the change of seasons, whether that change is from cold in the winter to hot in the summer. He also likes spending time with his wife, Cindy, now that his two children, Ben (27) and Daniela (24), are out of the house. Robert's hobbies include amateur radio and bike riding when the weather is favorable.



Sarrah Dunham-Cheatham **Lecturer**

Sarrah Dunham-Cheatham is from Valparaiso, Indiana. She received her bachelor degree in natural resources and environmental sciences from Purdue University in West Lafayette, IN, and her doctoral degree in geochemistry from the University of Notre Dame in South Bend. She moved to Colorado for a job and then back to the Midwest to be a lecturer in our department and work at the St. Louis Science Center. In August she started teaching two senior level courses. When asked about her job, she said that she enjoys "being able to educate students about topics I am passionate about and to see their curiosity for and comprehension of the subject grow." Sarrah and her significant other, Ed, are beginning to explore the various neighborhoods, festivals and museums the city has to offer. When she is not teaching or at the Science Center, Sarrah is usually at a park with her favorite fur babies: Buddy, a blue heeler, and Chloe, a Rhodesian ridgeback mutt. Currently, she also serves on Boards for a few organizations, including the Grand Valley Zoological Quest/The Children's Nature Center and the Colorado Mesa University Composting Facility.

Dick Berry (PhD '63) is actively retired and living in Connecticut. He attended the Clay Minerals Society meeting in October and the Annual GSA Meeting. Now that his knee has been replaced he has continued to volunteer at UCONN Medical Facility and gives lectures to community organizations about Global Warming and Sea Level Rise.

Michael Fix (AB '72, MA '75), was promoted to the rank of full Professor of Geology in the Department of Physics and Astronomy at University of Missouri – St. Louis this spring. Also, in May 2014 he led a one week field course to the Island of Hawaii entitled “Hawaiian Volcanoes – Crucible of Creation.”

Erol Morey (AB '82) from Thornton, CO is working at DigitalGlobe who integrated his previous company, GeoEye, in January of 2013. Currently he is in the information line of business supporting business development activities in commercial and government sectors.

Michael Shepard (PhD '94) became Chair of the Dept of Environmental, Geographical, and Geological Sciences at Bloomsburg University. He continues to study asteroids using the Arecibo radar, focusing on the M-class objects. In other news, he has a book called “Asteroids: Relics of Ancient Time” in press with Cambridge University Press. It should be out in the spring of 2015.

Bob Brackett (PhD '95) passed his four year anniversary at Bernstein Research where he remains one of the few planetary scientists working on Wall Street, in his case covering oil and gas exploration and production stocks. Bob, Joyce, and Chloe (now 1st grade) live in the city but do get out to explore. Chloe visited her first zinc mine.

Andrew Dombard (PhD '00) and D'Arcy Meyer-Dombard (PhD '04) welcomed a new addition to their family. Daughter Phoebe made her appearance on May 12, 2014 and is the apple of everyone's eye.

Nicole Lovenduski (AB '01) and her husband welcomed daughter Neve into the family on September 16, 2014. Neve joins older sister, Jade (18 months). Nikki is currently an assistant professor in the Department of Atmospheric and Oceanic Sciences at UC Boulder.

Brian Hynek (PhD '03) and his wife welcomed Jeremiah Frank Hynek on Jan 16, 2014. In May, the family drove to Alaska where Brian has been working at the University of Alaska - Fairbanks on sabbatical. Brian

says, “It’s getting cold and dark, but the northern lights are amazing.” They’ll be back at the University of Colorado come spring semester, 2015.

Walter Kolczynski (AB '03) completed a post-doctoral position at the Naval Postgraduate School in February and in March started a position as a Support Scientist in the Global Ensemble group at the NOAA National Centers for Environmental Prediction - Environmental Modeling Center. He is researching techniques to improve the next generation of operational meteorological ensembles.

Crystal Yates-White (AB '05) is now a graduate student in Rangeland Ecology at Colorado State University. She also has a research assistantship working on a project to create models that integrate local and data-driven models for ecological sites in northwestern Colorado.

Ryan Zeigler (PhD '05) is heading down to Antarctica for the ANSMET (Antarctic Search for Meteorites) field season this year. He'll spend 6 weeks camping in the frozen ice field and collecting meteorites. He misses the St. Louis fall weather.

Robert Buchwaldt (PhD '06) has been appointed Research Associate Professor at Boston University where he will teach courses and undertake research while retaining his former position as guest scientist in the geochronology lab at MIT.

Johanna Kieniewiz (PhD '07) started a new job as Head of Outreach and Engagement at the Institute of Physics in London, the professional society for British physicists. Although a bit of a discipline switch, she will certainly be drawing on all the geophysics classes she took whilst at WashU. Johanna also got married this year to Kings College London geographer, Dr. Jonathan Reades.

Magdalena Osburn (AB '07) joined the faculty of Northwestern University's Earth and Planetary Sciences and moved to Evanston IL. **Mitch Barklage (PhD '10)** and she are happy and healthy, although currently living in different parts of the country.

Aine Steiner Mines (AB '07) is still working at Cornforth Consultants as a geotechnical engineer, still living in Portland, OR, and still accruing work experience to qualify for her RG and PE exams. She and Greg did get three chickens though, so she figures she is that much closer to being a living Portlandia sketch!

Greg Finkelstein (AB '08) received his Ph.D. in geosciences and materials science from Princeton in June, and started as the Seismological Laboratory Director's Post-

doctoral Fellow at Caltech in September. For you Pasadenaans, Greg can be found on E. Green St., Pasadena, CA.

Jennifer Griffes Shechet (AB '08) was married this year to Eli Shechet. She is still happily employed at JPL in Pasadena. The wedding was a mini-reunion of the Pathfinder class of 2004 and some of the Remote Sensing Lab's former grad students.

David Mayer (MA '09) earned his second master's degree in December, 2013. He now holds an M.A. in geography from Clark University. David will start a new job in January, 2015 as a staff planetary GIS/data specialist in the Department of Geological Sciences at the University of Chicago. He will be in the Mars research group, headed by Dr. Edwin Kite.

Hannah Rabinowitz (AB '12) went to Rome, Italy to work in the rock mechanics lab at the Istituto Nazionale di Geofisica e Vulcanologia (INGV). Using the high velocity rotary shear apparatus, SHIVA, they sheared gouge samples in order to get a short time-scale temperature rise which will help to constrain a new biomarker-based paleoseismic indicator that they have been developing. They also ran a set of experiments on a biaxial deformation apparatus (BRAVA) to look at the impact on the friction of subducting sediments of different carbonate concentrations. Of course, all of this work was punctuated with tons of pasta and gelato!

Natalie Accardo (AB '12) is currently a 3rd year doctoral student at Columbia University - Lamont-Doherty Earth Observatory. This summer she spent 5 weeks in Tanzania and Malawi installing seismic stations as a part of the NSF funded project SEGMeNT (Study of Extension and magmatism in Malawi and Tanzania). Along with colleagues from both countries, 40 stations were installed over a 400 x 300 km footprint that spans the 3rd largest African lake, Lake Malawi. By recording ground motions in this region from near and far earthquakes, they hope to elucidate the controls on magmatism and tectonic segmentation during early-stage rift development. With the dust just settled after homecoming, she looks forward to returning in early 2015 when they conduct an active source survey in Lake Malawi.

Abigail Freeman (PhD '14) started a postdoctoral fellowship in **Bethany Ehlmann's (AB '04)** lab at Caltech. She is continuing her Mars research in remote sensing of Mars using orbital and rover-based datasets.

ALUMNI UPDATE! Let us know what you are doing now.

Either send an email to mueller@wunder.wustl.edu or mail an update to: Washington University in St. Louis, Department of Earth & Planetary Sciences, Margo Mueller, Campus Box 1169, One Brookings Drive, St. Louis, MO 63130.

ALUMNI, VISIT US THIS DECEMBER

**Fall AGU Meeting
San Francisco
Department and Alumni Reception
Jillian's@Metreon**

101 Fourth Street
San Francisco
Monday
Dec. 15, 2014
7:00–10:00 PM

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