

The TECHtonic

2018 Fall Newsletter
Department of Geosciences



Welcome to The TECHtonic!



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**SUPPORT GEOSCIENCES.
WHAT TO SUPPORT AND HOW TO GIVE.**

See back cover.

Dear Alumni, Stakeholders, & Friends of the Department,

Welcome to our Fall 2018 newsletter. Inside you'll find lots of news and announcements. As you'll see, our faculty, staff, students and alumni continue to succeed in many realms of science and life.

I would especially like to draw your attention to alumnus Jimmy Whitmer's account of his trip to Switzerland. In October, Jimmy joined our Study Abroad students and three of our faculty on a terrific cross-Alps field trip in Switzerland. I was fortunate enough to participate in this trip, and two things really stood out to me: First, our students receive a fantastic and life-altering experience there. Second, Jimmy's presence added so much to the experience of our students — as articulated clearly in Jimmy's piece on page 10. We hope to begin a new tradition of alumni participation in our fall Study Abroad trip — if you're interested, let us know!

On page 13 you'll meet our new Academic Advisor, April Newcomer. April has just finished her first year at VT (time flies!). As many of you know, April had big shoes to fill after Connie Lowe's retirement, but rest assured that she is doing so very ably, and helping lead our academic advising in exciting new directions.

Finally, please note the Save the Date on page 13, announcing our upcoming Spring Banquet and Alumni Dinner on April 12, 2019. I hope to see you there!

I hope you enjoy this semester's newsletter. And as always, we always want to hear from our alumni and friends, whether by email, phone, or in person whenever you're back in Blacksburg.

W. Steven Holbrook, Head of Department

ON THE COVER | The Petrified Forest National Park, Arizona, was first established to preserve the remarkable silicified tree trunks from the Triassic Period (~228-200 million years ago). Today we know that the park also contains important fossils for understanding the early evolution of dinosaurs and other members of those fossil communities. Establishing the ecology of those communities is one of the research focuses of VT Paleobiology group led by Assistant Professors, **Sterling Nesbitt** and **Michelle Stocker**.

ALUMNI FLASHBACK

By David Barna (B.S., 1973)

Earlier this year, Department Head **Steve Holbrook** received a package from alumnus **David Barna**. Inside was the letter reprinted below, along with a rather special book. (David: No apologies necessary. All is forgiven.)



David Barna recently finished his career at the National Park Service in Washington, DC.

"Dear Dr. Holbrook:

My copy of the new TECHtonic arrived today and it's wonderful. Congratulations on the new publication, and on your new appointment.

Coincidentally, I am cleaning out my man-cave, having retired after a 40 year Federal career. I was fortunate to work in the geosciences for the Atomic Energy Commission, the Nuclear Regulatory Commission, the Department of Energy, the U.S. Bureau of Mines and the National Science Foundation. The last seventeen years of my career I was the Chief Spokesman for the National Park Service.

I searched for cobalt manganese crust on the Pacific seafloor, lead two expeditions across Antarctica to the South Pole, served as a judge at seven European film festivals, lived on Midway Atoll for a year, traveled to 25 countries and 220 National Parks, worked closely with documentary filmmaker Ken Burns for nine

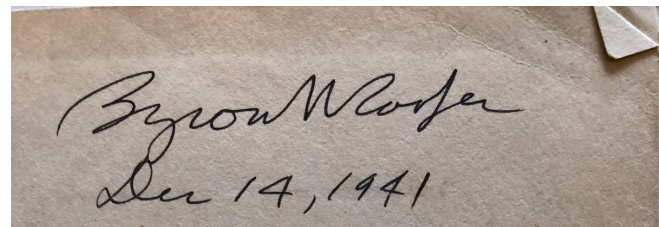
years, and managed the Ranger Museum in Yellowstone National Park. And somehow I found time to spend 22 years in the Navy Reserves. What success I've had in my career is due to the guidance and direction of Geology Professors **Cooper, Lowry, Tillman, Hackett, Gibbs, Grender, Bloss, McLean, and Sears**. Enough about me.

I'm writing about the enclosed volume that belonged to Departmental Founder **Byron Cooper**. It was gifted to me by a fellow graduate. Alas, I am sure it was obtained under questionable circumstances. Dr. Cooper was my course advisor from 1969-1971. I was with Dr. Cooper in his office less than an hour before he died in March 1971. Horrible day for everyone. I am sure this is what prompted the gift of the book.

It is the classic 'Geology of the Appalachian Valley of Virginia,' by Charles Butts, first edition, 1940. It is signed: 'Byron N Cooper, Dec. 14, 1941.' It was donated to the VPI Geology Library by Mrs. Cooper. In 1941, Dr. Cooper was still working for the Virginia Geological Survey (with Charles Butts). Maybe this book was a gift from Butts? Cooper became head of the VPI Geology Department (a two-man operation) in 1945.

Please accept this book, along with any apologies due. All the best,

David Barna
dbarna2222@gmail.com
BS Geology 1973 VT
MURP (Environmental Planning) 1975 VT"



Faculty Spotlight—Michelle Stocker and

By Andrew Parent (Ph.D. Candidate)



Assistant Professors **Sterling Nesbitt** and **Michelle Stocker** in the field with son, Avett.



Part of VT Paleo getting ready to flip a plaster jacket containing a large phytosaur skull just south of Petrified Forest National Park, Arizona. From left to right, Ph.D. Candidate **Chris Griffin**, Dr. Michelle Stocker, **Chuck Beightol**, **Alexander Beyl**, **Bryan Gee**, M.S. Student **Dana Korneisel**, and Jones Intern **Rebecca Hawkins**.

Members of the Dept. of Geosciences at Virginia Tech take pride in the diversity of research done here in Derring Hall. These disciplines range in scale, from molecular to extraterrestrial, and approach, from analytical to field. Paleontologists at VT take this breadth a step further; their research is at the nexus of geology, biology, and anatomy. **Sterling Nesbitt** and **Michelle Stocker** are vertebrate paleontologists who focus on the evolution and paleobiology of Mesozoic and Cenozoic animals.

Drs. Nesbitt and Stocker arrived at VT in 2013 after completing a post-doc and Ph.D., respectively, at the University of Texas at Austin. Prior to Texas, Dr. Stocker completed a B.S. in Geological Sciences at the University of Michigan and a M.S. in Geosciences at the University of Iowa. Paleontology was not always a passion for Dr. Stocker. It wasn't until her sophomore year that she decided on a career path. An introductory geology course, with a major field component, spurred her interest in paleontology and attending graduate school. Here at VT, she specializes in convergent evolution and how animal morphology changes over time.

Dr. Nesbitt attended the University of California at Berkeley, graduating with a B.A. in Integrative Biology in 2004. He received a Ph.D. in Geosciences from Columbia University in 2009, followed by two post-doctoral appointments. Dr. Nesbitt grew up in Arizona where, at 15, a local fossil discovery caught his attention. "A mammoth was discovered in the nearby Phoenix basin. I asked my parents if they'd drop me off to help dig for the next two weeks, and that's where it started," Nesbitt said. "Now, I focus on understanding how reptiles respond to Earth events and how some groups, particularly dinosaurs, become successful."

Both, along with Dr. **Shuhai Xiao**, lead the VT Paleobiology and Geobiology Research Group, which consists of seven Ph.D. and three M.S. students. Four VT undergraduates are conducting active research, with another 15 involved as student volunteers. 2018 was an exciting year for the group, consisting of multiple field seasons and excavations. "My group has incorporated some novel aspects to our research, like examining stable isotopes in fossils to determine trophic structure, funding from National Science Foundation to pursue the patterns and processes that result in convergent evolution of the snake-like body plan, and leading a paper describing the earliest frog fossil from North America from foundation-funded fieldwork with undergraduate interns," said Dr. Stocker.

Sterling Nesbitt



Drs. **Sterling Nesbitt** (middle) and **Michelle Stocker** (far right) with collaborators (from left) Dr. Christian Sidor (University of Washington), Dr. Roger Smith (Iziko Museum), and Dr. Ken Angielczyk (Field Museum) on the coast of Lake Malawi in Tanzania during their expedition to the Ruhuhu Basin of Tanzania to understand the effects of the Permian-Triassic mass extinction on the evolution of synapsids and reptiles.



2019 promises to be another exciting year for Paleobiology at VT. The group plans to re-visit fossil sites in Arizona to continue prospecting for early dinosaurs as well contemporaneous small (lizard-sized) animals.

They target the Petrified Forest National Park, a region known for its excellent tree preservation, to search for the animals that lived below the ancient canopy. Their findings will shed light on how smaller animals responded to biotic and abiotic events, and how similar these responses were to their larger dinosaur counterparts. Other potential field locations range from New Mexico to Zimbabwe. The premier gathering of vertebrate paleontologists (Society of Vertebrate Paleontologists) will be held in Brisbane, Australia next fall, where many Paleobiology members will present their research and network with colleagues. Both will be traveling to China to investigate an archosaur (early dinosaur ancestor) collection with external collaborators. Dr. Stocker will be leading a conference symposium at the International Congress of Vertebrate Morphology in Prague. Both look forward to another (typical) busy and exciting year.

Outside of research, Drs. Nesbitt and Stocker emphasize community outreach. They and their students host and take part in multiple public events every year. "Our university's motto is 'that I may serve' and we take that seriously with scientific outreach to the local, regional, and national public," Dr. Stocker explained. The biggest of these events is a fossil unpacking party, where local volunteers of all ages come help unwrap and organize specimens collected during the last field season. The unwrapping party often results in sustained volunteerism and participation from local enthusiasts. "In the end, much of science is publicly funded through taxpayer dollars, and to have those same people understand the importance of the work they are helping to make happen is a huge incentive to both keep doing the work and for them to continue to support the work," Dr. Stocker emphasized. Group members also participate in local science festivals and National Fossil Day, an event attended by many paleontologists in Washington D.C. Recently, Dr. Stocker participated in Science on Tap, an informal lecture series held at Blacksburg brewery Rising Silo.

Coupling passion and ability, Drs. Nesbitt and Stocker have played a key role in sustaining and advancing Paleobiology at VT. The group has become one of the largest in the U.S., with a wide range of projects addressing a number of paleontological questions. Their mentorship towards students leads to well-developed scientists advancing paleontology and representing the Dept. of Geosciences well, continuing the tradition of sustained excellence in Paleobiology at VT.



VT Paleobiology contingent at the Society of Vertebrate Paleontology 2018 in Calgary. From left to right, **Chris Griffin**, **Dr. Nesbitt**, **Hazel Taruvunga**, **Avett**, **Devin Hoffman**, **Elizabeth Evans**, **Dana Korneisel**, **Caitlin Colleary**, **Khanh To**, **Ben Kligman**, **Brenen Wynd**, and **Dr. Stocker**.

ALUMNI NEWS

Karina Cheung (B.S., 2005 and M.S., 2012) recently traveled to Juneau, Alaska in May 2018. She visited Mendenhall Glacier (and pointed out the schists along the hike!) and did flight seeing over the Juneau Icefield, which consisted of several glaciers including the Taku Glacier, the thickest and deepest glacier in the world. En route to the west coast, she flew over Utah and captured the magnificent geology of Glen Canyon, and its meandering channels and extinct oxbow lake.



Sheyla Palomino Ore (M.S., 2018) is a Geochemist at Amphos 21 in Lima, Peru.

Brady Ziegler (Ph.D., 2018) is an Assistant Professor at Trinity University in San Antonio, Texas.

Zachary Munger (Ph.D., 2016) is the Senior Staff Scientist at Geosyntec in Titusville, Florida.

Tiffany VaderWerker (M.S., 2016) is a Geologist at the Maryland Geological Survey in Baltimore, Maryland.

Yinka Oyewumi (Ph.D., 2012) received promotion to Associate Professor with Tenure at Central Connecticut State University.

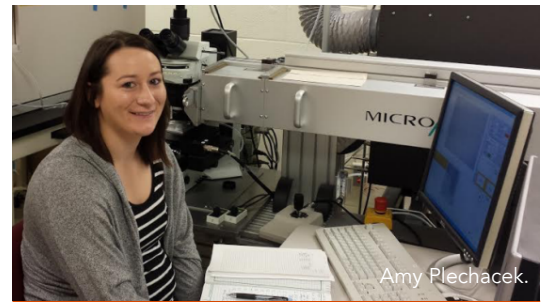
Nicole West (M.S., 2008) started as Assistant Professor at Central Michigan University in 2017.

Ben Schwartz (Ph.D., 2007) is an Associate Professor at Texas State University in San Marcos and also Director of the Edwards Aquifer Research and Data Center.

Christa Peters-Lidard (B.S., 1991) was elected a fellow of the AGU.



Robert N. Ulrich (B.S., 2017) was awarded the 2018 National Science Foundation Graduate Research Fellowship and began his graduate program at UCLA, where he is pursuing his Ph.D.



Amy Plechacek (B.S., 2017) was awarded the 2018 National Science Foundation Graduate Research Fellowship and began her graduate program at UW-Madison in Fall 2018.

SEND US YOUR NEWS!

We want to know where you have been and your geosciences training in action. Please email, phone, or write to us with your news and your pictures. Use the contact information on page 13 or send to **Department Head Steven Holbrook** (wstevenh@vt.edu).



Student Awards

Endowed Scholarships

- Leo and Melva Harris Geosciences Scholarship:** Alexander Bradley, Hunter Edwards, Alexandra Hoeher, Lisa Whalen
- Thomas Jeffries Geosciences Scholarship:** Elizabeth Evans, Austin Leake, Zack Lester, Alexandra Menza
- Wallace Lowry Scholarship:** Dalton Anderson, Alexander Bradley, Erin Kelly, Calvin Mako
- Edith and Lawrence Meade Scholarship:** Kalyn R. Fox, Michelle Worek
- William and Francia Presley Scholarship:** Dalton Anderson, Caleb Shockley
- J.D. Rimstidt Field Trip Scholarship:** Erin Kelly, Jamie Lafoon
- Charles Gose, Jr. Scholarship for Geological Sciences:** Kristin Chilton, Brenen Wynd
- Chinese Geosciences Scholarship:** Shuyang Sun
- Aubrey and Eula Orange Award in Geosciences:** Dana Korneisel, Calvin Mako
- Charles and Francis Sears Scholarship:** Brenen Wynd
- David Wones Geological Sciences Scholarship:** Kristin Chilton, Selva Marroquin, Rui Serra Maia
- Alumni and Faculty Scholarship:** Kristin Chilton, Katie Krueger
- Petroleum Industry - Geosciences Scholarship:** Shangxin Liu, Selva Marroquin, Andrew Parent, Hao Wu
- Cooper Memorial Scholarship:** Kirkland Broadwell, McNeill Bauer

Other 2018 Awards

- Tillman Awards for Teaching Excellence:** Selva Marroquin, Joe Cochran, Caitlin Colleary
- Fulbright Scholar:** Sheyla Palomino Ore
- National Science Foundation Fellowships:** Christopher Griffin, Devin Hoffman, Matthew LeRoy
- Multicultural Academic Opportunities Program (MAOP) Scholarships:** Selva Marroquin
- Virginia Space Grant Consortium Fellowship:** Caitlin Colleary
- Graduate Student Doctoral Assistantships (GSDA):** Calvin Mako, Brady Ziegler
- Institute for Critical Technology and Applied Sciences (ICTAS) Fellowship:** Alexandra Nagurney
- Clare Boothe Luce Undergraduate Research Award:** Jordan Pritchard
- Best Oral Presentation at 2018 Southeast Geobiology Symposium:** Selva Marroquin
- L'SPACE Virtual Academy:** Ryan Faris
- Geosciences Outstanding Service Award:** Kannikha Kolandaivelu

Student Research Spotlight: Richard S. Jayne

By **Ryan M. Pollyea**

Continental large igneous provinces (LIPs) are fascinating geologic features that form as molten lava floods the Earth's surface to create layers of basalt rock several kilometers thick. LIP emplacement is rapid and has been implicated in extinction events due to massive greenhouse gas emissions. **Richard S. Jayne**, has found evidence suggesting that rapid LIP emplacement also disturbs the isostatic equilibrium of the underlying continental crust (*Geology*, 2018). Jayne shows that rapid emplacement of the Columbia River Basalt Group resulted in increasing permeability at depths greater than approximately one kilometer. This result is highly unexpected because there is widespread consensus in the geologic community that permeability decreases with depth due to lithostatic loading and mineral precipitation in fractures. Jayne's research may help explain how critical zone weathering patterns in flood basalt extend much deeper than models predict. When asked about Jayne's research, Dr. **Steve Holbrook** commented, "your permeability compilation gives us reason to suspect that water ought to be able to access those depths relatively easily in basalt." Jayne's research has broad implications and may cause the research community to rethink the feasibility of LIPs for geologic CO2 sequestration, natural gas storage, secure nuclear waste disposal, and geothermal energy recovery.



Richard S. Jayne, Geosciences Ph.D. Candidate.

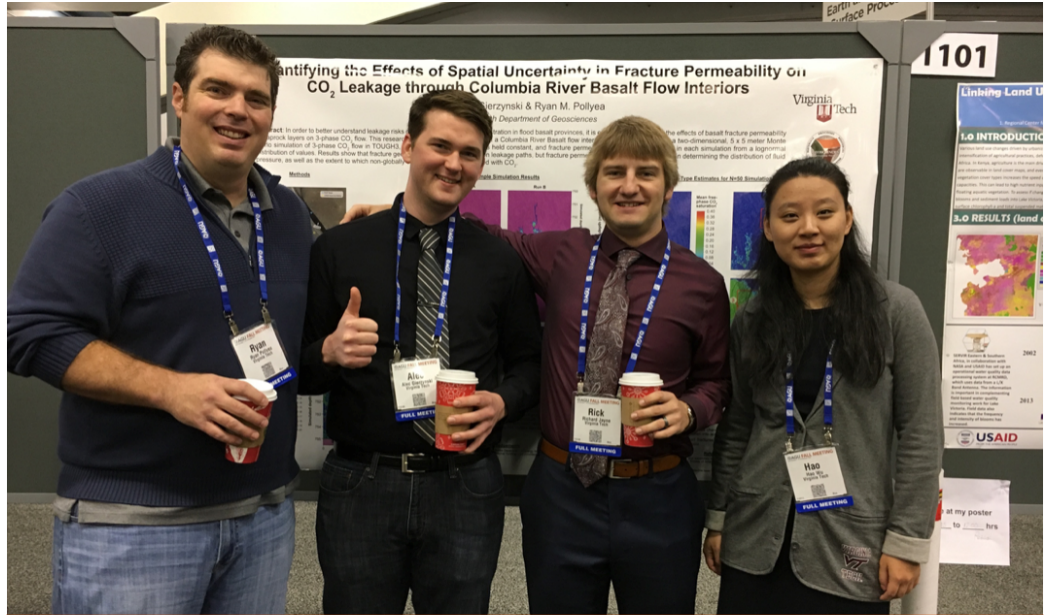
Water, Energy & Supercomputers— The Nexus of Science and Technology

By Robert J. Bodnar

Water, and fluids in general, are intimately associated with diverse geologic and planetary processes, ranging from formation of metal and hydrocarbon deposits to influencing the explosivity of volcanic eruptions to facilitating the generation of large magnitude earthquakes along subduction zones. Today, a major research effort is focused on developing methodologies and protocols to manipulate natural fluid-bearing systems to best serve modern society. These engineered geologic fluid systems are ubiquitous today and form the basis of numerous legacy and emergent energy technologies. Geologic fluid systems account over 80% of the U.S. energy inventory with a growing proportion attributable to unconventional fossil fuel plays in which fluids are used to extract energy resources from rocks that were not thought to contain recoverable

energy resources in the not too distant past. Geologic fluid systems also form the basis for a number of next-generation, low emissions energy technologies, such as enhanced geothermal systems and subsurface CO₂ disposal (also known as geologic CO₂ sequestration). In the Department of Geosciences at Virginia Tech, Assistant Professor **Ryan M. Pollyea** and his graduate students (see photo) in the Computational Geofluids Lab combine field methods, such as terrestrial LiDAR (see photo), and publicly available databases, with high-resolution numerical models and supercomputers to learn how fluid injections alter the physical and chemical environment in deep geologic environments. Since joining VT Geosciences in Fall 2015, Pollyea and his team have made several important discoveries, including development of a new model that explains permeability evolution in large igneous provinces (see Student Research Spotlight), and have developed a model documenting that basalt fracture networks may represent self-sealing storage reservoirs for the safe and secure geologic storage of CO₂ generated by burning of fossil fuels.

A recent research project in Pollyea's lab that has gained much national and international attention is related to the effects of oilfield wastewater disposal, whereby water co-produced during oil and gas recovery is injected into deep geologic formations. This process is implicated in the dramatic rise of earthquake frequency across the mid-continent U.S., particularly in Oklahoma, where the annual rate of magnitude-3 or greater earthquakes increased from one per year before 2008 to nearly one per day between 2008 and 2017. To understand the geographic extent of this phenomenon, Pollyea and VT Geosciences colleague, Dr. **Martin Chapman**, recently published an important study in the journal *Geology* that shows injection volume and earthquake occurrence are spatially correlated at length scales exceeding 100 km. This study was highlighted in *Newsweek*, on Oklahoma Public Radio, and in several newspapers in Oklahoma. Although there is some debate about these findings, Pollyea and his students are currently working to understand the physical processes that govern this long-range spatial correlation. "Our preliminary models show that fluid pressure from just nine injection wells will drive a pressure front beyond 70 km from the well cluster. There are hundreds of wells operating in north-central Oklahoma, and our research shows that long-range pressure migration is highly probable." says Pollyea.



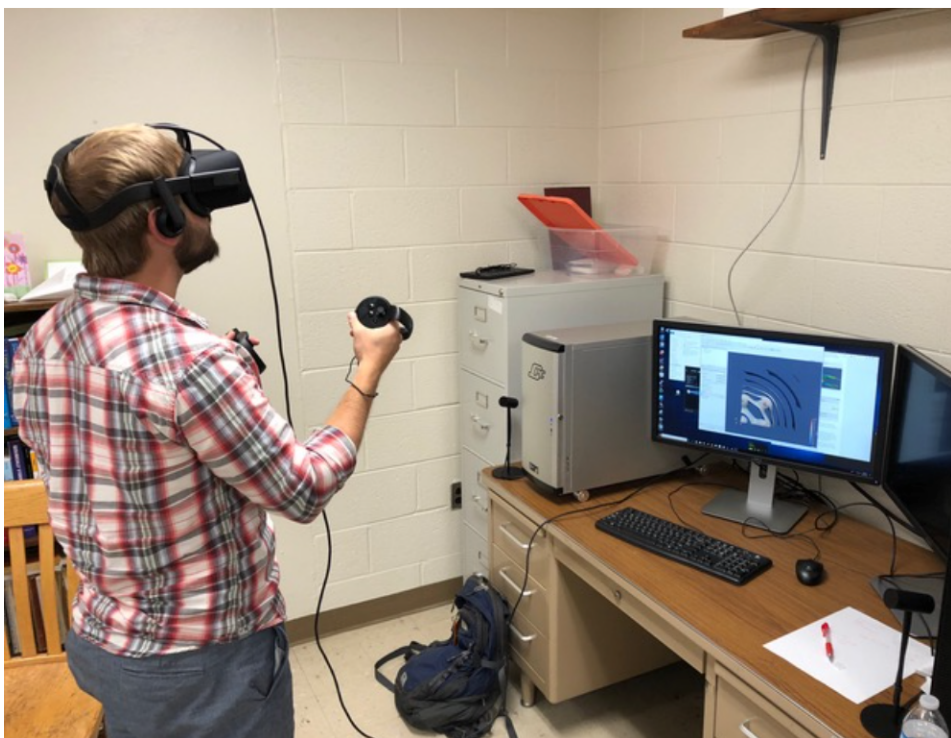
The Computational Geofluids Lab Group at the 2016 American Geophysical Union Fall Meeting in New Orleans. From left to right: Dr. **Ryan M. Pollyea**, **Alec Gierzynski** (M.S., 2016), **Richard Jayne**, and **Wu Hao**.

Pollyea and his students have also introduced state-of-the-art technology into their research to visualize geologic processes by implementing virtual reality (VR) in the Computational Geofluids Lab (see photo). The combination of VR technology and high-fidelity numerical simulation offers unparalleled opportunities to “see” the complex geological processes that occur deep underground. Looking forward, Pollyea hopes to expand VR from a cool new visualization technology to a robust data analysis platform. To accomplish this goal, Pollyea and his students are collaborating with researchers in the VT Advanced Research Computing division to implement visual analytic methods that take advantage of recent advances in high performance computing and machine learning. While this research is still in its infancy, preliminary results suggest that visual analytics may offer a transformative new paradigm for cyber-enabled geological research and Pollyea’s team is at the forefront of this technological revolution.

A successful university research program demands a leader who is knowledgeable, enthusiastic and dedicated to working with students, and also requires students who are hard-working and want to become leaders in their field. The Computational Geofluids Lab in the Department of Geosciences is fortunate to have this combination. Ryan Pollyea is a leader who shares his knowledge and experience willingly and instills confidence in his students through his teaching and mentoring. His program is destined to become a “Destination Area” for future students who strive to become experts in numerical modelling of fluids and learn under the guidance of one of the world’s leaders in this area. New graduate student Grady Konzen noted this when he told me *“Last winter, I was on the fence with a few different grad schools. Ryan’s easy going but driven personality was a major influence on my decision to come to Tech.”* Similarly, senior graduate student Rick Jayne, who is nearing completion of his PhD under Ryan, writes *“One of the reasons Ryan is such a good teacher and mentor is because of how excited he is about the material he teaches. When I was taking Ryan’s Numerical Modeling class, no matter how difficult the material was or how much we (the students) struggled he was always upbeat and ready to help. Not to mention, every class ended the same way, with Ryan saying “Well, it’s been real. It’s been fun. It’s been real fun.”* PhD student Wu Hao notes that she views Ryan as a “giant” and writes *“He cheers me up when I struggle, he provides leadership when I am lost, and he always applauds me when I succeed”*. It is clear that Ryan’s students admire and respect him for his dedication and for his hard work to help them to be successful.



Alec Gierzynski (M.S., 2016) acquiring LiDAR scans of fracture networks in the Columbia River Basalt Group. Photo taken along the Snake River near Starbuck, WA.



Richard Jayne (Ph.D. Candidate) using virtual reality (VR) technology to explore a numerical model of oilfield wastewater disposal.

FACULTY NEWS

Research Awards

Scott King

Professor of Geophysics

Awarded ~\$590,000 from NASA for "Mantle Structure and Process with Insight: A Proposal for a Participating Scientist"

John Chermak and John Hole

Collegiate Associate Professor and Professor of Geophysics

Awarded a \$750,000 Grant from NSF's Industry-University Cooperative Research Center for their project, "Center for Advanced Subsurface Resource Models"

Madeline Schreiber

Professor of Hydrogeosciences

Awarded ~\$983,000* (co-PI) Grant from NSF's Ecosystems Program for "Collaborative Research: Consequences of changing oxygen availability for carbon cycling in freshwater ecosystems"

Robert Weiss

Associate Professor of Natural Hazards

Awarded \$3M Grant from NSF for "NRT: Disaster Resilience and Risk Management (DRRM) - Creating quantitative decision making frameworks for multi-dimensional and multi-scale analysis of hazard impact"



Professor Madeline Schreiber leading a field activity on acid rain with Upward Bound students at the Hubbard Brook Experimental Forest in New Hampshire.

Leadership

Mark Caddick

Associate Professor of Metamorphic Processes

Elected to Mineralogy Society of America Council, Vice Chair for Geological Society of America's Mineralogy, Geochemistry, Petrology & Volcanology Division, Steering and Oversight Committee for geoPRISIMS

Madeline Schreiber

Professor of Hydrogeosciences

Associate Department Head of Geosciences

Robert Weiss

Associate Professor of Natural Hazards

Co-organizer of the Securing Property of the Coastal Zone, the 2018 Summit of the Virginia Academy of Science, Engineering, and Medicine

Patricia Dove

University Distinguished Professor & C.P. Miles Professor of Science

Elected to serve as the Secretary of Physical Sciences (Class I) in the National Academy of Science



Professor Ken Eriksson pauses from teaching to enjoy the views of Schwarzmönch mountain in Switzerland, a part of the VT Geosciences Study Abroad Program.

Publication Highlights

Pollyea, R.M., Mohammadi, N., Taylor, J.E., and Chapman, M.C. 2018. Geospatial analysis of Oklahoma earthquakes (2011-2016): Quantifying the limits of regional-scale earthquake mitigation measures. *Geology*, Vol. 46, No. 3, p. 215-218. doi: 10.1130/G39945.1.

Zhou, Y. Anomalous mantle transition zone beneath the Yellowstone hotspot track. *Nature Geoscience*, Vol. 11, p. 449-453. doi: 10.1038/s41561-018-0126-4.

King, S.D., Castillo-Rogez, J.C., Toplis, M.J., Bland, M.T., Raymond, C.A., and Russell, C.T., 2018, Ceres internal structure from geophysical constraints, *Meteoritics and Planetary Science* 53, 1999-2007, doi: 10.1111/maps.13063.

Wu, H., Jayne, R.S., and Pollyea, R.M., 2018, A parametric analysis of capillary pressure effects during geologic carbon sequestration in a sandstone reservoir, *Greenhouse Gases Science and Technology* 00:1-14 (2018); doi: 10.1002/ghg.

David M. Hodgson, Anne Bernhardt, Michael A. Clare, Anne-Christine Da Silva, Julie C. Fosdick, Barbara Mauz, Ivar Midtkandal, Amanda Owen, and **Brian W. Romans**, 2018, Grand Challenges (and Great Opportunities) in Sedimentology, Stratigraphy, and Diagenesis Research, *Frontiers in Earth Science: Sedimentology, Stratigraphy, and Diagenesis*, doi: 10.3389/feart.2018.00173.

Recognition

Scott King

Professor of Geophysics

Recently named a Geological Society of America Fellow

Jim Beard

Adjunct Professor

Recently named a Geological Society of America Fellow

Michelle Stocker

Assistant Professor of Geobiology

2018 Virginia Tech College of Science Diversity Award

Mark Caddick

Associate Professor of Metamorphic Processes

Promoted to Associate Professor with Tenure

Benjamin Gill

Associate Professor of Sedimentary Geochemistry

Promoted to Associate Professor with Tenure

Martin Chapman

Research Professor of Geophysics

Promoted to Research Professor

D. Sarah Stamps

Assistant Professor of Geophysics

Quoted in the May 2018 issue of *Discover* in the article "Africa's Big Break"



Professor Martin Chapman at a former Cold War-era bomb shelter that now serves as a seismological observation site for the Virginia Tech Seismological Observatory (VTSO).

An Extraordinary Alumni Experience—

By Jimmy Whitmer (B.S., 1982)

Let me start with a resounding and emphatic recommendation to our Virginia Tech Geology/Geophysics/Geosciences alumni that this is a trip you need to add to your bucket list. I had the great fortune of being invited by the Geosciences Department at Virginia Tech to participate in their study abroad program, specifically an 8-day trans-Alps geology field trip that crossed most of Switzerland, from Zürich in the north to Riva San Vitale in the south. This was a very special and unique opportunity to experience the Swiss Alps in a way that has so much more to offer than a tourist experience. The sheer beauty and awe of the striking mountain scenery and quaint Swiss villages dotting the landscape are reasons enough to make this trip. But the unique experience of observing, learning, and understanding the incredible geology first hand was astounding. Especially since I didn't have to worry about being graded! As exceptional as all of this was, the highlight of the experience was making very real and sincere connections with the outstanding Geosciences professors and students at Virginia Tech. We alumni can be very proud of the direction the Virginia Tech Geosciences program is going and of the professors leading it.

My trip began in Riva San Vitale, Switzerland, a quaint small town in the southern reaches of the Alps near the Italian border. The weather was brilliant, and the scenery makes you feel like you're in the middle of a picture post card. Virginia Tech has a European campus here, The Steger Center for International Scholarship. The Center provides a tremendous opportunity for students to participate in study abroad programs. The semester I arrived (end of September 2018) there were three separate programs in Architecture, International Studies, and Geosciences. I imagine many alumni are unaware of the amazing resource Virginia Tech has in the Steger Center. The students told me this study abroad program had really been a life-changing experience for them. For some, this was the first time they had traveled outside the United States, or even been on an airplane. This program offers such a great way for students to experience other

cultures and broaden their understanding of the world. We need much more of that!

I chose to arrive two days ahead of the actual field trip, so I could spend time with the students in the classroom learning about the processes that formed the Alps. I really enjoyed the classes by Virginia Tech Geosciences professor, Dr. **Mark Caddick**. He did an outstanding job teaching metamorphic petrology and really connected with the students, both academically and personally. I highly recommend including this classroom portion of the trip, not only did it help me get much more out of the field trip, it also provided a terrific opportunity to connect with the students. It was time well-spent and very worthwhile.

The field portion of our geology field trip started in Zürich. Dr. Caddick lived in Zürich for 8 years, so he was a terrific tour guide, taking us to old town Zürich, and ETH Zürich University where he used to work. While at ETH we visited an awesome geology museum and a high-pressure experimental petrology lab.



Jimmy Whitmer (far left) with VT students and faculty at the Klausen Pass, Switzerland. Photo by **Steve Holbrook**

Put This on Your Bucket List!

We were also joined in Zürich by Dr. **Steven Holbrook**, Professor and Department Head of Geosciences at Virginia Tech and Dr. **Richard Law**, Structural Geology Professor at VT. I really enjoyed spending time with and getting to know them. We had great discussions sharing the accomplishments and challenges from both the private industry and university perspectives. These professors are really dedicated to the Geosciences program and have a real desire for active alumni participation in the program. If you are looking for a way to give back to the Geosciences program at Virginia Tech, I highly recommend you reach out to [Dr. Holbrook](#) and seek ways to engage. Becoming a mentor to a student would be a great way to start.

We spent the next several days lodging in Andermatt, a traditional mountain village in the heart of Switzerland. This was a great central location where we made several day trips into the field, enjoying remarkable mountain scenery and terrific examples of deformed igneous and metamorphic rocks. The mountain hikes were even more special, having our own personal geology guides to point out the remarkable recumbent folds and thrust sheets and the various grades of metamorphic rocks and minerals. This included a short hike to the [Glarus thrust fault](#), a geologic UNESCO world heritage site because of its significance as an exceptional example of mountain building through continental collision. This is one of the most studied thrust faults in the world and has played an important role in the development of geological knowledge on mountain building. My favorite hike was to the top of the Eggishorn to view the Aletsch Glacier, the largest glacier in western Europe. The views were spectacular, and it felt like we were on top of the world as we watched clouds roll in below us. We were able to see the Matterhorn, Mt. Blanc, and the Eiger from this single location, as well as terrific examples of glacial geology. The most memorable part of the hike for me was watching one of the students overcome their very real fear of heights as we hiked adjacent to some significant drop offs. It was very special to watch firsthand the pride this student felt in overcoming this challenge.

The accommodations in Andermatt were phenomenal, much better than I remember at field camp. We stayed in newly constructed tourist villas/apartments with a kitchen and large dining area that allowed us to prepare and share meals family style with the students every evening. This provided an exceptional opportunity to really get to know the students, their dreams and aspirations, and in some cases the hardships they had overcome to be there. This was an enlightening and memorable experience for all and really deepened the relationships formed.

As we worked our way back to Riva San Vitale, we were joined by Dr. **Robert Bodnar**, University Distinguished Professor of Geochemistry and Director of the Steger Center for International Scholarship, and the Virginia Tech Executive Vice President and interim Provost, Dr. **Cyril Clarke**. It isn't every day that you get to spend two days in the Swiss Alps studying geology with the provost of the university. This really demonstrated to me the level of commitment to this program from the highest levels at the university. It was a pleasure to sit in on discussions with these dedicated professors about the vision for the Steger Center and how the university plans to make this remarkable resource available to even more students.

Finally, I want to add how impressed, and thankful, I am for the professors' commitment to making this study abroad program such an outstanding experience for the students and enhancing the overall learning experience for our Geosciences program at Virginia Tech. These professors volunteer their time to develop and conduct this course, all while maintaining their normal teaching and research responsibilities. Virginia Tech is fortunate to have such a dedicated group of professors who are committed to providing a life changing experience for the students and alumni who are fortunate enough to participate in this program. There is so much more I could say about what a wonderful alumni experience this trip turned out to be but more words cannot do this trip justice. Do yourself, and the Geosciences program, a favor and consider making this trip a part of your memorable life experiences!



Fall 2018 Study Abroad Students from left to right, **Michelle Worek, Patrick Riles, Brian Scholten, Brandon Hatcher, Emily Patellos, and Dalton Anderson.**

THE MUSEUM PIECE

By Rebecca Hawkins* & Llyn Sharp



Christopher Griffin (M.S., 2016, Ph.D. Candidate) with Amos and his grandfather, Bob. Photo by **Llyn Sharp**



Volunteers transcribe locality data as they unpack the fossils. Photo by Skyler Taube

The Museum of Geosciences offers many kinds of learning opportunities for students and the community, including the chance to actively participate in scientific projects! For the past three years, Dr. **Sterling Nesbitt** and Dr. **Michelle Stocker** have hosted “Fossil Unwrapping Parties” for the public to help unpack their findings from the field. These events have welcomed over 300 people including kids, K-12 teachers, VT students, Master Naturalists, and community members. They include a brief lecture with field photographs and videos followed by unpacking the specimens with supervision from students in the VT Paleobiology and Geobiology Research Group. The Fossil Unwrapping Parties are a rare opportunity for people to interact with scientists in a “discovery” setting. Volunteers and scientists alike are excited to see what has been found!

Dr. Nesbitt and Dr. Stocker came up with this idea partly from their own experiences as undergraduates and partly from necessity. The field teams work from dawn to dusk (and sometimes longer!) every precious day that they have in the field. Their field locations are in Arizona, Wyoming, and as far away as Tanzania in Africa. As such, the volume of material that they acquire can be daunting to process once it comes back to the lab -- and the first step is carefully unpacking and making sure everything is labelled with where it came from and who collected it. This unpacking and organizing step is where they have recruited the community's help with the Fossil Unwrapping Parties. What takes months to do alone takes only a single night thanks to volunteers!

Everyone has a great time handling fossils and learning new things about them, all while helping scientists with their work. Some kids have even come all three years!

The undergraduate and graduate students who supervise these activities also learn a lot about how interesting their work is to those outside the field.

“I find interacting with the kids and the public very invigorating because it allows me to think of science in a different manner. They asked great questions, and I was happy to see how many people are interested in paleontology!”

-**Khahn To**, Graduate Student

**Rebecca Hawkins is a sophomore in Wildlife Conservation and current president of the VT Natural History Collections Club. She was an intern in the VT Paleobiology and Geobiology Research Group and accompanied Dr. Nesbitt and Dr. Stocker on their expedition to Arizona during the summer of 2018.*

Welcome, April Newcomer!

By Madeline Schreiber

We are so pleased to introduce **April Newcomer**, who started as the Geosciences Student Programs Coordinator and Advisor in November 2017.

Prior to her arrival at Virginia Tech, April was Assistant Director of Advising at the Pre-Major Advising Center at Radford University, and before that served as the Communications Officer and Assistant to the Dean in the College of Visual and Performing Arts at Radford. April has an MS in Counseling and Human Development – with concentrations in College Counseling and Student Affairs Administration – and a BS in Psychology, both from Radford.

In addition to coursework and degree planning for Geosciences undergraduate and graduate students, April focuses on promoting career development opportunities for students such as internships, research experiences and study abroad. April has used her background and experience in marketing to create advertising materials, with a “Choose Your Adventure” theme, showcasing our major and the opportunities that Geosciences offer. She is also a contributing member of the National Academic Advising Association (NACADA), a global professional advising society; she recently gave an invited presentation on STEM advising at NACADA’s annual national conference.

During her interview, the search committee was incredibly impressed with April’s expertise and accomplishments in advising. In her day-to-day interactions with Geosciences students, staff and faculty, April brings creative approaches to problem-solving (her tagline is “Swiss Army April”) and a positive attitude (she calls them “sparkles”). We are so pleased that April joined our Geosciences family and know that current and future students will greatly benefit from her expert and thoughtful advising.



April Newcomer, Student Programs Coordinator and Advisor.



2018 Fall Newsletter

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SAVE THE DATE!

Mark your calendars! The Department of Geosciences will hold its annual Spring Banquet and Alumni Dinner on Friday, April 12, 2019. We have a great venue, the German Club Manor in Blacksburg and a great date that coincides with the Spring Family Weekend, Run in Remembrance, and the spring football game! Hotel reservations can be made by calling the Inn at Virginia Tech (540-231-8000) or Homewood Suites by Hilton in Christiansburg (540-381-1394) and mentioning “Virginia Tech Geosciences.” For more information contact Mary Jane Smith, mjsmth@vt.edu.

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SUPPORT THE FUTURE. SUPPORT GEOSCIENCES.

Please consider donating to the **Geosciences Annual Fund**. Your support is critical to the department's future success. Contributions from our alumni and friends help our many deserving students, provide state of the art facilities, and expand research of career opportunities. Gifts made without restriction allow departmental leaders to immediately respond to opportunities and to allocate resources where they can have the greatest impact. When you receive the College of Science Annual Fund letter or phone call, please earmark your support for the Department of Geosciences Annual Fund.

<https://www.giving.vt.edu/> or all the Office of Accounting at 1-800-533-1144.



Other ways to make an impact:

Scholarships - create a named scholarship for a deserving student

Faculty Chaired Position - attract an eminent scholar to join our department

In-kind Gifts and Volunteering - donate an old car or help in the museum

Bequests - support VT Geosciences in the future

Endowment - invest in our long-term future with a permanent charitable legacy

Designated Gifts and Sponsorships - let us know your passion for a personal gift

Please contact:

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PARTING SHOT



Josh Benton installing a well in the field at the Hubbard Brook Experimental Watershed in New Hampshire.

Photo by **Madeline Schreiber**