

# The TECHtonic



**2017 Fall Newsletter**  
Department of Geosciences



# Welcome to The TECHtonic!



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**SUPPORT GEOSCIENCES.**  
**FIND OUT WHAT TO SUPPORT AND HOW TO GIVE.**  
*See back cover.*

Dear Alumni, Stakeholders, & Friends of the Department,

It's a great pleasure to present *The TECHtonic* — the “new and improved” Department of Geosciences newsletter for Fall 2017. As you will see inside, the newsletter's “new” name is really a throwback to a publication that some of you may remember (see p. 4 for details). I hope you enjoy it.

For those of you who don't know me yet, I arrived at Tech on July 1 as the new head of Geosciences. A little about me: I'm a geophysicist who works both in marine seismology (I've spent nearly 18 months of my life at sea) and in near-surface geophysics. I'm a product of land-grant universities, as I was educated at one (B.S. at Penn State) and spent much of my career at another (the University of Wyoming). I did do some time at private institutions in between (Ph.D. at Stanford, and almost a decade at Woods Hole Oceanographic Institution), but at heart I'm a land-grant kid. I'm thrilled to be a Hokie and committed to *Ut Prosim*.

As you probably know, I've inherited a department that is in great shape, thanks in large part to the leadership of Nancy Ross, who completed a nearly six-year term as department head on June 30 (see p. 13). The entire VT Geosciences diaspora owes Nancy a debt of gratitude for her tireless dedication to this department. There are so many exciting things going on here, as you'll see when you look through the pages ahead.

Of course, there's always room for improvement, and I have a few ideas, which I'll share in time. For now, though, suffice it to say that priority #1 is to connect with our alumni, friends and supporters. This newsletter is one step, and you'll see others soon. Meanwhile, for those of you who haven't been to Blacksburg or to Derring Hall in a while, I'd like to extend a personal invitation for you to come back and see us. When you do, please stop by the department office and say hello — I'd love to meet you and share my excitement for VT Geosciences.

W. Steven Holbrook, Head of Department

**ON THE COVER** | Continuous Global Positioning System station installed in June 2016 on the Natron Rift of the East African Rift in Tanzania. The active volcano Ol Doiyo Lengai towers in the background. This photograph, which won the GeoPrisms award, was taken by **Dr. D. Sarah Stamps**, Virginia Tech Department of Geosciences. [https://vtnews.vt.edu/articles/2017/10/Science-Stamps\\_balto\\_funding.html](https://vtnews.vt.edu/articles/2017/10/Science-Stamps_balto_funding.html)



# Alumni & Faculty Honored at GSA Meeting in Seattle

By Shuhai Xiao

VT Geosciences faculty and alums were featured prominently at the Geological Society of America (GSA) annual meeting in Seattle, WA, October 22-25, 2017. Geosciences faculty **Dr. Sterling Nesbitt** won the 2017 GSA Young Scientist Award (Donath Medal). Geosciences alumnus **Dr. Alexander E. Gates** was awarded the 2017 GSA Public Service Award. Also, Geosciences alumna **Dr. Isabel P. Montañez**, who serves as the GSA president, received the 2017 Lawrence L. Sloss Award of the GSA Sedimentary Geology Division.

**Sterling Nesbitt** received his Bachelor's degree from UC Berkeley and his PhD degree from Columbia University. He joined the VT Geosciences faculty in 2014. He is a vertebrate paleontologist studying the rise of dinosaurs and the Mesozoic evolution of archosaurs—a group including birds, crocodylians, and dinosaurs. His work centers on environmental evolution and vertebrate radiation after the Permian-Triassic mass extinction,

using archosaurs as a model. Through targeted hypothesis-driven fieldwork and elucidation of large-scale patterns in vertebrate history, Sterling has helped reshape our knowledge about macro-evolutionary patterns of diversification, biogeography, disparity, morphology, and convergent evolution. His discoveries have revolutionized the way geoscientists view the beginning of the Age of Dinosaurs and Earth history in general. Sterling is also an extraordinary science communicator, teacher, and mentor. Along with Virginia Tech paleontologists **Michelle Stocker** and **Shuhai Xiao**, Sterling has helped build one of the best paleontology programs in the nation.

**Dr. Alexander E. Gates** received his MSc (1981) and PhD (1986) from VT Geosciences, working with the late **Professor Lynn Glover**. **Dr. Gates** is the Distinguished Service Professor and Department Chair of the Dept. of Earth & Environmental Sciences at Rutgers University Newark. Dr. Gates also served as Vice Chancellor for Research at Rutgers University Newark in 2011-2014. Dr. Gates was recognized at

GSA for his “untiring effort and enthusiasm in spreading information and appreciation of Earth and Environmental issues to the public”; according to the citation, “these efforts have included numerous venues, from museum displays and media and public appearances to raising significant funding to devise and institute programs to extend the educational resources to the public and especially underrepresented minority youth.”

**Dr. Isabel P. Montañez** received her PhD degree (1989) from VT Geosciences, working with Professor Fred Read. Dr. Montañez is the Chancellor's Leadership Professor in the Dept. of Geology, University of California, Davis. Dr. Montañez has made major contributions in a wide range of research topics, including carbonate sedimentology and diagenesis, sequence stratigraphy, sea level changes, paleoclimatology, paleosols, pCO<sub>2</sub>, and integrated Earth-life system. According to GSA, “the Sloss Award is given annually to a sedimentary geologist whose lifetime achievements best exemplify those of Larry Sloss — i.e., achievements that contribute widely to the field of sedimentary geology and through service to GSA.” Past winners of the Sloss Award include Virginia Tech Geosciences faculty **Dr. Fred Read** (2013) and alumnus **Dr. John P. Grotzinger** (2011).



Virginia Tech Geosciences Faculty and Alumni at the GSA President's Reception on October 22, 2017. From left to right: **Shuhai Xiao**, **Isabel P. Montañez**, **Alec Gates**, **Sterling Nesbitt**, and **Michelle Stocker**.

# Student Awards

## Endowed Scholarships

**Charles J. Gose, Jr. Scholarship for Geological Sciences:** Selva Marroquin, Mitchell Riegler

**Leonard P. and L. Harris Scholarship:** Alexander Bradley, Hunter Edwards

**Aubrey E. Orange and Eula H. Orange Award Scholarship:** Alexandria Hoeher, Rui Serra Maia

**Wallace D. Lowry Geosciences Graduate Scholarship:** Calvin Mako, Selva Marroquin

**Charles E. And Frances P. Sears Endowed Scholarship:** Qing Tang

**David R. Wones Geological Sciences Scholarship:** Alexandra Nagurney, Estzer Sendula

**David and Ruth Henderson Scholarship:** Carolyn Cox, Erin Kelly, Amy Plechacek

**Thomas T. Jeffries Geological Sciences Scholarship:** Elizabeth Evans, Austin Leake

**Edith Louise Meade and Lawrence E. Meade, Sr. Geological Sciences Scholarship:** Kaly Fox

## Other 2017 Awards (partial list, to date)

**US Department of Energy Leland Energy Fellowship:** Richard Jayne

**Soc. of Exploration Geophysicists (SEG) David W. Worthington Scholarship:** Zhen Guo

**Society of Sedimentary Geology Student Research Grant, Alaska Geological Society Student Grant:** Selva Marroquin

**Tillman Teaching Award:** Sebastian Mergelsberg, Josh Jones, Tyler Rasmussen

**Interdisciplinary Sustainable Nanotechnology (VT SuN IGEP) Scholar:** McNeill Bauer

**Fullbright Scholar:** Sheyla Palomino Ore

**National Geographic Society Young Explorers Grant, Colbert Prize for Outstanding Student Poster Presentation, NSF Graduate Research Fellowship Program:** Christopher Griffin

**Virginia Space Grant Consortium Graduate STEM Research Fellowship, Association of Women Geoscientists Winifred Goldring Award:** Caitlin Colleary

**NSF Graduate Research Fellowship Program:** Devin Hoffman

## Selected 2016 Awards (partial list)

**SigHPC Fellowship in Computational and Data Science Fellowship, National Geographic Society Waitt Grant:** Tahiry Rajaonarison

**National Science Foundation Doctoral Fellowship:** Matt LeRoy

**Nanotechnology Entrepreneurship Challenge (NTEC):** Rui Serra Maia, Karel Kletetschka

**Geosciences Outstanding Service Award, College of Science Roundtable Make-A-Difference Scholarship (2015):** Rui Serra Maia

**ExxonMobil/Geological Society of America Student Research Grant:** Theodore Them (2015)

## Mary McMurray Retires

By Nancy Ross



**Mary McMurray** retired on June 30, 2017 after 25 years of loyal, highly professional service to the Department of Geosciences. While Mary's role as an administrative assistant ensured the smooth day-to-day running of the department, she will always be remembered for her dedication to our alumni. The benefits of long-standing and active alumni are beyond compare to our department's health and vitality, and Mary was one of the most important connectors to them. She was a trusted and inspirational contact with new alums when they first moved away from the university as well as to alums who went back 50 or more years, and all in between. Mary also organized and ran the Geosciences Alumni Dinners and played a huge role in managing and mailing tens of thousands of departmental news magazines to alumni for many years. Mary treated all alums with skill, commitment, respect, and grace. As a result, many areas of long-term alumni benefits to the department actually were started by, and/or can be connected to, Mary. Her contributions to the department were exceptional, for which we will always be deeply grateful.



# Faculty Spotlight— D. Sarah Stamps

By Rui Serra Maia (Ph.D. Candidate)

**Dr. D. Sarah Stamps** joined the Department of Geosciences in 2015 as an Assistant Professor in geodesy/geophysics. Using GPS as a primary tool, she established the Geodesy and Tectonophysics Laboratory (GTL) and is rapidly building an internationally recognized program focused on understanding the how and why of continental movement. This work has many broader implications. For example, her interpretations of data from diverse techniques can be used to evaluate volcanic and seismic hazards near inhabited areas.

Her group, which consists of a research scholar, graduate students, and undergraduates, perform research and outreach in places that include Madagascar, Kenya, Tanzania, Uganda, China, Central America, and the Caribbean. These areas provide rich opportunities to study the subsurface phenomena that drive continental break up and drifting. Sarah's group collects millimeter precision surface motions to investigate the physics driving those motions and explain how the mantle dictates surface dynamics. In addition, the GPS technology allows 24/7 monitoring earth movements to anticipate events that can pose risk to the surrounding populations, such as volcanic eruptions.

Dr. Stamps' love and scientific interest in volcanoes is seen on the cover of this newsletter. The spectacular image of a GPS station was collected during a field campaign conducted in June of 2016 on the active Ol Doinyo Lengai volcano in Tanzania, which is part of the East African Rift. This photo also earned her a First Place Award in the 2016 GeoPRISMS Photo Contest held at the American Geophysical Union Fall Meeting in San Francisco. More than a pretty picture, she states, "This is an early stage of continent break-up and thus the perfect place to study why and how continents rupture." Because of recent earthquakes that reflect a higher level of geologic activity, the National Geographic Society has provided partial funding to expand the network to five GPS stations that continuously monitor the site geodynamics in real-time.

Dr. Stamps' fascination for geosciences began in high school during a summer program at the University

of Missouri, Rolla, where she first learned that earth scientists had developed ways to image geologic faults within the Earth. She went on to become the first person in her family to earn a college degree, which she obtained in Earth Science from the University of Memphis in 2007. Dr. Stamps then completed a Ph.D. in geodesy/geophysics at Purdue University, followed by a postdoctoral position at MIT joint with UCLA.



The NSF recognized the importance of Dr. Stamps's research and funded both her Ph.D. and post-doctoral research.

This Fall 2017, the significance of Dr. Stamps scientific efforts was recognized again by the NSF when she was awarded a \$1.4M grant to lead a multidisciplinary scientific and cyberinfrastructure project. This effort aims to speed up access and processing capabilities to large volumes of data that exist in different fields of natural sciences. The research is part of the NSF EarthCube Integration grant, with co-investigators from the VT Dept. of Biological Systems Engineering, Univ. of Colorado, and OPeNDAP – a nonprofit scientific data center. The cyberinfrastructure is a "broker" that acts as an access point for scientists to obtain data from a wide range of databases in distinct formats that are reformatted in ways that allow scientists to use the data. The broker first will be tested in research studies of the participating co-investigators such as watershed dynamics and earthquakes in subduction zones, etc. In particular, Dr. Stamps and her students will use this new cyberinfrastructure to evaluate how the earth's crust moves in response to deeper subsurface processes.

*"I am living my life dream."*

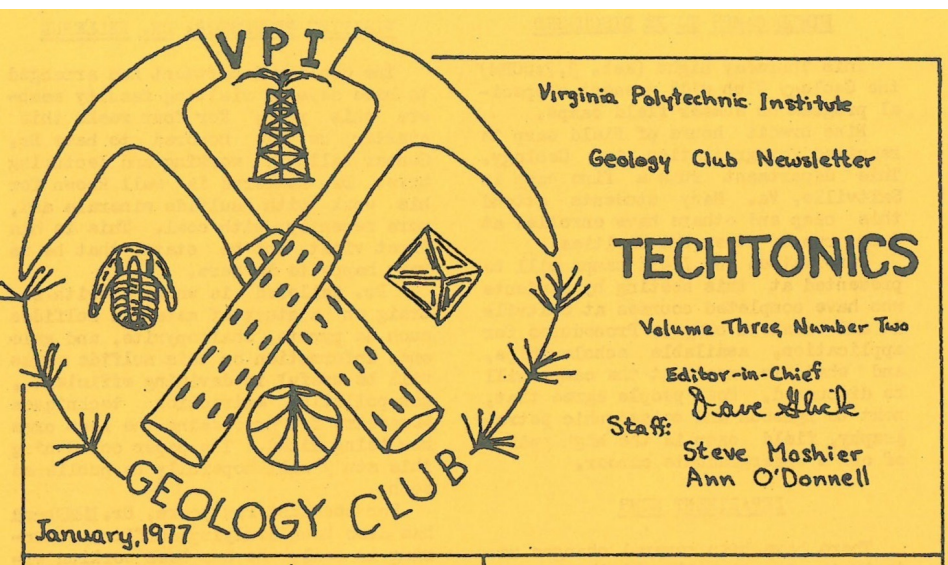
*"We employ modern approaches to perform cutting-edge research and contribute to the education of our next generation of geoscientists."*



# ALUMNI FLASHBACK

By David Glick (B.S., 1979)

The Department provided me with a real “blast from the past” by sending a copy of a newsletter which I edited over 40 years ago. I remember the people involved with the very active and helpful Geology Club, but only bits and pieces about producing the newsletter. One bit is the interesting gadget involved in its production. The newsletter was reproduced by mimeograph, but wasn’t made by the usual method of typing or writing directly on the mimeograph master to make a stencil. Errors were difficult to correct with that process. Instead, the department had a very nifty new electrostencil machine which could take a typed and/or drawn paper original (after errors had been relatively easily corrected) and create the stencil from it. I was very grateful both for use of the machine and the Department staff’s help in using it. Within the next few years, xerographic copying took over and the hassles of mimeographs were happily forgotten by most.



During my Tech years, I had summer jobs with U.S. Steel's coal resource group in Pennsylvania, which led me to do a Masters degree at Penn State in coal petrology. I was then hired there to work with the Penn State Coal Sample Bank and Database. I ended up being in charge of its day-to-day operation. The variety of tasks in that job was very satisfying: driving all over the U.S. in a pickup truck to collect samples from active mines; sample processing; analysis by optical microscopy, physical testing, and chemical methods; setting up databases in new software as technology

progressed; and being in contact with coal researchers all over the world to distribute subsamples and data. This period corresponded with the boom in personal computer use, and I was involved with the local computer club (before the internet allowed answers to computer questions to come from around the world), editing their newsletter for a time.

Eventually my boss retired, funding declined, things went downhill and I left the job. I continued to be involved with an international specialist group which had formed during that period, The Society for Organic Petrology. I was their newsletter editor (now using a wide-format color laser printer, with the ability to include color photographs) and then webmaster for many years, as the newsletter migrated to the web. I also got back to mineral collecting, the hobby which had led me into the field, and have been heavily involved in the local club, Nittany Mineralogical Society (including as editor and webmaster), and Friends of Mineralogy - Pennsylvania Chapter (editor).



# ALUMNI

## NEWS

**Stephen M. Scott** (B.S., 1979 and M.S., 1987) visited the department in October.

Mr. Scott is the donor for the Aubrey & Eula Orange scholarship, which is currently valued at over \$100 K. Mr. Scott worked as an oil company exploration geophysicist for many years and was involved in the discovery of one of the largest natural gas fields of the 90's, the 22 trillion cubic feet Tangguh Fields in West Papua.



**Professor Emeritus Ed Robinson** and Alumnus **Stephen M. Scott**.

**Matthew Steele-MacInnis** (Ph.D., 2013), an Assistant Professor at the University of Alberta, received the Hisashi Kuno Award from AGU for 2017. This early career award is given annually for outstanding contributions to the fields of volcanology, geochemistry or petrology. The award is based on the quality of publications arising from work performed up to seven years past the receipt of the Ph.D.

**Pilar Lecumberri Sanchez** (Ph.D., 2013) an Assistant Professor at the University of Alberta, received the Waldemar Lindgren Award from the Society of Economic Geologists for 2017. This early career award is given annually to a young scientist whose published research represents an outstanding contribution to economic geology. The award is based on research published before the author's 35th birthday.

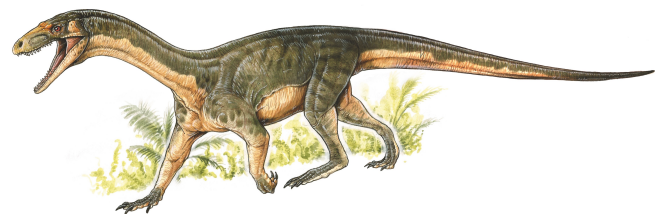
## SEND US YOUR NEWS!

We plan to grow this space into a great place for you to share professional and personal events, big and small, with fellow alumni and friends of Geosciences. So 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](mailto:wstevenh@vt.edu)).

## GEOSCIENCES IN THE NEWS...

### NATURE

Our understanding of the rise of dinosaurs, one of the most successful groups of vertebrates to ever live on land, relies heavily on the discovery and study of their closest extinct relatives. However, fossils of those dinosaur relatives are exceedingly rare, and most are known from just a few bones of the skeleton. Virginia Tech geoscientists **Sterling Nesbitt** and **Michelle Stocker** led an international team of vertebrate paleontologists that discovered and named a new fossil, *Teleocrater rhadinus*, that represents one of the earliest relatives of dinosaurs ever found. Their study, recently published in *Nature*, showed that these dinosaur relatives were abundant, had a wide variety of body forms, and had a wide distribution before dinosaurs took over the world, and their find from Tanzania in East Africa has acted as a catalyst to discover other dinosaur relatives from around the world (e.g. India, Russia). Their publication received worldwide recognition and was covered by more than 200 media outlets. Nesbitt and Stocker returned to the discovery site in June 2017 and discovered much more of the skeleton of *Teleocrater* and the other animals that lived alongside it. Their research can be followed on Twitter (@VTechmeetspaleo).



Full Reference:

**Nesbitt, S. J.**, R. J. Butler, M. D. Ezcurra, P. M. Barrett, **M. R. Stocker**, K. D. Angielczyk, R. M. H. Smith, C. A. Sidor, G. Niedźwiedzki, A. Sennikov, and A. J. Charig. (2017) The earliest bird-line archosaurs and assembly of the dinosaur body plan. *Nature* 544:484-487.  
<https://www.nature.com/articles/nature22037>



# Geosciences— Rockin' in the Alps

By Robert J. Bodnar & John Chermak

During a meeting with Virginia Tech President Sands in December 2015, **Bob Bodnar** mentioned that the VT Steger Center for International Scholarship in Riva San Vitale, Switzerland would be a great location for a study abroad program in geology. As part of Bob's role as Director of the Steger Center, President Sands encouraged him to develop a Geosciences study abroad program. With generous financial support provided through the President's Office, the Department of Geosciences created and implemented the first study abroad program for Fall 2016. Our inaugural cohort of students included **Hunter Moore, Erin Kelly, Charlotte Hayes, Anna Montgomery, Amy Plechacek** and **Connor Sexton**. Geosciences faculty **Rick Law, Ken Eriksson, Nancy Ross, Esteban Gazel**, and **Bob Bodnar** traveled

to Switzerland and taught 2-4 week modules, and graduate students **Sarah Mazza** and **Michelle Fame** each spent half of the semester at Riva to assist the faculty. Highlights of the program included a one-week field trip to southern Italy and the Aeolian Islands to study active volcanoes at Mt. Etna, Stromboli, Lipari and Vesuvius, as well as a visit to Pompeii. The students also participated in several field trips to visit classic geologic locations in southern Switzerland and northern Italy with **Professors Law and Eriksson**, and visited an active petrology research lab in Milan with **Professor Ross**.



Professor Bob Bodnar & Geosciences Students  
with President Sands.



Photo by **Christiana Hoff**

At this writing our second cohort of students is in Riva for fall 2017, and we are currently recruiting students for fall 2018. A major change in the program from the first year is that the students will earn credit for field camp by studying Alpine and northern Italy geology. This provides an outstanding opportunity for our students to satisfy the field camp requirement through field activities in one of the most famous and geologically diverse locations on Earth. A highlight of this year's program is a week long cross Alps field trip led by **Professors Rick Law** and **Mark Cad-dick**.

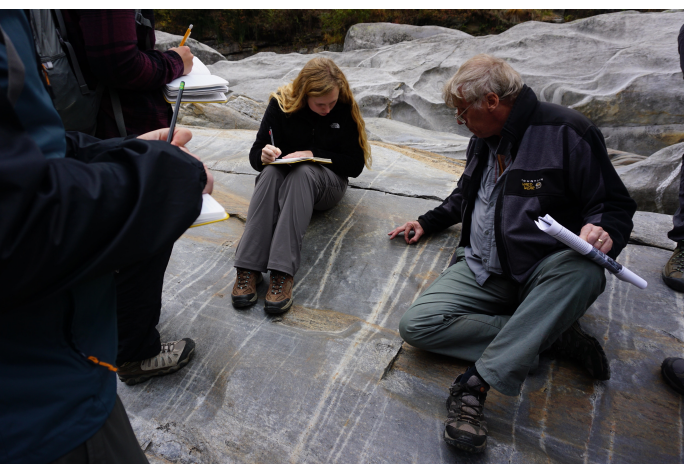


## Comments from Dr. Chermak about Study Abroad...

Hello! This Fall 2017, I had the pleasure of teaching the geosciences and global scholar students for two weeks. As an alum from this department, it was a particularly rewarding experience. After graduating with my Ph.D. in 1989, I worked for 3 years as a post-doctorate researcher in Bern. It was great to reconnect with local experts in water quantity and quality issues, hydroelectric energy, hazard mapping and mitigation. Riva is an inspiring and unique learning environment. For example, we saw an underground hydroelectric facility in Biasca and visited the safety and intervention center for the 57 km (35.4 mi) long underground Gotthard tunnel. These activities fit well with the overall theme of global challenges facing society, including Energy, Food, and Water. This is seen in quotes from students that include, *"The opportunity to travel and work with a diverse group of students changed the way that I tackle projects due to the intersection of varying thoughts and backgrounds. I don't think I would have come to many of the conclusions about myself and the way I learn if I had spent all four years of college surrounded by students in my major who think similarly."* The many benefits of studying geology in the Swiss Alps and Dolomites of northern Italy are obvious to geoscientists, but the personal growth and maturation that occur while studying abroad are perhaps just as important.



Photo by **Professor Mark Caddick**



**Prof. Law** shows evidence for metasomatism. Photo by C. Hoff

*"We want to thank both of you for all of your time and effort in making [our daughter's] Study Abroad trip so wonderful. When [our daughter] first told us that she wanted to study abroad in Switzerland, we were her dream crushers and said NO! However, [our daughter] not accepting no for an answer, found a way to go (which we were very grateful for). The time and effort that you spent is greatly appreciated. [Our daughter] left as a young eager student and came back a young lady. She has already expressed interest in going back to Europe in the future. We can see how much she has grown in the last few months. [Our daughter] is looking forward to being a mentor to future students hoping to study abroad. Thank you again for this wonderful opportunity."*

Some students are unable to participate in the Geosciences Study Abroad program because of limited financial resources. The Global Education Office and the Department of Geosciences try to assist students with financial aid to the extent possible, but sometimes that is insufficient. If you would like to help a deserving student afford the kind of international experience that you have read about here, please see the back cover of this newsletter for instructions on how to help.

# FACULTY NEWS

## Awards

### **John Chermak**

Collegiate Associate Professor  
VT Teacher of the Week Awarded by CIDER

### **Patricia Dove**

C.P. Miles Prof. of Science & University Distinguished Professor  
Thomas Jefferson Medal for Achievements in Natural Sciences

### **Gary B. Glesener**

Director, Modeling & Educational Demonstrations Laboratory  
TLOS Faculty Fellow Award

### **Michael Hochella**

University Distinguished Professor  
SCHEV Outstanding Faculty Award

### **F. Marc Michel**

Assistant Professor of Nanoscience  
NSF Career Award  
Luther and Alice Hamlett Junior Faculty Fellow in the Academy of Integrated Science

### **Sterling Nesbitt**

Assistant Professor of Geobiology  
Donath Medal, Geological Society of America

### **Brian Romans**

Associate Professor of Sedimentary Geoscience  
IODP Distinguished Lecturer

### **Nancy Ross**

Professor of Mineralogy  
Fellow of Geological Society of America

### **Madeline Schreiber**

Professor of Hydrogeosciences  
Editor's Citation for Excellence in Refereeing, AGU

### **D. Sarah Stamps**

Assistant Professor of Geophysics  
NSF EarthCube Community Service and Leadership Award  
NSF CIG Distinguished Lecturer

### **Robert Weiss**

Associate Professor of Natural Hazards  
VT Scholar of the Week

### **Shuhai Xiao**

Professor of Geobiology  
Virginia Outstanding Scientist Award  
Best Paper Award National Science Review



**Professor Shuhai Xiao** with Virginia Governor-elect Ralph Northam.  
Photo by Rebecca D'Angelo



**University Distinguished Professor Michael Hochella, Jr.** receives the SCHEV Outstanding Faculty Award (State Council for Higher Education). Left to Right: Anne Holton (Sec. of Education, Commonwealth of Virginia), Mike Hochella (VT Geosciences), Hunter A. Applewhite (Pres. of Dominion Foundation), G. Gilmer Minor (Chair of SCHEV), and Peter Blake (Director of SCHEV).  
Photo by SCHEV



# Leadership

## **John Chermak**

Collegiate Associate Professor  
Vice-chairman Geology & Society, GSA;  
Member, Geology and Public Policy Committee, GSA

## **Patricia Dove**

C.P. Miles Professor of Science & University Distinguished Professor  
President, Virginia Academy of Science, Engineering, and Medicine ([vasem.org](http://vasem.org))

## **Michael Hochella**

University Distinguished Professor  
Founder & Director, VT National Center for Earth and Environmental Nanotechnology Infrastructure

## **Scott King**

Professor of Geophysics  
President-Elect, Studies of Earth's Deep Interior (SEDI) Focus Group, AGU

## **Richard Law**

Professor of Geology  
Chief Books Editor, Geological Society of London, 2012-present

## **Nancy Ross**

Professor of Mineralogy  
Department Head of Geosciences (2011-2017)  
Principal Editor of Elements (2016-19)  
Chair Single Crystal Neutron Diffraction Review, ORNL (2017)

## **James Spotila**

Professor of Geology  
Science Lead Editor, GEOLOGY

## **D. Sarah Stamps**

Assistant Professor of Geophysics  
NSF EarthCube Leadership Council (elected)  
NSF EarthCube Science Committee

## **Robert Weiss**

Associate Professor of Natural Hazards  
Leader of Coastal@VT Initiative  
Executive Committee of AGU's Natural Hazards Focus Group

## **Shuhai Xiao**

Professor of Geobiology  
Co-editor, Paleobiology; Assoc. Editor, Comptes Rendus Palevol; Editorial Board Member, Evolution & Development; Deputy Editor-in-Chief, Journal of Stratigraphy; Assoc. Editor, Palaios; Assoc. Editor, PaleoWorld; Assoc. Editor Precambrian Research



**Professor Mark Caddick** at the ETH Geoscience Museum, Zurich, Switzerland.  
Photo by Christiana Hoff



**Professor Richard Law** with Geosciences Student **Ronald Navarro**.  
Photo by Christiana Hoff



# GEOS 2024 — Earth's Dynamic Systems

By Mark Caddick & Sterling Nesbitt



In 2015, our department embarked on a great experiment by completely reshaping the introductory classes for our geoscience majors. We welded the long-taught physical geology and historical geology courses into one 'mega' 8-credit course named Earth's Dynamic Systems. This unique course combines the essential physical and life processes driving the evolution of our planet through lecture (6 hours per week), hands-on minds-on labs (two per week), and field trips sprinkled throughout the semester.

Team-taught by **Mark Caddick** (metamorphic petrologist) and **Sterling Nesbitt** (paleobiologist), this course weaves the story of the history of our planet by focusing on a number of themes (e.g., the dependence of life on physical process and how life has, in turn, fundamentally changed our planet), critical thinking skill development (e.g., lecture activities like reconstructing the diversity of the last 600 million years), scientific communication (student-led weekly presentations), and writing skill training (conducting a semester-long research paper).

Most importantly, we teach the foundation of how to think and problem-solve as a geoscientist. All of these enriched learning experiences occur in an interactive classroom (SCALEUP) where students work together in groups and use the surrounding white boards daily. Furthermore, we also teach professional development starting the first week of class (e.g., how to read a *Nature* paper, how to start independent research, how to be an effective student).

Measurably, the students that graduate from our 2015 and 2016 classes are more engaged in later geosciences classes, developed a great understanding of the evolution of our planet, and are better prepared for their futures. Further outcomes of this course has led to tight-knit cohorts, higher average test scores, an incredibly high attendance record (~98% class attendance to date), and an appreciation of how integral basic biology, physics, and math classes fit into the scope of their academic trajectories. We are proud of the new crops of students.





*"Dr. Sterling Nesbitt and Dr. Mark Caddick are excellent professors who present the course information in a way that all students can learn and appreciate. They provide 'big-picture' explanations and then bring forth great detail in a way that is easily understood. While the course is rigorous at times, the outcome is a greater understanding of the basic fundamentals of the geosciences that will overshadow the general geoscience information known by others who have not taken this course."*

*"The class atmosphere is not like that of a typical Virginia Tech course, as there are many opportunities to ask questions if a topic is not understood, or if there is a general interest to learn more about it."*



## WHERE IN THE WORLD?

We want to see where you have been and your geosciences training in action. Send us pictures of yourself or others (preferably in VT gear) and we will feature it in our upcoming "GeoHokies in the World" section of the newsletter. Please email [mjsmth@vt.edu](mailto:mjsmth@vt.edu) the image, a short description, the name of the people in the image, and their graduation year from geosciences.

# THE MUSEUM PIECE

By Llyn Sharp



Donald V. Dalton at the Alumni Association Museum mineral exhibit.

Long-time donor and Museum supporter **Donald V. Dalton** (Geology 1960) returned to campus again October 2017 to work with the Geology Club conducting a fundraiser for the Museum. The GeoFair and Mineral Sale was attended by over 600 people including 25 teachers and 200 kids! Don started this annual event about 20 years ago with **Dr. Susan Eriksson**, now retired Director of the Museum. He has continued leading it, building a loyal following in the department and the community.

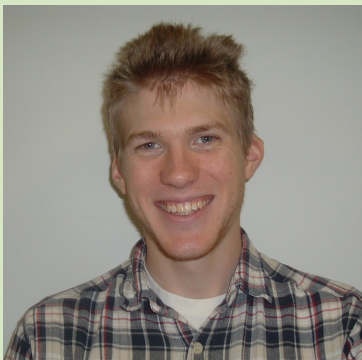
Don has also donated hundreds of beautiful minerals from his personal collection to the Museum, as well as purchasing minerals to enhance the representation of Virginia samples at Virginia Tech. Some exceptional examples from those donations are in a

short-term exhibit at the Alumni Association Museum for Fall 2017 (pictured above). We are happy that Don got a chance to see this during his visit!

Other minerals from Don's donations were used to build a new "Mineral Resources of Virginia" exhibit on permanent display in the Museum in Derring Hall. Undergraduate **Thomas Hale** (Political Science 2019, Geology Club) developed and curated this exhibit. Geosciences student **Alex Bradley** (Geosciences 2018) and alumna **Emma Tulskey** (M.S. Geosciences 2017) also worked on it along with staff and faculty. It is a great resource for K-12 teachers who bring their classes in on field trips.

We truly appreciate Don's commitment to supporting the Museum in such a variety of ways!

## Bubbles Matter



Lowell Moore, PhD Student

**Lowell Moore's** paper "Bubbles matter" has been recognized as a highly cited paper by Web of Science. According to WoS, as of May/June 2017, this highly cited paper received enough citations to place it in the top 1% of the academic field of Geosciences based on a highly cited threshold for the field and publication year.

Moore L, Gazel E, Tuohy R, Lloyd A, Esposito R, Steele-MacInnis M, Hauri E, Wallace P, Plank T & Bodnar RJ (2015) Bubbles matter: An assessment of the contribution of vapor bubbles to melt inclusion volatile budgets. *American Mineralogist*, 100, 806-823.

Link: <http://dx.doi.org/10.2138/am-2015-5036>



# Renewal and Transition— The Nancy L. Ross Years

By Patricia Dove



**Professor Nancy L. Ross** completed her 5 1/2-year term as the Department Head of Geosciences in July 2017. Dr. Ross provided steady leadership as the profile of the Geosciences changed dramatically with a number of new hires that will reshape the department for decades to come. Calling on her eight years of experience as Associate Dean in the College of Science, Nancy was able to hire many new faculty during this time. Seven tenure-track and research faculty joined the department at the assistant professor level including **Mark Caddick**, **Ben Gill**, **Marc Michel**, **Sterling Nesbitt**, **D. Sarah Stamps**, **Ryan Pollyea**, and **Michelle Stocker**. She also obtained permission to make an outside hire for the new head of department, thus making it possible to bring in **Steve Holbrook** as a Full Professor from the University of Wyoming. Other hires include **Gary Glesener**, Director of the newly-formed Geosciences Modeling and Educational Demonstrations Laboratory, collegiate associate professor **John Chermak**, and a new technical staff member, **Natalie Sievers**.

The department also benefitted from Nancy's efforts to upgrade the facilities for instruction. She obtained funds to replace the 30+ year-old polarizing microscopes used in the mineralogy, petrology and sedimentary /stratigraphy labs and for new microscopes for the paleontology laboratories. Nancy also procured funds to upgrade the computer teaching laboratory and supported the transition to new pedagogies such as the First Year Experience for majors in geosciences and the Geosciences Study Abroad Program in Riva San Vitale, Switzerland.

Nancy tirelessly promoted her faculty, staff, and students at every opportunity including her leadership of two successful nominations for the prestigious Virginia Outstanding Scientist Awards (see page 8). She also reached out to alumni and friends during her term and is looking forward to greater engagement in the future. Thank you, Nancy, for your service!



## 2017 Fall Newsletter

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## PARTING SHOT



Looking South to Riva San Vitale from Gotthard Pass, Switzerland.

Photo by **Professor Mark Caddick**

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## SUPPORT THE FUTURE. SUPPORT GEOSCIENCES.

Your home department gave you a great education and a great start. Your professors, friends, and experiences at VT launched a lifetime of success. Pay it forward for generations to come by helping the Department of Geosciences today.

### There are many ways to make an impact:

**The Geosciences Annual Fund.** To make a simple yet impactful donation, give to our Annual Fund. This is our most flexible and important account, because we can apply it to the most urgent need, whether that's a scholarship for an undergraduate in need, travel money to send a grad student to a national conference, or a new microscope for the optical mineralogy lab. Can you afford to buy us a cup of coffee? Then donate \$5! Any amount helps!

**Scholarships.** Make a difference for a deserving student! Create a named scholarship and help a student pay for college or gain life experiences like Study Abroad, Field Camp, and undergraduate research. Join your alumni colleagues (see page 5) in the legacy of creating a named scholarship.

**Designated Gifts and Sponsorships.** What is most important to you when you think about how to advance Geosciences at Virginia Tech? The classrooms? The public areas in Derring Hall? The Distinguished Lecture series? Computer labs? The Museum? A new building? Let us know your passion and we will help you follow it.

**In-kind Gifts and Volunteering.** Have a working car or pickup truck that you would like to get a tax break on? Interested in helping with the museum or other outreach activities? Do you have time on your hands since the kids have gone off to college? Talk to us about your ideas.

**Bequests.** Perhaps you'd like to sustain the long-term strength of Geosciences but can't make a significant gift today. A charitable bequest under your will or revocable trust enables you to keep your commitments today while supporting the VT Geosciences tomorrow.

**Endowment.** The Department can partner with the VT Foundation to provide donors an opportunity to invest in our long-term future with a permanent charitable legacy. The principal of Endowment Fund gifts remains invested in perpetuity with annual earnings used to support operations or any donor-specified purpose. Alumni and friends can be confident that their donations to an endowment are being managed by experienced professionals, and that their money will have the greatest future impact on the VT Department of Geosciences.

**Faculty Chaired Positions.** This special type of endowment creates a prestigious titled faculty position that will attract an eminent scholar to join the Department. Remember a loved one or favorite faculty member in perpetuity by creating a chaired position while also enhancing the reputation of the department. Examples include the C.P. Miles Professor of Science position held by **Dr. Patricia Dove** and the G.C. Garvin Professorship held by **Dr. Robert Bodnar**.

This is your Department of Geosciences and we look forward to connecting with you. Please contact **Department Head Steven Holbrook** ([wstevenh@vt.edu](mailto:wstevenh@vt.edu), 540-231-6521) to discuss possibilities.

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