

The TECHtonic

2020 Spring Newsletter
Department of Geosciences



Welcome to The TECHtonic!



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

See back cover.

As I write this in summer 2020, we are several months into the Great Coronavirus Pandemic of 2020 -- an event that has changed life everywhere, including here in Derring Hall. Like virtually every college and university in the country, VT emptied its campus in mid-March, making a sudden transition to remote learning in the interest of public health. The pandemic has had multiple impacts on our operations, from slowing research, increasing workloads for faculty and staff, and forcing students to suddenly adjust to online learning. The graduating class of 2020 had the first virtual commencement ceremony in our history. Although it wasn't quite the same as an in-person event, we worked hard to create a ceremony that did justice to our long tradition of graduation celebrations. I think we pulled it off pretty well. If you'd like to see a recording, you can find it here: <http://bit.ly/VTGeo2020Commencement>.

Through this challenging time, I have been extremely proud of our entire department, especially our dedicated faculty, staff, and graduate students, who have stepped up in difficult circumstances to ensure that we are still meeting our mission of providing an excellent education in geoscience, making new discoveries about the Earth and planetary bodies, and sharing that knowledge with the world. While we don't know what the future holds, right now we expect a Fall semester that will combine in-person teaching with online and "hybrid" approaches. We are all enduring "zoom fatigue" and are eager to get back to "normal," whenever that will be. (And I will say that I never thought I would hear so many people express a longing to see the inside of Derring Hall again...)

It was also a great disappointment to have to cancel our Spring Banquet and Alumni Dinner, especially after two highly successful events in the German Club Manor. I greatly miss the connection to our alumni, and I would like to invite all of our alumni and friends to contact me directly if you'd like to have a 15-minute zoom chat, just to touch base. Let us know how you are doing in these strange times!

Finally, the pandemic has hit our department hard in gift support, as charitable contributions dropped off a cliff in the spring, partly due to the cancellation of VT's Giving Day this spring. While this hampers our ability to respond to the challenging times as fully as we would like, we are painfully aware that many of our alumni are experiencing true economic hardship, especially given the impact this pandemic has had on the energy industry - and our hearts go out to those of you struggling. However, for those of you who are fortunate enough to be in a position to give, VT-Geosciences needs your support now more than ever.

I know that Hokies will weather this storm and come back stronger than ever. I'm proud to lead this department and humbled by the achievements of our incredible alumni.

W. Steven Holbrook, Head of Department

ON THE COVER | A Photo micrograph of a green seaweed fossil dating approximately 1 billion years. The image was captured using a microscope as the fossil itself is 2 millimeters long, roughly the size of a flea. The contrasting color of the fossil was created by adding a drop of mineral oil to host sandstone, to create contrast.

Findings by Dr. Xiao and Dr. Tang.

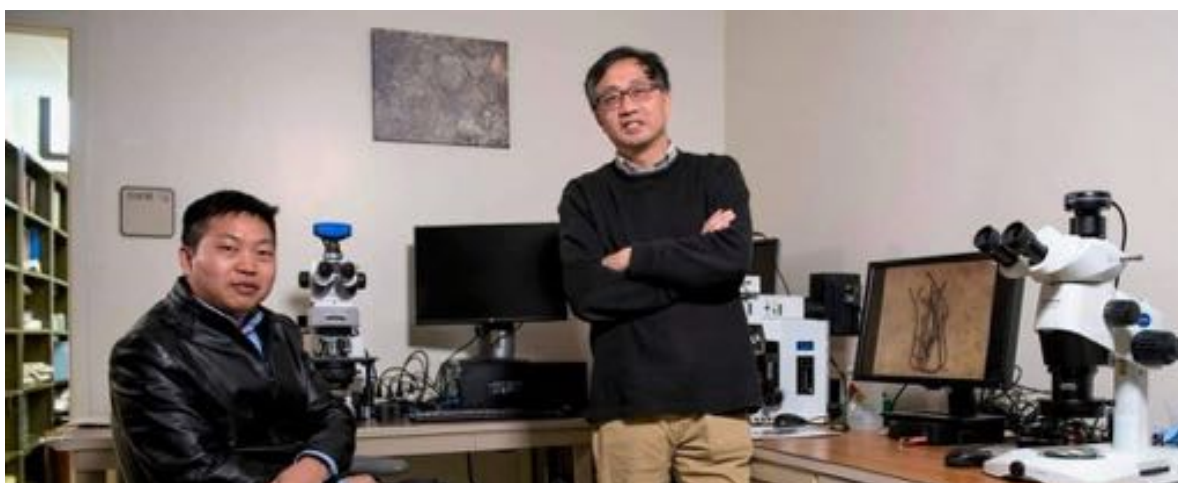
One Billion Years Ago

In a recent *Nature Ecology & Evolution* article, **Dr. Qing Tang** and **Professor Shuhai Xiao** from Virginia Tech Geosciences and their collaborators reported the oldest known green seaweeds found in one-billion-year old rocks in North China.

Green plants (e.g., land trees and green seaweeds) are everywhere on modern Earth. They play important roles in maintaining the ecological balance of our planet by producing organic carbon and oxygen through photosynthesis. But when did the first green plants evolve? This question has been debated by paleontologists and biologists for many years. Dr. Tang and his colleagues inform this question by investigating a new fossil (*Proterocladus antiquus*) they discovered from ca. one billion year old rocks. The new fossil preserved an array of morphological characteristics, including a multicellular thallus, multiple orders of branches, a root-like anchoring structure, large siphonous cells, and a unique branching style. Together, these features indicate the new fossil represents a group of green seaweeds called siphonodaleans.

Prior to this study, the oldest green seaweed was about 800 million years old; thus, *P. antiquus* pushes back the appearance of green plants by 200 million years.

Left: Ecological reconstruction of the green seaweed *P. antiquus*

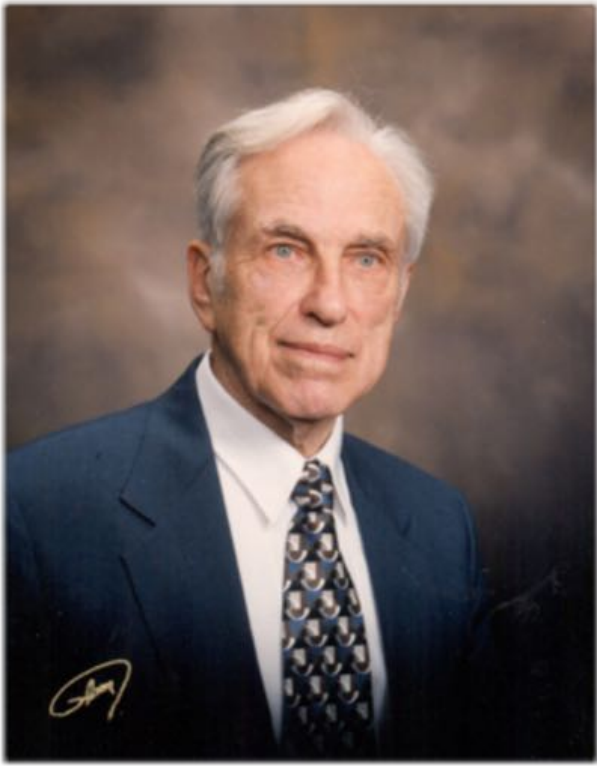


Qing Tang (**PhD 2018**) and Dr. Xiao discovered the one billion-year-old green seaweed.



Cover photo, Seaweed fossil dating one billion years.

Dr. Bloss remembered 1920 - 2020



VT Geosciences mourns the passing of Fred Donald "Don" Bloss, a longtime professor of Geosciences. In 1972, he was the first Virginia Tech professor to be an appointed Alumni Distinguished Professor (ADP).

Dr. Bloss passed away peacefully in his sleep on April 22, 2020, just a few weeks before his 100th birthday. Bloss was born May 30, 1920. A proficient writer of poetry whose work appeared in the Chicago Daily News as a teen, he accepted a scholarship at the University of Chicago to major in English.

While a first-year student, Bloss heard a lecture by the geologist J Harlen Bretz, who was the first to correctly interpret the barren, soil-free region of eastern Washington state as remnants of ancient cataclysmic floods. Despite having no prior interest in Earth sciences, Bloss changed his major to geology soon after. **Norman L. Gilinsky** (Geosciences Professor 1983-1995 and Microsoft Executive) shared his thoughts on Dr. Bloss: "Don was a brilliant scientist, teacher, and writer. He was also a gentleman. He treated Susan and me like gold when we first arrived at Virginia Tech in 1983 and he was a wonderful colleague throughout my entire tenure."

Don wrote with an incredible clarity that every writer should emulate. His *Introduction to the Methods of Optical Crystallography* (1961 and later revisions) taught generations, me included, how to unlock the hidden world of minerals under the microscope. And much later—after many scientists had moved on to newer technologies—Don reinvigorated optical crystallography with his incredible Spindle Stage, a device that unleashed further insights. It's not easy to visualize atomic lattices in three dimensions, and it's not easy to track a ray of light as it splits into multiple paths while passing through a crystal. But Don's crystal clear writing brought these concepts within reach.

"I worked on the third floor. I was almost 40 years younger than Don, so it was easy for me to take the stairs. But Don also took the stairs—to the fifth floor! When I asked him why he didn't take the elevator he told me that it was good exercise. Maybe stair climbing had a little bit to do with his longevity. Having Louise at his side for 74 years was surely a factor. Don was a visionary scientist and very kind man. There was none better."

Mickey Gunter (PhD 1987, Emeritus University Distinguished Professor of Geological Sciences University of Idaho and a former student and lifelong friend of Dr. Bloss) shares his thoughts. "He earned this prestigious first honor (ADP) based on his teaching skills, research, and textbooks and his professional service." Among Bloss's service roles were serving as president of the Mineralogical Society of America (MSA) in 1977 and as executive editor of the organization's journal, *The American Mineralogist*, from 1972 to 1975. Gunter wrote the Foreword for Bloss's 2012 memoir, *World War II, Mineralogy, and Me: A Memoir*, which contains accounts of Bloss's childhood in Chicago during the Great Depression, his service in an English medical military unit during World War II (he was a conscientious objector), and his research career in optical mineralogy.

Emeritus Professor **Arthur Snoke** recently had lunch at the Showalter Center in Blacksburg, and Don and Louise Bloss were at the next table. Arthur reported, "Don came over and told us, 'In my youth, I learned more and more about less and less, and now I learn less and less about more and more.'"

Student News

Tahiry Rajaonarison, (PhD 2020) has found evidence that large sections of the asthenosphere deform significantly over geologic time following a governing flow law known as dislocation creep.

His manuscript, published in January 2020 in the *Journal of Geophysical Research*, is entitled "Numerical Modeling of Mantle Flow Beneath Madagascar to Constrain Upper Mantle Rheology Beneath Continental Regions".

He used advanced, 3D regional geodynamic modeling of Madagascar and surroundings from the surface down to 660 km deep. His model output was used to predict indicators of upper mantle flow and compared with independent seismic anisotropy data that typically portrays characteristics of deformation in the upper mantle as well as weakened regions in the crust.

His results suggest the dominant control of the measured anisotropy may be from asthenospheric flow beneath northern and southern Madagascar. The conclusions have broad implications for understanding asthenospheric characteristics beneath the continent.



Tahiry Rajaonairson in Madagascar installing a remote Global Positioning Sensor.



Shelly Worek (B.S. 2020), left, was accepted for the ETH - D-ERDW (Swiss Federal Institute of Technology Zurich) Scholarship for Masterstudies in Earth Sciences. She was inspired to pursue graduate school in Fall 2018 while participating in the VT Geosciences Study Abroad Program.

Shelly Worek shown during travel to Zermatt, Switzerland, near the summit of Gornergrat for an amazing view of the Matterhorn .

A Warm Welcome to our New Faculty

Bemis, Moore, Reid, and Yarborough



Sean Bemis

Field Lab Manager - Sean Bemis

Dr. Sean Bemis joined the department in August 2019, after moving across campus from the Global Forum on Urban & Regional Resilience. He is supporting a range of field operations for teaching and research utilizing geophysical/hydrological equipment and for those seeking to collect data via drone surveying.

Sean is developing a proposal seeking to obtain a small 'fleet' of drones for teaching and research use in the department. With the drone park and Virginia Tech already well-positioned as a leader in research-based use of drone technology, these capabilities would also provide new teaching and student recruitment opportunities for our department. Sean also maintains an active research program with a focus on paleoseismology, active tectonics, and Quaternary geology.

He is the lead PI on an NSF-Tectonics award for a comprehensive examination of a fault system that cuts obliquely across the Himalaya in western Nepal, and has support from the Southern California Earthquake Center (SCEC) for conducting high-resolution displacement measurements using multiple lidar datasets for a portion of the creeping section of the San Andreas fault.



Lowell Moore

Microbeam Lab Manager - Lowell Moore

Dr. Lowell Moore (PhD 2019) became our new Microbeam Laboratory Manager in the fall of 2019. He will be well-known to many of you, having completed a Ph.D. in our department earlier that year (advised by **Dr. Robert Bodnar** and Dr. Esteban Gazel).

His primary responsibility is the resuscitation, maintenance and operation of our electron microprobes, and he has already made significant strides in this regard: The microprobe that has resided in Derring Hall for 32 years is finally up, running and producing data again. We know that this can't last forever though, and Lowell has recently contributed to a major new federal grant proposal to purchase a replacement for this instrument - keep your fingers crossed folks! Lowell has also recently revived our scanning electron microscope and X-ray fluorescence facilities, with both instruments now producing data for geoscience students and other departments around campus.

Lowell has formalized standard operating procedures for each of these instruments, has begun training students in their usage, and is now the point-person for all inquiries about their use. Please join us in welcoming Lowell!

Lab Managers

- New Initiative to Support Instrumentation

Stable Isotope Lab Manager - Rachel Reid

Dr. Rachel Reid joined the department August 2019 as a research scientist and is now in charge of managing the department stable isotope facility. Rachel was previously a post-doctoral researcher at Washington University in the Department of Anthropology. She received her bachelors in Geology from Carleton College and M.S. and Ph.D. in Earth Science from the University of California Santa Cruz.

Rachel's research interests are in paleoecology and paleoclimatology and she primarily applies stable isotope techniques to address questions in these fields. Some examples of her studies include tracing past changes in the diets of coyotes in California using carbon and nitrogen isotopes and reconstructing past climate change in East Africa by examining the oxygen isotopes in tooth enamel from different animals.

In the VT Isotope Lab, Rachel is key to improving research output and mentoring students working in the lab. She has already collaborated with many of our students and faculty, as well as others across campus and outside of Virginia Tech. She has plans to offer a new course on stable isotope geochemistry for our students during the upcoming academic year. Rachel is also a new member of the Global Change Center, a university-wide, interdisciplinary research



Rachel Reid

Paleo Lab Manager - Vicki Yarborough

Vicki Yarborough joined the paleobiology and geobiology research group in November 2019 from Duke University. Vicki, as our lab manager and fossil preparator, is an integral member of our team and is tasked with helping us stay organized, clean fossils from all over the world, is the point person for answering questions about best practices for fossil cleaning, preservation, and curation of these important pieces of Earth history.

Since starting, Vicki has helped us fully modernize our lab, has increased our capacity for cleaning fossils, has been instrumental in recruiting and training local volunteers and students, and facilitating independent research of our talented undergraduate geoscience majors and other majors across campus.

This fall, Vicki will help teach a new course titled 'Paleontological Laboratory Techniques' aimed at equipping our undergraduates with a new set of skills to further pursue Earth History research.



Vicki Yarborough

D. Sarah Stamps and Sterling Nesbitt

Dr. D. Sarah Stamps arrived at Virginia Tech in 2015, when she joined the Department of Geosciences as an Assistant Professor in geophysics. Using the Global Positioning System (GPS) and geodynamic modeling as primary tools, she established the Geodesy and Tectonophysics Laboratory (GTL), which is rapidly becoming an internationally recognized program focused on understanding how and why continents move.

Recently, she received a prestigious NSF CAREER Award for the project, *Volcano-Tectonic Interactions During Early Phase Continental Rifting*. The research is aimed at investigating the Natron Rift, a part of the East African Rift System in Tanzania, where early-phase rifting is expressed. This project will tackle two fundamental issues using computational modeling, as well as new and existing surface motion observations derived from GPS:

- 1) elucidating volcano-tectonic interactions during early phases of continental rifting and 2) advancing our understanding of volcanic eruptive processes. An integrated four-step approach to computationally model the volcano-border fault system will be used. First, simplistic models of the system's geometry will be performed to determine the subsurface plumbing system of the volcano. Second, her team will implement 3D physics-based models of the same system to assess stress interactions between the volcanic plumbing system and surrounding faults. Third, Stamps will lead eruptive processes modeling to better understand how explosive an eruption might be and what factors are most important in predicting the next eruption. Finally, her team will apply a technique that detects anomalous inflation and/or deflation behavior of the volcano. To complement the modeling efforts, Stamps and her team will collect new GPS measurements in the Natron Rift to understand how the rift is extending and how it responds to volcanic movements.



Volcano in Eastern Africa

In addition to the research objectives, Stamps's CAREER Award involves several educational activities, which encompass interactions with high school, undergraduate, and graduate students from underrepresented populations in the geosciences, aimed at increasing diversity in the field. At the high school level, Stamps's lab will be participating in the Summer Camps with the Geosciences program developed by the Virginia Tech Department of Geosciences' Modeling and Educational Laboratory in an effort to inspire high school juniors and seniors to pursue geosciences as a

career. At the undergraduate level, she will implement a Spring Break program to teach the students coding and data analysis skills. Finally, at the graduate level, a PhD student will be trained in GPS data analysis and numerical modeling. The graduate student will be afforded numerous opportunities to engage in international collaboration, education, and research.

This project has the potential to move the needle on advancing our understanding continental rifting processes in its early phases and to advance diversity initiatives in the geosciences through a comprehensive educational program.



Assistant Professor, **D. Sarah Stamps**

Receive Prestigious 2020 NSF CAREER Awards



Sterling Nesbitt and students collect a large reptile skull from the Triassic Period (~216 million years ago) from the western US last year in the same place the CAREER research will take place.

Dr. Sterling Nesbitt was awarded a prestigious National Science Foundation CAREER grant titled *Persistent Vertebrate Communities in Deep Time and the Great Triassic-Jurassic Vertebrate Transition* (\$622,222 – a five year grant). The project will unlock how communities respond to both minor and major environmental changes over both short (seasons to decades) and long (thousands to millions of years) timescales. The research combines tools used by ecologists studying living communities with tools used to study extinct communities that can only be reconstructed using the fossil record. The research aims to reconstruct vertebrate communities in the last 20 million years of the Triassic Period (252-200 million years ago) prior to the end-Triassic mass extinction

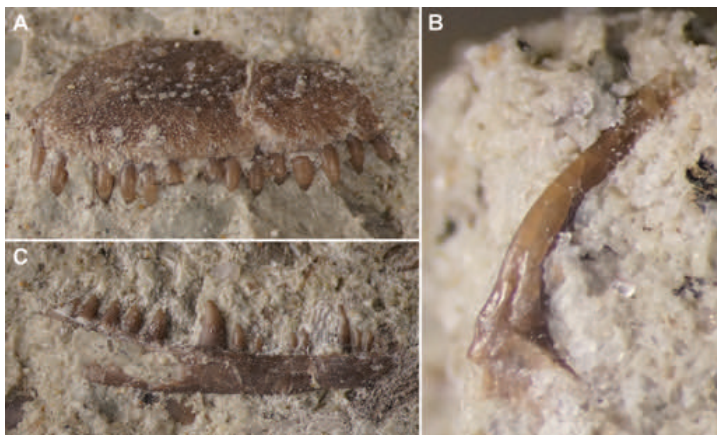
and measure their characteristics. These Triassic vertebrate communities are important to understanding living vertebrate communities because they appear to be unchanged during both quick and gradual changes. Studying these communities will help answer two questions: (1) What makes the communities successful during a time of quick and long-term environmental changes? and, (2) Are the survivors of great changes a product of those earlier successful communities? The team will answer these questions by finding new fossils and measuring the geological data associated with them, reanalyzing fossils previously discovered, and modeling interactions of community members over millions of years of geologic time. This research will be integrated with

educational activities at local, regional, and national levels and will train graduate and undergraduate students and interested volunteers. An experiential K-12 teacher field school will take place in the National Park system, and teaching kits will be built to demonstrate the importance of the fossil record to our understanding of the current natural world.

The large team includes **Dr. Michelle Stocker**, **Ben Kligman**, **Llyn Sharp**, and **Jennifer Van Mullekom** from Virginia Tech and other national partners including Greg Wilson, William Parker, Adam Marsh, Randall Irmis, Peter Roopnarine, Kenneth Angielczyk and Ashley Dineen.



Team members **Ben Kligman** (left; graduate student) and **Dr. Michelle Stocker** (right; assistant professor) collecting fossils from the Triassic Period (~216 million years ago) from the western United States. Photo by Khanh To.



Incredibly preserved small vertebrates (only a few millimeters long) from the Triassic Period (~216 million years ago) from the western United States. These fossils will help reconstruct ancient communities. A, fish jaw; B, frog hip bone; C, reptile jaw with teeth.

Faculty News

Geosciences faculty join university-wide efforts to protect against Covid-19

As you probably know, the covid-19 pandemic caused unprecedented changes in Blacksburg after Spring Break. Courses were converted to online formats for the rest of the semester, and most students did not return to campus for the second part of the semester.

What you probably didn't know is that faculty and other researchers in Blacksburg doubled down during this time to meet both the needs of their students in teaching and the emerging threat of the pandemic to the region. Many VT faculty jumped out of their normal roles and routines to join all-hands-on-deck responses to protect the region and the Commonwealth of Virginia. At stake were the uncertainties regarding the rate of Covid spread across the US and concerns that the virus would arrive in Virginia in the face of insufficient PPE supplies nationwide.

Among the faculty that contributed to the efforts was Associate Professor of Nanoscience and Geosciences, **Marc Michel**. Led by Professor Chris Williams of Mechanical Engineering, researchers from the College of Science, College of Engineering collaborated with Carilion Hospital and VT Carilion with the goal of rapidly developing and testing critically needed PPE for medical workers. Ten teams quickly formed. Although they could not hold regular meetings, or meet with hospital staff, the groups nonetheless held regular brainstorming and tasking sessions via the collaborative online platform Slack.

Using the advanced 3-D manufacturing capabilities of his Nanogeosciences research laboratory, Marc led Team SnorkelMask, whose goal was focused on repurposing full-face off-the-shelf snorkel masks into reusable stopgap PPE solutions. This work addressed the critical shortage of face shields facing hospital and first-responder personnel. Marc also led Team NasalSwabs with the goal of addressing the shortage of test swabs that were critically needed to ramp up Covid-19 testing. Having

the specific type of printer required and expertise in designing and fabricating experimental devices with low tolerances and specific mechanical properties, Marc's expertise was critical to bringing 3D-printed swab capabilities to campus. These efforts were combined with ongoing Covid-19 testing being led by Carla Finkelstein, VT Biological Sciences.

As further evidence that the spirit of Ut Prosim runs broad and deep, Geosciences alumni also contributed to the efforts. Informal brainstorming sessions with Dr. **Dongbo Wang**, now a staff scientist at the Food and Drug Administration, contributed to the effort. While at Virginia Tech, Dr. Wang was a member of the inaugural class of VT ICTAS Fellows and is a former Ph.D. student of University Distinguished Professor **Patricia Dove**. Dongbo continues to interact with the university on a regular basis and was a cheerleader for the effort.



Team Snorkel/Mask design



Marc Michel removes a new set of nasal swabs from the 3-D printer to assist with the VT testing effort.

Photo by **Steven Mackay**, COS

Staff News

Geosciences Welcomes Bera Cuskovic!



Bera Cuskovic, Business Manager

We are pleased to introduce **Bera Cuskovic**, who started as the new business manager of the Geosciences Department in November 2019.

Bera was born in Bosnia and then moved to New York City, where she received her BA in Accounting from New York University. Bera began her journey at Virginia Tech in 2011 at the Office of Sponsored Programs as a Post-Award Administrator, where learning about research and its impact on society gave her tremendous motivation to learn more and serve the university. She then became a Grants and Contracts Administrator in the College of Veterinary Medicine in September of 2017. In this role, Bera was afforded with exceptional opportunities to gain new skills and experiences that have helped prepare her for her current role as Business Manager of the Geosciences Department.

In addition to overseeing the Geosciences finances, she enjoys the opportunity to interact with and get to know students within the department. Bera feels that it is an inspiring experience to interact daily with researchers who make

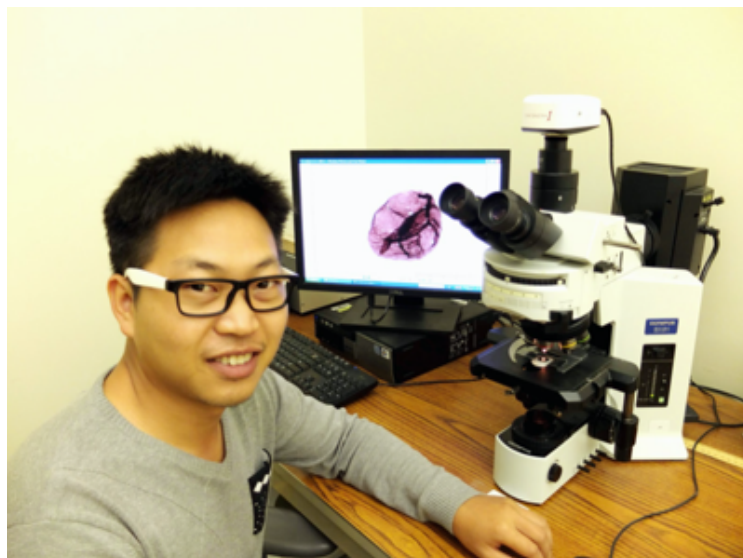
significant research discoveries and help shape our society. When she isn't working, Bera raises her four children, three of whom are triplets, with her husband of ten years. The main office can always count on comic relief with a funny story about the kids!

Post Doc Spotlight: Dr. Tang

Sponges are among the first animals to diverge. Their earliest fossil record is thus crucial to understanding when and how animals evolved. However, there have been no biomineralized sponge spicules prior to the Cambrian, despite the expectation of Precambrian sponges on the basis of biomarker fossils and molecular clocks.

Dr. Qing Tang, formerly a Ph.D. student in the Geosciences Department and currently a post-doctoral fellow in **Dr. Shuhai Xiao's** lab, analyzed early Cambrian sponge fossils and concluded that Precambrian sponges may have had only weakly biomineralized or even entirely organic skeletons, hence low fossilization potential.

This study not only explains the lack of Precambrian sponge spicules, but also provide insights into the evolution of biomineralization in early sponges. This study was published in *Nature Communications*, doi.org/10.1038/s41467-019-11297-4.



Dr. Qing Tang (PhD 2018) examining Precambrian microfossils

GeoHokies David B. Jones

The David B. Jones internship offered through the Virginia Tech Paleobiology Research Group and Petrified Forest National Park gives students the amazing opportunity to learn about ecosystems that existed about 210 million years ago while gaining fieldwork experience during the day and lab skills in the evenings. It can apply to those who wish to enter the field of paleontology as a career or may be on the fence and instead just want to get more of an idea of what being a paleobiologist actually means. It offers two students a two-week dive into the exciting job of a field paleontologist and one student a ten-week opportunity.

Hannah-Marie Eddins, an Animal and Poultry Science major, Geosciences minor, and a two-week intern in 2019, used the internship as a way to look at how paleobiology is relevant in today's science and wishes to use her experience as a way to further her passion for conservation.

"As an individual who came to college with the intentions of working in elephant conservation, the David B. Jones Internship really encouraged me to continue that path. It gave me a huge appreciation of how difficult it is for something like the diversity of extant ecosystems to exist today and why it is so important to try to continue and preserve that variation. I now would like to try and combine my passion of paleontology with that of conservation to see if the fossil record could offer hints and clues on how we as scientists could help prevent more extinctions from happening. To elaborate more on the fieldwork itself, my favorite thing to come from the field, was this special new jaw that I discovered while splitting rock. We were about a week into the internship and I was sunburnt as all get out and I found this super tiny black jaw! It is about about eight millimeters long. It was not until one of the graduate students looked at it under a microscope that night that we found out how special that super tiny discovery was. The teeth have grooves in them! We don't know what those grooves mean, they usually signal that the animal is venomous. I have since used CT data to isolate pieces of the jaw and presented the research at the Society for Integrative and Comparative Biology Conference. This internship has shown me how much fun research really can be, especially when the subject is personal to you. I really am so grateful for the opportunity."

All six interns continued undergraduate research with the Paleobiology Lab in the Geosciences department, along with participating in outreach events, volunteering in the lab during fossil preparation nights, and even traveling to conferences to present research that they have developed because of the internship. The David B. Jones internship is an amazing opportunity for anyone, inside or outside of Geosciences, interested in evolution of extinct ecosystems or just curious as to what being a paleontologist is like.



Left to right:

PhD student **Khanh To**,
Undergraduates **Hannah-Marie Eddins**,
Michael Mellet, **Emily Patellos**,
Dr. Michelle Stocker,
PhD student **Brenen Wynd**,
William Reyes (Petrified Forest Intern),
PhD student **Devin Hoffman**,
Xavier Jenkins (Petrified Forest Intern),
Dr. Sterling Nesbitt with Avett

Internship National Park

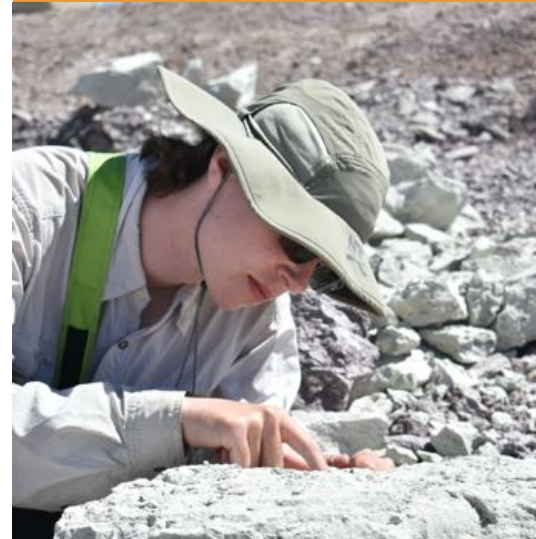


Another intern, **Emily Patellos**, a Geoscience major, found herself humbled by the ability to travel and really immerse herself into the fieldwork aspect of the internship. Emily plans to be a paleontologist and work on some of the largest land animals ever known, sauropods.

"My time at the Petrified Forest was truly a once in a lifetime experience for me. Not only did it provide me with paleontological experience I never imagined I could have received as an undergrad, I felt challenged in the most rewarding way possible. Waking up nearly every day to explore large expanses of desert, paying extra close attention to the geology as you hiked through remnants of past worlds, made every day of the internship feel like an adventure. One of my favorite fieldwork experiences was actually when the park interns went on a solo mission to retrieve a re-excavated phytosaur skull from the field. The skull was found by another group a year back, but could not be excavated at the time it was found. Earlier that week the paleontology group went out to the site to check on the condition of the skull, and to see if it was still worth excavating. We decided it was worth it, but within the next couple days it was going to rain at the park. The interns had to go out the next day by ourselves to jacket the skull, and it was really fun to get a chance to handle a job on our own. By the end of the week, the paleontological group, and some park volunteers were able to walk the jacket out of the desert on a stretcher. Paleontological fieldwork genuinely makes you feel like you are discovering something completely unique everyday- quite simply because you are!- and the work gives you an idea of what the science is like outside of the classroom. I recommend the experience to anyone interested in earth's history with a true adventurers' spirit."



Emily Patellos



Michael Mellet, VT Biological Sciences Major (above), regularly works with the SEEDS and the Blacksburg Nature Center.



Undergraduates: **Emily Patellos**, **Michael Mellet** (Bio Major) and **Hannah-Marie Eddins**;

Graduate Students: **Devin Hoffman** and **Khanh To** during Summer 2019 in the Petrified Forest.

The Museum Piece: Growing Collections

By: Sarah Windes* and Llyn Sharp

More than 50 years ago, the Geology Department expanded from Holden Hall into the newly constructed Derring Hall. The custom-designed Museum opened as a designated public space, assembling various collections from around the Department. It incorporated Dr. Carlton Michael's large personal collection of museum-quality specimens as well as other significant donations (e.g. Holden, Brannock, and Gruger). Dr. Michael served as the founding curator of what was then known as the Geology Museum, and established its long history of public outreach and collections stewardship. Mirroring Department names over the years, it is now known as the Museum of Geosciences (MoGs).

Purchases and donations continued to add to the collections, especially the mineral collection. Alumni and others have noted the quality of minerals on exhibit and wanted to contribute to this resource for the students of Virginia Tech and the wider community. Dr. Susan Eriksson, former Director, grew the reputation of the collection through the Mineral Museums professional community. Notable donations have come from **Donald V. Dalton** (Geol 1960) and **Jane Kessler Hearn** (MS 1937).

A recent donation from Paul and Ruth Prideaux (both VT Engineering majors in the 1980s) was received in 2018. The Prideaux collection was developed by Paul's mother, Gwynn Cochran Prideaux, who held a Masters degree in education from the University of Arkansas. She spent much of her adult life enjoying and collecting gems and minerals from across the world. She instilled this passion in her sons, Jeff and Paul, both engineering graduates of Virginia Tech. Upon her passing in 2017, they agreed to share some of her collection with the VT Geosciences Department to help foster future interest in the many wonders of the Earth. The collection was immediately used in the *Natural History Collections Curation* course.

For that course, **Ella Davis** (BS 2020) curated an exhibit based around favorite minerals of members of the Department, and the features showcased by those minerals. Turns out some of those are also the key characteristics for mineral identification! Having museum-quality specimens for teaching and professional training helps students and teachers develop and refine their mineralogical discrimination skills.



Specimens from the Michael Collection, part of the original Museum displays.



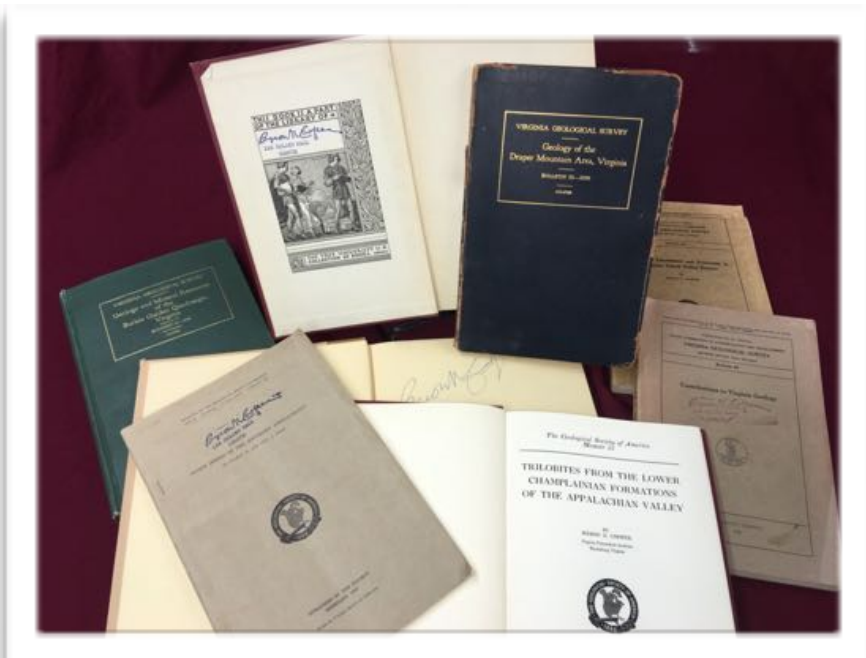
Minerals from the Hearn Collection



Exhibit project using the Prideaux Collection

Memories of Dr. Cooper, Geosciences Leader, Live On

While many have recently donated minerals or rocks, alum **Michael J. Huggins** (MS 1983) donated a unique discovery. At a geoscience book dealer in California he found several books from the personal library of **Dr. Byron Cooper**.



Books and publications from Byron Cooper's Library

Dr. Cooper was the chair during the first major expansion of our Department, a strategic effort leading to the current 25+ tenure track faculty and our excellent reputation in several geoscience disciplines.

Our work continues to preserve the collections and their associated information. For example, we used some early documentation of the Museum's holdings by **Dr. Carl Francis** (Geol 1979) in this article--thank you, Carl.

*Sarah Windes is the Head Interpreter at the Museum. She has coordinated and led tours for many thousands of visitors over the past 25 years.



2020 Spring Newsletter

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PhD Candidate,
**Sebastian Andres
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took this photo during
field work in Chile in
early 2020.