

The TECHtonic

Spring 2022 Newsletter
Department of Geosciences



WELCOME TO THE TECHTONIC!



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Welcome to a (long-overdue) new installment of the TECHtonic. As we (hopefully) emerge from the worst of the covid-19 pandemic, the Department of Geosciences is looking to the future with a great deal of optimism. Despite the challenges of the past two years, our department is stronger than ever. Our faculty and staff have tackled the challenges of the pandemic with grace and grit, handling the rapid pivot to online instruction in March 2020, followed by a year of largely online courses, and then, last fall, a return to almost-normal, but with classroom voices muffled by masks and frequent techno-juggling of simultaneous in-class and Zoom participants. Despite the challenges, there is much to celebrate. Our enrollments are increasing, at both the undergraduate and graduate level, and I continue to be amazed by the quality and accomplishments of our students. And, as you'll see in this issue, we've continued to hire incredible new faculty, and our faculty and students are making a difference, both in their research and their community.

Sadly, in this issue we also bid farewell to several faculty and friends who have passed, all of whom had a huge impact on the department in their own ways: Ed Robinson, Gordon Grender, Don Dalton, and Luca Fedele. We also wish longtime museum manager Llyn Sharp happy trails in her retirement. Llyn left the museum in great shape, and with some generous support from our alumni and friends, we're looking forward to a renovated, redesigned museum going forward. We welcome our new museum manager, Mariah Green, on page 7 of this newsletter.

I hope this newsletter finds you well. As we emerge from the pandemic, we would be happy to welcome you back to Blacksburg - perhaps at our upcoming **Spring Banquet and Alumni Dinner on April 9** (scan the QR code below for more information). Stay in touch, and Go Hokies!

W. Steven Holbrook, Head of Department



SUPPORT GEOSCIENCES.
WHAT TO SUPPORT AND HOW TO GIVE.

See back cover.

ON THE COVER | Alumnus Steve Grimsley collected this photo of a supernova explosion while on a recent astronomy imaging trip to central Texas. Steve reports that the expanding debris is where most of the elements with atomic masses greater than lithium are distributed in the galaxy.

WELCOME DR. SHIRZAEI



Manoo Shirzaei

In Fall 2020, Dr. Manoochehr (Manoo) Shirzaei joined the Department of Geosciences as Associate Professor of Geophysics and Radar Remote Sensing. While most are familiar with geophysics, Radar Remote Sensing (RRS) is an active imaging technique that provides

information about changes in the Earth's surface and atmosphere using microwaves transmitted from airplanes and satellites. Over the past three decades, RRS has generated tremendous excitement in the Earth and atmospheric science communities because of its unparalleled spatial coverage, resolution, and low cost.

Dr. Shirzaei grew up in a small town in southeast Iran's Sistan and Baluchestan province, among the poorest in Iran. As the eldest son, his traditional duty was to finish school and support his family with a job. But at the end of high school, realizing he would be required to serve in the military, he instead chose to take a national qualifying exam for university admission. While he had no passion for science at the time, he thoroughly prepared for the exam and entered college where he met his first mentor, Dr. Mahmoud Zolfaghari. Dr. Shirzaei became so enthusiastic that he finished his B.S. in engineering in three years, rather than the usual four and half, and immediately began work on a Master's. During this period, he was introduced to the work of Dr. Paul Segall. Segall, a geophysicist at Stanford, indicated he would consider Manoo as a Ph.D. student if they could meet for an in-person interview. Encouraged, Dr. Shirzaei worked for about two years at Iran's National Cartographic Center and International Institutes for Earthquake Engineering and Seismology to save for the trip. But since obtaining a U.S. visa is difficult for Iranian nationals due to a lack of diplomatic relationships, Dr. Shirzaei traveled to Germany and obtained his Ph.D. while waiting for the U.S. visa to be processed. After finishing in Germany, Dr. Shirzaei arrived in the U.S as a postdoctoral scholar at UC Berkeley. There he was mentored by Dr. Roland

Bürgmann and enjoyed meetings with Dr. Michael Manga (UC Berkeley), Howard Zebker (Stanford), and Dr. Segall. They helped shape his view of the Earth as an interconnected system and introduced him to remote sensing as a powerful tool for its study. Due to restrictions on Iranian postdocs, Dr. Shirzaei was not permitted to use any software produced by U.S. agencies like JPL, so he developed his own, from basic fault slip modeling codes to commercial-grade software for multi-temporal SAR interferometric processing. This allowed Dr. Shirzaei to develop into a confident scientist and engineer who enjoys new challenges and is willing and able to reinvent himself as new problems, new tools, and new ways of thinking emerge every day.

Dr. Shirzaei's research spans topics from improving our understanding of the underlying mechanisms associated with seismic and aseismic faulting processes, the evolution of crustal stresses and seismic hazard associated with fluid extraction and disposal, changes in groundwater and surface water resources, to the impacts of relative sea-level rise on coastal areas. Though diverse, the common theme of these topic is to develop better quantitative understandings of physical processes operating in the Earth. As a professor at Arizona State University and now at Virginia Tech, Dr. Shirzaei has mentored a dozen students and postdocs, served as P.I. on more than a dozen projects funded by NASA, NSF, DOE, and USGS, and authored more than 60 peer-reviewed articles, including some in Nature, Science and PNAS. He has also served on the Southern California Earthquake Center planning committee and NASA Sea Level Change Science Team.

Dr. Shirzaei will teach a number of courses at VT, including "Environmental Geoscience," "Statistics in Earthscience," "Crustal Deformation," and "Radar Remote Sensing of Earth and Planetary Surfaces," through which he will strengthen the graduate and undergraduate programs in the Geosciences department and form connections with other VT units such as in engineering and computer sciences.

Dr. Shirzaei is now a U.S. citizen living the American Dream. He enjoys Blacksburg for its nature and landscape and for the inclusive community at VT and beyond.

GEOSCIENTIST BY DAY

By: Jim Spotila

A question that is asked of every applicant to a volunteer rescue squad is “why do you want to serve?” When I interviewed candidates as personnel lieutenant for the Blacksburg Volunteer Rescue Squad (BVRs), I sought to be convinced of answers, without having ever analyzed the importance of the question. Motivation is fundamental to commitment. **If you’re on the duty schedule, you will be there, even if you don’t feel like it. When tones drop, you will respond in seconds, regardless of what you’re doing.** When you arrive, you will make patient contact once the scene is safe, no matter what the scene looks, feels, or smells like. And no matter how sick or horrific their condition, who they are, or what they’re lying in, you will apply your training to aid and convey the patient to the hospital. Sometimes, this is easy. With COVID, it got harder.

What is a professor doing on the rescue squad, you ask? It takes something dramatic to inspire an egocentric academic to do public service unrelated to their field. In my case, it was watching a fleet of ambulances assemble outside Derring Hall on a blustery April day fifteen years ago. I have been a member of BVRs almost ever since. In 2020, I was honored to be elected as a Life Member (i.e. volunteer with tenure). At the same time, public health became a global focus and changed all of our lives. Although I haven’t run many calls during the past two years (life membership allows one to “step back”), I’ve witnessed enough to relay some of the effects of COVID on EMS.

Dr. James (Jim) Spotila received his PhD from Caltech in 1998 and joined the Department of Geosciences that same year. Jim’s research is related to active tectonics and geomorphology, and he combines field study with various geomorphological methods to constrain erosion rates and landscape evolution. Jim has supervised over 20 MS and PhD students while at Virginia Tech, and has contributed greatly to the Department’s success through his many service activities, including service as Assistant Department Head and chairing the Graduate Student Affairs Committee for several years.

Most people don’t realize how *personal* rescue calls are. The vast majority of cases are medical, not high-action trauma. There’s a strong demographic skew towards older patients. Rescue scenes are very different from hospital rooms, where a specialist can interview a patient in a clean gown and sterile

bed from a distance. EMS is performed in the wild. The most common place to find a patient is in their room, in bed, yet it’s surprising how often they’re lying on the bathroom floor. On many calls, the patients are ambulatory (i.e. can walk to the stretcher). More typically, transporting a patient means lifting, carrying, supporting, or wheeling them, first to the stretcher, then to the ambulance, and finally to a hospital bed. My primary role on calls is the ambulance driver, which also means that I’m responsible for scene safety, communications, equipment, and patient movement. The patient may have COVID, but if they are unable to rise from the easy-chair, we’re picking them up, sometimes even with a frontal bear-hug. If they’re in bed, one of your team is going to be climbing into the bed with them for leverage. EMTs wear PPE, but there is no social distancing on calls.

COVID definitely changed some aspects of the EMS experience, such as the PPE that must be worn. N95 masks are more stifling than what we used to wear, but they do provide a welcome sense of security. Luckily for me (and other geologists!), it’s now possible to meet OSHA fit-testing standards without removing facial hair, by using a powered-air purifying respirator (PAPR) hood (as modeled in the picture above).



Jim Spotila in PAPR hood

VOLUNTEER EMT BY NIGHT



Jim Spotila on a Rescue Call

COVID also had a stronger effect on the psyche before vaccination was available. I definitely experienced elevated anxiety during the few COVID-suspected

calls I went on before getting the shot(s). Since then, the emotional experience of running a call has gone back to what it was before, at least for me. Once PPE is donned, there isn't much time to worry about where you are, given the flow of activity that stems from the urgency, training, and teamwork. Beyond the experience of a handful of calls by this weekend warrior, however, the risks and cumulative strain experienced by many fulltime healthcare workers have been extreme and deserve recognition.

The residents of Blacksburg and Montgomery County are lucky to be served by BVRS, particularly now. The organization is composed of ~120 medical and ~50 technical-only personnel (with overlap among specialties, including extrication, swiftwater, and search and rescue), all of whom are well trained, competent, and proud. BVRS is well run, well equipped (visit our new station!), and efficient, covering an annual call volume of over 3000 calls with superb response times and supporting many neighboring jurisdictions. The leadership has been directly involved in the New River Valley's coordinated pandemic response. BVRS quickly adopted new care protocols, PPE, and decontamination procedures including foggers, ventilation, and UV lamps on trucks after calls. The agency never got overwhelmed, even during the major peaks. During the first wave, call volume actually declined, as the public avoided the healthcare system. Yet the frequency of true emergencies, including cardiac arrests, has, very sadly, been elevated over the past two years.

So what's in it for a geologist serving as an EMT on the local rescue squad? It's hard to convey how special it feels when a person expresses pure gratitude for your aid. Ultimately, the best answer to the question, "why do you want to serve," is to help others; that helping people that are hurting is truly rewarding. Specific rescue experiences, some raw and humbling, have also thickened my skin. It's harder to get as emotionally charged in faculty meetings over issues that aren't truly life-or-death. I've attended to professors as patients and, believe me, engrossing academic reputations seem less important in such moments. I've also had my eyes opened to what's out there. We talk about silos in academia, but academia itself is a towering one. There's a whole other world that most of us don't know, just minutes from our flagship campus; raw poverty, repulsive conditions, hoarding, weapons, fear, mistrust, abuse of all kinds. During my time at BVRS, there's only been three other VT faculty serve as members, only one of which was tenure-track. There are many student members, however. Serving on the rescue squad is an equalizer. I'm used to being humbled by the teenager who knows their stuff better than I do. It's also forced me out of my comfort zones. I've had challenging conversations about the government, policing, parenting, and the universe, but, in the end, our different worldviews don't make us adversaries. We trust each other out of our pursuit of the common good. In an increasingly polarized country, I value this public service as a form of experiential civics. Still, I admit that my top-five rescue calls have involved a bit of Earth science: a cave, a stream, a trail, some ice, and gravity (always gravity).

I'm thankful for the opportunity to volunteer for BVRS. I'm grateful to my family, my lab, and the Department of Geosciences for tolerating this pursuit. My involvement in BVRS has been reduced lately, but I aim to continue serving. From this other dimension of my life, I offer the advice to take time to appreciate what matters, keep it in perspective, focus on the common good, and, above all, stay safe!

ALUMNI NEWS

Isabel Montañez (PhD 1990) Isabel P. Montanez (PhD 1990) was recently elected to membership in the National Academy of Sciences. Emeritus Professor Fred Read was Isabel's PhD advisor. Dr. Montanez is currently a Distinguished Professor in the Department of Earth and Planetary Sciences at the University of California - Davis and served as President of the Geological Society of America. In 2018, Dr. Montanez delivered the Department of Geosciences' commencement address to our graduating class.



Dr. Isabel Montañez

Kirk Broadwell (PhD 2020) accepted a position with Golder Associates in Richmond, Virginia.

Kristie Dorfler Caddick (PhD 2014) recently stepped down from her position with the Innovation Campus to become Chief of Staff for the VP of Advancement at Virginia Tech.

Wu Hao (PhD 2020) accepted a postdoctoral position at Los Alamos National Lab.

Cathleen Humm (MS 2021) accepted a position with Geosyntec Consultants in their Columbia, Maryland office.

Joshua Jones (PhD 2021) accepted a position as an Orbiteer at NOAA's National Geodetic Survey in Silver Springs, MD.

Emeritus Professor **Mike Hochella (MS 1977)** has been announced as the 2021 winner of the Geochemical Society's [Claire C. Patterson Medal and Award](#). This major award recognizes "an innovative breakthrough of fundamental significance in environmental geochemistry, particularly in service of society, consisting of either a single outstanding contribution or a short series of papers published within the last decade." Mike's award was for his discovery of nanoparticles generated by industrial coal burning that are highly toxic to humans.

Mike was also awarded the 2021 Geochemistry Division Medal of the American Chemical Society. This award will be presented at the ACS national fall meeting in Atlanta in August. Congratulations Mike!

Brooke Wilborn Haiar (BS 99; MS 2001) was recently promoted to full professor at the University of Lynchburg in Lynchburg, Virginia and received the Faculty Award for Excellence in Research Mentoring. This award recognizes a full-time faculty member who mentors undergraduate and or graduate students in research projects in a scholarly discipline.

The Geosciences department is pleased to announce the return of our annual Spring Banquet and Alumni Dinner, after a two-year absence due to covid-19. Assuming that the public health situation allows, we will have our banquet in the **German Club Manor on Saturday, April 9, 2022**. This event is both a celebration of our graduating students, and a chance to welcome our alumni back to campus. This year's guest speaker will be David Spears, an alum of our department and the State Geologist of Virginia, who will speak on "Geoscience for the Public Good - the Life of a State Geologist." You can see the announcement attached to this email, and sign up to attend at: bit.ly/SpringBanquet_2022.

WELCOME DR. WERTH

In summer 2020, Susanna Werth joined the Department of Geosciences as Associate Research Professor for Hydrogeodesy. Hydrogeodesy is an emerging research field that applies a wide range of space, airborne and surface geodetic and remote sensing tools that operate at different spatial and temporal scales to characterize the Earth's water resources and reservoirs.

Dr. Werth grew up in East Germany, where she discovered her passion for physics and dynamics of the Earth during her studies of Geodetic Engineering at the Technical University of Dresden. At the time, the gravimetric satellites of the Gravity Recovery and Climate Experiment (GRACE) had just been launched and Susanna began working as a master's student on signal processing and analysis of data recorded by the German-US mission. This early work sparked her interest in interactions of the solid Earth with climate systems, and she continued her graduate research on the integration of satellite gravimetry observations into global hydrological modeling at the German Research Center for Geosciences in Potsdam.

Since then, Dr. Werth has worked in several post-doc positions, which included a hydro-geodetic field campaign in South Africa and Spain. In 2016, she became a research faculty member at Arizona State University and began teaching undergraduate and graduate courses in geology, satellite gravimetry and groundwater systems. Dr. Werth is currently the PI of two NASA projects studying water storage and groundwater budgets in semi-arid regions of the Southwest USA. In these projects, geodetic observations of changes in the gravity field and surface elevation are jointly utilized to quantify impact of drought and human water consumption on groundwater aquifer, water availability and hazards. In other projects, for example, Dr. Werth studies causes of glacier mass changes in the Himalaya by applying remote sensing and big data analysis methods; and she is engaged in a study group of the International Association of Geodesy

for monitoring monsoon phenomena with geodetic observation techniques.

In fall 2021, Dr. Werth will be teaching "Geo Data Science with Python". Through this and future courses at the Geoscience Department, her goal is to strengthen undergraduate and graduate student skills in data science, big data analysis and remote sensing of Earth systems. Since arriving in Blacksburg, Susanna spends most of her free time with her son and husband Dr. Manoochehr Shirzaei (see page 1) in the garden, in Jefferson Forest, or discovering places in Virginia.



Susanna Werth hiking at Cascades, a favorite place for all Hokies.



LLYN SHARP RETIRES

By Dr. Madeline Schreiber

Looking back, Llyn's career has been focused at the interface of science and the public. One of her favorite analogies is the fable "Stone Soup" where everyone contributes what they can to a better, shared result. If we had a word cloud to describe her, "flexibility and persistence" would be the two biggest ones in the center.

Llyn came to the Museum of Geosciences part-time in 2004. At that time, Director Dr. **Susan Eriksson**, one of Llyn's mentors, had recently left to lead international outreach at UNAVCO. Susan's vision had established our Museum as a well-known community amenity and built its reputation within the professional Mineral Museum community. Llyn had a past life as a technician in the Department in the 1980s and brought experience in collections management, museology, and informal science education from her years at the Virginia Tech Museum of Natural History (from 1990 until it closed in 2003). When she re-joined the Department, her enthusiasm and knowledge of operations helped sustain the Museum of Geosciences and protect the collections. Our Museum continues to be a wonderful resource for our faculty and students to inspire public interest in geosciences.

One of Llyn's favorite things about the Museum was the chance to provide student professional development opportunities--she mentored dozens of GTAs and undergraduates, identifying their talents and finding ways for them to contribute. Students got exposure to a variety of museum program areas and professional practices. Colleague **Sarah Windes**

coordinates Museum tours and has been a key part of the success of our student volunteer tour guides over many years. The GeoFairs and Mineral Sales, co-hosted with **Don Dalton (BS 1960**, see accompanying article), engaged many students and faculty as well as thousands of visitors. Our Museum offers a wide range of museum experiences that are opportunities for collaboration. It is a friendly place for public access to science and scientists.

As Museum Coordinator, Llyn worked closely with the Museum's Directors to promote the Museum and facilitate stronger links with the faculty and the wider geoscience community. Dr. **Bob Tracy** became Museum Director after his service as Department Chair until his death in 2019. He and Llyn acquired major donations and grants, established the Museum Committee and the Board of Curators, and championed geoscience collections preservation with the Geological Society of America. Dr. **Sterling Nesbitt** now serves as Director; he brings a wealth of experience, energy, and ideas, as well as his prestigious connections with flagship Museums. After a pandemic pause, we expect our Museum will continue to distinguish the student experience at Virginia Tech Geosciences.

Through her outstanding problem solving skills, her skillful mentoring of students, her ability to see both the forest and the trees, and her unwavering commitment to improve the Museum, Llyn brought the Museum to a new level. We are both amazed by, and appreciative of, all that she has done to make the MoGS that outstanding museum that it is.

As for Llyn, she loved these rocky (ha!) adventures and now hopes to float calmer waters, with a new puppy, Callie.



Mariah Green at Dinosaur National Monument.

WELCOME MARIAH GREEN

In August 2021, **Mariah Green** joined the Department of Geosciences as the museum and collections manager. Green had just graduated from the University of Colorado Boulder with a Master of Science in Museum and Field Studies Vertebrate Paleontology. A Chicago native, Mariah went to Northeastern Illinois University for her Bachelor of Science in Earth Science. However, her interest in geosciences formed way before she was a college student. Her dad was fascinated by geosciences and provided her dinosaur books and toys from a young age and she never outgrew the interest. Being exposed as a child helped her cultivate her own interest in dinosaurs and paleontology. As for moving into her new role as museum and collections manager, she is excited to refresh exhibits, modernize the museum, meet the community, and work with the students. The sky's the limit and she has big, big ideas.



Llyn Sharp with her new, calamitous puppy, Callie, and her older dog, Shady.

AMATO VISIT AND DONATION

Roger Amato (Geol 1966, MS 1968) and **Susan Amato** visited in September 2020--despite the pandemic--to bring a donation of rocks and minerals that will be useful for teaching and outreach. Roger had a long career with the Department of the Interior in Reston, working with the USGS and the Bureau of Ocean Energy Management, where he analyzed prospects. He also taught Oceanography at Northern Virginia Community College. His specimens include some of the usual suspects: beautiful malachite, sparkly galena and pyrite, weird concretions, and clear crystals, but also some rare examples of manganese nodules from the Blake Plateau, and core from a salt dome in Texas!



Roger and Susan Amato in the Museum of Geosciences.

IN MEMORIAM - DR. EDWIN S. ROBINSON

By Emeritus Professor Cahit Coruh



Dr. Edwin Robinson

Edwin S. Robinson, an Emeritus Professor in our Geosciences department, passed away peacefully on Sept. 10, 2020 in Roanoke, Virginia.

Ed was a geoscientist, Antarctic explorer, university professor, book author, musician and farmer. Ed studied Geology and Geophysics at the University of Michigan. He started to be interested in exploration of Antarctica after participating in a trip to Antarctica. He received his PhD at the University of Michigan in 1964 and became a Polar researcher to explore and study the parts of Antarctica that were previously unvisited.

Ed began his teaching career at the University of Utah in 1964. In 1967 he and John Costain joined the faculty of Virginia Tech to start the geophysics program. Ed continued his contributions in teaching Geology and Geophysics courses until he became a Professor Emeritus in 1997. Ed continued his multidiscipline and multidimensional teaching and research activities many years after his retirement.

In addition to his numerous scientific papers and journal articles he was the author of two textbooks in Geology and Geophysics. During the preparation of his Elementary Geophysics book his extra efforts were very obvious in explaining geophysical concepts without using the easy mathematical way. This was a side effect of his humanist approach to students. Ed, with open-door, was a generous mentor and collaborator for students, faculty, and staff.

As the Department's bagpiper he enjoyed leading the faculty and students to graduation ceremonies and making participants happy. Ed will be missed not only by his many friends and colleagues in the Department of Geosciences, but also by many others at Virginia Tech.



June 2021 Jane and Ken in Iceland

Kenneth Eriksson has been awarded **Professor Emeritus** status at a March 2021 meeting of the Board of Visitors. Eriksson has been a Hokie since 1981 and served as the chair of the Department of Geosciences between 2008 to 2012. The title of Professor Emeritus reflects the positive impact **Dr. Kenneth Eriksson** has had on the Department of Geosciences and Virginia Tech as a whole. Ken and his wife, Jane Hundley took a trip to Iceland and are pictured in front of a volcano that erupted in February 2021.

Associate Professor **Brian Romans** used Google 'Jamboards' (collaborative digital whiteboards) in his Sedimentology-Stratigraphy (GEOS 3204) course in Fall 2020 as a way for students to engage with each other in small groups in breakout rooms and work on various activities during the virtual lab sessions. Brian's use of this tool was featured on [American Geophysical Union's GeoEd Trek website](#) in October 2020.

Professor Emeritus Gordon Grender passed away on Aug. 23, 2020 at the age of 90. Dr. Grender was a former professor and department head of our department. We pass along the advice he left us with via his obituary: "He recommended to all planting a native shrub, and a long walk with someone you love."

MARC MICHEL: DIVISION LEADER OF NANOSCIENCE

Dr. F. Marc Michel was named division leader of Nanoscience in the College's Academy of Integrated Science. The division leader is the intellectual leader of the division, which houses the undergraduate B.S. in Nanoscience. In addition, **Marc Michel** has also been named deputy director of [NanoEarth](#) at Virginia Tech. In that capacity, Marc will serve on NanoEarth's Executive Committee and will be the liaison between the Center and NSF-EAR, to help align the needs of the center with NSF. NanoEarth is an NSF-supported center that is the national hub for Earth and environmental science applications of nanoscience. These appointments reflect the high regard in which Marc is held in the college and at the university.

While Marc has been busy in his leadership roles this year, he has also continued to pursue important research. When asked about the Michel Lab, **Geosciences major Steven Watson** said, "In Marc Michel's lab, I have worked with PhD candidate **Ali Namayandeh** to publish an experimental rate model for the transformation of ferrihydrite, a metastable ferric oxyhydroxide, in the presence of varying oxyanion surface coverage by arsenate and phosphate contaminants. When characterizing our samples, the focused energy of a synchrotron facility provides the contrast necessary for visualizing the structural shift from nanocrystalline ferrihydrite to macrocrystalline goethite and hematite. Travel restrictions kept our group from working at Argonne National Lab in Chicago, but lead beamline scientist Olaf Borkiewicz

processed our mailed samples and further collaborated with us by improving the statistical analysis on-site through removal of instrumental background

noise and testing statistical constraints with respect to sample composition. Graciously, this was all done swiftly to meet this year's GSRS, which our EnviroNano research group also spent a month meeting weekly on Zoom to prepare and best inform our geoscience community at Derring. While we may be physically distant, we are fortunate to have the channels present to keep science flowing as long we acknowledge our support groups and are not averse to new forms of cooperation with the shared aim of improving our understanding of the world."

Nanoscience major Daniel Seitz said, "My research under Dr. Michel involves statistical analysis of the

factors controlling the growth of Nickel Hydroxides. Nickel Hydroxides $\text{Ni}(\text{OH})_2$ are a type of inorganic compound that is often found in battery

technologies, since it undergoes reactions that are useful for electrodes in electrical devices. Since access to the labs was so restricted last year, Dr. Michel's lab adapted by starting statistical analysis projects, where we find published research that reported on a mineral or nanostructure, in my case $\text{Ni}(\text{OH})_2$, which can form in one of two structure types (alpha or beta). We collect the data from these papers and plug it into statistical analysis software to collect models that attempt to predict what phase the product will be based on the parameters of the reaction. Ideally, we would find a model that can accurately predict the phase based on what values we put in, which we would be able to use to synthesize large quantities of specific phases of $\text{Ni}(\text{OH})_2$ for practical uses.



Nanoscience student **Daniel Seitz**



Geoscience student **Steven Watson** in the lab

Awards

PhD Candidate **Allie Nagurney** won Best Student Presentation Award at the Metamorphic Studies Group Virtual Research-in-Progress meeting 2020.

Undergraduate Student **Wynn Timer** won first prize for best poster at the National Association of Black Geoscientists.

Graduate Student Grants & Scholarships

Rose McGroarty was awarded a Virginia Space Grant fellowship (\$6,000)

Brenen Wynd received a GSA graduate student research grant for \$930 to travel to South Africa.

Shuyang Sun was awarded the David W. Worthington scholarship from SEG.

Nick Hammond, Junyao Kang, and Brenen Wynd received GSA graduate student research grants.

Alix Ehlers was awarded a scholarship from the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS).

Jess DePaolis and **David Bruce** were awarded Student Research Grants from the Society of Sedimentary Geology.

Graduate Student Highlights

Natalia Varela has been selected to participate on International Ocean Discovery Program (IODP) Expedition 396, Mid-Norwegian Margin Continental Magmatism in Fall 2021.

Ben Kligman discovered a new non-mammalian eucynodont from the Chinle Formation (Triassic: Norian).

Drew Parent and spouse Rachel welcomed their son, Henry Edward Parent, to the world.

STUDENT NEWS

BLACK STUDENTS IN STEM

By Piper MacNicol



Wynn Timer

Wynn Timer, a Geosciences undergraduate, founded the club Black Students in STEM (BSS) to advocate for students and spread inclusivity throughout Virginia Tech's College of Science. Wynn founded BSS in March 2019 because she felt there was not previously an organization on campus which characterized her experience as a black student in the College of Science that many other students also share. While black student organizations and STEM organizations previously existed, BSS is an innovative combination of both, which strives to equip STEM students of African descent with additional academic, professional, and social opportunities and skills. BSS actively works to establish a safe

space for club members to create a sense of community, further enabling significant academic, personal, and professional growth. While Wynn is graduating soon, she hopes once she hands the club down to the next generation of students, BSS will continue to connect students and alumni of BSS in a long-lasting, impactful way as well as continuing to advocate for students within the College of Science.



BSS day trip to the Cascades.

2021 NAS Award in the Evolution of Earth and Life Mary Clark Thompson Medal



Shuhai Xiao
Virginia Tech



SHUHAI XIAO RECEIVES THE 2021 MARY CLARK THOMPSON MEDAL OF THE NATIONAL ACADEMY OF SCIENCES

By Dr. Patricia M. Dove

The first Mary Clark Thompson Medal was awarded in 1921 for "most important service to geology and paleontology." This prize has a rich history of recognizing exceptional geoscientists. Exactly 100 years later, Professor Shuhai Xiao has received this prestigious prize. On April 25, 2021, Professor Xiao was awarded the Medal and a \$20,000 prize in a special ceremony at the annual meeting of the National Academy of Sciences.

Shuhai is recognized for his discovery, characterization, and insightful interpretations of exceptionally preserved fossils from Ediacaran rocks (dated at 609 ± 5 Ma). The Ediacaran is the earliest of three periods that make up the Neoproterozoic Era and was a remarkable time in evolutionary history. Through the extensive mentorship and collaborations with students, postdocs, and colleagues in China, Shuhai and his team have led the way to discoveries of Earth's first complex multicellular organisms and discovered exceptional records of early animal diversification. These include the oldest complex algae, early animals, and trace fossils of anatomically complex metazoans. His findings have significantly advanced our understanding of the evolutionary history and environmental context of the Neoproterozoic oceans. Over the years, Shuhai has worked with many excellent postdoctoral fellows and graduate students in VT Geosciences, and he attributes his success to their efforts and collaborations.

Congratulations Professor Xiao!

For more information:

<http://www.nasonline.org/programs/awards/2021-awards/Xiao.html>

FACULTY FUNDING

D. Sarah Stamps received a NSF EARLY CAREER Grant and a FRES Grant.

Sterling J. Nesbitt received a NSF EARLY CAREER Grant.

Mark J. Caddick was awarded a NSF MRI grant for a new microprobe.

W. Steven Holbrook was awarded a Critical Zone grant from the NSF.

F. Marc Michel and **Madeline Schreiber** received a 4 year renewal for the NanoEarth grant.

Ryan Pollyea and **John Hole** were awarded funding from CASERM. Ryan's project, "*Integrating sequential simulation with Bayesian visual analytics for applications in the mining sector*," was funded for the second year in a row. John's project, "*Radar imaging for hazard mitigation in a salt mine*," was also funded.

PhD Candidate **Devin Hoffman** and Professor **Michelle Stocker** were awarded a Pathways Grant to help develop Dr. Stocker's Age of Dinosaurs course into a summer class that will be taught this year for the first time by Devin Hoffmann.

Madeline Schreiber (lead PI) and **F. Marc Michel** (co-PI) were funded by the Dean's Discovery Fund for a project entitled, "*Using a Nanoscale to Whole-Ecosystem Scale Approach to Examine the Role of Reactive Metal Hydroxide Nanoparticles in Drinking Water Reservoirs*."

THE MUSEUM PIECE: IN MEMORY OF DON DALTON

By Llyn Sharp



Don Dalton working at the Mineral Sale.

One of our most stalwart and supportive alumni, Don Dalton, passed away on Tuesday, July 28, 2020, in Tucson, Arizona. We are deeply saddened by this loss. Don visited the Department regularly over the years and had friends across several generations of Geosciences faculty, staff, and students.

Donald Vance Dalton was born in Alexandria, VA in 1938. The family moved to Lake Lure, NC, a rural and tourist area near Asheville, when he was in 3rd grade. Don was already out collecting minerals in the Blue Ridge and Piedmont of North Carolina while he was in high school. His parents started a couple of gift shops and "Dalton Minerals" had rocks and minerals for sale on a shelf in the shops before he started college.

He went to prep school at Blue Ridge School for Boys in Hendersonville, NC then college at Virginia Polytechnic Institute (VPI). Like all students then, he was in the Corps of Cadets. He sustained his early interest in rocks and minerals and majored in Geology. He took field camp at Saltville, Virginia in the summer of 1959 with Dr. Byron Cooper and most of the rest of the VPI Geology faculty at that time—Dr. Richard Dietrich, Dr. Wally Lowry, Dr. Jake (C.G.) Tillman, and Dr. Rosie (Charles) Sears.

After graduation from VPI in 1960 he went into the military at Ft. Belvoir in Northern Virginia where he was accepted into the U.S. Army Corps of Engineers 30th Engineer Battalion. Getting this assignment was where he learned *"you won't get it if you don't ask"*—he had

been shy of asking to be in the COE. He was transferred to the COE school where he was asked to teach Concrete Construction. COE put them through a month-long course on "how to teach" that Don found to be one of the most useful classes he ever took, followed by his experience teaching a wide range of students in the Corps of Engineers.

COE had the Concrete Section and the Asphalt Section, and one week Don was invited along on a field trip to an asphalt plant (American Bitumen, owned by Standard Oil) where he made such a good impression that they offered him a job when he got out of the Army. It helped that they already had VPI grads on staff. Standard Oil became Chevron, so Don worked for Chevron for 30 years, the first 20 in "Special Products" (tennis court surfaces, tracks, etc.) that took him to projects in Saudi Arabia, Hong Kong and around the United States.

For a mineral collector, Tucson was an amazing place to have a home. The Tucson Gem and Mineral Show (TGMS) grew to be one of the largest shows in the world, and Don was involved from its early days. He was a regular at a local dealer, Susie Davis Minerals, whose shop was on his way home from work. As the TGMS grew, Don would set up and sell minerals once a year "just for fun". Dalton Minerals was still in business! Don's fabulous personal large collection has been built by his opportunities there in Tucson, and his eye for an interesting piece or excellent example at *"the right price"*.

He liked crystals in matrix, had many North Carolina specimens, and at one time had a large collection of mining paraphernalia—signs, ephemera, and tools. He did a lot of his own preparation work using a shop that he added onto his home.

Don was a diehard Hokie fan and kept his connection with the Department. At the end of his career at Chevron, and continuing after he retired, he and Museum of Geosciences Director Dr. Susan Eriksson started having a Mineral Sale as a fundraiser for the Museum. After a couple of sales he thought *“oh, gosh, I’ve started something I can’t stop!”*. He started shopping the Tucson

show not only for his own collection, but to have things to donate to the Museum or sell at the Mineral Sale, with proceeds donated to the Museum. His annual donations helped with education and public outreach and exhibit upgrades over many years. He also had the foresight to start an endowed fund to support Museum operations. He took advantage of Chevron’s charitable match for decades, much to the benefit of the fund. Donations in his memory can be made to the Virginia Tech Foundation Donald Dalton Museum of Geosciences Endowment.



Spring 2022 Newsletter

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Letters to the editor,
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IN MEMORIAM - DR. LUCA FEDELE

Dr. Luca Fedele passed away unexpectedly on October 22, 2020. Luca received his PhD in Geosciences from Virginia Tech in 2002. After returning to his home in Italy for a short time as a post-doc following completion of his degree, he returned to Virginia Tech to accept a position as manager of the laser ablation ICP-MS laboratory in the Department of Geosciences. During this time, he also began teaching introductory geosciences class and developing new, online classes in the earth sciences. At the time of his passing, he was one of the most active and successful instructors in the department, and continued to assist with operation of the LA ICP-MS laboratory. Luca was a valuable contributor to the success of the Department, always willing to help out when needed, and he is and will be missed by those who know and worked with him.



Dr. Luca Fedele

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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

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In-kind Gifts and Volunteering - donate an old car or property 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

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GIVING:



PARTING SHOT

The Geosciences semester-long study abroad program is based at the Steger Center for International Scholarship in Riva San Vitale, Switzerland in the fall semester. We invite our Geosciences alumni and friends to participate in this field-based experiential learning opportunity by attending one (or more!) of four field excursions that are included in the program; and 8-day Trans-Alp trip, excursions to the Dolomites of northern Italy, and to Cinque Terra, on the Mediterranean coast in northwest Italy, and to Naples, Italy to visit Vesuvius, Pompeii and other locations. To participate, contact Bob Bodnar at rjb@vt.edu for more details.