NEWSLETTER - SPRING 2019
FOR CALENDAR YEAR 2018

DEPARTMENT OF GEOSCIENCES

BUCHTEL COLLEGE OF ARTS & SCIENCES

Dear Alumni and Friends,

Once again, it has been a year of change at The University of Akron. The President stepped down in May of last year, less than two years after taking over. Shortly thereafter, the Dean of the College of Arts and Sciences, Dr. John Green, was selected as the Interim President. In turn, the Associate Dean for Academics, Dr. Linda Subich, was selected as Interim Dean of the Buchtel College of Arts and Sciences. Dr. Subich is from the Department of Psychology. She is a common-sense leader with whom I have worked in the Dean's Office for the past five years. I am confident she will do her best to support all units in the College over the next few years until a permanent Dean is appointed. We do not expect that to happen until a new President and Provost are named and they have time to evaluate the situation. Of the eleven Colleges comprising UA, more than half have interim Deans. Filling those positions will take a couple of years and will likely have a major impact in shaping the future of UA.

During the time these leadership changes were occurring, all of the academic departments on campus were undergoing program review. Program review is process whereby academic programs and units are evaluated to identify areas of strength, areas for improvement, areas of growth and future needs and to set priorities. Important metrics used for these evaluations usually include historical enrollment, degree production, student credit hours, research productivity, quality of instruction, job placement and overall impact to the University. In principle, this process is intended to make programs and departments stronger. In practice, the process has been used at UA in the past as a way to criticize and cut programs using poorly defined criteria with no metrics. This year was no different. Despite this, I am happy to report that the geology-related BS and BA programs scored in the upper 10% of the programs evaluated in the Buchtel College of Arts and Sciences. Despite an approximately 23% decline in overall University undergraduate enrollment over the past five years, geology programs have remained stable with between 110-125 majors per year. Our four-year retention, year-to-year persistence and six-year graduation rates of 80% were higher than the College averages. About 10% of our majors are also students in the Honors College. Sadly, our geography programs were targeted for elimination. We are no longer permitted to admit students in the undergraduate or graduate GIS programs. We will continue to teach GIS courses to geology students and others across campus and we will continue to teach a variety of Geography general education courses. However, we will phase out the GIS degree programs over the next few years.

Shortly after we completed program review, we were asked to prepare a three year plan. Part of that plan involved developing a mission statement and supporting goals that could increase matriculation, retention, persistence and degree completion. After much discussion, we developed the following department mission statement:

> *The Department of Geosciences immerses students in field- and laboratory-based experiential learning through paired masters-bachelors level instruction, preparing students for high-demand careers in oil, gas and mineral discovery industries and in fields related to environmental protection. In addition, the department supports a liberal arts education by offering natural science, social science, critical thinking, complex systems, domestic diversity and global diversity general education courses. Geoscience faculty members also perform fundamental research in areas related to geographic information science, geology and environmental science.*

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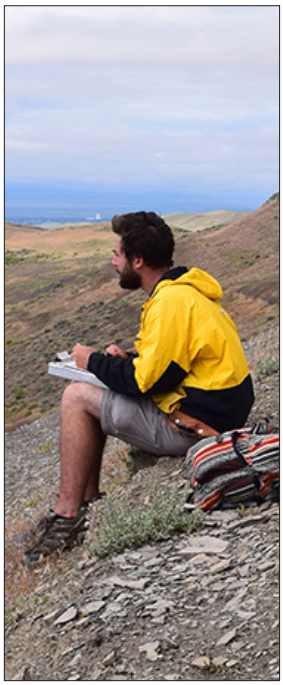
For more information about supporting Geosciences, please see page18.



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Our supporting goals mostly relate to increasing the number of students that attend and succeed at UA. Over the next several years we hope to attract more students by working closely with K-12 schools to broadly promote geology-related research and career opportunities. We are considering revising or re-tooling our BS and BA degree tracks to allow most of the first two years of the engineering curriculum to count toward degree completion. We are thinking about developing a geology degree track in Environmental GIS since there appears to be demand for such a degree. Geoscience faculty are also considering the option of developing an experiential learning, general education science course focused on environmental science in urban settings (e.g. heat island effects, air and water pollution, environmental risk assessment, low impact design). Students would learn about environmental issues affecting the very communities where they were raised. Since about three-quarters of our majors are students who switch majors at UA, we see this as a possible way to broaden our recruiting pipeline. What we implement will be determined as the University three-year plan is finalized and resourced.

We have some good news regarding the geology graduate program. The Interim Dean agreed to provide funding for three graduate students next year. While that is a far cry what we had in the past, it is a positive sign moving forward. You, our alumni and friends, know the added value graduate students provide to the department. Their contributions do not stop when they exit the labs where they are teaching. Graduate students serve as intermediaries between undergraduate students and the faculty. They work with undergraduates in research labs, provide guidance to students deciding which courses to take, and are great spokespersons for the Department. We are hoping this small allocation for next year is the start for rebuilding the Master of Science program.

Lastly I want to thank you for your continued support, both financially and in spirit, as we strive to provide the best possible education for our students as UA continues to grapple with its many issues. Last year your financial support was used to partially offset the costs for over two dozen students that attended field camp or a local, regional and national scientific geology and geography professional meeting. In the latter case, students presented original research they performed with faculty and other students across the department. A special thanks goes to Dhreoma Burford who made a major donation to the University in memory of her late husband, Dr. Arthur Burford. The endowment she established more than doubles our ability to provide deserving students with scholarships and will help us recruit and retain students. See the next section of the newsletter for a description of that new award. You can help support these causes by clicking the “Give online” button found on the bottom right side of our webpage (www.uakron.edu/geology).

Remember to check out to our Facebook alumni page. It is a great place to rekindle old acquaintances and make new contacts. Keep in touch, and I hope 2019 is going well for you. Again, I welcome your email updates, phone calls and visits if you are in the area. Feel free to contact me any time (steer@uakron.edu; 330-972-2099).

David Steer

Arthur E. Burford Endowed Scholarship Established

In February, 2018, a new avenue of support for students, The Arthur E. Burford Endowed Scholarship, was initiated by a donation from Mrs. Dhreoma R. Burford. This action was taken in tribute to her late husband, an accomplished geoscientist and former department chair, who was especially skilled in inspiring students and faculty to pursue their dreams. Professor Burford is remembered as the founding father of The University of Akron's Department of Geology. He joined UA in 1968 as a full professor and in 1970 was appointed head of the University's new geology department. Over the next 20 years, Dr. Burford nurtured the department's growth to more than 100 undergraduate and 60 graduate students by way of 14 new faculty hires, acquisition of state-of the-art research equipment, opening academic exchange programs with Chinese universities and field camps in Wyoming. A structural geologist, Dr. Burford received his Ph.D. at the University of Michigan, worked for the U.S. Geological Survey and was elected a Fellow of the Geological Society of America. He retired from UA in 1989 and continued his civic patronage as a Scoutmaster for Troup 320 of Hudson, OH and with many other community organizations and societies.

The scholarship is directed to qualified full-time undergraduates enrolled in the Department of Geosciences. Scholarships and will be awarded to students with demonstrated scholastic achievement, with an emphasis towards degree completion, as well as superior character and leadership. The scholarship is renewable provided recipients remain in good academic standing.

Alumnus is new State Geologist

Breaking news: In February of 2019 UA alumnus Mike Angle (BS '79, MS '82 Geology) was appointed as State Geologist of Ohio. The ODNR Division of Geological Survey is the state’s oldest natural resources agency, established in 1837 as the Geological Survey of Ohio. The division provides geological information and services needed for responsible management of Ohio’s natural resources. Mike joins fellow UA alumnus Rick Simmers (BS '81, MS '85 Geology) in high service to the state. Rick is Chief of the ODNR Division of Oil & Gas Resources, a position he has held since 2011.

Alumnus Report

40 Years of Geologic Time

By Janet de Vries, BS 1980

As an impressionable college freshman semester at The University of Akron, I met with Dr. Jim Teeter about my major, Environmental Education. He looked at my geologic time table quiz score and said, "Janet, you have potential!" That's when I changed my major to geology.

The most memorable part of my University of Akron education was geology field trips in Ohio (1975-79), Canada (1977-78), Bahamas (1977), and geology field camp (1979) based at Casper College in Casper, Wyoming. Because I had been on a Girl Scout trip to Ten Sleep, Wyoming, I already knew I wanted to move from my hometown of Akron to Wyoming when I grew up. I saved field camp for my final class and used my University of Akron connections to get my first geology job – a mud logger on oil and gas wells in Wyoming, North Dakota, and Montana.

After earning an MS Geology from Utah State University in 1982, I returned to Casper working for Hotline Energy Reports. In 1989, the oil industry gave me the opportunity to change careers when the oil boom when bust. I eventually earned MS Counseling and worked at Casper College as a career counselor for 21 years.

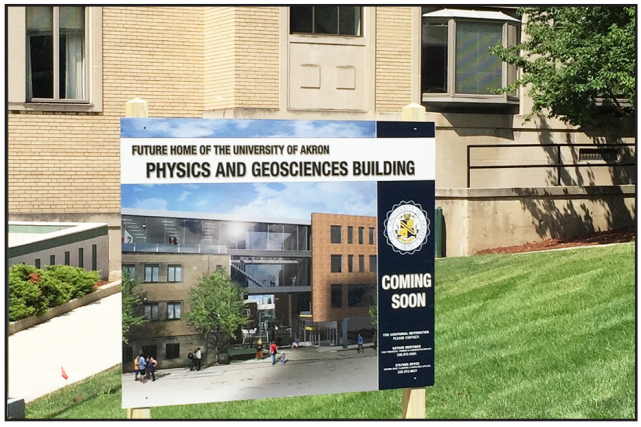
Students often wonder why they have to take general education courses. This meta-knowledge and background in geology helped me as a career counselor because I could discuss a wide range of career options with students. I often used that line from Dr. Teeter, "You have potential!"

Who would have guessed that 40 years after field camp, I would have spent most of my working life at the college where I spent the summer of 1979? The campus has grown and changed so much, my field camp classmates would not recognize the place. But the geology has not changed – Emigrant Anticline, Casper Mountain, Alcova Reservoir, Hat Six Ranch, Yellowstone Park, Teton Mountains.

Janet de Vries

Field Camp, 1979

Janet taking a break in the Bahamas, 1977



Crouse Hall Renovation?

In fall of 2018 signs appeared outside of Crouse Hall, showing an artist's rendering of a new Physics & Geosciences Building. We soon learned that a proposal had been made to undertake a full renovation of Crouse and Ayer Halls, joining them in to one building with a pass-through courtyard. This work, which is pending approval of funding, would begin in summer of 2020. It will require moving the department to swing space in Central Hower High School for up to 2 years. Stay tuned for further updates.

Part time faculty during 2018

The following part-time faculty taught courses during calendar year 2018, and their contributions are greatly appreciated.

Dr. Robert Barrett
Mr. Paul Becks
Dr. Annabelle Foos
Mr. Nick Frankovits
Dr. LaVerne Friberg
Dr. Ronald Runeric
Dr. Lee Thibodeaux

Faculty News

Linda R. Barrett, Ph.D.

Associate Professor
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In Spring Semester 2018 Linda taught both Advanced GIS and Advanced Remote Sensing. In the fall she taught Remote Sensing, Urban Applications in GIS, and GIS Programming and Customization. Her summer course was Cartographic Theory and Design. Fall 2018 started with the shocking news that the university abruptly discontinued the B.S. and M.S. programs in Geography/Geographic Information Sciences and would be admitting no new students to these programs. Linda has therefore been involved with "teach-out" plans and making sure that current students continue to be well served by our programs.

2018 was a year to visit family. In January, she visited her parents' winter place in Florida; in May-June she went to San Francisco to see her children, and during the summer she was in Michigan to visit both parents and in-laws, as well as attend a nephew's Lake Michigan beach wedding. There was also some time spent camping in the northern Lower Peninsula.

Meanwhile, she continues to work with colleagues in Archaeology and Chemistry to explore applications of shallow subsurface soil spectroscopy ("S4") to archaeological and/or forensic investigations. One recent project involved testing whether the technology could be used to help verify the location and extent of a Native American burial ground in the upper Midwest. In addition, they are busy analyzing data previously collected at several archaeological sites in Kansas. The team is also putting considerable effort into exploring commercializing the process.

Linda's current research project is to reconstruct the forests of several counties in north central Ohio from the early 1800s using records from the original congressional survey of the area. The records, once incorporated into a GIS environment, can be related to the site characteristics (e.g., soil texture, drainage class, and slope). Other historical information with a spatial component, such as a map of farm woodlots from the mid-1800s, can also be related to these.

Hazel A. Barton, Ph.D.

Professor (Primary Appt. Biology)
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The Barton Lab had another active year, with 4 papers in peer-reviewed journals, with another 6 submitted, and 3 published book chapters.

The entire Barton Lab traveled to Montana, taking three days and visiting all the significant sites on the way to attend the National Speleological Society annual convention, where three students gave oral presentations on their research.

They had three significant field trips. The first was a five-day camping trip in Lecuguilla Cave, where they sampled microorganisms for both antibiotic production and barite precipitation (yes, they think they've found a cave microbe that precipitates barium sulfate as part of its growth strategy!). They also had a combined trip to Wind Cave National Park and Jewel Cave National Monument in South Dakota. The deep lakes in Wind Cave, about two hours of difficult caving from the entrance, have been known since the 1980s, but last year new lakes were discovered in Jewel Cave, about 14 hours of hard (and tight) caving from the entrance, requiring a four-day camp. Graduate students Olivia Hershey and Katey Bender collected bacteria by filtering over 1,000 L of water from each lake, allowing us to examine the microbial processes that maintain groundwater quality in the Madison Aquifer. On the Jewel Cave trip, Katey became only the second woman to go this far into the cave! The last field trip was back to Brazil, to continue work on the microbial processes that are leading to iron formation caves, with the newly acquired data supporting our hypothesis of exothenic speleogenesis.

It was a big year for PhD student, Ceth Parker. During the summer, Ceth won two awards for his research presentations: the James G. Mitchell Award at the NSS convention and the best oral presentation at the 24th International Conference on Subterranean Biology held in Aveiro, Portugal. Ceth also successfully defended his dissertation in Fall 2018 and has begun a post-doctoral position at the NASA Jet Propulsion Laboratory in California.

Hazel made an appearance on the National Geographic Channel, where her work in Lechuguilla Cave was featured in the TV Series 'One Strange Rock' (Episode 3: Genesis), and was nominated to serve as Vice Chair of the Board of the National Cave and Karst Research Institute.

And, we finally updated the Barton Lab website. Check it out at www.cavescience.com.

John Beltz

Proffesor of Instruction

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John is starting his 26th year of teaching at The University of Akron by continuing to instruct Historical Geology, Physical Geology, Introduction to the Oceans, Wetlands and Dinosaurs. He is also teaching the laboratory section of Historical Geology, due to the lack of graduate student assistance and is missing them now more than ever.

Over the last two summers, John and Tom Quick have taught the Wetlands class. John teaches the sections covering wetland types, wetland determination and basic plant identification, while Tom instructs sections covering the chemical analysis of wetland water and soil samples collected on two field trips. They continue to take the class to the Bath Nature Preserve, as Forrest Smith had done in previous years. They have also added the former pond at Tom's house. It has been transitioning into a small wetland over the last several years, and they hope to track its progress as it continues to evolve. They will examine both of these sites again in the summer of 2019.

John continues to serve as secretary for the Department's faculty meetings after more than sixteen years. In his spare time, he hikes, works on home improvements and takes his kids on field trips around Ohio. Fourteen-year-old Hollie and ten-year-old Will still enjoy long walks, fossil collecting and geocaching with mom and dad. Will is really getting a love for science, doing experiments and watching YouTube videos of science demonstrations. Hollie still excels in science in high school, so John figures he can turn at least one of them into a geologist in the future.

Meera Chatterjee, Ph.D.

Proffesor of Instruction

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Meera has been very active in teaching multiple sections of Introduction to Geography, Cultural Diversity and World Regional Geography. Due to an increased demand for remote learning, the vision of having online geography classes caused her to work on getting Introduction to Geography and Cultural Diversity 100% online. These online sections have already attracted an increased number of students. Meera's project has been chosen for funding as a part of Mini ITL Grant (University of Akron) in 2018 and soon will be presenting the outcomes. She served on the steering committee and successfully organized NEXT conference in February 2018 at the University of Akron. Meera is also serving on the steering committee for the NEXT conference to be organized in March 2019.

Shanon Donnelly, Ph.D.

Assistant Professor

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Shanon expanded his research and teaching using unmanned aerial systems (UAS) in 2018. A summer course that focused on applications of UAS in mapping drew students from Geosciences and Civil Engineering to Bath Nature Preserve. Two new projects also explored the use of UAS to help connect citizens to environmental issues.

Environmental Science students from Akron's STEM high school visited the university-managed nature preserve to learn about wetland invasive species and then used a custom-built web mapping application to interpret aerial imagery taken during the summer when the invasive species was in bloom.

Shanon directed students in the experiential learning course in working with staff at the Cleveland Museum of Natural History to develop a web mapping applications for their Discover-Explore-Connect project.

Shanon also continued his research on spatial models of land change associated with shale gas infrastructure development in the Utica and Marcellus shale plays.

A summer course focused on applications of UAS in mapping drew students from Geosciences and Civil Engineering to Bath Nature Preserve

Caleb Holyoke, Ph.D.
Assistant Professor
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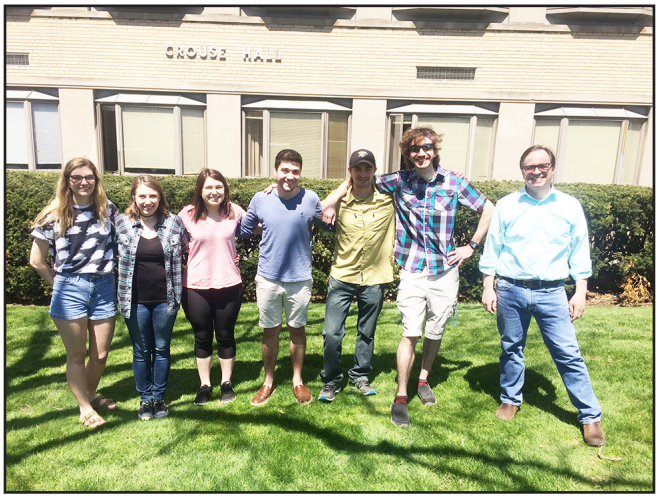
In 2018, Caleb taught a very wet Field Camp II, Structural Geology, Engineering Geology and Graduate Seminar. Caleb also continued as the undergraduate advisor for the geology majors. We have been busy deforming rocks over the past year. In March, Danielle Anderson and Rebeccah DiPuccio attended the Northeast GSA meeting in Burlington, VT to present their results on how water content affects the strength of quartz and how foliation orientation affects the strength of rocks deformed by crystal plastic mechanisms, respectively. Both Danielle and Rebeccah graduated in May. Joseph Millard and Caleb McDaniel defended their M.S. theses on pressure dependence and grain size dependence of magnesite strength, respectively, in May. Both Joe and Caleb started positions in gold mining after graduating. During Field Camp II, we visited the Brunton Compass factory in Wyoming and they made a bunch of small repairs to our compasses! Casey Braccia completed her Honors Thesis project on how preexisting lattice preferred orientations affect the strength of rocks this year and presented her work at the Fall AGU meeting in Washington, D.C. before graduating in December. Dr. Rachel Wells worked in the laboratory for four months before starting a position at Iowa State University. She helped analyze samples from Joe and Casey's experiments and presented these results at AGU. Christopher Thomas also started a project to determine how weathering affects the strength of Indiana Limestone.

Another beautiful day on the structure trip.

(L-R) Sarah Burgess, Kyle Boston and Josh Phillips discuss stratigraphy



2018 Rock Mechanics Lab members (L-R) Casey Braccia, Danielle Anderson, Rebeccah DiPuccio, Caleb McDaniel, RJ McGinnis, Joe Millard, and Dr. Caleb Holyoke

Jorie Krob and some friends in Seminoe Dam State Park, Wyoming.

To keep UA up to date on your personal information and accomplishments/news, please go to: www.uakron.edu/postyourpride

John Peck, Ph.D.
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Highlights for 2018 involved students, including two presentations John made to the Geosciences Club. John went on many enjoyable field trips with students in order to teach Sedimentology-Stratigraphy, Physical Geology, Coastal Geology, Rivers Seminar, Independent Research and both Field Camp I and II. On these trips students are required to make measurements, interpret the results and often produce substantial written reports. He recalls all of these trips as enjoyable, sunny and warm. However, trip photos show Rivers Seminar students building the coring raft on a snowy day that never went above freezing, and because of all the rain Field Camp II students doubted they were actually in a desert!

John continued outreach in 2018 by participating in the Cuyahoga Valley National Park's resources inventory meeting and also writing the Outstandingly Remarkable Values Geologic Section for their Wild and Scenic Rivers application. Furthermore, he was the invited speaker at the *Summit Soil & Water Conservation District* annual meeting in October and the *Environmental Resources Technical Advisory Committee* in December. At these meetings John presented the research he and his students performed regarding sediment yield and watershed dynamics in northern Ohio.

John continues a research program in sedimentology/environmental magnetics, providng research opportunities for undergraduate students. Connor Estes completed his Honors Thesis on Cuyahoga River sedimentation in which he calculated the volumetric changes to the former Munroe Falls Dam impoundment sediment. Sierra Swisher extracted pollen from a local kettle lake sediment core and identified the Youngest Dryas climate event by the change from spruce to pine pollen. Brandon Kopfer studied the anthropogenic impacts as recorded in the sediments of Nesmith Lake, Summit County. John Marke continued the geomorphic assessment of dam removals on the Cuyahoga River. All of these students wrote substantial research term papers and presented their findings at a department colloquium.

Field Camp II, 2018

Coastal Geology students profiling Geneva State Beach. You know it is a fine day on Lake Erie when you can see the horizon and use the Emery beach profiling method.

One of the four teams of Rivers Seminar students having just recovered a long sediment core from the Gorge Dam impoundment.

Rivers Seminar students building the raft they will use to core the Gorge Dam impoundment.

Tom Quick

Asst. Professor of Instruction

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This is Tom's third year as instructor in the department. He has been busy creating instructional videos and teaching On-line Earth Science for both Fall and Spring semesters as well as Summer. For a second year, Tom helped John Beltz teach the Wetlands course during the summer where the class visited a couple of sites collecting samples to take back to the lab for testing. Everyone enjoys these field trips and this past summer no one picked up up any ticks! Tom assisted the regional Science Olympiad this past spring by providing samples used in rock and mineral identification, and helped students from a few of the local schools in sharpening their skills in rock and mineral identification.

Tom attended a Chemical Industry Outreach Workshop hosted by The Cleveland Division of the Federal Bureau of Investigation and our University Safety Department. He watched several explosive devices detonate and plans to use what he has learned to keep our chemical inventory safe.

Tom is still doing the usual equipment maintenance in the department from replacing springs in the Spex mill to fixing electrical circuits in a precision saw. Computers in the department also keep Tom busy. The main GIS lab was upgraded with the latest operating system software for classes.

Nita Sahai

Professor (Primary Appt. Polymer Sci)

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Dr. Sahai maintains a full research program on a variety of topics, and began a year-long Professional Development Leave in Fall of 2018.

Heather Suppan enjoys a rainy day during field camp.

Ira D. Sasowsky, Ph.D.

Professor

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In spring semester 2018 Ira taught the Caves module, along with Petroleum Geology. In fall he developed and taught a new Honors Natural Science Colloquium titled "Our Great Lakes". This class explored a variety of topics related to these important freshwater bodies. They read and discussed the book *The Death and Life of the Great Lakes*, by Dan Egan. They also had various content lectures and presentations by the students. The highlight was a day field trip where they followed the path of water from the headwaters down to Lake Erie, including stops at Brandywine Falls and the canal.

Two students completed their master's thesis projects and graduated: Kyle McDaniel: *Origin of Crystal Rock Cave, Ohio, USA and its record of Lake Erie variation through speleothem analyses* and RJ McGinnis: *Quantitative Analysis of Valley Stress Relief in the Genesis of Valley-Aligned Cave Master Conduits*. RJ presented the results of his research at the GSA Northeastern sectional meeting in Burlington, Vermont. Undergraduate Josh Novello completed his study of the large sandstone sinkhole in Little Mountain, Geauga County. He submitted a manuscript to the Journal of Cave & Karst Studies, and it has been accepted for publication. He moved to Binghamton, NY in the summer to pursue an MS degree at SUNY.

Undergraduate Geologic Aides Alizabeth Christian, Sarah Burgess, and Christian Dadante continue to assist with numerous projects. Alizabeth focuses on the Bath Bog monitoring. Sarah completed a history of the department (see this issue), and continued work on her experiment in Scott Hollow Cave, West Virginia to evaluate possible aerosol deposition of manganese oxides. She presented her results at the GSA Annual meeting in Indianapolis in the fall, and then graduated. In 2019 she will move to Indiana to pursue a MS degree. Christian completed his degree, and is now working with a local geoscience consulting firm.

Ira continues as a reviewer of manuscripts for numerous journals, as well as publishing his own research results. Recent book chapters on major caves Windy Mouth and Scott Hollow were issued with former student co-authors, along with a paper on karst area protection. He remains active with the Geological Society of America (appointed to the Editorial Board for the journal *Environmental & Engineering Geoscience*), Cave Conservancy of the Virginias, and the Karst Waters Institute (serving as Secretary). He attended the fall GSA meeting in Indy this year. In December 2018 he was very busy helping to convert the former "Grad computer lab" across from the Dept. office in to a study space for students. This should bring a nice spirit of community to the first floor of Crouse Hall.

John Senko, Ph.D.

Associate Professor

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John continued to teach Geology and Environmental Science Service Learning (Spring 2018), Geomicrobiology (Spring 2018), and Geochemistry (Fall 2018). A new addition to the course rotation was a Special Topics course that focused on advanced topics in environmental microbiology. It was a fun course, with graduate students with backgrounds in biology, geology, and environmental engineering.

The Service Learning field trip over spring break of 2018 was the eigth sampling campaign to monitor the performance of several acid mine drainage (AMD) treatment systems in southeastern Pennsylvania and southwestern Ohio. Spring 2018 was our first sampling campaign to Silver Creek Metropark (Norton, OH), where Professor Emeritus Annabelle Foos has worked. Thus far, over one hundred students have participated in this course, which was initiated with support from the National Science Foundation (NSF).

The Senko Lab currently has four Ph.D. students, three M.S. students, and four undergraduate students. Bobby Miller (Integrated Biology Ph.D.) and Tim Schmucker (Environmental Science M.S. are continuing their research on microbially influenced corrosion. Josh Davis (Integrated Bioscience Ph.D. has started a project to isolate anaerobic bacteria from corroding natural gas transmission lines. Shagun Sharma (Integrated Biology Ph.D.), Nick Wander, and Zach Santangelo (Geology M.S.) are working on projects to characterize the geochemistry and microbiological processes associated with several AMD-impacted systems. Finally, Melissa Mulford (Integrated Bioscience Ph.D.) has started working on a project to understand how microbiological iron metabolism influences the solubility of Si in banded iron formation and iron ores that host unique caves in the "Iron Quadrangle" of Brazil .

The work on iron formation caves is a continuing NSF-funded project in collaboration with Hazel Barton and Ira Sasowsky that was initiated in 2017. In collaboration with Chelsea Monty-Bromer (UA Chemical and Biomolecular Engineering), we received a grant in 2018 from the US Department of Transportation's Pipeline and Hazardous Material Safety Administration to study microbially influenced corrosion in natural gas transmission lines. We have also been chosen by the US Department of Energy's Joint Genome Institute to receive a great deal of DNA sequencing effort in collaboration with Clara Chan (University of Delaware). We have published several papers with collaborators from The University of Akron, and presented our results at several national and international meetings.

Jeremy Spencer, Ph.D.

Assist. Professor of Instruction

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In the past academic year, Dr. Spencer has continued to develop active learning materials for his classes, participate in archives and science education research, and has started to do outreach to local elementary schools.

New learning material developed in cartography and GIS courses include opportunities for students to reference and digitize older map sources. This has included aligning a period map of the Pearl Harbor attack to modern coordinates in a GIS, and then having students symbolize ships by their type and amount of damage sustained. The maps of A.B. Williams, a prominent Cleveland MetroParks naturalist, were also aligned to modern coordinates and the positions of trees by species were mapped out. Dr. Spencer was a co-author on a paper that outlined the use of A.B. Williams' data in various classrooms (https://jitp.commons.gc.cuny.edu/branching-out-using-historical-records-to-connect-with-the-environment/).

Dr. Spencer continues to draw on his background in natural hazards vulnerability by updating and developing new active learning assignments that use actual physical and social data. Examples of such assignments include an analysis of hurricane vulnerability in selected cities for his Earth's Atmosphere and Weather class, along with an assessment of earthquake-related hazards across the United States using GIS for his Physical Geography class.

Dr. Spencer has also done educational outreach involving talks and activities to local elementary schools. The topics of these presentations included the water cycle, maps, and landforms, including a demonstration of plate boundaries using Oreo cookies. The students (and Dr. Spencer) loved the Oreos…and the plate boundaries.

David Steer, Ph.D.

Professor

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In 2018, Dr. Steer completed his first full year as Chair of the Department of Geosciences and his fourth year as Associate Dean for the Natural Sciences. Besides attending to the myriad of last minute demands from higher and routine department business, Dr. Steer focused on building a strong sense of community within the Department. This included hosting faculty and students at his home during the Superbowl and at

Thanksgiving, visiting students at field camp in Wyoming and meeting more students as he attended geoscience club meetings. He also taught an Honors College Colloquium entitled "Super-wicked problems and the Earth System." In that class, student researched and discussed resource and environmental issues related to population growth, geoengineering climate, sea level change and coastal vulnerability, and local sources of pollution. Dr. Steer also began working with two Honors students who are comparing and contrasting the data and inversion results from model-based resistivity surveying as compared to data generated using a physical model. At the Dean-level, he was busy with program review and assisting the incoming Interim Dean with College-level operations and planning. He also continued his work on an NSF-funded grant to increase the pipeline of students entering and persisting in STEM disciplines. Lastly, the 4th edition of the textbook he co-authored with David McConnell, The Good Earth: An Introduction to Earth Science, was published in 2018.

James Thomka Ph.D.
Assist. Professor of Instruction
jthomka@uakron.edu

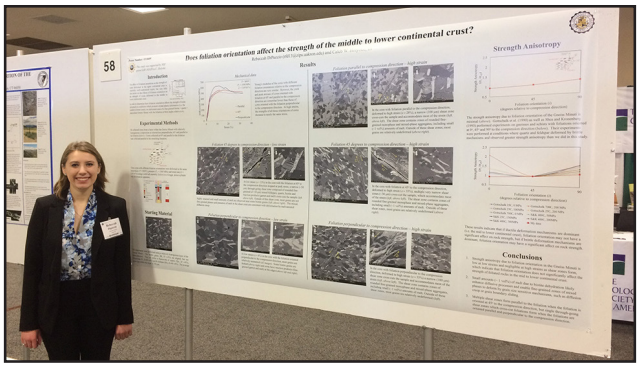
James taught more than 300 students in 2018, distributed among Earth Science, Introductory Physical Geology, Introductory Historical Geology, Mass Extinctions and Geology, Paleobiology, and Geology Field Camp I. All courses went smoothly, though the absence of TAs was definitely felt during the fall semester and a few adjustments had to be made to certain classes as a result of the transition to a four-day academic week. The Mass Extinctions course was taught during the summer semester for the first time and Earth Science was successfully completed in the fall term in spite of a brutal 7:15 a.m. starting time.

2018 was a very productive year for the Thomka Lab, with major progress occurring in the primary research areas of (1) Paleozoic stalked echinoderm taphonomy and paleoecology, (2) invertebrate trace fossils, and (3) cratonic sequence stratigraphy and cyclostratigraphy, in addition to a variety of other subjects. Six papers were published this year, including several co-authored with current or former undergraduate research students. Some highlights include publication of an exhaustive guidebook and running of a multi-day field excursion focusing on the Ordovician-Devonian stratigraphy of western Kentucky as part of the national GSA meeting in November; description of an unusual assemblage of Ordovician crinoids discovered during the spring Paleobiology field trip; and documentation of a remarkable crinoid collection that contains important information concerning predator-prey and host-parasite dynamics during the Paleozoic.

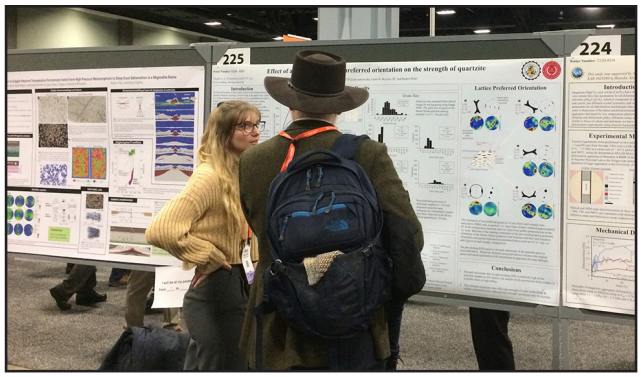
Many students were involved in research projects this year, with some finishing up their projects and others getting started. Sarah Burgess and Brynne Burgy traveled to the GSA meeting in Indianapolis to present their findings. Sarah has been working on very small crinoid elements that are unexpectedly abundant in Ordovician muds of southeastern Indiana. Brynne has been working on the preservation of "Little Horatio," the mastodon that has been in the department since 1966. *(For background information, see page 12.)* Students who are beginning research projects include Christopher Thomas, is working on microfossil assemblages recovered from samples collected during Geology Field Camp I; and Josh Mercier and Hannah Smith, are working with the Pennsylvanian crinoid collection of the Cleveland Museum of Natural History. Josh is working on the origin of bite marks on crinoid plates and Hannah is conducting an SEM analysis of the microstructure of previously undescribed parts of crinoids for her honors college thesis. All of us are looking forward to seeing what new discoveries are made in the coming year!

Undergraduate student Christopher Thomas disaggregating Upper Ordovician shales. Samples initially look like unappealing sludge and sieved residues look like little more than dust. However, this "dust" is actually a diverse and well-preserved assemblage of microscopic fossils!

Undergraduates Hannah Smith and Josh Mercier working in the invertebrate paleontology collections of the Cleveland Museum of Natural History.



Undergraduate student Rebeccah DiPuccio NEGSA 2018.



Undergraduate student Casey Braccia presenting at AGU.

Old friend lost!

In August of 2018 winds damaged the aged cucumber magnolia tree that sits between Crouse Hall and the Student Union, next to the Spirit Rock. The damage was so severe that the tree was considered a loss, and it was eventually cut down by the grounds crew.

(Spirit Rock can be seen peeking out in lower rt of photo.)

More highlights from Field Camp, 2018

Brian Keough measuring stratigraphy.

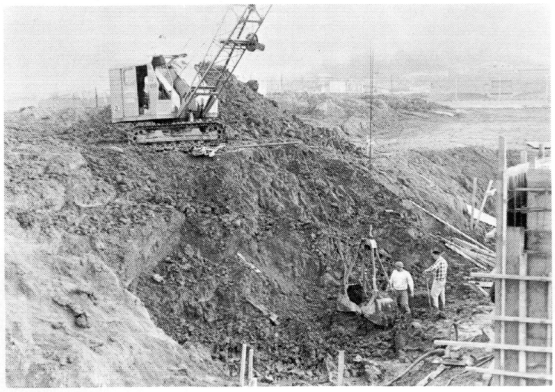
Brian Keough, Anna Pastore and Sarah Burgess find the buried pipeline and a road back to the vans.

GeoloZips at the Brunton Compass factory.

Here is an article from *The Akron Alumnus*, Winter 1966-67 about the mastodon that Dr. Thomka's lab is working on cataloging and preserving (see page 10).

AU Scientists Probe for Bones Of Prehistoric Mammal

By William S. Cramer



A 30-foot deep hole has been produced at the excavation site by a combination of mechanical and human diggers.

Iron probing rods are used by workers to detect objects in the soft mixture of clay and wet soil.

AT CAPE KENNEDY, scientists are hard at work probing the mysteries of outer space. But just west of Akron, University scientists are equally hard at work probing "inner space" in an attempt to unearth the skeleton of a prehistoric mammal.

It all began last September when workers preparing ground for construction of a funeral home uncovered several animal bones. Faculty experts were called in and identified the bones as probably those of a mastodon which thousands of years ago fell into a swamp then in that area and died. Nearly a third of the animal's skeleton was recovered before the project was forced to a halt because of a lack of funds.

But leaders of the project were convinced that the find was too important to be abandoned. Dr. Paul Wingard, Assistant Dean of Buchtel College of Liberal Arts and Associate Professor of Geology, and Dr. Roger Keller, Associate Professor of Biology and head of that department, who are coordinating the project, went to Washington, D. C. in an attempt to obtain financial assistance from the National Science Foundation.

The result was a $28,000 grant, awarded the project in November. Since then, faculty members and interested students have been working six days a week in order to find as much of the animal as possible before work must be discontinued February 1 in order to allow for resumption of construction on the funeral home.

Almost 100 bone fragments have been discovered at the digging sight. Another significant find has been the discovery of a four-foot section of a pine tree. Tests are being conducted off campus in order to determine the age of both the bones and the tree.

Digging at the excavation sight is complicated by the fact that beneath the two or three feet of topsoil is flowing mud and clay, the remains of organic matter which thrived in the once swampy region. This substance, resembling soft margarine in texture, must be searched with the aid of four-foot iron probes. The probes are sunk into the soft substance by hand until something is detected. If an object is located which the scientists wish to extract, the remaining muck must be cleared away by

THE UNIVERSITY OF AKRON
ALUMNUS
WINTER 1967

shovel and bare hands. A person using the iron probes can tell by the feel of an object whether it is a bone or just a rock.

The project has the enthusiastic support of the business firms concerned with construction of the funeral home. These include the Narzisi Construction Company, 1229 Main Street, Cuyahoga Falls, Ohio which is doing the actual building; Schmeltzer Construction Company, Inc., 1570 Akron-Peninsula Road, Akron, which is doing the excavating; and the Billow Corporation, 118 Ash Street, Akron, funeral directors. Schmeltzer has donated the services of the earth-moving equipment and an operator. This has helped to cut down on the cost of the expensive operation.

In addition to the $28,000 from the National Science Foundation, the University has given $5,000 to the project. Of the $33,000 total, $18,000 will go toward partially compensating the contractors for the change in construction plans and the resulting added costs for labor brought on by the digging. Other extensive costs which must be paid are for the removal of 15 to 20 feet of clay above the level where the swamp is buried. The dirt which has been removed will then have to be replaced in the excavation. Also, some of the money must be held in reserve to pay for scientific tests on the bones and other materials.

"Expenses are preventing our hiring students or others to come in and do some of the probing and handwork required," Keller said. Most of the work is being done by Keller, Wingard, Dr. Richard F. Nokes, Assistant Professor of Biology, Dr. James W. Teeter, Assistant Professor of Geology and a few interested students. In addition, experts from other universities have visited the digging site and helped with the project.

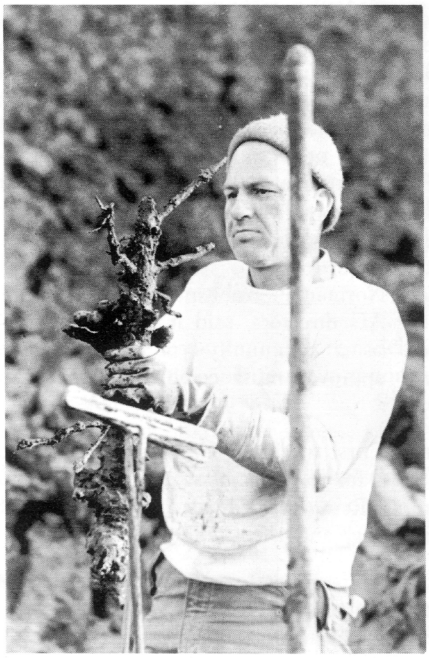
Bones and dead trees are not the only things the men are looking for. The area abounds in the remains of very small snails and plant life, such as grass, all of which add up to make this project worth all the money that is being invested in it.

Only time will tell what will be uncovered in the remaining period available for digging. "We intend to keep going until we run out of time or money," Dr. Keller asserted.

The Akron Alumnus

Dr. Richard F. Nokes (right), Assistant Professor of Biology, examines some of the bones and bone fragments with his lab assistant.

Interested onlookers view the digging operations from a dry vantage point.



A four-foot section of an ancient pine tree just extracted from the digging site is examined by Dr. Paul Wingard, Assistant Dean of Buchtel College of Liberal Arts and Assistant Professor of Geology.

Scholarly Activities

(Current or past Geosciences students are in italics and Geosciences faculty are in bold print)

Papers

Brett, C.E., Hartshorn, K.R., Waid, C.B.T., McLaughlin, P.I., Bulinski, K.V., **Thomka, J.R.**, Paton, T.R., Freeman, R.L., and Dattilo, B.F., 2018, Lower to middle Paleozoic sequence stratigraphy and paleontology in the greater Louisville, Kentucky area, in Florea, L.J., ed., Ancient Oceans, Orogenic Uplifts, and Glacial Ice: Geologic Crossroads in America's Heartland: *Geological Society of America Field Trip Guidebook* 51, p. 35-94.

Dalai P. and **Sahai N.**, 2018, Mineral-lipid interactions in the origins of life. *Trends. Biochem. Sci,* v.1531.

Dalai P. and **Sahai N.**, 2018, Protocell emergence and evolution. In: *Handbook of Astrobiology*, ed. Vera Kolb. CRC Press, Boca Raton, FL., Chapter 7.2.

Dalai P., Ustriyana P. and **Sahai N.**, 2018, Aqueous magnesium as an environmental selection pressure in the evolution of phospholipid membranes on early Earth. *Geochim. Cosmochim. Acta*. v. 223 p. 216-228.

Fukuda, J., **Holyoke, C.W.**, and Kronenberg, A. K., 2018, Deformation of fine-grained quartz aggregates by mixed diffusion and dislocation creep, *Journal of Geophysical Research*, DOI: 10.1029/2017JB015133.Abstracts:

Hershey, O.A, Giarrizzo, J., Wallace, A., Barton, M.D., Johnston, M.D., Kellmeyer, J. and **Barton, H.A.**, 2018. A bacterially dominated ecosystem in the ultra-oligotrophic lakes of Wind Cave, Wind Cave National Park, South Dakota, USA. *Frontiers in Microbiology* 9:2823.

Kaddour H., Gerisioglu S., Miyoshi T., Wesdemiotis C. and **Sahai N.**, 2018, Non-enzymatic polymerization at the mineral-water interface: An insight into adsorption-polymerization relationships and the effects of magnesium. *J. Phys. Chem. C*. 122, 29386-29397.

Kosič Ficco, K., and **Sasowsky, I.D.**, 2018, An interdisciplinary framework for the protection of karst aquifers *Environmental Science and Policy*, v. 89, p. 41-48.

Maciejewska, M., Calusinska, M., Cornet, L., Adam, D., Pessi, I.S., Malchair, S., Delfosse, P., Baurain, D,. **Barton, H.A.**, Carnol, M., Rigali, S. 2018. High-throughput sequencing analysis of the actinobacterial sapatial diversity in moonmilk deposits. *Antibiotics* 7(2):27

Miller, R.B., Lawson, K., Sadek, A., Monty, C.N. and **Senko, J.M.**, 2018. Uniform and pitting corrosion of carbon steel by Shewanella oneidensis MR-1 under nitrate-reducing conditions, *Applied and Environmental Microbiology*, AEM 00790-18.

Parker, C.W., Auler, A.S., Barton, M.D., **Sasowsky, I.D.**, **Senko, J.M.**, and **Barton, H.A.,** 2018. Fe (III) Reducing Microorganisms from Iron Ore Caves Demonstrate Fermentative Fe (III) Reduction and Promote Cave Formation, *Geomicrobiology Journal 35* (4), 311-322.

Penga, C., Vishwakarmaa, A., Lia, Z., **Barton, H.A.**, Joy, A. 2018. Modification of a conventional polyurethane composition provides significant anti-biofilm activity against Escherichia coli. *Polymer Chemistry* 9:3195-3198

Thomka, J.R., 2018, Plant or animal, terrestrial or marine? Thoughts on specimen curation in university palaeontological teaching collections based on an example from Ohio, USA: *The Geological Curator,* v. 10, p. 517-521.

Thomka, J.R., and *Eddy, D.B.*, 2018, Notes on additional material associated with the type specimens of *Diphuicrinus ohioensis* (Echinodermata: Crinoidea) from the Middle Pennsylvanian of southeastern Ohio: *Ohio Journal of Science*, v. 118, p. 25-30.

Thomka, J.R., and *Eddy, D.B.*, 2018, Repeated regeneration of crinoid spines in the Upper Pennsylvanian of eastern Ohio: Evidence of elevated predation intensity and significance for predator-driven evolution of crinoid morphology: *Palaios*, v. 33, p. 508-513.

Thomka, J.R., Brett, C.E., *Bole, T.A.*, and *Campbell, H.J.*, 2018, A noteworthy accumulation of disparid crinoids from the type Cincinnatian (Upper Ordovician) of southwestern Ohio, USA: Implications for the palaeoecology and taphonomy of crinoid "logjam" assemblages: *Swiss Journal of Palaeontology*, v. 137, p. 259-264.

Thomka, J.R., Sullivan, N.B., and Brett, C.E., 2018, *Arthrophycus* as a mimic of crinoid column impressions in the lower Silurian of central Kentucky, USA: *Lethaia*, v. 51, p. 96-101.

Zander, Z.K., Chen, P., Hsu, Y.-H., Dreger, N.Z., Savariau, L., McRoy, W.C, Cerchiari, A.E., Chambers, S.D., **Barton, H.A.**, Becker, M.L. 2018. Post-Fabrication QAC-Functionalized Thermoplastic Polyurethane for Contact-Killing Catheter Applications. *Biomaterials* 178:339-350.

Book Chapters

Auler, A.S., Parker, C.W., **Barton, H.A.**, and Soares, G.A. 2018. Iron Formation Caves: Genesis and Ecology. In *Encyclopedia of Caves*. Ed., White, W.B. and Culver, D.C.. 3rd Edition. Elsevier, Amsterdam, Netherlands.

Hershey, O.S, Kallmeyer, J. and **Barton H.A.** 2018. A practical guide to studying the microbiology of karst aquifers. In: *Karst Water Environment: Advances in Research, Management and Policy*, Eds. Younos,T., Schreiber, M. Kosič-Ficco, K. The Handbook of Environmental Chemistry: Volume 68. Springer, New York, NY. p.269

Hershey, O.S. and **Barton, H.A.** 2018. Microbial Diversity in Caves. In *Ecological Studies: Cave Ecology*, Ed O. Moldovan, L. Kovác and S. Halse. Springer, New York, NY.

Lane, S., Bishop, M.R., Dore, M.J., and **Sasowsky, I.D.**, 2018, Scott Hollow Cave. In: White, W.B. (ed.), *Caves and Karst of the Greenbrier Valley in West Virginia*, Springer, Berlin, p. 339-357.

Shank, D.A., *Fucci, M.C.*, and **Sasowsky, I.D.**, 2018, Windy Mouth Cave. In: White, W.B. (ed.), *Caves and Karst of the Greenbrier Valley in West Virginia*, Springer, Berlin, p. 313-337.

Edited Books

Sasowsky, I.D., Byle, M.J, and Land, L., (eds.), 2018, Proceedings of the 15th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst and the 3rd Appalachian Karst Symposium, April 2-6, Shepherdstown, West Virginia: NCKRI Symposium 7. Carlsbad, New Mexico: National Cave and Karst Research Institute, 425 p.

Abstracts and Oral Presentations

Barrett, Linda R., 2018. Swamp, Prairie, Bottom, Glade, Barrens, and Burnt Woods: Treeless Areas in the General Land Office Surveys of North-Central Ohio. Presented at the annual meeting of the American Association of Geographers, New Orleans, LA, April 10-14, 2018.

Braccia, C., Wells. R.K., **Holyoke, C.W.**, 2018, Effect of a pre-existing lattice preferred orientation on the strength of foliated quartzite, Abstract T21D-0225 presented at 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Brett, C.E., **Thomka, J.R.**, and Bissett, D.L., 2018, Analysis of disarticulated pelmatozoan columns from the Silurian of Indiana: A key to assessment of biodiversity, taphonomic biases, and paleoecology: *Geological Society of America Abstracts with Programs*, v. 50.

Brett, C.E., **Thomka, J.R.**, and Bissett, D.L., 2018, Improving echinoderm biodiversity calculations and interpretations of paleoecology through analysis of disarticulated stem material: A Silurian example: *Abstracts of the 5th International Palaeontological Congress*, p. 527.

Burgess, S.A., **Sasowsky, I.D.**, and Dore, M.J., 2018, Field experiment shows manganese oxide aerosol deposition near cave stream: *Geological Society of America Abstracts with Programs*, v. 50, no. 6, doi: 10.1130/abs/2018AM-317888.

Burgess, S.A., and **Thomka, J.R.**, 2018, Preservation of crinoids in the Upper Ordovician 'Flexicalymene minuens butter shale' of southeastern Indiana: Preliminary results: *Geological Society of America Abstracts with Programs*, v. 50.

Burgy, B.E., and **Thomka, J.R.**, 2018, Linear gouges on the bones of a Pleistocene mastodon from northeastern Ohio: Evidence of scavenging, gnawing, or human butchering?: *Geological Society of America Abstracts with Programs*, v. 50.

Delaney, A. and **Peck, J.A**., 2018. Effects of Climate and Development on the Yellow Creek Watershed, Ohio. *Cuyahoga River Area of Concern 2018 Symposium*, p.4.

Goddard, R., Hansen, L.N., Wallis, D., Stipp, M., **Holyoke, C.W.**, Kohlstedt, D., Goldsby, D.L., Durham, W.B., Kumamoto, K.M., Thom, C., 2018, Comparing in-situ and ex-situ stress measurements in polymineralic rocks, Abstract T31B-04 presented at 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Marke, J. and **Peck, J.A.**, 2018. Long-term Monitoring of the Effects of Two Dam Removals on the Middle Cuyahoga River, Ohio. Cuyahoga River Area of Concern 2018 Symposium, p.4.

McGinnis, R.J., **Sasowsky, I.D.**, and **Holyoke, C., III,** 2018, Role of rock mechanical properties in major cave development: Geological Society of America Abstracts with Programs, v. 50, no. 2, doi: 10.1130/abs/2018NE-310794

Miller, R., Sadek, A. **Senko, J.**, Monty, C., 2018. Determining the mechanisms of carbon steel corrosion by microorganisms isolated from contaminated biodiesel, NACE Corrosion 2018, Phoenix, AZ.

Parker, C.W., Auler, A., S**asowsky, I.D.**, **Senko, J.**, and **Barton, H.A.**, 2018, Brazilian iron formation caves reveal a novel mechanism of microbially driven cave formation: 24th International Conference on Subterranean Biology, 20-24 August 2018, University of Aveiro, Portugal.

Peck, J.A., *Gromofsky, G.*, *King, M.L.*, *Mann, K.* and *Milkovich, N.*, 2018. Using Sediment Magnetism to Assess Anthropogenic Impacts to Notheast Ohio Streams. *Geological Society of America Abstracts with Programs*, vol. 50, no. 6, doi: 10.1130/abs/2018AM-316341

Sahai N., 2018. Geochemical constraints on protocell self-assembly in the origins of life. NASA-Goddard Environments of Terrestrial Planets Under the Young Sun, Seeds of Biomolecules Symposium, NASA, Greenbelt, MD. April 2018.

Sahai N., 2018. Priming the origin of life by concentrating phosphate and magnesium on prebiotic Earth, Gordon Research Conference on the Origins of Life, Galveston, TX. January 2018.

Pumneo, J., Sharma, S. and **Senko J.**, 2018. Influence of different sequencing platforms on the evaluation of response of soil microbial communities to the intrusion of coal mine-derived AMD, Ohio Branch American Society for Microbiology, Athens, OH.

Senko, J., Miller, R., Monty, C., 2018. Evaluation of microbially-induced carbon steel corrosion using zero resistance ammetry in a split-chamber format. *Abstracts of Papers of the American Chemical Society 255*, New Orleans, LA.

Thomka, J.R., and Brett, C.E., 2018, Morphology and occurrence of a sphaeronitid diploporitan (Echinodermata) attachment structure in the middle Silurian of southeastern Indiana: *Geological Society of America Abstracts with Programs, North-Central Section*, v. 50.

Thomka, J.R., Bissett, D.L., Bantel, T.E., Davidson, M.D., and Brett, C.E., 2018, Microstratigraphy and modes of occurrence of diploporitan echinoderms in the Napoleon quarry Lagerstätte (middle Silurian Massie Formation, southeastern Indiana): *Geological Society of America Abstracts with Programs*, v. 50.

Ustriyana P., Wang Z., Chen K., Zhao W., Xu Z. and **Sahai N.**, 2018, Osteocalcin in modulating biomimetic collagen fibrillogenesis and intrafibrillar mineralization. MRS Spring 2018. Phoenix, AZ. Poster.

The following papers and abstracts were inadvertently omitted from a previous newsletter, and are included here to correct the record.

Articles and books 2014/2015

Brett, C.E., Malgieri, T.J., **Thomka, J.R.**, Aucoin, C.D., and Schwalbach, C.E., 2015, Calibrating water depths of Ordovician communities: Lithological and ecological controls on depositional gradients in Upper Ordovician strata of southern Ohio and north-central Kentucky, USA: *Estonian Journal of Earth Sciences*, v. 64, p. 19-23.

Brett, C.E., **Thomka, J.R.**, Schwalbach, C.E., Aucoin, C.D., and Malgieri, T.J., 2015, Faunal epiboles in the Upper Ordovician of north-central Kentucky: Implications for high-resolution sequence and event stratigraphy and recognition of a major unconformity: *Palaeoworld*, v. 24, p. 149-159.

Thomka, J.R., and Brett, C.E., 2015, Paleoecology of pelmatozoan attachment structures from a hardground surface in the middle Silurian Massie Formation, southeastern Indiana: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 420, p. 1-12.

Thomka, J.R., and Brett, C.E., 2015, Palaeontological and sedimentological effects of micro-bioherms in the Middle Silurian Massie Formation of southeastern Indiana, USA: *Lethaia*, v. 48, p. 172-187.

Thomka, J.R., and Brett, C.E., 2014, Taphonomy of diploporite (Echinodermata) holdfasts from a Silurian hardground, southeastern Indiana, United States: Palaeoecologic and stratigraphic significance: *Geological Magazine*, v. 151, p. 649-665.

Thomka, J.R., Malgieri, T.J., and Brett, C.E., 2014, A swollen crinoid pluricolumnal from the Upper Ordovician of northern Kentucky, USA: The oldest record of an amorphous paleopathologic response in Crinoidea?: *Estonian Journal of Earth Sciences*, v. 63, p. 317-322.

Abstracts 2014/2015

Aucoin, C.D., Brett, C.E., and **Thomka, J.R.**, 2015, A sequence stratigraphic model for recurring trilobite-rich 'butter shales' in the Upper Ordovician (Katian) of the Cincinnati Arch: *Geological Society of America Abstracts with Programs, North-Central Section*, v. 47, p. 87.

Aucoin, C.D., Brett, C.E., **Thomka, J.R.**, and Dattilo, B.F., 2015, Recurring taphofacies in the Upper Ordovician (Katian) of the Cincinnati Arch: A predictive model based on sequence stratigraphy: *Abstracts of the 12th International Symposium on the Ordovician System*, p. 92.

Brett, C.E., McLaughlin, P.I., Baird, G.C., Emsbo, P., **Thomka, J.R.**, and Zambito, J.J., IV, 2015, Silurian-Devonian environmental and biotic change recast in a new time scale: Evidence of changing volatility from the Appalachian Basin: *Geological Society of America Abstracts with Programs*, v. 47, p. 631.

Degrees Awarded

Spring 2018

Alhasani,Majed M	MS Geography/GIS
Asare-Bediako,Felix	MS Geography/GIS
Mireku,Franchesca	MS Geography/GIS
Antenucci,Nicholas M	BS Geography/GIS
Anderson,Danielle M	BS Geology
Dipuccio,Rebeccah F	BS Geology
Johnston,Joseph A	BS Geology
Milkovich,Nicholas M.	BS Geology
Vineyard,Rich D	Minor - Geology
McDaniel,Caleb A	MS Geology
Millard,Joseph W	MS Geology
Estes,Connor D	BS Geology - Engr Geology
Domanick,Sarah E	BA Geology - Environ Sci
Donnellan,Andrew J	BA Geology - Environ Sci
Franks,Lydia G	BA Geology - Environ Sci
Granger,Eric McChesney	BA Geology - Environ Sci
Rossett,Melbourne F	BA Geology - Environ Sci

Summer 2018

Brown,Kelsey A	BA Geology - Environ Sci
Kahwaji,David W	BS Geology
Ahadzie,Veronica M	MS Geography/GIS
McDaniel,Kyle A	MS Geology
McGinnis,Robert J	MS Geology

Fall 2018

Takyi Jr,Albert B	MS Geography/GIS
Oster,Grace L	BA Geology - Environ Sci
Snyder,Nolan B	BA Geology - Environ Sci
Boston,Kyle B	BA Geology - Environ Sci
Boycik,Brena O	BA Geology - Environ Sci
Dadante,Christian S	BA Geology - Environ Sci
Eley,Andriana E	BA Geology - Environ Sci
Herold,Joshua L	BA Geology - Environ Sci
Braccia,Casey M	BS Geology
Burgess,Sarah A	BS Geology
Phillips,Jonathan T	BS Geology
Phillips,Joshua E	BS Geology
Ray,Jacob M	BS Geography/GIS
Wilcox,Clifford R	BS Geography/GIS
Yankey,Ortis	MS Geography - Thesis Option

Donations received in 2018

Thanks to the following individuals, charitable funds and corporate matching funds, we received a total of $15,000 in 2018. Thank you so much for your generosity!

Department of Geosciences

Mr. and Mrs. David G. Arnold
Mr. Andrew P. Berkoski
Mr. and Mrs. James V. Bikun
Mr. and Mrs. Thomas F. Bray, Jr.
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Ms. Karen A. Heffley
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Mr. Gary E. Sanger
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Benevity Fund
ExxonMobil Foundation (formerly Exxon Educ Found)
Shell Oil Company Foundation
Lubrizol Foundation

Environmental Magnetics Lab

Mr. Gary M. Harris

Arthur E. Burford Endowed Scholarship

Mrs. Dhreoma Burford (2017 donation)

Geology Alumni Memorial Scholarship

Mr. and Mrs. Kerry Estes
Mr. Philip A. Fox

Dr. Paul C. Franks Endowed Scholarship

Mr. and Mrs. Michael P. Angle
Mr. and Mrs. Frank A. Marsek

James F. Fitzgerald Jr. Memorial Scholarship Fund

Mr. Thomas J. Quick

Geocience Program Awards

Geology Alumni Scholarship ($250)

Bracia, Casey
Burgess, Sarah
Kahn, Alexandra

Geology Alumni Memorial Scholarship ($200 or $400)

Keough, Brian ($400)
Marke, Jonathan ($400)
Mercier, Joshua ($400)
Thomas, Christopher ($400)
Dadante, Christian ($200)
Eley, Andriana ($200)
Swisher, Sierra ($200)

Paul C. Franks Endowed Scholarship in Resource Geology ($500)

Braccia, Casey
Burgess, Sarah
Kopfer, Brandon
Phillips, Jonathan
Phillips, Joshua

James F. Fitzgerald, Jr. Memorial Scholarship ($500)

Burgess, Sarah

Outstanding Graduate Student Award ($500)

Wander, Nicholas

Geography & Planning Alumni Fund ($200)

Alhasani, Majed
Asare-Bediako, Felix
Yankey, Ortis

The Hsin Kwung Chen Endowed Fellowship ($400)

Paudyal, Pramila

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Akron Geology Alumni

Your Support Makes a Difference!

Gifts from alumni and friends are vital to the success of Geosciences – both the program and the students! Each year, donor support makes it possible for deserving, hardworking students to attend field camp or afford tuition; for labs to be updated; and for programming to be enriched – all of which results in an outstanding academic experience. Your gift is tax deductible and 100 percent is used toward the designation of your choice. Please see the enclosed envelope for areas of greatest need or designate your gift to one of the following scholarships. Thank you for your consideration!

Field Camp II, 2018.

Cleaning the vans at the end of field camp.

Arthur E. Burford Endowed Scholarship Fund (638035)

Established in 2018, this scholarship will be awarded to full-time Geology students with demonstrated scholastic achievement, with an emphasis towards degree completion, as well as superior character and leadership. The scholarship is renewable provided recipients remain in good academic standing.

Paul C. Franks Endowed Scholarship Fund (637303)

The scholarship was established in 2010 in memory of Dr. Paul C. Franks to support geology majors interested in the resource side of geology (minerals, oil, gas, etc.). Preference is given to students from Northeast Ohio who are attending Geology Field Camp.

Geology Alumni Memorial Scholarship Fund (637348)

Established in 1991 with the express purpose of assisting eligible students to participate in the Geology Field Camp. This endowed fund provides support for a geology major with a 3.0 GPA or better who has completed at least 15 credits in geology. The student must have promise as a geologist and demonstrate enthusiasm, participation, interest and knowledge. Scholarship awards will be distributed each year from the fund's accumulated interest.

Geology Alumni Scholarship Fund (636263)

This fund supports student attendance at Geology Field Camp as well as the Outstanding Graduate Student award. Students must be a currently enrolled, major having completed 21 credits of science, engineering, or math courses, have at least 8 credits in Geosciences and have a 3.3 GPA or higher.

James F. Fitzgerald, Jr. Memorial Scholarship Fund (637285)

Established in 1980, this scholarship honors the memory of James F. Fitzgerald, Jr., a 1970 geology graduate killed during the eruption of Mount St. Helens volcano while engaged in field work for his doctoral dissertation as a graduate student at The University of Idaho. This scholarship is awarded to an outstanding geology senior selected by the faculty of the Department and is given to the outstanding senior graduating within the current academic year who has at least a 3.5 GPA, responsibility, integrity, industry, originality, ability to communicate and professional attitude.

Geosciences Van Maintenance and Replacement Fund (639516)

This fund allows the Department to maintain and periodically replace our fleet of two vans and pickup truck used for field trips and Field Camp.

Geography and Planning Alumni Fund (636670)

Established in 2006, this fund provides support for graduate and undergraduate student activities outside of the classroom context and for department sponsored student-centered events. The fund is designed to provide financial assistance for travel to professional conferences, attendance at workshops, participation in field trips, and other similar activities.

The Hsin Kwung Chen Endowed Fellowship Fund (639457)

Established in 1992 to benefit a worthy graduate student in the area of Geography. The graduate student will be chosen by the Department.

Over 55 years of history of the University of Akron Geography and Geology Programs

Compiled by Sarah Burgess (UA Geology Major) under the direction and editing of Dr. Ira D. Sasowsky (Professor of Geosciences). With contributions and assistance from Drs. Alan Noble and Chuck Monroe (former Geography Dept. Chairs), Dr. Roger Bain (former Geology Dept. Chair), Ms. Debbie King (retired Senior Lecturer in Geography), Dr. Linda Barrett (Associate Professor of Geosciences), Mr. John Ball (University Libraries and Archives), and Dr. Joe Hannibal (Cleveland Museum of Natural History). Information prior to the 1980s made use of the University Archives. Later information draws primarily from alumni newsletters and a summary by Dr. Noble.

The geology class in 1896 made a picnic out of their last field trip. This picture was possibly taken at the Old Stone Quarry at Penninsula, Ohio. The professor is Dr. Edward W. Claypole (right). Members of the class are seated l-r Katherine Laughead, Mary Andrews, Mary James, Eben Mumford, Emily Harpham and Edward Lukesh.

The intent of this review is to provide a narrative of the rich history of the Geosciences programs at The University of Akron (UA). The earliest records of geoscience studies at UA are related to Dr. Edward Waller Claypole. From 1883 to 1898 he was Professor of Natural Sciences in Buchtel College, where he was known for taking class trips to the Cuyahoga River Gorge

Originally a teacher in England, he resigned his position there because the church-sponsored institution considered his teaching of evolution to be heresy. Prior to joining UA he taught at Antioch College, and worked at the Pennsylvania Geological Survey. After leaving UA he went on to Throop Polytechnic Institute (forerunner of California Polytechnic Institute). Claypole was a highly respected geologist, and an expert on sandstones, glacial history, and paleontology. During his 15 years at UA he was a prolific researcher and contributor to the growth of the science, publishing 41 papers on fossil vertebrates.

In 1963, the Geography and Geology programs were formally established. At that time, the departments were one conjoined division known as the Department of Geography & Geology overseen by acting head Dr. Allen G. Noble.[1,2] The story of how this department became two independent groups, and then later rejoined, is woven into the development of the entire University. Rapid growth in the Department of Geography & Geology in its early years correlated with overall growth of the University at that time. Most departments were straining for space, and Geography & Geology was no exception. The conjoined department's first location was a single floor of Kolbe Hall, which contained one small joint Geography-Geology lab. [2,3]

Initially, offerings in Geology were limited to just two introductory courses; physical geology and historical geology. In the entire department there were only two students, both Geography majors. There were few maps, globes, hand samples, or the technical equipment that we have grown accustomed to, as evidenced by the reports of shortcomings and subsequent requests recorded in the Annual Dean's Reports. Geology faculty developed their baccalaureate program, adding classes year by year. This coincided with the enrollment of the first Geology major at The University of Akron just a year after the first Geography students. [3]

These years could not have been complete without some excitement. On November 22, 1966, a construction crew in Fairlawn was digging the basement to the Fairlawn Chapel when their equipment hit something that was neither mud nor stone. After some initial excavation, the foreman called The University of Akron and got in touch with the Department. Geology professors Jim (James) Teeter and Paul Wingard promptly appeared at the site to identify the remains as a juvenile mastodon. They received a $28,000 grant to conduct the dig, which took an additional 2 months to complete. The remains of the Fairlawn Mastodon, reportedly about 60% of a complete skeleton, are still on display in Crouse Hall.[33]

Kathy Teeter, daughter of Dr. Jim Teeter, at age 3 with a mastadon bone from the Fairlawn Mastadon Excavation Site on Sept. 19, 1966. (Akron Beacon Journal file photo) [https://www.ohio.com/akron/lifestyle/local-history-old-bones-found-in-1966-excavation-for-fairlawn-funeral-home]

After the graduation of the first two Geography baccalaureate students in 1967, and the graduation of the first Geology baccalaureate students in the following year, the Department of Geography & Geology began to seek serious expansions to their programs.[1] In the 1968-1969 academic year, the masters degree program in Geography took off. Concurrently, grant assistance was given to Geology faculty in order to develop an Earth Science program aimed at furthering the reach of public school teachers in that subject. The acting Dean of the College of Liberal Arts reported that there was increasing need to separate the departments, however the split could not be made without more development of the Geology division. [2]

Events progressed rapidly from there. In September of 1970, the Department of Geography & Geology split into two independent entities, the Department of Geography, which continued to be overseen by Dr. Allen Noble, and the Department of Geology, first headed by Dr. Arthur Burford.[3] It was Dr. Burford who that year started The University of Akron's Geology Field Camp program, then located at Casper College in Casper, Wyoming. 1970 also saw the establishment of the Center for Environmental Studies.

Recorded in the Board of Trustee Meeting Minutes from February 18, 1970, is a letter from the University President Norman P. Auburn expressing the University's interest in increasing its environmental awareness through an ad hoc committee of faculty and students.

"My proposal is that you organize under the chairmanship of Dr. M. J. Rzasa, Vice President for Academic Affairs – designate, to make suggestions and to formulate plans as to what part we on this campus can play in the national mission for the 1970s—improvement in the quality of life by cleaning up our environment. To this end, I hope you will consider how we can mobilize the talent on this campus in an interdisciplinary effort to work for what President Nixon calls the birthright of every American—'clean air, clean water, open spaces'."

Dean Charles Blair was requested to serve as Secretary of the Committee and recommendations for students to be appointed were also sought. The letter also suggests the creation of a subcommittee to investigate the degree to which The University of Akron itself was polluting the environment.[27] Meeting Minutes from September 17, 1970 report that the Committee, in addition to planning environmentally minded programs in association with the College of Engineering, was considering the creation of the Center for Environmental Studies.[29] At the meeting in the following month on October 28, the Center for Environmental Studies was still in the early stages of its conception. Through the creation of the Center for Environmental Studies as well as the Center for Peace Studies, Developmental Studies, and what was then Afro-American Studies, it was hoped that students would feel progress was being made on the role of the University in our society.[28]

In the summer of 1971, the crowding problems presented by the expanding programs became further aggravated when Kolbe Hall underwent remodeling. The Dean reported at this time that one house on the corner

of campus had been delegated as an office building for some Geology faculty, effectively fracturing the department. Once the renovations were completed, the English department vacated Kolbe and the Geology Department was allocated additional building space.[4] The Department of Geography continued under the leadership of Dr. Allen Noble following its separation in 1970. In 1973, the department moved into the 4th floor of Carroll Hall, where it would stay until the new College of Arts and Sciences Building was constructed in 2002.

Despite some growing pains, the University's expansion made available many new resources to students and faculty, particularly so for the Department of Geology. In the 1971-1972 academic year, they obtained a Phillips Norelco X-Ray diffraction system.[4] This is the first record of acquisition of a large, sophisticated piece of equipment in the Department of Geology and was made through a Title VI matching funds grant. It was put into use in the following year, increasing the quality of instruction and enabling both graduate and undergraduate research in crystallography.[5] A coordinated program between Kent State University's Geology Department and The University of Akron's Civil Engineering Department was also developed by Akron Geosciences faculty around this time, enabling students to pursue baccalaureate and masters degrees focused on engineering geology and professional geology. The following year, in 1973, The University of Akron began a Certificate Program in Environmental Studies designed to cross department lines as was suggested by the Ad Hoc Faculty and Student Committee on Environmental Studies.[30]

In the mid 70s, the Department of Geology benefited from a surge of increased enrollment partially due to a program through which college level geology courses were taught at Cuyahoga Falls High School by The University of Akron faculty. At the time of the program's conception it was praised for strengthening the relationship between the University and the local school system.[31] From the perspective of the University, much motivation seems to have been derived from attempting to encourage greater enrollment, a goal to which positive results appear to have been seen.[6] Both Physical Geology and Historical Geology were taught to high school seniors with course fees subsidized through the Cuyahoga Falls Board of Education. Dr. Arthur Burford and Dr. James Teeter taught the courses at the high school but they were otherwise identical to those taught on campus, including the presence of field trips.[7] The program continued for at least 4 years; in the Annual Report of the Buchtel College of Arts and Sciences from 1975-76 the program was said to have been renewed with urging from the Superintendent and Board of Education to expand the program to other disciplines.[8]

Enrollment in the geosciences seems to also have been boosted by what was called "extremely good informal relationships" between students and faculty members within the Department of Geology. In an Annual Report of the Buchtel College of Arts and Sciences, there is mention of student-faculty volleyball games in which there was a proposal (underlined in the original text) that the losers of the game streak.[6]

Around this time, Dr. Thomas Nash and others from the Department of Geography designed and constructed a 3-dimensional model of downtown Akron in 1850, measuring 10' by 4'. In the Annual Dean's report (1975-1976), the model was reportedly housed at the John Brown House of the Summit County Historical Society.[8] This is not the first record of Dr. Nash's "unusual" contributions to the community. In previous years, he had overseen the preparation of various maps and charts, "…containing information about the community in novel and often dramatic forms."[8] Attempts to find further information on these maps, or the maps themselves, have not been successful. In the following year the Department of Geology was able to move into its current home in Crouse Hall.

The Dean's reports ceased in 1979, and therefore this useful record of the programs becomes less clear for the ensuing years. The end of the 70's decade was marked by an impressive event organized by Geography faculty. In 1975, Dr. Larry Ma wrote to the Chinese Scientific and Technical Association in Peking to request a geographic tour of China. In May, the Department of Geography received a letter requesting to have American geographers tour China as guests of the Chinese government if in return a delegation of Chinese geographers could be sent to the United States. Dr. Ma, Dr. Noble, and eight other geographers were able to gain insight into a country that at that time had limited relations with the United States on their privately funded research trip.[9] Then, in the 1978-1979 academic year, Dr. Noble and Dr. Ma organized and hosted a delegation of Chinese geographers to the United States and participated in a National Science Foundation Panel on the Scholarly Exchange of Geographers between China and the United States.[10] This accomplishment was acclaimed by the acting Dean as bringing the Department of Geography at The University of Akron to a preeminent scholarly position.

Academically, this time period is when the Geology programs truly began to encompass the breadth of study that characterizes the geosciences. In the 1978-1979 academic year, the graduate program in Geology expanded to include concentrations in Earth Science, Geophysics, Environmental Geology, and Engineering Geology, the latter of which was a result of a successful collaboration between the Department of Geology and the Department of Civil Engineering.[9] The following year saw the approval of the Environmental Science B.A. degree in Geology that continues as an active program today.[10]

Post 1980's, we resume our story with a farewell letter from department head Dr. Burford after 21 years at The University of Akron.[11] Dr. James Teeter assumed the department head position following Dr. Burford's retirement. This transition is framed by a shift in Ohio's philosophy towards higher education as is marked by a study titled, "Managing for the Future" commissioned by the Ohio

Board of Regents. The study is summarized by Dr. Teeter as recommending the centralization of power for setting goals and funding for state schools to the Ohio Board of Regents. The study also recommended designating Ohio State University and the University of Cincinnati as major research institutions for the state.[13] On a more local level, President Elliot reduced the operating budget of the College of Arts and Sciences from $1.4 million to $578,000 despite the College having the greatest profit margin of over $13 million at that time.[14]

In spite of budget cuts, the Department of Geology continued to develop their programs. Beginning in 1994, 5-week modular geosciences topic courses were taught and saw high enrollment from their inception.[14] Morale in the Department of Geology remained high with the next decade of acting department heads overseeing much needed renovations to Crouse Hall. The walls of lockers on the first floor were converted into glass display cases, the departmental office complex and conference rooms were modernized, and many of the classrooms and laboratories in Crouse were refurbished.[14,15] These projects were funded by generous alumni donations which also served and continue to provide scholarship funding for deserving Geology students.

A big change for the Department of Geography occurred in the early 1990s when the Planning faculty (Dr. Frank Costa and Dr. Richard Klosterman) were moved from their former home in Urban Studies, and the department became known as the Department of Geography and Planning. This also gave the department an M.A. degree in Geography/Urban Planning, which joined the previous M.A. and M.S. Geography degrees. The planning faculty (including Dr. Ashok Dutt, whose primary appointment had been in Geography, but had had a joint appointment with Urban Studies) also participated in a joint Ph.D. program with Cleveland State University, which gave the department a number of Ph.D. students as well. A B.A. track in planning was added in 2001.

One of the strong points of the Planning M.A. was its emphasis on internship training. The department worked closely with a number of local agencies to provide the students with paid hands-on work experience. By the early 2000's there were more than 40 contracts for internships being written every academic year with more than 20 different agencies.

The department embraced the growing field of Geographic Information Systems as well. Dr. Tom Nash did some work in digital mapping, and also taught an early GIS course. Dr. Klosterman taught GIS after he joined the department; and gradually new GIS courses were added to the curriculum, and new faculty with expertise in the area were hired. An instructional computer lab was formed in Carroll Hall by the mid-1990s, containing 14 networked computers, digitizing tablets, and color and black and white printers. When the department moved to its new home in the Arts and Sciences Building in 2002, the number of computers in the instructional lab increased to 29. The department also housed a separate research computer lab that had a SUN workstation and was connected to a high-speed research network. The M.S. Geography degree became an M.S. Geography/Geographic Information Sciences in 2004. At the same time, the B.S. Geography/Cartography was revamped to become a B.S. Geography/Geographic Information Sciences.

Throughout the 90's the Department of Geology was also wholeheartedly embracing the global transition into the technological age. In addition to lecture halls being outfitted for computer hookups for digital presentations, faculty multimedia courses helped pioneer online learning at The University of Akron.[16] The fall of '94 saw the opening of the Geology Resource Center which operated for 12 hours a day and was used to the point of overcrowding complaints. The overcrowding situation is also reflected by the fact that in '96 the Department of Geology had 25 full time graduate students who worked in a sum total of 700 square feet of graduate offices.[15] This is even more shocking when viewed within the context that just a few years earlier the number of graduate students was predicted to have stabilized at 20.[12]

For the Department of Geology, the start of the millennium was a time to emphasize and focus research on the Terrestrial Records of Quaternary Environmental and Climatic Change as well as Virtual Reality and Earth Science Education and Research. Nearly $500,000 in external funding was garnered by faculty to support this work.[18] Additionally, Dr. Lisa Park and Dr. David Black were able to obtain a $250,000 environmental scanning electron microscope for the Department which further increased research capacity.[20] A donation of over $5,000 by John and Libby Sperr for the purchase of geology books helped to stimulate an increase in undergraduate involvement with departmental research that had begun earlier in the decade.[19,21] All this culminated in a unanimous vote to change the name of the Department of Geology to the Department of Geology and Environmental Science, with the intent of representing the diversity of geosciences practiced by students, faculty, and alumni.[21] Additionally, the 2006 meeting of the North-Central Section of the Geological Society of America was hosted by The University of Akron in the newly constructed and modernized student union.[22]

In the financial realm, another round of state-wide budget cuts reached The University of Akron in 2003 and resulted in a permanent 25% cut in operating dollars. At the time, it came to the University's attention that a large group of professors were being grossly underpaid compared to other departments in the State's university system. The administration thus reduced athletic funding to bring salaries to the median level for state universities.[19] In the following year, the University faculty voted to unionize through the American Association of University Professors.[20] In 2010, state funding for universities changed from being allocated in part based on student enrollment to being based in the number of students who received a passing grade. This created uncertainty both in the Department

budget as well as how to take these changes into consideration when structuring courses.[24] These times coincided with a spike in oil prices, increased interest in the Marcellus and Utica Shales, and a shortage of geologists and geophysicists in the industry. This may have helped bolster the enrollment of geology majors to over 100 in 2011, despite the fact that numbers had been dropping prior to 2008.[23,26]

In 2011, the Department of Geography and Planning was effectively dissolved, and several faculty from that entity applied for and were accepted as faculty within the Department of Geology and Environmental Science.[25] At the same time, Geology Chair Dr. John Szabo was assigned by the Dean to handle the scheduling of Geography (3350) courses. Thus, after a 40-year separation, the two departments were effectively once again combined. Faculty voted to have the name become the Department of Geosciences to reflect the diversity faculty expertise.[25] In total, the department had about 110 undergraduate majors and 41 graduate students at the time of the "merger". Not long after this, Dr. Szabo retired in 2013 after serving 16 years as Department Chair.[26] Following his departure, Dr. Jim McManus was hired and served as Chair for 3 years, followed by Dr. Steve Weeks (Biology Chair) as Interim Chair. In October of 2017, Dr. David Steer (geophysics Professor) assumed the role of Chair.

The geosciences program at The University of Akron has been very successful across the many decades it has been active. Over the 52 years since 1966 (earlier records not easily available) there have been 519 and 384 undergraduate degrees granted in geology and geography, respectively, along with 325 and 565 masters degrees. Our graduates hold prominent positions in agencies and businesses worldwide, and we are so proud of all that they have accomplished for the citizens of Ohio, the United States, and the world. Unfortunately, moving forward there are many challenges to continuing this success. In 2017, in an effort to reduce expenses, the University made a plan to greatly reduce graduate teaching assistantship funding as well as tuition remission for graduate students, in most master's level departments. This decreased the number of TA's we could offer from 23 to 3, decimating our graduate program since similar programs at other universities do offer TA support. Then, in 2018, the University undertook a "review" of programs. As a result of that, our Geography / Geographic Information Sciences – BS and MS degree programs were eliminated. Finally, even though we currently have 93 majors, we have lost many tenure-line faculty, and have been severely constrained in any new hiring. While there were a total of 19 such faculty in 2004, only 7 exist in 2019. Significant commitment will be needed in order to continue the long history of teaching, research, and service that Geosciences at The University of Akron has brought to the state and nation.

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