

Department of Earth and Environmental Sciences Newsletter

Message from DEO David Peate

Once again, I hope that you and your families are staying safe and well, and coping with ongoing impacts of the COVID-19 pandemic. Here, we have also had to deal with the aftermath of the unexpected 'Derecho' storm in August that brought hurricane-force winds across central Iowa and beyond. As an interesting aside, the term 'Derecho' was coined by a physics professor at the University of Iowa back in 1888. Iowa City saw many downed trees and power outages of several days, but north of us in Cedar Rapids, the stronger wind gusts (estimated at up to 130 mph) caused more extensive damage. Trowbridge Hall did not suffer any wind damage, and maintained power and internet throughout, providing a haven for people who had lost power and internet access at home.

In response to the pandemic, Trowbridge Hall was completely shut down from March 12th and it took us until June 12th before we could get permission for limited access to labs for faculty and students to restart their research programs. Most student research is back up and running, at least on campus, but most students could not complete any field work or museum trips over the summer. For the Fall semester, we have limited in-person instruction for smaller classes and labs, and larger classes online, and department seminars are virtual using zoom, which has meant that the corridors of Trowbridge Hall have been unusually quiet. In spite of these changes to how courses are being run, our student enrollment numbers this semester are higher than in Fall 2019, which is remarkable given that overall student enrollment in the college decreased significantly.

Field work and field trips remain a big and unresolved issue for the department under the present circumstances. Physical distancing restrictions make it difficult to use university vans for student travel, so we will have another semester without any field trips other than to local places that students can drive to themselves. The recent news of the development of a potential vaccine makes us a bit more hopeful that by the end of the spring semester, we might be able to provide field courses once again.

There have also been several personnel changes in the department recently. Bill Barnhart left to take a position at the USGS as the Assistant Coordinator of Earthquakes and Natural Disasters. Mary Kosloski will continue teaching for the Fall semester, and then move with Bill to Colorado. Ingrid Ukstins has left for a faculty position at the University of Auckland in New Zealand. We wish them all well in their future careers. Some great news is that we have been able to transition Ben Swanson from a Visiting Assistant Professor position to a more permanent Lecturer position, and he brings critical expertise to support the Environmental Science program.



2020 Distinguished Alumni Award

by Joanna Thamke

It is an incredible honor to be selected to receive the University of Iowa Earth and Environmental Sciences Department 2020 Distinguished Alumni Award. Thank you to the Alumni Advisory Board for supporting this award, mentoring students, and promoting communication among alumni, faculty, and students. You are providing a great service to the EESD community.

I give credit to the University of Iowa for providing the foundation I needed in my career. My interest in the Earth Sciences occurred in Trowbridge Hall, sometime near the end of the upper Holocene when analog watches became digital. Dr. Richard Baker was teaching 'Evolution of the Earth'—also known as Rocks for Jocks—and mentioned that a U.S. Geological Survey (USGS) office was located near the campus. Not only did Dr. Baker's class cement my decision to get a Geology degree at the University of Iowa, but I also decided during his lecture that I would have a career with the USGS. It took mountains of perseverance and several visits to the USGS Iowa City office, but I was eventually hired as a Cooperative Education Student. An enormous shout out to the University of Iowa and USGS for offering student work/study programs which still exist today. My USGS supervisor Dr. Michael Burkart and University of Iowa advisor Dr. Richard Brenner worked together to make sure I had the necessary courses to become a USGS Hydrologist upon graduation. Those years yielded many wonderful memories. Classes such as Mineralogy, Paleontology,



*Joanna taking field notes at the Grinnell Glacier Stream gauge, Glacier National Park.
Photo By Don Bischoff, USGS.*

ogy, Petrology, and Structural Geology with brilliant professors such as Dr. Tom Foster, Dr. Brian Glennister, and Dr. Richard Hopper plus field trips to the Green River, the Florida Keys, and the Wasatch-Uinta Range all prepared me for my USGS career. My fellow Geology students included Eric Carman, Melanie Clark, Steve Ales, Doug Walters, and Orrin Plocher and these fun folks were my introduction to network-building. If it weren't for the University of Iowa's Geology Department, I would have never met my favorite University of Iowa Geology Department alum—Ed Thamke. Shortly after my graduation from the University of Iowa with a Bachelor of Science degree in Geology, Ed and I married and moved to Helena, Montana where the USGS office there had an opening for an entry-level hydrologist. The mountains of Montana became our home where Ed also established a rewarding career in Earth Sciences with the Montana Department of Environmental Quality.



1980s USGS Geophysical Crew, Big Spring Project, Iowa

Three decades of USGS scientific research with what is now the Wyoming-Montana Water Science Center have resulted in opportunities for me to lead projects with a focus on water quality, water availability, water use, and energy. These projects range in scope from mapping aquifers in the Helena Valley to assessing groundwater availability in the Williston Basin spanning the United States and Canada. Primarily, my scientific research has focused on the energy-water nexus and delineating brine contamination from oil development within the Williston Basin. The brine is co-produced with the oil in enormous volumes, is extremely saline, and has contaminated drinking-water supplies within the Fort Peck Indian Reservation. Fortunately, the affected residents and community now have an alternative and safe water source. Today I co-lead a project to estimate water use associated with the development of continuous oil and gas throughout the Nation. I am also the Associate Director of Studies for the Wyoming-Montana Water Science Center and supervise a very talented and exceptional staff of Hydrologists, Physical Scientists, Civil Engineers, Ecologists, Microbiologists, and Geologists.

Nearly all my USGS peers began their careers as student hires and have remained with the agency since then. The USGS continues to hire students through the Pathways Intern Program and the Iowa City office welcomes visits from University of Iowa students. I give credit to the University of Iowa and the USGS in Iowa City for creating a solid foundation to an amazing career and am particularly grateful to be selected for this year's Earth and Environmental Sciences Department Distinguished Alumni Award.



Graduate Student Profile

Sam Hudziak - MS student

Research Title: Icelandic Ventifacts as a Testbed for Constraining Martian Climate Signatures

Research: My research is focused on a ventifact field in the Askja region of Iceland as proxy for surficial processes on Mars. The work that I am doing is a statistical analysis comparing in-situ field measurements that I collected in the summer of 2019, with synthetic measurements 3-D models generated within Agisoft-Metashape photogrammetry software.

Experience I value at UI: One of the largest aspects that got me interested in geoscience was the real world, tactile way in which we can study the world

around us. I was fortunate to be able to spend a month in the field before I began at Iowa in the fall of 2019 in the Askja region of Iceland. While in the field I was able to fully immerse myself in the study area that would become my focus for the coming two years while meeting and working alongside incredible people. The ability of my advisor and the department to facilitate opportunities for students to study and explore topics that are literally out of this world is something I will always cherish.

Future Plans: I aim to continue my education in the realm of planetary science and am excited for the next step in the journey.



Graduate Student Profile

Cole Gardner - MS student

Research Title: Detrital Zircon Provenance of the Cretaceous Blackleaf Formation in Southwestern Montana, USA with Implications for Regional Sedimentation Patterns

Research: My project is using high-n detrital zircon geochronologic data and statistical modeling to characterize the sediment sources and transport pathways controlling deposition of the Cretaceous foreland Blackleaf Formation, drawing direct linkages between unroofing strata in the fold-thrust belt in central Idaho and deposition across the foreland basin.

Experience I value at UI: Graduate school has taught me the thoroughness needed to really delve deep into a scientific project and find both the confidence to stand by my interpretations and the criticism to challenge what I read in the literature. I am grateful to be part of a highly collaborative research group with both my advisor as well as PhD students available as mentors, and a cohort of fellow graduate students who have become close peers this past year. I have had

the opportunity to use cutting-edge geochronological methods at the Arizona Laserchron Center and present my research at the virtual GSA meeting this fall, as well as participate in projects that test my skills and provide valuable experience in oil and gas.

Future Plans: After graduation, I am going to be a geoscience intern for ConocoPhillips in Anchorage, Alaska for Summer 2021. I am hoping to turn that into a career in oil and gas, which directly aligns with my interests in paleogeography, basin analysis, and geochronology.

Provost's Postdoctoral Faculty Fellow

Shamar Chin

I am currently a postdoctoral fellow working with Dr. Brad Cramer. My field of study focuses on calcareous nannofossil micropaleontology and biostratigraphy. My primary interests are understanding paleoclimatic and paleoceanographic changes using calcareous nannofossil paleoecology as a method, particularly during the Cretaceous. I completed my PhD at the University of Nebraska–Lincoln under the supervision of Dr. David Watkins. My research entailed understanding the onset of the Late Cretaceous cooling event, more specifically, the negative carbon isotope excursion that coincides with the Campanian–Maastrichtian Boundary. During this time, the conditions changed from a 'hot greenhouse' to 'cool greenhouse' climate. Using paleoecological trends from South Atlantic and Indian oceans deep sea sites, it was concluded that surface water conditions changed due to major paleoceanographic reorganization. I will continue to explore these findings using new isotopic data and make comparisons to other localities.



Calcareous nannoplankton are sea surface dwellers that prefer deeper marine environments and their presence as well as abundances provide key information about past surface water conditions and fluctuations in sea level. My postdoctoral research focuses on calcareous nannofossil biostratigraphy and paleoecological trends combined with organic carbon isotope analysis of sediments from northwest Iowa. The sediments were deposited on the eastern margin of the Western Interior Seaway during Oceanic Anoxic Event 2 (Cenomanian–Turonian) and is marked by a positive organic carbon excursion. Ultimately, these paleoecological trends will help us to make inferences about oceanic conditions that led to this anoxic event.

Four postdoctoral scholars comprise the University of Iowa Office of the Provost's first cohort in the Provost's Postdoctoral Faculty Fellowship Program. The program is intended to serve as a pipeline to tenure-track positions and is expected to increase campus diversity and align with the goals of the 2019–2021 Diversity, Equity, and Inclusion Action Plan. Applicants were selected based on their potential to become successful tenure-track faculty. Considerations included the strength and quality of candidates' research and scholarship; their contributions to diversity, equity, and inclusion excellence; and the quality of the fellowship resources and programming offered by the applicant's host unit—including but not limited to mentorship opportunities, professional development, and the availability of a tenure-track position upon the fellowship's completion. - from <https://now.uiowa.edu/>

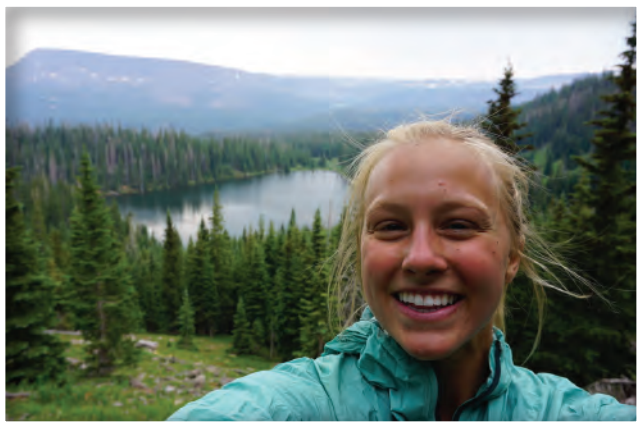
Environmental Science Club

by Kaila Pinto

The Environmental Science club meetings are currently every other Tuesday night from 5:30-6:30 pm! Because COVID-19 has put a wrench in things, we aren't able to do as much as we have in previous semesters, but we've still found fun ways to learn about sustainability and the Environmental Sciences! So far this semester we've had Professor Silvia Secchi speak to us about her sustainability work in Illinois and Iowa. Claire Carlson, a UI ENVS alum and the original president of the Environmental Science Club, spoke to us about her journey pursuing low waste living since graduating.

We've also played some environmentally-themed games and we do a new social media challenge every week. We are also planning on doing more interactive activities in the future, and of course, we are always open to suggestions as well! Also, stay tuned next semester when we have our executive board elections, there are several positions that will be available!

It would be great if other University of Iowa Alums would like to come speak to us! If you would like to be added to our email list or have any other questions about our club, feel free to email us at studorg-uiowaenvs@uiowa.edu!



Undergraduate Student Profile

Megan Lenss- Geoscience BS student

Experience I value at UI: Reflecting on my undergraduate career here, there are many great experiences that I know I will value for the rest of my life. The field experiences offered in our department are phenomenal. My first field trip was with the Geology of the National Parks class my freshman year. We traveled to Death Valley, CA and Great Basin, NV, I liked it so much I switched my major to geology! Since then I have had the opportunity to travel to Montana and throughout the Midwest for field trips. More locally, I've had the opportunity to do field work on campus with the prairie reconstruction project. As a sophomore, I pitched the concept of starting a reconstruction

prairie to the UIowa Director of Sustainability, and since then we have won two grants and secured land on the Ashton Cross Country Course. Right now, our prairie is a one acre pilot program, but we have recently received funding and will be expanding four more acres during the summer of 2021. My senior project will be a more quantitative analysis of the prairie reconstruction, studying the impacts of prairie root nutrient sequestration on water quality in the Cardinal Creek watershed. The prairie reconstruction project has been the highlight of my undergraduate career. I have learned how to bring a big idea to life, how to work in a team, and how to write a grant. I am so grateful for the opportunity to learn from and collaborate with the UIowa Geology department, specifically Jeff Dorale and Brad Cramer, and the UIowa Office of Sustainability, specifically Stratis Giannakorous, Mike Fallon, and Blake Rupe.

Future Plans: In my future, I want to pursue a PhD in limnology and freshwater chemistry. I am passionate about the Midwest and motivated to do local research to inform and guide environmental policy. My goal is to build a career that is at the intersection of environmental policy and science so that I may produce relevant research that can be used to build sound conservation practices.



Undergraduate Student Profile

Ashley Morris- Geoscience BS student

Research: Using trace element compositions to better understand the volcanic systems on the Snæfellsnes Peninsula of Iceland. Separately, altering the standard mineral separation process for U-Pb dating for work on glacial till for an IGS project.

Experience I value at UI: As an undergraduate student at the University of Iowa studying Geosciences I have always been amazed at the amount of opportunity and support provided. Throughout my career I have worked on many types of projects and used a variety of equipment, sometimes after asking and sometimes after just being offered. Over the years I have used the pXRF to

identify meteorites, analyzed REE's in water samples, learned and altered the mineral separation process, and have begun to use clinopyroxene to better understand the volcanic systems of Iceland. In addition to research, taking every opportunity to do some field work has made everything I have heard in class not only make more sense, but seem more relevant. The best thing about this department is that every professor will not only help me, but make sure I understand each part of every project and get the most out of it.

Future Plans: My plan is to attend graduate school in the fall of 2021, to either continue my studies in geology or to pursue an ecosystems degree to expand my knowledge of the natural world.

New EES Alumni Board Members

Rob Decker - Axiom Consultants

Rob was born and raised in Iowa City, Iowa and attended the University of Iowa where he graduated with a Bachelor's Degree in Geology in 1995 with a double major with Anthropology. He worked in geotechnical engineering in Salt Lake City, UT after graduation with a large engineering company primarily at the Kennecott Copper Mine and for the I-15 reconstruction through Salt Lake City. Subsequently, Rob moved to Fort Collins, CO to take a job with Terracon Consultants in Longmont, CO. After working out west, he decided to transfer back home with the company to its original headquarters in Cedar Rapids, IA (it is now headquartered in Olathe, KS.) Rob's expansion in the geotechnical field led him into additional work in civil and structural engineering and he entered a long career with the City of Iowa City (13+ years) working for the Engineering Division and managing a huge variety of projects including the new Water Plant located just off of I-80.



In 2012, Rob decided to start his own company with his best friend Brian Boelk, PE (University of Iowa Civil Engineering, 1997.) For a time between 2013 and 2018 they, instead, ran an Iowa City office of HBK Engineering out of Chicago, IL. Starting this office with just the two of them, they grew the branch into nearly 30 employees which included a Cedar Rapids location. Rob also earned an M.S. in Structural and Geotechnical Engineering from the University of Wisconsin-Platteville in 2017.

In 2018, Rob started his own company (Axiom Consultants) with Brian Boelk and they are nearing their 3rd year of operation. Axiom Consultants is a full service engineering firm that provides Civil, Geotechnical, Structural, Electrical, and Mechanical Engineering design services to public and private clients. They also have a full survey department and complete a variety of project management and owner's representative services. Axiom Consultants was named the best Engineering Company of the Corridor by CBJ in 2018 and 2019. Rob serves on the Board of Directors for the Englert Theatre in Iowa City where he's in his 4th year. He is a Certified Professional Geologist with the AIPG and a Certified Public Infrastructure Inspector with the APWA. He also holds an FAA UAS pilot's license for commercial drone use.

Rhawn Denniston - Cornell College

For his dissertation, Rhawn studied stalagmites from the Midwest and Nepal with Luis Gonzalez and collaborated with Mark Reagan, Richard Baker, Art Bettis, and Holmes Semken. Rhawn was a research assistant for Luis and a teaching assistant for Earth History and Resources, Mineralogy, Petrology, and Field Camp.

Rhawn has been at Cornell College for 20 years and is now the W.H. Norton Professor of Geology. He has served as occasional chair of the geology department and full time chair of the environmental studies program. Rhawn teaches courses in paleoclimatology and hydrogeology, as well as a field class in New Zealand. He and his students are involved in stalagmite-based research projects in the Ozarks, Great Basin, Australia, Portugal, Nepal, and coral-related projects in the Dominican Republic and Costa Rica. Rhawn serves as an associate editor for three journals: Geology, Geosphere, and Scientific Reports.



Rhawn is a new member of the current EESD Alumni Advisory Board. He received his Bachelor of Arts in Geology (1991) from Hamilton College, Master's in Earth and Environmental Sciences (1995) from the University of New Mexico, and PhD in Geosciences (2000) from the University of Iowa. He belongs to the Geological Society of America and American Geophysical Union.

Melissa Evans - DeGolyer & MacNaughton

Melissa Evans is a 14-year veteran of the petroleum industry with ten years of reserves estimations. She is a Vice President and Senior Petrophysicist for the private international consulting firm, DeGolyer & MacNaughton, working primarily on fields in Europe, Africa, and the Middle East. She has performed petrophysical evaluations, including rock and fluid type characterizations for oil, gas, and helium fields in over 40 countries. Melissa specializes in fractured carbonate environments.

Prior to working for DeGolyer & MacNaughton, Melissa worked for Schlumberger where she developed a Geomechanics department in the Midland Basin, using acoustic theory to determine rock fracturing, stress regimes, and best completion strategies.

Melissa received her BS in Geoscience from the University of Iowa in 1999 and she is a member of the Society for Professional Well Log Analysts.



Noah Stern - AmebaGone

Noah's Ph.D. research has focused on characterizing geochemical controls on microbial metabolism rates in sediment and riverbed environments. The hyporheic zone is the area just below a river where constant mixing of groundwater and river water occurs. At this intersection between two sources of water, with different organic carbon and nutrient contents, complimentary pairing of electron donors and acceptors leading to highly elevated rates of microbial metabolism. His experiments investigated how different sources and forms of organic carbon found in freshwater river and groundwater systems effects hyporheic zone microbial metabolism rates and microbial community structure.

His postdoc research with the Department of Bacteriology at the University of Wisconsin, Madison and in collaboration with the Great Lakes Bioenergy Research Center, Noah focused on bioengineering of model organisms for I) increased production of bioproducts through the methyl-D-erythritol 4-phosphate (MEP) pathway and II) Use of recalcitrant carbon sources for bioproducts generation.



Graduate Student Profile

Megan Koch - MS student

Research: Paleozoic accretion history of the Pearya terrane to the northern Laurentian margin evaluated through igneous and detrital zircon geochronology

Experience I value at UI: Working with Dr. McClelland in graduate school at the University of Iowa has greatly increased my understanding of all facets of scientific research, from grant writing, to sample processing, to data analysis and synthesis. I am grateful for the opportunities I have been provided to acquire hands-on experience while here, and for the community of faculty and fellow graduate students that

have supported me. I have also enjoyed field-based experiences, such as the AAPG fall trip to Baraboo, WI and summer fieldwork in Idaho.

Future Plans: After the completion of my master's degree in May 2021, I will be spending a year working as a Fulbright researcher in Krakow, Poland. After next year, I plan to pursue a PhD and work as a research geologist at a state or federal geological survey.

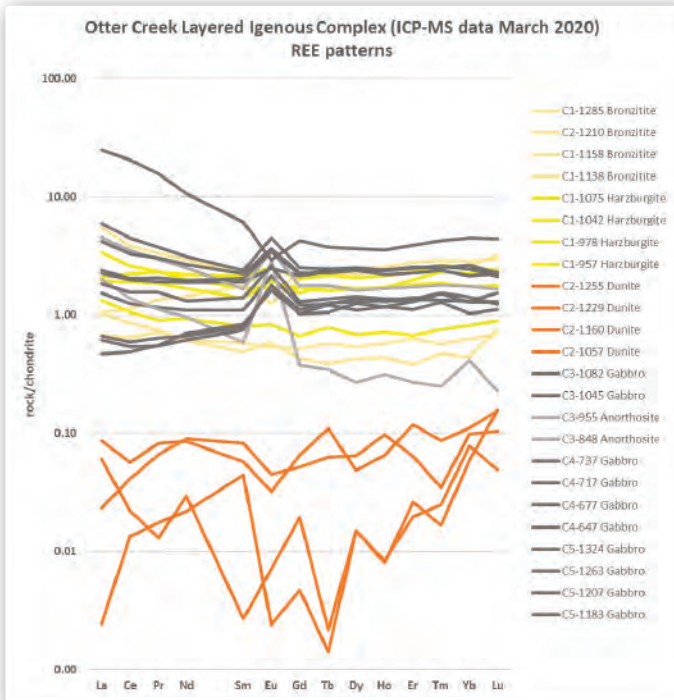
Graduate Student Profile

Trent Olson - MS student

Research: Developing a petrogenetic model for the emplacement of the Otter Creek Layered Igneous Complex, Northwest Iowa, through high resolution geochemical and petrographic analyses

Experience I value at UI: Being part of the EES graduate program has greatly expanded my research and teaching skills. I have learned a great deal about petrologic principles in the short time that I have been here. This is all thanks the amazing support I get from the faculty, especially my advisor Dr. Peate, and more experienced graduate students in the department. My research has let me explore and learn many different aspects of sample preparation and analytical techniques needed to learn how to use the chemistry of rocks to understand the processes that form them.

Future Plans: Once I complete my Master's, I plan to continue my education by doing my PhD here at Iowa. I hope to stay in academia, with my ultimate goal of becoming a professor of geochemistry.



Iowa Geode Stars

<https://clas.uiowa.edu/ees/about/awards/iowa-geode-stars>

Have you seen the newest edition to the EES website? The Iowa Geode Star is intended to highlight profiles of notable University of Iowa earth and environmental scientists whose contributions have influenced the development of geoscience. The emphasis is on the featured geoscientist's early life, the circumstances of choosing geoscience and early career history. The first three featured Geode Stars are A.C. Trowbridge, Bill Furnish, and P.B. King.



A.C. Trowbridge
1886-1971
Faculty 1911-1952



P.B. King
1903-1987
BS 1924, MS 1927



Bill Furnish
1912-2007
BS 1934, MS 1935, PhD 1938
Faculty 1953-1978

BLAST FROM THE PAST

Department photos from throughout the years...reminiscing about a time when we could stand closer than 6 feet apart



Graduate Student Profile

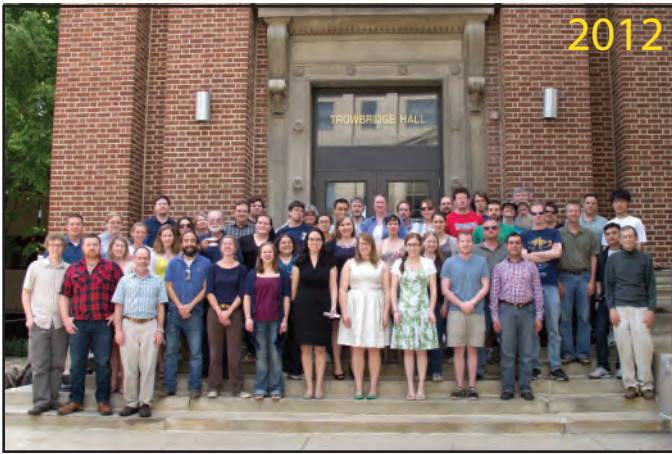
Rebecca DeKoster - MS student

Research: Trilobite taxonomy and systematics from the Late Silurian in Oklahoma

Experience I value at UI: Graduate school at the University of Iowa has opened me up to many new experiences, both academically and personally. The faculty and fellow graduate students here have been incredibly supportive and helpful, and have helped me in pursuing my academic goals. I have been fortunate to continue my education both in the lab where I learned to prepare and photograph specimens and in the field where I was able to collect trilobite material in Nevada and Utah. The graduate student cohort is both incredibly welcoming and also close-knit and Iowa City is also a beautiful place to live.

Future Plans: I plan to continue my education in studying the evolution and ecology within the fossil record and work to obtain my Ph.D.





If you have departmental group photographs or any other photographs from your time at the University of Iowa, we would love to share them! Please send them to geology@uiowa.edu with a short description for the caption.

Call for Distinguished Alumni Award Nominees

Beginning in 2019 the Earth and Environmental Science Department (EES) has embarked on an annual recognition event to showcase the UI Alumni contributions to our disciplines. Our goal is to recognize individuals who have made significant contributions to earth and environmental sciences throughout their careers. Awardees will have personified service to and passion for the discipline and community. The Alumni Outreach Committee of the Earth and Environmental Science Alumni Advisory Board (EESB) stewards the selection process.

Nominations are accepted from Iowa EES alumni, and individuals with knowledge of the nominees. Eligible nominees will be UI EES alumni who have (1) an established history of distinguished service to the discipline and/or the department; (2) made lasting contributions to understanding geological or environmental questions; and (3) exhibited leadership that has provided inspiration to others in the field. Importantly, all nominations are kept on file and be reactivated for future consideration. Nominations are due annually by January 15, for the award ceremony during Homecoming in October of the same year.

The nomination and selection process may be found at: <https://clas.uiowa.edu/ees/about/distinguished-alumni-award>





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EARTH & ENVIRONMENTAL SCIENCES

FALL 2020

Share your perspective

Please share the wisdom you've accrued throughout your career with our students by answering one or more of the questions below, or dispensing any other advice you may have. Your responses will be included in the Alumni Perspectives in the next newsletter. Send them to geology@uiowa.edu and indicate whether you would like it to be anonymous or attributed to you. Thanks for sharing!

What made you competitive in your field?

What were your lucky breaks?

What type of preparation would have made your career path easier?