## Geosciences Program

For students, alumni and friends of the Geosciences Program | Fall 2023





#### Jesse Houghton ('08) What are CMU Geosciences alumni doing?

Upon graduation, Geology students from CMU have followed a variety of career paths, which are constantly changing. In order to help our current students learn about what life after CMU might look like, as well as to keep all of our friends and supporters aware of what our graduates are doing, we are using this CMU geology students at the Spring potluck. Front (L to R): Destiny Duarte, Faith Urbin, Hailey Peters, Laura Kleim, Jackson Weber. Back (L to R): Addison Early, Andrew Schmidt, Aaron Orelup, MJ Winey, Miles Garrison.

newsletter to present a series of updates on what alumni are doing/ have done since they graduated. We contacted a random selection of alumni to contribute to the newsletter, and after reading the updates, if there are any alumni who would like to be included in a future newsletter, please let us know!

# Geosciences Program

For students, alumni and friends of the geosciences program | Fall 2023



## Jesse Houghton('08) Senior Project Manager, Institute for Geophysics, The University of Texas at Austin



Jesse Houghton and Dr. Daniel Jaffe, Vice President for Research at the University of Texas at Austin, executing permits for the 2023 hydrates research ocean drilling program in the Gulf of Mexico.

At the University of Texas, I am currently involved in Planetary Sciences, the Carbon Cycle, and Energy Transition. What advice would I give to current aspiring geologists? Be courageous enough to ask questions that may seem obvious to everyone else. You'll be surprised how much information you can uncover, as well as gaps in fundamental understanding. Talk to your professors and seek out research opportunities. Getting some proper research experience and adding a few conference posters, abstracts, or maybe even a journal paper to your resume by the time you have completed your undergraduate degree can make a meaningful impact in the next phase of your education or career as a geoscientist. Take labcourses frequently and get accustomed to experimental work. We



Technology demonstration test of the US DOE Hydrates Pressure Coring Tool at the Catoosa Test Facility in Hallett, Oklahoma. Pictured Left to Right: Adrian Garcia (USGS), Zach Murphy, Jesse Houghton, and Addison Savage (UT Austin)).

currently see a shortage of young geoscientists with experimental backgrounds (i.e., knowing your way around a lab, how to design experiments, turn knobs and twist dials, identify problems, correct them, carefully collect and evaluate data, and make meaningful conclusions). And learn some Python! Don't neglect communication. Developing the ability to effectively communicate complex subject matter in simple terms (or by analogy) is key to success as an earth scientist. The process of developing and mastering this 'soft skill' also frequently reveal gaps in your own understanding and forces you to dig deeper. Invade your professors' office hours at every opportunity!

For students, alumni and friends of the geosciences program | Fall 2023



Did I pursue a graduate degree? This is a funny story - I moved to Austin, TX with the intention of completing grad school at the UT Jackson School of Geosciences. However, I started working as an environmental consultant, one thing led to another, and I somehow never got around to it. Fast-forward to present, I have a senior position at the UT Institute for Geophysics, managing one of the largest research programs in the history of the University. So it turns out that while I sometimes regret not earning a graduate degree, my B.S. in Environmental Geology from CMU has stretched further than I would have imagined.

## Alexandra Price ('15) Business Development Associate in Mining and Minerals with CGG



Alexandra Price having fun in the field.

I have always gloated that I received the best geology education in the world from Colorado Mesa University. I even noticed as I made my way through my graduate programs, that I was quite well-versed in outcrops, and all things geologic. At CMU, geology students see every rock type, process, and structure on Earth right outside their front door. Sometimes we don't appreciate the things that come easy. At CMU there were abundant opportunities to learn and grow, for example, scholarships, internships, and fellowships. After I graduated, I was fortunate enough to work in paleontology, archaeology, geographic information systems, and in the field. I spent two years in the oil and gas fields of New Mexico and Texas, making my way as a sample catcher to a lead well site geologist. The harder you work for something the greater you feel when you achieve it. I had the honor and privilege of working with the late Adam Trumbo, and other alumni at Field Geo Services. I decided to make a change and entered the University of Texas of the Permian Basin, where I received a master's degree in geology and became an adjunct instructor after being a consistent and lively teaching assistant. Since 2021, I have been teaching geology full-time, and in 2023 I was accepted into the University of Houston to pursue a doctoral degree in geology. I am studying locating, identifying, and quantifying critical minerals such as rare earth elements and lithium, using remote sensing techniques. If it weren't for CMU, none of these opportunities would have been possible! I have just accepted an offer as a Business Development Associate in Mining and Minerals with CGG. https://www.cgg.com/

What a tremendous journey it has been! Every little bit of experience and every single mentor helped along the way. As I leave my privileged position as a college instructor, I tell my students: work hard, take chances, be brave, and follow your heart! Volunteer! Go to conferences! Trust the advice of your professors, and make sure you listen to those who want to guide you in the right direction. There are wonderful things around that meander! I always loved the saying "If you don't know where you are going, any road will get you there." Do not have too many expectations, the universe might just have surprises for you! And remember, "A journey of 1,000 miles begins with a single step"!

For students, alumni and friends of the geosciences program | Fall 2023



## Marshall Thurmon ('18) Operations Team member, Field Geo Services, Grand Junction

I am currently working as a member of the operations team for Field Geo Services, a local Grand Junction oil field service company. More specifically, I handle the quality control of mud logs and data files that are sent out to clients, and I train new hires. I also handle on-call duties over weekends, which rotate between operations individuals. The CMU Geosciences Program helped prepare me immeasurably for this job and for my previous position as a mud logger.

Courses that played large roles in my typical day as an on-site mud logger on a drilling rig include Depositional Systems, Sedimentology, Geophysics, and Mineralogy. Precisely and thoroughly describing sedimentary rocks using a microscope is a key function of a mud logger's daily activities. Mineralogy and Sedimentology helped immensely in giving me a solid foundation for being able to accurately classify and describe rock and mineral samples. Depositional Systems was my favorite class, and it gave me, before I even graduated, a really strong exposure to descriptive classification of many different field examples of sedimentary rocks.

For all the geology students who are interested in working as an operations geologist or as a mud logger in an oil company, make sure to acquire a solid understanding of sedimentary rocks, including limestones, sandstones, shale/mudstones, and siltstones. Understand various chemical tests that can be done to determine lithologies; think dilute acid and limestone, or phenolphthalein and cements, or the grain-size difference between a sandstone and a siltstone.

CMU Geosciences gave me a rock-solid foundation in soft rock principles that helped me throughout my mudlogging career as well as in operations. I was also well prepared for advanced services like geosteering and mass spectrometry by taking elective classes like Subsurface Methods, Basin Analysis, Depositional Systems, and Geochemistry. The concepts and skills you learn while in the CMU Geoscience Program will catapult your career forward in the oil and gas field.



Marshall Thurmon drinking coffee in the field.

#### Justin Humenik ('19) Mud logger, Field Geo Services, Grand Junction

I'm currently mudlogging for Field Geo Services here in Grand Junction. I work primarily in the Delaware Basin in Texas and New Mexico. I hope to either go back into the environmental side of geology or try to get a WellCon geologist or MWD position (Measurement While Drilling) down the road.

I think the CMU Geosciences program was great with the fieldbased and hands-on aspects, which helped with both my stint in the environmental industry as well as with mudlogging. Also, knowing and having a professional connection with an alumnus, Marshall Thurmon ('18), helped me get hired at Field Geo Services last year.

Colorado Mesa University

For students, alumni and friends of the geosciences program | Fall 2023

My advice to students and recent graduates looking for work in the oil and gas field - don't be intimidated by the long work hours if you start off as a mud logger. Work hard and smart, keep up with the technology, and it will pay off down the road. Keep in mind, though, if you are the type of person who doesn't like being away from home for longer periods of time, it may not be the right job for you.

## Miriam Kane ('20) M.S. student in Evolutionary Biology, North Carolina State University



Miriam Kane excavating at the Mygatt-Moore quarry.



The close partnership and shared faculty between CMU and the Museums of Western Colorado provides CMU geology students with opportunities for field, lab, and collections work in paleontology. CMU students have worked with the museum curator, Dr. Julia McHugh, and CMU geology faculty members on research projects that resulted in co-authorships on published research and professional conference presentations. This has propelled several of our CMU geology alumni into highly competitive graduate school programs, where they continue to succeed.

I am currently an Evolutionary Biology M.S. student at North Carolina State University. My research uses 3-D morphometrics of shark teeth to determine phylogeny from the Cretaceous to the present. I have funding to work on this for the next two years as a TA, and I hope to go on for a PhD.

The CMU Geosciences program gave me the knowledge, connections, and references I needed in order to get into graduate school and continue my career. All of those things also allowed me to go into the work force while I researched graduate school for a couple of years.

Anyone looking to get into graduate school should remember to be patient and to trust yourself. I had to take a few years off from my BS because of Covid and a lack of graduate school funding. Universities are finally starting to recover funding wise from Covid and in some cases are still being affected so if you don't get in the first time you apply it's ok just keep trying. Graduate school is hard for everyone, even if you go straight into it from your bachelor's degree, but you will get alot of support from the school, your advisor, and your peers as long as you are dedicated and try your best. So trust yourself and don't get discouraged if you end up working for a couple of years before starting graduate school.

For students, alumni and friends of the geosciences program | Fall 2023



#### Jordan Walker ('20) PhD student in Geosciences, Baylor University

Are you considering going to graduate school? If so, this information is for you. To begin, I recommend that you pad your resume with as many relevant geologic experiences as possible. Lucky for you, you are blessed with outstanding professors and world class outcrop only minutes from campus. Classroom subjects are almost always reinforced through field-based experiences. Few geologists will get the intensity of exposure to world class outcrop as you very commonly do at CMU, so do your best to get to the rocks. Try to get involved with the CMU geology club by being an officer. This will demonstrate that you can work in a team environment and shows that you have leadership capabilities. Please understand that having club leadership experience on your resume carries weight. Next, I recommend that you join a research team at CMU and start your senior research project as early as possible. In graduate school, you will be doing research so getting exposed to research early on will set you up well and demonstrate initiative and commitment to the geosciences. The purpose of this is to show graduate school selection committees that you are hardworking and that you want and can provide value to a research team. In my experience when applying to graduate school, I have always established rapport with prospective advisors by (1) doing prior research on them to determine if they are accepting new students as well as if their research is a good fit for me, and (2) emailing them to start a conversation. This can be a numbers game so create a spreadsheet and send many cold emails. If a good rapport is established, I would attempt to tour their campus, meet the advisor in person, and talk with their research team and other students in the department. I want to emphasize this last point because you want to make sure that the person you will be working for is a good fit for your personality and goals. If it is not feeling right after the tour, prioritize other prospects (note, it is not uncommon for a school to invite you for a tour). If an offer is presented to you, make sure you are fully funded (i.e., tuition is covered, there is money for your research project, and you have a monthly stipend as well as health insurance). You shouldn't have to pay your way through graduate school. Also, try and commit to an R1 University as you want to be in the best environment to do research. Overall, I would develop your time management skills, ability to work hard, and scientific writing skills because if you don't

know how to effectively communicate, then how can you share yourself and your ideas with the world? Currently, I am beginning to realize the importance of charisma, ability to network, work in a team environment, and readily make friends. If you can provide value and get someone to like you, success will find you. Check out the following link by Dr. Sarah Cooley at the University of Oregon for more information on the graduate school application process (https://sarah-cooley.com/applying-to-graduate-school). Note, I was surprised to find similar information that I described to you here when I stumbled upon Dr. Cooley's post in 2022.



Jordan Walker working in his lab at Baylor Univ.

For students, alumni and friends of the geosciences program | Fall 2023



#### Caden Anderson ('21) Geologist, Ivanhoe Electric (Mining Industry); headed to Idaho State for graduate school in Fall 2024



After graduating CMU I wanted a job that would allow me to increase my geologic knowledge, and I was fortunate to be hired by Ivanhoe Electric, a junior exploration mining company. Ivanhoe Electric's goal is to discover and help with the initial development of copper deposits around the world to assist in the transition to green energy. Although I knew very little about economic geology after graduation, most junior mining companies are more than willing to teach you everything you need to know about mining and mineral deposits after you start, and the job comes with lots of perks as well. I've been able to travel the country working at the different copper deposits Ivanhoe Electric owns, attend geologic conference (they are paid for), and most importantly, conduct lots of field work. Field work ranges from soil and rock sampling, to geophysical surveys, to claim staking and mapping, and much more. There is no end to the knowledge you can gain from participating in any aspect of the mining industry. Unlike a large mining company that would mainly focus on extracting ore from known deposits, Ivanhoe Electric's objective is to identify previously unknown deposits and increase our understanding of unmined deposits. To do this, we implement the use of multiple fields of geology to help unravel the unique history of each deposit. First, we employ petrographic and mineralogical studies of the rocks around where we think the deposit may be, allowing us to identify all the minerals present in each sample and assess their relationship to the processes that formed this deposit. Next, we use geochemical surveys to look for pathfinder elements

For students, alumni and friends of the geosciences program | Fall 2023



present in the surrounding rocks and soil that can help guide us to potential mineralization on the surface, along with magnetic, induced polarization, and gravitational geophysical surveys to identify magnetic, resistivity, conductivity, chargeability, and density anomalies in the subsurface. Finally, we drill into our targets and log the core from the drillholes, which gives us an opportunity to get our hands on the mineralization and host rocks and investigate the feasibility of the producing an economically viable deposit. Getting a job in the mining industry is a great way for you to continue your geologic education while getting paid. Although the many aspects of geology needed in this job may seem overwhelming at first, CMU has adequately prepared all of us for any industry job and so long as you are willing to learn the new skills these jobs require, you will benefit greatly from the opportunities it will afford you.

### Karlie Hadden ('22) MS student in Planetary Geology, Colorado School of Mines

I am currently conducting research on NASA Apollo mission samples at the Colorado School of Mines, as well as teaching courses for undergraduate students. I am looking for certain minerals and metals in Lunar Apollo samples that NASA might target for in situ resource utilization. Basically I am trying to streamline mineral resource extraction from Lunar regolith. My future plans are to graduate in the spring of 2024 with my MS degree, and to continue on for a PhD at CSM. This year will be very busy because I am working on my first published paper in December and sitting for my qualifying exams around that same time!

Attending CMU allowed for extremely hands-on and in-depth geological experience which has allowed me to excel in my graduate program. In addition, those experiences have allowed me to create great connections with the undergraduate students I teach.

If you are thinking about graduate school, I'd say go for it. CMU's Geoscience program prepares its students to excel in postgraduate education at the highest levels!

-Myah Baker ('23)

## Myah Baker ('23) IRIS Advisor at CMU; headed to graduate school at Colorado School of Mines in January 2024

Right now, I am an IRIS Advisor at CMU. Eventually, I would like to teach at the post-secondary level so I am glad to be able to continue working with students during my time away from school. I am currently working on a National Science Foundation Graduate Research Fellowship Program application, and have a paper in preparation with Dr. Cassandra Fenton (CMU), Abby Winkler (graduate student at Mines), and Dr. Dave Marchetti (Western Colorado University). We hope to publish in the Journal of Hydrology: Regional Studies. In January, I will begin a MS degree program in geochemistry at Colorado School of Mines, with hopes of one day advancing to a PhD. I will be working closely with Dr. Ryan Venturelli, who is best known for her work with subglacial lake sediments in Antarctica. Her work is on the cutting edge of paleoclimate research, and I am so excited to be working with her! The CMU Geosciences program has helped me with establishing the necessary skills to be "research ready" for graduate school. I believe that the rigorous coursework, field experiences, and tight-knit feel of our program makes us one of the best. I also will stress the importance of the mentorship and support the CMU geosciences faculty has given me in navigating the unique set of challenges that come with being a first-generation student. It is because of this program that I want to eventually teach and hope to provide a similar experience to students who are passionate about geosciences in the future.

If you are thinking of going to graduate school, get to know the faculty at the schools you are interested in and dream big! Anything is possible when you apply yourself. I would also recommend getting into undergraduate research early if you are interested in a thesis based graduate program so that you can have the background and jump right in!

For students, alumni and friends of the geosciences program | Fall 2023



## Kenna Lee Worster; Current geology student at CMU



Kenna Lee Worster out in the field locating alluvial fan paleochannels.

I am currently finishing up my last year at CMU. This is my 5th year at Mesa and my 3rd year in the Geosciences program. When I first got to college, I was a pre-radiologic science major for two years. I found myself taking some geology classes with a friend to see if I liked geology enough to pursue it, and eventually I was hooked. This past summer I worked as an intern with RSIEnTech, where I got to work with the Groundwater and Geochemistry Group. During my internship, I worked in the field collecting water and sediment samples to be processed in the lab. Then, I got to do lab work including running column tests, batch leaches, and running samples on the KPA (Kinetic Phosphorimetry Analyzer) and the IC (Ion Chromatographer) to test for anions in water samples. I also gave a presentation and wrote a white paper based on data from one of the disposal cells monitored by the DOE's Legacy Management program. My work with the internship has continued into the school year where I am getting to work on a 3-D model of the same disposal-cell site using the EVS (Earth Volumetric Studio) application. CMU Geosciences provided me with the connection to RSIEnTech employees, which helped in getting my internship. I heard about the internship opportunity through Dr. Fenton.

This semester I gave a poster presentation at the national GSA meeting based on research I have been doing with Dr. Baker on alluvial fan paleochannels. We're locating these paleochannels in a semiarid, high-elevation desert using multispectral imagery. We have done multiple drone flights and some hiking at our study site to locate paleochannels.

In the Geosciences program, I had peers (now alumni) who helped me in making the transition from a biology degree into Geosciences, and I still have peers in the program who push me to think harder and work harder. I have been awarded scholarships by the program that have helped me to pursue my goals.

After working with hydrogeologists and geochemists, I have seen how important the work they do is for protecting the environment. I was given some incredibly helpful advice this summer about working in the water-resources field - you don't have to be the best geologist, hydrogeologist, or geochemist to be great at the job. Just understanding and knowing the basics of what you don't specialize in is going to help you stand out.

#### COORDINATOR'S CORNER – Andres Aslan

-Program and Faculty News

Since the last newsletter, we had a successful Field Camp (led by Field Camp Director **Dr. Greg Baker**), several students and faculty conducted summer field research, and the early Fall semester has

Colorado Mesa University

For students, alumni and friends of the geosciences program | Fall 2023



been highlighted by student and faculty participation on several field trips (GJGS Chenoweth Piceance Basin field trip) as well as attendance at the national GSA in Pittsburgh. **Note: Kenna Lee Worster's poster was recognized as the top undergraduate presentation by the Hydrogeologic Division of the 2023 GSA Connects meeting! Dr. Greg Baker, Kenna Lee's advisor, as well as the rest of the Geosciences faculty are all very proud of her hard work and scientific contributions!** 

The most significant change to the Geosciences Program, as many of you already know from the last newsletter, has been the retirement of **Dr. Rick Livaccari**. To help fill the gap created by Rick's departure, **Dr. Greg Baker** is teaching Structural Geology, and **Dr. Cassie Fenton** is teaching Mineralogy this Fall. In addition, **Dr. Marlon Jean** has joined the Geosciences faculty on a 1-year appointment. Marlon is teaching a variety of introductory courses and will teach Petrology in the Spring semester of 2024. Welcome Marlon (see Faculty Spotlight article)!

#### 2023 MAVERICK GEOSCIENCES GRADUATES

The following students received special recognition for their academic accomplishments in Spring 2023:

Miles Garrison	Jackson Weber
Andrew Schmidt	Hailey Peters
William Myers	MJ Winey

#### **2023 STUDENT AWARDS**

The following students received special recognition for their academic accomplishments in Spring 2023:

**RMAG Neal J. Harr Award** (awarded to the top senior in the program)**: MJ Winey** 

William C. Hood Student Research Award: Andrew Schmidt

Verner C. Johnson Geology/GIS Award: Liam Posovich

Association for Women Geoscientists: Laura Kleim, Faith Urbin

*Forrest Nelson Fund Scholarships:* Grant Barnes, Mackina Chamberlain, Ethan Freeburger, Graceanne Hanson, Michael Longworth, Liam Posovich, KennaLee Rowley, Adam Tuck, Faith Urbin, Laura Kleim

**Geosciences Tuition Scholarships:** Cole Beyer, Morgan Sholes



Neal J. Harr award recipient MJ Winey and Dr. Andres Aslan.

For students, alumni and friends of the geosciences program | Fall 2023





William Hood award recipient Andrew Schmidt (center) with Dr. Bill Hood (left) and Dr. Verner Johnson (right).



Mark Garman scholarship recipients Andrew Schmidt (left), Laura Kleim (right) and Dr. Greg Baker (center).

#### **2023 STUDENT AWARDS**

Mark Garman Field Camp Scholarship: Andrew Schmidt, Laura Kleim

RMAG Robinson Field Camp Scholarship: Andrew Schmidt

**Grand Jct Geological Society Field Camp Scholarship:** Miles Garrison, Laura Kleim, Andrew Schmidt, Faith Urbin



Grand Jct Geological Society Field Camp scholarship recipients Andrew Schmidt, Miles Garrison, Brann Johnson (presenter), Faith Urbin, and Laura Kleim.



Verner Johnson award recipient Liam Posovich and Dr. Verner Johnson.

Colorado Mesa University

For students, alumni and friends of the geosciences program | Fall 2023



#### FACULTY SPOTLIGHT – Dr. Marlon Jean



Dr. Marlon Jean at Los Tercios in Suchitoto, El Salvador standing beside a lava flow with columnar jointing.

I come to CMU after a more than a decade of teaching and research. I received my BS from the University of Michigan and PhD from Utah State University in 2012. Since then, I have traversed the globe in search of a permanent home. These travels have taken me from the east coast to the west coast, as far north as Alaska, and as far south as Tasmania, Australia. Along the way I have interacted with a diverse array of students who keep me motivated to stay in academia. My teaching is centered around field experiences and developing workforce-necessary skills, which

is realized via access to the latest instructional technology and injection of fresh content acquired by utilizing my own research results. These new methods are needed with today's science world and today's science student.

My discipline is Igneous Petrology. So I look forward to teaching the Mineralogy and Igneous Petrology courses, among other potential new offerings. In terms of research, I use major- and trace-elements, and the isotopic composition of ultramafic to mafic volcanic and plutonic rocks, with a main focus on the life cycle of oceanic and continental lithosphere in the US Cordillera. I make it a priority to include students in my research. With some students having the experience of presenting their work at professional conferences. I am currently investigating (1) layered gabbros from the Hess Deep rift, a fast-spreading ridge, sampled by IODP Expedition 345; (2) Martian and Lunar meteorites; (3) gold deposits from Nevada; and (4) drill core from Alaska. If you have any interest in these projects, or others, please feel free to discuss with me.

#### GJGS CHENOWETH FIELD TRIP TO PICEANCE BASIN – Andres Aslan

In late August, ~30 GJGS members and CMU Geosciences students and faculty gathered for the annual Chenoweth Field Trip. This year's trip was led by the GJGS "Dream Team" consisting of **Jerry Daub, Rex Cole** and **Steve Cumella**. We traveled across the entire Piceance Basin beginning in DeBeque Canyon (west end of the basin), following the Grand Hogback north of Rifle (east end), and ended in the heart of the Piceance Basin ~20 miles north of

#### ADAM TRUMBO MEMORIAL SPRING FIELD TRIP –2024

The Geosciences Program plans to hold the annual Adam Trumbo Memorial Spring Field Trip on **Saturday or April 13th 2024**. Alumnus **Pedro Terres Illescas ('21)** and his colleagues at Western Uranium will host a tour of the Sunday Uranium Mine in the Paradox Valley of the Uravan Belt. If you are interested in attending, please email (aaslan@coloradomesa.edu).



Left to right: Laura Kleim, Liam Posovich, Graceanne Hanson, Kenna Lee Worster, Faith Urbin and Dr. Javier Tellez.

COLORADO MESA UNIVERSITY **DEPARTMENT OF PHYSICAL AND ENVIRONMENTAL SCIENCES** 

For students, alumni and friends of the geosciences program | Fall 2023

#### **GEOSCIENCES PROGRAM SUPPORT**

If you are interested in donating to the Geosciences Program, the CMU Foundation has established a website with a list and description of our current program funds and scholarships. No more checks in the mail! To donate, simply visit:

https://www.supportingcmu.com/geosciences

One of the areas of need is funding for students to attend professional meetings such as AAPG or GSA. If you are interested in contributing to this area of need, please donate to the newly established Geosciences Student Research Fund. If you are interested in learning more about establishing a named fund to support the Geosciences program at CMU, please contact Rick Adleman at 970.248.1871.



Left to right: Laura Kleim, Liam Posovich, Graceanne Hanson, Kenna Lee Worster, Faith Urbin and Dr. Javier Tellez.



Addison Early, Laura Kleim.