EAS

EARTH AND ATMOSPHERIC SCIENCES

NEWSLETTER | summer 2023

NOTES FROM THE CHAIR

The time since our last newsletter has been packed full. The past year has arguably been the first normal year at IU since the pandemic lockdown in 2020, and the first normal year since I started as department chair in January that year. What is back to normal? We have run faculty job searches, hosted a full range of events, including our Crossroads conference, done field work around the world, and recruited the largest cohort of incoming graduate students in several years.

In this newsletter we celebrate an important milestone in our Atmospheric Science program, the graduation of Sam Smith, the first student to obtain a PhD in Atmospheric Sciences. Our Atmospheric Science program got fully underway in 2015 when Cody Kirkpatrick was joined by new faculty hires Paul Staten (Sam's advisor) and Chanh Kieu. The Atmospheric Science program now has a total of four tenure-track faculty (Ben Kravitz and Travis O'Brien joined the faculty in 2018 and 2019), a growing number of undergraduate majors, and a strong cohort of graduate students. Our Earth and Atmospheric programs are well integrated, and both with cognate faculty in Geography and the O'Neill School of Public and Environmental Affairs. While undergraduates and MSc students have already graduated with IU degrees in Atmospheric Sciences, PhDs have the longest lead time. Sam's degree is thus the ultimate benchmark of success for our new program – congratulations to Sam and Paul both on this achievement.

Our summer capstone field course at the Geological Field Station in Montana just started, the caravan having left Bloomington just days ago at the time I write this. Erika Elswick, after having stepped in as interim director, has graciously agreed to continue as the field station's Executive Director. Erika has devoted her decades of knowledge and tremendous personal energy to the Field Station over the past year, including winter maintenance and admissions while we searched for a new resident manager in Montana and program coordinator in Bloomington. Both positions are now filled. Meagan Need joined our Bloomington staff as the IUGFS program coordinator and Jonathan Thompson started last week at the time of writing as the resident manager at the Field Station.

We lost several active alumni since our last newsletter. Among them was Shirley Pruett (1935-2022), a lifelong supporter of the department, who along with her husband Frank received BSc, MSc, and PhD degrees from our department and established our Frank D. and Shirley A. Pruett Undergraduate Scholarship. We also lost sedimentologist Allen Archer (1953-2022), a native Hoosier who got his undergraduate degree in Oregon but returned to IU and finished a PhD here in 1979. Jessica Elzea Kogel (1959-2023), who got her MSc and PhD in clay mineralogy with Hadyn Murray, who was Associate Director for Mining for the National Institute of Occupational Health and Safety and who was President-elect of our departmental Alumni Advisory Board at the time of her death, lost a two-year battle with cancer.

As you will read in this newsletter, new geophysics faculty member Ginny Gong joined us this past January, and geochemist Julia Kelson and glaciologist David Lilien will join our faculty next January. With the other hires over the last few years, the department has grown back to the size we were prior to the wave of retirements over the last six years. You will also see that we had a very large number of graduate students who completed their degrees this year, who will be replaced this fall by the largest incoming class of new students in several years. Our students and faculty have continued to make major accomplishments that you will also see featured in the following pages, and now that the world has adjusted to a post-pandemic norm, we have also been active again in many kinds of outreach events aimed at people of all ages.

Enjoy!

P. David Polly
Indiana University
14 June 2023

EARTH AND ATMOSPHERIC SCIENCES

EAS

NEWSLETTER of the
DEPARTMENT OF
EARTH AND ATMOSPHERIC SCIENCES

Chair: David Polly

https://earth.indiana.edu/

College of **Arts + Sciences**

Executive Dean: Rick Van Kooten

Executive Director of Advancement: Jeff Stuckey

Director of Alumni Relations: Vanessa Cloe

https://college.indiana.edu/

Editors: Arndt Schimmelmann + Ruth Droppo

this is who we are

FACULTY

Simon Brassell	Professor
Doug Edmonds	Associate Professor *Malcolm and Sylvia Boyce Professor*
Erika Elswick	Senior Lecturer *Executive Director, IU Geologic Field Station*
Paul Goddard	Assistant Research Scientist
Ginny Gong	Associate Professor
Michael Hamburger	Professor
Ed Herrmann	Senior Research Scientist
Claudia Johnson	Professor *Herman B. Wells Professor*
Kaj Johnson	Professor *Judson Mead Professor*
*Julia Kelson	Assistant Professor
Elizabeth Kenderes	Lecturer
Chanh Kieu	Associate Professor
Cody Kirkpatrick	Senior Lecturer
Ben Kravitz	Assistant Professor
Chusi Li	Senior Scientist
*David Lilien	Assistant Professor

*will be joining us in January 2024

Jess Miller-Camp	Assistant Research Scientist *Paleontology Collections Manager*
Jackson Njau	Associate Professor
Travis O'Brien	Assistant Professor
David Polly	Professor *Department Chair*
Shelby Rader	Assistant Professor
Peter Sauer	Assistant Scientist
Juergen Schieber	Professor
Arndt Schimmelmann	Senior Scientist
Paul Staten	Associate Professor
Andrea Stevens Goddard	Assistant Professor *Lee J. Suttner Professor*
Brian Yanites	Associate Professor *Robert R. Shrock Professor*
Chen Zhu	Professor

EMERITI FACULTY

Abhijit Basu, David Bish, Jim Brophy, David Dilcher, Bruce Douglas, Jeremy Dunning, Enrique Merino, Greg Olyphant, Gary Pavlis, Lisa Pratt, Ed Ripley, Lee Suttner, Bob Wintsch

introducing

our new faculty

Jianhua (Ginny) Gong joined our department in January 2023 as an Assistant Professor. Jianhua is a seismologist using both seismological observations and numerical simulations to understand the structure, seismic activity, and deformation of major tectonic plate boundaries. Her current research focuses on subduction zones and oceanic transform faults. Her research group aims to design and conduct field experiments to study these two types of plate boundaries and develop novel data analysis methods on a variety of seismic data types to probe the seismotectonic processes of the plate boundaries with enhanced spatiotemporal resolution.

Julia Kelson is a sedimentary geochemist and paleoclimatologist. She researches modern and ancient environmental change on land, primarily through the lens of stable isotopes in sediments. She is currently fascinated by soils because they make up the physical interface between climates and landscapes. She will be joining the faculty in January 2024 as an Assistant Professor.

You can read more about her work and interests here: https://earth.indiana.edu/directory/faculty/kelson-julia.html

David Lilien is a Research Associate in glaciology at the University of Manitoba. He studies the dynamics of ice streams and outlet glaciers using numerical models, remote sensing, and field data. His primary interest is understanding how recent changes to large outlet glaciers will propagate upstream; this involves simulating modern changes as well as contextualize current retreat by understanding past ice flow.

Starting January, 2024, he will be an Assistant Professor in the Department of Earth and Atmospheric Sciences at Indiana University.

Read more about his work here: https://earth.indiana.edu/directory/faculty/lilien-david.html

this is
who we are

POST-DOCS + RESEARCH ASSOCIATES

Eric Barefoot	Post-Doctoral Research Fellow
Alexander Charn	Post-Doctoral Research Fellow
Katherine Kravitz	Post-Doctoral Fellow
Eyal Marder	Post-Doctoral Fellow
Jovanka Nikolic	Post-Doctoral Research Associate
Ruiguang Pan	Post-Doctoral Research Associate
Olivia Thurston	Post-Doctoral Fellow
Zalmai Yawar	Post-Doctoral Research Associate

Our department welcomes 3 staff members: Meagan Need, our new Program and Financial Coordinator for the IU Geologic Field Station, Jon Thompson, our new Residential Field Station Manager, and Molly Karnes, our new SIRF Technical Manager.

Meagan previously worked in the hospitality industry and as Hotel Manager of the Indiana Memorial Union Biddle Hotel & Conference Center.

Jon Thompson has extensive experience in all the areas required for the IUGFS Resident Manager and will be starting his position on June 12.

Molly comes to us from the University of California at Merced, where she received her MSc looking at carbonate isotopes in shark teeth.

STAFF

Cami Albers	Graduate Services Coordinator
Ted Boardman	IT Manager
Ruth Droppo	Graphic Design | Web Design + Development
Dianne Dupree	Administrative Secretary, Chair's Assistant
Brandon Ettelt	Financial Administrative Coordinator
Nora Ferstead	Procurement (Purchasing + Travel)
Carol Glaze	Fiscal Officer
John Hettle	Facilities Administrator
Melissa Jackson	Undergraduate Advisor
Molly Karnes	SIRF Technical Manager
Meagan Need	IUGFS Program and Financial Coordinator
Jennifer Simms	EAS Librarian
Terry Stigall	Geophysics Technician
Jon Thompson	Resident Field Manager, IUGFS
John Walker	IT Technical Specialist

For the next academic year, our department will welcome 13 new students and 2 existing students will be continuing into the PhD, which means we have a class of 15 new students. That is the biggest incoming class we have had since 2018.

this is who we are

2023-24 GRADUATE STUDENTS and their advisors

Durga Acharya	PhD	Kaj Johnson
Gombodorj Batsukh	MSc	Andrea Stevens Goddard
Allison Bormet	PhD	David Polly
Eric Burton	PhD	Kaj Johnson
Isabelle Caban	MSc	Brian Yanites
Nicholas Castro-Perdomo	PhD	Kaj Johnson
Anupama Chandroth	PhD	Claudia C. Johnson
Ping Chen (Evan) Chiang	MSc	Kaj Johnson
Janelle Cook	MSc	Chen Zhu
Syan Das	MSc	Doug Edmonds
Peyton Dewaelsche	PhD	Ginny Gong
Kelsey Doiron	PhD	Simon Brassell
Jayson Eldridge	MSc	Ed Ripley
Ricardo Ely	PhD	David Polly
Jake Gearon	PhD	Doug Edmonds
Jeong Yeon Han	PhD	Doug Edmonds
Samantha Hartzell	PhD	Claudia C. Johnson
Kirsten Hawley	PhD	Claudia C. Johnson
Joseph Hildebranski	MSc	Paul Staten
Jenni Hurst	MSc	Shelby Rader
Ariful Islam	PhD	Ginny Gong
Mohammad Rubaiat Islam	PhD	Travis O'Brien
Diya Kamnani	PhD	Travis O'Brien
Matthew Koelbel	MSc	Jackson Njau
Thomas LaBarge	PhD	Jackson Njau
Heather Lawson	PhD	Arndt Schimmelmann
Tony Li	PhD	Ben Kravitz
Ya-Shien (Zax) Lin	PhD	Brian Yanites
Xuechang (Shay) Liu	PhD	Paul Staten
Sierra Lopezalles	PhD	David Polly
Lan Luan	PhD	Paul Staten
Owen Madsen	PhD	Simon Brassell
Garrett Marietta	MSc	Jose Luis Antinao + Henry Loope (IGWS)
Trenton Meier	MSc	Simon Brassell + Ed Herrmann
Quan Nguyen	MSc	Chanh Kieu
Trung Nguyen	PhD	Ben Kravitz
Danielle Peltier	PhD	Ed Herrmann/Jackson Njau
Kwesi Quagraine	PhD	Travis O'Brien
Nathan Roden	MSc	Shelby Rader
James Ryan	PhD	Ben Kravitz
McKailey Sabaj	PhD	Chen Zhu
Charles Salcido	PhD	David Polly
Brooke Santos	MSc	Brian Yanites
Elizabeth Sherrill	PhD	Kaj Johnson
Alec Siurek	MSc	To be determined - IGWS
Hrisikesh Sivanandan	PhD	Ben Kravitz
Trent Stegink	MSc	Shelby Rader
Eli VanDyke	MSc	Andrea Stevens Goddard
Madeline Williams	MSc	Brian Yanites
Hao Yuan	PhD	Simon Brassell
Zhang Zonghao	PhD	Juergen Schieber

faculty **HONORS**

Professor **Simon C. Brassell** has been awarded a DSc degree (Doctor of Science) from Bristol University in the United Kingdom for his research accomplishments in the area of molecular biogeochemistry. The DSc degree, which is uncommon in the USA, is an advanced degree that is usually awarded by the same university as the recipient's PhD, recognizing "substantial and sustained contributions to scientific knowledge." Few people receive them, even at institutions where they are given.

ac-com-plish-ments

Professor **Michael W. Hamburger** was recently selected to chair the U.S. Geological Survey's "Scientific Earthquake Studies Advisory Committee", or SESAC. This Federal Advisory Panel was initially created in 1977 by legislation authorizing the National Earthquake Hazards Reduction Program (NEHRP). SESAC brings together a group of academic experts in fields ranging from seismology to structural geology and engineering to advise the USGS Director on all issues related to the USGS contribution to earthquake hazard mitigation research and application. The committee's annual report on USGS earthquake hazard efforts is delivered to the USGS Director and to Congress on September 30 of each year. As part of his role as chair of SESAC, Hamburger also serves as liaison to the Advisory Committee on Earthquake Hazards Reduction (ACEHR), which connects the activities of four major federal agencies involved in earthquake hazard activities—the U.S. Geological Survey, the Federal Emergency Management Agency, the National Science Foundation, and the National Institute of Standards & Technology. According to Hamburger, "In the aftermath of this year's devastating earthquakes in eastern Turkey, the world turns its attention to the United States for leadership in state-of-the-art earthquake hazard mitigation. I am proud to be part of that effort."

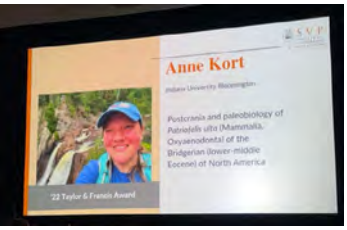
IU Trustees Teaching awards were awarded to Assistant Professor Shelby Rader and Lecturer Elizabeth Kenderes. The Trustees Teaching Awards are given each spring to honor outstanding teaching during the prior calendar year. The award honors faculty who have had a positive impact on student learning, especially undergraduates.

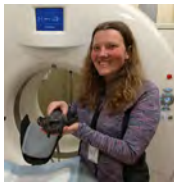
student **HONORS**

PhD student **Elizabeth M. Sherrill** has been awarded a highly competitive College Dissertation Year Fellowship for 2023/24 (advisor **Kaj Johnson**).

MSc student **Sophie Black** won the Sedimentary Geology Division's student poster award at the annual GSA meeting in early October 2022 (advisor **Andrea Stevens Goddard**). This is a huge achievement, and Sophie was honored at the division banquet at the end of the conference.

PhD student **Owen Madsen** (advisor **Simon Brassell**) and MSc student **Henry Z.M. Fulghum** (advisor **David Polly**) both received NSF Graduate Research Fellowships (GRFP). In addition, our recent undergraduate student **Dylan Seal**, who is now at Boston College also received the same kind of award. These highly competitive fellowships provide three years of support with stipends of $37,000.





PhD student (now Dr.) **Anne Kort** received an award at the Society of Vertebrate Paleontology Annual Meeting, 31 October – 05 November, 2022, for best student paper of the year in the Journal of Vertebrate Paleontology (advisor **David Polly**). Titled "Postcrania and paleobiology of *Patriofelis ulta* (Mammalia, Oxyaenodonta) of the Bridgerian (Lower-Middle Eocene) of North America" (https://doi.org/10.1080/02724634.2021.204549), the paper was an expansion of her MSc thesis.

ac-com-plish-ments

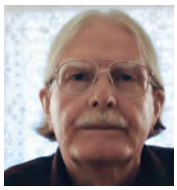
PhD student (now Dr.) **Sam Smith** was granted our very first PhD in Atmospheric Sciences. While undergraduates and Masters students have completed Atmospheric Science degrees already, Sam is the first to complete the PhD. His work is addresses uncertainties in forecasting climate change at regional levels. Among Sam's many accomplishments, he received one of a very small number NASA's FINESST fellowships to support his research.

Our program in Atmospheric Science got fully underway in 2015 when faculty **Paul Staten** (Sam's advisor) and **Chanh Kieu** joined our department (which was still called Geological Sciences at the time). The Atmospheric Science program now has a total of four tenure-track faculty (**Ben Kravitz** and **Travis O'Brien** are the other two) and a truly phenomenal Senior Lecturer, **Cody Kirkpatrick**. The program is now quite well integrated with the Earth Science part of our department, as well as with cognate faculty in Geography and the O'Neill School, and both undergraduate and graduate student numbers are growing quickly.

Undergraduate student **Brianna Pinnick** received the Drs. Sidney and Becca Fleischer Research Scholarship from the College of **Arts + Sciences**. The fellowship supports outstanding undergraduate students in their research endeavors.

Undergraduate student **Cameron Adams** received a Mineralogical Society of America Grant for Student Research in Mineralogy and Petrology for his work "Remobilization of thallium and fluid-mineral interactions during high-pressure metamorphism." This represents a major achievement since both graduate and undergraduate students are evaluated in the same pool of applicants.

other **HONORS**



DEAS Alumnus Dave Bottjer has been awarded the Twenhofel Medal, SEPM's highest honor. David J. Bottjer (PhD 1977) received the prestigious Twenhofel Medal from the Society for Sedimentary Geology (SEPM) on October 11th, 2022 at the GSA Annual Meeting in Denver. David has long served on the faculty at the University of Southern California (USC; dbottjer@usc.edu).

student AWARDS

Undergraduate Awards

Cumings-Malott Scholarship for Department Citizenship: Kenia Caro

Robert Wintsch Field Geology Award: Arya Gotoh

Cumings-Malott Scholarship for Professional Development: Carter Dills

Bill and Jan Cordua Senior Award: Ethan Steward

Frank and Shirley Pruett Junior Award: Mia Keller

Sheldon Turner Fellowship for Academic Achievement: Cameron Adams

Sheldon Turner Fellowship for Research Excellence: Kenia Caro

Robert Saenger Scholarship: Jaxson Bennett

Senior Student Scholarship for Research Grant-in-Aid: Ethan Steward

Maynard and Winifred Coller Scholarship for Academic Achievement: Sophie Carmosino, Melissa Humbarger

N. Gary Lane Beginning Geologist Award: Harley Bailey, Braden Henning, Riley Henson, Jack Stewart, Wade Lowe, Sophie Carmosino, Ross McNeill, Katie Snodgrass, Michael Krauter

ac-com-plish-ments

Graduate Awards

Galloway/Perry/Horowitz Academic Achievement Award: Anne Kort

John and Mary Droste Award for Best Teaching Assistant: James Ryan

2023-24 Dissertation Year Fellowship: Elizabeth Sherrill

Life is a Ride Scholarship for Department Citizenship: Henry Fulghum

John Barratt Patton Award for Indiana-focused Research: Garrett Marietta

Ralph E. Esarey Geology Award for Research on Indiana: Harrison Martin

Norman R. King Award for Field Research in Soft-rock Geology: Clarke DeLisle

Grants-In-Aid of Research: Anupama Chandroth, Nathan Roden, Owen Madsen, Danielle Peltier

milestones:

2022-23 undergraduate DEGREES

Harley Bailey – Earth Science BSc
Sophie Carmosino – Earth Sciences BSc
Braden Henning – Earth Sciences BSc
Riley Henson – Earth Sciences BSc
Michael Krauter – Earth and Atmospheric Sciences BA
Wade Lowe – Atmospheric Sciences BSc
Ross McNeil - Earth and Atmospheric Sciences BA
Connor Miller - Earth and Atmospheric Sciences BA
Cas Regan - Earth Sciences BSc
Sarah Seaman - Earth and Atmospheric Sciences BA
Katie Snodgrass - Earth and Atmospheric Sciences BA
Jack Stewart - Earth Science BSc

2022-23 graduate DEGREES

Sam Anderson – MSc Geological Sciences (June '23)
Corey Brazell – MSc Geological Sciences (October '22)
Sophie Black – MSc Geological Sciences (May '23)
Eric Burton – MSc Geological Sciences (June '23, DEAS PhD program Fall '23)
Etienne Chenevert – MSc Geological Sciences (July '23)
Henry Fulghum – MSc Geological Sciences (July '23)
Allison Nelson – MSc Geological Sciences (February '22)
McKailey Sabaj – MSc Geological Sciences (June '23)

Quan Nguyen – MSc Geological and Atmospheric Sciences (June '23)
Kwesi Quagraine – MSc Geological and Atmospheric Sciences (May '23, DEAS PhD program, Fall '23)

Clarke DeLisle – PhD Geological Sciences (June '23)
Anne Kort – PhD Geological Sciences (May '23)
Harrison Martin – PhD Geological Sciences (June '23)
Sam Smith – PhD Geological and Atmospheric Sciences (June '23)









GRADUATE PROGRAM
DEPARTMENT SELF-STUDY 2023

DEPARTMENT OF EARTH AND ATMOSPHERIC SCIENCES
Graduate Studies

program description for the College of Arts + Sciences
In response to a request from the College of Arts + Sciences we answered nine questions presented to us. These questions are meant to uncover the purpose of our graduate program, and opportunities for future innovation.

The graduate program in Earth and Atmospheric Sciences at Indiana University is ranked #22 by US News and World Report in the field of geology in 2022. The success of our graduate program and our top 25 ranking is enabled by our graduate students because they are the "glue" that keeps our department strong, engaged, and successful.

Graduate students enable our externally funded research program, they are a core part of our undergraduate teaching, and they play an outsized role in our engagement mission, serving as ambassadors to our alumni, community members, K-12 teachers, and students in other departments. Graduate students mentor undergraduates and one another, they fill our building with an intellectual buzz, they are the heartbeat of our research output, and they catalyze collaboration among faculty. Our department's relationship with its alumni—as exemplified by their generous financial support and participation in advisory and career programs—derives in large part from their connection with our graduate program. Over the years, we have created a cohesive graduate community—at both the masters and PhD levels—who feel integrated, engaged, and fully supported in their experience at IU.

Student recruiting and admission: Student recruitment and admission are based on the advisor-student relationship. Prospective students first find a faculty advisor that matches their research interests before applying to our department. Students start their thesis research in their first semester and work closely with their assigned faculty advisor. The size of our program is limited by faculty size, not the applicant pool.

Mentoring: Mentoring is a key aspect of our graduate program. We have a comprehensive graduate handbook outlining degree requirements and expectations for students, as well as guidelines for the relationship between students and their advisors. To ensure timely degree completion, students have an Annual Review with their committee in the spring and PhD students take an Early Review exam in year 1 or 2.

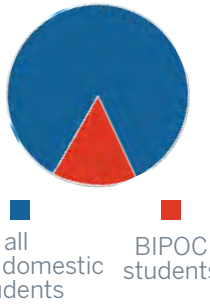
EAS by the numbers

(all numbers are averages or range over the last five years)

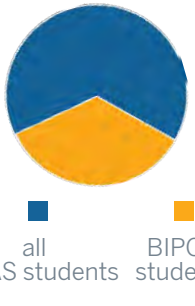
Graduate Program Size: 45-50 students
Incoming Class size: 12-15 students
Placement rate: 93.3 %
Yearly number of UG students taught by AI: 1200-1300

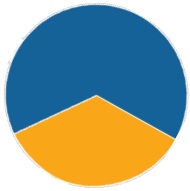
Diversity:

18 % of domestic students are BIPOC



35 % of all students are BIPOC

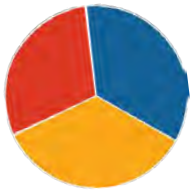




Gender balance:
35 % women, 65 % men
men women
non-binary data are not available for the past 5 years

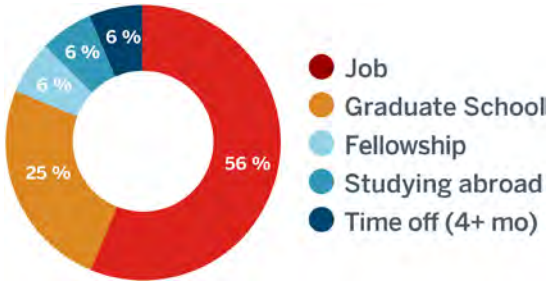
Program: 50 % PhD, 50 % MSc
PhD MSc

Application numbers:
55-60 per year, 45 % PhD
all applications PhD

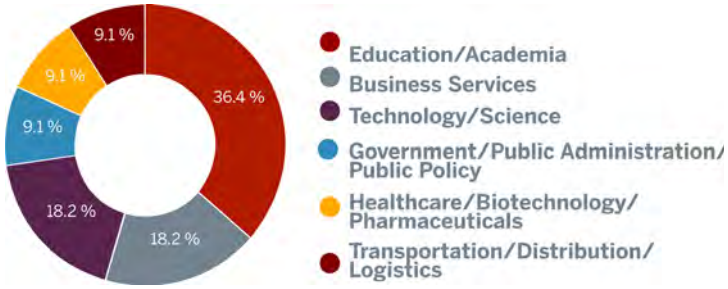


Funding: 30 % RA, 35 % AI,
35 % fellowships and other sources
RA AI other

In 2022-23, 93 % of our graduates are employed or in graduate school within 6 months of graduation



Our graduates have careers in:



IU Walter Center for Career Achievement

The Brophy and McDonald dorms were named in 2019. The signs went up fall 2022.

news from the IU Geologic Field Station

Erika Elswick, Executive Director

Students in X429 were real troopers during the 2022 session. They weathered a COVID outbreak, with the timing that coincided with the historic flooding in Yellowstone. This resulted in us missing out on the Bighorn Basin Fieldtrip with the Beartooth Highway closed owing to the landslides and the rock falls and the damage to the infrastructure in Yellowstone. Fortunately, we had a COVID plan and made it through the course, supplementing those folks in quarantine with select units from the E432 virtual course. We even got everyone to Yellowstone for a day trip on one of their days off later in the summer when the park partially reopened.

This winter and spring saw staff changes in the program. **Meagan Need** joined us this April as the new Program Coordinator, and we have already had her out to the station in May to get to know the place. This June, **Jon Thompson** joined us as the new Resident Manager. He and his wife Debbie are settling into the newly updated Resident Manager house on campus.

The winter at the station was long, cold and unusually snowy, so there will be a number of repairs this summer that will be undertaken, including replacing the wind sock that disappeared during one of the storms. Facilities Operations in Bloomington have visited the Field Station in the fall and spring and are currently soliciting local bids to upgrade part of the upper bathhouse to make it ADA compliant and to create an all-gender bathroom facility. With the weather delays, and with up to 30 inches of snow this spring into mid-April, we hope to have the project fully completed by the fall or early spring next year, but certainly by the summer 2024 season.

The Lee and Ginny Suttner Classroom.

The newly remodeled Resident Manager's house.

The new windsock to replace the one that was carried off during one of the late spring storms.

Scan or click the QR code to visit the IUGFS website.

field COURSES

EAS-X 420 Geology of the Colorado Plateau

Exploring the Geology of the West and Utah's National Parks

May 7-13 2023

Professors Doug Edmonds and Kaj Johnson

from the syllabus:

I asked ChatGPT to write a tagline for "a group of geologists going on a field trip to the Colorado Plateau" in different styles.

See if you can match the responses to

A) Donald Trump

B) Jerry Seinfeld

C) The Rock

D) Joe Biden

"'Ooh, look at this sedimentary layer, it's so fascinating!' Come on, guys, it's just a bunch of rocks. But hey, if it makes them happy, who am I to judge? Maybe they'll find a really cool rock and make it their pet or something. 'This is my pet rock, I call him Sedimentary Sam.' It could happen!"

"Come on folks, let's get this geology party started! We're gonna explore the Colorado Plateau and learn all about those rocky ridges, because as my dad used to say, 'if you want to understand the earth, you gotta dig deep.' So let's get digging, folks! We're gonna build back better and make the rocks great again!"

"Nobody loves rocks more than we do, okay? Trust me, our geologists are the best, no one even comes close. We're gonna make the Colorado Plateau so great, it's gonna be rockin' and rollin' like you've never seen before. And I know rocks, I have the best rocks. We're gonna build a wall, a big beautiful wall of rocks, and make New Mexico pay for it!"

Join me on the Colorado Plateau and we'll lay the smackdown on these sedimentary jabronis. It doesn't matter what kind of rock you are, we're gonna rock bottom you all and give you the People's Elbow of geological knowledge!

the 2023 daily schedule (aka, what we did):

Sunday, May 7 Land in Salt Lake City, UT. Smith's, Salt Lake City, UT. Gather supplies and groceries.

Drive to G.K. Gilbert Geologic View Park, Sandy, UT.

Drive to Salt Lake County Flight Park, Draper, UT. Steep Mountain Bench.

Drive to Antelope Island State Park, Syracuse, UT.

Drive to AirBnB in Huntsville, UT.

Monday, May 8 Breakfast. Get coffee.

Drive to head of Ogden Canyon Ogden, UT. Lunch.

Drive to Overlook (41.2128, -111.8078). Wasatch Anticlinorium.

Drive to Coalville, UT 84017 (Echo Dam). Synorogenic Conglomerates.

Drive to hotel in Huntsville, UT. Dinner and work session. Turn in assignments before drive in the morning.

Tuesday, May 9 Breakfast. Get coffee. Pack Lunch.

Drive to Water Tower (39.6852, -110.8610) Helper Face.

Drive to Gentile Wash (39.7120, -110.8697) Lunch.

Drive to Spring Canyon Trailhead (39.7005, -110.9203).

Drive to Helper, UT Kenilworth Wash.

Drive to hotel in Price, UT. Dinner, work session. Turn in assignments before drive in the morning.

Wednesday, May 10 Breakfast. Get coffee. Pack Lunch.

Drive to San Rafael Reef View Area, Emery County, UT 84522.

Drive to Uneva Mine Canyon (PULL OFF: 38.8817, -110.4462) (CANYON: 38.8832, -110.4556) Lunch.

Drive to hotel in Green River, UT. Dinner, work session, turn in assignment.

Thursday, May 11 Breakfast. Get coffee. Pack Lunch.

Drive to Courthouse Rock Campground, Moab, UT, (38.7106, -109.7289) Courthouse rock mapping.

Drive to Arches National Park Visitor Center. ARCHES!

Drive to hotel in Green River, UT. Dinner, work session. Turn in assignment.

Friday, May 12 Breakfast. Get coffee. Pack Lunch.

Drive to Maiden Creek Sill (37.9204, -110.5921) Mapping area.

Drive to Little Wildhorse Canyon & Bell Canyon Trailhead, Green River, UT. Hike Little Wildhorse Canyon.

Drive to hotel in Green River, UT. Dinner, relax.

Saturday, May 13 Flight back to Bloomington.

Crossroads 2023

Crossroads Conference 2023 was held in-person on the Bloomington campus, Friday March 24th.

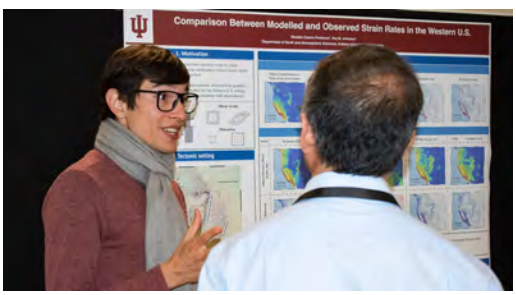
Thank you to everyone who helped and participated in Crossroads! Especially C.J. Salcido, Thomas LaBarge, Garrett Marietta, Sayan Das, Harley Bailey, Kenia Caro, Katie Snodgrass, Wylah Brahaum, and Amanda Chandroth for their immense help in organizing everything. And thanks to the department staff, including Ruth, Carol, Cami, and John Hettle, who helped make sure everything stayed on track and went smoothly.

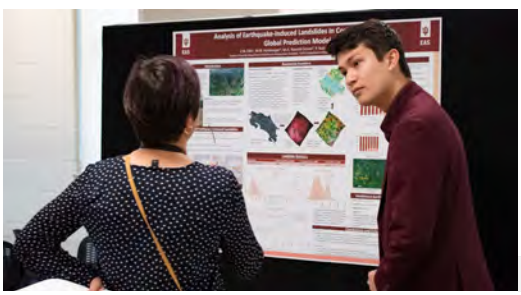
Most of all though, thanks to those who presented and came to the event. All our visitors and judges volunteered their time to come, and having such a good turnout makes it much easier to ask them to come again. There were several compliments from judges about the presentations and level of participation, so thank you!

The following representatives from industry and education participated as judges for talks and posters, and as consultants during the working lunch:

JUDGE	ROLE	AFFILIATION
Jose Luis Antinao-Rojas	Research Geologist	Indiana Geological and Water Survey
Jessica Towell		Arcadis
Cameron Stewart		Arcadis
Joel Degenstein	EAS Advisory Board	Retired El Paso E&P
Sarah Pietraszek-Mattner	EAS Advisory Board Transformation Manager	ExxonMobil
Larry Whitmer	Retired	Wabash Energy

COMPANY	REPRESENTATIVE
Arcadis	Cameron Stewart, Jessica Towell
IGWS	Jose Luis Antinao-Rojas
Resume Review	Sarah Pietraszek-Mattner
Keynote Speaker	Darren Tollstrup IOMS Sales Lead, Thermo Fisher Scientific





PRESENTER	INSTITUTION	TITLE
Kort, A.E.	IU DEAS	*Photogrammetry and Fortnite®: Epic new tools for 3D digitization and a word of caution about their use*
Salcido, C.J., Polly, P.D.	IU DEAS	*Functional drivers of evolutionary rates in mandible shape of carnivorous therian mammals: a study using biomechanical modeling and geometric morphometrics*
Peltier, D., Johnson, C.C., and Njau, J.K.	IU DEAS	*Biostratigraphic framework of Bed II, Olduvai Gorge, Tanzania*
Martin, H., Lewis, Q.W., and Edmonds, D.A.	IU DEAS, U. Waterloo	*Point bar and cutbank morphodynamics on a rapidly meandering river revealed by more than twenty drone-based lidar scans*
Gearon, J.H. et al.	IU DEAS, UTA, U. Minnesota	*Investigating hypotheses for river avulsion using space-borne lidar*
Adams, C. and Rader, S.T.	IU DEAS	*Constraints on the remobilization of thallium and fluid-mineral interactions during high-pressure metamorphism*
Anderson, S.B., Njau, J.K., and Herrmann, E.W.	IU DEAS	*Geoarchaeological mapping with UAV, SfM Photogrammetry and GIS at Olduvai Gorge, Tanzania*
Caro, K.Y., and Kenderes, E.M.	IU DEAS	*How do changes in precipitation affect volcanic activity at Yellowstone?*
Chenevert, E., Gearon, J., and Edmonds, D.A.	IU DEAS	*Using explainable machine learning to investigate the controls of vertical accretion on the Mississippi River deltaic plain, Louisiana, USA.*
Dills, C.W. et al.	IU DEAS, IUPUI, U. Costa Rica	*Analysis of earthquake-induced landslides in Costa Rica using a global landslide prediction model*
Lombardo, S. et al.	IU DEAS, U. Utah	*Improving avalanche forecasts: verification and bias correction of GFS precipitation forecasts in Little Cottonwood Canyon*
Castro-Perdomo, N. et al.	IU DEAS, MUST, USGS	*Using geodetically-derived strain rates to infer slip deficit rates on faults in the Western US*
Chandroth, A. and Johnson, C.C.	IU DEAS	*Mapping the spatial shift in community structure of shallow water corals in the Caribbean*
Han, J.-Y. et al.	IU DEAS, Yonsei University	*The bifurcated channel networks in modern river deltas depending on climate*
Hawley, K.M. et al.	IU DEAS	*Geochemical examination of submerged archaeological ceramics from eastern Dominican Republic*
LaBarge, T.W. et al.	IU DEAS, Univ. Reading	*The evolutionary ecology of gigantism in terror birds*
Lin, Y.-S.	IU DEAS	*The dynamics of bedrock channel incision and lateral migration under various rates and patterns of rock uplift*

Finally, congratulations to our winning presentations! Our judges decided the following for best presentation in each category.

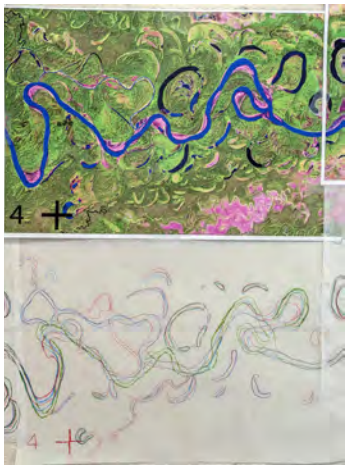
DEGREE	POSTER	ORAL
UNDERGRADUATE	**Carter Dills, IU DEAS**	
MSc	**Sam Anderson IU DEAS**	
PhD	**Kirsten Hawley IU DEAS**	**Harrison Martin IU DEAS**

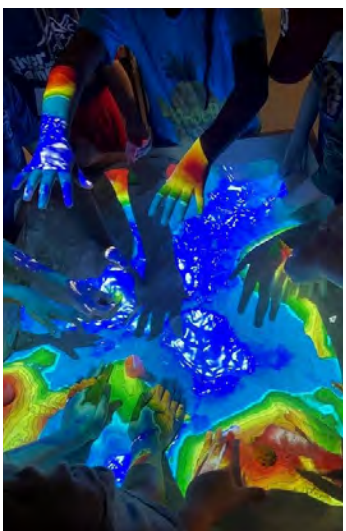
education + public outreach

Important information about EAS River Camp:

a) 26 campers (5 from diverse backgrounds).

b) Funding came from an NSF award to Edmonds.





From faculty and student collaborators in DEAS and the School of Education:

Saturday Science Quest for Kids *presents*

River Camp

May 22-26, 2023

We are thrilled to share the latest news and updates about a summer camp program aimed at addressing the pipeline problem in Earth Sciences and promoting a deep understanding of the field among elementary-aged students. Thanks to the generous support of the National Science Foundation (NSF) and the award granted to DEAS Associate Professor **Douglas Edmonds**, River Camp has become a reality.

River Camp's week-long curriculum, titled "*When Rivers Move*," was collaboratively developed by Doug Edmonds (DEAS) and Co-PI Meredith Park-Rogers (Associate Professor, School of Education). They worked closely with a team of Earth Science and Science Education PhD students at Indiana University, including Qiu Zhang and Esther Kataate Namakula from the School of Education, as well as **Harrison Martin**, a recently graduated DEAS PhD student, and **Jake Gearon**, a current DEAS PhD student. Aligned with the Next Generation Science Standards, this curriculum not only imparts scientific concepts and facts but also emphasizes the application of scientific thinking in students' everyday lives.

During the program, students embarked on a thrilling journey of exploration and discovery. They delved into the captivating dynamics of rivers using cutting-edge tools such as Google Earth and engaged in hands-on experimentation with stream tables, settling tubes, timelapse tracing, and interactive AR sandboxes. Through activities like data collection, observation, and scientific reasoning, students acquired practical skills while deepening their understanding of river systems. By comparing field-measured migration rates to theoretical models, they developed a comprehensive perspective on the subject matter while having a great time!

Meredith Park-Rogers conducted formative assessments to evaluate students' learning progress and the successful transfer of knowledge to elementary-aged students. These assessments will pave the way for future publications on the program's achievements.

The ultimate goal of River Camp was and remains to foster a passion for Earth Sciences in young children and encourage them to pursue advanced studies in the field. By connecting the captivating movements of river systems with theoretical predictions, River Camp equips students with a solid foundation in Earth Science concepts. Furthermore, this program seeks to bridge the representation gap and inspire underrepresented groups to explore and engage with Earth Sciences at an advanced level.

We express our sincere appreciation to the National Science Foundation for their generous support, enabling us to develop and implement this transformative program. As we witness the impact of River Camp, we are committed to sharing our findings and experiences with the broader scientific and educational communities. Through publications and conferences, our aim is to inspire educators nationwide to adopt innovative and engaging approaches in science education.

We extend our heartfelt gratitude to all the students, families, and supporters who have been part of this remarkable journey. Together, we are fostering a more inclusive and vibrant future for Earth Sciences.

Doug Edmonds, Meredith Park-Rogers, Jake Gearon, Harrison Martin, Qiu Zhang, and Esther Kataate Namakula

education + public outreach

INDIANA UNIVERSITY PALEONTOLOGY COLLECTION EXHIBIT AT MACALLA

The Indiana University Paleontology Collection (IUPC) collaborated with the Zooarchaeology Collection and IU Collections to put on a year-long exhibit on shells and reefs in their new exhibit hall in the McCalla Building on the IU Bloomington campus. The focus was on the Stotter Collection, a largely Australasian collection of marine molluscs and corals donated to Indiana University by an alumnus.

Our departmental Paleontology and Zooarchaeology Collections Manager **Jess Miller-Camp** reported that the exhibit is wildly popular with visitors. The room it formerly inhabited will now be the designated interdepartmental collaborative science exhibit room.

education + public outreach

PhD students **Elizabeth M. Sherrill** and **Sayan Das**, and Senior Lecturer **Cody Kirkpatrick** organized Science Fest with the help of many volunteers among staff and students on October 22nd, 2022. The fantastic weather brought a never-ending crowd to marvel at numerous displays and activities, for example at the new stations "*Tree Time*" (developed by PhD student **Owen Madsen**) and "*Clouds, Tornadoes, and Pressure*" (developed by undergraduate student **Ethan Steward** and PhD student **James Ryan**).

education + public outreach

EDUCATING for Environmental Change

Half a dozen of our department's faculty are involved in the high-profile outreach program Educating for Environmental Change (EfEC) where one-day workshops for teachers complement intensive three-day summer teacher professional development programs. Especially noteworthy is the geoengineering workshop that was organized by Assistant Research Scientist **Paul Goddard** and Assistant Professor **Ben Kravitz**.

According to Adam Scribner, Director of STEM Education Initiatives, these workshops are designed to help elucidate and deepen teacher understanding and provide lessons and resources to help educators teach the science and policy of climate change.

"EfEC (Educating for Environmental Change) is designed to address a major gap in environmental education. Indiana's teachers contend with multiple barriers to effectively teach their students about climate change and its causes. These include a lack of training in climate science, misinformation in the media, local and state resistance, and a dearth of grade-level-appropriate resources," he said. "Although 72 % of Hoosiers agree that our schools should teach the causes, consequences and potential solutions of climate change, it can be extraordinarily challenging for teachers to include the right balance of information and activities that can fit neatly into existing Indiana education standards.

EfEC was created in 2017 to provide teachers with the training, support, and tools necessary to bring high-quality climate education into their classrooms and provide direct access to IU's climate scientists."

Read about the program here

Chen Zhu, Professor

Professor **Chen Zhu's** sabbatical leave was a welcome break after serving as the Henry Darcy Distinguished Lecturer during the pandemic. In that role, he gave 30 in-person lectures in six countries and 35 virtual lectures to about 4,000 attendees from ~30 countries (read his reflections here).

The first stop of his leave was the Swiss Federal Institute of Aquatic Science and Technology in Zürich. He regretted that he worked too much and hiked too little, but fortunately, his proposal to NSF ($736,412) that he submitted from Switzerland was funded. The project focuses on weathering of basalt as a natural process that removes carbon dioxide (CO_2) from the atmosphere. Chen proposed isotope spiking as an innovation to close knowledge gaps in basalt-CO_2-water reaction kinetics.

The final stop of Chen's sabbatical was a visit to England as the Leverhulme Visiting Professor at the University of Cambridge. There, Chen collaborates with Professor Nicolas Tosca and others on climate change mitigation research and teaches workshops and short courses to students across the UK.

Chen's other ongoing project is on "critical minerals" for which a team of collaborators received a multi-million-dollar grant from the U.S. Department of Energy to study thermodynamic properties of rare earth elements. Two undergraduate students at IU's Luddy School of Informatics, Computing, and Engineering, Kevin Tu and Rob Hageboeck, who studied with Chen, contributed significantly to winning this grant. Kevin and Rob developed a cyber platform for geochemical modeling which has attracted ~4000 visits from 89 countries since 2020. This project leverages the cyber platform to disseminate basic science data that are critical to the energy transition.

Chen felt indebted to his mentors, which prompted him to co-sponsor the Schwartz Award for Excellence in Mentoring and Education at GSA to honor Professor Frank Schwartz. While Chen and Frank have no formal academic ties, Frank has nevertheless been a great mentor and friend to Chen for more than 30 years. With the help of his children, Chen endowed the Professor Jin Jingfu Memorial Lectureship for early career scientists at the International Association of Geochemistry, which honors Chen's undergraduate advisor Professor Jin Jingfu.

The first Schwartz Award will be presented at this year's GSA annual meeting in Pittsburgh, and the first Jin Lectureship will be presented at the IAGC Conference in Sendai, Japan this August.

Doug Edmonds, Associate Professor

Land loss in coastal areas is a major concern worldwide. Following a publication by Associate Professor **Douglas Edmonds** and collaborators on March 6th, 2023 in Nature Sustainability, IU followed up with its own news article.

The research reveals new information about the role humans have played in large-scale land loss in the Mississippi River Delta — crucial information in determining possible solutions to the crisis.

nature sustainability

Article

https://doi.org/10.1038/s41893-023-01061-0

Land loss due to human-altered sediment budget in the Mississippi River Delta

Received: 5 May 2022

Accepted: 2 February 2023

Published online: 06 March 2023

Check for updates

Douglas A. Edmonds[1], Stephan C. Toby[1], Christopher G. Siverd[2], Robert Twilley[3,4], Samuel J. Bentley[4,5], Scott Hagen[3,6] & Kehui Xu[3,4]

Land loss in the Mississippi River Delta is due to the human-altered sediment budget, yet the relative contributions of building dams, levees and extracting subsurface resources are unknown. Here, using numerical models, we show how each cause contributed to the land loss crisis in Barataria Basin within the Mississippi River Delta. Before human interference, Barataria Basin had a sediment budget surplus, and the excess sediment would have grown the wetlands at 7–13 km^2 yr^{-1}. Dam building in the Mississippi River basin decreased overbank fluvial sediment deposition in Barataria by a third, yet the basin-wide sediment surplus persisted. The installation of flood-protection levees eliminated overbank sediment deposition and created an annual basin-wide sediment deficit, leading to land loss of 7 km^2 yr^{-1}. During its peak, subsurface resource extraction enhanced the deficit and doubled the land loss rates. Our findings show that these three causes can explain the land loss crisis, and the recent slowdown in land loss is linked to the declining rate of resource extraction. Finally, we find that the effect of dams is secondary to levees and resource extraction, which implies that sediment supply reduction may not be as detrimental to sediment diversions and coastal restoration as previously thought.

Edward W. Herrmann, Senior Scientist, Harrison Martin, PhD, and Brian Yanites, Associate Professor

Drone-based Lidar improves mapping of pre-contact Native American site at Cahokia Mounds

Long before European contact, Cahokia Mounds State Historic Site, directly across the Mississippi River from modern St. Louis, was North America's largest and most influential urban settlement of the Mississippian culture from ~ AD 1050 until ~1425 with a population larger than that of European cities like London. Cahokia and surroundings contain over 100 human constructed mounds and other earthworks that form one of the 24 UNESCO World Heritage Sites within the USA. High-resolution elevation mapping is essential for archaeological interpretation and future research and preservation.

In early 2023, Senior Scientist **Edward W. Herrmann**, PhD candidate **Harrison Martin** and Associate Professor **Brian Yanites** began collaborating with the IU Museum of Archaeology and Anthropology (IUMAA) and IU's Geography Department to obtain drone-based Lidar (i.e. light detection and ranging) data at Cahokia Mounds State Historic Site to reveal subtle differences in elevation. Drone-based Lidar operates much closer to the ground and at slower speeds than aircraft-based, which means that its data provide superior resolution.

The team expects improvement in measuring subtle ground surface elevations in the wooded and less-studied areas around the site. Certain aspects of the site's historic past will be visible in the images, like Euroamerican land modification or plowing and previous site infrastructure like housing, pathways, or roads. Decades of plowing and development have changed the topography of the site by flattening it, and high-resolution Lidar data can visualize subtle changes in elevation that can provide clues to past landscape use. Perhaps more importantly, Lidar images will also provide a baseline for understanding the effects of erosion and slumping at Cahokia and serve as a tool that can aid preservation efforts. The new GPS-associated data are important for georeferencing decades of legacy data obtained through excavation, geophysics, survey, construction, and utility infrastructure work at Cahokia. The data can be used to tie previous work into modern datums and modern work into previous datums using the obtained GPS coordinates.

The DEAS team is privileged to be able to work at this important and sacred site and acknowledges the American Indian people who studied and carefully constructed the landscape while residing at Cahokia. The team recognizes their descendants whose vibrant cultures thrive within many different tribes today.

Preparing for launch atop Monk's Mound.

The team initializes the Lidar equipment in the swamp.

The Falcon Drone in front of Monk's Mound.

Celebrating a successful Falcon drone landing in the swamp.

Large, petrified tree fossils rediscovered north of Geological Sciences Building

Ever since the move of the Geology Department and of the Indiana Geological Survey from Owen Hall to the newly constructed Geology Building around 1964, a neglected rock garden has occupied the corner of Cottage Grove Avenue and Forrest Avenue. Many of the large rocks have partially sunken into the soil owing to six decades of faunal burrowing. With no discernible design or purpose to the pile, and no marker explaining what the rocks are or why they've been deposited here, in 2022 the Indiana Geological and Water Survey (IGWS) decided to dispel some of the mystery. IGWS's surprising findings (see details here) are briefly summarized in the following images.

At least three of the rocks are 300-million-year-old pieces of petrified wood. Historic photographs from outside Owen Hall confirm that some rocks are fossils of *Callixyon newberryi* of Devonian Age from Clark County, Indiana. Apparently, some evergreen trees floated from nearby land into the sea and became buried in New Albany Shale where tree organic matter became replaced by silica from pore fluids.

Digitization Imaging Specialist **Kristen Wilkins**, IGWS Education and Outreach Coordinator **Polly Sturgeon**, and IGWS Director **Todd Thompson** are confident that the current and historical photos provide a match.

Devonian petrified wood found in New Albany Shale in Clark County, Indiana, as seen outside Owen Hall before 1964 (IGWS Digital Collections).

Unmarked rock garden north of the Geology Building at the corner of Cottage Grove Avenue and Forrest Avenue (photograph by Kristen Wilkins, IGWS).

Left: Historical image of Callixyon newberryi outside Owen Hall. Right: The same fossil north of the Geology Building (photos by Kristen Wilkins, IGWS).

Shake, rattle, and roll! IU seismograph station finds a new home

Professor Michael W. Hamburger

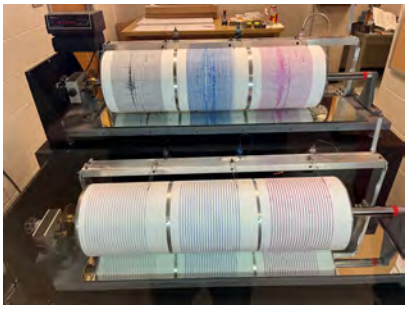
The IU Seismograph Station is one of the longest-standing and most widely known research facilities in DEAS. Recently it found a striking new home as part of the recent renovations to the Geology Building. The seismograph station dates back to 1960, part of a collaboration with Saint Louis University's seismology laboratory, one of only five regional seismograph stations established to the stringent standards of the Worldwide Seismograph Station Network (WWSSN). The station has been operating continuously for over sixty years, providing critical constraints on midcontinent seismic activity. The archive of data contains approximately 120,000 individual paper seismograms. For the last three decades, the traditional analog station has been upgraded to include a new state-of-the-art digital instrument system, whose data are archived by the EarthScope consortium and used by seismologists across the globe.

Now, thanks to the department's major renovation in 2021-22 — and to herculean efforts by building manager **John Hettle** and electronics guru **Terry Stigall** — the station has been relocated to a new and beautifully visible space in the northwest corridor of the Geological Sciences Building. The newly configured seismograph display includes our traditional drum recording system, lit by hidden LED lights, together with a large-format digital display system showing real-time displays of earthquakes from around the globe, digital recordings from the IU seismic station, and photographs and seismic records from recent earthquakes — all made visible to the public through a nearly floor-to-ceiling glass display.

The seismograph is mounted on a mobile platform, allowing it to be rotated away from the windows and into the display room, allowing for access by classes, school groups, and news crews — when IU seismologist Professor **Michael W. Hamburger** gets his "ten seconds of fame."

And as of this spring, the seismic station has been graced by a new piece of instrumentation — a beautifully renovated pendulum clock, brought back to life by the loving hands of seismologist Emeritus Professor (and amateur horologist) **Gary L. Pavlis**.

The original seismograph installed in the Geology Department, Owen Hall, January 6, 1954. Professor Judson Mead (left), and then-graduate student Robert Blakely (right; subsequently IGS Research Scientist and Professor of Geophysics). Photo courtesy of University Archives.



Terry Stigall, DEAS Geophysics Technician, keeps the IU seismograph station running.

Emeritus Professor Gary L. Pavlis' plea to help preserve departmental "Seismic History"

I appeal to our alumni to help me preserve any information in the collective memory about the history of our seismic station at IU. I was prompted to write to our alumni for two reasons. First, several DEAS members have been involved in a discussion about what to do about our historic data from the older seismic instrumentation. There are old analog records from the instrument that date back to the mid-1960s. We have reason to believe that older records also exist at Saint Louis University in Missouri. Both collections are at risk of being lost and we are hoping to get at least the local collection digitized and stored in an appropriate archive.

My second reason for writing is shown in the associated pictures. The historic clock shown was part of the background of the seismic station for as long as anyone I have talked to can remember. The movers damaged its wooden case when we went through the recent building renovation.

It might have been discarded but luckily **Terry Stigall** suggested that I should consider fixing it. A long-term hobby of mine is woodworking. Since retirement I learned a few things about repairing mechanical clocks. This clock hadn't run for at least 40 years. It was a bit of a challenge to repair. Most mechanical clocks of this quality were built to last and repair instructions can still be found online. This one, however, is apparently very rare. The only place I found online for a similar clock was in a museum in Michigan. I managed to find descriptions of similar, but different clocks that helped me figure out how to repair it. That search also helped me learn why this clock was useful as a timekeeper for the seismic station prior to the modern use of externally broadcast time standards. First, note the pendulum looks odd compared to most clocks. The two stainless steel cylinders are filled with mercury, which was a 19th century invention for temperature compensation. When temperature increases, the rod suspending the pendulum extends, but the mercury level rises a compensating amount to keep the moment of inertia of the pendulum, and hence the swinging period, constant. The second technology in this clock was an early 20th century invention called an electric auto-winder. In this case the winder is initiated by a cam on the second hand of the clock that opens and closes a relay once per minute. When the relay closes it applies current to a magnet that pulls a lever to wind the mainspring of the clock. When the clock was used for timing on the seismic station that same signal was rectified, stepped down in voltage, and used to apply the "minute mark" to the analog records. The auto-winder makes the clock more accurate because the force applied to the pendulum by the escapement stays constant.

After that exercise I also decided to try to reconstruct the history of the IU seismograph station. Scanned pdf versions of all known departmental newsletters are posted in the Alumni section of our departmental website. The earliest is June 1952. For this article I want to quote a marvelously entertaining text from the 1954 newsletter we can most likely attribute to the late **Prof. William Thornbury**:

*A new seismograph has been installed at I.U. under the able direction of **Dr. Judson Mead**. The seismograph is set upon a concrete pier that rests upon the limestone bedrock below the basement floor of Wylie Hall. The recording drum is located in the first-floor corridor of Owen Hall. It has created much interest among all persons who come to Owen Hall. In fact, many persons who are not inmates of Owen drop in every day to see if there has been any earthquake. Dr. Mead becomes ecstatic when he sees the pen going through its paroxysms and has indicated that an earthquake is in progress. As someone has aptly stated he "counts that day lost whose low descending sun sees no earthquake begin."*

Most seismographs record on a narrow strip of paper that is fed under the pen from one roller to another. Dr. Mead has improved upon this method by having the waves recorded upon a large sheet which is wrapped around a drum. Thus, it is possible to see the entire 24-hour record.

Geology students are becoming very conscious of primary waves, secondary waves, and microseisms, etc. and are beginning to realize that "every little movement has a meaning all of its own" applies equally as well to the earth's crust as to hula dancers.

One of the local newspapers in writing about the seismograph proclaimed it as "the world's most sensitive seismograph." Dr. Mead claims that this, like the report of Mark Twain's death, is a gross exaggeration.

"Seismic History" - continued

"Seismic History" - continued

This text and a one-liner in the 1953 newsletter indicate the seismograph station most likely began operation in the summer of 1953. Since I was born in the summer of 1953, maybe I was predestined to come to IU? That aside, it is clear that clock was definitely used form 1953 to sometime in the 1960s when the instrument was upgraded to the then state-of the-art World Wide Standardized Seismograph Network (WWSSN) instrumentation. No trace remains of the original sensor or the original helicorder described in the newsletter. There are good reasons to suspect that some of the original equipment may have been hand made by the late **Charlie Miller** who worked in our former departmental machine shop for several decades. Many of you may remember him.

That story brings me to the last point of this article.

We are working to preserve anything we can about the history of the seismic station at IU:

- We would love to get any old pictures you might have of any part of the station. This might be old newspaper clippings or personal photographs. Some of you may have done the job of the daily record change and perhaps you have photos from those days?
- I would especially appreciate an early picture of the clock. I have a vague memory that the original glass had some gold-colored trim paint and possibly showed the name of the manufacturer. I would like to restore the glass to its original state if someone can find a photo.
- If you have any stories you can remember from **Judson Mead**, **Al Rudman**, or **Bob Blakely** about the history of the IU seismograph station, please write them down and send them to us. All three of our former colleagues are gone and we lost too much of that history already.

My ultimate goal is to collect photos and stories to use as material for a display board that conveys the history of the station. It will improve the new display located across the hall from the old location. I hope you can help me make that display more encompassing.

Dr. Howard Feldman

Dr. Howard Feldman (PhD 1987, advised by **Gary Lane**) retired from ExxonMobil after 26 years as a petroleum geologist and is now an Affiliate Faculty at Colorado State University in Fort Collins, Colorado. He was also just elected as SEPM's new Secretary-treasurer and is organizing an SEPM conference on parasequences in October in Green River, Utah. He will be presenting deepwater fan facies models at SEPM's Bouma Conference in Utrecht, The Netherlands. And lastly, he is writing a clastic facies textbook.

Lee Suttner, Professor Emeritus

Former three-time recipient of the Department's annual Screwball Award for his crazy antics, our Emeritus Professor **Lee J. Suttner** continued to give evidence that he indeed merited triple recognition of his screwball behavior, but this time in Assembly Hall not in the Geology Building. Multiple big victories this past season signal a resurgence of IU basketball. However, none was bigger than IU's huge upset of then #1 ranked Purdue on a brutally cold, but very joyous February Saturday afternoon in 2023.

Since Assembly Hall was dedicated in 1971, Lee estimates that he has missed no more than 10 games out of near 450-500 that have been played there, and he has been a frequent attendee of basketball practice there as well. But never has he had an opportunity to actually touch, much less stand on, the famous mid-court logo, instantly recognizable to millions of IU basketball fans across the country because of its prominence on TV.

Immediately after the game-ending horn sounded, as Lee put it "I finally got that monkey off my back." He decided to embed himself in the avalanche of thousands of students who stormed the court. The Friday evening before the game he had brought pizza, breadsticks, and beer over to a small group of students camped out for the night across from Assembly Hall, just to experience the atmosphere. Almost miraculously, among the throng on-court two students recognized him from the night before. They literally parted the red sea of students so he could celebrate with them on the logo.

spring 23 colloquia

February 27: Dr. Sarah Aarons, Assistant Professor of Geosciences, Marine Chemistry and Geochemistry, Scripps Institute of Oceanography, UC San Diego

Title: *Radiogenic and non-traditional stable isotope insights into past climate & Earth surface processes*

March 6: Dr. David Richter, Associate Professor, Civil and Environmental Engineering and Earth Science, University of Notre Dame

Title: *Turbulence, droplets, and hurricanes: Using simulations to look where experiments cannot*

March 20: Dr. Jim Hurrell, Professor and Endowed Chair, Department of Atmospheric Science, Colorado State University

Title: *Extreme weather in current and future climates: perspectives from global climate models*

March 24: CROSSROADS: Presentation awards were given to Harrison Martin for his talk, and Carter Dills, Sam Anderson, and Kirsten Hawley for posters

April 3: Dr. Xiaotao Yang, Assistant Professor, Department of Earth, Atmospheric, and Planetary Sciences, Purdue University

Title: *Investigate lithosphere structure and dynamics in alaska from subduction margin to continental interior*

April 10: Riley Black, Science Writer

Title: *Out in the Field - How to foster safety and inclusion in field sciences*

April 17: Dr. Paul Goddard, Post-Doctoral Fellow, IU Earth and Atmospheric Sciences

Title: *Can stratospheric aerosol geoengineering slow antarctic ice loss?*

DEAS Hosts USGS Director David Applegate

Our department was fortunate to host the first public address by Dr. David Applegate, newly appointed director of the U.S. Geological Survey, on November 28, 2022. His day-long visit to IU was organized as part of the annual DEAS Tudor Commemorative Lecture, which was established in honor of Dan Tudor, a DEAS alum and former president of Chevron Geosciences. As the 18th director of the U.S. Geological Survey, Applegate leads the nation's largest water, Earth and biological science and mapping agency, whose mission is to provide the scientific data that enable decision-makers to create sound policies for a changing world.

Applegate's visit to IU included meetings with DEAS faculty, staff, and students, staff of the Indiana Geological and Water Survey, an informal departmental lecture on geologic hazards, and a formal presentation to a large campus-wide audience on "Science in Service to Society: The Evolving Role of the U.S. Geological Survey." Applegate is the 18th Director of the U.S. Geological Survey, sworn in by Secretary of the Interior Deb Haaland in August, 2022. He previously served as the Associate Director for Natural Hazards, leading USGS emergency response activities and overseeing the bureau's geologic hazards and coastal and marine programs. Apart from the public talks, a highlight of his visit was a tour of the Lilly Library's rare book collection of rare geological manuscripts and maps, together with IU faculty and Lilly Library curators.

in memory

Prodip K. Dutta
1935-2022

Our alumnus Dr. Prodip K. Dutta passed away on October 24th, 2022, at the age of 87. Prodip received his Ph.D. in 1983 with a thesis entitled "The role of climate in the evolution of detrital and authigenic mineralogy in sandstone from the Gondwana supergroup, India" with Lee Suttner serving as advisor. Upon receipt of his PhD, Prodip joined the faculty at Indiana State University in Terre Haute where he taught for 28 years. In 1986 he was honored by the selection of two combined papers he co-authored with Lee for the annual Outstanding Paper Award in the Journal of Sedimentary Petrology. Following his retirement, he and his wife Gouri moved to Arizona.

Prodip K. Dutta and Lee J. Suttner in ca. 1981 (photo credit Lee J. Suttner).

Jessica Elzea Kogel
1959-2023

Our alumna Dr. Jessica Elzea Kogel passed away on January 25, 2023 at her home in Connecticut after fighting illness for almost two years. Jessica was Associate Director for Mining at the National Institute for Occupational Safety and Health (NIOSH) of the US Center for Disease Control. She worked through December and died just a few weeks after taking formal retirement. Jessica got her BSc in Paleontology and Geology at University of California Berkeley, and then did both her MSc and PhD (1991) at IU in clay mineralogy with Haydn H. Murray. After graduating, she worked in private industry for 25 years. She held numerous patents, coauthored many peer-reviewed publications, and authored two books. She served as a member of our departmental advisory board and had been due to assume the presidency of the board, but deferred because of her illness. She was an incredibly effective member of the board, and a genuinely wonderful person.

hello alumni!

(we'd love to hear from you)

Are you an alumnus or alumna of the Department of Earth and Atmospheric Sciences (formerly the Department of Geological Sciences)?

Would you like to update your contact information?

If so, please visit our online form and send us some stories, news about your employment or address or just chat.

https://earth.indiana.edu/forms/share-your-story.html

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Indiana University College of Arts + Sciences
Summer 2023 Alumni Newsletter of the
Department of Earth and Atmospheric Sciences

This newsletter is published by the
Department of Earth and Atmospheric Sciences
in cooperation with the

College of **Arts + Sciences**

to encourage alumni interest in and support for
Indiana University.

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