

DEAS

DEPARTMENT OF EARTH AND ATMOSPHERIC SCIENCES

NEWSLETTER | spring 2024



NOTES FROM THE CHAIR

In academic year 2018-19 our department adopted a strategic plan for research, teaching, and hiring. Our atmospheric science program had been established a few years before, but the faculty hiring was not yet complete, a wave of retirements had just begun that ultimately took more than one-third of our faculty, and we had just changed our name to Department of Earth and Atmospheric Sciences. The five-year strategic plan aimed to maintain our core strengths across the geosciences, to build the atmospheric sciences program, and to recruit faculty in Earth sciences who filled our specific disciplinary gaps but who had research interests that intersected with three unifying themes: climate change, the 'critical zone', and Earth's evolving crust.

Since the plan was adopted we have hired six new tenure track faculty, one new lecturer, and one new research scientist, giving us new expertise in trace metal geochemistry, petrology, basin analysis, paleoclimate, clumped isotope geochemistry, seismology, and climate modeling. Our newest additions, Julia Kelson and David Lilien, are introduced in this issue of the Newsletter. Having dropped from 22 to 14 tenure-track faculty over the four years before the strategic plan was adopted, we have regrown to 19 with one more tenure-track hire expected in the next year in the area of water. We are once again easily able to offer classes in all areas of geosciences, our graduate program is expanding again, and the number of grants and publications we produce is tracking our growth.

Indiana University itself is changing rapidly. In 2021 President Michael McRobbie and Provost Lauren Robel retired and were replaced by Pamela Whitten and Rahul Shrivastav respectively. They embarked on an ambitious plan to reshape the university. Whitten has adopted a centralized "one university" model for the IU system and many activities have been elevated from the Bloomington campus to the university, a process that is still underway. Many policies, procedures, and financial decisions that were previously at the level of College deans or Campus vice-provosts are now considered at the level of University vice-presidents. Their new IU 2030 and IUB 2030 strategic plans are central to decision making.

These changes have had a direct impact on the department. An important source of research funding, the so-called "indirect cost" portion of external grants, that was once largely devolved to College of Arts + Sciences budget has been reapportioned so that 30 % is held by the Vice President for Research office, 10% is given to the department, and 10 % to the principal investigator (PI) of the grant. With 50 % of this income having been taken away from the dean, it is expected that the department and PI will now contribute more to expenses like instrument maintenance and start-up costs for new faculty hires. The campus strategic plan prioritizes hiring in geriatric health, artificial intelligence, quantum technology, and environmental health, and the Provost has been rigorously prioritizing faculty hires in these areas over other requests thus slowing the completion of our own strategic hiring plan.

Allocation of research space has also been centralized and reviews of the MSB-II building are currently underway with an eye to consolidating animal-based research in that building. The Provost also initiated a review of the undergraduate majors offered on the Bloomington campus that is still underway, with the possibility of prioritizing new faculty hires in growth areas and deprecating majors where enrollment is below a critical threshold, but also the possibility of prioritizing growth in majors related to environmental science, which would include ours. It is still too early to fully comprehend what impact, if any, these changes will have for our future.

Political and social trends in the state, nation, and world have had some tangible effects on the Bloomington campus in recent months. At least two research collaborations between our faculty and researchers in China have been sidelined by changes cascading from the CHIPS and Science Act of 2022 and some researchers have had collaborations with Russian and Ukrainian scientists scrutinized. Two campus events related to the Israel-Palestine war were cancelled at short notice. The fate of the Kinsey Institute has been under intense discussion after a state funding moratorium was imposed by the Indiana legislature. And the legislature passed another bill this month titled "state educational institution matters"; colloquially known as SB 202, that could bring the so-called "culture wars" to campus classrooms by allowing students, staff, and faculty to lodge complaints with an external body about "cultural and intellectual diversity" in classes and related to faculty. Because of the bill's open-ended language, it could conceivably have negative impacts on courses that touch on energy, mining and petroleum extraction, environmental remediation, climate, Earth history, and the history of life given the tenor public discourse on these subjects. Both the IU President and Provost have issued public warnings of unintended consequences such as these. At the time of writing, the state Governor has not yet signed the bill into law.

As you will see in this newsletter, a lot of positive things are happening in the department. You will meet our latest faculty recruits, new postdocs and staff, new grant projects and publications, and more. We are gearing up for the total solar eclipse on April 9 when we will join the entire campus celebrating the science of the Earth and solar system, including a guest appearance by actor William Shatner of Star Trek fame. Next year I will be on research leave at Helsinki University and professor Kaj Johnson, who will serve as acting chair of the department, will report what happens next. As always, special thanks to Arndt Schimmelmann and Ruth Droppo for compiling this newsletter and to the entire department for doing all the things that create the news we have to share.

P. David Polly
Indiana University



EARTH AND ATMOSPHERIC SCIENCES

DEAS

NEWSLETTER of the
DEPARTMENT OF
EARTH AND ATMOSPHERIC SCIENCES

Chair: David Polly

Editor: Arndt Schimmelmann

Graphic Arts: Ruth Droppo

<https://earth.indiana.edu/>

College of **Arts + Sciences**

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<https://college.indiana.edu/>

this is **who we are**

FACULTY

Simon Brassell	Professor	Jess Miller-Camp	Adjunct Research Scientist
Doug Edmonds	Associate Professor <i>Malcolm and Sylvia Boyce Professor</i>	Jackson Njau	Associate Professor
Erika Elswick	Senior Lecturer <i>Executive Director, IU Geologic Field Station</i>	Travis O'Brien	Assistant Professor
Paul Goddard	Assistant Research Scientist	David Polly	Professor <i>Department Chair</i>
Ginny Gong	Assistant Professor	Shelby Rader	Assistant Professor <i>Director, SIRF</i>
Michael Hamburger	Professor	Peter Sauer	Assistant Scientist <i>Assistant Director, SIRF</i>
Ed Herrmann	Senior Research Scientist	Juergen Schieber	Professor
Claudia Johnson	Professor <i>Herman B. Wells Professor</i>	Arndt Schimmelmann	Senior Scientist
Kaj Johnson	Professor <i>Judson Mead Professor</i>	Paul Staten	Associate Professor
Julia Kelson	Assistant Professor	Andrea Stevens Goddard	Assistant Professor <i>Lee J. Suttner Professor</i>
Elizabeth Kenderes	Lecturer	Brian Yanites	Associate Professor <i>Robert R. Shrock Professor</i>
Chanh Kieu	Associate Professor	Chen Zhu	Professor
Cody Kirkpatrick	Senior Lecturer		
Ben Kravitz	Assistant Professor		
Chusi Li	Senior Scientist		
David Lilien	Assistant 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

this is
who we are

POST-DOCS + RESEARCH ASSOCIATES

- Eric Barefoot Post-Doctoral Research Fellow
- Eyal Marder Post-Doctoral Research Fellow
- Aleksandr Marfin Post-Doctoral Researcher
- Hue Nguyen Post-Doctoral Researcher
- Jovanka Nikolic Post-Doctoral Research Associate
- Ruiguang Pan Post-Doctoral Research Associate
- Sinclair Zebaze Post-Doctoral Fellow
- Alex Zimmerman Post-Doctoral Research Associate

STAFF

- Cami Albers Graduate Services Coordinator
- Ted Boardman IT Manager
- Ruth Droppo Graphic Design | Web 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
- Zalmai Yawar Manager, Flume Laboratory



photo credit: Ruth Droppo

2023-24 ADVISORY BOARD

- Chris Canfield Colorado DNR
- Stan Carpenter Colonial Pipeline Company
- Pete DeCelles University of Arizona
- Joel Degenstein EP Energy (retired)
- Robert T. Duncan One Atlas
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- P. David Polly Professor and Chair, DEAS
- Tom Skirvin Skirvin Geoscience Consulting
- Todd Thompson Director and State Geologist, IGWS

For the 2023-2024 academic year we had 15 new incoming graduate students. This was the largest class in the last ten years. In the last 3 three years, applications to the DEAS graduate program have increased ~50 %.

this is
who we are

2023-24 GRADUATE STUDENTS and their advisors

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

new faces

We welcome Assistant Professor **Julia Kelson** who joined the DEAS faculty in January 2024.

Julia's research uses Earth's past to reveal dynamics of the climate system and includes the study of chemical and hydrological processes in the modern critical zone. Her primary work on soils and paleosols, which are the skin of the Earth and record interactions between the atmosphere, the hydrosphere, and the biosphere, makes use of stable isotope geochemistry.

Julia is currently establishing her lab with the capabilities to measure clumped and triple oxygen isotopes of carbonates. Together, these novel stable isotope techniques offer information about surface temperature and water stress in geologic time. Clumped isotope thermometry (Δ_{47}) emerged in the mid-2000s as a powerful method to directly measure growth temperature of carbonate minerals. It has now become a reliable thermometer, and is widely used across the geosciences, including in studies of paleoclimate, paleo-altimetry, diagenesis, and fluid flow.

Julia's lab will use clumped isotopes to investigate surface temperature on Cenozoic and Quaternary timescales. Triple oxygen isotope geochemistry ($\Delta^{17}\text{O}$) is a relatively new field as mass dependent fractionation was first noted as useful and measurable in waters the mid-2000s but measuring $\Delta^{17}\text{O}$ of carbonates with sufficient precision has proven to be technically challenging. The ability to constrain the magnitude of evaporation via $\Delta^{17}\text{O}$ in soils and lakes has huge potential for improving our understanding of paleo-hydrology from the perspective of arid, terrestrial environments. The future custom-built $\Delta^{17}\text{O}$ lab at IU will utilize a novel laser spectroscopy technique to make fast and precise measurements of ^{17}O directly in CO_2 derived from carbonates.

Julia is looking forward to recruiting graduate students for the coming fall to join her in laboratory work and field-based research in the Mojave Desert, California and the Jornada Basin, New Mexico.

Julia Kelson sampling for soil water and soil carbonate in the Mojave National Preserve, California, as part of an ongoing, NSF-funded research project into the formation processes of soil carbonate. Julia was surprised to learn that soil carbonate forms mid-winter in the Mojave.



Julia Kelson points to Holocene calcic soil in Reynolds Creek Experimental Watershed, Idaho. Studying near-modern calcic soils is critical to inform our paleoclimate interpretations based on their stable isotope compositions.



photo credit: Julia Kelson



Assistant Professor **David Lilien** started in DEAS at the beginning of 2024, together with his wife, Assistant Professor **Julia Kelson**.

As a glaciologist, David is primarily interested in the flow of Earth's ice sheets. The flow patterns largely determine the ice sheets' response to changes in climate since faster flow causes changes to spread more rapidly.

David works with numerical models, remote sensing, and field data to understand how ice sheets respond to changes at the ice-ocean or ice-atmosphere interface. His recent work focused on translating the small-scale physics of ice deformation to the ice-sheet scale to understand how processes related to the orientation of individual ice crystals affect the flow of the ice sheets.

David will study how the softness of ice shelves (i.e., floating extensions of glaciers) affects how shelves restrain the ice upstream and prevent sea-level rise, and how ice-penetrating radar can be used to better understand ice flow.

photo credit: David Lilien



1 photo credit: Paul Goddard



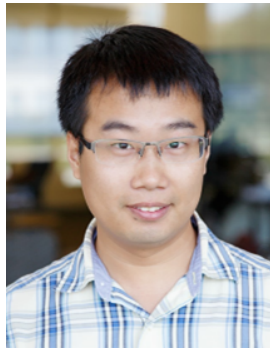
2 photo credit: Ruth Droppo

1. **Paul Goddard** joined the faculty as Assistant Research Scientist.

2. Our freshly-minted PhD **Zalmay Yawar** joined the staff as Flume Lab Manager on August 1.

FOUR POSTDOCS STARTED SINCE THE FALL SEMESTER BEGAN

photo credit: Ruigang Pan



Ruigang Pan in **Chen Zhu's** group joined our department in May 2023. His research mainly focuses on the thermodynamics and kinetics of fluid-rock interactions. He is developing an internally consistent thermodynamic database for modeling rare earth element minerals and aqueous species. He is also working on the experimental study of the reactivity of the mineral zircon, using isotope doping and SIMS technologies.

photo credit: Zebaze Sinclair



Zebaze Sinclair is working in **Travis O'Brien's** group on the diurnal to inter-annual variability of coastal fog in an effort to understand the relationship between the frequency of synoptic disturbances and the occurrence of coastal fog in a warming climate.

photo credit: Sasha Marfin



Sasha Marfin in **Shelby Rader's** group studies continental flood magmatism and associated Cu-Ni-PGE sulfide deposits by traditional and non-traditional stable isotope systems.

photo credit: Hue Nguyen



Hue Nguyen in **Chanh Kieu's** group focuses on modeling hurricane development and rapid intensification.

FROM
COLLEGE
OF ARTS +
SCIENCES
NEWS:

Old World monkey skulls shed light on brain evolution

The findings may provide insights into how the brain evolves during periods of significant climate change.

Thirty million years ago, the landscapes of northern Africa underwent a transformation. Dense, leafy canopies yielded to grassy savannas due to droughts, temperature fluctuations, and a decline in atmospheric carbon dioxide. As the environment changed, so did the animals that called it home.

In a recent publication in the *Journal of Mammalian Evolution*, Alannah Pearson, a doctoral candidate at the Australian National University, and **David Polly** explored the case of one such family: Cercopithecidae, or Old World monkeys. These primates are named for the geographic regions they once inhabited: stretches of Africa, Asia, and Southern Europe formerly called the 'Old World' by European colonizers. The researchers found that the temporal lobe of the brain, responsible for functions such as facial recognition and language, increased in size in these monkeys at key stages between 30 to 40 million years ago.



photo credit: Ruth Droppo



*scan or click to read
the whole story*

Back to the basics and the basics of backs: researchers study the evolution of mammalian spines

*The bones of early mammals reflect the diversity of ways they moved, but current locomotor categories do not. Our alumna **Anne Kort** is working to change that.*

The box of lumbar vertebrae had already been on quite the trek. Housed in the University of Wyoming, they were shipped cross-country to Bloomington and were now scaling up the Midwest in the trunk of Anne Kort's car to Minneapolis.

Kort was on her way to the University of Minnesota to analyze the bones with a micro-CT scanner in hopes of understanding how early mammals moved. Outside, temperatures approached freezing, too cold for 20-million-year-old bones. So, the 2023 IU PhD awardee stopped at her mother-in-law's home in Madison, Wisconsin, for the night. The next morning, she and the bones bid her host goodbye and carried on with their journey to the CT scanner.

What she found from those 3D scans —and from scans of 48 other species— was that placental mammals had varied shapes of lumbar vertebrae that allowed them to move in specialized ways and that this range of motion likely developed earlier than previously thought. Kort's findings, published in the *Evolutionary Journal of the Linnean Society*, encourage researchers to think differently about how early mammals may have moved and to reconsider traditional locomotor classifications.

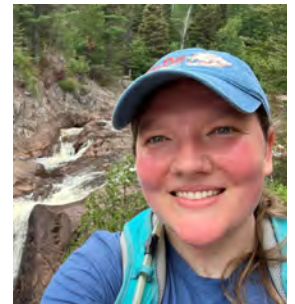


photo credit: Anne Kort



*scan or click to read
the whole story*

FROM STANFORD UNIVERSITY DATABASE:

Updated science-wide author databases of standardized citation indicators

Thirteen of our faculty, adjunct faculty, and emeriti are mentioned for their top 2 % citation statistics in Stanford University's October 2023 "Updated science-wide author databases of standardized citation indicators" (Ioannidis, John P.A., 2023), Elsevier Data Repository, V6.

The number 13 for our comparatively small department comes close to the number of top 2-percenters of the entire IU School of Education. For the calendar year 2022, our department's worldwide ranking of the top 2 % in alphabetical order is in the table.

[Read the report](#)

	first year	last year	rank (ns)
Bish, David L.		2022	17,916
Brassell, Simon C.	1978	2022	109,348
Churchfield, Matthew	2006	2023	165,503
Dilcher, David L.	1963	2022	43,737
Edmonds, Douglas	2007	2023	78,753
Li, Chusi	1991	2023	87,029
Mastalerz, Maria		2022	27,975
Murray, Haydn			43,859
Polly, David P.	1993	2023	65,209
Ripley, Edward M.			61,571
Schieber, Juergen	1986	2023	10,616
Schimmelmann, Arndt	1983	2023	55,375
Zhu, Chen	1991	2023	97,056

FROM NATURE SCIENTIFIC REPORTS:

First publication funded by the Lee J. Suttner Professorship identifies cratonic basins as barrier to continental sediment transport

Assistant Professor **Andrea Stevens Goddard**'s group recently published a paper entitled "Cratonic basins as effective sediment barriers in continent-scale sediment routing systems of Paleozoic North America" in the prestigious journal *Nature Scientific Reports* (vol. 13, article number 11126, published July 10th, 2023).

[Read the article](#)

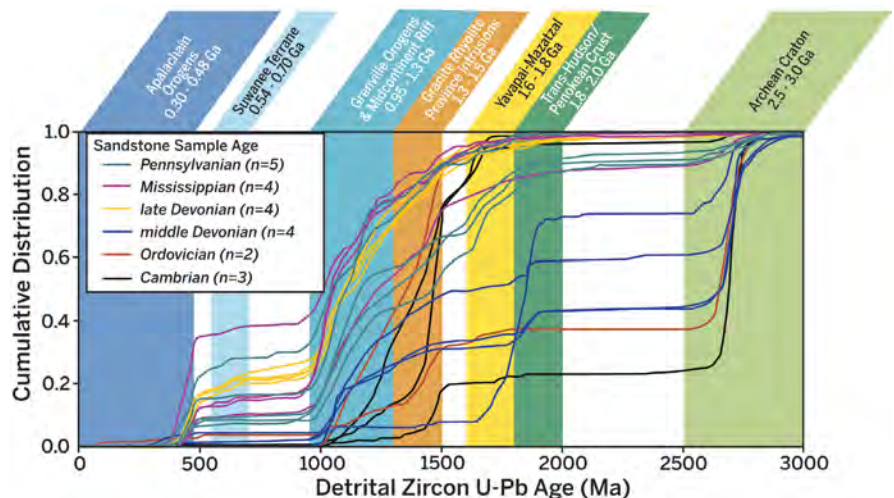


photo credit: Andrea Stevens Goddard

The research by Andrea, her former postdoc **Olivia Thurston** (now a Visiting Assistant Professor at Norwich University) and undergraduate student **Jack Stewart** (BSc 2023, now a geologist at Quantum XL) was funded in part by the Lee J. Suttner Professorship and is the first publication supported by this endowment.

The study used provenance data from cratonic basins in North America to investigate sediment routing systems in the midcontinent throughout the Paleozoic and discovered that cratonic basins serve as effective sediment barriers that prevent mixing within and across basins from tens to hundreds of millions of years.

Cumulative density plot of compiled uranium-lead detrital zircon ages from Paleozoic strata in the Michigan Basin. Contemporaneous samples in Cambrian, Ordovician, and middle Devonian strata show intrabasinal differences in provenance sources whereas late Devonian, Mississippian, and Pennsylvanian samples converge on a common provenance signature.



FROM
COLLEGE
OF ARTS +
SCIENCES
NEWS:

“Research by IU scientist Juergen Schieber provides new insights into the potential for early steps of biological evolution on Mars”

In early September, Professor **Juergen Schieber**'s research was highlighted in the College of Arts + Sciences Newsletter.

Juergen Schieber provided new insights into the potential for early steps of biological evolution on Mars that were published in the prestigious scientific journal *Nature*. The article concludes that the martian surface once had sustained high-frequency wet-dry cycles, not just sporadic wet moments caused by rare events.

Quoting College of Arts + Sciences News: “That the planet Mars had habitable surface environments early in its existence has been firmly established by the scientific community. These environments provided water, energy sources, elements like carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur, as well as critical catalytic transition metals associated with life as we know it. However, whether that potential stimulated further progression towards the independent evolution of life on Mars is unknown.

A team of scientists comprised of **Juergen Schieber**, a Professor in the Department of Earth and Atmospheric Sciences within the College of Arts and Sciences at Indiana University Bloomington, and colleagues on NASA's Curiosity Rover mission, uncovered the first tangible evidence for sustained wet-dry cycling on early Mars. The latter condition is considered essential for prebiotic chemical evolution, a stepping-stone towards the emergence of life.”

[Read the Nature article](#)

[Read the College article](#)

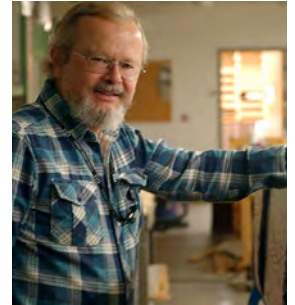


photo credit: Ruth Droppo

FROM
ENVIRONMENTAL
RESILIENCE
INSTITUTE
NEWS:

IU researcher studies carbon-trapping mineral systems

Quoting Environmental Resilience Institute News: “An Indiana University researcher is investigating critical geochemical processes that trap carbon dioxide in rock to better predict the potential for atmospheric carbon removal and storage at scale.

‘It’s become clear that we must do more than just reduce global emissions,’ said **Chen Zhu**, an affiliate of the IU Environmental Resilience Institute. ‘No current technologies, however, have demonstrated the ability to capture

and store CO₂ at the necessary gigaton scale, though several show promise.

New insight into the chemical processes that dictate CO₂ mineralization could help accelerate the development of these technologies to meet society’s urgent need.’”



photo credit: Chen Zhu

“We are training students to do cutting-edge research and to be employable for the new ‘climate tech’ industry.” *Chen Zhu*

[Read the ERI news article](#)

FROM
THE NEW
YORK TIMES
MAGAZINE:

“The trillion gallon question: extreme weather is threatening California’s dams. What happens if they fail?”

Arndt Schimmelmann’s research on paleofloods in the Santa Barbara Basin laminated sediment was mentioned in terms of “ingenious series of experiments examining what’s known as the paleoflood history of California” in the January 25th issue of the Sunday *New York Times*’ cover story “The Trillion Gallon Question.”

Read the article in the [New York Times Magazine](#)

Requires a subscription.



photo credit: Ruth Droppo

FROM
THE JOURNAL OF
GEOPHYSICAL
RESEARCH:
ATMOSPHERES

“Stratospheric aerosol injection can reduce risks to antarctic ice loss depending on injection location and amount.”

Assistant Research Scientist **Paul Goddard** and Assistant Professor **Ben Kravitz** published a study where they show how climate engineering might impact Antarctica. The study was published in the *Journal of Geophysical Research: Atmospheres*.

Paul explained that “exploring ways to reflect sunlight into space before it is absorbed into Earth’s climate system could help buy us more time to address climate change and avoid or delay climate tipping points, such as collapse of the West Antarctic Ice Sheet.”

[Read the article](#)

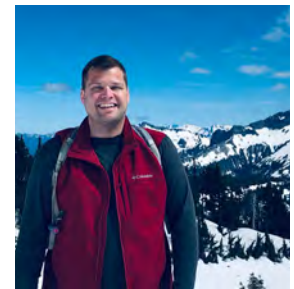


photo credit: Paul Goddard (upper), Ben Kravitz (lower)

FROM
COLLEGE
OF ARTS +
SCIENCES
NEWS:

IU research collaboration uncovers earliest evidence for farm fields in Indiana more than 1,000 years ago

Senior Research Scientist **Edward Herrmann**’s research on first farming in what is now the state of Indiana was featured on the College of Arts + Sciences’ news website. The evidence came from analysis of soil structures and sediment grain analysis, for example structurally preserved hoe marks. It pushes agriculture back for more than 1,000 years at the Angel Mounds site in southern Indiana.

[Read the article](#)



photo credit: Ruth Droppo

**FROM
THE IU
NEWSROOM:**

McCormick's Creek tornado aftermath 'tree throw' and its effect on soil

After a tornado leveled trees in a south-central Indiana state park last year, an Indiana University professor began studying the forever-changed forests to conduct first-of-its-kind research on natural disasters' impact on the environment.



On the evening of March 31, 2023, McCormick's Creek State Park in Spencer, Indiana, was hit by an EF-3 tornado hurling 138 mph winds. More than 280 acres of the 1,961-acre park were seriously damaged, and two people died in the park's campground. **Brian Yanites**, an associate professor of earth and atmospheric sciences in the College of Arts and Sciences at IU Bloomington, drove to the park and saw hundreds of destroyed trees.

Brian Yanites is an Associate Professor of Earth and Atmospheric Sciences in the College of Arts and Sciences.

Yanites, who studies how the Earth's surface and topography are shaped by atmospheric and geologic processes, and his colleague **Doug Edmonds** had just been awarded a grant from the National Science Foundation to establish a process for mapping tree throw, or the deep depressions made in soil once a tree is uprooted by extreme atmospheric events, and to investigate the implications it has on the surrounding soil and biosphere. What happened at McCormick's Creek State Park would give them an important opportunity to do so.



photos credit: Brian Yanites

[Read the article](#)

**FROM
NATURE
COMMUNICATIONS:**

"Anthropogenic aerosols mask increases in US rainfall by greenhouse gases"

Mark D. Risser, William D. Collins, Michael F. Wehner, **Travis A. O'Brien**, Huanping Huang, Paul A. Ullrich

Quoting the article in Nature: "A comprehensive understanding of human-induced changes to rainfall is essential for water resource management and infrastructure design. However, at regional scales, existing detection and attribution studies are rarely able to conclusively identify human influence on precipitation. Here we show that anthropogenic aerosol and greenhouse gas (GHG) emissions are the primary drivers of precipitation change over the United States. GHG emissions increase mean and extreme precipitation from rain gauge measurements across all seasons, while the decadal-scale effect of global aerosol emissions decreases precipitation."

[Nature Communications article](#)



photo credit: Travis O'Brien

honors + awards

The EAS Leadership Through Chaos Award

Professor **P. David Polly** received “The EAS Leadership Through Chaos Award” for his successful navigation through covid, the renovation of the geology building, and otherwise turbulent times as our intrepid Departmental Chair. This fabulous award comes with massive symbolism -- including what seems like a 20+ lb weight, a heavy chain, a Lorenz chaos attractor, and abundant fossils in a Salem Limestone block.



Isabelle Caban awarded Advancing Diversity scholarship

Our new MSc student **Isabelle Caban** has been awarded a merit-based scholarship for Advancing Diversity in the Geoscience Profession from the American Geosciences Institute. This competitive scholarship provides \$5,000 to support an underrepresented minority student for their transition into a geoscience graduate program. A recent recipient of a BSc degree in geology from Amherst College, Caban began her graduate work at Indiana University Bloomington in the Fall of 2023.

Her research interests include volcanoes, landslides, and the long-term consequences they pose as natural hazards. “As a first-generation, low-income student, I felt a lot of anxiety about entering a master’s program in a new state far from home, where I didn’t have an established community,” said Caban. “This award allowed me to focus on adjusting to my new life without additional stresses of financial security. The award also provides participants with a network of people who are dedicated to advancing diversity in geosciences, providing us with an opportunity to engage in meaningful conversations about diversity in our field.”



photo credit: Isabelle Caban

educa- tion + public outreach

science rocks

In September, DEAS gave strong support to WonderLab's "Science Rocks" fundraiser at the Woolery Mill in Bloomington. Our amazing student volunteers **Owen Madsen**, **Sayan Das**, **Kirsten Hawley**, **Kenia Caro**, **Nicolas Castro Perdomo**, **Jenni Hurst**, **Elizabeth Sherrill**, and **Anupama Chandroth** wowed visitors with their geological, paleontological, and seismological prowess. **Terry Stigall** provided amazing geophysical equipment, and **Nick Toth** and **Kathy Schick** shared wonders of the Stone Age Institute collection. **Jess Miller-Camp** shared treasures of the Paleo collection, while **Shelby Rader** displayed contributions from the IU Min/Pet collection. The heroine of the night was our own **Elizabeth Kenderes**, who rocked the house from the big stage.



Lilly Library



On September 10th, 2023 Indiana University's Lilly Library invited a group of our departmental colleagues to take a close look at a special collection of antique books.

photos credit: Michael Hamburger

educa- tion + public outreach

EAS E490/G690 Environmental and Energy Diplomacy

In collaboration with the U.S. State Department and the U.S. Consulate in Vancouver, Professor **Michael Hamburger** taught the class “Environmental and Energy Diplomacy” as E490/G690. The special topic of the class was “Disaster Risk Reduction in Canada”.

The intersection of environmental science, public policy, and diplomacy brought together students from the sciences, policy studies, and international relations to explore practical applications to U.S. Foreign Policy. Students presented their research at a virtual U.S. State Department symposium to the Minister Consular for Consular Affairs for Canada and the desk officer in charge of Overseas Citizens Services for Canada.



Exploring Environmental Change with Galapagos Teachers

Professor **Michael Hamburger** had an unexpected opportunity to take a break from Indiana winter weather and work with teachers in the Galapagos Islands, Ecuador.

The Galapagos, famous for Charles Darwin’s groundbreaking discoveries on the voyage of the Beagle nearly two centuries ago, is a natural laboratory for environmental change—tectonic, volcanic, geomorphic, and, of course, biological.

This program, sponsored by IU’s Office of the Vice President for International Affairs (IU Global), is the direct outgrowth of an innovative science professional development program led by Hamburger since 2017.

Educating for Environmental Change (or EfEC, for short) is the product of a successful collaboration with Adam Scribner, Director of STEM Education at IU’s School of Education and a host of IU science faculty members, introducing middle- and high-school science teachers to the science and policy of climate change.

photo credit: Michael Hamburger



Meeting with USFQ rector, GSC director, and staff.



Welcome dinner meeting in San Cristobal hosted by USFQ rector and colleagues.



Tour of Tomas de Berlanga school.

Exploring Environmental Change with Galapagos Teachers

Hamburger and Scribner visited two of the Galapagos islands (San Cristobal and Santa Cruz islands), together

with Molly Fisher, director of IU Global's Mexico Gateway. Their visit included meetings with the Rector (president) and faculty of the Universidad San Francisco de Quito, an important new international partner for IU, along with the Galapagos Science Center, the Charles Darwin Research Station, and teachers and administrators from the Tomas de Berlanga School in Santa Cruz Island, Galapagos.

The trip centered on a three-day professional development workshop for teachers at Tomas de Berlanga, an international school that focuses on conservation, social development, and global citizenship, conducted in collaboration with the School of Education at USFQ. The trip included organizational and planning meetings with USFQ and GSC staff, and tours of facilities at USFQ and Darwin Station.

The three-day teacher professional development workshop at Tomas de Berlanga included topical sessions on environmental science and policy, led by Adam Scribner and Michael Hamburger. In addition to other activities, Hamburger established a digital seismograph station at the school, where teachers can observe local and global seismic activity and collaborate with teachers operating educational seismographs from around the world.

Of course, the week-long trip also offered an opportunity to explore the remarkable volcanic landscapes of the Galapagos, and the extraordinary endemic species that inhabit it, from the ancient land tortoises to the marine iguanas and diverse bird life. With luck (and some funding!) we are hopeful that this trip will lead to long-term collaborations with our new Ecuadorian partners!



Teachers collaborate on the "Toxic Popcorn" icebreaker exercise.



Teachers examine a model ice core, used for teaching climate change science.

Michael Hamburger introduces the Raspberry Shake educational seismograph to TdB physics teacher.



Michael Hamburger leads a field observation activity with TdB teachers.



Meeting with Charles Darwin Research Station Scientific Director Maria Jose Barracos.



Group photo with USFQ and TdB school staff.



Adam Scribner leads a workshop exercise.



Group photo with TdB teachers.



photos credit: Michael Hamburger

field COURSES

news from the

IU GEOLOGIC FIELD STATION



It is quite remarkable that we are here and able to be looking forward to our 75th season this summer! What an accomplishment by all those who have taught and attended classes at the Field Station. It is also exciting to note we have new faculty with strong interests in learning the ropes and continuing the educational mission of the program.

As part of the celebration, we are looking to put together some images and statements of how the field camp experience impacted your careers! We are hoping to fill in some of the missing class rosters and any photographs from the 1950s and 1960s. If you would be willing to share any high-resolution scans from your archives, that would be wonderful. They can be emailed to IUGFS@indiana.edu along with any notes or comments about the photos that you would like to share.

We also hope you would be willing to share your statements of how the field camp experience impacted your own careers. You can upload your comments on the form "[Reflections from 75 years in the field.](#)" You can access the form by clicking the link or scanning the QR code below.

We think it is important to share these perspectives with future students looking ahead toward their careers. The AGI report "*Critical workforce skills for bachelor-level geoscientists*" lists 'field skills' as the most important skill employers are seeking based on analyses of over 3600 job advertisements (Shafer et al., 2023). First-hand accounts and examples like yours go a long way toward making it real to our students and help them see themselves.

[Read the AGI report](#)

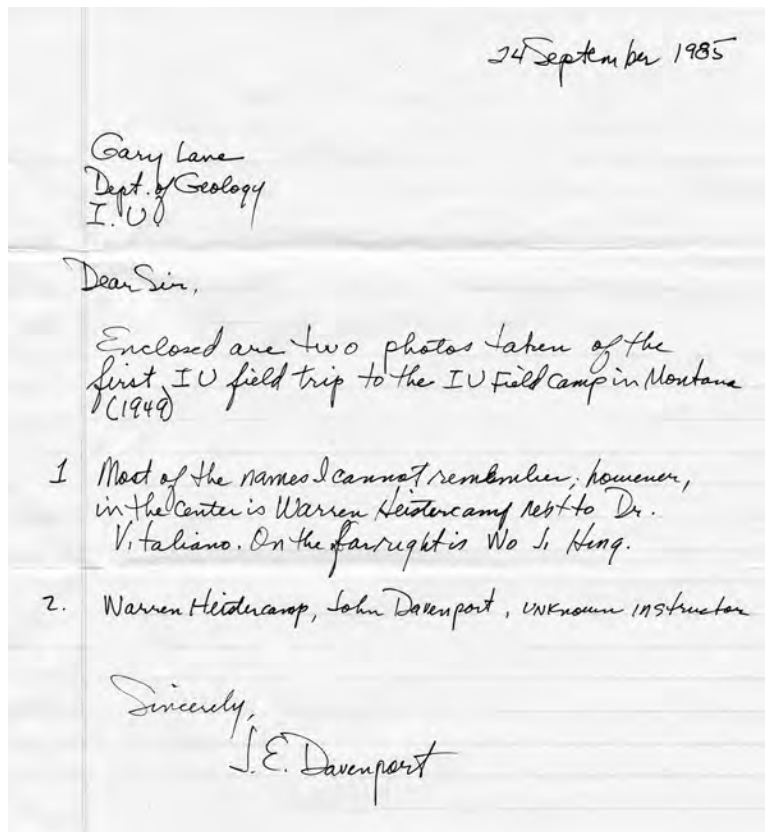
We look forward to hearing from you, thank you!

A handwritten signature in black ink, appearing to read 'Erika Elswick'.

Erika Elswick
Director, Indiana University Geologic Field Station

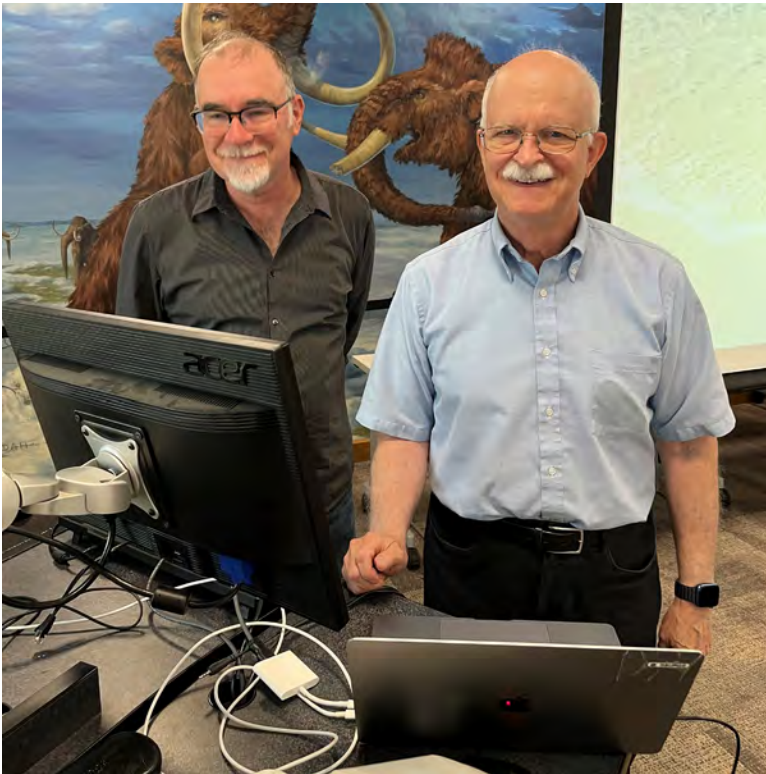


*scan or click to
go to the form*



Letter text: "Enclosed are two photos taken of the first IU field trip to the IU Field Camp in Montana (1949). 1. Most of the names I cannot remember, however, in the center is Warren Heistercamp next to Dr. Vitaliano. On the far right is Wo Ji Heng. 2. Warren Heistercamp, John Davenport, unknown instructor." Sincerely, J.E. Davenport, 1985

news + events



A special seminar entitled Exploring Mars for Evidence of Life-Sustaining Environments on September 14th featured our alumnus **David J. Des Marais** (PhD 1974), a retired Research Scientist at the NASA Ames Research Center, Moffett Field, California. David has studied both living communities of microorganisms and their ancient fossil records. He has investigated the chemistry of carbon in meteorites, lunar samples, and volcanic rocks and ancient sediments on Earth. David was our departmental Owen Awardee in 2008/9. The new picture of David contrasts with a picture taken by late professor John M. Hayes (Biogeochemistry) nearly 50 years ago in 1974/75. That picture shows David on the right near our Professor Emeritus **Abhijit Basu** (PhD 1975) on a late Friday afternoon discussing analyses of lunar soils in the then Gas Chromatography Laboratory near the southern end of the 3rd floor in the geology building.

photo credit: Arndt Schimmelmann

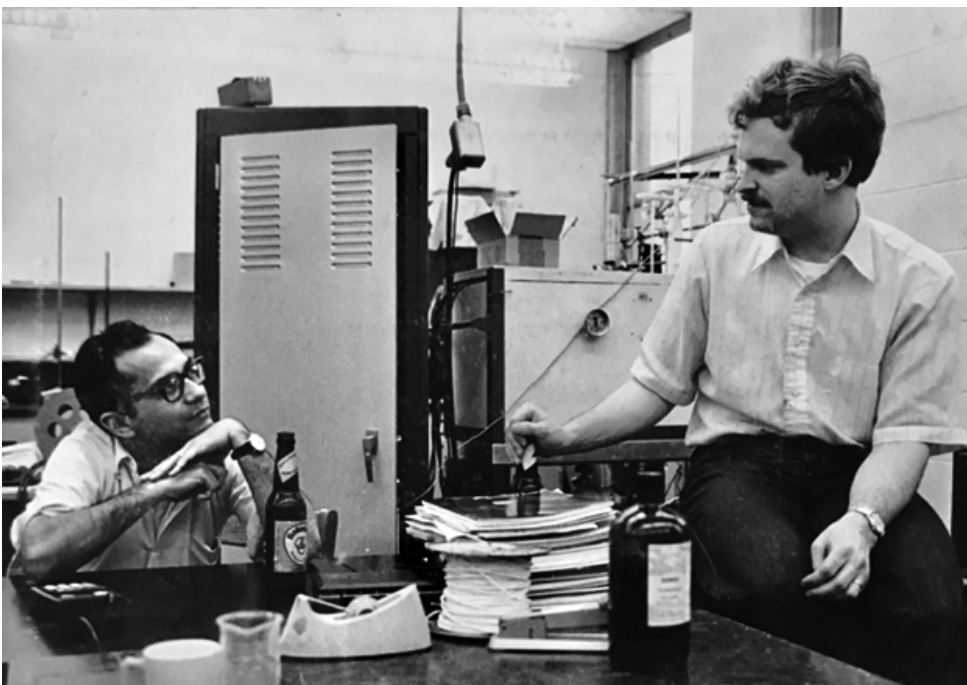


photo credit: Abhijit Basu



photo credit: Ruth Droppo

Abhijit Basu

Professor Emeritus **Abhijit Basu** left a legacy of his own prehistoric pipes in the Owen Room that had found abundant use during male-dominated faculty meetings up to the 1970s.

In his defense, Basu noted that the image of one battery of his long-unused pipes is a testament to his abandonment of cultivating a professorial image. After all, “I did not inhale” (apologies to William Jefferson Clinton). Also, there is historic precedent that such images may be deceiving the reader. “Ceci n’est pas une pipe” (Magritte, 1929; <https://www.renemagritte.org/the-treachery-of-images.jsp>).



photo credit:
Arndt Schimmelmann

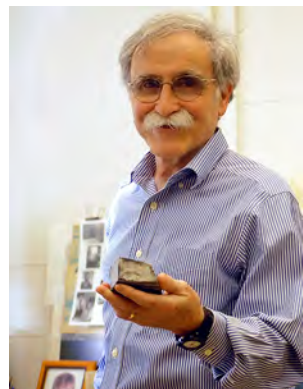


photo credit: Ruth Droppo

Enrique MERINO

I wish I could remember the dates of my best years and of my worst years in the department.

I am glad 2023 is over: Last August I gave a talk at a meeting in Japan which was a flop, then I was infected with mild COVID, and then the COVID became long COVID – to judge by its main consequence, brain fog, which doesn’t let me finish a manuscript (on mineral replacement) which I’ve been working on for years.

I am looking forward to 2024. Our two sons live far away, one in southern Mexico, the other in northern Germany. We have had to implement a plan of yearly travels to Oaxaca and Hamburg to see our grandchildren.

-Enrique



photo credit: Ruth Droppo

Lee Suttner

Professor Emeritus **Lee J. Suttner** reminisces after residing for 58 years in the Geology Building

My career on the faculty of the Department of Geology (i.e., its initial name) at Indiana University began at the start of the 1966 Fall semester. It had been less than a full year since the end of construction of the Geology Building. With the passing of Thomas E. Hendrix in October 2023, I remain as the last living faculty and staff member among the group of about 25 who were here upon my arrival. Except for our still living and beloved 101-year-old Henry Gray, staff geologist for the then Indiana Geological Survey, I could claim to be the oldest remaining person in the entire Geology Building, including those in the Indiana Geological Survey. And I have essentially outlived the first edition of the Geology Building itself, after its renovation a few years ago. I am not sure if I should be happy, or I should be sad!

I settled into my first office located on the second floor. I have since occupied six other offices on all floors below the library, except the fourth. I guess my quantitative skills were not sufficient to qualify me to reside in the neighborhood of the geophysicists and hydrogeologists.

Fortunately, I could walk the stairs. Consequently, I did not have to confront the challenging decision about which of the two elevators to use. One worked. One didn’t. Professor John Droste had mounted a Foucault pendulum in the second one to demonstrate to students that the Earth was rotating, not perhaps just their heads suffering from their not-so scholarly activities the night before.

Lee
Suttner

Faced with a limited budget for the construction of the Geology Building, the Chair had opted for a sixth floor for the Geology Library while foregoing cosmetic touches like paint for interior walls. As in all offices, except for the Chair's, my cement cinder-block walls lacked paint and my cement floors lacked tile. (No carpet like today? Are you kidding?) Perhaps cement needed to be all over to constantly remind us geologists of the importance of Earth materials in construction.

My office furniture was somewhere between old and antique. And to this day, 58 years later, never have I ever asked for, or had anything new delivered to my office — desk, chair, bookshelf, lamp etc. I am not sure how long I will have my current office, but I expect to continue what must be a record for that particular interior decorative nuance. Happily, my current furniture is closer to old than antique.

My first faculty meeting was held in a small conference room a couple of doors down the hall from the Chair's first-floor office. Walking into the room, I was scared. Really scared. I felt like a petite timid mouse walking into a room full of unfed, mostly elder cats. Smoke and pipes were ubiquitous. Women, not so. Well, there were none except for Bea Banfill, a secretary recording minutes of the meeting. I know it is not politically correct to use the "secretary" title today, but it was the only title used for women on the staff in those days. All of us had on coats and ties, except Bea.

I chose to sit next to Professor Bill Thornbury. Just 6 to 7 years earlier, I had purchased his newly published and widely acclaimed textbook used in my undergraduate geomorphology course. In my mind he was next to God. And now I was his colleague. In contrast, I chose to sit as far away as possible from Professor Wayne Lowell. A few years earlier in Montana, in rather salty language Wayne had scared the hell out of me and predicted that I lacked the whatever to become a geologist. But Bill had the personality of a gentle, warm and loving grandfather like whom I hoped I would become later in life. More importantly, I knew he loved basketball. So did I. A few months earlier, each faculty member had interviewed me during my job application process. Bill and I had talked for nearly an hour — about 15 minutes on aspects of my application, because I think he had to, and 45 minutes about basketball. I get emotional thinking about how much I loved that man and that interview.

Sitting around the 20 ft long oblong conference table were the remaining faculty members. Professor John Patton, Department Chair and then State Geologist and Director of the Indiana Geological Survey, was leading the meeting from the head of the table. Sitting around the table were the rest of the faculty. They included the older bucks — Thornbury, Mead, Perry, Blakely, Shaver, Beck, Vitaliano, Meinschein, and Lowell. The more mid-career faculty included Potter, Rudman, Hattin, Hendrix, and Droste. Recent hires in addition to me were Dodd and Towell. Horowitz, the paleontology curator, might have been there but I do not recall for sure. In those days it seemed like the Department was going through hydrogeologists like little kids go through M&M's, so I may have forgotten one or the other. Also, I may have missed someone, but if so, I am sure the Straws or Gibsons among our alums will remind me of an embarrassing omission.

I remember only one topic discussed at the meeting. I recall John Patton announcing the committee assignments. He had appointed me Chair of the Undergraduate Studies Committee. I was petrified. Only five years earlier, I was an undergrad! Now I was going to be in charge of all undergraduate affairs.

I am sure no one could tell any stories about me, but I am equally sure I could tell a story or two about each of the above. A visit from one or more of you would catalyze my memory. If on campus, please stop by and reminisce. I would love to see each and every one of you. And remember, memories are blessings.

Lee J. Suttner

spring 24 colloquia +



January 22: iDEAS Seminar

Speaker: Isabelle Caban, MSc student, studying with Brian Yanites

Title: *ADI geoheritage and oil drilling in PA*

Speaker: Kaj Johnson, Professor DEAS

Title: *Uh-oh. It's looking like locked areas change over time on the Hayward Fault*

January 29: iDEAS Seminar

Speaker: Gary Pavlis, Professor Emeritus DEAS

Title: *New insights on the tectonics of alaska region from a synthesis of earthscope seismic imaging results*

February 5: iDEAS seminar

Speaker: Charles Salcido, PhD student working with David Polly

Title: *Can you eat well in Flatland?*

Speaker: Travis O'Brien, Assistant Professor, DEAS

Title: *Atmospheric rivers in the Midwest!*

February 12: EAS Colloquium Series

Speaker: Dr. Corinne Meyers, Associate Professor University of Minnesota

Title: *Revisiting the mechanisms and thresholds of mass extinctions*

February 19: EAS Colloquium Series

Speaker: Dr. Laura Wallace, Helmholtz Professor Research Div. Dynamics of the Ocean Floor GEOMAR and Christian-Albrechts-Universität zu Kiel

Title: *Near-trench crustal deformation at the Hikurangi subduction zone from a decade of seafloor geodetic experiments: implications for shallow megathrust behavior*

February 26: iDEAS Seminar

Speaker: Dr. Bei Liu, Research Geologist, IGWS

Title: *Organic matter in black shales: Accumulation, thermal maturation, and contribution to the pore system*

March 4: EAS Colloquium Series

Speaker: Dr. Jonathon Delph, Purdue University

Title: *Linking heterogeneous expressions of subduction along the Cascadia margin*

Our former faculty member Associate Professor **Thomas E. Hendrix** passed away on 8 October 2023 after a short illness. Tom got his degrees from the University of Wisconsin in the late 1950s and came to IU first as an instructor, then as Assistant and Associate Professor. He taught introductory geology, structure, and tectonics. He further taught at the IUGFS from 1960 to 1968, and most of that time he served as the Field Station's Associate Director. Tom was one of the finest teachers our department has ever had. Many of our older alumni have wonderful memories of their interactions with Tom. He went to Grand Valley State University in Allendale, Michigan in 1978 as a Professor until his retirement, after which he remained active in the field. Tom's most significant recognition for his contributions to Earth science education came in 1994 with the prestigious National Association of Geoscience Teachers (NAGT) Neil Minor Award.



*Thomas Hendrix
image credit: Lee Suttner. Lee received the picture from another faculty member at Grand Valley State University*

[You can read about his life here](#)

Jim Handschy passed away on November 18th, 2023, while hiking in the Grand Canyon. He had walked down to the Colorado River on the Kaibab Trail and was making his way back up to the rim on Bright Angel Trail when he passed. Jim was an alumnus of our field course in Montana and served as Director of the IU Geological Field Station and Professor of Practice in our department from 2015 until 2022. He received his undergraduate and MSc degree at the University of Texas at El Paso, then a PhD at Rice University in 1989 on the structural geology and stratigraphy of the Endicott Mountains in the Brooks Range of Alaska. Jim worked from 1988 to 1998 at Shell, then through 2015 at ConocoPhillips during which he worked around the world, including in Argentina, Malaysia, Colombia, Azerbaijan and Nigeria. In 2019, he was elected a Fellow of the Geological Society of America. Jim was passionate about IU and about the welfare of our department. As Director of the Field Station, Jim was active in fund raising and guided IUGFS through several challenging years, including working with the instructional team to create a completely online version of our field geology course that we continue to run in parallel to the classic field course in Montana. He retired from his role as Director in 2022. Jim is survived by his wife Karen.



*Jim Handschy
image credit: IU Geologic Field Station*

Our 26-year old alumna **Tori Moore** (BSc in Earth Science, 2019) perished along with three others in a helicopter crash on the North Slope where the group was doing field surveys near Utqiagvik in July.

Tori was from Elkhart and double-majored with a BSc in Environmental Science. She was working for the Alaska Department of Natural Resource's Geological and Geophysical Surveys Department as a geologist in hydrology and surficial geology. Tori will be greatly missed by her family, friends, and all of us here.

[Read more about Tori's life.](#)



*Tori Moore
image credit: alaskanewssource.com*

Thomas E. Hendrix
1934-2017

Jim Handschy
1958-2023

Tori Moore
1997-2023

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
Spring 2024 Alumni Newsletter of the
Department of Earth and Atmospheric Sciences

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College of **Arts + Sciences**

to encourage alumni interest in and support for
Indiana University.



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