

Teaching Dossier and Philosophy

Andrew Moore

Teaching Responsibilities (reverse chronological order)

My teaching experience tends towards geomorphology and hydrology, though at Earlham I've also taken on sedimentology and Earth history. During my time at Kent, students asked me to make my lecture notes available to them—the result was a website that Kent maintains to this day (found here: personal.kent.edu/~amoore5/); I think Kent maintains this site because it's used in Wikipedia articles related to sediment transport. Similarly, at Earlham I've moved into a flipped classroom approach to my mid and upper-level classes; the lectures associated with Earth Surface Processes, Hydrology, and Earth History are available on my YouTube channel. I can provide links to anyone interested.

Earlham College (2007-present)

Upper-level classes (times taught): Earth Surface Processes (9), Depositional Environments (8), Hydrology (3), Soils (1), Planetary Surfaces (1)

Mid-level classes: Earth History (16)

Introductory classes: Environmental geology (16), Oceanography (2), Geologic Hazards (2), First-year writing seminars in geology (4)

Kent State University (2002-2007)

Upper-level classes: Hydrology (3), Fluvial Sediment Transport (3), Coastal Processes (2), Field Geology (2)

Introductory classes: Environmental geology (2)

Tohoku University (1999-2001)

Technical English for Hydraulic Engineers (1)

Faculty Seminar (1)

University of Washington (1998)

Fluvial Sediment Transport (1)

Teaching Effectiveness

It's a little difficult for Earlham faculty to document their teaching effectiveness. The Quaker underpinnings of our school cause us to shy away from "unleveling" distinctions like teaching awards; similarly, our course evaluations contain no Likert scales, so our feedback comes entirely in the form of written responses. On the plus side, our Faculty Affairs Committee looks closely at each individual response to our courses during promotion and tenure, and provides written feedback (in the form of a "minute" to the individual faculty member) after each evaluation. In lieu of Likert forms, I am providing my minutes for my 2-year (2009), tenure (2011), and promotion (2019) reviews. My Kent reviews are more familiar and require less explanation.

Earlham also has no internal recognition for outstanding faculty—the closest thing we have is that graduating seniors choose who their graduation speaker will be from Earlham faculty. I was chosen as the graduation speaker by the class of 2011; I was the first natural sciences faculty member chosen in anyone's memory (so far at least the previous 30 years), and the first chosen pre-tenure.

I received awards for teaching at Kent State, at the University of Washington, and (as an undergraduate TA) at Carleton College.

Faculty Affairs Committee
Minute for Andy Moore
December 19, 2008

Faculty Affairs Committee and Student Faculty Affairs Committee have reached consensus to recommend to the President that Andy Moore's contract be renewed. Faculty Affairs Committee has reached consensus on the following minute to be sent to the President. This minute follows discussion with Student Faculty Affairs Committee, but according to established practice, no consensus with SFAC was sought regarding the wording of the minute.

FAC takes special note of Andy's effectiveness as a faculty leader in a department that has been handicapped by a turnover and a leave of absence. Andy filled this gap effectively. Andy identifies with the Geosciences Department, recognizes its history of significant contribution to the college and feels an usually high degree of responsibility for helping the department advance. He has provided this leadership through a heavy load of advising, managing searches for faculty replacements and by focusing on the administrative details needed to advance the program.

FAC also notes the high degree of collaboration in which Andy engaged with colleagues, especially Meg Streepey, as he developed his courses, not as individual containers, but as parts of the fabric of the department's curriculum.

In service to the broader community Andy has assumed important committee responsibilities on the Museum Advisory Committee and the Environmental working Group. He is also active in Science Division work including modifying a course to contribute to the Science Division's Keck grant activities.

Andy has demonstrated quality of mind through his work with student research projects and his own extensive publishing. This included finding a way to take students to Japan to conduct research on ancient tsunamis in Japan.

But of course teaching effectiveness is an essential element of faculty evaluation. FAC takes note that Andy gave up a position with heavy research responsibilities and teaching of graduate students to come to Earlham. At Earlham Andy has found a place where he can pursue his interest in teaching. FAC sees in this file evidence of a strong teacher. He brings enthusiasm, a sense of humor, and hard work to the enterprise which students recognize and appreciate. Andy also gets high marks for effective use of technology in his presentations. We note with appreciation Andy's commitment to field work and the extra effort he makes to arrange and carry out these projects. Students note these as highlights of their courses with Andy.

As noted earlier Andy comes from a research position in which he worked primarily with graduate students. In his self-evaluation he noted the need to adapt his teaching to the needs of undergraduates. These needs include stronger support (than for graduate students) such as clearer up-front explanations of the importance of course material, more

timely feedback on performance, and more explicit integration of classroom material with texts and field work. We encourage Andy to continue his exploration of how to adapt his teaching to these needs of undergraduates.

We also noted in his course evaluations and in his reflection on them in his self-evaluation a tension. He wants to make the courses “his own” and remain flexible but he sees that in conflict with developing course structure and holding students to expectations. We do not believe this tension need exist and we encourage Andy to develop clear goals for his courses which are supported by all activities (lectures, labs, field trips, text, etc.), communicate them to students and hold students to achieving those goals. Given the student-centered orientation of Andy’s pedagogy and his willingness to listen to student feedback, we have confidence that these challenges will be addressed.

In assessing the quality of Andy’s teaching we also note his accessibility outside of class and his willingness to spend time with students. In fact this is part, not just of his teaching, but also his contribution to the community. He provides support for students outside their immediate course work, for example re-establishing the Geosciences Club, as well as their non-academic lives.

Andy is making good progress in the transition from a university where heavy attention is given to research to a liberal arts college which provides a student-centered learning experience. We appreciate these teaching efforts while assuming, often by default, many responsibilities that would usually fall to experienced faculty. When the department is fully staffed with long term colleagues we hope that Andy can share those departmental responsibilities with others and does not have to carry the full load.

Faculty Affairs Committee
Minute on Tenure Recommendation for Andrew Moore
April 2011

Faculty Affairs Committee and Student Faculty Affairs Committee have reached consensus to recommend to the President that Andy Moore be awarded tenure. Faculty Affairs has reached consensus on the following minute to be sent to the President. This minute follows discussion with Student Faculty Affairs Committee, but according to established practice, no consensus with SFAC was sought regarding the wording of the minute.

Andy Moore's initial commitment to Earlham brought him into a department in an almost overwhelming state of flux, and his previous review file revealed a person rising to the challenges before him with aplomb. Faculty Affairs Committee is pleased to note that while Andy is still adapting to major transitions at Earlham and in his domestic life, he no longer seems to feel like proverbial duck in mid-stream—calm above the surface of the water but paddling like mad underneath. The Geology department is now fully staffed with people who clearly work well together; the expanded and redesigned curriculum now draws more majors and prepares all its students more effectively; Andy's growing daughter will soon be old enough that he can commit to some new off-campus adventures. We hope that Andy occasionally stops to recognize and reflect on how much he has accomplished in his time here and that his goals for the next several years allow him to ratchet down from what has clearly been a hectic pace.

Among Andy's recent challenges was the job of teaching courses originally designed by others, in subjects he may not have intended to teach. He was also working to develop courses for non-majors as well as Geology majors at beginning, intermediate and advanced levels of study. His self-evaluation and student evaluations highlight many of the same challenges in each of these contexts. Andy is clear about the pedagogical choices that worked, that needed tweaking, or that should be discarded and replaced. He is also much tougher on himself than students typically are. They praise him for the variety of methods he uses to guide their learning: in-class activities, lectures, labs, paper assignments, journals, posters, and field work when it was possible. They thank him for his ability to meet them where they are and to adapt or redesign elements of a course as they went along, without losing energy or focus. Concerns raised in their evaluations guided him toward useful changes in new or re-designed courses. The accolades for Andy's teaching are numerous and heart-felt: Andy is "simply put, a great teacher" with a "No question is a bad question mentality," who imparts knowledge of waves and "why they knock me down." In short, "Andy rocks."

Andy's file provides ample evidence for his quality of mind. He has produced articles and abstracts and is engaged in a wide range of research projects with students and with colleagues at other institutions, including Kent State, UT Austin, and the Virginia Museum of Natural History. It is especially exciting to see the ways his work draws on connections with colleagues in Japan, given Earlham's long-time interest in Japanese studies.

Andy serves the College in a wide range of ways, as a member of various standing and ad hoc committees, and in helping to draft the Environmental Studies major. He has committed himself, over the next five years, to issues of the General Education curriculum,

assessment, and the role of advising in student life. Andy's love for teaching is equaled or surpassed by his passion for helping students. His advisees marvel at the time he gives them and the wisdom he shares. The chance to do this hands-on work is what drew Andy here, and it is clear that he and Earlham are a good fit for each other.



Academic Dean

**Promotion to Rank of Full Professor
Andrew Moore
May 2019**

Faculty Affairs Committee (FAC) has reached consensus to recommend to the President that Andrew Moore be awarded the rank of full professor.

Andrew Moore has abundantly demonstrated Sustained Teaching Excellence. Colleagues in the Geology Department highlight how adept he is at teaching concepts in ways that stick with students, which helps them make the necessary connections between courses in the major. They also note his skills at introducing the field of Geology to non-majors and even to students who consider themselves not adept at the natural sciences. His pedagogy is noted for its innovation and creativity. Both colleagues and students consistently praise him for the strong rapport he develops with students, and many students credit Andy for having helped them through particularly challenging times in their lives and having prepared them wonderfully for graduate school and careers. Andy has worked hard to help build an even stronger Geology major and has also contributed to the general education program at Earlham by enthusiastically designing a new Earlham Seminar course entitled "John Muir the Geologist." One student wrote that Andy was "one of the greatest teachers I have ever had," and another called him "one of the most influential educators in my life."

Andy has also shown Professional Growth and Development. He arrived at Earlham already known as one of the world's foremost experts in tsunamis, and he has continued to develop his work in tsunamis, natural hazards, and resilience after catastrophic events. Given the urgency posed by climate change, we are grateful to have at Earlham College someone whose expertise is in these particular areas. While his prior area of expertise was in Japan specifically, he has branched out to other areas, including Shetland, Nova Scotia, and Tanzania, and he has conscientiously sought out possible research opportunities for students as well. In Tanzania, his research team was looking for evidence of ancient precursors to the 2004 Indian Ocean tsunami. The colleagues who have joined him in his field research note that not only does he study resilience, but he also models it for his colleagues and peers. Having faced a number of setbacks during their fieldwork in Tanzania, a research colleague noted Andy's "ability in turning a negative situation into a positive one . . . while [also] knitting a nice sweater." He has an extensive publication record, and his contributions to the field of tsunami science are recognized internationally.

With regard to service to the community, Andy's record is unsurpassed. He has been a member of the Early Alert Team; served as Board Observer/Board Liaison; served as Associate Academic Dean for one year; served a term as the Class Dean for Juniors and Seniors; and has served on both the Curricular Policy Committee and Faculty Affairs Committee, both of which are among the most time-intensive and labor-intensive faculty committees.

His colleagues in the Geology Department state that Andrew Moore is an “outstanding teacher, scholar, and community member,” and FAC concurs. We strongly recommend he be awarded the rank of full professor. His presence makes Earlham a richer place.

Sincerely,

A handwritten signature in black ink, appearing to read "S R Thomas", with a stylized flourish at the end.

S. Rebecca Thomas
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A note on Kent's student evaluations:

Kent's system assigns "strongly agree" a rank of 5, and "strongly disagree" a rank of 1, so that higher scores equate to increased student satisfaction. The norms listed in the column adjacent to instructor scores are in classes similar to those of the instructor (*i.e.* large undergraduate lectures are graded against similar classes, and not against small graduate seminars), and within natural sciences departments. Additionally, Kent registers Masters level students into a 6xxxx level class, and PhD into a 7xxxx class of the same number, but only reports one set of evaluations. As a result, because this class had 10 Masters students and 2 PhD students, these evaluations show 10 people registered, but 12 evaluations.

Transcribed comments (all comments from survey included):

The labs were good putting to use what we learned in class.

The fieldtrip was great!

The final project was fun and educational. A good experience.

Excellent use of analogies & visuals to improve student understanding.

I'm looking forward to the learning and mastery I will obtain in fluvial.

I appreciate being given the opportunity to work thru problems repeatedly so that I could master the topic versus just getting the task done w/o the opportunity to retry for a better grade.

The field trip and activities (w/ the trip to Central U.) gave me the opportunity to work in 3D what we discussed and learned in class.

This is a mastery class for learning—I would recommend highly to others.

Field trip helped to understand the concepts.

Very interesting work.

Liked outdoor labs.

Labs in the field were an excellent means to learn.

We actually got to use instruments in the field that are used today, and will help us in our future career.

They [syllabus, textbook, website] were pretty sufficient.

The final project was exciting.

GEOLOGY - Spring 2006

06-28-2006

INSTRUCTOR CALL# DEPT COURSE TITLE
 MOORE 13085 GEOL 62011 HYDROLOGY

INSTRUCTOR REPORT

BLDG ROOM TIME DAYS ENROLLED SURVEYS NORMING GROUP
 MCG 00307 1100AM TR 10 12 Non-LEL Courses

STUDENT ITEMS

- 1 I am taking this course for:
 2 How many classes did you miss?
 3 The grade I expect to receive in this course
 4 What is your current KSU Grade Point Average?

MAJOR 91.7% MINOR LER ELECTIVE OTHER OMITTED
 8.3%

0 1-2 3-5 6-8 9+
 58.3% 41.7%

A B C D F
 83.3% 16.7%

0.0-1.9 2.0-2.5 2.6-3.0 3.1-3.6 3.7-4.0
 8.3% 8.3% 8.3% 8.3%

STRONGLY AGREE AGREE NEITHER DISAGREE STRONGLY DISAGREE OMITTED
 A/D

SECTION NORMS
 MEAN SD
 4.42 0.64 4.37 0.73
 4.58 0.49 4.25 0.81

STUDENT COMMITMENT AND LEARNING

- 5 I did the required preparations for each class.
 6 I learned valuable information/skills from this course.

INSTRUCTOR ITEMS

COURSE ORGANIZATION

- 7 Expectations were clear to me throughout the course.
 8 The structure/organization of the course helped me learn.
 9 The course materials/activities helped me learn.

4.42 0.49 4.23 0.85
 4.50 0.50 4.04 0.94
 4.75 0.43 4.24 0.85

EVALUATION PRACTICES

- 10 The assignments and tests allowed me to demonstrate what I learned.
 11 I received feedback about my progress throughout the course.

4.50 0.65 4.11 0.90
 4.17 0.55 4.29 0.79

INSTRUCTOR CHARACTERISTICS

- 12 The instructor gave clear written/oral explanations.
 13 The instructor motivated me to think about the subject.
 14 The instructor demonstrated knowledge of the subject matter.
 15 The instructor showed respect for students.
 16 The instructor was available for individual consultation.

4.58 0.49 4.13 0.92
 4.75 0.43 4.26 0.85
 5.00 0.00 4.63 0.62
 5.00 0.00 4.58 0.70
 4.50 0.50 4.38 0.76

**Total of Instructor Items 7-16

1.7%

63.3%

35.0%

Professional Development in Teaching

I've been actively engaged in learning more not only about new technologies and ideas in my subfield, but also in learning more about how to teach diverse audiences. To that end, I've attended about one scholarship or technology conference every other year, including:

Bringing geophysics to introductory science classes, EarthScope, 2023

Cohort 1, joining the UNAVCO equipment pool, UNAVCO, 2019

Using kinematic and static GPS in undergraduate courses, UNAVCO, 2018

Using high resolution topography, UAVs, and GPS in undergraduate education, UNAVCO, 2017

Teaching about risk and resilience: sea level rise, flooding, and earthquakes, NAGT, 2014

Teaching structural geology, geophysics, and tectonics in the 21st century, NAGT, 2012

Building strong geoscience departments, NAGT, 2010

Teaching geomorphology in the 21st century, NAGT, 2008

In most cases, I've integrated new pedagogies (e.g. flipped classrooms across my upper levels) and new technologies (e.g. GNSS and UAS in Earth Surface Processes; GPR in Depositional Environments) into my classes within about a year of the workshop.

I've also taken advantage of Earlham's professional development to become more proficient in GIS, and have taken instructor-led classes from ESRI, including:

Essential workflows (ArcGIS Online and ArcGIS Pro), ESRI, 2022

Working with Lidar data in GIS, ESRI, 2022

Imagery analysis (ArcGIS Pro), ESRI, 2022

Last, I've taken classes on my own to be able to teach QHEI in my Hydrology class. These include:

Community Stream Habitat Assessment, Midwest Biodiversity Institute, 2024

Basic Training, Hoosier Riverwatch, 2024

Sample Teaching Materials

At Earlham, I've moved to a flipped classroom model, where content is delivered via video and class time is used either to practice using the information gained in the video, or to teach instrumentation or techniques that don't lend themselves to video. Videos are archived on a Youtube channel and kept unlisted. Here are a few examples from my class on Hydrology:

The water cycle: <https://youtu.be/TwqSCgiT59Q>

Evapotranspiration: <https://youtu.be/LZoqxvHyp4I>

<https://youtu.be/HgVbEQbtgo4>

Precipitation: <https://youtu.be/uUzMA0UR9IQ>

<https://youtu.be/ReNJutCMnCA>

Abstractions: <https://youtu.be/k8703PXzmpk>

<https://youtu.be/noYdoEYXwmQ>

Runoff: <https://youtu.be/iurrewjzhQM>

As mentioned in "Teaching Responsibilities," my class notes (albeit unedited from circa 2006) for Hydrology, Fluvial Sediment Transport, and Coastal Processes are available online at Kent State's website:

<https://personal.kent.edu/~amoore5/>

They are cited within the Wikipedia article on sediment transport, and as an external link.

Teaching Philosophy

I've struggled writing a statement of teaching interests. Part of me is rather evasive about the whole thing—"they can read my CV, they know what I've taught." Part of me wants to quote chapter and verse from the latest teaching philosophies—"the teacher guides learning, not merely dispenses knowledge." I think it's probably more informative, though, for me to focus on some of my more brilliant failures, and what I've done about them.

When I was a grad student, a friend of mine was the geology professor at the local community college. He's scatter-brained, and commonly called me with less than a day's notice to come and take his classes. I used to show up with the sum-total of his advice being "teach them about sedimentary rocks." So I'd start. We'd talk about the rock cycle, and every few minutes someone would ask, "But Tracy says it works this way," and I'd have to stop and explain how we were both right. People would have trouble with my bad drawings, and ask questions about what I meant to show. In exasperation, I'd use examples from around town—I can't draw a landslide, but we've all seen them enough in Seattle. People enjoyed the class, but I felt awful after lecture; it wasn't smooth, and I felt like the class didn't respect me because I didn't have all the answers.

When I got the chance to teach my own class, I assumed that what the class required was a smoothly delivered, well planned, and well timed lecture. "Finally," I thought, "a chance to be in control while I teach." I tried it all—slide shows, PowerPoint presentations, typed class notes to hand out. I impressed the hell out of myself—I did not, however, impress my students. My beautifully scripted lectures were far too smooth—information was lost while people marveled at the medium. People were afraid to interrupt. As a result, I had an extremely passive, extremely well-run classroom.

It finally dawned on me that students got a lot more out of my community college lectures, no matter how disoriented, than they did from my mirror-smooth engineering lectures. The difference was that the community college students had to interact with me, whereas the engineering students could sit and let it all wash over them. It is through this interaction that learning occurs. People learn what's important to them, and it's only important if they can relate it to their own experience.

One of the best places for students to learn is in lab. In my time as a teaching assistant, I could see when a student "got it", or when I wasn't connecting. People would approach me with questions about other topics—I held math sessions in my sedimentology labs because people were too nervous to ask the professor. I understood the importance of having a lab for my engineering class, and regularly took the entire class down to our hydraulics facility—where I proceeded to lecture them while standing in front of flowing water instead of a blackboard. By the end of the class, however, I understood. I came down with a fleet of rulers, and all the velocity meters I could find. Everybody measures something, and I'm here only to answer questions. I didn't worry that people understood the intricacies of Reynolds Number—I worried that everyone was engaged, and that everyone at least understood WHAT Reynolds Number was by the end.

As a result of this experience, I returned to a more comfortable style of teaching. I no longer come to class with a well-scripted, well-rehearsed lecture. I know what I want to say that day, and tailor what I want to say to what my students are asking me. I use chalk instead of PowerPoint, and try to draw as much as possible, reserving slides and prepared graphics for only those things I consider too difficult to draw. Students learn when they are engaged, and they are engaged best when actually doing something. Lecture is a set-up for lab, which affords the best opportunity for learning. Every chance I

can, I want students out of their seats and involved in their own learning process, not sitting and listening to me talk.

My natural tendency is still to be evasive about my teaching interests—you can see from what I’ve taught that I’m comfortable and interested in teaching hydrology, geomorphology, coastal processes, sedimentology, and geohazards. What you can’t see from my CV, though, is that I’ve made plenty of mistakes teaching, and that I’ve learned a lot about motivating a class to learn as a result.

I first wrote these words a little over 20 years ago, and I still view them as a touchstone for how to approach a class. I try to revisit the words about once a year, to remind myself not to get too caught up in the mechanics of class, and to refocus on student learning. I’m still as committed to student outcomes as I was then, though I suspect I have a few more brilliant failures to show for it.

When Covid changed our classroom dynamic fundamentally, I had to pivot a class I’ve taught here for 15 years (Earth Surface Processes) to run in 7 weeks instead of 15, and with no off-campus lab. I spent a week trying to get lectures onto Moodle, get my class notes available online. In short, everything I told myself to stop doing in this essay. After my annual re-read, I made a decision to stop prepping like this was an online class, and to commit to a (mostly) outside lab—they only said I couldn’t have a van, not that I couldn’t go outside! My class spent the 7 weeks surveying everything we could reach on bikes, with tools ranging from hand level to GNSS and drones. We used the data we collected to talk about geomorphology while we were looking at it. I certainly didn’t cover everything I wanted to cover (coastal processes are not happening here in Richmond), but students still talk about that class as their favorite at Earlham, Covid or not, and it’s led directly to our students getting hired into industry.

At the same time, my classroom has evolved considerably in the last 20 years. My first engineering classroom was dominantly male, and overwhelmingly white. My current classroom is over 50% female, and although light-skinned people are still the majority, it’s about 30% people who do not identify as “Caucasian.” It’s about 30% people who are experiencing the American educational system for the first time, and it’s about a quarter people whose families are unfamiliar with college. In short, my classroom is more diverse ethnically, economically, and nationally than I’ve ever experienced before.

I’ve had to recommit to how to approach each student. I can’t require weekend field trips, because people need to work (required field camp also falls in this category). I’ve gotten better about allowing more time to take exams, and to let students have a reduced distraction environment in which to take exams (because these are common accommodations for ADHD and ASD students—but how many undiagnosed students do I have in my class?). I’ve recognized that representation matters, and that people need to see working geologists who look like they do. I believe students when I’m told that bias exists either in or outside my classroom. I’m much more aware of who speaks and who doesn’t in my classroom, and to make sure that underrepresented voices have equal access.

I am very proud to work in a department that is 75% female, that graduates a senior class that’s between 60-80% female, and that places women into graduate school at a rate at least proportional to the men. Our track record with non-Caucasian identifying students is equally good. I’ve been part of something good here at Earlham, and I’d look forward to bringing the same spirit with me to Monticello.

Research Interests and Experience

I view myself as a process sedimentologist; my research generally involves trying to use the physics of sedimentation to interpret the sediments left behind by floods, hurricanes, and tsunamis in an effort not only to understand how to identify ancient catastrophes from their deposits, but to determine how large those catastrophes were. I've spent most of my working career traveling to disaster areas just post-event to document sedimentological and geomorphological change—these surveys were remarkably interdisciplinary, with experts from civil engineering and social sciences mixing with earth scientists. They were also remarkably intercultural—I've been on surveys where the language of the survey was Japanese but the language of those to which the disaster happened was French. Or Bislama. Or Bahasa. As difficult as it was to intrude on a disaster scene, I deeply miss the interdisciplinarity and closeness of the disaster survey community.

As a small liberal arts college professor, however, my research projects are almost solely driven by the ability to involve undergraduates—as a result, most of my projects are collaborations with larger institutions, and involve research that can be planned ahead of time (this rules out studies of modern tsunamis) and which may not have a high chance of success (e.g. hunting for ancient tsunamis in areas with low preservation potential). My current research collaborations include:

- Searching for ancient events of size similar to the 2004 Indian Ocean tsunami in coastal sediments in Sumatra, Sri Lanka, and Tanzania. This was done in collaboration with faculty from the University of Aberdeen and the University of Dar es Salaam.
- Identifying ancient tsunami deposits in Nova Scotia and estimating the size of those tsunamis. This was done in collaboration with faculty from Dalhousie University and the University of Louisiana at Lafayette.
- Documenting sedimentation and geomorphological change during dam removal in Richmond, Indiana. This was done in collaboration with the City of Richmond in direct response to Earlham's restrictions against taking students out of the local area because of Covid. It's evolved into a multi-year collaborative project that's really picked up steam with the dam's removal in October, 2023.
- Mapping existing fossil excavations in California and New Mexico, and using drone imagery to scout new fossil sites. This was done in collaboration with curators from the Western Science Center.

In each case, the research done is in response to a need for individual undergraduate research projects, and in the hope that collaboration early in undergraduate careers might lead to the ability to place students into career opportunities post-graduation.

Because research projects at Earlham need to be planned about 2 years into the future, projects over the next few years include:

- Documenting a sedimentary record of ancient hurricanes in Louisiana in collaboration with the University of Louisiana Lafayette.
- Expanding the search for Maritime tsunami deposits to Newfoundland, and altering tactics to include coring shallow ponds with vibracors. I'll continue collaborating with faculty from Dalhousie University.
- Expanding drone mapping for fossil hunting to include multispectral cameras. We suspect that some fossils become more visible using beyond-visible wavelengths, and are hoping to include GIS image analysis of aerial images in our hunt for fossils near Barstow, CA.

Were I to leave Earlham, I'd likely continue these existing collaborations, but I'd consider including more local projects as well.