

Petroglyphs



2017-18

# PETROGLYPHS

2017-18 EES Newsletter

7<sup>th</sup> Edition

## Message from the Chair: Dickson Cunningham

Greetings!

I assumed Chair duties last August and am happy to report that the Department of Environmental Earth Science is on firm footing and continues to prosper. We offer a remarkably strong and diverse undergraduate curriculum building on full-time and part-time faculty expertise in soft and hard rock geology, geomorphology, physical geography, glaciology, coastal geoscience, paleo-ecology, climate science, hydrogeology, geospatial science, sustainable energy science, environmental health science and other earth and environmental science subjects. We are dedicated to ensuring that our students acquire the knowledge and core skills needed to compete in today's job market. Our department is widely recognized as a close-knit community with positive spirit. In May, the Department formally initiated a new chapter of the National Honor Society in the Earth Sciences (Sigma Gamma Epsilon).

We continue to offer our students valuable experiential learning opportunities including DEEP internships, field-, lab- and GIS-based undergraduate research projects and exciting field trips. Our students have distinguished themselves at numerous professional conferences in the last 12 months such as GSA, COPLAC, NCUR, and at the annual ECSU undergraduate research conference. Independent faculty research has also been published in leading journals and presented at numerous national and international meetings including invited lectures and keynote presentations. The department has an active Facebook group and we have started a new Instagram page. We also have created new visual displays in the department highlighting our student achievements and other department activities. We remain optimistic about our future and encourage our alumni to connect to our social media sites and keep in touch. We love it when our former students return to visit us, so please stop by if you are in the neighborhood. In the meantime, please enjoy our 2017-18 Newsletter!

Inside: Student Research, Notable Events/Achievements, Faculty/Alumni Updates

# Department

# NEWS

Drew Hyatt, Assistant Chair

Hello all. Our efforts in teaching and research within EES remained focused on providing the best learning opportunities we can for our departmental family – present and former students. As many of you know, we celebrate this pursuit, other accomplishments, and the pleasure of relaxing with friends and colleagues at the year-end EES celebration and awards ceremony. Indeed as the photo below from the event last May indicates, the ceremony is well attended by faculty, students and alumni alike. If you can, please come to the 2019 celebration, most likely held between May 6<sup>th</sup> and 8<sup>th</sup> next year. I also hope you will also enjoy the imagery and updates within this newsletter. We begin with the important stuff – a “hats off” to our graduating class and acknowledging the winners from last year’s awards ceremony. Summaries of new activities in the department, student and faculty research endeavors, and updates from faculty and alumni round out the document. All the best for the coming year and alumni please send us updates for the next newsletter as explained on the last page.



EES Celebration, May 2018





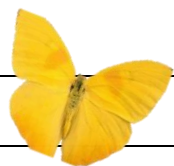
## Congratulations to the Class of 2018!

What better way to start than with a big SHOUT OUT to our most recent class of graduates. As Henry David Thoreau said, *"Go confidently in the direction of your dreams! Live the life you've imagined."* We wish you all the best in your life journey!



The Environmental Earth Science Department (faculty and students) participating and enjoying the graduation ceremony in May 2018. CONGRATULATIONS GRADUATES!

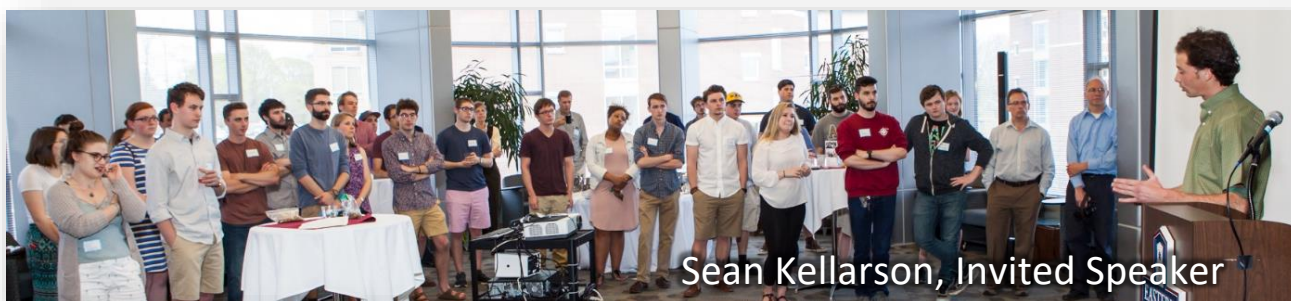




## 2018 EES Student Award Recipients

In keeping with tradition, the year-end EES celebration includes a presentation by an EES alum, this year Mr. Sean Kellarson (2014), a slideshow of events from the preceding year, and discipline and excellence awards. A big thank you to Pete Dane and University Relations for supporting this event and for establishing and managing the EES Founders Fund. If you do not know about this fund, please read the last page of this newsletter.

Photos below identify disciplinary award winners as well as the excellence awardees from this past year.







Madie Varney,  
Quaternary Geology



Dominic Livoti, Soft Rock Geology



Noah Hallisey,  
Sustainable Energy Science



Madison Knox, Sophomore  
Academic Excellence



Jennifer Croteau, Junior  
Academic Excellence



Emma Avery, Senior  
Academic Excellence



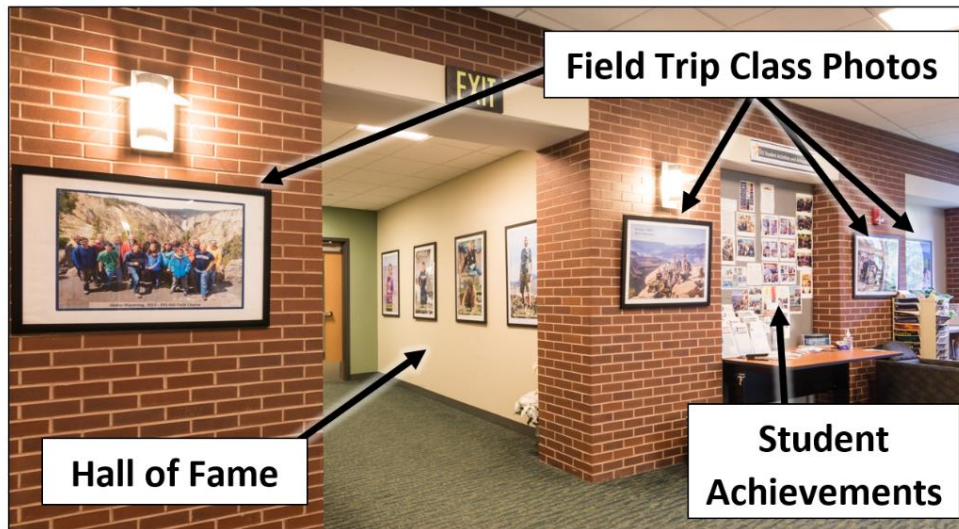
# 2018 EES Outstanding Student: Luke Davis



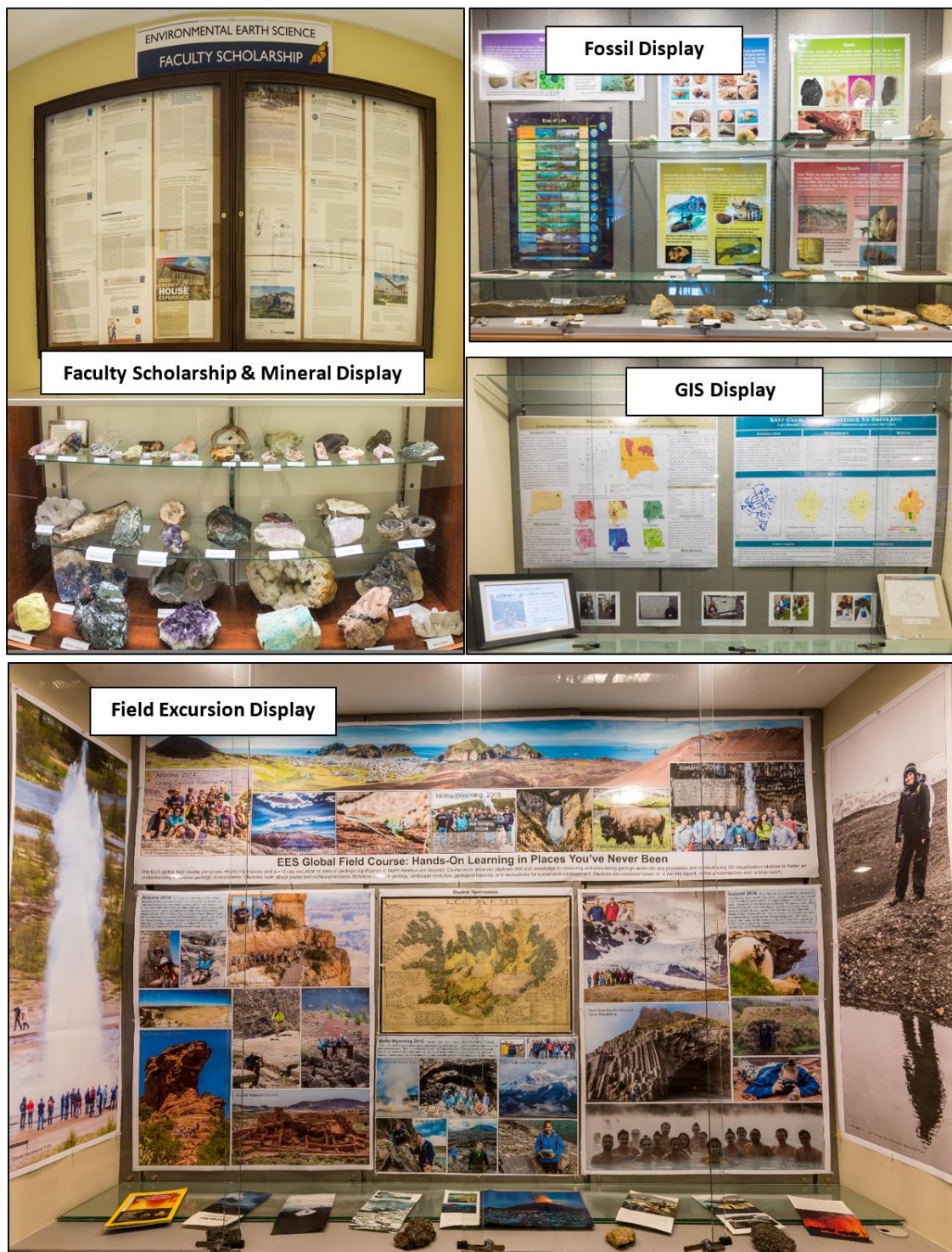


## New Displays

As part of a reinvigoration plan led by the Dickson Cunningham, the Department has added several new displays on the 2<sup>nd</sup> and 4<sup>th</sup> floors to highlight the vibrant activities of EES students and faculty. This includes postings about the EES curriculum, student research, field excursions, and a variety of displays in and around classrooms, and in the EES office area. A few photos of some of these displays follows – we hope you will take the time to visit us and see some of these materials.

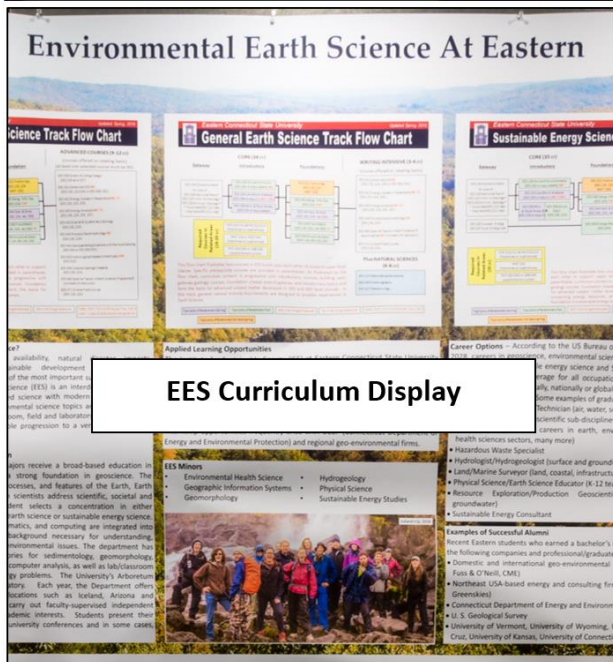


EES displays are front and center upon entering the 2<sup>nd</sup> Floor office wing. This includes photographs of prior outstanding student awardees and information on student achievement, and field excursions



Several new displays are available for viewing. This includes a mineral display in the office wing, and updated Field trip, GIS, Rock and Mineral, and Fossil displays, with some examples given above.





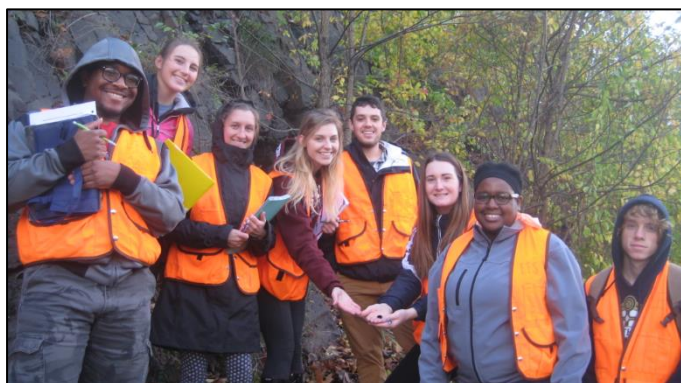
Many of the new displays focus on the curriculum offered in EES, student achievements, and 12 recent student research posters.



# Class and Club

## Activities and Photos

It has been another busy year, both inside and outside the classroom. A few photographs follow from assorted class field trips, induction of the first Sigma Gamma Epsilon cohort, Earth Day activities, holiday gatherings, and various student club events.



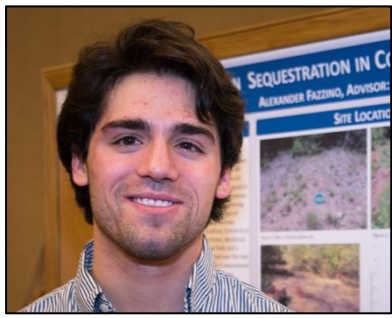




Dec. 2017 Holiday Gathering

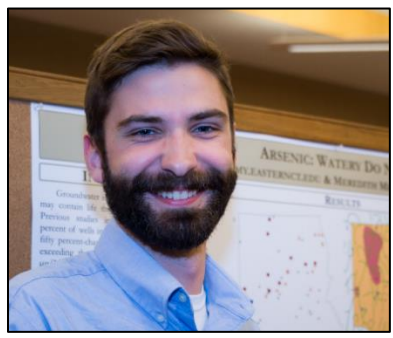






## CREATE and Other Conferences

A substantial number of students presented research, not only in the classroom, but also at the on-campus student research conference (CREATE, a few photos are shown). As well, several students attended and/or presented research at professional meetings such as the Geological Society of America, the National Council on Undergraduate Research, The Northeast Arc Users Conference, the Council on Public Liberal Arts Colleges, and the New England Estuarine Research Society Conference. Some details on these activities are provided in the faculty update section of the newsletter.





## Environmental Earth Science Student Research

In the summer of 2017, seven EES faculty members offered undergraduate research experiences to twelve students through the EES Exemplary Program Fund. Many of these students continued their projects throughout the 2017/2018 academic year, with the goal to present their results at the ECSU CREATE Conference, and/or a national conference. Below is a summary of the student projects.

Student: Madison Knox

Mentor: Dickson Cunningham

Project: Poly-deformational geological history between Colchester and south Salem, CT: Documenting the mid-crustal structure across the Honey Hill Fault Zone

During the summer of 2017, EES Major Madison Knox worked with Professor Dickson Cunningham investigating the bedrock geology along route 11 in Colchester and Salem, CT. The objective was to complete a lithological and structural transect to document the deformational history north and south of the Honey Hill Fault Zone, a major tectonic boundary in eastern CT. Madison collected geological data on the rock types and tectonic structures and took samples for follow-on microscopic study. Her study is part of a larger multi-year geo-transect that Professor Cunningham is carrying out from Willimantic to Waterford. Key results from the study that are new and significant include the following: 1) the northern half of the transect consists of a multi-km-scale S-vergent recumbent antiform in the Brimfield Schist; 2) Post-contractional ductile shear zones cut the fold's lower limb and accommodated extensional collapse; 3) Significant sub-horizontal extension and vertical flattening dominates the transect's deformation history; 4) Late brittle normal faults locally cross-cut all older structures; 5) The Honey Hill fault is not exposed along the transect, nor is there much structural evidence for its existence in highway outcrops.

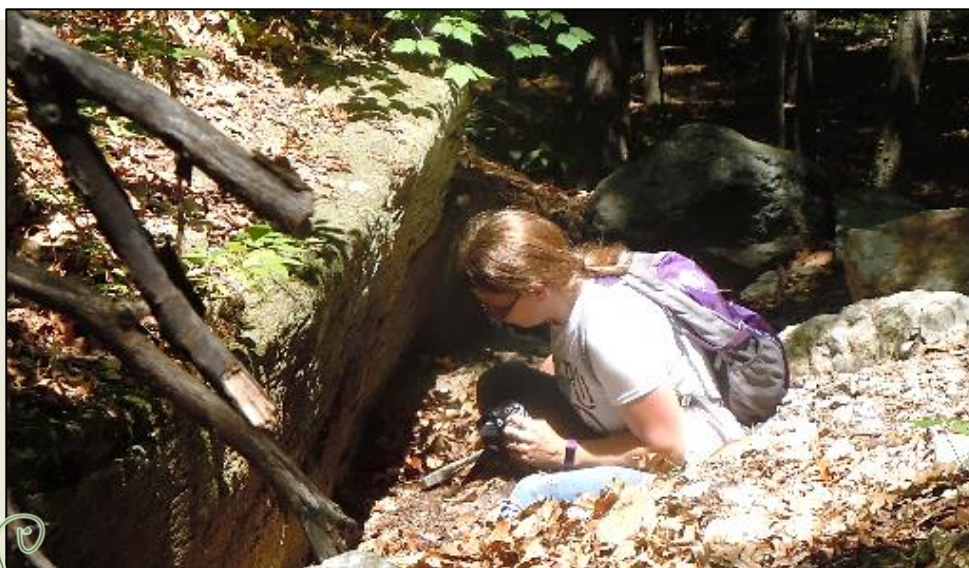


Madison in front of a rusty stained brittle normal fault zone that crosses Route 11 in Salem, CT

Student: Katherine Hope  
Mentor: Dickson Cunningham

Project: Investigating the mineralogical variability and feldspar extraction history of some pegmatite quarries in Haddam, East Hampton, Portland and South Glastonbury, CT

Katherine Hope, another EES Major also worked with Professor Cunningham over the summer investigating the mineralogy of pegmatite quarries in the Haddam, East Hampton, Portland and South Glastonbury districts. Seven different quarries were visited to examine their mineralogy, and special attention was given to identifying beryl minerals, which can occur as gem quality aquamarine (blue-green), or heliodor (golden yellow). Connecticut was once known as the gem state of New England and there are still beautiful minerals to be found. However, most of the quarries were originally mined principally for their feldspar (used in porcelain/ceramics) and Katherine's project involved investigation of the history of feldspar mining in Connecticut that was an important extractive industry in the 19<sup>th</sup> and 20<sup>th</sup> centuries.



Katherine examining the mineralogy of one of the Case pegmatite mines in Portland, CT







Dominic Livoti (left) at Dinosaur State Park with Peter Drzewiecki (ECSU), Randy Steinen, (CT DEEP), and Matte Thomas (State Geologist, CT DEEP)

Student: Dominic Livoti  
Mentor: Peter A. Drzewiecki  
Project: Sedimentology of the Jurassic East Berlin Formation at Dinosaur State Park



The purpose of this project was to examine the sedimentary rocks exposed at Dinosaur State Park and surrounding outcrops and cores to provide a detailed description and interpretation of depositional environments associated with the *Eubrontes* trackways preserved at the park. Signage in the park, along with popular interpretations, suggest the trackway was developed on the margin of a large perennial lake. This interpretation is not justified based on advances made in our understanding of the sedimentology and stratigraphy of playa lake systems during the last two decades. Thus, a reappraisal of the most popular outcrop in the state is warranted.

This project involved visiting Dinosaur State Park, nearby outcrops in the towns of East Berlin and Cromwell, and the DMC Core Repository in South Hartford. At the park, stratigraphic data were collected on the outcrops inside and outside of the park. In addition, Dominic described the Dinosaur State Park core. We made a careful examination of the track surface itself for trace fossils and sedimentary structures that may reflect the environment in which the dinosaurs walked. This study was extended outside the park to outcrops of the same stratigraphic interval in outcrops in Cromwell and East Berlin, and to cores collected in South Hartford in order to determine how the environment may have changed laterally over several kilometers.

Important conclusions at this time include the recognition that the dinosaurs were likely not walking on the margin of a perennial lake, but rather congregating on alluvial sheet flood deposits in a playa (dry lake) environment. They were likely walking on wet sediment on land, or possibly in very shallow ephemeral water bodies. These results have implications for long-standing interpretations at the park involving dinosaur swimming and hunting behaviors.

**Outcomes for this project include a final report and a presentation by Dominic at Eastern's CREATE Conference. In addition, interpretations of data collected will be incorporated into the publication of a book (*Connecticut Dinosaurs*) published by Indiana University Press, with Dominic as a co-author.**

Student: Katherine Hope

Mentor: Peter A. Drzewiecki

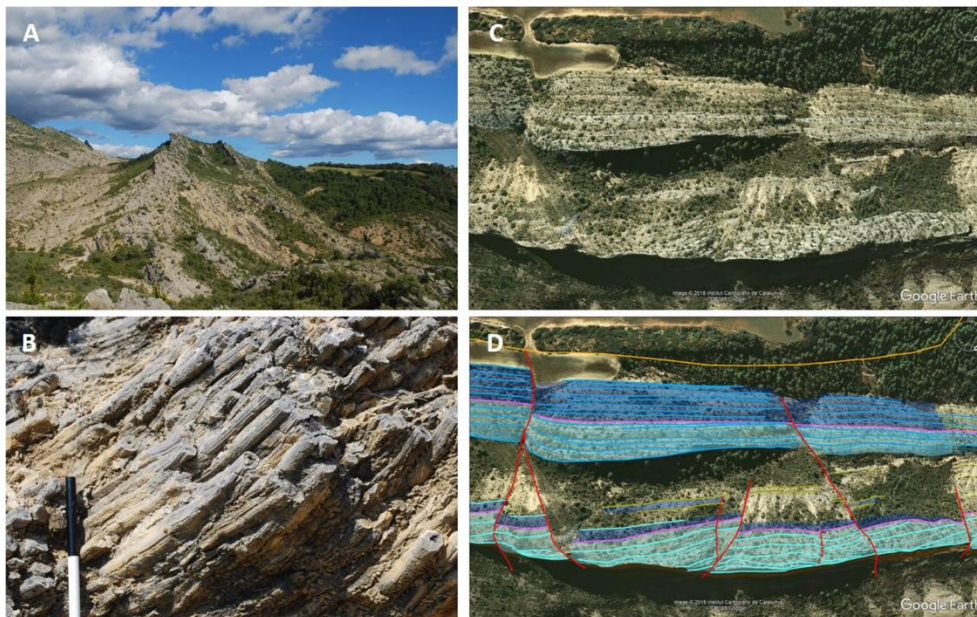
Project: Correlation of Cretaceous Strata of the Basturs Carbonate Platform, Spain

This project examined the stratigraphic architecture of a Cretaceous rudist (clam) reef platform in the Pyrenees Mountains of Spain on Google Earth in preparation for fieldwork that was conducted in the fall of 2017. Correlation of bedding surfaces and interpretation of depositional facies on Google Earth images illuminated subtle geometries that revealed the growth history of the reef system, and provided a basis for understanding the nature of sea-level and tectonic control on the platform development. Results were used by geoscientists to prioritize key locations within the field area to visit and collect data.

Katherine spent an intense week in the summer of 2017 working on tedious correlation of the platform system in the lab. She added information about the facies and microfacies to the correlations. An integrated tectono-stratigraphic synthesis emerged from her careful work. Her correlations were shared with colleagues in Spain and Norway, and used in the fall of 2017 to guide fieldwork aimed at collecting data to resolve some of the questions that her work revealed. Through the work Katherine completed, international teams of geoscientists were able to identify and visit key outcrops and establish a strong tectono-sedimentary interpretation for development of the reef. These interpretations have implications for understanding the initial development of the Pyrenees Mountains.

Important progress at this time includes improving our understanding of how: (1) faults that were active while the reef was growing and how they influenced the location of the reef margin, (2) sea-level fluctuations resulted in three orders of cyclicity of the reef facies, and (3) large-scale growth of a salt-cored anticline influenced where the reef developed.

Outcomes for this project include incorporation of images generated into a field workshop for professional geoscientists, use of results to generate external funding for additional fieldwork, and publication of an article describing the growth history of the reef system in a peer-reviewed journal.



Detailed stratigraphic analysis of the Basturs carbonate platform:

A) Field view of the Basturs outcrop

B) Close-up of the rudist clams that construct the reefs (scale in 10 cm segments)

C) Google Earth image of approx. 1 km of the outcrop in A

D) Same image as in C, with facies, beds, and faults interpreted



Students: Ryan Cueto and Jeffrey Fontaine

Faculty Mentor: Drew Hyatt

Project: Digital mapping and modelling *Eubrontes* trackways at Dinosaur State Park, Rocky Hill

EES majors Ryan Cueto and Jeffrey Fontaine worked as part of a 3-member research team, including Dr. Hyatt, to image both the main and secondary track-site at Dinosaur State Park. This work provided an opportunity for the students to collect high quality overlapping images in order to generate digital photogrammetric point clouds that enable detailed morphological analyses of selected tracks at the site.

Through intensive fieldwork at DSP nearly 500 high-quality images and surveyed locations for some 60 photogrammetric targets were recovered. Upon completion of fieldwork, these students received individualized training at Eastern with a variety of software packages used to process images, prepare photogrammetric point clouds, and to analyze the resulting models. This included processing images using Adobe Lightroom, generating dense point cloud data sets using Agisoft Photoscan, and analyzing *Eubrontes* geometries utilizing Cloud Compare and Blender software.

These techniques also enabled Ryan to build and 3D print selected replicas for portions of the track-site. Ryan undertook follow-up practicum coursework through the fall of 2017 and spring of 2018 in preparation for a poster presentation at the upcoming spring 2018 CREATE conference at Eastern. Jeffrey also had follow-up course work and poster preparations on a different site through separate funding. These efforts provided all students exposure to between two and three different research projects, although each is focusing their follow up work on a single topic.



Image of Jeffrey Fontaine collecting digital imagery of the DSP tracksite using a sturdy tripod. Jeffrey and Ryan were also used laser surveying equipment in this image to measure location of photo-grammetric targets. PLUS some uninvited visitors.



Students: Bryce Mase and Ryan Cueto

Mentors: Drew Hyatt in cooperation with B. Oakley

Project: Utilizing digital photogrammetry, laser scanning, and real-time kinematic GPS to measure eroding bluffs on Block Island, RI.

Bryce Mase and Ryan Cueto accompanied Drs. Hyatt and Oakley to Block Island in June of 2017 to image and survey two eroding bluffs at West Beach and Clay Head. Ongoing erosion at West Beach is exposing debris from an old municipal dumpsite resulting in significant contamination of the beachfront. In contrast, Clay Head is a much larger eroding bluff that reveals cretaceous aged sediments. At both sites the students collected many (>600) overlapping full-frame digital images that included numerous photogrammetric targets. As well, students measured the locations of these targets using a combination of real-time kinematic (RTK) GPS equipment and a Trimble VX laser scanner (photos below). In follow up summer training, these students were introduced to image processing, photogrammetric modeling, and manipulation of data sets using a variety of software packages (Cloud Compare and Blender). This enables the students to perform change-detection to quantify erosion for both sites. In addition to summer field-work and software training, Bryce has followed up with two practicum courses supervised by Dr. Hyatt. This has enabled Bryce to construct and print scaled 3D models of the bluffs. As well, he has learned to assign real-world coordinates to these models and has begun to measure changing positions of the coastlines by comparing his summer photogrammetric models with subsequent images collected by Dr. Hyatt and Oakley. Bryce presented his work at the spring 2018 CREATE conference.

**Below:** Bryce Mase surveys photogrammetric targets at Clay Head Bluff on Block Island. **Right:** Fellow EES major Ryan Cueto assists Bryce in using Real Time Kinematic GPS technology to determine coordinates to within a few cm's for several photogrammetric targets.





Students: Luke Davis, Christopher Kaminski

Mentor: Meredith J. Metcalf

Project: Further Evaluation of Naturally Occurring Contaminants from the Hebron Gneiss

Dr. Metcalf continued her research efforts on understanding distributions of arsenic occurrence in groundwater during the summer of 2017, which allowed two Environmental Earth Science students the opportunity to assist. Previous research projects completed by students who assisted in the collection of groundwater quality data during the summer have focused on arsenic distribution in eastern Connecticut as it relates to the underlying geology or other groundwater quality parameters. However, results consistently suggest that the source of arsenic is anthropogenic rather than natural. Therefore, groundwater quality for domestic wells was tested in Eastford and Pomfret, two towns that were expected to have arsenic in domestic wells given the underlying geology, during the summer of 2017. Luke and Chris assisted one to two days a week for the duration of the summer.

The students were responsible for assisting in the organization of sampling events with homeowners, collecting water samples following a newly developed technique developed by Dr. Metcalf and Dr. Robbins, submitting samples to the Department of Public Health, entering data, and communicating findings with homeowners upon receiving water quality results from the Department of Public Health. Given the number of hours required for sampling during the summer months, both Luke and Chris completed Independent Study projects under Dr. Metcalf's supervision during the fall semester, which focused on evaluating anthropogenic sources of arsenic as previously mentioned. Luke's research focused on the distance from recharge/discharge areas as an indicator for predicting arsenic concentrations and Chris' research focused on using satellite imagery to identify whether trends exist between current wells testing positive for arsenic and historical and current land use (more specifically, agricultural use). Luke has submitted an abstract for an oral presentation to the 32nd National Conference on Undergraduate Research (NCUR) that has been accepted. Luke presented his research at the spring Northeast Arc Users Group Conference hosted at the University of Connecticut in May. Both Luke and Chris also presented at Eastern's CREATE Conference in April.

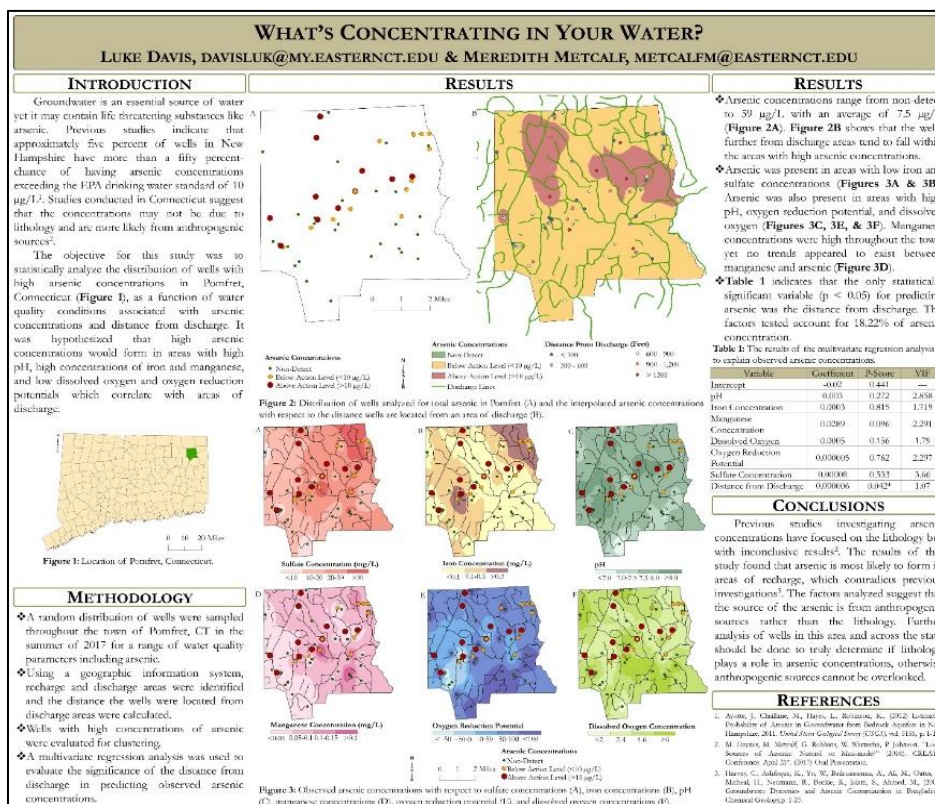


Chis Kaminski and Luke Davis enjoying a rainy day of sampling groundwater and recording field parameters at a private domestic well in Eastford, Connecticut in May 2017





Chris Kaminski (left) following the DPH protocol of pumping well water for 5 minutes before collecting a sample and Luke Davis (right) collecting a sample at a home in Pomfret, Connecticut



Luke Davis' prepared poster presentation for Spring NEARC. This was presented orally to a group of students upon completion of his independent study. Luke also prepared an oral presentation to correspond to this poster presentation for NCUR.

Students: Emma Avery and Kayla Andrews

Faculty Mentor: Steve Nathan

Project: Benthic Foraminifera of Block Island, Rhode Island: Gauging a Proxy of Historical Tropical Cyclone Severity in New England

The purpose of this project was to engage two EES students (Emma Avery and Kayla Andrews) in climate change research. The goal of this on-going research is to determine the feasibility of using foraminifera (single-celled marine organisms) and a suite of sedimentological proxies, as a gauge of the severity and frequency of historical tropical/ extratropical cyclones (i.e., hurricanes and nor'easters, respectively) upon Block Island, RI.

Kayla and Emma retrieved and analyzed five sediment cores (i.e., storm wash over deposits) from two near shore ponds located on Block Island, Rhode Island. Specifically, two sediment cores were collected from Wright's Pond and three from Middle Pond. Two cores from Middle Pond were split, photographed, and described upon return to Eastern.

Both students gained valuable field experience from this project. They saw firsthand the details that need to be addressed for carrying out such fieldwork. They worked with coring equipment (i.e., a push core), described and photographed the cores (using Munsell color charts and grain size cards), and kept detailed field records. Kayla and Emma also used a real-time kinematic GPS to measure and record beach profiles (to determine the extent of coastal erosion on Block Island).

Emma is an honors student and she continues to work with the cores since they are a central part of her senior Honors Thesis. The foraminiferal and sedimentological data Emma is currently collecting from the pond sediments will provide a unique record of storm severity and frequency in southern New England; a record that is not found in the literature. Emma presented her preliminary findings at CREATE 2018. It is likely that she will present her final research at COPLAC 2018 and the Northeast Section meeting of the Geological Society of America (March 2019).



**Above:** Kayla Andrews (l) and Emma Avery (r) (with Dr. Bryan Oakley) stabilize a sediment core collected from Middle Pond, Block Island, RI (June 2017).



Student: Madie Varney

Faculty Mentor: Bryan Oakley\*

Project: Evolution of the barrier spit at the Napatree Lagoon 1939-Present

Grant Title: Monitoring of Shoreline Change: Misquamicut State Beach and Block Island, Rhode Island

Madie Varney's project focuses on the evolution of the barrier spit on the Napatree Point lagoon, Watch Hill, Rhode Island. She is currently mapping the position, morphology and elevation of the barrier spit now, as well as on historical aerial photographs (1939-present). Change analysis of the barrier spit over time is being conducted and additional parameters are being measured in ESRI ArcMap software. Madie is working on describing the changes to the spit, and attempting to link these to the coastal processes involved, including storm impacts. The working hypothesis is that the barrier spit was formed largely by longshore transport. A secondary hypothesis is that the spit, which enclosed the lagoon in 1997, will continue to migrate to the west, potentially limiting tidal exchange with the lagoon and Little Narragansett Bay. The Watch Hill Conservancy has partially funded aspects of this project, particularly with in-kind support involving access, transport and logistics.

Madie continued to be involved in this project informally in the fall 2017 semesters as part of a practicum (EES 392) in the spring, 2018 semester. She presented on this work at both CREATE and the New England Estuarine Research Society annual meeting in April 2018. This project will continue into the 2018 summer field season and culminate with an independent study in her penultimate semester (fall 2018).

The faculty PI is a science advisor for the Napatree Point Conservation Area (NPCA) and a senior fellow at the URI-CI. This research furthers the partnership between the NPCA, Eastern Connecticut State University and the University of Rhode Island Coastal Institute. The NPCA and Watch Hill Conservancy will provide in-kind support in the field, as well as partial funding for this work (Banner Index WHZ-01 and WHZ-02).



Madie Varney (left) and Jenn Croteau (right) mapping the edge of the salt marsh on the Napatree lagoon, May 2017



Madie Varney (left) and Bryan Oakley (faculty mentor) measuring the Napatree Spit, 12/2017

Student: Alexander Fazzino  
Faculty Mentor: Paul Torcellini  
Project: Carbon Sequestration



Building a strong foundation is important because multiple students will complete this project. It would not be efficient for each student to have to relearn how to use the equipment and software, so results will also include creating a PowerPoint tutorial to shorten the learning process. Numerous hours were spent reading manuals, contacting LiCor representatives, watching webinars, setting up the equipment to be able to take a measurement, and understanding the computer software program.

Carbon can be sequestered in the top soil. Disturbing this top soil can release the carbon back into the atmosphere. This research project will look at the rate of carbon sequestration for various top soil and vegetation combinations over the course of several years. The previous endowed chair secured LiCor equipment to measure the carbon to air exchange, but the equipment had never been used. This summer research effort looked specifically into the following tasks: (1) preliminary research on soil based carbon sequestration, (2) reading manuals to understand how to use the equipment, and (3) and take initial readings at specific sites. The specific environments that would be tested were a pine forest, deciduous forest, wetland, gravel quarry, well-established field, and a conventionally tilled cornfield. The success of these tasks will help launch a long-term project.

Creating the initial baseline set of data will make recording data simple, as it will be added to throughout the years. This data will provide a better understanding of how carbon is naturally sequestered. Outcomes for this project include creating an accessible database, PowerPoint of the process, and a presentation by Alexander Fazzino at Eastern's CREATE Conference.





# Faculty Updates

## DICKSON CUNNINGHAM

Another year has passed by in a blur. Life is busy, but full and rewarding. I took over as Chair in August and have enjoyed my new responsibilities addressing the challenges that the department faces. We are a buoyant, vibrant department with an excellent cohort of majors and dedicated faculty. We continue to offer a rich variety of experiential learning opportunities for our students and in May, we initiated a new chapter of the Sigma Gamma Epsilon National Honor Society in the Earth Sciences.

Prior to assuming the role of Chair, I reviewed all key department data including student recruitment, retention and graduation rates, course enrollments, historical trends in number of majors, various budgets, the status of the Founders Fund, faculty overload credits and student experiential learning opportunities. The department is on firm footing in all categories, but must not be complacent in terms of sustaining our number of majors and maintaining healthy course enrollments. In an ever-competitive market, we have embarked on an 8-pt plan to be more pro-active in advertising and presenting all that we do in EES to the university, local community and beyond. Part of this effort involves creating a more dynamic department appearance that includes new displays about the department curriculum, employment prospects, the activities and achievements of EES majors, and faculty scholarship. In the coming year, we will participate in a new university-wide multi-year plan to enhance our students' employability prospects and raise external perceptions of our students' achievements and career preparation. In addition, we expect to look carefully at our curriculum to ensure that it continues to evolve to meet employer expectations of graduate skills.

On the teaching front, I have continued to teach structural geology/tectonics, mineralogy and igneous and metamorphic petrology. For the structural geology course, I have added more local field trip sites so that the majority of lab sessions involves hands-on field training. We did not run an extended field course this year, but expect to run the Wyoming/Idaho trip in 2018. Two students carried out research projects with me in 2017-18. Madison Knox worked on a structural transect along Route 11 in Colchester and Salem. We documented a major, kilometer-scale, recumbent fold cut by extensional shear zones associated with the Honey Hill Fault terrane boundary. Thin-sections from the shear zones reveal world-class kinematic indicators and we are awaiting Ar-Ar ages to document the timing of the extensional deformation. Katherine Hope carried out a small project investigating the mineralogical diversity of pegmatite bodies in publicly accessible quarries in East Hampton, Haddam and Portland. Pegmatites are arguably Connecticut's most interesting rock type because of their mineralogical diversity, historical economic importance and controversial tectonic significance. It is amazing that gem-quality aquamarine

and heliodor (varieties of beryl) can still be found in some quarries with patient prospecting and a bit of luck.

One of the highlights of the year was presenting at the 50<sup>th</sup> Anniversary of Plate Tectonics Meeting in London in October. Many of the most prominent geologists in the world were present, including some who were key contributors to the plate tectonics revolution in the 1960's. My 25 years of research into intraplate tectonism in Central Asia connected well with one of the major conference themes. For decades, plate boundary processes have been the primary research focus of tectonicists, but now increasingly, we are finding that many intraplate, continental interior regions are not tectonically dead and may be repeatedly reactivated through time. This has obvious implications for earthquake hazard assessments and the long-term stability of continental crust.

In addition, I was an invited speaker at the American Geophysical Union annual meeting in New Orleans in December and gave two presentations concerning: 1) the northward expansion of Tibet and, 2) style and kinematics of active deformation in the Gobi Corridor region of Central Asia. At the time of writing, I have two significant papers in press concerning landslide hazards in the Longmenshan, China and another paper on the poly-phase evolution of the Langshan region in northern China. I am also involved with a project documenting the geological heritage of Mongolia for global geo-park status consideration.

Presenting at the Plate Tectonics at 50 conference in London, October 2017

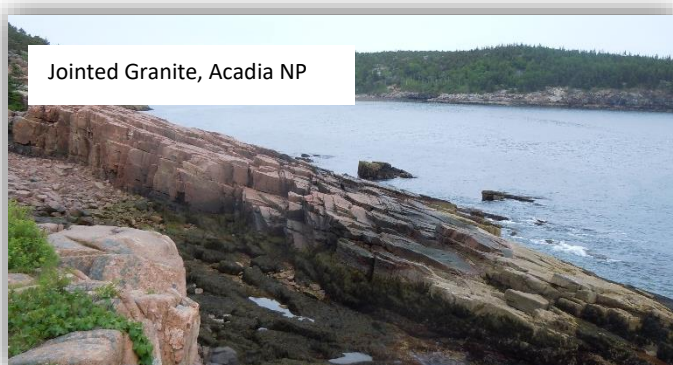
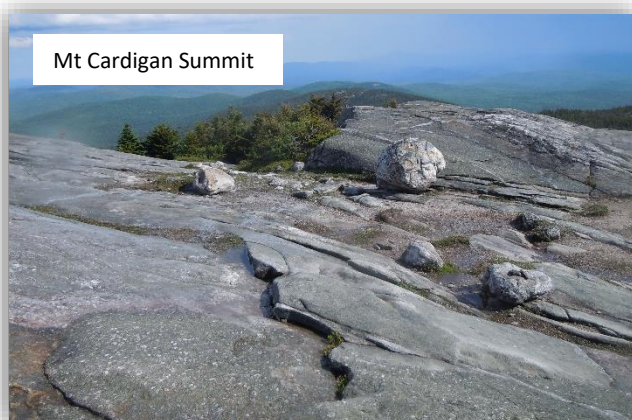


I received a curriculum development grant to scout out a relatively low-cost undergraduate field trip to New Hampshire and Maine during summer, 2017. The trip will focus on the White Mts. and Acadia NP regions, but will also include Quechee Gorge (VT), Pemaquid Point and some Maine mineral localities.





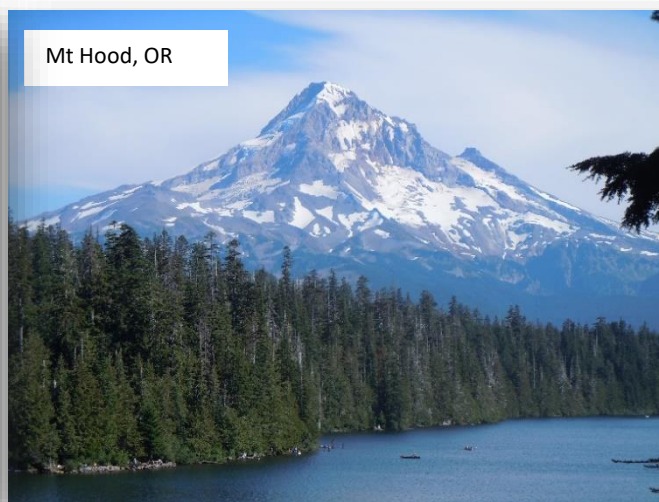
Below are a few photos of some geological highlights that will be included in the future field trip.



My son and I travelled to Oregon in late summer to visit with relatives and to see the solar eclipse. For two minutes, we witnessed totality and I found it to be very moving. When darkness descended, the solar corona became visible while a distant 360° sunset surrounded us. In Central and Northern Oregon, we also went to Newberry Crater to see the amazing obsidian flows and



other volcanic features, and we spent several days hiking on Mt. Hood and in the Columbia River Gorge (photos below).



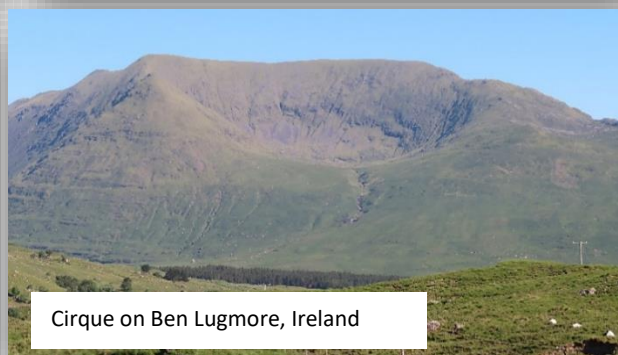
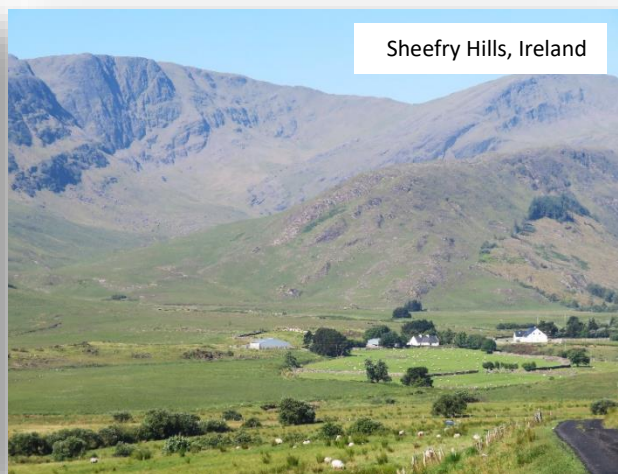
In August, we also spent a week with family at Folly Beach, South Carolina where we beachcombed for sand dollars and went on boat trips and hikes to see dolphins and alligators (photos below).



Finally, in terms of travel highlights, at the time of writing, we have just returned from a wonderful 3-week trip to England and Ireland. I serve as section editor for Elsevier's Encyclopedia of Geology and in June, we had a 2-day organizational meeting in Oxford. After the meeting, I travelled to Pembrokeshire National Park (Wales) where I completed a 15-mile segment of the park's famous coastal route. Then I met my wife and son in Dublin for a weeklong vacation in NW Ireland in Connemarra National Park. We were very taken by the beautiful scenery, friendly

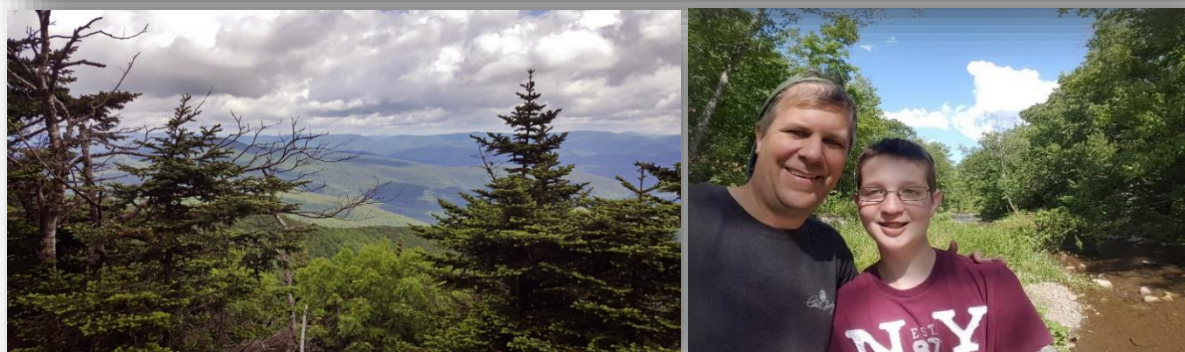


people and relaxed pace-of-life that we witnessed in the small villages and towns of Connemarra. I have travelled widely in Scotland, Wales, and other parts of Ireland and have seen a lot of beautiful scenery throughout the British Isles, but in my opinion, nothing matches the wonderful combination of rugged mountains, gorgeous coastline and quaint rural communities of NW Ireland. In Connemarra, I explored some of the key geological localities of the poly-deformed Dalradian group and Mayo Trough basin fill. In addition, we visited an underground lead-zinc mine and the spectacular Cliffs of Moher. The region would be an ideal field trip location for an EES undergraduate field trip in the future. I plan to investigate this possibility further-stay tuned!



## PETER DRZEWIECKI

Following a student fieldtrip to Arizona (described in the last newsletter), the summer of 2017 began with usual family travels to visit family in Buffalo and Maine (twice). In addition, we managed a day on Block Island, where I did no geology. I also decided to spend some time with my youngest son (12) in order to keep him away from the TV screen all summer. We took day trips to the Roger Williams Zoo (to see our favorite animals – the Red River Hog and the Red Panda), the Basketball Hall of Fame, and the Peabody Museum. We also went to the Catskills for 4 days to hike, visit Howe’s Cavern, and go birding. We had a great time!

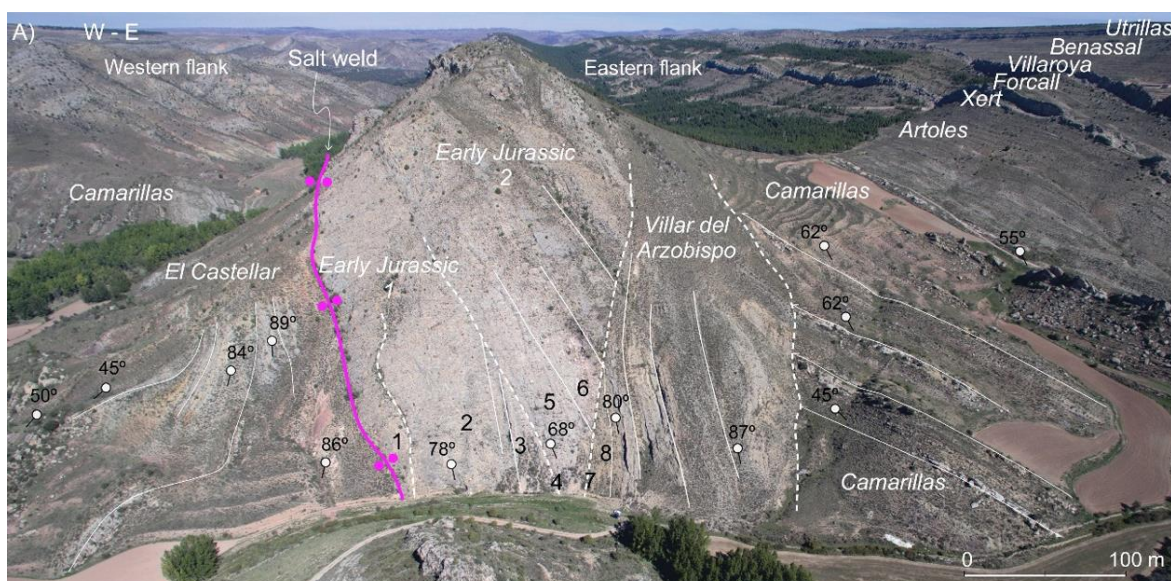


Lobster boats in New Harbor, Maine (top). View from the top of Slide Mountain in the Catskills (bottom left), and my son, Max, and I in the Catskills (bottom right).



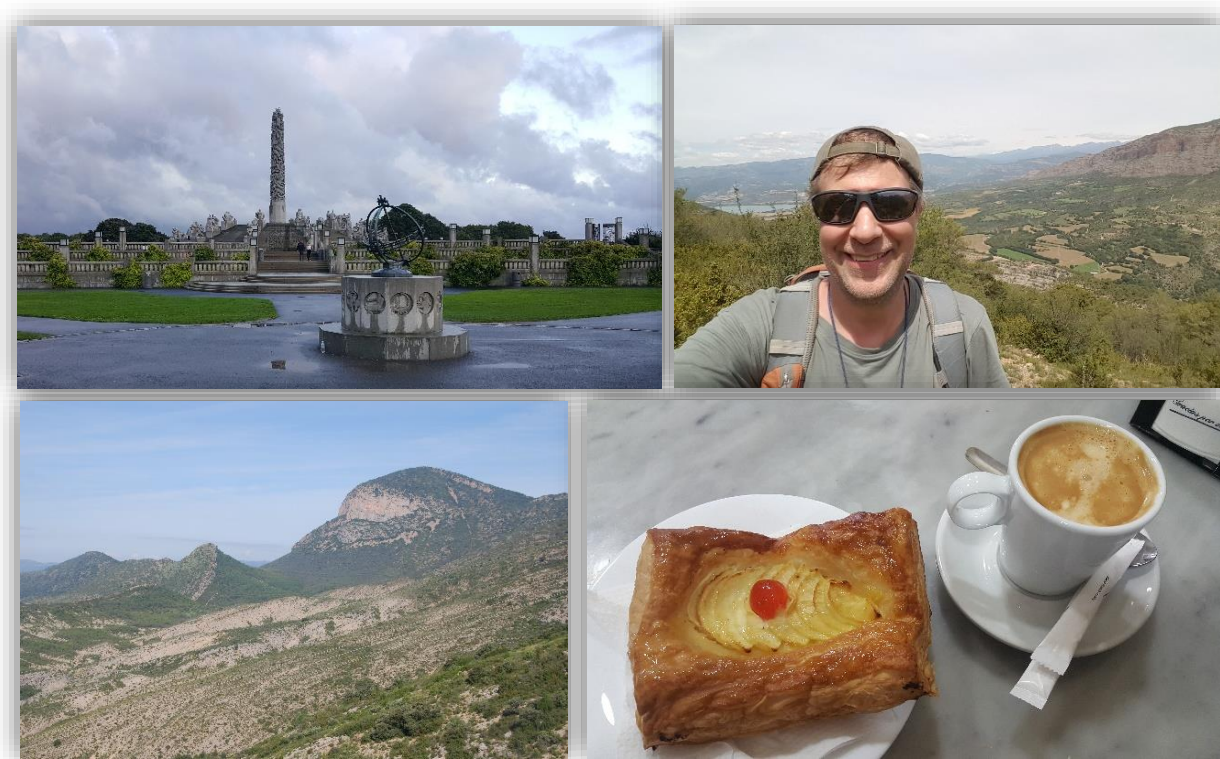
The 2017/18 academic year was a major transitional year for me both academically and personally. I began the fall semester on sabbatical leave, with a 6-week trip to Spain and Norway. For the first week, I worked with Dr. Jaume Vergés, a well-known structural geologist, and his group from CSIC (the Spanish National Research Council – equivalent to our USGS) in Barcelona. We are collaborating on a paper that uses both stratigraphy and structural geology to document a previously unrecognized episode of salt diapir-related tectonics that is partially masked by the later Alpine Orogeny, which created the Iberian Range in East-central Spain.

I followed this up with a week in Oslo, Norway, working with colleagues at Equinor (formerly Statoil) Energy Company. I was granted use of proprietary software and state-of-the-art visualization technology to conduct research on the Sant Corneli Anticline in the South-central Pyrenees. There I am investigating the origin and cyclicity of ancient Cretaceous reefs made up of unusual (now extinct) clams called rudists. In the evenings, I took advantage of the extended light hours to explore Oslo and the surrounding areas. From Oslo, I returned to Barcelona, where I co-led a field course on carbonate facies for Equinor. I do this every year, and enjoy the challenge of “teaching” geoscientists who sometimes have more experience than I do. I then spent three more weeks in Barcelona and the Pyrenees conducting more fieldwork in the Pyrenees and writing papers with my colleagues. I happened to be there while Catalonia, providence where Barcelona is located, voted for independence, and witnessed the very peaceful protests and emotions of the people. It was a very interesting experience. I finished the second half of the semester at Eastern, trying to finish my papers. However, I was never as productive as while in Europe! The biggest change I experienced while at Eastern was that I am no longer department chair – something that has permitted a better balance of teaching, research, and family life.



Key outcrop of the core of the Miravete Anticline, showing the salt weld (the seam through which salt escaped to the surface) in purple, and the complex stratigraphic units on either flank that were used to reconstruct the anticline growth history.

During the spring of 2018, it was back to the daily grind of teaching, administrative work (although less of this as I am no longer chair), and conducting research whenever possible. I taught two sections of Sedimentology and Stratigraphy. With the labs, this was a full teaching load. I also started to ramp up on the local research projects I am working on with students. This included reinterpreting the environments in which the dinosaurs at Dinosaur State Park roamed. I have always had problems with the current interpretations that they were walking on the margins of large perennial lakes full of fish, because the sedimentary structures (mudcracks, raindrop imprints, etc.) indicate a dry playa environment. If this is a surprise to anyone, please review your Sed/Strat notes! I have had the capable assistance of Dominic Livoti, one of our upper classmen, on this project. We collected data at not only the park, but from surrounding outcrops and cores in order to make a more comprehensive interpretation. This will be published in a volume on Dinosaur State Park that I am sure you can read more about in Drew Hyatt's contribution.



Oslo's Vigeland Sculpture Park (top left) with 212 bronze and granite sculptures of more 400 human figures from all stages of life constructed by Gustav Vigeland. Me (top right) in the foothills of the Pyrenees, in the location of my northern field location. The Sant Corneli Mountain (bottom left) in my Pyrenees field area. My favorite Spanish breakfast (bottom right) consisting of Tarta Manzana and Café con Leche.

On a personal note, I have been involved in Cub Scouts and Boy Scouts since 2005, but have successfully avoided the big job – Scoutmaster – until now! That changed this fall, as our old Scoutmaster stepped down. My older son made Eagle last year and is finished, but my younger son has 4 years left. I suppose that means I do as well. This position takes a lot of time. However, I did manage to gain some



time, because we are down to only two “fulltime” kids. My oldest daughter is officially “out the door”. She graduated from Franklin and Marshall College with a degree in neuroscience. She currently has a 2-year position as a lab tech at Yale University, and will pursue a Master’s Degree following that. My older son began his college career studying engineering at UConn. Even though he is in town, we made him live in a dorm, which happens to be directly across the street from his former high school. If you notice a jump in car insurance this year, it is because my younger daughter is now driving. She passed her test despite the comment from the DMV tester that she showed “questionable judgement” several times. I expected this, because the very first time I took her driving, I asked what the first thing you do in a car is, and she replied, “Find a good radio station”. Adjust the mirrors or put on a seatbelt were acceptable answers. Finally, my younger son still spends a lot of time with dad, but I expect that to change soon. My wife is in her 4<sup>th</sup> year as a state auditor, and has been assigned to UConn. This generates an alarmingly high rate of interesting stories about fiscal irresponsibility at the university, including the one where they paid a professor his full salary for 8 months after he had died because they did not realize he was dead. You may have seen that one on the news!



Drzewiecki Clan at my daughter’s graduation, from left to right: Aiden (19), me (perhaps unrecognizable with suit and graying hair), potential future son-in-law Avery, Kaela (21), Lisa (wife – not permitted to disclose age), Shelby (17), and Max (13).

I hope you all had as productive and enjoyable year as I have had, and I wish the best in the future. If you are ever in the area, stop in and say “hi” ... the door is always open!

## DREW HYATT

Hi everyone. I hope all is well with you and that your year/summer has been enjoyable and productive. As always, I have found the year-past to have been busy, interesting, and 95% fun (not a bad average). The following provides a few updates on my efforts in teaching, research, student engagement, and life outside the office. I may blur the line between the last academic year and the current summer as some activities span both.

Teaching over the past year has been rewarding. As always, I taught Field Methods in the fall, as well as Process Geomorphology which I had not offered since 2015 (photos below). I enjoy both classes. New to Field Methods was the introduction of RTK GPS testing, while I built in some new photogrammetry labs in Process. I recently acquired a drone and plan on incorporating drone mapping in a new class that will be developed next summer.



The fall 2017 Field Methods class meets at Bailey's Ravine, day 1 of the final project.



Collecting vibracores from the Eastern Arboretum in the Process Geomorphology lab.



The spring 2018 Landform class – notice the map being held backwards (what was I thinking!).





In spring, I taught Landform Analysis to the next wave of EES majors, as well as continuing several practicum classes with students that presented their work at the spring CREATE meeting elaborated on below. I taught EES 224, for the first time, in the new Fine Arts building. If you have not been back to campus in a while, you should check out Eastern's website to find a time that you could come back for concert/art show in the center as it is a really impressive addition to campus.

My research interests this last year have expanded on early work using digital photogrammetry to map and analyze change on coastal shorelines, and similar modelling efforts at Dinosaur State Park (DSP). The costal work, thus far, has primarily been in support of undergraduate research projects that build on collaborations with Bryan Oakley. In the summer of 2017, I supervised Bryce Mase on photogrammetric mapping at two sites on Block Island, and Jeffrey Fontaine for similar work at several sites on Napatree Point in Watch Hill, RI. As well, Ryan Cueto applied photogrammetry to selected parts of the tracksite at DSP. Summaries of these students' activities are provided elsewhere in the newsletter.

Research at DSP has been ongoing for a while, and I was pleased to receive a volunteer award from the park last summer. While I will focus on research efforts below, an important part of work at the park has been to support its educational mission. To this end, the Park now has several displays from EES including imagery on large rolling tables, a new dig-pit that consists of life-sized milled replica of the track derived from a 3D computer model that I constructed, a poster describing our mapping efforts at the park, and image contributions used in new videos on display in the auditorium.



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# TRACKS AND TRAILS

a publication of the Friends of Dinosaur Park and Arboretum, Inc.

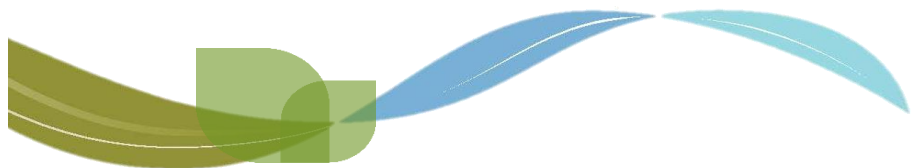
**April - May - June 2017**

## Premier Showing of New Video

The park's newest video, "*Stepping Through Time*," made its official debut at the celebration of Friends and volunteers on April 23, and will replace *Dinosaur*, a short Claymation general dinosaur video that the park has been showing for many years. The new video was created by the advertising agency, Mintz and Hoke, that worked with the park staff 10 years ago to create "*Step Into the Early Jurassic*," the first video about the park. This video is 25 minutes in length and is shown to school-age children and adults. The new

The 2016 Volunteer of the Year was announced at the recent annual meeting of the Friends of Dinosaur Park and Arboretum, Inc. James (Drew) Hyatt was selected by the FDPA for his volunteer service to the park. (See page 2.)





Over past year, there has been considerable development on research collaborations with Dr. James Farlow from Indiana-Purdue University. Jim is a well-known dinosaur track expert with a lengthy publication record. Under his leadership we have been awarded a book contract to edit a multi-authored book entitled “Connecticut Dragons: The Dinosaurs of Dinosaur State Park and Their World” to be published by Indiana University Press. This is an exciting and somewhat intimidating undertaking. For my part, in addition to editing, I will contribute to several chapters by creating and analyzing assorted 3D models of portions of the tracksite using digital photogrammetry. This includes the existing tracksite under the dome as well as 3D models constructed using historical photographs (*ca* 1969) of the adjacent original tracksite that has been buried by about 2 m of sandy soil since 1975. Other contributions relate to chapters that examine overlapping relationships between various tracks and bedding planes (with Peter Drzewiecki), and unusual trace fossils tracks some of which have been suggested as possible tail impressions. Manuscript deadlines arrive in the spring of 2019, so it will be many busy days ahead.



As noted in the introduction to this newsletter Dickson Cunningham has taken on the responsibilities of department chair. He has made substantial contributions and provides great vision going forward. I currently serve as assistant chair and will continue in that capacity next year.

Saving the best for last, I also wanted to provide a brief update on family affairs. Trudy and I have



been “*empty nesters*” for a while, although our dog Roxy keeps us entertained and happy. My son Jake continues to live/work in Ottawa as a computer engineer, while Hannah, a recent grad from Plymouth



State, is now working as a science Educator at Sea Camp San Diego. It is a bit more difficult for all of us to get together given the distance, but as some family photos suggest, we did have a wonderful Christmas together last year in Ottawa. We have also visited both Jake and Hannah recently. As they say, pictures are worth a thousand words so a few images follow from various family outings.

We had a wonderful visit to Ottawa for Christmas that enabled all four of us to spend some downtime together. This included taking in some sites in a beautiful city including the requisite visit to the hockey rink erected in front of Parliament (previous page). Not bad eh? Roxy (below) was happy to see us on our return. Another quick visit with Jake in May 2018 unfortunately meant that I had to miss the graduation ceremony (only the 2<sup>nd</sup> one I have missed in 18 years!). As you likely know, Ottawa is the Canadian capital, and is a beautiful place to visit (about 7.5 hours from CT). Below are views of Parliament at night a pub-view of Rideau falls. If you have not been, I strongly recommend visiting Ottawa on your Also in late May we visited Hannah in San Diego – another very cool place to live. It was a great visit, my



first to that City. We had a busy and fun visit complete with hikes along the coast, snorkeling with Sea Lions, visiting the San Diego Zoo, and a cocktail cruise in the bay.







## MEREDITH METCALF

This summer I have been working with Bryce Mase testing domestic wells in the Deep River Quadrangle, which includes the towns of Haddam, East Haddam, Lyme, Deep River, and Essex. Work is being completed in cooperation with the Department of Energy and Environmental Protection (Bill Warzecha), the Connecticut Geological Survey, the State Geologist (Margaret Thomas), and the Department of Public Health to determine whether the rock types within this area can be used to predict the underlying water quality conditions. This is typically assumed but the USGS and the Connecticut Geological Survey are mapping the Deep River Quadrangle this summer and the mineralogy and litho geochemistry analyses they perform will be compared to our water quality analyses to validate this assumption. Sampling in towns unfamiliar to us allows us to meet some great people in the state and have some unexpected experiences! It has been so fun that Madie Varney even joined us one day for sampling!



Bryce Mase preparing to sample a domestic well in the Deep River Quadrangle following the Department of Public Health's protocol (left), enjoying a trolley car while in the field (center), and enjoying a sampling volunteer's backyard getaway with Madie Varney (right).

Interests and opportunities continue to grow in the field of geographic information systems (GIS). Last summer Tara Brooks completed an internship for the City of Hartford's Department of Public Works under the supervision of Adjunct Professor, Aaron Nash. Their work was presented at the Connecticut GIS User-to-User Network Meeting in June of 2017. Luke Davis, Chris Kaminsky, and Alexia Bohnenkamper also attended this User-to-User Network Meeting and presented projects they had completed in Advanced GIS (EES 342) that were focused on the City of Hartford. In the spring, Emily Margolis also completed an internship under Aaron's supervision. Aaron has provided a wonderful opportunity to students with an interest in GIS by exposing them to additional skills and techniques not obtained in the classroom. Alexia Bohnenkamper completed an internship with the Connecticut Office of Policy &

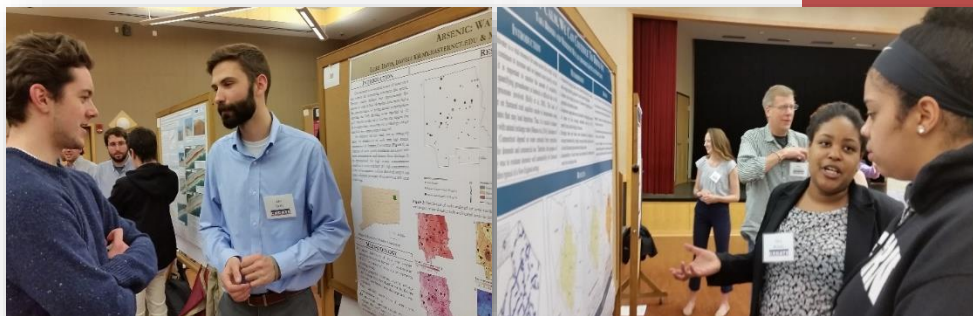
Management, Comprehensive Planning and Intergovernmental Division under the supervision of Eric Lindquist (2012). On-campus students continue to complete internships creating parcel data for the Wildlife, Park, and Forest areas mandated in Public Act No. 14-169 for the Land Acquisition & Management Office of the Commissioner for the Department of Energy and Environmental Protection.

In the fall of 2017, Luke Davis and Alexia Bohnenkamper presented their work in Advanced GIS at COPLAC, Mansfield University in Pennsylvania. Luke Davis also presented this work at the Northeast Arc Users Conference in Burlington, Vermont.

Also, during the fall semester Luke Davis and Tara Brooks completed independent study projects evaluating water quality and water quantity issues for towns in eastern Connecticut. Using GIS, Luke statistically evaluated the distance from areas of recharge and discharge as an additional variable to work completed by Laura Markley and Madeleine Haynes to potentially explain the occurrence for arsenic in domestic wells in the towns of Eastford and Pomfret, Connecticut. Tara evaluated the sustainability of groundwater within the fractured rock for Lebanon, CT to determine whether this area of the state can sustain future development without impacting the groundwater. Both Luke and Tara presented this work at CREATE, NCUR, and the spring Northeast Arc Users Conference.

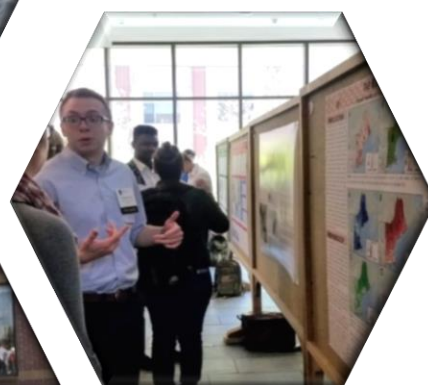
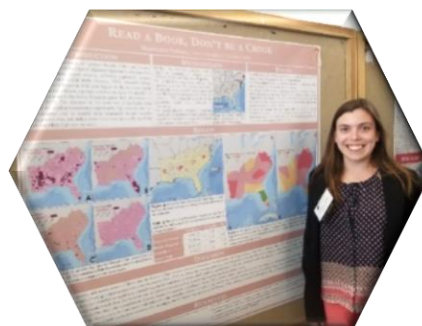


Luke Davis and Alexis Bohnenkamper presented their Advanced GIS projects in October 2017 at COPLAC at Mansfield University



Luke Davis and Tara Brooks presenting the independent study research projects at Eastern's CREATE conference in April 2018.





Students presenting and attending the Spring Northeast Arc Users Conference at the University of Connecticut in May 2018 included: Madie Varney, Noah Hallisey, Luke Davis, Ryan Cueto, Zach Adams, Bryce Mase, and David Bafumo.

Jennifer Croteau, Jeffrey Fontaine, Noah Hallisey, Zach Adams, David Bafumo, Ryan Cueto, Madie Varney, and Sam Evans from Advanced GIS presented their capstone projects at the spring Northeast Arc Users Conference at UConn this spring. Mario Vinci completed an independent study project using GIS, which he also presented at the conference. The student projects were well received, and it was a fun day for the students to present and attend with fellow GIS professionals in the area that included Aaron Nash (Adjunct Professor in EES), Eric Lindquist, Maddie Haynes, and Jenny Petrario.



Students presenting and attending the Spring Northeast Arc Users Conference at the University of Connecticut in May 2018 included Sam Evans, Madie Varney, Bryce Mase, Zach Adams, Ryan Cueto, Jennifer Croteau, Noah Hallisey, Mario Vinci, Luke Davis, Tara Brooks, Jeffrey Plourde, and Jeffrey Fontaine.



This year I chaperoned my husband's annual Spring Break travel-study abroad program in March to Portugal and Spain. Joining us this year was Luke Davis who received a scholarship and, repeat travelers, Maddie Haynes and Jenny Petrario. We explored the cultures of the Iberian Peninsula traveling from Lisbon, Portugal through Seville and Madrid, and ending in Barcelona. The highlight was visiting Sagrada Familia by Spanish Architect, Antoni Gaudi, known as God's Architect. The basilica is known as "the bible written in stone". Carvings around the façade depict the life of Christ and both Old and New Testament stories. The longest ongoing construction project on Earth, the basilica is expected to be completed in 2026. Gaudi's engineering genius and affinity for nature is something that must be seen and cannot be described.



Luke Davis and I in front of the hardest stone in world, red porphyry, at Sagrada Familia (left) and Luke zip lining across the Tagus River in Toledo, Spain (CRAZY) (right).

## STEPHEN NATHAN

2017-2018 was a full year of teaching and research for me! I taught a new course (for me), went on several wonderful trips, and worked with two EES students on a great research project during the summer and academic year.

June 2017 two EES students, Emma Avery and Kayla Anderson, joined me and my EES colleague, Associate Professor Bryan Oakley, for a second season of fieldwork on Block Island (Rhode Island). The 2017 trip was to build upon a smaller, pilot study we carried out summer 2016. The purpose of this research is to gauge the feasibility of using microscopic, single-celled marine organisms called foraminifera, as a proxy for measuring the severity and/or frequency of historical tropical/extratropical storms, and in turn, climate change upon Block Island and Block Island Sound. For the 2017 trip, the four of us spent two and a half days collecting five sediment cores from Wright's Pond and Middle ponds on Block Island. One core from Wright's Pond and two from Middle Pond were later split, photographed, described and sub-sampled by Emma for her senior Honors Thesis. She continued this summer research during the past academic year and is concluding her lab work summer 2018 (by doing bulk grain size analyses and a survey of foraminiferal abundances).

The project is funded in part by Eastern Exemplary funds for undergraduate summer research (2016, 2017 and 2018) and by a 2017-2018 faculty research grant from



Emma brings home the bacon (a sediment core) collected from Middle Pond, Block Island



Kayla Andrews cuts the core with Prof. Bryan Oakley assisting

CSU-AAUP (Connecticut State University-American Association of University Professors). These grants provided Emma with financial support for each summer as she worked on the project. They also funded a wide range of technical analyses available only through commercial laboratories (e.g., carbon-14 and lead-210 age dating of the pond sediments; continuous Geotec data (magnetic susceptibility, spectral reflectance, density, and color); and XRF data (x-ray fluoroscopy).



Emma presented her preliminary results at the April 2018 Eastern CREATE Conference. She will present her final results at the spring 2019 Geological Society of America Northeast Section meeting as well as at CREATE 2019.

Last fall (2017), I taught Ancient Environments (a.k.a., Historical Geology) for the first time at Eastern. My colleague, Peter Drzewiecki, was on sabbatical and I stood in to teach this core course for him. In Ancient Environments, students learn how the Earth has changed over time, becoming the planet we know today. Most importantly, they come to know, how we know, the history of the Earth. Specifically, students develop the basic skills needed for observing rocks and in turn, interpreting what they see. Being able to collect and interpret data are key skills they will need in the workplace.

I continue to upgrade my Sustainable Energy (EES 205) and Energy Issues in Geoscience (EES 402) courses. For the former (EES 205) I've updated content so to keep pace with the rapidly changing landscape of Sustainable Energy; while for the latter (EES 402) I engage students through new active learning projects in geothermal energy and fracking for hydrocarbons. Next fall (2018), I will split the Ancient Environments course with Peter; he will teach the lecture sections and I will teach the labs. I am very much looking forward to teaming up with him to teach this key introductory course for EES majors.

October 2017, I presented a poster at the annual AASHE conference in San Antonio, TX (Association for the Advancement of Sustainability in Higher Education). The topic of the poster followed a paper I co-authored with EES Professor Emeritus Fred Loxsom and published in *The Physics Teacher* (Oct. 2016). The paper described the Sustainable Energy laboratory (EES 207) and how it has been a great success as a Tier II service course for the university and the EES department.

The rule of never a dull moment at school often spills into my time outside of Eastern. As one little example, my wife works for the American Red Cross and often municipalities ask the ARC to march in holiday parades, such as the City of Springfield's (Massachusetts) day after Thanksgiving "Parade of the Big Balloons". Last fall, the city asked the ARC to help with the parade. Short of volunteers, my wife roped me (almost literally) into being a "balloon wrangler". So there I was (with 40 other folks), guiding the 75 foot "Cat-In-The-Hat" Balloon down Main Street, ducking him under tree limbs, around traffic lights, etc., for two miles. This was certainly an interesting experience, not to mention deflating the balloon and getting a face-full of helium! I wonder if this will qualify me for the Macy's T-day parade?



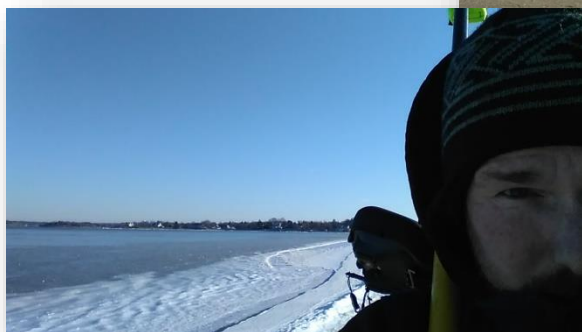
My other "day-job", Balloon Wrangler



## BRYAN OAKLEY

WOW! Why is it when we look ahead to the end of the semester it seems to arrive at a glacial pace, yet the beginning of the semester seems like yesterday? This was a busy academic year; in addition to the introductory courses 'Dynamic Earth' and EES 220 'Environmental Geology', I taught Glacial and Quaternary Geology in the fall 2017 semester, and Coastal Geologic Hazards in the spring 2018 semester. On the home front, my kids continue to grow; Aidan is 8 ½ and Haley is approaching 5 ½, and give my wife and I lots of fun, fast times (and even furious times!!) Aidan is very much into karate now, having reached the rank of Junior Blue belt, and Haley is alternating between dancing, gymnastics and swimming. Aidan is starting to get to be old enough to be Dad's field assistant at the beach, and Haley is just trouble (in a good way!). When I am not in the office, you can typically find me in the field or cruising a local waterway at dawn on my paddleboard!

Why I put up with my commute: paddleboarding  
Watch Hill Harbor, early December, 2018



### My how the seasons turn fast!!!

Conducting late December fieldwork measuring barrier profiles at Napatree Point (that is a very frozen Little Narragansett Bay in the background!)



The Oakley kids helping to collect some beach profiles at Westerly Town Beach







In the field at Napatree Point with EES student Jenn Croteau and Aidan Oakley; April 2018

My on-going research projects have continued, focusing on monitoring the shoreline on Block Island (collaborating with volunteers) and Napatree Point. The work at Misquamicut State Beach on the 2014 replenishment project trickles along, and research has been assisted by numerous students over the years. The results of this work was presented at the 2018 Eastern CREATE conference by May, 2018 graduate Michael DePinto. On the Napatree front, I have been named to the science advisory panel for the Napatree Point Conservation Area, and the Watch Hill Conservancy has funded my on-going monitoring at Napatree through 2018. Dr. Hyatt and I are continuing to use photogrammetry to evaluate changes to the bluff at the western end of Napatree Point. The projects here have expanded its scope beyond shoreline change.

EES student Jennifer Croteau began a project in the spring of 2017 examining the vulnerability of the salt marsh within the Napatree Lagoon to sea level rise and crab predation. EES student Madie Varney is examining the evolution of the barrier spit that enclosed the Napatree lagoon following the 1938 Hurricane and Alyson Augenstein is working on the bathymetry of the Napatree Lagoon to examine sedimentation since the lagoon was last surveyed in 2014. The partnership between Eastern EES, the University of Rhode Island Coastal Institute and the Watch Hill Conservancy remains a great asset to the department and will continue to provide student research opportunities in the future! The research on Napatree has garnered significant local and national attention. Locally, the Coastal Institute at the University of Rhode Island has named Napatree a designated example of natural coastal resilience and has commissioned a documentary on Napatree, which was released in the fall of 2017 (Link is available on my website)! Working with Alexia Bohnenkamper, and building upon work



EES students Jenn Croteau and Madeline Varney surveying the barrier spit at the Napatree Lagoon using RTK-GPS, December 2017

done by EES alumni Joshua Bartosiewicz, Samantha Boyle, Mike Manzi and Amber McDonald and my colleague at the University of Rhode Island Scott Rasmussen, we completed historic shoreline change maps for Block Island, Rhode Island, depicting the change between 1952 and 2016. These maps form the basis for coastal construction setbacks for new construction along the Rhode Island shoreline, and represent the first shoreline change maps for the Island. This project dovetails nicely with work done with Dr. Hyatt and his students looking at bluff erosion using photogrammetry.

Outside of Eastern, I continue to be involved with the Rhode Island Shoreline Change Special Area Management Plan, which we hope will become a national model of science-based policy, aimed at guiding sustainable development along the RI shoreline. The overall policy document is being drafted now, and should be approved by the Coastal Resources Management Council later in 2018. Aspects of this project and other facets of our research have led to a handful of publications with my Ocean Engineering colleagues on coastal risk in the *Journal of Marine Science and Engineering* and *Natural Hazards*. We are continuing to evolve our thoughts on this topic as we develop the planned Coastal Environmental Risk Index (CERI), and were funded for this project beginning in 2018. CERI is gaining traction nationally as coastal cities are looking closely at our protocol and 'stakeholder' approach to training the local municipalities in coastal risk.

Collaborating with John King at the Graduate School of Oceanography at URI, we are continuing to look at sand and gravel resources offshore of Rhode Island as part of a project funded by the Bureau of Ocean Energy Management, and we continue to work on a sediment budget using side-scan sonar, surface sediment grab samples and underwater video imagery for the same shoreline, funded by the Department of Interior and National Fish and Wildlife Federation. EES students Cody Murphy, Madie Varney and recent alumni Joel Hara worked on this project. Cody worked up part of the project, examining the sediment deposition within the Point Judith Harbor of Refuge following the construction of the harbor breakwaters in 1914.

As many of my research projects are continual and ongoing, I am always looking for motivated students to help with field and lab work, especially if you have already taken GIS! More information on these projects can be found on my website:

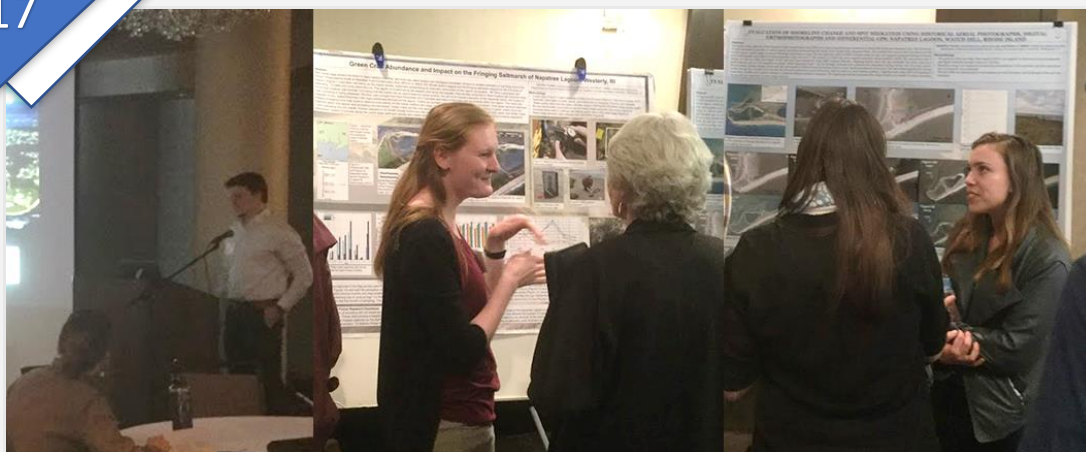
<http://www1.easternct.edu/oakleyb/>





NEERS  
2017

## New England Estuarine Research Society Annual Conference, Portsmouth, NH (April 2018)



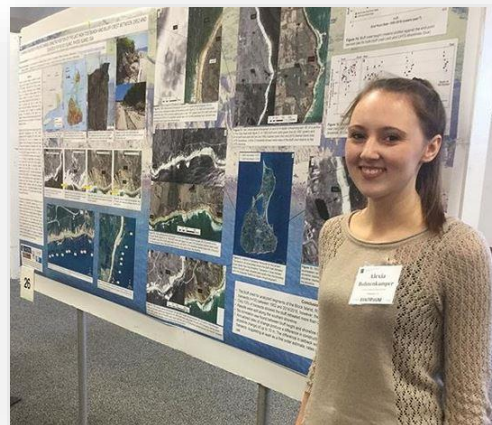
Cody (left), Jenn (center) and Madie (right) presenting at the 2018 NEERS conference

Eastern Connecticut State University EES students Cody Murphy (oral presentation), Jennifer Croteau and Madie Varney (poster presentations) (Faculty mentor, Bryan Oakley) attended and presented their respective research projects at the 2018 New England Estuarine Research Society (NEERS) annual conference in Portsmouth, NH. The presentations were very well received, and the feedback received from Oakley's colleagues at the conference was that overall folks were impressed that all three were undergraduate students! Cody graduated in May 2018 after completing an independent study, and Jenn and Madie will continue to work on their projects in the 2018-2019 academic year.

NEGSA  
2018

## NE Section of the Geological Society of America Meeting, Burlington, VT (March 2018)

Alexia Bohnenkamper, a May 2018 graduate presented her research project at the Northeast Section of the Geological Society of America meeting in Burlington, VT. Alexia began working on this project with Bryan Oakley in the summer of 2017, as we worked to create the first historic shoreline change maps for Block Island, RI, depicting shoreline change between 1952 and 2016. Alexia built on that work during the academic year to compare the rates of change measured at the beach with those measured at the crest of the bluff. The shoreline change maps completed by Alexia form the basis for coastal construction setbacks for the Rhode Island coastal management agency.



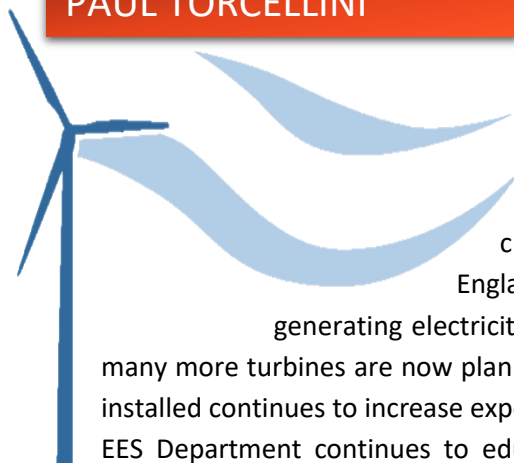
Both EES 424 (Glacial Geology) and EES 456 (Coastal Geologic Hazards) had a field component in 2017-2018. The EES 424 fieldtrip examined sites in southeastern Connecticut and western Rhode Island, while the coastal class split their time between Napatree Point and Block Island, RI.



EES 424 students examining an outcrop within a glacial delta, December 2018



## PAUL TORCELLINI



The mixture of fuel sources we are using is changing dramatically. Natural gas continues to grow as a dominant part of the electricity generation mix. Constraints in this system are creating some pressure on using oil for electrical production in New England. The first commercial offshore wind turbines in the U.S. are generating electricity off Block Island, RI and went on-line near Block Island, RI, and many more turbines are now planned for Long Island Sound. The number of solar electric systems installed continues to increase exponentially. The Center for Sustainable Energy (CSE) housed in the EES Department continues to educate students on the advances as we move towards a more sustainable energy future. Dr. Torcellini continues to lead the Center working with other faculty to prepare students for jobs of the future.

Students studying Energy Analysis (EES 407) created plywood boxes on the fourth-floor patio of the science building with 80W solar panels that mimicked a small house. The experience in setting up the houses, installing a small-scale heating system with controls and monitoring the consumption and production provided practical hands-on experience. The data collected provided analytical skills and report writing skills as students digested thousands of data points trying to understand the house's performance. A new generation of controllers has been purchased for future classes to augment the web-based data acquisition systems that students are learning to use.

Energy Resources (EES305) and Green Buildings (EES306) continue to be popular classes where students learn about current energy technologies and analytical skills about energy with a focus on sustainable energy. Field trips to local power plants and to mechanical rooms of buildings provide a sense of scale of energy consumption both on-campus and in the community.

As in the past, three interns of the endowed chair gained experience in working on integrating sustainability into the Eastern Campus. They organized solar demonstrations on the quad lawn, organized Earth Day activities, hosted sustainability films for the campus and continued to promote mixed recycling on campus. Not only is recycling environmentally sound, but also putting items into recycling bins saves Eastern money! A highlight was the first ever campus wide picnic that was a "zero waste event." All materials used for the event could either be recycled or composted except for a few small items. In all, an estimated 90% of the waste generated was either recycled or sent to a bio digesting facility for electrical production with remaining solids being converted to agricultural amendments.

CSE has also been working on Municipal Action Plans to help local towns reduce their energy impact. Part of this effort, students have been learning about these plans and strategizing on ways to save energy for town buildings. Following on from a previous project, one student worked on examining the energy use of Eastford Elementary School. Through these efforts, electricity consumption is down approximately 20% and photovoltaic panels will be installed this summer. Some issues related to thermal comfort were discovered and students devised a plan showing improvement after changes. Students are learning how to use the data loggers and interpret data to look for energy waste.



Branching into sustainability and agriculture Alex Fazzino (EES'18) did a senior thesis on examining carbon sequestration with agriculture and the relationships between energy, agriculture, and the environment. Soils have the potential to store vast amounts of carbon, but it is highly depending on farming practices and the top few inches of the soil layer. His analysis potentially will become the foundation for future work in this area.



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|---------|---|
| (a)     | Emily Miller '18 and Alexa Bohnenkamper '18 create their solar home for EES 405   |
| (b,c)   | Chef Sean Bodnar (EES '18) cooks grilled cheese sandwiches using a solar cooker during a solar demonstration day outside the science building   |
| (d,e,f) | Faculty and Staff Spring picnic designed to have zero-waste by using compostable dishes and recyclable products. CSE interns provide educational information and instruction on how to recycle and compost. |





## Alumni Updates

**Tara Brooks (2018)** is a Water Quantity Seasonal Intern at the Department of Energy and Environmental Protection. She works with four other individuals on a water diversion project which involves uploading permit reports to designated sites in a site information management system, organizes water use data from water diversion permit reports, conducts wading field work to install trail cameras, and remaining up-to-date on trainings required for the position.



**Tim Bugden** completed his master's degree in water management at the University of Connecticut. He studied the effects of changing spatial resolution on watershed scale hydrologic model performance, particularly with the Precipitation-Runoff Modeling System produced by the USGS. Currently he is busy taking courses in Python, assisting a colleague with GIS at UConn, learning Fusion 3D, and studying Italian. He has visited Italy three times now and his most recent interests were visiting the small town of Orvieto north of Rome. The walled city was built on a plateau of tuff with an extensive network of manmade caves under the city. Both the hydrology and geology of the setting makes an amazing learning experience.



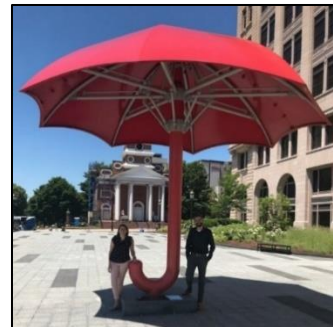
**David Carney (2013)** is currently working with the Forest Service in Montana. He is working out of the Belt Creek Ranger District as the crew leader for a trail crew of seven people. They are responsible for clearing and maintaining trails throughout the six mountain ranges in the district. He also volunteers at an amazing museum in Bozeman Montana preparing dinosaur fossils and providing enjoyable tours to the visitors. This position will help better prepare him as he pursues an advanced degree in paleontology.

**Hannah Cheney (2017)**, now Hannah Puchkoris, is currently working as a vacation planner at Topsail Realty Vacation Rentals in Surf City, North Carolina. She communicates with guests vacationing and helps them navigate the reservation process for an enjoyable stay at one of the many beach houses on the island. She also works closely with property services and management to make guests have the best vacation experience.



**Tim Ciskowski (2016)** started working as a GIS Technician, soon to be a Drone Operator, for Atlas 10 which is a GIS consulting firm located in downtown Cincinnati. He is responsible for mapping properties for clients and determining the health of their pavement and asphalt using remote sensing software. In other words, they are currently using high-resolution aerial photography to determine the accuracy, reliability, and cost to determine the defects in pavement without having to send someone to the site.

**Luke Davis (2018)** is a Geospatial Intern for the Personal Insurance Platform Team at Travelers Insurance. He works with geospatial technology to increase productivity and assist business partners with the development of layers, maps, and web applications. Luke is one of the three-geospatial interns hired by Travelers Insurance this summer. Luke and Maddie are both enjoying their time “under the umbrella”!



**Martha Denisky (2017)** completed her master’s degree in Education this past May (2018) and is now employed as an 8th grade science teacher at Enfield Public Schools where she will primarily be teaching Physics, Earth Science, and Genetics. She has found it difficult to keep herself away from geology too long, as she is a volunteer at Dinosaur State Park this summer!

**Connor Dunleavy (2017)** is working at Phillips Cruises and Tours, a glacier cruise company operating out of Whittier Alaska. As a deckhand, Connor assists with daily operations of the boat, serves passengers, and talks about the sites as the boat cruises. He has been accepted to the University of British Columbia and will be pursuing his master’s degree in Land and Water Systems.



**Jeffrey Fontaine (2018)** began working at Microbac Laboratories, Inc. in Dayville as a Sample Login Technician, joining fellow EES alumni **Matthew Young (2012)** and **Samantha Boyle (2015)**. Jeffrey is responsible for receiving water samples and ensuring the integrity of the sample from the time the lab receives the sample to the time of analysis. This includes recording temperature, verifying how the sample is preserved, and ensuring a proper wait time for analyzing samples for specific parameters. Since he began in May, he has had a dynamic experience involving a great deal of customer relations who are both homeowners and large companies required to test water quality on a weekly basis. **Samantha**

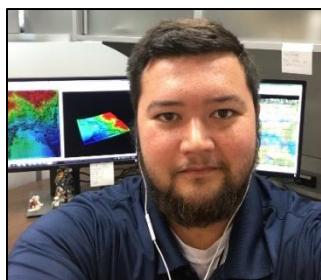
**Boyle (2015)** is a Project Manager and the UCMR4 Operations Manager at Microbac Laboratories, Inc. She oversees the entire UCMR4 project within Microbac. This project with the EPA requires public water systems to test for contaminants that are currently not regulated. She handles all client interactions, as well as shipping and receiving of samples and reviewing of completed data. She interacts directly with the EPA regarding data and client issues. Additionally, Sam reviews the results from the sister labs for the UCMR4 project – she reviews the results and helps when needed. She is the liaison between Microbac Laboratories, Inc. and clients; thus, she is responsible for communicating results and addressing issues with clients. **Matthew Young (2012)** is a Project Manager at Microbac Laboratories, Inc. He largely focuses on private wells in Connecticut, Massachusetts, and Rhode Island. He is also managing all the testing for Providence Water and many Massachusetts public water systems.





**Noah Hallisey (2018)** is currently an Administrative Assistant in the Environmental Laboratory at Dominion Energy's Millstone Power Station in Waterford, Connecticut. The lab conducts studies on marine ecosystems as part of the permitting process as well as Dominion Energy's commitment to environmental stewardship. Studies include lobster, winter flounder, Ichthyoplankton (fish eggs and larvae), and other marine life. Noah's main function in the lab is to sort Ichthyoplankton samples using a microscope in support of a monitoring program on fish eggs and larvae that are being entrained through the seawater cooling intakes. In the fall, Noah will be a graduate student in the Masters of Environmental Science and Management program (MESM) with a concentration in Conservation Biology at the University of Rhode Island.

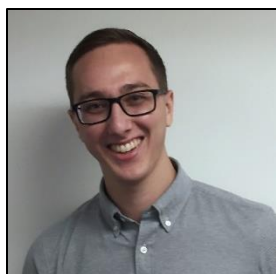
**Maddie Haynes (2017)** is a Geospatial Intern at Travelers Insurance where she is responsible for many GIS projects within the Claim Department. Completed projects provide much needed insights for the company to be more successful at serving clients. Maddie is also a graduate student at Clark University. She is currently pursuing her master's degree in Geographic Information Science for Development and the Environment. While completing her degree, she works as a Teaching Assistant, Research Assistant, and serves as the Program Representative.



**Kevin Lacy (2016)** is a GIS Analyst with Stantec, a Canadian based engineering firm located in Raleigh, North Carolina. Currently he is responsible for quality control and writing metadata for LiDAR projects for FEMA. He also creates, edits, and quality controls flood insurance maps. He will be heading a field collection team for various cities in the southeast.

**Eric Lindquist (2012)** is an Environmental Analyst for the Connecticut Office of Policy & Management, Comprehensive Planning and Intergovernmental Division. He's responsible for assisting in the State's efforts to revitalize cities by building sustainable and economical communities while preserving both the historical and unique properties that Connecticut is known for and it's natural resources.

**Jaqueline Lorange** is pursuing her master's Degree in K-12 education at the University of New Haven. While earning her degree, Jaqueline continues to teach special education at Oak Hill School in Hartford. She enjoys incorporating as much science as she can into her lesson plans.



**Michael Manzi** is currently lives in Boston and is a Client Engagement Professional for a company called EnergySavvy, which provides energy efficiency solutions for utility companies across the country. He works with clients as an account and project manager to help design and implement software solutions for their energy efficiency programs.

**Bryce Mase (2019)** has been working this summer as a GIS Intern at Milone & MacBroom in Cheshire, Connecticut. He primarily works for the Planning Department and is responsible for completing GIS work for various projects ranging from town conservation and development plans to school planning. He is responsible for making maps, creating data and finding data, and organizing the information internally for each project.



**Jeffrey Olandt (2013)** just moved to Kansas City, Missouri for a new job located on the Kansas-Missouri state line. He is working as a GIS Specialist II for the fiber optic industry, his work is focused on locating new line development, and current design plans. As a member of a small team, he is responsible for data processing, geodatabase management, and analysis of current projects.

**Lauren Polansky (2017)** is currently pursuing her master's degree in Organizational Management at Eastern Connecticut State University. While completing her degree, she is a Graduate Intern in the Office of Student Activities at Eastern. She is responsible for supervising the Campus Activity Board, overseeing commuter student initiatives and staffing large scale events run through their office.



**Katie Rychling (2013)** graduated with a Master's in Education from Eastern in 2015) will be starting her 4<sup>th</sup> year at Hall Memorial School in Willington, Connecticut as the 7<sup>th</sup> and 8<sup>th</sup> Grade Science Teacher. Throughout the year, she teaches various topics including physical, life, and earth science. She has taken the position of Science Curriculum Chair to assist in the transition to the Next Generation Science Standards. She also serves as 8<sup>th</sup> Grade Team Leader, 8<sup>th</sup> Grade Class Advisor, and Staff Development Coordinator.

**Mark Skaff (2015)** is a Project Coordinator for Ceco Concrete Construction, LLC in Hartford, Connecticut. Ceco Concrete is a national structural concrete contractor that is focused on creating high quality structures at an affordable price in an appropriate amount of time. Mark is responsible for overseeing material and drafting drawings for use in the field.



**Natalie Stepniewski (2017)** is a Passenger Service Crew Member for Phillip's Cruises & Tours, LLC in Whittier, Alaska. The cruise ship takes daily trips to show passengers the amazing wildlife and the 26 glaciers in the area. Natalie assists passengers on the boat and serves food and beverages while experiencing the beauty of Prince William Sound. She and the other crewmembers are trained to keep passengers and fellow crewmembers safe for the duration of the cruise. She has enjoyed the amazing experience that she has been lucky to witness every day.



**Lucas Suchinski (2017)** is a Product Specialist at Reflex Lighting Group of Connecticut where LED and fluorescent lighting fixtures are sold to interested parties that mainly include distributors and contractors. Lucas is also responsible for putting together lighting packages for new and retrofit construction projects. To future graduates, Lucas' states, "Believe in yourself and never worry. Life and this major will bring you many great, unexpected opportunities. Stay optimistic!"



**Erica Tefft (2012)** is the GIS Coordinator for the Massachusetts Department of Conservation & Recreation, Division of Water Supply Protection. She supports approximately 75 GIS users with various needs, including administration of ArcGIS Online, development and support of multitude of Collector/Survey123 field applications, management of a fleet of field data collection devices and GPS, development of workflows for all division GIS users, implementation of staff training in both desktop and online software, development and implementation of mapping and metadata standards, development and implementation of Standard Operating Procedures for layer naming, file schemes, archiving, etc., and development of public-facing applications for the Mass.gov website.

## For Our Alumni

### What are you up to?

We would very much like to include updates from EES alumni in our newsletters. If you would like to contribute, please e-mail responses to the following questions to either Zosia (carlquitz@easternct.edu) or Dickson (cunninghamw@easternct.edu).

All the best for a great year!

### To help us build the next newsletter, please send the following:

1. Name, graduation year, current e-mail address.
2. Tell us what you do now (and if you would like us to include this information in the newsletter).
3. A brief paragraph telling us about your other activities since graduating.

**Eastern EES Facebook Page:** Alumni, if you are not currently a member of the Eastern EES Facebook page, please email Bryan at [OakleyB@easternct.edu](mailto:OakleyB@easternct.edu) and he can send you the link. The Facebook page is a great way to stay connected to the department, as well as a growing resource for EES related jobs.



### **SUPPORTING EES STUDENTS**

The faculty members of the EES Department are committed to providing our students with practical research, field, and presentation experience as often as possible. Many of the activities our students participate in are supported through the EES Founders Fund, which was established for these purposes. We welcome your tax-deductible donations to this fund and encourage you to contact Mr. Peter Dane at University Relations (860-465-4513), if you would like to learn more about how to contribute to experiences that open minds and support career development for new generations of EES students! Thank you in advance!

