THE UNIVERSITY OF TENNESSEE CHATTANOOGA

DEPARTMENT OF BIOLOGY, GEOLOGY AND ENVIRONMENTAL SCIENCE

BGE 2021 Newsletter

Dear Alumni, Students and Friends,

The Department of Biology, Geology, and Environmental Science has experienced a challenging, yet productive, year! I'd like to express my sincere appreciation to BGE students, faculty, and staff for their creativity, flexibility, and patience as, together, we have navigated the unique complexities presented by Covid-19. When the pandemic hit in March 2020, BGE faculty converted over one hundred sections of face to face (F2F) classes to online modalities in less than one week. Course offerings during Summer 2020 were largely online; whereas, in Fall 2020 and Spring 2021, many courses have followed a hybrid modality, involving both online and F2F components. The conversion to online and hybrid modalities was a daunting task requiring hundreds of person-hours. BGE faculty embraced the challenge with a positive "can do" attitude, despite most having never taught online. Our students adjusted to the new course modalities and other Covid-19 issues with grace and resilience. BGE staff adjusted to hybrid schedules, involving rotating work-from-home and at-work assignments, to ensure essential tasks were performed while also reducing health risk by minimizing the number of individuals in the department office at any one time.

Even with these challenges, faculty, students, and staff were highly effective in meeting their responsibilities. Faculty advanced their research programs, mentored student research projects, presented results at virtual scientific meetings, submitted grant proposals, and published research findings in academic journals. Students completed courses, conducted research, defended thesis projects, advanced in their degree programs, and graduated. Staff kept the department functioning smoothly, including overseeing lab and classroom safety, purchasing supplies and equipment, processing student and faculty payroll, fielding inquiries, and performing other essential functions.

Looking ahead, we are gearing up to recognize several of our most outstanding students with scholarships and awards in our annual spring student awards event. It is spring planting season in our Teaching and Learning Garden! The Garden has quickly become an important component of BGE's education and service mission, providing hands on experiences for students and food for underprivileged Chattanoogans. Finally, I'd like to congratulate our Geology program for being recognized as the top ranked undergraduate geology program in Tennessee! Please accept my best wishes for a terrific spring!

John Tucker
Department Head

CoVid-19 IMPACT ON THE DEPARTMENT:

During the second week of March 2020, departmental faculty and students headed off to what we thought would be a normal spring break. Little did we know that for many of us we would not be back in the classroom or lab face to face until spring semester 2021 (and some later)! Due to ever-increasing knowledge of the virulence of the novel SARS CoV-2 virus and, as we saw the remarkable levels of CoVid-19 disease in US Hospitals, it quickly became evident that UTC had to take the virus seriously and enact realistic preventive measures. Many departmental faculty (who had never taught a course online) quickly had to master development of lectures and lab exercises that then had to be video recorded and posted online. Needless to say, there were some bumps in that road.

After spring semester 2020, UTC convened a CoVid-19 Task Force to make plans for summer and fall classes. The campus was outfitted with signs encouraging social distancing, plexiglass everywhere, and the requirement to wear masks anywhere on campus. The UTC Health Center developed protocols for identification and tracking of any students, faculty, or staff who might show symptoms of the disease, and plans for quarantining those people. Classroom and lab capacity limits were established to encourage proper social distancing. Most classrooms and labs were limited to half their usual capacity. During fall semester 2020, most departmental courses were taught entirely online. Our faculty were definitely learning how to teach online and most classes ran smoothly. The rules limiting classroom and lab capacities are still in effect (spring semester 2021) and will possibly remain in effect next fall (fall semester 2021), depending on the status of the disease in Tennessee at that time. As we have gradually attempted to reinitiate face to face classes this semester, we have reduced the number of students who can take the classes. This, too, has affected the way our faculty teach our classes.

Over this time a number of departmental students and faculty contracted the virus. For most who were infected disease symptoms were minimal. After an appropriate quarantine period, a complete recovery occurred. However, for one of our recent retirees (Wayne Williams, former lab coordinator for the Geology program) his road to recovery has been via the hospital. At the time of this writing, he is currently out and about, but still needs bottled O_2. In the extended families of our students, faculty, and staff the impact of this disease has been devastating. We have lost parents and aunts and uncles. We will all remember CoVid-19 well into the future and hope that we never have another pandemic like this.

RESEARCH HIGHLIGHT:

UTC's Clinical Infectious Disease Control Research Group

The Clinical Infectious Disease Control (CIDC) research group was formed in 2015 by Dr. Henry Spratt (BGE) and Dr. David Levine (Physical Therapy) to develop a research and clinical agenda to address the growing concerns in infection control and to provide resources and better tools for infection prevention. On any given day, approximately one in 31 hospital patients has at least one healthcare-associated infection (HAI). Healthcare-associated infections affect millions of people and add billions of dollars to healthcare costs around the world each year. More people die from HAIs each year than from cancer. The CIDC research group consists of a consortium of UTC professors representing microbiology, molecular biology, engineering, epidemiology, and various health professions; faculty in the U.T. College of Medicine – Chattanooga; along with physicians (Erlanger Heath System being a primary partner) in infectious disease, critical care, hematology, oncology, emergency medicine, pediatrics, pulmonology, and plastic surgery. Since our inception, our research has involved the active participation and mentoring of over 30 students (undergraduate, graduate, and medical interns and residents) in a variety of disciples.

Since its inception, researchers working with the CIDC have given 28 presentations at regional, national, and international scientific meetings. In one case Drs. Spratt and Levine gave a presentation at the annual meeting of the U.S. Public Health Service, where we met the U.S. Surgeon General.

Although the major focus of work that the CIDC has done has been determination of the presence of bacterial pathogens on clinical surfaces, we were quite concerned when the novel SARS CoV-2 virus appeared in the US in early 2020. We provided several news outlets (both online and television) with information regarding protection from the virus, including discussions of the efficacy of masks, and how to best disinfect surfaces. In early March 2020 the CIDC was asked to prepare a statement for the American Physical Therapy Association that could help physical therapists prepare for this novel Coronavirus. Our perspective on the virus and avoidance of the virus was published on the APTA website on March 9, 2020.

Our members have also published four articles in peer-reviewed national and international scientific journals. Working with university, local, and regional groups both public and private, the CIDC has been awarded 12 grants totaling over $101,000 since 2015. We've been able to put those funds to good use supporting group work, including the purchase of needed equipment, and providing funds to support undergraduate student research assistants. As of this writing four UTC students who have worked for the CIDC have gone to Medical School, and nine of our graduates have gained admission to graduate or other professional schools.

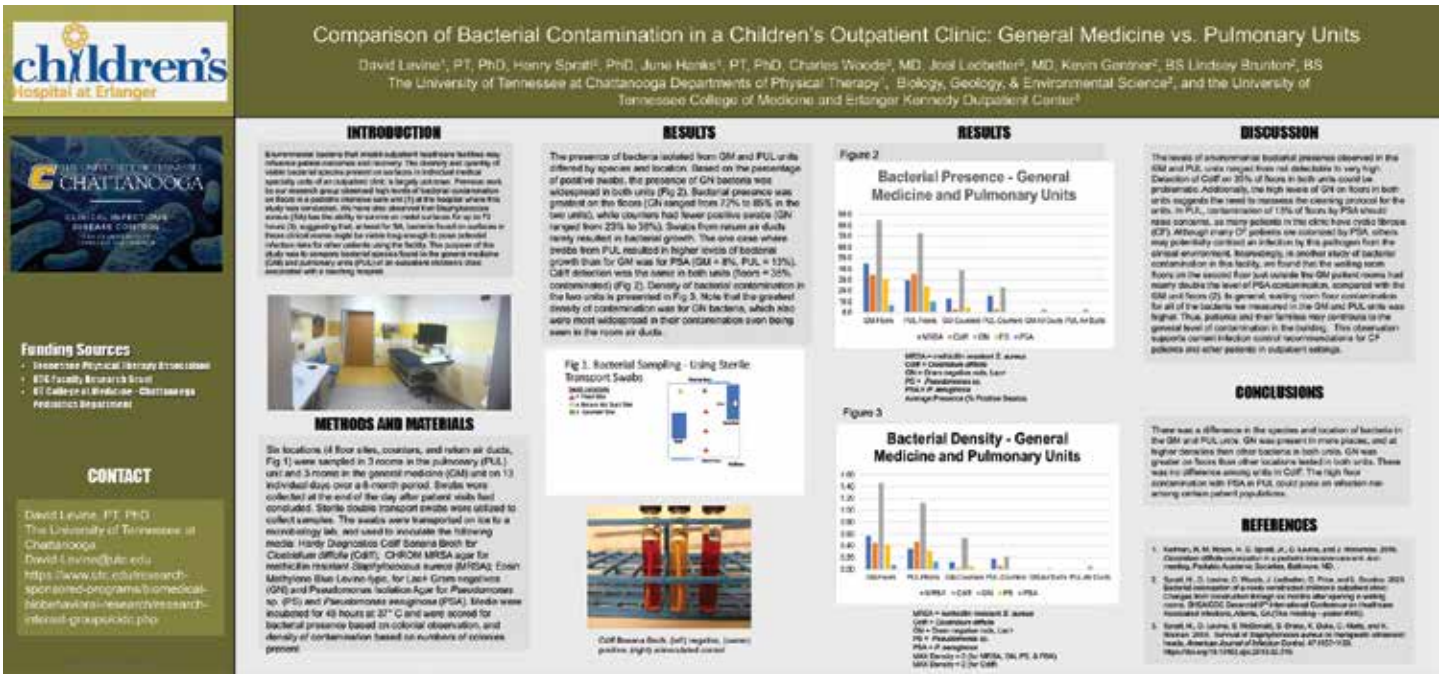
Left to right, Kevin Gentner and Gary Price

Photo of two students (Left to right, Kevin Gentner and Gary Price) working on a CIDC project. Incidentally, both Kevin and Gary are now in medical school.

Recent CIDC projects have included studies of the bacterial colonization of a newly constructed outpatient clinic at Erlanger Hospital. In this study we were able to document changes in the types of viable bacteria present on surfaces throughout the building both during the concluding phase of construction, and then for six months after patients began using the facility. The following poster describing this study was presented at the 6th Decennial International Conference on Healthcare Associated Infections, cohosted by the U.S. Centers for Disease Control and Prevention (CDC) and The Society for Healthcare Epidemiology of America. This conference had been planned for March 2020 in Atlanta, but sadly was converted into a "virtual" event due to CoVid-19. We presented two "virtual" posters at the CDC meeting during the fall. Later, for the annual meeting of the Association for Professionals in Infection Control and Epidemiology, which was to be in Phoenix, AZ, we also presented two different posters in a "virtual" format. Manuscripts describing this work at Erlanger Hospital are currently either submitted for publication or close to submission.

During the lab closures and tight restrictions for conducting research during the CoVid19 pandemic the CIDC initiated a new line of research during 2020, focused on studies of bacterial colonization on surfaces in veterinary rehabilitation clinics. We managed to collect samples from five clinics and will be presenting the results of this study later this spring. A manuscript describing this study is also currently in the works.

Future CIDC projects include a long-term study in the Erlanger Hospital neonatal intensive care unit to monitor the effectiveness of new cleaning and disinfection measures in, hopefully, reducing bacterial colonization of unit surfaces. In this study we will work with Erlanger physicians to obtain patient data on HAIs, to see if there are any clear links between these environmental bacteria on surfaces and infections in babies in the unit.



undergraduate
KATIE SPIVEY

WHAT ARE YOU RESEARCHING?

While attending UTC, I have had the opportunity to work on a couple of awesome, meaningful projects. Recently, I was able to work on a project that aimed to locate a source of nitrates polluting the water supply of a region in Wisconsin by building a model of the groundwater basin and groundwater flow. My part in that project was to transfer data from well construction reports to a GIS map and to correlate the data from those reports with their physical locations in GIS.

Katie is a senior in the BGE Geology program.

WHAT IS ONE THING YOU WOULD LIKE EVERYONE TO KNOW ABOUT YOUR RESEARCH?

Although my part in that project was somewhat monotonous and was in a field (hydrology) that I do not see myself specializing in, I was excited and grateful to be a part of a project that is so meaningful. That project has the potential to clean up a region's water supply and address what could be a serious health concern for the residents. The information that is to be developed there is very important.

WHAT IS THE FAVORITE PART OF YOUR RESEARCH?

Another project comes to mind when answering this question. For that project, I worked more closely with other students and, together, we built Story Maps in Esri ArcGIS for different landmarks around Chattanooga. My favorite part of that project was the lessons I learned from my colleagues. I learned a lot about creating diagrams and finding good resources and starting places for research in geology. I was also introduced to several computer systems and graphic design concepts that have already proven beneficial.

WHAT IS THE BIGGEST LESSON YOU LEARNED?

One of the biggest lessons I have learned is the importance of communication and teamwork. It is so valuable to be able to communicate ideas, or a difference in ideas, to your other team members. Also, I recognize the value of being able to communicate your research well to people within or outside of your field.

WHAT ARE YOUR PLANS AFTER GRADUATION?

After graduating this May with a B.S. in geology and a minor in chemistry, I hope to further my education with a master's degree and an eventual Ph.D. I have several academic interests, including isotopes, crystallography and mineral chemistry, biogeochemistry, paleoenvironments, paleogeography, and tectonics. I see myself going on to study sedimentology and stratigraphy with a focus on paleoenvironments and stratigraphic sequences at plate boundaries. Ultimately though, I hope that my future career path provides ample opportunity for research and travel.

graduate
CHYANNE SMITH

Chyanne entered the UTC MS Environmental Science program in Fall of 2020 bringing with her a prestigious $46,000 National Science Foundation Graduate Research Fellowship Program (GRFP) grant to support her research. Only 15% of applications for the 2020 competition were awarded. Congratulations to Chyanne for this amazing accomplishment! Chyanne is currently working under Dr. Loren Hayes studying factors influencing sociality in degus, a small South American rodent.

WHAT ARE YOU RESEARCHING?

My research with Dr. Loren Hayes is focused on the social organization of degus *(Octodon degus)*, which is a rodent endemic to Chile. Degus can live either solitary, in male-female pairs, or in groups. I am exploring what drives this variable social organization in degus using a long-term dataset. Additionally, I will be giving special attention to groups containing multiple-males, as this is less common in degus than other social organizations. My goal is to determine what factors might influence the formation of these multiple-male groups, as well as variable social organization as a whole for this species. This research has potential to assist in understanding the evolution of sociality in degus, as well as predict future social organization patterns.

HOW HAS COVID-19 IMPACTED YOUR RESEARCH PLANS?

Originally, I was supposed to go to Chile and collect data on the degus this summer. However, because of COVID-19, I am now using a dataset to explore my questions. I know that there are many people who have had to put their research on pause due to COVID-19, so I feel fortunate that I have a long-term data set to work with.

WHAT IS ONE THING YOU WOULD LIKE EVERYONE TO KNOW ABOUT YOUR RESEARCH?

In general, I love rodents and I think that many people look at rodents negatively. Unfortunately, they are often seen as pests or carriers of disease. However, rodents can be extremely important to ecosystems. Degus for example are a major source of food for many species in their native area. Additionally, degus can influence the environment around them. They trim back plants as they eat them, create burrows which many other species also use for shelter, and create runways which can alter the landscape. It's amazing the impact such a small creature can have.

WHAT IS THE FAVORITE PART OF YOUR RESEARCH?

My favorite part of research is being in the field, nothing compares to it. I love being able to hold a rodent and collect data on it. I feel very fortunate to be able to see animals in their natural habitat and learn about their lives.

WHAT IS THE BIGGEST LESSON YOU LEARNED?

Persistence! You can't get too discouraged when things don't go as planned. As most individuals in science can attest, research has many ups and downs and uncertainties. What is important in these situations is how you handle them. You need to be able to pivot and keep going.

WHAT ARE YOUR PLANS AFTER GRADUATION?

Right now, I am looking at multiple options, mainly in wildlife biology or consulting. However, I am not getting too attached to any one idea, because I would like to see what options arise once I am closer to finishing my degree. I would also love to obtain an adjunct position at Weber State University, where I completed my undergraduate degree. That's the great thing about the Environmental Science degree, there are lots of career options.

Jason Muhlbauer
Geology Lab Coordinator

Dr. Jason Muhlbauer, who joins BGE as the Geology Lab Coordinator, will instruct Physical Geology Lab each semester and develop new assignments for this critical introductory class. While our community recovers from the pandemic, focus will return to student collaboration and approaches that facilitate motion and outdoor work. As a December 2020 graduate of the Earth and Planetary Sciences department at the University of Tennessee, Knoxville, Dr. Muhlbauer brings with him experience in sedimentology, stratigraphy, fluvial and deltaic landscapes, and a dedication to sharing field-work experiences with scholars of all backgrounds. Although research is not a part of his official duties, he is willing to collaborate with BGE faculty on a wide range of investigation or pedagogical objectives. Once established in the classroom, he intends to further outreach to local high-school teachers with the goal of delivering geological concepts to those not traditionally exposed to the Earth sciences.

BGE Social Media

Here in the Biology, Geology and Environmental Science department, we love staying connected with our alumni and students. Which is why you can now find us on various social media channels, including Facebook, Instagram, and Twitter! Whether you're a recent graduate wanting to stay connected to job opportunities, a current undergraduate looking to connect to a larger online community, or a high school student wanting to learn more about our programs, we have created a space for you to get news and ideas! We love hearing from our followers and hope you will share news and questions with us!

- bgedepartment
- wildlifezoologyclub
- geologyutc
- utchattanoogaesc
- utc.tribeta

Instagram is our main hub for up to date news and information about department and club activities.

If you're looking for job announcements and department news, follow our Facebook accounts!

- Department of Biology, Geology, and Environmental Science at UTC
- UTC Geology
- UTC Wildlife and Zoology Club

If you like your information quick and to the point, follow us on our Twitter account!
@UTC_BGE

contact us

Please send any "Alumni Updates" you would like us to pass along to your old classmates in future newsletters to:

m: 615 McCallie Avenue, Dept. #2653
Chattanooga, TN 37403
p: (423) 425-4341
e: **bgepr@utc.edu**

In addition we would like to ask for your assistance. The first way you could help the BGE department would be by possibly serving as a mentor to a current student or two. We realize that some of our younger students at times need a little reminder of why earning a degree from the BGE department could help them after graduation. There is good evidence that when current students talk with alumni, this helps them better see where they may find themselves in a few years. If you live in the Chattanooga area and would be interested in possibly serving as a student mentor please let us know. Another way you might help the BGE department would be through a donation to our departmental gift account. Any donation amount would be greatly appreciated. Donations in support of BGE programs may be made via the UTC Development Office.

DONATE TODAY