


ENABLING TECHNOLOGIES & INNOVATION CONSORTIUM

2022 Newsletter



WELCOME TO ETI'S ANNUAL WORKSHOP 2022

March 29 - 30, 2022



ETI PRINCIPAL INVESTIGATOR SPOTLIGHTS

Something else here

Andrea Johnson (SC): Exploring the Effects of Industry Standard Tools on Computational Thinking in the Classroom

While preparing students for careers beyond graduation, HBCU faculty often must balance the priorities of bridging the gap between the level of student preparation and the expected level of preparedness as influenced by industry and discipline standards. Prioritization of these standards does not always align with the experience of students at Historically Black College and Universities (HBCU) and Minority Serving Institutions (MSI). The Association of Computing Machinery (ACM) 2013 Computer Science Curricula guidelines highlight version control as one of many core tools in the Social Issues and Professional Practice (SP) Knowledge Area students should experience in their upper-level software engineering courses. Research has demonstrated that at this level, students receive exposure to the tool but are not able to gain sufficient mastery. Other researchers have advocated for version control being introduced earlier in the computer science curricula. There is limited research that indicates that this tool improves the learning outcomes for students or significantly complements the other ACM Knowledge Areas. Dr. Johnson's work explores the challenges experienced by an HBCU faculty member while integrating GitHub and various other tools into programming classes at Spelman College. It is important to note, there is no research that directly addresses the use of version control in predominately African American classrooms. This research also extends a larger agenda of understanding how computational thinking is developed in students from historically marginalized classroom settings.



Spelman College®

A Choice to Change the World

Milton Garces (UH): The Tonga Blast Wave

There always something blowing up somewhere. However, massive blasts are rare. In an ideal world, we see disaster looming and take preemptive measures; isolate, evacuate, mitigate. In the case of the Hunga Tonga eruptive sequence, in hindsight one could argue there was some advance warning. However, nobody was prepared for the massive explosion at ~04:15 UTC of 15 January 2022, with an equivalent explosive yield to rivals the 1993 Krakatoa eruption.

It was early Friday evening in Hawaii when the news started rolling in, before ash and tsunami damage cut off communications from Tonga. Reports of the blast wave being heard in Samoa and Fiji started coming in. The first atmospheric wave hit Hawaii - 5,000 km away - around 11:30 PM local time. This first arrival was recorded by our local infrasound stations, barometers, sea-level sensors, and smartphones; this was the first of multiple circumglobal transits of an exotic surface guided air wave known as a Lamb wave. An unexpected tsunami surge caused some damage in Kona, Big Island.

There is a cadence and method to approaching blasts on the right side of the boom, a term often used to convey forensic analyses of destructive explosions. Was it natural or man-made? The answer leads to different approaches and reporting paths. In this case, the blast was clearly volcanic, and international relief efforts were set in motion. How big was it? We have standard methods for equivalent yield estimated, but nobody in my generation had worked with anything beyond a few hundred tons of TNT equivalent. After reviewing the acoustics literature from the Cold War, by Monday afternoon I had a yield estimate many megatons larger than the nominal 50 MT yield of Tsar Bomba. But I was incredulous; such an intensity sounded preposterous. By the time the fifth arrival of the Lamb wave around the world, the remaining question was if the Tonga blast was bigger than the 200 MT blast from the 1883 Krakatoa eruption.

In the last weeks we've aggregated, processed, and fused data from hundreds of recording stations on Earth, and teamed up with US and international teams to interpret the complex wavefield captured by multiple sensor modalities. Various papers have already been submitted, and many more are in progress. This emerging body of literature will upgrade take our understanding of our Earth's response to extreme events, as seen through the high-resolution lens of the digital era.

SCHOLARSHIP RECIPIENTS SPOTLIGHT

Fellowship and Scholarship Recipients Update



Sarah Mantell

Sarah Mantell is a Ph.D. student at the University of California, Santa Barbara. Sarah has spent the majority of her time during the last few months preparing a conference paper for her work in developing computer vision based detection methods for melt pool defects. Sarah will get the chance to present her work at a machine learning conference in July 2022. Additionally, Sarah has been working with her mentors at Los Alamos National Laboratory to create a research plan for Summer 2022. The remainder of time has been dedicated to studying for my qualifying exams which I will take at the end of the school year.

Alexandra (Lexie) Schueller

Alexandra (Lexie) Schueller is a third-year graduate student at the Georgia Institute of Technology studying mechanical engineering. Previously, she graduated from The University of Texas at Austin with a B.S. in mechanical engineering and a certificate in manufacturing and design. She also has past experience working at 3M, General Electric, and IBM on measurement system design, thermal systems design, design for manufacturing, and manufacturing process optimization.



Jordan Parker-Ashe

Jordan Parker-Ashe is a Massachusetts Institute of Technology freshman from Virginia Beach, VA. She has been focusing on advancing her technical skills. Last semester, under her PI's supervision, Joran built a Geiger Counter from scratch (except for the Geiger tube). She states, "Learning the circuitry involved really helped me grow as a nuclear engineer." This semester, with another researcher from MIT's Plasma Science and Fusion program, Jordan is building a LED Peltier-cooled cloud chamber to detect and visually show ionizations. She has learned that she really enjoys working with her hands, and having a thorough foundation in electronics, machining, designing, and building has made her a better researcher.

Nick Folino

Nick graduated with his B.S. in Computer Engineering at The Ohio State University in December 2021. Since graduating in December, I accepted a full-time position as a Hardware Engineer at CAS (Chemical Abstracts Service), a division of the American Chemical Society in Columbus, Ohio. In this position, I maintain the computer hardware and monitoring systems in CAS's main data center. This position will allow me to further my knowledge of hardware technologies and could lead me to attending graduate school for a masters degree in Computer Engineering.

Alexander Greenhalgh

Alex is currently an undergraduate material science and engineering major with a minor in mathematics at the University of Tennessee, Knoxville. His hobbies include trail running and 3D printing. Alex has always had a fascination with computer science, so he wants to go into a field like computational science that combines his domain knowledge of materials with his interest in mathematics and coding.



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