



## **2023 GeoCUR Award For Excellence in Student Research**

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**Emma Stolinas, Pennsylvania State University**

*Department of Geosciences, Nominated by: Dr. Tanya Furman*

Emma has been working with my group since summer 2021. Her ability to conceptualize, carry out and communicate research is well beyond her years. Emma's first research involved xenoliths from the lower lithosphere that were carried in erupting lavas from a key portion of the East African Rift in southern Uganda. Their origin has been enigmatic and has confounded geochemists since the 1960s. Emma collected mineral chemistry and textural data, and reached truly exciting interpretations around the link between volcanism and continental rifting: the data indicate the transfer of CO<sub>2</sub>-rich fluids from 150+ km depth along a steep topographic gradient on the boundary between solid lithosphere and mobile asthenosphere that was activated recently, causing uplift of the Rwenzori Mountains and facilitating continental extension in this magma-poor setting. Emma is currently studying pyroxenitic mantle xenoliths from Saudi Arabia. She used laser ablation microanalysis to obtain rare earth element abundance profiles of clinopyroxene crystals that have been affected by both melt- and fluid-rich metasomatism. Emma distinguished the textural differences between the two styles of metasomatism and discovered that the clinopyroxene crystals adjacent to metasomatic veins record interactions with volatile-rich fluids. Emma brings a strong and mature mix of high-level perspective and detailed focus that is rare among undergraduate students. She has the ability to think systematically, to keep multiple perspectives in mind, and to tie threads together to make a scientific story. Emma presented her work at AGU (2021, 2022) and earned the REU Faculty Choice Award in 2022.

## Josephine Tesauro, Trinity University

*Geosciences, Nominated by: Dr. Daniel Lehrmann*

Josephine Tesauro is a senior at Trinity University majoring in Geosciences with a minor in Art History and Museum Studies. Josephine is one of our top students. Josephine is regarded as a very bright, responsible and reliable student who has consistently done well in her coursework and exceptionally well in research studies. In the summer of 2021 Josephine completed an independent research study titled: Sedimentologic and Geochemical Analysis of a Dinosaur Track site, the Davenport Ranch, Bandera County. Josephine's study included field work (describing, stratigraphic sections, collecting spectral gamma ray data from the outcrop, detailed sampling and photo documentation, and latex molding of tracks) as well as laboratory work (thin section petrography, stable isotope analysis, and elemental analysis). In the summer of 2022 Josephine completed an independent research study on the origin of dolomite titled: Environments and timing of dolomitization and carbonate diagenesis in the Triassic Yangtze Platform in the Nanpanjiang Basin, south China. She has done excellent analytical work for this study including standard petrography, CL microscopy, fluid inclusion geothermometry, SEM microscopy and EDS analysis, LA-ICPMS elemental analysis and U-Pb age dates of carbonate phases (at the FIRST lab in Stony Brook). She presented the results of both studies at the Trinity University Summer research symposium and at national and regional meetings of the Geological Society of America and is co-author on several additional abstracts for papers presented at meetings. Josephine has published her dinosaur track-site research as a journal article in the South Texas Geological Society Bulletin.

## Jocelyn Valdivia, Chapman University

*Environmental Science & Policy, Nominated by: Dr. Jason Keller*

Jocelyn is a junior Environmental Science & Policy major (Chemistry minor) and is performing very well in this interdisciplinary curriculum (course work ranging from chemistry to geology to environmental politics). Jocelyn has been engaged with research in my group since the Spring of her first-year on campus. She initially worked on a project exploring the use of a commercially-available peat substrate to track the novel process of microbial organic matter reduction (where microbes ‘breathe’ carbon compounds instead of oxygen). She quickly learned a number of complex techniques (e.g., gas chromatography and an electron shuttling assay) and I was impressed with her ability to collect high-quality data independently. Jocelyn co-presented a wonderful poster summarizing this work at the Fall 2021 Student Scholar Symposium. She has since moved on to lead a project exploring how microbes in northern wetlands decompose simple sugars under anaerobic conditions. Virtually every text book tells us how this process should occur, but Jocelyn’s results consistently point to a story that is far more complicated. She has done an amazing job of building a series of experiments to refine methods, add new measurements, and push on this fundamental question. She has presented two additional on-campus posters focused on this work. I am hopeful that she will accept an offer for a summer position in my laboratory which will allow her the chance to collect soils in Minnesota and really dig into this question. She is an exceptional student researcher.

## Eli VanDyke, Grand Valley State University

*Geology Department, Nominated by: Dr. Ginny Peterson*

Mentor: John Weber Eli VanDyke is currently a senior Geology major at Grand Valley State University. He is among our best students academically and a highly engaged undergraduate student researcher. He has been the major student contributor to our ACS-PRF-funded Trinidad (West Indies) Raman spectroscopy study. We are applying Raman spectroscopy to study metamorphic field gradients in the metamorphic rocks exposed in northern Trinidad and then to test proposed models for the connections of those exposed rocks with those in the subsurface beneath the petroleum-bearing rocks in south Trinidad. Eli first engaged in the scientific context and methodology via participation in a reading seminar for which he was a major contributor. In summer 2022 he contributed significantly to sample preparation and then traveled to the Royal Ontario Museum in Canada, to collect Raman spectroscopy data. Eli remained up-beat and dedicated to this endeavor showing great care in his choice of what material to analyze and collecting full data sets (15 replicates) for each sample. Eli quickly learned several new software programs to process the raw Raman data, including PeakFit. He was the major contributor in producing some important new thermometry results. He helped produce a poster and co-presented these results at the national 2022 GSA meeting. He also contributed to a parallel pilot study in the Ouachita Mountains, Arkansas and independently presented those results at the Fall 2022 AGU meeting. In addition, Eli has also been nominated for an NAGT-USGS summer internship by the SDSMT field course director.

## Ben Wilkerson, DePauw University

*Geology & Environmental Geoscience, Nominated by: Dr. Ken Brown*

The Department of Geology & Environmental Geoscience at DePauw University nominates junior computer science (CS) major Ben Wilkerson for the GeoCUR Excellence in Student Research Award. Ben stands out among his peers by conducting undergraduate research on interdisciplinary topics that have led (or will lead) to multiple presentations and peer-reviewed publications. Specifically, Ben worked on Physics research to understand fluid dynamics of droplet impact/skirting in a fluid bath using high-speed cameras (presentation). Ben programmed an Arduino computer to simulate environmental responses for a Roomba-like robot to conduct research on human perceptions of robots for a CS/Asian Studies project (paper pending). He also developed interactive touch-screen applications for a kiosk/video wall in the DePauw Tenzer Center and worked on a CS deep-learning/neural network program to generate art. Lastly, for a Geoscience research project, Ben created an augmented reality app for iPhones that allows students to overlay various AR objects (2D interpretations and 3D virtual models of rock samples/outcrops) in the real-time view of the device's camera to better visualize, explore, and interpret geological features/processes. Specifically, within the camera environment, AR objects can be placed on planes or in air in response to user tap or image recognition (triggered by book images or actual outcrops), and then manipulated/georeferenced by students using standard gestures (paper & presentation pending). Ben's interdisciplinary research projects highlight his ability to rapidly learn new skills and to implement them in an effective and highly productive manner that leads to publishable research.

## Niles Williams, Penn State Brandywine

*Earth Sciences, Nominated by: Dr. Laura Guertin*

Niles Williams has demonstrated strong research skills and a dedication to not only improving his own knowledge of geology but contributing to the greater discipline. In his second year at Penn State Brandywine, Niles has participated in a project quantifying the mentions of oceanographic research vessels that have made a contribution to our past and present knowledge of the hydrosphere and lithosphere. He has participated in virtual tours of JOIDES Resolution and the U.S. Gulf Coast Repository to expand his knowledge and understanding of the process of science at sea. He is co-presenting the results of his findings at a regional Geological Society of America meeting and will be collaborating on a publication to further disseminate project results. As a geoscience major and with this early undergraduate research experience, Niles is certainly laying the foundation to continue his investigative excellence in the discipline and to the greater community.

## Monica Woodruff, University of West Florida

*Earth and Environmental Sciences, Nominated by: Dr. Johan Liebens*

Monica Woodruff is an undergraduate at the University of West Florida (UWF) pursuing a BS in Environmental Science with a minor in Communication. Monica is an outstanding student who ranks at the very top of her class. She is in the Kugelman Honors Program at UWF and impressed her Honors Thesis committee with the quality of her work. Monica reviewed the scientific literature with the depth of a graduate student, understood the literature, and build on it to design and carry out her own thesis. The analyses were sometimes tedious but, motivated as she always is, Monica worked long hours to get them completed in a timely fashion and with constant concern for quality. She has presented her research results at local and national conferences. In addition to standing out academically, Monica is engaged in several service projects. She holds a leadership position in a UWF student organization, manages the campus community garden, and has mentored other students in formal and informal settings. Monica is intelligent, creative, motivated and hard working. A recipe for success in any graduate program that is lucky enough to admit her.