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Project description:
The formation of Earth's first continental crust remains a mystery, and the petrogenesis of this crust is fundamental in understanding how our planet evolved as a whole, from the development of our atmosphere to our oceans. The role of impact melting on these early Earth structures is difficult to constrain, as early Earth looked a lot different than modern Earth. The way large-scale impacts would affect the Earth today is plausibly dissimilar compared to how impacts would have affected the Earth over 2.5 billion years ago. This project focuses on exploring the extent of impact melting on Archean continental crust through utilizing the geochemical evolution of three felsic melt sheets within the Sudbury Impact Structure. The Sudbury Impact Structure located in northern Ontario, Canada is one of the Earth's oldest known impact craters, with a formation age in the Paleoproterozoic at 1.85 Ga. This structure could offer valuable insight as an analogue towards gauging the extent impact melting had on generating felsic continental crust during the Archean. To illustrate the extent impact melting had on the development of the Earth's earliest crust, I will compare the results of this project to existing data I have from Neoarchean felsic continental crust (2.8-2.5 Ga) from the Slave Craton in the Northwest Territories of Canada. A model of the melt evolution of the three felsic melt sheets will be constructed using the major oxides obtained from whole-rock x-ray fluorescence spectrometry of original rock samples collected from the Sudbury Impact Structure. With the support of the Barringer Family Fund, this project will create a model of melt evolution within the Sudbury Impact Structure and assist in constraining the degree of impact melting had on the formation of Earth's continental crust.

Personal statement:
When I first began my journey through higher education, it was my ambition to be challenged and to push my boundaries. Earth and Planetary Sciences gave me the avenue to broaden my horizons due to its extensive interdisciplinary subject matter, as it utilizes all domains of science to approach overarching questions about the formation and progression of our planet and solar system. Along with the intellectual challenges it presents, science promotes collaboration among others, connection to broader communities, and allows for exploration into the ambiguity of the universe. My scientific journey began at the University of California, Santa Cruz where I wrote my undergraduate thesis on modeling the crystallization of the lunar magma ocean, I then went on to join the Soil Microbial Ecology lab at the U.S. Geological Survey where I assisted in creating an archive of historic terrace chronosequence soil samples for further radiocarbon research, currently I am pursuing a PhD in Geosciences at the Pennsylvania State University where I explore the geochemical evolution of Earth's continental crust. I have been incredibly fortunate to have gotten and get to work alongside many encouraging and talented scientists aimed towards producing valuable science and making the Geosciences a more equitable environment. I am passionate about preserving existing science through the nurturement of legacy knowledge and data, making current science more accessible, and bolstering opportunities for the next generation of geoscientists.