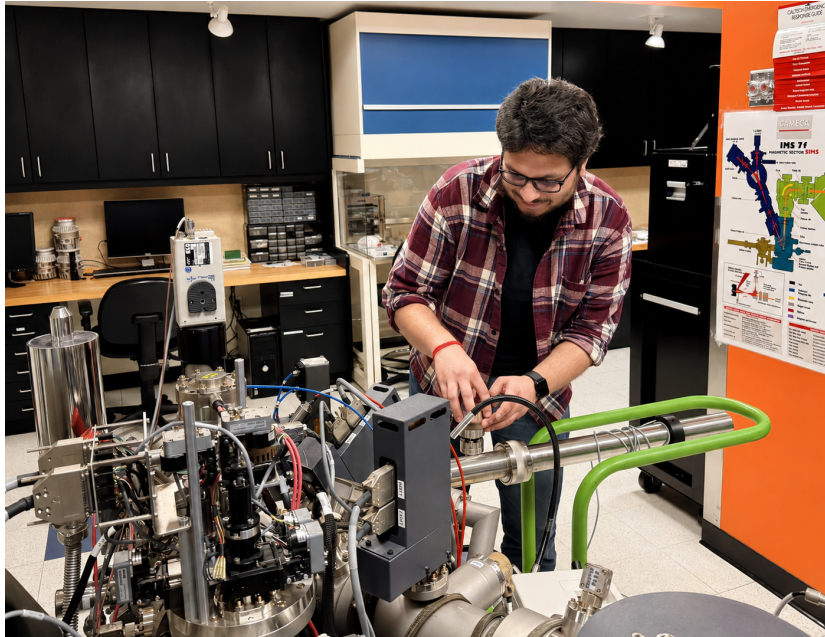


Arkadeep Roy, University of Arizona, Tucson, Arizona, USA for their project:
Experimental Constraints on Hydrogen Isotope Fractionation Between Apatite and Lunar Melt.



I am a Ph.D. candidate in Geosciences at the University of Arizona, working with Dr. Ananya Mallik. My research uses high-pressure and high-temperature experiments to study water during the formation and evolution of the Moon. I focus on how water moves between lunar magmas and minerals.

My dissertation examines crystallization of the lunar magma ocean and whether hydrogen

measured in lunar minerals can reveal the Moon's original water inventory. I combine piston-cylinder and gas-mixing furnace experiments with secondary ion mass spectrometry and electron microprobe analyses. This work tests how mineral composition and magmatic conditions shape the water record preserved in lunar samples

My Lipman Research Award project investigates hydrogen isotope fractionation between apatite and lunar melt. Apatite is widely used to estimate the amount and source of water in lunar magmas, but these interpretations remain uncertain because apatite-melt hydrogen isotope fractionation has not been experimentally constrained. I have successfully grown apatite from lunar-composition melts under controlled conditions and measured hydrogen isotope compositions in the experimental materials. The resulting fractionation factors will show how crystallization changes the hydrogen isotope signatures recorded by apatite and improve reconstructions of lunar water history.

Support from the Lipman Student Research Grant will help fund the experimental and analytical costs of this work. I am grateful to the Howard and Jean Lipman Foundation and the Geological Society of America for supporting my research.