Erin Alexander, Arizona State University, Tucson, AZ for her project: Seeing Beneath the Surface: Using Geomorphology and Geochemistry to Map Hot Spring Regions.

Erin Alexander is a M.S. student at Arizona State University working with Professor Everett Shock and Professor Kelin Whipple on studying geochemistry and geomorphology in hydrothermal regions. She researches hot spring regions in Yellowstone National Park to understand how geologic structures in the subsurface influence hot spring geochemistry and fluid pathways. Yellowstone is best known for its diverse and dynamic hot spring regions: temperatures range from cool to boiling, pH can range from acidic to alkaline, and volcanic gases and water-rock reactions combine to form a geochemical array of unique hot spring compositions. The first step in understanding how such biogeochemical diversity can exist in these regions is to evaluate how fluid gets to the surface to form hot springs; faults and local stratigraphy play a big role in fluid access to the surface. Though Yellowstone is well-mapped in non-thermal areas, thermal areas are incredibly difficult to map due to acid erosion, sinter resurfacing, multiple glaciations, and thermal alteration. Understanding these thermal areas therefore requires an integrated approach of field geologic mapping, LiDAR geomorphic mapping, and hot spring geochemical mapping. Erin utilizes field observations and geomorphic inferences to understand where faults are and uses hot spring geochemistry to understand what kinds of fluid are rising up the faults. She is currently working on Midway Geyser Basin and the Mud Volcano area in Yellowstone.

Erin is grateful for the support of the Lipman Student Research Grant, which will help fund a two-week field season in Yellowstone this summer to map more parts of the park.