Samantha Dunn - Project Profile

2023 AGeS-Grad awardee
Project Title: LASS-ICPMS zircon petrochronology to investigate the connection between the Jackass Lakes pluton and adjacent porphyry and metavolcanic rocks
Lab: UCSB Petrochronology Lab
Lab Mentors: Andrew Kylander-Clark

What scientific question(s) does your research address and what motivates this work?
My research addresses the volcanic-plutonic connection of the Jackass Lakes pluton (JLP) in the central Sierra Nevada batholith. The motivation for this study is to better comprehend the evolution of magmas within the continental crust and the relationship between volcanic and plutonic rocks and whether arcs develop thick magma mush columns, that later segregate out intermediate to high silica melt and leave behind cumulate residue.

Figure 1. Lab work at the UCSB Petrochronology Laboratory

What chronometric tool did you employ and why?

I used laser ablation split stream inductively coupled plasma mass spectrometry (LASS-ICPMS). We chose this tool as we wanted the U-Pb ages for our rock units, as well as zircon trace element data to better compare our plutonic and volcanic rocks to see if they are connected via a complementary or equivalent relationship.

What were some of the key takeaways of your research?

1. All of our rock units, the Jackass Lakes pluton (JLP) granodiorite, meta-rhyolitic/dacitic tuff, and leucogranite units are coeval
2. The zircon trace elements corroborate with our whole-rock data that the JLP has a complementary relationship between the meta-rhyolite/dacitic tuff and leucogranite units

What new experiences, opportunities, and collaborations did you gain as an AGeS-Grad awardee?

I was able to learn multiple new lab techniques such as the process of zircon separation from hand sample to polishing the zircons for CL imaging, and an overall greater comprehension on how LASS-ICPMS works.

What is one piece of advice you have for future AGeS-Grad award applicants or awardees?

Do not be shy to ask any and all question to your lab mentor. Take good notes and look be up similar studies to see how they collected their data.