Statement of Purpose
Grad Admissions_UCD

Geology is interdisciplinary at its very core, and I am too; whether those disciplines are teaching and research or geochemistry and thermochronology, these exist in blissful coordination within me. I was a teaching assistant for six classes where I had one-on-one interactions with students during my well-attended office hours, gave practical in-class activities to classes of +150 students, and prepared and delivered a lecture on the geochemistry of acid mine drainage. While continuing to hone my skills in the classroom as a teaching assistant, I am eager to bring my research skills in low-temperature geochemistry and thermochronology to Dr. C's magmatic storage research during my PhD at [Uni A].

As an undergraduate at [Uni B], I joined Dr. T's geomicrobiology lab as the resident metamorphic petrologist in 2018. Using a Raman spectrometer and petrographic microscope I identified garnet in serpentinite cores from the [location] ophiolite. The presence of andradite garnet was a surprising discovery, because it should be geochemically unstable in these conditions. Analyzing and imaging the garnet and its surroundings led to my first research presentation at the AGU annual meeting in 2018, where I explained the role of garnet as a potential site of microbial life in the ophiolite's extreme subsurface conditions. I am now continuing this research into the garnet-microbe relationship by reacting environmentally-viable concentrations of mineral and fluid precursors to crystalize garnet and release H2, a potent microbial food source, by iron oxidation.

I started in Dr. F's thermochronology lab in 2019 after graduating from [Uni B] working to develop and implement a solution to estimating uncertainties on He-loss correction in apatite during U-Th decay and alpha-ejection. I classified over 400 apatite grains based on grain size, grain geometry, and surface roughness using an x-ray microscope in collaboration with the Engineering Department at [Uni B]. I designed mounts to hold 50 apatite grains on the head of a pin to achieve the highest resolution x-ray images of apatite ever published. I enjoyed weaving this methods development project into a compelling story, which I told at the 2019 GSA meeting where I was awarded 'Best Poster Presentation.' Currently, I am drafting a manuscript which details our findings and how they will increase the accuracy of apatite (U-Th)/He calculated ages.

My work with Dr. T and Dr. F has given me a strong, interdisciplinary background in low-temperature processes, which I believe will integrate well with the skills I will gain by working with Dr. C. For my PhD, I want to study mafic magmatic systems, which present a thermochronologic challenge and is a natural and wanted progression from my ultramafic research.

Dr. C's expertise in isotope diffusion and U-series and trace element geochemistry compliments my previous studies, and her intent to apply her methods to mafic systems is extremely exciting, as it supports my research goals. Her history of collaborations outside of [Uni A] and travels to unique field sites is a perfect fit for my collaborative academic spirit.

The faculty and facilities at [Uni A] provide unrivaled opportunities to enhance my technical research skills with access to instrumentation such as the TIMS, FTIR, EPMA, and multiple ICP-MS systems. I also look forward to contributing to the mentorship of Dr. C's undergraduates in the lab. [Uni A] will prepare me to pursue an academic career at an institution with a focus on undergraduate education and the ability to integrate research into my classroom. The EaPS Department provides access to advanced instrumentation, opportunities for collaboration, resources to publish, and a community dedicated to deliberately increasing diversity in the geosciences—qualities that are integral to my growth as a researcher and educator.