# RECOVERING CONTINUOUS THERMAL HISTORIES FROM SINGLE GRAINS BY LASER ABLATION (U-TH)/HE DEPTH PROFILING

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Thermal histories of rocks can tell us important information about geophysical processes such as faulting, magmatism, erosion, and burial. (U-Th)/He thermochronometry is an important tool for understanding these processes in the mid and upper crust. Conventional methods require totally degassing a mineral (usually zircon and apatite) and measuring the radiogenic He followed by mineral dissolution and isotope dilution measurements to get parent concentration. This analysis provides information about when a mineral cooled below a certain temperature (based on the mineral interrogated). My research involves developing a method to get more information from a single grain in an ultimately more time and cost efficient way. I am developing a method that uses laser ablation to measure the radiogenic helium and parent concentration profiles. The spatial variation in He can be inverted for a continuous thermal history through a range of temperatures, as opposed to a single T-t data point that comes from total degassing and dissolution. The new method will increase data output (as it does not require mineral dissolution in acid) to better understand rock thermal histories. This information is transportable to a whole array of applications in both academia and industry. Single grain T-t paths are important information for determining the viability of energy from geothermal sources and hydrocarbon maturation.

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