Stanford Geochronology Facility

We comprehensively examine the evolution of the Earth's crust using highly integrated geochronologic approaches conducted in a wide spectrum of analytical facilities that are all housed within the School of Earth, Energy & Environmental Sciences. Our highly collaborative research provides fundamental data to many disciplines throughout the geosciences, including tectonics, geodynamics, petrology, geochemistry, geomorphology, sedimentology, stratigraphy, paleontology, and paleoclimatology.

The Stanford Geochronology Facility offers capabilities in the following areas:

U-Th-Pb and U-Th Geochronology by Secondary Ionization Mass Spectrometry (SIMS)

Lab Website: shrimprg.stanford.edu

Contact: Christie Jilly-Rehak, *cjilly@stanford.edu*

- SHRIMP-RG is a high mass resolution, high sensitivity ion probe operated under the auspices of the **Stanford-USGS Micro Analysis Center** that is staffed by Stanford (Christie Jilly-Rehak) and USGS (Jorge Vazquez) scientists.
- Measurements performed with either grain mount (polished or natural surfaces) or thin section (full petrologic context)
- Easy to use LabVIEW software facilitates fully automated analysis and 24-hour operation after analysis locations are targeted
- Spatially resolved 10-30 micron spot, 1-3 micron deep, 1-3 nanogram volume
- Some additional trace element measurements (from B to Th) can typically be included with U-Th-Pb analysis
- All sample preparation, characterization, analysis, and data interpretation supported by laboratory personnel
- $1700/day external use rate for SHRIMP-RG use (all sample preparation, characterization and data reduction factored into daily rate)

$^{40}Ar/^{39}Ar$ and (U-Th)-He Geochronology and Thermochronology by Noble Gas Mass Spectrometry

Lab Website: noblegas.sites.stanford.edu

Contact: Marty Grove, *mjgrove@stanford.edu*

- Nu Noblesse magnetic sector multi-collector calibrated with 5 automated pipette systems including ^{40}Ar-^{39}Ar-^{38}Ar-^{36}Ar reference gasses developed with USGS (Menlo Park), atmospheric Ar as well as ^{4}He and ^{3}He.
- Fully automated Laser fusion $^{40}Ar/^{39}Ar$ analysis of anhydrous single crystals via 10-watt CO_2 laser system
- Fully automated laser incremental heating for $^{40}Ar/^{39}Ar$ or (U-Th)-He applications of metal encapsulated single crystals or grain aggregates (up to ~2 mg) via 75 watt near-IR (908nm) fiber optic laser with either current regulated or PID-regulated optical pyrometer or type C thermocouple-based PID feedback
- Laser ablation (spot) analysis via UV (UP-213) laser (manual targeting)
- In house HF 125 ml Parr bomb digestion laboratory
- All sample preparation, characterization, analysis, and data interpretation supported by laboratory personnel.
- Cost recovery: $^{40}Ar/^{39}Ar$ $25/measurement (U-Th)-He $50/measurement

Apatite Fission Track Analysis

Contact: Trevor Dumitru, *tdumitru@stanford.edu*

- Mineral Separation Laboratory for separating apatite and zircon
- Specialized fission track mounting and polishing facilities
- Custom-configured, research-grade Zeiss Axioskop microscope with computer-automated stage for track observation and data collection
- Software for data analysis and modeling
- All sample preparation, characterization, analysis, and data interpretation supported by laboratory personnel.
- Cost recovery depends upon details of the project – contact Trevor Dumitru for further information