

EarthScope AGeS Student Geochronology Research and Training Program Laboratory Overview  
**University of Texas at Arlington Luminescence Lab (UTALL)**  
Nathan Brown, Lab Director ([nathan.brown@uta.edu](mailto:nathan.brown@uta.edu))

### **Lab Description**

The UTA Luminescence Lab (UTALL) measures luminescence ages of sediments and bedrock samples. Our primary research instrument is the Risø TL/OSL-DA-20, an automated luminescence reader. The reader is equipped with a single-grain attachment (infrared and green lasers) for age estimation of individual sand grains of quartz or feldspar. We also have an EMCCD imaging attachment for spatially resolved luminescence imaging of rock slices, and an IRPL imaging chamber designed to map the luminescence depth profile of a rock slab to estimate the duration of sunlight exposure or the time since surface burial. The reader also incorporates an automated detection filter (DASH) system, an optical image sample camera, and a Sr-90 beta source.

UTALL hosts comprehensive sediment and bedrock preparation facilities within safe-light conditions, including an HF-rated fume hood, heavy liquid density separation facilities, and various acids and dispersants for chemical purification. Rock preparation facilities include a low-speed trim saw, a low-speed drill press with diamond coring bits and fluid circulation, and a precision low-speed wafering saw, all of which are designed to prevent sample heating during preparation. For projects involving nearby sample collection sites, the lab is equipped with field equipment including sediment collection tools, an angle grinder diamond rock saw, a 1"-diameter diamond coring drill, and various chisels and hammers for rock outcrop sampling. When possible, we are happy to visit field sites with students!

Our primary research focus is on geomorphology and "hard rock" luminescence dating (thermochronology, rock surface dating), though we have experience working in a variety of geologic contexts.

### **Expected Time Frame**

Students should contact the lab director ([nathan.brown@uta.edu](mailto:nathan.brown@uta.edu)) as early as possible when designing a research project. This communication allows us to plan for a sampling strategy and measurement methodology that best matches the student's research goals and to schedule the student visit. Because geologic dose rates are determined based partly on mass spectrometry results from external facilities, students should ideally send samples to UTALL at least one month prior to arrival.

Generally, students should plan on spending at least two weeks at the lab, depending on the number of samples and the complexity of analysis. During this period, students will learn and perform sample preparation under the supervision of Brown and graduate students. Students will observe how to collect luminescence measurements, reduce the data and interpret the resulting age distributions. Final sample ages are typically reported within 9-12 months after the student visit, though informal progress updates and preliminary age estimates are often available sooner.

### **Costs**

Because students perform the sample preparation steps, the reduced cost per sample is \$500 for single aliquot analysis, \$900 for single grain analysis, and \$1000 for rock surface dating results (measured at multiple depths beneath the rock surface) with an added cost of \$1500 per project (not per sample) for offsite Co-60 irradiation if IRPL slab imaging is included.