EarthScope Student Geochronology Research and Training Program Laboratory Overview
Rutgers University $^{40}Ar/^{39}Ar$ Laboratory

Lab Description: The Rutgers $^{40}Ar/^{39}Ar$ Laboratory, established in 2003, is modern facility centered about two fully automated noble gas extraction systems in line with customized high-resolution high-sensitivity MAP 215-50 noble gas mass spectrometers. The facilities include standard rock crushing, density, and magmatic mineral separation equipment. Mineral separates can be prescreened by standard optical method, back-scatter electron imaging and EDX composition analysis.

Expected Time Frame: Due to the neutron irradiation requirement for $^{40}Ar/^{39}Ar$ dating, there is a time delay between sample preparation and isotopic measurements. Thus, students should plan for two visits to the Rutgers $^{40}Ar/^{39}Ar$ Laboratory. The first visit will require ~1 week of time. During this visit, the student will learn how to screen samples for selection and sample preparation methods (crushing sieving, and washing of samples without cross-contamination of samples. Students will develop the skills to make mineral separates using heavy liquid and magnetic separation methods. They will also package their samples and mineral standards for neutron irradiation. During this first visit, students will also learn the principles of the K-Ar and $^{40}Ar/^{39}Ar$ dating method and noble gas mass spectroscopy.

The second visit will occur once the students samples have returned from the reactor. The students should allow 1-2 weeks for the second visit, depending on the number of samples to be measured. During this visit, the student will analyze their samples. Once the measurements are completed, students will learn how to process and reduce all of the data that they have collected. This includes neutron flux monitors to determine "J", mass spectrometer mass fractionation, and blank corrections. Upon completion, students will return to their home institution with an archive of their data and publication quality tables and figures.

Analytical Costs
Students should budget $400 per sample (5 sample minimum)

Preparation for Visit
Students should arrive at the Rutgers $^{40}Ar/^{39}Ar$ with their samples. They will be responsible for processing their own samples.

Relevent Laboratory Staff
The Rutgers $^{40}Ar/^{39}Ar$ Laboratory is directed and managed by Professors Carl C. Swisher III and Brent D. Turrin. Student's research activities will be coordinated with Turrin. This will include project planning, training, which includes sample preparation, analysis, and data reduction methods.

Data Reduction and Interpretation
During their visit, students will learn how to process and reduce all of the data that they have collected. This includes neutron flux monitors to determine "J", mass spectrometer mass fractionation, and blank corrections.

Expected Lab Availabilty
Students should schedule time in the Rutgers lab with 2-3 months advanced notice.

Contact
If you are interested in using the Rutgers $^{40}Ar/^{39}Ar$ facility or would like to discuss potential collaborative projects, please contact: Brent D. Turrin: bturrin@rci.rutgers.edu