Rocks Beneath Our Toes (RoBOT): An Experiential Learning Collaboration in Geochemistry for Undergraduate and High School Students

ETHAN F. BAXTER[1]

[1]Boston College, Dept. of Earth and Environmental Sciences, 140 Commonwealth Ave, Chestnut Hill, MA 02467; ethan.baxter@bc.edu

RoBOT is an expertiential research and learning collaboration pairing undergraduate students enrolled in a mineralogy, earth materials, or petrology class with high school students enrolled (either concurrently or previously) in earth science or chemistry. It has been run ten times since 2006 with support from NSF grants and has involved over 100 undergraduates and over 120 high school students from at least five Boston area high schools. The aim is to inspire and inform students about geology and geochemistry by extracting the information locked inside rocks sampled in the local community through the collaborative use of petrologic and geochemical tools. After an early semester introductory lecture at the high school, all students meet in the field to collect samples they have identified in their community: literally the rocks beneath their toes. Students are paired up and each group is assigned one of the samples; this forms the basis of the undergraduate's final class project. The rest of the semester encourages students to use available university analytical resources such as petrographic microscopes, SEM, XRD, XRF, mass spectrometry, and thermodynamic modeling, to tell the story of the rock. The semester culminates with a visit by the high school group to the university where students reunite to see final student posters, tour the geochemistry labs, and view their samples in thin-section through the microscopes with their partners.

The program is most successful when a strong partnership is established between the university professor and high school teacher, and when high school students show some interest or aptitude in science, especially in geoscience or chemistry. Creative mechanisms or incentives to encourage communication and participation from the high school students between the field trip and lab visit increase program success. Some high school chemistry students discover that they can merge their passions through geochemistry, bringing their interests in chemistry to geoscience, and illuminating the exciting and diverse earth and environmental science stories recorded in rocks and minerals.