

Project Title: Interdisciplinary Research in Nuclear Science

Project Mentors: Dr. Graham Peaslee, Chemistry Department
Dr. Paul DeYoung, Physics Department

Project Description:

Hope College has its own particle accelerator in the Hope Ion Beam Analysis Laboratory (HIBAL). We will be using this nuclear physics facility to conduct interdisciplinary research in a variety of areas. For example, some students will measure metal contaminants in lake sediments and soils, and develop techniques that will be particularly useful in environmental chemistry. Particle-Induced X-ray Emission (PIXE) spectrometry is used for rapid screening of dried lake sediment samples where one can determine total metal content for most metals of interest in roughly one third the time of traditional wet chemistry acid-digestion techniques. We will be extending this method for measuring trace metals in the sediment to variety of new sediments and sediment types.

Students will also be examining the low-background radiation measurements of environmental samples at Hope. Using sensitive detectors shielded from the surrounding, low levels of radiation that are present in the dust and soils around us are measured, and the origin and age of these soils can often be deduced from the data. A combination of these radiodating measurements and other elemental identifications using HIBAL will be performed on local soils and lake sediment to establish a method to trace the soil origin of the lake sediment.