

Undergraduate

Position Available

Undergraduate Researcher (3 credits/15 hours week; 1 or 2 students needed; e.g., Chemistry 1710)

Application deadline: rolling, until filled (job posted 3 Nov 00)

Supervisor: Prof. Joseph J. Grabowski (Department of Chemistry)
Voice: (412) 624-8632, email: joeg@pitt.edu

Dates: Spring Term 2001 (3 January – April 28, 2001). If all things work out, at least one position will be extended to a full-time summer, research position

Details: There is growing recognition that health risks are associated with airborne particulates (i.e., aerosols) and that the toxicity of particulates may depend on their specific chemical characteristics. In order ultimately to address the toxicity of environmental particulates, it is necessary to describe the size, concentration, and chemical composition of each particle as a function of time and place. A new generation of instruments has been described in the literature that allows real-time, high resolution sampling, sizing, and chemical speciation of airborne particulates (in the range of 0.2 - 7 μm). These instruments are composed of three discrete 'instrumental packages' coupled together: a sizer, a laser-based ablation/ionization mass spectrometer, and a data collection/analysis system. As part of a new research thrust, we will build and operate an aerodynamic sizer. The sizer will eventually become one of the three necessary components on a complete, truck-portable, atmospheric sampling instrument. This instrument will be used to create time-based and chemical-based profiles of natural and anthropogenic particles in the Pittsburgh and Western Pennsylvania locales in order to quantify the aerosols to which we are all exposed. Additional applications of the instrument include analysis of aerosols generated from metalworking fluids in the metal forming industry and aerosols generated by nebulizers for drug delivery. The undergraduate researcher(s) will draw necessary blueprints (KeyCAD), work with the model shop to have the parts built, create a data analysis algorithm, assemble and debug the sizer, establish its working parameters, and begin a measurement program for particulates at various locations in the Chemistry Building. All activities will be carried out in close collaboration with Professor Grabowski.