

Outreach

The members of the group each devote a small fraction of their time to outreach activities aimed at explaining what we do, and how it affects their lives, to members of our local community, K-12 students and other occupants of the Indiana University campus. The impressive infrastructure at IUCF is a great attraction for tours from middle and high schools. It also plays an important part in the annual Physics and Astronomy Open House. Tours are provided throughout the year and are frequently conducted by faculty, post-docs and students from the nuclear physics group.

Since Paul Singh started it, the NPR program *A Moment of Science* (AMOS) has gone on to produce more than 2875 programs on a wide spectrum of topics, telling us where science touches our lives in ways both unexpected and amusing. This general science program is aimed at connecting common observations to the science principles that govern them, in ways that can be explained quickly with little reference to prior knowledge. About 260 programs are produced each year for distribution to some 70 NPR radio stations. Mike Snow is currently developing several topics in subatomic physics for AMOS, including: (1) You are made of unstable matter; (2) Matter is *very* close to electrically neutral; (3) All atoms of the same type are absolutely identical; (4) Why do we think the universe is expanding? (5) Where is the antimatter? For example, in the first of these Mike points out that almost all our mass is in protons and neutrons, and then asks why we don't just fall apart, given that free neutrons only live for about 15 minutes.

With its location in Bloomington and the fact that it draws visitors from much of Indiana, the WonderLab science museum presents an excellent opportunity for outreach from our nuclear physics group using interactive components and hands-on activities. We have plans to work with WonderLab to produce hands-on exhibits that demonstrate how scattering can be used to learn about things too small to see, perhaps coupled with a computer-driven display of "spectacular" events from actual scattering experiments such as STAR. In addition we have committed to produce demonstrations with suitable apparatus, techniques, script and training that they can be presented by WonderLab programs staff during the day. A popular feature for WonderLab visitors is an interactive demonstration on a variety of science topics, from live lizards to the van de Graaff. WonderLab is greatly interested in broadening this to include additional interactive demonstrations that can be presented during museum visits as well as during hands-on programs presented specifically for visiting school groups.

Members of the nuclear physics faculty participate in a number of programs aimed at establishing direct connections with pre-college students, to improve participation and retention in science and engineering. The College of Arts and Sciences Summer Pre-college Institute is directed at eleventh- and twelfth-graders looking to get an early taste of the university by working with an IU professor on a summer project. We have hosted several students from this program. One worked with Rex Tayloe on a neutrino detector project, wrote a report, and presented a seminar at IUCF. This student later decided to enroll in physics at IU and is now in the Honors Physics (undergraduate) program and is an IU STARS (Science, Technology, and Research Scholars) awardee, working with Rex Tayloe. Tayloe has also been the faculty liaison for the past two years for the IU Advanced College Project, a partnership between IU and select high schools in Indiana, Ohio, and Michigan. This program offers college credit for high school seniors who take Introductory Physics (P221) with their high school physics teacher. An IU faculty member oversees the program, trains the teachers and conducts annual site visits to the participating schools. New teachers are trained in a summer workshop and all teachers attend an annual workshop, both held on the IU-Bloomington campus. The workshops also offer an opportunity for the teachers to learn about research in the Physics Department and at IUCF. Several members of the group also help with the Science Olympiad, a yearly competition for high school students eager to meet challenges in all areas of science and technology.

In the near future we plan to increase our high school activity by enhancing our Scholars in the Schools program, in which faculty, graduate students or post-docs present classroom programs and/or mini-workshops. An open letter to science teachers has been prepared offering to host visits of science classes to IUCF, with a tour and a lecture on some topic of choice, or lecture visits by one of us at their school. Our letter will appear in the next newsletter of the Hoosier Association of Science Teachers (www.hasti.org).

Finally, we are also working to improve communications about what we do with the rest of the largely liberal-arts campus on which we reside. High-profile research efforts of the nuclear physics group have been occasionally described at a suitable lay level in the IU College of Arts and Sciences quarterly glossy magazine, *Research and Creative Activity*. The current issue, due out shortly, will highlight our research in the STAR Collaboration, both on the search for a state of matter believed to have last existed in the earliest infancy of the universe and on our attempts to understand what makes the proton spin. Meanwhile, Hans Meyer is taking advantage of the time students (with many different majors) wait in the Physics building between classes, to introduce them to what we do by using display space in the main hallway outside the large lecture halls to showcase our research areas in a series of colorful, inviting posters.