



Some participants in the 2005 symposium.

# Undergrads Show their Stuff at FiO Research Symposium

Harold Metcalf

Last year, a group of undergraduates held their own as they presented research amidst world-renowned physicists and Nobel-prize winners. The Symposium for Undergraduate Research at the annual Frontiers in Optics/Laser Science meeting showcased the contributions of the next generation of optical scientists.

A spectacular sunset over Tucson's Santa Catalina Mountains was the backdrop for a gathering of scientists at the dawn of their careers. At the Frontiers in Optics/Laser Science (FiO/LS) meeting in October 2005, undergraduate science majors from around the country came together for a poolside barbeque to get acquainted on the evening before they presented their first research papers. Excitement was in the air, and for good

reason: The students knew that the special Symposium on Undergraduate Research to be held the next day—which was sponsored by the Optical Society of America in conjunction with the Division of Laser Science (DLS) of the American Physical Society—may mark the beginning of new professional relationships and productive careers.

Indeed, the symposium gave some of these students an opportunity that few could have ever dreamed of: to discuss their work with three Nobel laureates. Ted Hänsch, John Hall and Roy Glauber—who shared the 2005 Nobel prize in physics—attended the event to talk with undergraduates about the students' posters or listen to their presentations.

This was the fifth such symposium in a series that began in 2001 and has brought more than 90 undergraduate students to FiO/LS. The event has grown from having 10 participants in that first year to 31 in 2005. Last year, the students' projects were conducted at more than 20 universities. More than a third of the presentations were given by young women—well above the national average for female

physics students. The symposium was a reunion for some students who had conducted their research in Europe over the summer, through a program run by Prof. Martin Richardson of the College of Optics and CREOL.

The symposium included three sessions of six or seven 15-minute talks each. The sessions were presided by Prof. Richard Haskell of Harvey Mudd College, Prof. Martin Richardson and Prof. Justin Peatross of Brigham Young University. Prior to giving their formal presentations, the students participated in a poster session; that event was overseen by Dr. John Noé of Stony Brook University and included eight posters from undergraduates who didn't give talks.

Among the diverse topics that the students studied were high-order harmonic generation from ultrashort pulses, optical properties of waveguides produced by various techniques, atomic spectroscopy and cold atom physics, optical characterization of various nano-structures, nonlinear phenomena and improvements to laser technology. In a joint presentation, two students showed the audience time-

lapse movies of embryonic development taken with coherence microscopy. All the students' abstracts can be viewed at <http://resonator.physics.sunysb.edu/research-symposium/>. Past symposia programs and photos can be found there as well.

As often happens at research symposia, some talks turned out to be about closely related subjects. Thus, the students were busily exchanging ideas and information at the end of the session as they walked to a reception hosted by the OSA. The friendships made through this event will likely lead to lifelong collegial connections or professional partnerships.

The symposium succeeded largely because of the high quality of the undergraduates' talks. The students were all well prepared, informed and articulate. Each of them had a firm grasp of their subject, their role in the project, and where their work fit into the larger scheme of things. They handled a broad range of questions with poise and confidence.

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Judging from the notes that accompanied their final expense reports, the students will remember this meeting throughout their careers. Some of the comments were: "I thoroughly enjoyed the experience. It was wonderful to converse with undergraduates from outside of [my institution] to gain additional research-related perspectives..." "Thank you very much for the amazing opportunity...It was definitely a motivator in showing that hard work does pay off..."

and "I thought the conference was great! I wish I could have stayed longer..."

The event was supported by funds from several sources. Both NSF and DLS provided block grants, and the departments and colleges of some of the participants shouldered a significant portion of the total. Sincere thanks go to Brigham Young University, Harvey Mudd College, Bates College, Temple University, The University of California Berkeley, Lawrence University, The University of Arkansas, Old Dominion University, Stanford University, Johns Hopkins University and Stony Brook University. This vital support has allowed us to provide 100 percent support to the students, including registration, travel, housing and meals. It has been greatly appreciated. ▲

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