

EDUCATIONAL OUTREACH

PUBLIC AFFAIRS AND EDUCATIONAL OUTREACH

Science Education Highlights: Frenzied Teachers in Atlanta and a Telescope Building Challenge for Students

Stephen Pompea & Douglas Isbell

Attending the National Science Teachers Association (NSTA) annual meeting each spring is not for the timid or faint of heart. The meeting is filled with the country's best and most energetic teachers, eager to increase their professional knowledge and to examine each other's teaching practices. This year, thousands of teachers converged upon Atlanta's main convention center in early April to attend workshops on best practices in science education and teaching pedagogy, and to roam the NSTA convention floor in search of new activities, teaching materials, and free books.

It was an intellectual madhouse, but one that the NOAO science education staff looks forward to each year as a way to reach significant numbers of engaged science teachers. With workshop slots that must be applied for a year in advance, the annual meeting is an important opportunity to disseminate NOAO's education work to a broad national teacher audience. NOAO's specialty in bringing astronomical research into the classroom was well-represented in 2004 workshops sponsored by its NSF-funded Teacher Leaders in Research Based Science Education (TLRBSE) program. This year, NOAO staff were leaders in seven workshops and one short course for teachers, and nearly all were filled to capacity. The NSTA efforts were organized by NOAO Public Affairs Senior Program Coordinator Kathie Coil, Senior Science Education Specialists Connie Walker and Steven Croft, and TLRBSE Co-Principal Investigators Jeff Lockwood and Travis Rector.

Most of the NOAO workshops, including one offered jointly with the National Solar Observatory, introduced teachers to research projects that they can pursue with students. Some of the projects covered in these workshops were research using high-quality data on novae, solar magnetic field phenomena, active solar longitudes, and active galactic nuclei spectroscopy. In another workshop, past TLRBSE teachers briefed other teachers on techniques they

have used to convert their classrooms into astronomical research centers. For example, Michigan teacher Ardis Maciolek described her involvement with a student's astronomy research project that was later chosen for the Intel International Science and Engineering Fair in Portland, OR, the most prestigious science fair in the world.

Walker and TLRBSE Director Stephen Pompea also led a workshop titled "Awesome Experiments in Light and Color," attended by an overflow crowd. "We were hoping to get 30 teachers at our workshop since it was on Sunday morning at the end of the convention, and in an obscure location," Pompea says, "but we had over a hundred teachers attended. The room was completely full 15 minutes before the workshop began." This was the third year a

light and color workshop has been given to standing room only crowds by NOAO under the cosponsorship of the Optical Society of America, who provided educational kits for each teacher to take home. This year's workshop tested a new laser activity developed by Pompea and Walker under the NSF-funded Hands-On Optics (HOO) program at NOAO. HOO is a joint informal education project of the Optical Society of America, SPIE, NOAO, and MESA of California that is aimed at middle school-age students in after-school programs.

Pompea also was a copresenter with University of California at Berkeley colleagues in a short course on the teacher activity guides *Living with a Star* and *The Real Reasons for Seasons*, which are part of the University of California at Berkeley

Lawrence Hall of Science's Great Explorations in Math and Science series, which has proven to be extremely popular with teachers.

While the NSTA meeting was happening in Atlanta, another NOAO educational outreach activity was being conducted back in Arizona. An NOAO-designed student competition to build a Newtonian reflecting telescope was being held at Arizona State



MESA program students (from left) Daniela Castillo, Miriam Flores, and Armando Castillo from Nogales High School in Nogales, Arizona, pose with a Newtonian reflecting telescope that they built as part of a science competition designed by NOAO educational outreach staff.

continued



Science Education Highlights continued

University in Tempe as part of a state-wide competition for middle and high school students. Also developed in connection with the HOO project, the competition was part of a set of educational activities developed with the Mathematics, Engineering, Science Achievement (MESA) program of Arizona, a college preparation program that strives to increase the number of ethnic minority, low income, and first-generation college-bound students who are eligible to enter a degree program at a university.

In the reflecting telescope challenge, student teams determined the focal lengths of lenses and mirrors and assembled Newtonian telescopes from surplus optical parts. The teams were judged on a test of telescope knowledge, as well as on the assembly, focusing ability, and resolution of their telescopes. The success of this competition has led NOAO to begin designing a team competition for next year that will be held throughout California as well as Arizona.

Undergraduate Students Join in CTIO Research

Alan Whiting

For most of the (southern) summer just past, Cerro Tololo once again hosted a group of undergraduate students learning about astronomy by participating in research. Six US students of the Research Experiences for Undergraduates (REU) program joined two Chilean students in the *Práctica de Investigaciones en Astronomía* (PIA) program for a ten-week experience involving astronomical observing, data analysis, and presentation of results. An important ingredient of those summer student programs is living and working together with foreign students in the international environment of the AURA Observatories in Chile.

notes on living and working in La Serena, can be found on the 2004 REU/PIA Web pages at www.ctio.noao.edu/REU/ctioreu_2004/REU2004.html.

All students participated in a dedicated REU/PIA observing run, using both the 1.5-meter (spectroscopy) and the 0.9-meter (imaging) telescopes for a variety of targets. The first night of observing included the spectrum of a new supernova, the basis of an IAU circular published three days later. The students were cautioned that there is generally a longer delay before an observation generates a publication.

The summer program ended in March with oral presentations by the students to all interested CTIO and Gemini staff, completely filling the new AURA Lecture Hall in the Gemini South building! The students will gather again next January to present their results as posters at the winter AAS meeting in San Diego.



Nick Suntzeff and Alice Globus reducing data in the 1.5-meter control room during the student observing run.

Each student was matched with a staff mentor, who supervised an individual research project carried out over the ten weeks. This year mentors came not only from CTIO, but from Gemini South (Bryan Miller and James Turner) and even from the European Southern Observatory (Linda Schmidtobreick). Projects ranged from multiple and variable stars to planetary nebulae, and from E+A galaxies to distant galaxy clusters. Some of the projects involved observing with the CTIO telescopes or Gemini South. Summaries of the projects, as well as the students'



Brazilian graduate student Hektor Monteiro explains some of the intricacies of modelling planetary nebulae to REU student Melissa Rice.

continued



Undergrad Students Join in CTIO Research continued



The students of the 2004 CTIO Research Experiences for Undergraduates (REU)/Práctica de Investigaciones en Astronomía (PIA) programs: from left to right, Luke Galli (Colorado College), Bárbara Rojas (Universidad de Chile), Alice Globus (Wells College), Kyle Walker (Ohio State University), Javier Fuentes (Universidad de La Serena), Melissa Rice (Wellesley College), Rebecca Barlow (Mount Holyoke College), and Ethan Knox (Humboldt State University).

KOLD CBS-TV Live Weathercast from Kitt Peak



Chuck George from Tucson's KOLD CBS-TV broadcast his evening weather reports live from Kitt Peak on Friday night, March 5. In addition to showing scenic panoramas with various views of Kitt Peak telescopes, the five segments included interviews of NOAO Public Affairs Manager Doug Isbell on topics ranging from new activities at the Visitor Center to the importance of dark skies, plus many graphical slides of factoids about Kitt Peak's impact on the local economy. The event was topped off in the 10 PM half-hour by the first-ever live television views from Kitt Peak of Saturn, the Moon, and Jupiter as seen from the 20-inch telescope at the Visitor Center Observatory.



NOAO Hosts Math, Science, and Technology Fun Fest Booth at TCC



With the help of several members of the NOAO North scientific staff, NOAO Public Affairs hosted a lively booth at the Math, Science, and Technology Fun Fest at the Tucson Convention Center during three mornings in mid-March 2004. This extremely popular event featured about 70 exhibits and more than 7,400 student attendees. NOAO's booth featured numerous activities from Family and Project ASTRO, as well as the Star Lab portable planetarium; several student participants said it was one of the most fun booths at the fest!

Tohono O'odham Family Night on Kitt Peak



Kitt Peak National Observatory held an open house for families of the Tohono O'odham Nation on April 24. The Mayall 4-meter, WIYN 3.5-meter, 2.1-meter, and WIYN 0.9-meter telescopes were open for touring during daylight, and for viewing celestial treasures through the acquisition TV monitors after sunset, along with some small telescopes deployed by staff and the Tucson Amateur Astronomy Association. Visitors were entertained by two traditional dance troupes and a chicken scratch band. Vendors from the Nation served local foods and sold crafts. A clear evening sky (with a bit of brisk wind) enhanced the experience for the estimated 400 to 500 special guests. Thanks to all the NOAO staff and volunteers for their time and efforts to support the event.



The Road to Pachón



A local Chilean man rests by the side of the road that leads up to Cerro Pachón in north central Chile, with the SOAR and Gemini South telescopes visible on Pachón in the background.

This photo was taken on 17 April 2004, a few hours before the dedication of the SOAR telescope, a cooperative project between NOAO, the University of North Carolina at Chapel Hill, Michigan State University, and the country of Brazil.