

# EDUCATIONAL OUTREACH

PUBLIC AFFAIRS AND EDUCATIONAL OUTREACH

## Optics Education at NOAO Receives Major Boost

*Douglas Isbell & Stephen Pompea*

Optics education took center stage in recent activity by NOAO Public Affairs and Educational Outreach (PAEO) staff, with significant contributions to an international meeting of optics educators and the award of a major National Science Foundation informal science grant to a team including NOAO.

PAEO personnel presented four papers and led a workshop at the Education and Training in Optics and Photonics (ETOP) meeting held 6–8 October 2003 in Tucson. Convened every two years, the ETOP conference is the primary international forum for the exchange of ideas and experiences related to education in optics and photonics.

The meetings are held under the auspices of the International Commission for Optics (ICO), the Optical Society of America (OSA), and the International Society for Optical Engineering (SPIE). This meeting in Tucson had a special emphasis on approaches to encourage the next generation of engineers, scientists, and technicians, and was held in conjunction with the annual meeting of the OSA.

PAEO's Constance Walker, Steven Croft, and Stephen Pompea presented papers on teaching optics through the NOAO Teacher Leaders in Research Based Science Education (TLRBSE) program, effective ways to teach about the electromagnetic spectrum, and teaching about infrared imagery. Walker and Pompea organized and led a one-day workshop for 48 science teachers from throughout the state of Arizona associated with the Mathematics, Engineering, Science Achievement (MESA) program. Pompea, manager of science education in PAEO, was also the organizer and host of a special invited session titled, "Best Practices in Science Education," with noted speakers such as Sir Michael Berry of the University of Bristol and Michelle Hall-Wallace of the University of Arizona.

The fourth paper presented by NOAO PAEO staff at the meeting, "Hands-On Optics (HOO): Making An Impact With Light," was especially timely given that it described an exciting new project that received a three-year, \$1.7 million NSF grant on September 30.

A collaborative effort by OSA, SPIE, MESA, and NOAO, the HOO program is designed to reach thousands of underrepresented middle school students, their parents, and their teachers with

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*Math and science teachers from Arizona at an NOAO-led workshop during the Education and Training in Optics and Photonics (ETOP) meeting, held 6–8 October 2003 in Tucson.*





## Optics Education at NOAO continued

lessons in optics education using creative activities like building a kaleidoscope and a pinhole camera, and creating holograms.

“HOO is truly a unique program targeting scientific activities not only at students in critical populations—educationally disadvantaged, middle-school-aged learners—but also their entire support network. Its activities will be geared towards actively involving parents, teachers and community volunteers in the learning process,” says OSA Executive Director Elizabeth Rogan. “Our goal with HOO is to enhance science education for these populations and to foster an interest in science, which may open doors to futures these students had never considered.”

“This program fulfills a critical component of SPIE’s educational mission,” says SPIE Executive Director Eugene Arthurs. “We are confident that fostering an interest in science at an early age will help supplement the ranks of future optical engineers, those who will fulfill the promise of the ‘century of the photon.’”

Based on recommendations from scientists, as well as science and technology educators and experts, HOO events

will take place after school, during weekend sessions, and at summer camps or family workshops, which is a specific strength of the MESA program. Through the activity modules, students will gain a physical understanding of optics principles. They will rely on inquiry, critical thinking, and problem solving skills involving optics, and will also learn how optics interfaces with other disciplines.

“Children and adults everywhere are enthralled by light, shadows, and the colors of our natural world,” Pompea explains. “Our fascination with astronomy and the microscopic world is fueled by advances in optics and optical technology. HOO has been designed to use the appeal of optical wonders to teach practical lessons about light and its uses.”

Development of the pilot program for HOO has already begun. NOAO will play a key role in training teachers and volunteers, and in developing the related optics kits. MESA teachers in Arizona will implement the program initially, with expansion to selected sites across the country in 2004 and 2005.

For more information, contact [spompea@noao.edu](mailto:spompea@noao.edu).

## The 2004 REU Program at Kitt Peak National Observatory

*Kenneth Mighell*



Each summer, a group of talented college students comes to Tucson to participate in astronomical research at Kitt Peak National Observatory (KPNO) under the sponsorship of the National Science Foundation Research Experiences for Undergraduates

(REU) program. The KPNO REU program provides an exceptional opportunity for undergraduates considering a career in science to engage in substantive research activities with scientists working in the forefront of contemporary astrophysics.

Each REU student is hired as a full-time research assistant to work with one or more KPNO staff members on specific aspects of major on-going research projects at NOAO. As part of their research activities, these undergraduates gain observational experience with KPNO telescopes, and they develop expertise in astronomical data reduction and analysis. They also take part in a weekly lecture series and a

field trip to New Mexico to visit Sacramento Peak Observatory and the Very Large Array. At the end of the summer, the students share their results with the Tucson astronomical community by giving oral presentations.

As part of their internship experience, all six of our 2003 REU participants will be presenting posters about their astronomical research projects at the January 2004 AAS meeting in Atlanta.

We anticipate being able to support six REU students during the summer of 2004. As required by the NSF, participants must be citizens or permanent residents of the United States. The KPNO REU positions are full-time for 10 to 12 weeks between June and September, with a preferred starting date of early June. The salary is \$440 per week, housing is provided, and additional funds are provided to cover travel to and from Tucson.

Further information about the KPNO REU 2004 program, including the on-line application form, can be found at [www.noao.edu/kpno/reu](http://www.noao.edu/kpno/reu). Completed applications (including official transcripts and two or three letters of recommendation) must be received no later than 26 January 2004.



## Fall 2003 Project ASTRO Training Workshop



Project ASTRO-Tucson held its 8th annual training workshop on 3-4 October 2003, hosting 33 teachers and 27 astronomer partners for two days of hands-on activities and lectures by speakers from NOAO, the University of Arizona, Biosphere 2 and the Space Science Institute in Boulder, among others. Topics included lunar craters, student misconceptions in astronomy, and how to integrate art, poetry and scientific journals, as well as an inspirational trip to Kitt Peak.

*Crater impact exercise—watch out for the cocoa powder ejecta!*



*Kinesthetic astronomy exercise on the University of Arizona mall—which way to Saturn?*