Hands-On Optics (HOO) – Making an Impact with Light

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Abstract:
Hands-On Optics (HOO) is a collaborative three-year program to create and sustain a unique, national, informal science education program to excite students about science by actively engaging them in optics activities. It will reach underrepresented middle school cohorts in science and technology, and connect with their parents, teachers, school districts and communities.

Summary
SPIE — The International Society for Optical Engineering and the Optical Society of America (OSA), in collaboration with the Mathematics, Engineering, Science Achievement Program (MESA) of California and the National Optical Astronomy Observatory (NOAO) in Tucson, have partnered to ensure that the optics community's expertise and resources will be tapped to provide maximum value in meeting the Nation's education challenges in optics. The initial HOO partnership of two optics societies, a science education program for minority students, and a national observatory provides a new, cooperative model for informal science education activities. This program, a follow-up to the 2001 National Science Foundation planning grant (number ESI-0136024), *Optics Education – A Blueprint for the 21st Century*, was undertaken to address the disconnect between the ubiquity of optics in everyday life and the noticeable absence of optics education in K-12 curricula and in informal science education.

NOAO — with expertise in teaching optics, developing optics kits, in science-educator partnerships — will design the HOO instructional materials by adapting well-tested formal education activities on light, color, and optical technology for the informal setting. These hands-on, high-interest, standards-connected activities and materials will serve as the basis for 6, three-hour-long optics activity modules that will be used during weekend and summer sessions held at 23 HOO host sites. NOAO also will train the teachers, parents, and optics professionals who will work in teams to lead the HOO activities. A key component of the project will be the optics professionals connected with the two optical societies who currently are engaged in outreach activities and programs. Optics professionals will serve as resource agents teamed with MESA lead teachers and parents. An intensive 4-day training program will familiarize the teams with the activities and materials, informal and formal education, middle school science standards, and inquiry-based learning and teaching. Critical to HOO's institutionalization will be the formation of local industry advisory boards, and an OSA and SPIE nationally administered support network offering diverse services and venues for assistance.

MESA California, an academic enrichment program founded over 30 years ago to aid educationally underserved minority students, now serves nearly 33,000 students. By leveraging the existing infrastructure at **17** diverse MESA host sites — in California and in six other states with successful MESA programs — the HOO program will gain a "jump-start" in reaching the target audience. HOO also will reach other students by disseminating the project to a minimum of **4** science-technology centers, **2** NSF-funded science and technology research centers, and through both optics societies' many volunteer outreach programs nationwide. Access to optics will be created for nearly 40,000 students by the end of program year 3, and to 18,000 students annually, of which over 80% of the students will be from traditionally underserved groups in science and engineering. Also by year 3, alliance formation and sustainability among the stakeholders — those previously mentioned, plus education institutions and optics and optics-related companies — will be strengthened to promote ongoing joint action in informal optics science education.

This collaboration and program actively seeks partners and participants who add value, resources, and expertise not only to promote stability and sustainability, but also to ensure the most enriching optics education experiences for the students, parents, teachers and communities.

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