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The Maury Project 2011 Annual Report

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LONG-TERM GOALS

The Maury Project is an oceanography-based graduate-level teacher professional development program, designed to promote the scientific literacy of young people by improving the background of pre-college teachers on the physical foundations of oceanography. This is accomplished through a peer-training process of training the trainers at a two-week workshop held at the US Naval Academy and subsequently via single-topic modules presented in sessions throughout the United States. By increasing the scientific knowledge of teachers, the Maury Project is ultimately directed towards attracting precollege students, including underrepresented minorities, to science, technology, engineering, and/or mathematics studies. This is in close alignment with the ONR mission to "nurture the next generations of researchers for the future of the Navy and Marine Corps."

OBJECTIVES

This project was designed to meet the following objectives:

(a) Master teachers will be trained to be peer trainers and resource persons on the physical foundations of selected oceanographic topics and/or issues.

(b) Self-contained single-topic teacher-enhancement instructional modules will be prepared and provided for use by the peer trainers in 1- to 2-hour training sessions.

(c) The peer trainers will arrange and conduct training sessions for other teachers, with support from the AMS.

(d) A national network of oceanography peer trainers and resource persons will be developed and maintained.

(e) A variety of instructional resource materials on the physical foundations of oceanography and related topics will be prepared and disseminated for adaptations by teachers for use in their own classrooms.

APPROACH

There are three major components to this program: an annual summer workshop for master precollege teachers, the production of teacher enhancement instructional resource materials, and the peer-training of teachers. The intent is to provide a core group of teachers with the knowledge and instructional resources to enable them, in turn, to train a large number of their peers on selected oceanography topics. In-class use of these topics by those peer-trained will enhance learning experiences for K-12 students.

WORK COMPLETED

In summer 2011, a two-week workshop for pre-college teachers on the physical foundations of selected oceanographic topics was held at the United States Naval Academy in Annapolis, MD. The USNA Oceanography Department makes available to the Maury Project essentially all of its outstanding facilities for the peer-trainer workshop, including an oceanographic research vessel and the Hendrix Oceanography Laboratory, which features a NOAA Tide Station, and a wet laboratory, which circulates water from the Chesapeake Bay. Participants have an intensive, hands-on experience in oceanography, which they are excited to share with others via peer-training workshops they conduct in their local school districts and communities.

RESULTS

With the training of 24 new participants in the summer 2011 Maury Project workshop, a total of 430 teachers representing all 50 states, the District of Columbia, Puerto Rico, American Samoa, Argentina, Guam, Mexico, South Africa, Canada, Great Britain, Australia, Switzerland, Japan, and US Department of Defense Overseas School System have become peer trainers since the first USNA summer workshop in 1994. These educators, in turn, have conducted more than 2000 single-topic peer training sessions for tens of thousands of teachers. Additionally, the Maury Project alumni have provided significant leadership in pre-college ocean science education curriculum reform. About 30 Maury workshop alumni have played key roles in the development and national implementation of the graduate-level AMS *DataStreme Ocean* (2003-present), *DataStreme Water in the Earth System* (2001-2008), and *DataStreme Earth's Climate System* (2009-present) inservice teacher enhancement courses, which have trained thousands of other teachers.

IMPACT/APPLICATIONS

Maury Project summer workshop participants are committed to offering a minimum of two single-topic training sessions lasting from one to two hours each. The table below lists workshops conducted over the past three years. In the past year, the majority of workshops have been conducted by the summer 2010 group. Summer 2011 participants will conduct their required workshops during School Year 2011-2012.

Peer-training Workshops Conducted from 1 April 2008 – 30 September 2011

Summer Workshop Group	Number of Peer-Training Workshops	Teachers Peer-Trained
Summer 2008	45	459
Summer 2009	45	506
Summer 2010*	39	288
Groups Prior to 2008**	57	880

*Summer 2010 participants are still completing their required 2 peer-training workshops.

**Several past participants continue to actively conduct workshops, well beyond the required number.

To see the multiplying effect of this program, consider that since its inception more than 2,000 workshops have been conducted by peer trainers across the country, reaching over 31,000 teachers, each of whom reaches about 100 students daily.

EVALUATION

End-of-workshop survey questionnaires are administered on the last day of each summer workshop. Data collected at the end of the summer 2011 workshop is summarized below. All 24 participants completed the survey.

When the 24 participants were asked for:

- their overall rating of the Maury Project in terms of its educational value, all 24 gave the highest response of "excellent."
- the long-term effect on their teaching, 21 reported "great deal" and 3 "some."
- the long-term effect on their curriculum development, 18 reported "great deal," 5 "some," and one participant reported "none."
- the long-term effect on training of colleagues, 23 reported "great deal" and 1 "some."

When asked "Has your perception of the value of the Navy changed as a result of your workshop participation?" 21 reported "increased" and 3 reported "remained the same."

When asked "Has your perception of the value of NOAA changed as a result of your workshop participation?" 20 reported "increased" and 4 reported "remained the same."

When asked how they would rank the Maury workshop with other summer workshop experiences they have had since becoming a teacher, all participants indicated it was the best or among the very best.

When asked if they would recommend that the Maury Project USNA workshop be offered in the future to other teachers, all participants responded affirmatively.

TRANSITIONS

Beginning in spring 2004, Maury Project alumni have played major roles in the development and implementation of *DataStreme Ocean*, a semester-long teacher enhancement course that is being offered nationwide by the AMS with NOAA support. Maury Project alumni lead 25 Local Implementation Teams (LITs) for the course. Through spring 2011 semester, a total of 3,090 precollege teachers were trained by this program. Approximately 148 teachers are taking *DataStreme Ocean* this fall.

Originally funded by the NSF for 3 summers starting in 1994, the existing Maury Project Summer Workshops at the Naval Academy received additional NOAA, Navy, and AMS support. Funding from ONR assures the continuation of the workshops through summer 2013. ONR has committed substantial support towards this continuation and is now its major sponsor.

RELATED PROJECTS

Building on the experiences gained in the Maury Project and the *DataStreme Ocean* distance-learning teacher enhancement course, the AMS developed an introductory college-level course entitled, *AMS Ocean Studies* (formerly termed *Online Ocean Studies*). The course was pilot tested in the spring 2005 semester at 12 undergraduate institutions, and 144 undergraduate institutions and 17 high schools have licensed the course since. This course would not exist without the experiences gained and the learning materials that evolved from those developed in the Maury Project. A major benefit of the *AMS Ocean Studies* course is that it will reach hundreds of preservice pre-college teachers.

The *AMS Ocean Studies* Diversity Project, an offshoot of our work with the AMS Ocean Studies undergraduate course, is a direct result of an NSF grant and NOAA support to provide special workshop opportunities for faculty at institutions serving significant numbers of minority students. Workshops were held each summer at the University of Washington/NOAA facilities in Seattle, WA from 2006-2008. Seventy-seven minority-serving institutions (MSIs) participating in the program have already offered the course to over 5,000 students, providing an opportunity to sample an oceanography course where none existed prior to this program.

AMS received an NSF OEDG grant in August 2011 to continue Diversity Project workshops, this time focusing on implementation of the *AMS Climate Studies* course at 100 MSIs over a five year period. Many participating faculty members will have already offered the Ocean Studies course, and this new project will build on the success of the Weather and Ocean Diversity Projects, including ideas formed at an Ocean Best Practices workshop held at the 2010 AMS Annual Meeting.

CONTINUED PARTNERSHIP WITH US NAVAL METOC PROFESSIONAL DEVELOPMENT CENTER

The Naval METOC Professional Development Center has offered *AMS Ocean Studies* and *AMS Weather Studies* courses since January 2006. The courses are offered through distance learning to 280

aerographer's mates (AGs) and Marines per year. This partnership demonstrates that ONR support for the Maury Project has the additional benefit of contributing towards the production of high-quality learning materials that have been and are being used in the professional development of Navy personnel.

NEW OCEAN EDUCATION PARTNERSHIP WITH COSEE

In early 2011, AMS and Centers for Ocean Sciences Education Excellence (COSEE), another ONR supported program, signed a Memorandum of Understanding "to promote atmospheric and oceanic science research, education, and outreach and cooperation and action." This MOU will create new avenues of outreach and educational opportunities for potential and current teacher participants. Historically many Maury Peer Trainers have also been involved with COSEE at a variety of levels, including several in leadership positions.

PUBLICATIONS

2011

AMS Pre-college Teacher Professional Development Courses: A Hands-on Exploration of the Dynamic Earth System, Dr. James Brey, Director, AMS Education Program, 91st Annual AMS Meeting, Seattle, Washington.

The AMS Approach to Online Education for Teachers and Undergraduates, Dr. Joseph Moran, Associate Director, AMS Education Program, Council of Science Editors Annual Meeting, Baltimore, Maryland.