

# HST Education & Outreach

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## A Vision Statement

The Hubble Space Telescope Mission enjoys wide name recognition and holds considerable public fascination. In fact HST is an icon for exploration, discovery and general "good news". The Office of Public Outreach (OPO) at Space Telescope Science Institute (STScI) employs the unique scientific discoveries and technological advances from the Hubble Space Telescope to make research and expertise broadly accessible and relevant to the public. OPO is able to cultivate this intense public interest and seize the opportunity to develop appropriate partnerships between the space science community and broader communities, including educators, science museum and planetaria personnel and other members of the general public.

By developing exemplary programs, OPO has been able to bolster mathematics, science and technical education and contribute to an improved public understanding of science and technology. OPO staff have placed importance on investigating methods that sensibly integrate the communities of researchers, engineers and technologists, both locally and nationally, into public programs with the tangible result that scientists and engineers are ever more motivated to take an active role in science communication. While the near term activities and metrics that characterize the OPO program are illustrative, it is the long view that is most relevant when pondering the direction of the science community for the next decade and beyond.



The current suite of OPO educational experiments, projects and grants programs are founded upon the NASA strategic and implementation plans in the Office of Space Science. The near term tactical approach of committing human resources, creating leveraged programs, documenting recommended practices, and urging scientists up the learning curve on effective methodologies is paving the way for a future in which the return to the taxpayer is second nature. We have a idea in which researchers, be they members of large teams supporting a facility class observatory, or conducting a small granted investigative program, will be as accustomed to sharing their expertise with the public as they are writing papers for scientific journals. Scientists will be in the habit of cascading scientific data and results into formal curricula in an appropriate manner and be at ease in building collaborative efforts with informal science educators (science museums, libraries, etc.). In general, we see the scientists of the future participating in programs that feed public interest and demonstrate science relevancy in every day lives with the same affinity as exercised in their scientific research.



One arena of activity that we pursue is to apply our scientific and technical know-how to evaluate new methods using emerging technologies to provide access to scientific human expertise as well as data and descriptions of research results in an informative, relevant way. Examples include: webcasting NASA press conferences, now a routine resource for internet users; supporting broadcasting of live events such as HST servicing missions and web simulcasts of NPR radio programs that cover specific science topics in much greater depth than the news, supported by imagery and graphics. We apply sensible good business practices in our programs:

inclusion of the "end user" in the authorship of materials; beta testing of the product; a robust revision cycle; *in situ* pilot testing and evaluation and documenting of results.

We envision that based on the modest growth rate and learning curve of the astrophysics community regarding appropriate methods and collaborations with the education communities, that a reasonable level of sophistication will be achieved nationwide in a few years. At that point, education and outreach will be seamlessly integrated into astrophysics missions. No longer will "return to the taxpayer" or "contributing to public understanding of science" be a foreign concept viewed with bittersweet nervousness.

### ***For Consideration and Discussion***

As the comfort level and refinement of education and outreach efforts mature, the magnitude of opportunities expands. In short order it will be important to consider how the profile of appropriate collaborations between the science community and others will evolve. It is clear from current interest in OPO products that pressure on creating interfaces with the commercial sector are increasing. We must be prepared and wise about such interfaces.

While at first blush this notion may appear to be counter to the scientific culture, in fact the Earth Science and Solar System communities have developed comfortable relationships with commercial entities. Interfaces with inventive companies have resulted in improvements in instrumentation, software, and scientific visualization. The astrophysics community in fact has had some measured success in this area in the development of sensitive imaging and spectroscopic detectors. Rather than detracting from the purity of science, some deliberate intelligent involvement in commerce can vastly improve the environment for science and be an enabling vehicle for scientific research as well as public understanding and acceptance of science.

Other equally creative relationships with non-traditional partners can be considered. For example, already OPO is applying the philosophy that in the United States, astronomy is rarely taught as is in the pre-college environment. Therefore, our curriculum support materials concentrate on using HST data, results and expertise to enhance mathematics, technical and scientific process skills as related to existing education standards rather than forcing astronomical content into venues unprepared to accept it. Similarly but more expansively, it is relatively straightforward, but challenging nonetheless to other areas such as to develop writing skills, reading literacy, and historical knowledge (in fact one resource OPO created in 1998 was specifically a reading exercise, addressing reading educational standards).

It is wise to proceed into these new areas with a solid basis of experience and a sophistication of thought as well as a willingness to meet educators and the science interested public on their own professional terms. In this way, education and public outreach associated with HST and subsequent missions will be a fruitful successful venture and a solid return on the continuing taxpayer investment.

### ***Reading Starting Points***

The NASA Origins Education Forum (<http://origins.stsci.edu/>) and its sister eco-system member web pages contain numerous references and pointers to materials, recommended practices and case studies.

In addition, the *Journal of Science Education and Technology* (Plenum Press: New York) is a valuable resource.