

# Origins Education Forum

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## Introduction

The Education Forum for the Astronomical Search for Origins and Planetary Systems ("Origins") has a role to cultivate and facilitate the development of partnerships between the space science community and broader communities. These communities include educators, science museum and planetaria personnel and other members of the general public who collaborate with scientists to improve public understanding of science through multiple, leveraged means. While the near term activities and metrics that characterize the Forum 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 Origins 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 monies, 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. 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.

## Mission

The charter of the Origins Education Forum is to

- Create handshakes between science community and educators
- Coordinate access to education products across all Origins missions
- Articulate "recommended practices" based on practical experience
- Interact with other eco-system members, NASA, and other agencies as appropriate
- Origins specific - conduct experiments with emerging technology for applicability to public understanding of science
- Origins specific - lead the development of a catalog system for NASA OSS education products

## Organization

The Education and Public Outreach (EPO) personnel from all Origins missions are all considered forum members, a philosophy distinct from the other OSS forums. The few Origins Forum personnel co-located with the EPO personnel associated with the Hubble Space Telescope (HST) mission in the Office of Public Outreach (OPO) at Space Telescope Science Institute (STScI), is to coordinate and manage the activities of the forum, not to create the specific educational materials. This means that the development of educational content is integrated, as it should be, within missions and within individual research programs, not "purchased" from a separate entity.

Origins educational content is created within the NASA missions and by individual PIs who have won funding through grants programs. The grants programs include the IDEAS program, EPO funds associated with observatory Call for Proposals for observing time (e.g., AXAF, HST Cycle 8 and Cycle 9, etc.), and research programs such as the NASA Research Opportunities in Space Science (ROSS) research announcement. The Origins Forum personnel at OPO/STScI coordinate the access, disseminate information on Origins mission materials, and create links within the membership and between NASA funded scientists, and members of the education community. To give one access example, we are leading the effort to establish a catalog system for the education products being created by establishing standards that align with other federal agencies, managing uniformity across the ecosystem and conducting tests and evaluation on user interfaces and product registration techniques.

## **Activities to Date**

### ***Coordinate access to products***

We organize presentations of the plethora of Origins materials at professional meetings held by the scientific, technical and education communities. Information is disseminated through exhibits, workshops, literature, presentations and teacher enhancement and professional development programs. The EPO personnel from the missions collaborate to staff booths, conduct the workshops and presentations and often arrange the detailed logistics for forum activities at local and regional levels. Hardcopy materials are disseminated nationally through the NASA networks such as the Educator Resource Centers, and through other agencies and institutions.

Materials are evaluated at the workshops, professional development sessions, and at the professional meetings through interviews and questionnaires. In addition, the method by which educational products are created, reviewed, revised, pilot tested, and evaluated are published through the forum website. OPO, responsible for the products from HST, the Origins flagship mission, has published the criteria to be used for its materials and by NASA personnel pilot testing materials at workshops. Specifically, OPO uses hundreds of educators across the country to pilot test and evaluate the effectiveness of the products being used. Evaluation methods used by other Origins missions launched subsequently will be published through the forum.

The Origins Forum website, created by the forum personnel at OPO, is the gateway to materials, exhibition calendars, documentation, and links to the catalog, the eco-system and to specific experts in the scientific and educational communities.

### ***Articulate "recommended practices"***

The Origins Forum website contains documentation on recommended practices for creating, disseminating, reviewing and evaluating the products and programs created within the forum. Included are examples of successful programs funded through IDEAS, through the HST Cycle 8 HST program and links to other materials relevant to EPO practitioners.

The Origins Forum also provides to the entire eco-system the appropriate and recommended improvements to grant programs and review criteria.

### ***Create handshakes between science community and educators***

Since the creation of the Origins Forum, NASA has offered several grant opportunities. We assisted many personnel responding to the Discovery and the MIDEX Announcements of Opportunity in 1998. The interaction included providing information on appropriate, leveraged education programs, evaluation methods, and clarification of review criteria. PIs (~15) consulted directly with forum personnel, many more were referred to other eco-system members. Several scientists consulted with the forum concerning the ROSS NRA. The IDEAS program supported ~100 inquiries, as these EPO proposals are intended to be the most innovative and exploratory

within the NASA suite of opportunities. Since the IDEAS program is managed by OPO, the Origins Forum has been able to thoroughly document the growth of this program, its successes and lessons learned. EPO proposals associated with missions are submitted by 10-15% of the eligible proposers. We also conduct workshops covering the grant programs at AAS meetings, providing a catalyst for creative thinking and new collaborations.

***Interact with other eco-system members, NASA, and other agencies as appropriate***

In addition to the considerable amount of coordination between all NASA OSS Forums and Broker/Facilitators regarding the business of the ecosystem, the Origins Forum interacts with other external agencies. For example, the catalog effort requires interaction with the Gateway to Educational Materials (GEM) supported by the US Department of Education and the National Science Foundation. The forum interacts with the American Association for the Advancement of Science in providing exemplary materials for the purpose of demonstrating the method by which educational materials should be created aligned with national science, technical and mathematics learning standards. We have also coordinated with the NSF educational archiving working group and other institutions and agencies, sharing expertise, articulating our methods and providing examples of resources. The Origins Forum, on a regular basis, supports briefings to decision makers requesting information, visitors to the STScl and other groups such as the Space Studies Board of the National Academy of Sciences.

***Conduct experiments with emerging technology***

One arena of activity that we pursue is to evaluate new methods using technology 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 in the future, for example, SOFIA flight experiences. We also web simulcast NPR radio programs that cover specific science topics in much greater depth than the news, and supported by imagery and graphics. We apply the methods inherited from the HST educational program: inclusion of the "end user" in the creation of materials; beta testing of the product; a robust revision cycle; *in situ* pilot testing and evaluation and documenting of results.

***Lead the development of an educational products catalog***

One of our goals is to create access to Space Science educational resources. At first blush this would appear to be a simple task, but the problem is a challenging one in information science. Conceptually, the catalog is a database, a search engine and an interface, but we recognize that different end users have different needs and comfort levels in searching for and retrieving information. We also recognize that "materials" come in different forms (online interactives, posters, slides, photographs, CDROMs, etc.) and granularity (individual images, lesson modules, teacher guides, courseware, etc.). We are leading a collaborative approach across all the OSS themes, to understand what actually is needed by the users and what methods can be used to rationalize the registration of materials available. We are also testing interfaces and database collection methods with an eye to efforts in other federal agencies and in close collaboration with the larger, science education community supported by the National Science Foundation and the Department of Education.

**Summary**

The Origins Education Forum in the near term is laying a foundation so that "education and outreach" becomes more fully and naturally integrated into the research community supported by NASA Office of Space Science funding. We also perceive our collective role across the forum is to provide leadership and vision so that the road in the future is smoother and so that scientists are ever more expansive and innovative in their approaches to public understanding of science.