THE SCIENCE AMBASSADOR PROGRAM: SCALING UP IN THE FUTURE

INTRODUCTION

Two major problems facing our society are the widening gaps between humans and nature, and the lack of connections between scientists and non-scientists. In 2002, a group of scientists and informal science educators (ISE) initiated a pilot "Research Ambassador Program" (RAP) to facilitate the establishment of direct communication between scientists and the general public. The central concept of the RAP is to provide appropriate academic rewards to scientists to link their research to an existing interest, trade, or hobby of a segment of the public in non-academic venues. In contrast to many ISE programs, the RAP focuses on the "environmentally unaware" (those not inclined to visit traditional ISE institutions), creates opportunities for direct interpersonal contact between scientists and non-scientists, and enhances, rather than detracts, from scientists' careers. The RAP is consistent with the increasing interest of the scientific community in promoting scientific engagement and scientific literacy in society. Participation in this program can also help scientists fulfill the "Broader Impacts Requirement" of the National Science Foundation grants. What is needed now is a means to scale up the program while retaining its grassroots approach to scientific outreach.

SUMMARY OF WORK TO DATE

Pilot efforts of the RAP consisted of recruiting academic participants through professional contacts of the PI, announcements at meetings, and email bulletin boards of professional societies, most in the field of ecology. The RAP staff and the first cadre of Research Ambassadors brainstormed creative connections between their research topics and groups outside of academics. They implemented a set of "outreach scenarios" in their local or regional communities. Examples of activities included the following: a botanist worked with inmates at a prison to develop sustainable moss-growing techniques for the horticulture trade; a forest ecologist gave sermons on trees and spirituality in churches and synagogues; a marine biologist worked with a rap singer to help inner city middle school children turn field experiences into rap and hip hop songs; a wildlife biologist supplied educational materials about rainforest mammals for a canopy zipline/ecotourism company in Costa Rica. To have these activities be perceived as worthwhile to academics, the RAP provided an honorarium, assistance with graphics and advice on the appropriate level of language, evaluation tools, and a letter from the scientist's dean or Chair for his/her portfolio. These efforts were funded by NSF's Informal Science Education Program (*Communicating Research to Public Audiences*) and the National Geographic Society (*Conservation Trust Program*).

Evaluation efforts by a consulting assessment team revealed the following insights from the pilot work:

- Non-scientists are open to contact with researchers when they are in non-scientific settings;
- Non-scientists have well-developed networks based on their own interests and values, and can link a scientist to other individuals and into those networks;
- Non-scientists are often amazed that scientists want to and are capable of communicating with them;
- Non-scientists frequently generated observations and questions that were novel and useful to scientists because of their fresh perspectives;
- Contact even as short as a single lecture can lead to sustained followup exchanges and actions that promoted favorable exchanges for environmental actions and science funding;
- Most RAs stated that the most powerful reward was the enthusiasm, curiosity, and gratitude that the audience communicated in person and in writing, both immediately and in follow-up messages.

The efforts of the RAP have attracted positive attention, both from scientists and the national media, including two articles in the Science Times of the NY Times (**www.researchambassador.com**) and an NPR radio story (**http://www.kuow.org/defaultProgram.asp?ID=7556**). Articles in the peer reviewed scientific literature and talks about the program at national and international scientific meetings met with interest from graduate students, junior faculty, and especially senior scientists, the latter being most concerned with broadening the legacies of their careers.

We also surveyed reactions to our program from academic administrators. We identified a random group of 200 institutions of higher learning and stratified them by geography and size, and administered a survey

developed by our evaluation consultants. Three patterns emerged: 1) outreach activities were viewed as being less important than research and teaching activities; 2) although approval and disapproval of a researcher's peers is the strongest determinant of decisions, administrators perceive that they themselves have a "significant' or "major" effect on actions of a faculty member; and 3) over 70% of the administrators support the idea of their faculty doing outreach and have confidence that their faculty members are good at it. Over 90% were interested in receiving a report of our results.

Based on evaluations of participating researchers, the financial honorarium ($500) was valued, but was of less import than peer approval and the letter from a high-ranking academic. What was also useful was the inclusion of the activities in subsequent "Broader Impact Statements" for NSF grants. Surprisingly, the strongest reward was the personal satisfaction that resulted in doing public outreach, and the sense that the RA was contributing directly to public understanding of his/her research.

Thus, the pilot RAP was effective on a small scale – at the level of single individual researchers and to local or regional public audiences (e.g., a church congregation, a lecture hall of medical students, a woodworkers workshop). To make this a significant program that will substantially increase connections between science and society, the RAP must overcome the limited scope of its direct impact. Although we learned that it is fairly easy and inexpensive to recruit scientists to give a single public talk, it is difficult to increase the number and frequency of these activities by an individual scientist, as the priority for academic work – even if accompanied by rewards – remains in research and teaching students.

FUTURE NEEDS

To make this cost-effective and long-term, we must create a planning process to work out how to raise the level of impact of this program to a larger scale in terms of numbers of individuals who receive scientific information, the fields of scientific participants, and types of audiences we engage. We anticipate that the ultimate program, which we will rename and hereafter term the "Science Ambassador Program" (SAP), will be associated with the AAAS. We will also partner with other national organizations (e.g., Org. for Biological Field Stations, Association for Science and Technology Centers, ASTC). The critical questions we need to answer to scale up include:

1) What is the nature of our audiences in terms of numbers, needs, and receptivity to the program?
2) What are the best ways to recruit, reward, train, provide outreach scenarios for, and evaluate scientists?
3) How can we best communicate results to academic administrators and encourage their reinforcement of outreach activities by their researchers and faculty?
4) How can we work with ISE professionals and other organizations to complement, rather than duplicate, their efforts?

We envision a step-wise effort to develop our goal to create a long-term program of training, implementation, and evaluation for a broad range of scientists to accomplish innovative and effective outreach work, and to integrate it seamlessly into their academic careers (Fig. 1). We plan to apply for a Planning Grant from the NSF Informal Science Education Program, followed by a major implementation grant from the same program.

PLANNING EFFORTS

The four goals of our planning efforts are to:

1) query potential audiences of scientists from different academic fields to find out the best rewards and the existing obstacles for doing public outreach;
2) convene a group of scientists, administrators, ISE professionals, and evaluators to explore best practices to recruit, train, and evaluate scientists;
3) develop 2-3 case studies to test these recommendations; and
4) ascertain the roles and responsibilities of collaborating individuals and institutions that will promote the successful expansion of this program.

Planning Activity 1. Survey audiences

We must identify the obstacles that our audiences face when offering and receiving public outreach, and explore appropriate rewards for academics to do public outreach. With the guidance of our evaluation consultants, we will develop questionnaires for our four audiences. To survey ***research scientists***, we will draw upon the affiliate societies of the AAAS, which comprise over 250 scientific societies. We will use the leverage of the AAAS to gain the support of the presidents (or equivalent) of 10-15 societies that represent a range of scientific disciplines. Segments of the ***non-scientific public*** will be surveyed before and after RAs activities. With guidance from the ASTC, we will identify 20-25 representative ***ISE institutions*** and carry out telephone interviews with staff to discuss opportunities for training and outreach venues for our SAs. We will follow up our previous survey of ***academic administrators*** with telephone interviews.

Planning Activity 2. Convene a Planning Forum for the SAP with scientists and ISE professionals

We will bring together the principal participants and consulting professionals from academia and ISE institutions for a two-day meeting. The mission is to draw suggestions on how best to expand the program in both breadth and numbers. Most critically, we will discuss how to create an institutional infrastructure that can perpetuate the recruitment, training, implementation, and evaluation in the long term. We will convene the meeting in Washington, DC (AAAS headquarters) before the 2nd quarter of the planning grant funding. The PIs will write and distribute a summary of the meeting.

Planning Activity 3. Develop case studies to test recommendations

Based on the recommendations from the Planning Forum, we will select 2-3 case studies for which we can test recruitment, training, implementation, and evaluation activities. We anticipate that we will recruit scientists via electronic bulletin boards, newsletters, and meetings of AAAS affiliate societies. We will explore three types of public outreach formats by scientists: 1) giving oral presentations to non-scientists; 2) writing popular articles for magazines by partnering with a professional writer/media professional; and 3) creating or modifying existing websites by working with a professional web technician. Training will be accomplished by workshops at the SA's home institution, a centralized ISE institution, a field research site, or other locale. For evaluation, we anticipate engaging the same evaluation consulting group that we used for the pilot RAP to create formative and summative surveys.

Planning Activity 4. Establish a cadre of collaborating individuals and institutions

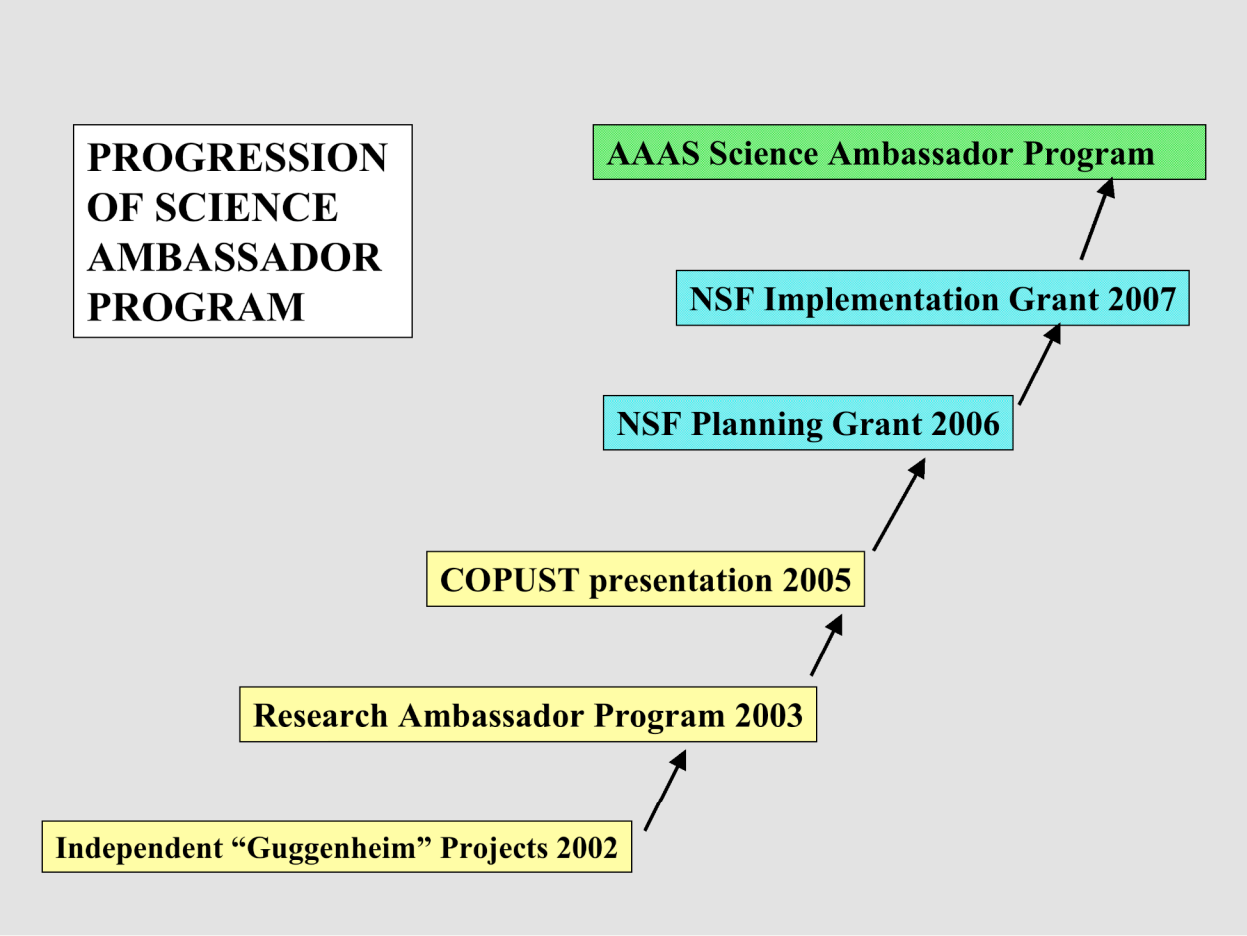
We anticipate engaging regional and national organizations, and will use the planning period to explore the roles and responsibilities of each. The most important task will be to establish a sustainable infrastructure for the program that lies both within and outside of participating individual institutions.

Planning Activity 5. Synthesis Forum

At the end of the planning activities, we will convene the principal players for a one-day summary meeting. The goals are to synthesize the experiences gained through our activities and make recommendations for next steps. We will also formulate mechanisms to provide oversight and guidance for the program, and will discuss the structure, composition, and potential members of an Advisory Board for the ultimate project. Tasks will be assigned and a timeline established for future steps. We anticipate applying for a major NSF grant from these activities, but will also seek other sources of support (Fig. 1).

CONCLUSIONS

Preliminary work with this approach suggests that the SAP could provide an effective and non-redundant strategy to promote scientific engagement and scientific literacy in non-traditional settings. However, its success as a long-term and large scale participant in the array of tools available for dissemination of scientific information will depend on engaging representatives of scientific and ISE organizations; creating a new and robust institutional structure for recruitment, training, implementation, and evaluation; and facilitating communication among academic administrators, researchers, and ISE professionals. A strong and well-considered planning effort is a necessary precursor to the success of these efforts.


PROGRESSION OF SCIENCE AMBASSADOR PROGRAM
AAAS Science Ambassador Program
NSF Implementation Grant 2007
NSF Planning Grant 2006
COPUST presentation 2005
Research Ambassador Program 2003
Independent "Guggenheim" Projects 2002