

Multi-Site Public Engagement with Science – Synthetic Biology

Larry Bell, Sr.V.P. for Strategic Initiatives, Museum of Science

David Sittenfeld, Forum Program Manager, Museum of Science

The Museum of Science has just received an award from the Advancing Informal Science Learning (AISL) program at NSF, with co-funding from ENG and BIO, for a project to conduct public engagement activities at multiple science museums. AAAS, Science Museum of Minnesota, and Ithaca's Sciencenter are subawardees, and SynBerc is a project partner. This project is just starting up, so I am reporting on it here even though the funding is already in hand.

The MSPES-SynBio project is aimed at building capacity among institutions of informal science education (ISE) to develop and implement multi-site public engagement with science (MSPES) activities in partnership with scientists working in the field of synthetic biology (synbio). In the first year of the project, materials will be developed collaboratively by participants from eight ISE sites, in partnership with local synbio scientists, with support from a central team of ISE professionals, synbio researchers experienced in public outreach, and experts on public engagement, science and society, and science communication. Materials tested at the eight pilot sites in year 1, will be revised and packaged into a kit like those developed by the Nanoscale Informal Science Education Network (NISE Net) for annual NanoDays events. The MSPES project will leverage work done by the NISE Net to disseminate 200 SynBio Kits to sites across the U.S. and help recipients to incorporate public engagement with science (PES) activities about synbio into their educational programs.

In addition to summative evaluation to identify project outcomes, an internal team of evaluators will develop approaches to evaluating PES activities that have intended outcomes for both public and scientist participants and are different from those of most ISE work that is firmly based on "public understanding of science" goals. All the material developed will be revised and posted online for open access to all who want to use them. In addition, a guide to developing single-site and multi-site PES activities more generally will be developed, shared online, and presented in publications and at professional meetings of informal educators and scientists.

The MSPES project builds upon the work of several prior NSF-funded projects including one that explored the extent to which ISE organizations are implementing PES as differentiated from "public understanding of science" in the Center for the Advancement of Informal Science Education 2009 report *Many Experts, Many Audiences: Public Engagement with Science*. Despite calls from social scientists and science policy experts for a decade, this prior work found that PES strategies are far from fully implemented in the work of ISE organizations. At a workshop held as part of the pathways project, 55 ISE professionals interested in PES outlined nine priority areas for further development of PES in ISE. The proposed MSPES project will address several of those priorities.

The team for this project includes the Museum of Science, public engagement leaders at the American Association for the Advancement of Science, scientists with particular interest in public engagement from the NSF-funded Synthetic Biology Engineering Research Center, ISE educators from the Science Museum of Minnesota, and Ithaca's the Sciencenter, social and political scientists associated with ASU's Center for Nanotechnology in Society (CNS) and Consortium for Science, Policy, and Outcomes (CSPO); and the Expert & Citizen Assessment of Science & Technology (ECAST) Network. Additional support from experts in engaging diverse

audiences, as well as from pilot site participants and NISE Net regional hub leaders, will ensure not only the development of new knowledge in this project but also its wide dissemination.

The ISE, SynBio, AAAS and science policy communities are all at a crossroads in terms of recognizing the importance of convening multidirectional conversations between scientists and the public around these kinds of issues, and synthetic biology provides a clear and rich path forward in terms of doing this that will allow us to build upon the work that CNS-ASU did with ISE people from the NISE net but brings in a different group of scientists. The hope is that this will provide a basis for approaching other groups of scientists with the tools that we will develop in partnership with AAAS and our colleagues.

The public will benefit from the MSPES project in several ways. The project will create materials, activities, and increased capacities among ISE organizations and scientists to engage the public in learning about synthetic biology—a topic about which a Presidential Commission has said that public deliberation is particularly valuable. It will also further develop PES in both ISE and science communities. Broader implementation of PES will help members of the public discover ways to engage with scientists to consider impacts and policies related to emerging technologies, feel a connection to the enterprises of scientific research and technological development, and even contribute to efforts to maximize their benefits to society.

Project deliverables are designed to have strategic impact on the field by building the capacity of ISE professionals to be developers, facilitators, and evaluators of PES activities, with scientists as potential partners or “clients” for whom the ISE professionals organize the engagements.

As the content of the MSPES project is developed, special emphasis will be placed both on questions that scientists would like to explore in discussion with the public, and that the public can contribute to in significant ways. A starting point for developing content will be consideration by the project team of topics like:

Risk Management: What processes should be put into place to ensure that health or environmental risks from synthetic biology are appropriately assessed and risks minimized?

Openness and Transparency: How transparent should the outcomes of synbio research be, including genetic information about novel organisms, given concerns about the potential for bioterrorism?

Community Coordination: How should the academic scientific community, the industry, and the DIY bio community work together?

Oversight and Regulation: How should we build a regulatory environment that reduces hurdles to innovation while protecting the public from unanticipated consequences?

Public Involvement: How should synthetic biology research be shared and communicated with the public, and what should the public role be in decision-making about synthetic biology policy?

Ethics and Equity: What process should be implemented for considering and responding to ethical concerns or objections to synbio research as they arise?

Workshops to develop public engagement materials and prepare participants to use them will take place on Oct 2014, Feb 2015, Jun 2015, and Oct 2015. Pilot engagement activities at eight host sites will take place in the summer of 2015, with engagement activities at 200 sites in the summer of 2016.