

## **The GSEE/Chicago Founding Summit, May 9-11, 2013: an Executive Summary and a Report on its Action Agenda.**

During a two-day summit in Chicago, sponsored by the University of Chicago, ICAM, the National Academy of Sciences, Argonne National Laboratory, and the American Institute of Physics, a group of 25 leading engaged scientists and educators discussed how best to enhance engagement by scientists and engineers in science education. Following a full day of brief presentations on experiments in engagement [with ample time for discussion], the participants split into two working groups to discuss scalable initiatives that could be effective and sustainable. One group focused on local and regional initiatives; the other on national and global initiatives. Each working group presented an action agenda for discussion and adoption by the summit participants.

Recognizing that there are many resources (training, workshops, question & answer sites, professional society funding and guidance, etc.) available to those who wish to engage with STEM education, the group advanced a consensus set of concepts and an action agenda that would help GSEE contribute to, complement, and expand existing STEM engagement efforts. It suggested a focus on programs that may be piloted locally, yet are scalable and sustainable once success is demonstrated, and developing quantitative tools for assessing that success.

**GSEE Structure** It is proposed that GSEE move forward under a hub and spoke structure with a mix of working groups, workshops, and experiments -- pilot programs that involve physical and life scientists from a broad range of institutions -- and that one long-term goal for GSEE might be creating a "Science of Engagement".

In convening GSEE/Chicago, The University of Chicago has been the de-facto initial GSEE hub and it is proposed that it continue doing so.

The initial proposed US spokes will be:

\*GSEE/Illinois, a "mini-hub" initially centered at UChicago, whose spokes will include Northwestern, UIUC, NIU, UIC, Argonne, and Fermilab

\*ICAM, another “mini-hub”, whose spokes will include its branches that decide to nucleate Regional Consortia, currently Kyoto and Beijing, and possibly soon, Boston, Boulder, Cambridge [England], Istanbul, and Paris

\*American Association for the Advancement of Science.

\*National Academy of Sciences

\*American Association of Physics Teachers

\*American Institute of Physics

\*Forum on Outreach and Engaging the Public and other engagement programs of the American Physical Society

GSEE is encouraged to add additional national spokes, such as the American Institute of Biological Sciences, American Chemical Society, American Geophysical Union, American Astronomical Society, Materials Research Society, and, as these develop, additional regional mini-hubs.

The initial GSEE spokes outside the US are:

GSEE/Kyoto, a mini-hub centered at the University of Kyoto  
The Science Academy [Istanbul]

It is expected that following GSEE/Kyoto, the GSEE Asian regional summit to be held from Oct.20-23,2013, these will be joined by GSEE/Beijing and several other Asian consortia, and, in the near future, GSEE/Paris and GSEE/Cambridge.

**Working Groups** Four working groups were formed to develop pilot programs and propose funding mechanisms to carry these out.

**Developing GSEE/Illinois** as a consortium involving UChicago, Northwestern, UIC, Argonne, Fermilab, NIU, and UIUC: Co Chairs, Michael Lach [Chicago] and Patricia Sievert [NIU]. The group is encouraged to re-form the area-wide Joint Education Committee (JEC) that includes the above institutions and develop a model for other regional attempts to connect professional scientists with STEM educators and students. As an initial project, GSEE/Illinois might strive to provide every school in a series of local municipalities with at least one STEM engagement opportunity with engaged practitioners

from outside institutions. The interface with school systems (e.g., Chicago Public Schools) will require appreciation of teachers' needs and expectations, as well as curricular requirements. Following this scoping exercise, GSEE/Illinois could be in a position to develop a compelling funding proposal to create a national network of similar committees. Endeavors such as these require sustained financial and scientific resources as well as methodological rigor.

**Defining “Grand Challenges in Engagement”** and proposing Exploratory Workshops to discuss and devise ways to meet these: Co-Chairs, David Pines [Davis] and Martin Storksdieck [National Academies]. The group will meet electronically and prepare an initial report by mid-October, 2013, in time for the GSEE/Kyoto Summit [Oct, 20-23, 2013].

**Communications.** Two working groups – one on national and global initiatives, chaired by Bo Hammer [AIP], and one on regional initiatives, chaired by Peter Littlewood [Argonne] -- have begun work.

The Hammer group held its first meeting at the Washington office of the American Chemical Society on August 22, 2013. Present were representatives from the National Academies, AAAS, AAPT, AIP, APS, ACS, ICAM, UIUC, UCD, and CAISE. They discussed a unified communications hub/portal/magazine/journal that would have the following components:

- \* an online refereed journal that will contain reports on “Experiments in Engagement” that are intended to connect and inform the community of engaged scientists
- \* using arXiv to include preprints of such reports
- \* a curated portal that connects blogs by engaged scientists and expand their number significantly.
- \* a web site that might serve as a National Engagement Registry and Resource

A white paper is being prepared by the group that will next meet on Oct.8, 2013.

Peter Littlewood has started work with Argonne and UChicago colleagues to get a communication hub [STEMware?] started with

information about practices of GSEE/Illinois partners that could then be expanded to include others in the region. The hub will be a web-based clearinghouse for engagement with a focus on connectivity. It could:

- \* link best practices and individuals from different organizations;
- \* provide peer review of content (verification and validation of activities) via a moderated blog or a stamp of excellence, etc.;
- \* support the development of platforms for delivery of engagement;
- \* present a suite of methodologies for measuring success of activities; and
- \* house a data archive of research results on engagement efforts, their administration, and assessment.

**Proposed Exploratory Workshops** As GSEE develops pilot programs, it was proposed that it hold a workshop entitled “Evidence in Engagement” that brings international leaders in engagement together with assessment experts to discuss quantitative tools for validating programs and strategies for engagement. An outcome might be a tranche of articles for the GSEE journal “Experiments in Engagement.”

A second proposed workshop would bring researchers together to study informal and formal STEM education engagement programs with plans to inform local, regional and national movements of scientists engaged in STEM education

Another workshop might be organized with a mandate to develop an exemplary research endeavor dedicated to engagement in STEM education that would include:

- conducting research of high technical quality to inform and assess engagement policy and practice
- creating a comprehensive data archive (e.g., engageSTATS)
- communicating expansively among researchers, policymakers, and practitioners as it supports the identification of the most effective engagement opportunities.

Outcomes from all of these and other such workshops would form excellent material for the proposed Journal.

**Concluding remarks** There is no unique path to enhancing engagement and measuring its effectiveness. Rather one should try a number of different approaches while searching for synergies between them. GSEE is accordingly encouraged to consider the merits and staging of a proposal to carry out a number of experiments in engagement based on the concepts examined in its working groups and exploratory workshops.

Looking further ahead, once success is demonstrated locally, a regional model, or models across multiple localities, may be launched to demonstrate scalability and test the functional reach of the ideas proposed here. Ultimately, the goal is for GSEE to stand solidly as a recognized resource for readily available, current and high quality information and results on STEM engagement and other ways to enhance science literacy.