

**Enhancing Engagement- A vision for GSEE,  
the Global Partnership of Scientists Engaged  
in Education, in Japan and Asia**

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**GSEE Background and Progress**

**GSEE/Kyoto**

**Asian Regional Founding Summits**

**Grand Challenges in Engagement**

**GSEE was founded on four basic premises:**

**\*Major improvements in science literacy become possible if significant numbers of research scientists and engineers *engage* in educating non-scientists at every level, from K-12 on, about science**

**\*Now is the time to initiate *experiments in engagement* on a large scale by building new partnerships in the *engagement community* of research scientists and engineers in universities, the private sector and government, and their professional and honorary societies, to carry these out in collaboration with the *educational community* of teachers, informal science educators, and behavioral scientists.**

**\*Science literacy is a major global problem and education about science can become a global multi-disciplinary effort.**

**\*It follows that a global partnership can accelerate science literacy by connecting, coalescing, and expanding the community of engaged scientists and engineers across disciplines and borders, and providing them with the tools to make their work more effective.**

## **GSEE Founding Partners**

**GSEE began under the auspices of ICAM, the Institute for Complex Adaptive Matter [<http://icam-i2cam.org>] with a group of eleven ICAM branches [Kyoto University, the Paris ICAM Consortium, Sabanci University [Istanbul], Santa Fe Institute, University of California [Davis], University of California [San Diego], University of Cambridge, University of Chicago, University of Colorado [Boulder], University of Illinois at Urbana-Champaign, and Zhejiang University [Hangzhou] serving as its *Founding Partners*.**

**During the past year, the number of GSEE Founding Partners has expanded significantly, with the American Association for the Advancement of Science, the US National Academy of Sciences, American Institute of Physics, American Association of Physics Teachers, the American Physical Society, the Exploratorium, and the International institute for Applied Systems Analysis joining ICAM, seven other ICAM branches, and five other institutions as Founding Partners.**

**As a result GSEE has at present 31 Founding Partners, with more expected after the GSEE/Kyoto Summit**

## **Become a GSEE Founding Partner**

**The requirements for an organization or institution to become a GSEE Founding Partner are simple:**

**A shared interest in our goals**

**One or more key members who agree to work with GSEE to explore potential synergies between the Partner's activities and those of GSEE and to keep both groups informed of existing and planned activities that are of mutual interest.**

**Founding Partners are invited to nominate members of GSEE working groups, to send representatives to exploratory workshops, to participate in GSEE Founding Summits, and to join in other GSEE activities.**

## **GSEE Strategy and Plans**

**\* Use our skills and influence to get more scientists engaged, at every level of their careers, in education about science and to give them the tools and guidance to do so effectively.**

**\*Develop a Global *Engagement Registry*-a list of *experiments in engagement* carried out or proposed by members of the GSEE community as part of our effort to help engaged scientists communicate and collaborate with one another and with formal and informal science educators across traditional boundaries**

**\*Carry out new *experiments in engagement* that focus on scalable and sustainable concepts and practices and realistic assessment protocols. *Act locally, but think globally***

**\*Develop a new on-line peer-reviewed journal, tentatively called " Experiments in Engagement", that will provide a way for engaged scientists across borders and disciplines to communicate, and so to learn about some of the many best practices that underlie scalable and sustainable initiatives.**

**\*Define the *Grand Challenges in Engagement* —the major problems that need to be addressed in order to enhance substantially the number of engaged scientists and make their *engagement* more effective and impactful.**



## **GSEE Structure**

**A hub and spoke structure based on Founding Partners who collaborate via a mix of working groups, workshops, and experiments in engagement -- pilot programs that involve physical and life scientists from a broad range of institutions.**

**The hub is the University of Chicago. The current spokes are:**

**\*ICAM, a “mini-hub” whose spokes are its branches with an active program of experiments in engagement**

**\*GSEE/Illinois, a “mini-hub” centered at U Chicago, whose spokes are the Argonne National Laboratory, Fermilab, Northwestern, Northern Illinois University, University of Illinois at Chicago, and the University of Illinois at Urbana-Champaign.**

**\*GSEE/Kyoto, a mini-hub centered at the University of Kyoto**

**\*GSEE/Beijing, a mini-hub centered at the Institute of Physics of the Chinese Academy of Sciences**

**\*American Association for the Advancement of Science**

**\*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**

**\*The Science Academy [Istanbul]**

**GSEE/Kyoto-a Japanese and Asian Regional summit, Oct. 20-23, 2013**

**Our 30 participants, who are leading engaged scientists from Japan, China, Korea, the US, France, and Turkey, will:**

**\*exchange information on our experiments in engagement**

**\*discuss ways of coalescing and expanding the Japanese and Asian engagement communities**

**\*develop a path forward for GSEE/Kyoto based on a hub located at Kyoto University**

**GSEE/Kyoto will :**

**\*identify Working Groups that will be initial spokes of GSEE/Kyoto**

**\*develop the GSEE/ Kyoto Engagement Registry as a model for other regional consortia.**

**\*develop plans for future Regional Asian Summits**

**\*serve as a focus group that provides feedback on the reports of the GSEE Working Groups on *Communications* and *Grand Challenges in Engagement***

## **Proposed Hub and Spoke Structure for GSEE/Kyoto**

**Hub Kyoto University with two *Co-Directors*, a *Board of Governors* to oversee its activities and identify possible sources of support for these; and an Engagement Steering Committee that encourages and selects its experiments in engagement and includes the Chairs of its spokes**

**Spokes The following working groups will comprise the initial spokes:**

***Kyoto Coordinating Working Group* will propose and execute experiments in engagement in the Kyoto area and serve as the nucleus for an eventual GSEE/Kansai consortium**

**GSEE/Kyoto spokes cont.**

***GSEE/Kyoto Communications Group* will be charged with developing the **GSEE/Kyoto Engagement Registry** and a regional communications hub**

***Science and Engineering Education Initiatives* will develop partnerships to carry out experiments in engagement that involve: universities; members of the Japan Machinery Federation and other leaders in the private sector: JST and other government agencies; and the Foundation for Biomedical Research and Innovation and other interested Foundations**

## **Introducing the GSEE/Kyoto Engagement Registry**

**Background** At the GSEE/Kyoto Founding Summit, the participants will discuss expanding the GSEEE/Kyoto *Registry* of engaged participants and the experiments in engagement in which they are taking part or would like to initiate. This could be of significant help to coalescing the regional engagement community and making their work more effective.

**Initial Implementation** The registry may be found at [http://www.kier.kyoto-u.ac.jp/GSEE\\_Kyoto/EngagementRegistry.html](http://www.kier.kyoto-u.ac.jp/GSEE_Kyoto/EngagementRegistry.html) where you will find a few initial sample entries that serve as examples of what we are seeking.

## **Suggested format for each entry**

- 1. Category**
- 2. Audience**
- 3. Brief description of the experiment in engagement, including, where possible, some exciting visual materials**
- 4. An assessment of its impact**
- 5. Sustainability and Scalability-ways in which the experiment could be continued, replicated, or expanded in other institutions.**
- 6. Links to web sites for the experiment being described**
- 7. Links to other web sites the engaged scientist has found useful**
- 8. Name of Contributor**



## **An Invitation**

**We invite each of you in the audience to send one or more entries to [gsee\\_kyoto@kier.kyoto-u.ac.jp](mailto:gsee_kyoto@kier.kyoto-u.ac.jp) for posting on our GSEE/Kyoto web site, [http://www.kier.kyoto-u.ac.jp/GSEE\\_Kyoto/EngagementRegistry.html](http://www.kier.kyoto-u.ac.jp/GSEE_Kyoto/EngagementRegistry.html)**

**Your entries will introduce you and your engagement activities to the GSEE/Kyoto participants as well as providing a valuable link to your efforts for those who are not able to join us there.**

A recent entry at [http://www.kier.kyoto-u.ac.jp/GSEE\\_Kyoto/EngagementRegistry.html](http://www.kier.kyoto-u.ac.jp/GSEE_Kyoto/EngagementRegistry.html)

## 1. Exploratory Workshop

2. Audience Engaged scientists and science journalists, members of the President's Council of Advisors on Science and Technology, leaders from the National Academy of Sciences, the American Institute of Physics, and GSEE

3. **"Becoming Engaged: Initiatives that can Change Science Education"** was a 2012 ICAM Exploratory Workshop. The twenty-one participants discussed a number of initiatives that represent *experiments in engagement* and broke into small groups to discuss potential partnerships, community building, and culture change as part of a regional, national, and global "Engagement Action Agenda".

4. Impact The workshop had a significant impact on the agenda for GSEE's May 9-11 Founding Summit, GSEE/Chicago, and led directly to the formation of the GSEE Working Group on Grand Challenges in Engagement and to the proposal for a peer-reviewed on line journal, tentatively titled, "Experiments in Engagement."

5. **Sustainability and Scalability.** We hope to hold GSEE exploratory workshops of about this size on the topic of Grand Challenges in Engagement annually at the Aspen Center for Physics in mid-September, beginning in September 2014.

6. A summary of the workshop, including a proposed global action agenda, may be found at [http://icam-i2cam.org/images/uploads/David\\_Pines\\_Becoming\\_Engaged.pdf](http://icam-i2cam.org/images/uploads/David_Pines_Becoming_Engaged.pdf),

7. **Links** to the initiatives discussed there, including major reports prepared by PCAST and the NAS, are posted at [http://icam-i2cam.org/index.php/conferences/detail/becoming\\_engaged/event\\_info/](http://icam-i2cam.org/index.php/conferences/detail/becoming_engaged/event_info/), as is a useful definition of science literacy

8. Name of Contributor David Pines

## **Asian Regional Founding Summits**

**Perhaps the most effective way for GSEE to continue its global growth is through Regional Founding summits**

**At GSEE/Kyoto we will be discussing future Asian Founding Summits with leading engaged scientists from China, Hong Kong, Korea, Taiwan, and Turkey. A leading Indian scientist was to have attended but had to cancel at the last minute for health reasons.**

**We hope and expect that during the coming year there will be a GSEE Founding Summit in China, GSEE/Beijing, and it may soon be followed by GSEE/Hong Kong, GSEE/Seoul, GSEE/Taipei, GSEE/Mumbai, GSEE/Istanbul, etc.**

**We expect that each of these future Founding Summits will follow the general outlines of the approach developed for GSEE/Kyoto, but that their regional initiatives will depend on the locale. Their deliverables will be:**

**The establishment of a Mini-hub [with local spokes] that becomes a GSEE spoke as it initiates and carries out scalable and sustainable experiments in engagement**

**Active participation in one or more of GSEE's Grand Challenges in Engagement with the possibility that the regional Mini-hub might host workshops addressing one or more of these GCE.**

**A number of the participants will sign up to become authors, editors, or reviewers for GSEE's planned journal, "Experiments in Engagement".**

## **Grand Challenges in Engagement for discussion at GSEE/Kyoto**

**Overarching Grand Challenge Can we create and nurture an experiment-based “Science of Engagement” within the next decade?**

**Changing “Engagement” from an art to a science requires connecting the community of engaged scientists through a new on-line peer-reviewed journal “Experiments in Engagement”, while making their work more effective through significant progress on a number of specific grand challenges that include establishing major new national and global programs to enhance significantly the engagement by scientists in after-school education.**

**An on-line journal “Experiments in Engagement,” will enable engaged scientists to communicate with one another while reaching a global audience with peer-reviewed descriptions of their initiatives in science education, their “*Experiments in Engagement*”.**

**The journal would fill a current gap and is associated with the strategic goal to professionalize outreach, education, communication and engagement efforts by science and technology based professionals, and to raise the profile of these endeavors within the various relevant disciplines.**

**The journal concept is currently being developed by a GSEE Working Group chaired by AIP’s Philip [Bo] Hammer. A summary of their initial report is posted on [http://www.kier.kyoto-u.ac.jp/GSEE\\_Kyoto/index.html](http://www.kier.kyoto-u.ac.jp/GSEE_Kyoto/index.html) and will be discussed at GSEE/Kyoto**

**A Grand Challenge Establishing major new national and global programs to enhance significantly the engagement by scientists in *after-school education***

***Experiments in Engagement*** could fund individuals or small groups of engaged scientists at universities and other institutions to carry out scalable and sustainable experiments in engagement

***Frontier Learning Centers*** could establish major partnerships between universities, K-12 educators, science museums, honorary and professional societies, environmental learning groups, and the private sector to carry out large scale experiments in engagement, such as an **online science center** or **online courses on basic concepts in science** for middle-school and high school students.



**A Grand Challenge: Developing an on-line interactive science center for a middle school audience.**

**<http://emergentuniverse.org> is an experiment in engagement—ICAM's online interactive science center with exhibit halls that introduce viewers between the ages of ~17 and ~ 35 to science through examples of emergent behavior. It uses a manga segment to help viewers develop an emergent perspective on global problems.**

**Developing a version of emergentuniverse.org that is designed for middle schoolers would serve as a superb supplement to their in-school education and could reach a global audience.**

**It could help them acquire an emergent perspective on societal problems by using climate change as an example. Materials designed for this audience and their teachers already exist--cf [http://www.wolfridge.org/education/climate\\_change/i\\_climate.shtml](http://www.wolfridge.org/education/climate_change/i_climate.shtml).**

**A Grand Challenge Forming National and Global Partnerships to develop online courses for middle and high school students **that introduce them to basic concepts in science and the emergent universe in which they live.****

**What are most needed are courses that focus on **concepts** rather than facts, since going to Google will in most cases tell you the fact you seek.**

**It appears likely that most of the work to date on such courses is fact-based, not concept-based, so there is a potential major niche here for scientists and engineers in GSEE Founding Partners to collaborate with colleagues in the private sector and in the educational and design community in developing such concept-based courses.**