Project title: Circles of Self-Education in Science: Innovative Methods to Mentor Talents

Project Description:

Background:

Science education is on the decline in Hungary in an extremely strong and alarming fashion and is on the decline in several important regions of the world too. Hungary used to have excellent traditions in science education, that produced J. von Neumann, E.P. Wigner and E. Teller, who had a major impact on our world as is today by providing key contributions to computers, nuclear reactors and defense. Based on the still existing remains of these traditions of science education and also on innovative applications of modern, internet based communication tools, a new form of science clubs: circles of self-education in sciences is proposed. The model for such circles of self-education in sciences, or science clubs, has been already proven to be very effective, inspiring and successful in one given location in the country already. There are several locations with similar or "resonant" traditions that can be revived and revitalized in an apparently straight-forward manner.

The **main goal** of this proposal is to spread the example-value, proven model from the local to a national level, engaging 5+ new locations in different areas of Hungary. Capturing new experience and inspiring new talents a new kind of educational experince can be generated by pulling together scientists, students, teachers and parents in weekly or biweekly activities related to science. that on the next level can be also utilized for international mentoring of talents, including search for them, and providing inspiration, motivation, training and promotion of their talents in science. In particular we place emphasis on finding talens from remote, marginalized communities like small villages fighting for the survival of their schools and lack of funding for local education, or country towns without a mentoring help from a nearby university.

Activities include weekly of bi-weekly **meetings of science clubs** in middle schools, including scientists, studends and scientists during the academic year and a **summer mentoring camp** organized for the most active and dedicated students, scientists and teachers. The science clubs correspond to an average of 30 meetings during the academic year, while at the mentoring camps about 35 sessions/topics are covered during the summer, compressed to a week.

This **project timeline** starts from September 2011 and lasts till August 2012. However the activity of the science clubs is desired to be sustainable and continuous, so we are looking for several ways to make it possible. One is to base the clubs on volunteerism, in particular with regard to the fact that 2011 is dedicated as the European Year of Volunteering. Second we will make every effort to keep the expenses as low as reasonably possible. Third, we will carefully generate web-based archives of the talks and the presentations, so this is useful for education as well as for project monitoring and transparency. Fourth, we will develop a good relationship with local news and media and will inform them about significant events. Fifth, we aim to include parents as much as possible and if possible we plan to form public/private partnerships, in order to make these circles sustainable.

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Who is involved in this project?:
Please list the alumni groups or individuals who will carry out the project (the implementers), those who will be affected by the project (the audience), and also any supporting individuals or organizations (partners). Indicate how the various parties will be involved. All projects must involve teams of at least 10 alumni of U.S. government-funded exchange programs by the closing of the submission period. Please list those names here; you can add members throughout the submission period which ends on March 13. (If a team member is under 18 years of age, please only list his/her first name and country.)

The **project leader will be Tamás Csörgő**, a physicist, and a recipient of a Fulbright Advanced Research Award, a Fulbright Alumni Initiative Award and a Senior Leaders and Scholars Fellowship from the Hungarian American Enterprise Scholarship Fund. He volunteered to re-organized and mentor such a circle for self-education in science in his former middle school starting from 2006/2007, and based on the international recognition that some of the results of this project achieved, he proposed to spread this model now to several other locations in Hungary. He is the principal investigator of the PHENIX –Hungary team, that achieved landmark discoveries in hadron collider science in a collaboration with Brookhaven National Laboratory, NY, US. He lives in a small village in Hungary where his former, excellent primary school fights for daily survival and funding difficulties, and his former middle school, where this science club idea was introduced, has difficulties to find resources for quality training. The man-power and the inspiration to run the science club is given, and since several years, excellence in science education is based on volunteering of dedicated teachers and some help from scientists.

The core team consists of a mixture of scientists, professors, middle school teachers and students from middle scool, currently involving 30 persons: 19 former US state alumni and 11 volunteering partners : scientists, students and teachers who are enthusiastic about this project. We expect that further alumni and also volunteering scientists and teachers will join this project as it grows, based on the first reactions to the proposals and contacts of the team leader. The project is or supported by four organizations but their number is also expected to increase during the growth of the project.

As requested, we give the team members in three groups: US alumni, and additional supporting individuals and organizations.

The following US **alumni individuals** will carry out this project:

- Cs. Bagyinka, biophysicist, Dr.Sci, Institute for Biophysics, Biology Research Center of the Hungarian Academy of Sciences, Szeged, Hungary
- F. Borondis, physicist, SZFKI Research Institute for Solid State Physics and Optics of the Hungarian Academy of Sciences (currently in Canada, please Feri update me)
- M. Csanád, physicist, PhD, Department of Atomic Physics, ELTE University, Budapest, Hungary
- A. Csótó, physicist, Dr. Sci, Department of Atomic Physics, ELTE Universtiy, Budapest, Hungary
- I. Fórizs, geologist, Institute for Geology, Hungarian Academy of Sciences, Budapest, Hungary
- D. Karátson, vulcanologist, Head, Department of Geology, ELTE University, Budapest, Hungary

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- A. Kecskeméti, marketing specialist, ??, Budapest, Hungary
- E. Kirs, professor of law, Miskolc University, Miskolc, Hungary
- Gy. Kovács, lawyer, ??intellectual property rights, Budapest, Hungary Gyuri, please update me
- J. Kubassek, geologist, director, Hungarian Museum of Geology, Érd, Hungary
- P. Gyarmati, emeritus professor of mathematics, Szentendre, Hungary
- Gy. Jordán, geologist,I nstitute for Geology, Hungarian Academy of Sciences, Budapest, Hungary
- K. Nagy, dean, Faculty for Dentistry, University of Szeged, Szeged, Hungary
- L. Nánai, professor, Head, JGYPK Department of Physics, Szeged, Hungary
- Attila Nováki, lagoonist, Esztergom(?), Hungary (Attila, please update me)
- E. Márton, architect and designer, currently in the US (Enikő please update me)
- P. Szalay, D. Sc., chemist, Head, Department of Chemistry, ELTE University, Budapest, Hungary
- R. Vértesi, PhD student at University of Debrecen, researcher at KFKI Research Institute for Particle and Nuclear Physics of the Hungarian Academy of Sciences, Budapest, Hungary.
- Á. Zsigmond, chemist, docent, University of Szeged, Szeged, Hungary

The following **supporting individuals -** who are at present not US alumni – will participate and contribute to carrying out this project:

- András Cs., student co-president, BerzeTÖK Science Club, Berze Middle School, Gyöngyös, Hungary
- G. G. Barnaföldi, physicist, senior research fellow, KFKI Research Institute for Particle and Nuclear Physics, Hungarian Academy of Sciences, Budapest, Hungary
- J. Csörgő, former student president, BerzeTÖK Science Club, currently at ELTE University, Budapest, Hungary (daugther of T. Csörgő)
- Cs. E. Kissné, teacher of physics and mathematics, winner of Ericcson prize, Berze Middle School, Gyöngyös, Hungary
- M. Kiss, teacher of physics, mathematics and informatics, winner of Ericsson prize, Berze Middle School, Gyöngyös, Hungary
- Martin B., student co-president, BerzeTÖK Science Club, Berze Middle School, Gyöngyös, Hungary (*)
- A. Ősi, geologist, paleontologist, PhD, Hungarian Museum of Science, head, research group on paleontology
- K. Kopasz, teacher of physics and methodology, Department of Physics, University of Szeged, Szeged, Hungary
- M. Vargyas, M.Sc. student of physics, ELTE University, Budapest, Hungary

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- T. Solymosi, M.D.,freelance medical doctor, Budapest and Gyöngyös, Hungary
- I. Scheuring, PhD in physics, Dr. Sci in biology, professor, Department of Taxonomy and Ecology of ELTE University, Budapest, Hungary

Supporting organizations include the followings:

Hungarian Association for Innovation (dr. László Antos, representative)

Berze Middle School, Gyöngyös, Hungary (provides location for Science Club)
Dobó Middle School, Eger, Hungary (confirmed location for a new Science Club)
Ságvári Middle School, Szeged, Hungay (confirmed for a new Science Club)

Other organizations were contacted and will be added as the project develops, including further science clubs e.g from Békéscsaba, Budapest, Hódmezővásárhely, Kiskunfélegyháza. We also will contact all the schools that hosted one of the lectures of the "Meet the Scientist" program, a joint activity of the Hungarian Association for Innovation, the Hungarian Fulbright Association and the US Embassy to Hungary.

Who will be affected by this project?
Our goal is to affect science education in Hungary by the power of setting good examples for other schools, students and teachers and also by providing on-line learning materials and networking possibilities. At present, we will try to move from one science club to five, but we hope to generate many more on the longer term.

Directly affected will be the members of these science clubs, including about an estimated number of at least 250 talented students who will be exposed to regular, weekly or bi-weekly talks from scientists, or by their fellow students or from time to time from their teachers. Basically this is an exploration of how well the method that worked in one location successfully can be transplanted and applied at other locations.

If successful, the method can be utilized on the Hungarian national level in middle and primary schools, spreading not only the culture of science but also the culture of self-determination and volunteerism, and if its improved version will work on the Hungarian scale it is likely that it can be also a model internationally for finding, inspiring and mentoring students who are talented in sciences.

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Region: Europe

Location: This is a country-wide project, with a pilot project going on successfully in Gyöngyös, Hungary, since 4 years. Now the goal is to strenghten it and to spread

its best practices to 4-5 new locations, including middle/secondary schools in Eger, Hódmezővásárhely, Szeged and other locations.

It mixes good old traditions with modern communication tools. Trains scientists in communication with 14-18 years old students and teachers. Trains students and teachers in modern sciences and in web-based communication of science results. Utilizes web-based tools like archiving best presentations on youtube videos and talks in .ppt and .pdf files so that they could be used again by other science circle talks at different schools. These new educational channels will provide a local community that is insired by, educated in and embedded to modern science and the tools and archives will useful for students at more remote locations too.

Innovation:

For high level reports on one of the outcomes of the model BerzeTÖK Science Club, see:

Subatomic Shuffle, Science Magazin vol 331, no. 6014 p. 129 (2011)
http://www.sciencemag.org/content/331/6014/129.4.full?sid=da6b0100-5b46-45b3-a2fb-fc57aa5d4ae9

Quarks Matter at RHIC, Feature Story of Brookhaven National Laboratory, January 4, 2011:

http://www.bnl.gov/rhic/news2/news.asp?a=2175&t=today

Estimated Expenses:

Travel of scientists inside Hungary to science clubs: 4000 USD
(We will make an effort to find scientists as close to these Science clubs as possible)

Operation of science clubs, compensation for teacher patrons: 15000 USD
(30 meetings/club/year, 2 hours/meeting, 2 teachers/meeting, 25 USD/hour, 5 science clubs/country)

Science club summer camps: 15000 USD
(3000 USD/camp, 1 summer camp/club, 5 clubs, estimated)

This is an estimate, based on the experience that the summer camps provide about the same number of lectures and mentoring opportunities as do the annual weekly-biweekly meetings during the academic year, but this will be refined if we pass on to the second round of evaluation.

Total Funding Requested: 35000 USD

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