

## **Proposal for Forming IAA Study Group SG 6.16**

### **Title of Study: STEM/STEAM for Space. Grand Challenges**

**Proposer: Liya Regel (M)**

**Primary IAA Commission Preference: 6, Space & Society**

**Secondary IAA Commission Interests: 1, Space Physical Sciences; 2, Space Life Sciences**

**Members of the Study Team:**

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(Awaiting confirmation of additional members from Canada, China, France, Brazil and India who have expressed interest in participating)

**Chair: Prof. Dr. Liya Regel (M)**

**Secretary: TBD**

#### **Brief Description of Scope of Study**

The launch of Sputnik in 1957 marks the beginning of a global surge in interest in science, technology, engineering and mathematics (STEM) education. The world was excited by each development in space exploration. Not only were there vast improvements in STEM education, but also an increase in participation in these disciplines by our youth. Many of them eventually joined this exciting endeavor, while others utilized their education to benefit mankind in a myriad of other ways. In the 50+ years of the space age, developments have continued apace in the physical sciences. Recent years have also seen impressive advances in the life sciences stemming from space research. These advances are steadily moving toward the enablement of humanity to go beyond near-earth orbit on into the cosmos.

As space research has stimulated STEM education, improvements in technical education have benefitted space research and, indeed, all aspects of society. Less recognized is the interaction between the creative arts, space research and STEM education. Space research has stimulated the imagination of the art community in music, architecture, literature, and the graphic arts. Technical developments have made possible new methods of creating works of art. And conversely, the arts have stimulated creativity in science, technology, engineering, mathematics – and space research. It is this complex interaction we have dubbed STEAM. We propose to study this interaction with the objective of increasing the benefits to all.

The first step will be to gain a clearer picture of where we are today on the interaction between STEAM education and space research. Then we will address questions such as the following. How can we improve STEAM education for the benefit of space research and *vice versa*? How can we develop a coordinated initiative to support development of high quality STEAM education? Should we encourage the sort of competitions that have proved so successful in other fields, such as robotics, in our universities, high schools and, yes, even with younger students? If so, how can we persuade governmental space agencies, foundations and private industry to help?

While learning from the past, we need to look to the future to fully benefit from the complex interaction between space research and education in science, technology, engineering, art, and mathematics. We need a bright, enthusiastic generation for future space activities and they need us now.

#### **Process:**

Investigate the long-term impact of STEAM education on Space Science and Technology.

Understand what can be done now to enhance the impact of space science and technology on STEAM education for the improvement of all societies and for the spread of mankind into the cosmos. This would include understanding how human experience and expertise may be expanded to include formation of space colonies on Mars, the moon and beyond.

Investigate all possibilities to improve STEM/STEAM education of the next generation by attracting K-12 and university students to special space-oriented meetings and by expanding the competition of youth communities in space-related endeavors.

In its first two years, this study group will organize workshops on the following:

- STEM for Space Technology and Engineering
- STEM for Space Physical Sciences
- STEM for Space Biomedical Sciences
- STEAM for Space and Space for STEAM

Meetings on these subjects will include participants from academic institutions, companies and space agencies in order to provide the best input to help improve STEM and STEAM education for space around the world. The elite body of the IAA is only international organization that can make this happen.

### **Overall Goal:**

Identify sources for relevant expert information from national academies and companies, organizations and professionals in STEAM education for space research that will be used to generate recommendations from the Study Group.

### **Methodology:**

Multidisciplinary workshops, IAA events, seminars and surveys, conference publications. Create opportunities for inspiration through individual and group experiences for our youth.

### **Time Line:**

- May 2014: An Executive committee will meet at the beginning of the three-year study to define the research and report outline.
- October 2014: Meeting in Montreal (after IAC in Toronto)
- Interim results will be discussed at International Astronautical Congresses (IAC).
- A series of presentations at the Toronto IAC and the Jerusalem IAC, leading to a report and a recommendation for the Academy.
- A final report will be submitted at the end of the three-year study.

### **Target Community:**

IAA, Space Agencies, Academic Institutions, Space Policy Organizations (public & private), Professional Societies, Aerospace Industry, International Community, International Media.

### **Support Needed:**

- Rooms for meetings during IAA meetings and International Astronautical Congresses.
- Space for meetings and symposia
- Use of the IAA web site.

### **Potential Sponsors:**

IAA, national space agencies, private foundations, aerospace companies and the IAF Space University Committee.

**Date: January 20, 2014**

*To be returned to the IAA Secretary General Paris by fax: 33 1 47 23 82 16 or by email: [sgeneral@iaaemail.org](mailto:sgeneral@iaaemail.org)*