

2012

## STEM Future Dallas

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**1. Title of Project:** STEM Future Dallas

**2. List of Student Participants**

Student name: Jacob Fleming  
Major(s): Biology, Chemistry (minor in Philosophy)  
Year of Study: Junior

Student name: Joey Ottolenghi  
Major(s): Psychology (minors in Biology, Chemistry)  
Year of Study: Junior

Student name: Jessica Hart  
Major(s): Environmental Studies (minor in Education)  
Year of Study: Junior

Student name: Alex Saucedo  
Major(s): Electrical Engineering  
Year of Study: Junior

**3. Faculty cooperators, if any:** Dr. Larry Ruben

**4. Statement of the problem or issue, proposed methodology, and rationale.**

In 1993, the proposed Superconducting Super Collider (SSC) project of Waxahachie, Texas, was cancelled. This massive structure would have been three times as large as the recently completed Large Hadron Collider in Geneva and many times more powerful. With its cancellation, two generations of physics progress have been lost for the United States. This singular event is epitomical of a broader set of issues in the United States; namely, the issues of science, technology, engineering and math (STEM) education, their funding, and research and development in these fields.

In the second decade of the 21st century, we face a continuation of the patterns begun with the cancellation of the SSC. India and China's technical competencies are consistently rising while American education in the sciences is lagging. Funding for scientific progress has been inhibited by myriad factors -- economical, political, and

otherwise. One of the most egregious patterns observed is an utter lack of stimulation of interest at the primary and secondary levels. Each of these patterns impacts America's place in the global economy, and each is embodied in the Dallas area.

Our project concerns these patterns; our aim is to provide an accessible yet thorough and in-depth database of the issues facing science education in the Dallas area, with the hope that this information can affect policy, education, and funding reform for the Dallas metroplex area as well as the nation at large.

Our project will focus heavily on the student side of STEM education, while also seeking wisdom from professionals in the industries and academia. It will consist of two primary areas of investigation: the collegiate level and the secondary level. At the collegiate level, we will specifically examine the challenges that SMU faces with STEM education. We will survey and interview students regarding their experience in science courses at SMU and high school, and gather information that may be particularly useful for the faculty of SMU, as well as other educators. Within this investigation we will consider the differing experiences of science and non-science majors and their perceptions of STEM industries and academia. We will also conduct interviews of faculty, gathering their professional opinions on the state of STEM education.

Following this initial stage, we will move to the secondary level, examining high schools in the Dallas area. We hope to have gathered some preliminary data on particular high schools based on our surveys of SMU students so that we can identify schools with interesting patterns; for example, a certain school may be of interest for producing a preponderance of students adept in Advanced Placement science preparation, or the opposite. We would contact teachers at these schools, interview them, and travel to their schools for interviews and surveys of the students there. We anticipate observation of schools in different areas of Dallas faced by different challenges, including Dallas Independent School District schools as well as schools in the Park Cities area. We anticipate that similar ventures into the middle school and elementary school levels may be possible, though these would be slightly different in terms of the student approach.

Based on the data we collect, we will compile analyses and write articles on the trends that we observe. These, along with interviews and other media, will be made available on a regular basis on our blog and Facebook page. As we gain a sufficient amount of material, we will design a webpage that will serve as a more professional front for our project and a gateway to a variety of other resources related to STEM education.

We hope that this webpage will serve as a consolidated repository for a variety of resources on the subject that can be used by educators, students, parents, and professionals, particularly in the Dallas area. Other potential avenues include seeking publication in local magazines (e.g. D Magazine, UT Southwestern MED Magazine, and others), and traveling to conferences to deliver seminars on our project and the trends that we observe. Through these various possibilities, we hope to spread consolidated information on the trends and potential solutions in STEM education; we hope that this information, guided by a heavily student-influenced design, will be useful to many in the

Dallas area, and will even be applicable to other areas of Texas and the United States at large.

## 5. Proposed Timeline

We aim to tackle these issues from the top-down, so to speak. The first several months of the project would consist of approaching the issues at SMU. This will include surveying students (we have already designed an online questionnaire), interviewing students of particular interest (including students who have been involved in Teach For America), and interviewing teachers. We will compile this data as we can, and post it in an accessible form to our blog (which will be launched shortly). We will also employ Facebook and Twitter to make the project and the issues in STEM education known to our peers. During this time, we may also speak at SMU, focusing on issues that students are facing in science classes here and what faculty members may be able to do to help.

In the next stage, we will move to an investigation of secondary schools, using the same methods as before, though modified as may be necessary. We anticipate that we will be able to begin this phase by the end of the spring semester 2012, though time would certainly be budgeted for the beginning of the fall if necessary.

In the summer, several of our team members will be in the Dallas area involved in science-related internships. During this stage, we hope to gain some industry-related advice via interviews of supervisors and others in the areas. This could provide an extra dimension of information that could certainly augment our project. The summer could also be used as a time to work on the professional webpage for our project.

In the fall, we anticipate finishing up any extra work in the secondary and collegiate levels while beginning to release our information on a large scale, by means such as publication or speaking. At this point we hope to have a professional webpage containing all of our work in a succinct and accessible form. This would allow our project a wide amount of exposure, hopefully accomplishing our primary goal of making the issues and potential solutions in STEM education in Dallas visible to the public. This information would be usable in a variety of ways and could potentially enrich many facets of Dallas education.

## 6. Anticipated Budget<sup>1</sup> Complete in detail the following:

Supplies and equipment (e.g. pH meter, video camera) **\$1,300**

<sup>35</sup><sub>17</sub> Apple iTouch (for recording video interviews)

○  $\$325 \times 4 = \$1,300$  (possible education discount)

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<sup>1</sup> The budget is subject to SMU policies relating to grant expenditures—thus, for instance, purchase of computer or video equipment requires specific justification and a statement of how the items will be used, and these funds may not be used for purchase of phones.

- These devices are a reliable and affordable method of recording video, audio, and other types of data. They were chosen specifically because they could record both audio and video interviews, be used to take photographs if needed, and store and upload other data for the website with ease, among other potential uses.

Travel **\$2,000**

<sup>35</sup><sub>17</sub> traveling to Dallas schools (i.e. gas expenses)

<sup>35</sup><sub>17</sub> possibility of traveling to conferences in Texas (i.e. gas)

<sup>35</sup><sub>17</sub> hotel room and board for conference stay

<sup>35</sup><sub>17</sub> conference fees

Copying or printing expenses **\$300**

<sup>35</sup><sub>17</sub> fliers, informational booklets, etc.

Mailing expenses **\$0**

<sup>35</sup><sub>17</sub> not anticipated

Other (specify) **\$800**

Miscellaneous presentation expenses: \$500

<sup>35</sup><sub>17</sub> room rental fees for SMU seminars

<sup>35</sup><sub>17</sub> hard drives, laser pointers, misc. presentation supplies

Web fees: \$300

<sup>35</sup><sub>17</sub> website domain and maintenance

<sup>35</sup><sub>17</sub> extra storage for web materials, e.g. video, sound, etc

Total anticipated budget: **\$4,400**

Person responsible for funds: **Jacob Fleming**

Signature of person responsible for funds: 