STEM Undergraduate Students Teaching Adolescents Innovation and Sustainability (SUSTAINS)

Year 1 Annual Report

2013

by

Ms. Stephanie Maietta Romero, Evaluator
Ms. Lisa Werder Brown, Evaluator

Dr. Cynthia Tananis, Director
Dr. Keith Trahan, Assistant Director

August 2013
Introduction

SUSTAINS is a two-year capacity building grant that creates and fosters a community of science, technology, engineering, and mathematics (STEM) majors with a strong interest in middle grades teaching by engaging them in formal and informal learning experiences where they can interact with young adolescents, their teachers, and their families.

The goals of SUSTAINS are to: (1) provide opportunities for STEM undergraduates to interact with peers, faculty, and local practitioners around issues related to STEM education, particularly related to sustainability; (2) interface with multiple local partners to identify internship and volunteer opportunities for STEM undergraduates to engage with adolescents in formal and informal learning contexts; and (3) work with undergraduate advisers to develop pathways for interested STEM undergraduates to prepare for the post baccalaureate Middle Grades Masters of Arts in Teaching (MAT) program within the University of Pittsburgh’s School of Education.

SUSTAINS is designed as a mechanism to engage students interested in working with adolescents and will serve as an umbrella organization to recruit and support future Noyce Scholars. The Robert Noyce Scholarship Program responds to the critical need for K-12 teachers of STEM by encouraging talented STEM students to pursue teaching careers in elementary and secondary schools. The Noyce Scholarship Program provides funding to institutions of higher learning to provide scholarships, stipends, and programmatic support to recruit and prepare STEM majors to become K-12 educators. SUSTAINS is open to Noyce scholars and all STEM students interested in education. Members of Pitt’s faculty and local partnership communities (e.g. Falk School, Pittsburgh Public Schools) also interact regularly with Pitt students within SUSTAINS (see Appendix A for complete faculty listings).

Year 1 Evaluation

With the intent to build capacity and develop a program, the overarching emerging research question is, “How does the establishment of STEM community, and education partnerships
enable, extend, and sustain opportunities and outcomes to expand Middle School science and math teacher capacity and student opportunities?” Evaluation of Year 1, the planning and initial implementations phases of this project, involved reviewing documentation of meetings and program/course development, analysis of interviews/correspondence, and an inventory of opportunities.

Findings

Year 1 of the project (2012-2013) focused on (1) the development of SUSTAINS programming and opportunities, (2) outreach and recruitment of students and (3) the creation of a proposal for the Masters of Arts in Teaching for middle grades, with a focus on science/math.

During the set-up phase of the project, SUSTAINS procured space on the third floor of the Mascaro Center for Sustainable Innovation. A SUSTAINS online presence was established at: http://sustains.cs.pitt.edu/. The website includes a general description of the program, listings of both volunteer and internship opportunities, and interactive web-based forms that allow for sponsors and fellows to sign up for participation in the SUSTAINS program.

In this first year, SUSTAINS had 25 students (8 graduate and 17 undergraduate) participate in a variety of ways. The following sections summarize SUSTAINS’ recruitment and outreach activities, available opportunities to interested students through the formation of community partnerships, and establishment of course credits for that work. Finally, a summary of the graduate course, which has set the stage for a middle school teaching certificate program, is provided.

Recruitment and Outreach

During Year 1, the project formed a regularly attended Planning Committee, which met monthly to review needs and develop the infrastructure and activities of the SUSTAINS program. SUSTAINS subsequently engaged in various outreach and recruitment activities. On Thursday November 29, 2012 a kick-off meeting was held for SUSTAINS with a total of 19 people in attendance. These included 4 faculty representatives from the Biological Science Department, 1 person from Boyd Community Center, 1 person from the Science and Technology Academy, a Pittsburgh Public School, 1 person from the Carnegie Science Center, 1 person from the Wilkinsburg Senior High School, 6 persons from Pitt faculty, and 5 Pitt students.

In addition to the kick-off meeting, SUSTAINS faculty reached out to various student groups on campus, including: Engineers for a Sustainable World, Engineers Without Borders, and Pitt-
Environmental Hub. To supplement the aforementioned web site, a brochure was designed and distributed to advertise SUSTAINS to the University community.

Establishment of Internship & Volunteer Opportunities through Community Partnerships

In the first year, SUSTAINS successfully established eight internship possibilities through seven partners—schools and other community organizations (see Appendix A for complete listing). These internships provide undergraduate students with opportunities to work with educators and students (grades 3-10) in the field. SUSTAINS Internships also provide University of Pittsburgh undergraduate science, technology, engineering, and math majors opportunities to learn about sharing their knowledge of sustainability with young adolescents. This work gives interns valuable experience in professional settings. Interested participants may be students who either have a STEM major or who want to work with adolescents. Appendix A provides more detailed information.

Additionally, volunteer opportunities were explored as a viable possibility for students not wanting or needing credits. Volunteers could support sustainability and innovation projects in a variety of Pittsburgh communities. In the future, this option may also include tutoring middle- and high-school students in STEM subjects.

SUSTAINS faculty presented information about the program to the University of Pittsburgh Council of Deans retreat on January 25th, 2013, to more fully inform academic programs across the university. From that meeting it was decided that, for 2013, internships would focus on Pittsburgh Milliones 6-12 (University Prep) School (a partnership between Pitt and Pittsburgh Public Schools) and the Propel School (a local, public charter school) in Homestead. In addition, proposed volunteer opportunities for 2013 would be with the Kingsley Association, Pittsburgh Public Schools and the Boyd Community Center.

As SUSTAINS moves into Year 2, the focus will shift to developing stronger partnerships with a few schools and community partners. In this way, more structure and oversight can be built into the internship and volunteer experiences.

Coursework Opportunities Established

SUSTAINS established its internship opportunities as eligible for university credits. Interns can register for a SUSTAINS internship as 1-3 credits, which may count toward their course credits (see Appendix B for calculation of credits). SUSTAINS project interns can enroll in any of the
following 4 directed study courses:

- CS 1950, a directed study in Computer Science, taught by Dr. Daniel Mosse
- CEE 1996, a special project in Civil and Environmental Engineering, taught by Dr. Melissa Bilec
- ENVSTD 1499, a directed study Environmental Studies, taught by Dr. Mark Collins
- IL 2098, a directed study in Science through Instruction and Learning, taught by Dr. Jennifer L. Cartier

The flexibility of department and course allows students to choose a course that best meets their own individual credit hour requirements. Moreover, three courses are undergraduate (1000) level and one is at the graduate level (I&L 2098). As a requirement for these credits, interns complete weekly blogs or journals and meet bi-weekly with their instructor. Course requirements for credit are included in Appendix B.

Moving into Year 2, SUSTAINS faculty plan to explore the creation of a one-credit laboratory experience that could be offered as an elective and taken in conjunction with any sustainability course across the university. The intention is to expose students to the issues of teaching and learning in the field in order to spark an interest in educating others about sustainability. Such a lab could become a very fertile recruitment ground for SUSTAINS.

**Undergraduate Student Participation in Year 1**

Over the course of Year 1, seventeen undergraduate students attended organizational and informational meetings about internship and volunteer opportunities or community partnerships.

Of the seventeen students who attended the informational meetings, 5 were male and 12 were female. Fourteen attendees had declared a major in a STEM area, 2 did not have stated majors and 1 was in a field outside of STEM.

Two undergraduates who attended the informational sessions held internships in school sites (Spring 2013). Both were females. Fellow 1, a natural science major, completed an internship with Pittsburgh Milliones 6-12 (University Prep) School. Fellow 2 had a double major in Anthropology and Environmental Studies and worked with the Propel School in Homestead. In addition, 1 undergraduate student in Engineering completed a summer research internship that focused on education issues and projects (Summer 2013).

A goal for Year 2 will be to recruit freshmen and sophomores into the internships. This will hopefully help SUSTAINS attract younger students before they have solidified their career goals.
One avenue of access to freshmen and sophomores is through undergraduate advisors, both departmental and general. Multiple contacts with those advisors will be necessary in order to prepare and support them for SUSTAINS recruitment.

**Master of Arts in Teaching Development**

Due to changes in the Commonwealth of Pennsylvania’s teacher certification areas, teachers no longer receive either an elementary (K-6) or secondary (7-12) certificate. Beginning in 2012, certification areas are in K-3 and 4-8. In this way, teacher educators throughout Pennsylvania are changing their academic programs to prepare teachers to specialize in the middle grades (4-8). Such a change is replacing the existing certification programs at the University of Pittsburgh. The new Master of Arts in Teaching (MAT) program at Pitt focuses on preparing middle grades teachers with special expertise in mathematics and science.

During Year 1 SUSTAINS faculty offered a graduate course, *Building a 4-8 Teacher Preparation Program*, in the Department of Instruction & Learning (I&L3010), designed to inform the creation of the middle school STEM certification program at the University of Pittsburgh. Eight graduate students were enrolled in the course in Spring of 2013. The course outcomes included: articulating a model of teacher learning & program outcomes; looking at other programs (benchmarking); underscoring the need to obtain input from area middle school administrators. The work that was done in this course has allowed SUSTAINS faculty to begin writing a proposal for the STEM teacher-training program that will meet the new certification requirements of Pennsylvania Department of Education.

As a result, SUSTAINS faculty are well on track to propose the new Masters of Arts in Teaching program by the end of Fall 2013 so that a program can be fully operational by Fall 2014. During Year 2 of SUSTAINS work, undergraduates in STEM fields that participate in SUSTAINS internships or volunteer positions will be channeled into the new MAT program.

**Conclusion**

In Year 1, SUSTAINS established a physical location for housing the collaborative venture, created a website for recruitment and information about the program, and held a series of planning meetings which led to recruitment meetings in the Fall 2012. Outreach meetings attracted both faculty and student interest. The first interns took advantage of these opportunities in the Spring of 2013.
Year 1 was also successful in establishing a variety of community partnerships for internships and volunteer opportunities, and developed an avenue for STEM students to obtain credits for internships. The first placement experiences were positive and will be used to guide recruitment and placement efforts in year 2.

A result of the experiences in Year 1 was the creation of a goal for Year 2 to meet with undergraduate admissions officers and advisors to build greater awareness of the program across the university. Discussion of how to attract students to STEM education has included making credit courses available in more departments.

With a successful Year 1--focused on program development and building community connections--completed, Year 2 of the SUSTAINS Project is on track and set to begin in the Fall of 2013. Year 2 goals include an increase in recruitment, greater student involvement in the volunteer and internship opportunities, and progress in the development of a STEM teacher-training program. Thus, the evaluation focus will shift to a greater extent of interviewing and surveying of participants in the programs and courses to determine impact related to consideration of careers in STEM education.

For questions regarding SUSTAINS, contact
Jennifer L. Cartier, Ph.D.
Director of Teacher Education
Department of Instruction & Learning
University of Pittsburgh
5523 Wesley W. Posvar Hall
230 South Bouquet Street
Pittsburgh, PA 15260
412-648-7248
jcartier@pitt.edu
http://sustains.cs.pitt.edu

For questions regarding the evaluation or report, contact CEAC.
Dr. Cynthia Tananis, Director
School of Education
4316 Wesley W. Posvar Hall
230 S. Bouquet Street
University of Pittsburgh
Pittsburgh, PA 15260
(412) 624-7240
cceac@pitt.edu
www.ceac.pitt.edu
Appendices

Appendix A: Program Membership, Partners, Internships

SUSTAINS Co-PIs

- Jennifer L. Cartier, PI  
  *Instruction & Learning, School of Education, University of Pittsburgh*
- Melissa Bilec, co-PI  
  *Civil & Environmental Engineering, Mascaro Center for Sustainable Innovation, Swanson School of Engineering*
- Mark Collins, co-PI  
  *Environmental Studies, Dietrich School of Arts & Sciences*
- Daniel Mossé, co-PI  
  *Computer Science, Dietrich School of Arts & Sciences*
- Margaret S. Smith, co-PI  
  *Instruction & Learning, School of Education, University of Pittsburgh*

Other involved Pitt Faculty

- Meryl Lazar  
  *Coordinator of Elementary Education*
- Matthew Luskey  
  *Coordinator, PA Writing Project*
- Wendell McConnaha  
  *Director, Falk School*

Community Partnerships for Internships

Internship sites for SUSTAINS:

1. Mascaro Center for Sustainable Innovation
2. Penn State Center
3. Kingsley Association
4. Carnegie Science Center
5. Environmental Charter School
6. F.U.S.E Pittsburgh
7. Manchester Academic Charter School
8. Propel Schools

Internship Partners for SUSTAINS:

1. Falk School
2. Propel Schools
3. Barack Obama Academy
4. Carnegie Science Center
5. FUSE
6. University Prep High School
7. Boyd Community Center
## Appendix B: Course Requirements

Internship structure as set-up by University of Pittsburgh’s Dietrick School of Arts and Sciences

<table>
<thead>
<tr>
<th>Internship Credit</th>
<th>Hours at Site/Semester</th>
<th>Academic Product for Pitt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 credit</td>
<td>40 hours</td>
<td>5-page topical paper integrating experience with topics from academic discipline</td>
</tr>
<tr>
<td>2 credits</td>
<td>80 hours</td>
<td>10-page topical paper integrating experience with topics from academic discipline. Additionally, student submits portfolio of work from site OR reflective journal</td>
</tr>
<tr>
<td>3 credits</td>
<td>120 hours</td>
<td>15-page topical paper integrating experience with topics from academic discipline. Additionally, student submits portfolio (containing integrative paper) OR reflective journal</td>
</tr>
</tbody>
</table>