

G-STEM: ADVANCING INTERNATIONAL RESEARCH OPPORTUNITIES FOR STEM STUDENTS AT SPELMAN COLLEGE

K. McCormack, K. Clay, T. Galvao, D. Togunde, & J. Butler



Introduction

“Enhancing Global Research and Education in STEM at Spelman College” (G-STEM) seeks to prepare African American women within the STEM disciplines to be globally-engaged upon graduation from Spelman College. Although there have been modest increases in the participation of women in the STEM disciplines, very little progress has occurred in terms of African American female participation. Furthermore, over the last 10 years there has been a substantial increase in the number of international research collaborations and co-authored publications, indicating a movement towards the globalization of research and science. There is a clear need to increase the participation of African American women in the STEM disciplines, as well as to prepare them to be globally-engaged scholars.

Spelman College ranks 5th in the country for awarding baccalaureate degrees in Science and Engineering to African Americans, and is ranked 2nd in the United States for graduating African American baccalaureate students who obtain doctoral degrees. Spelman College has a well-established Study Abroad and International Exchange Program, with approximately 25% of each graduating class participating in study abroad experiences. However, a limited number of STEM students engage in study abroad activities, and only a few have participated in research activities abroad. Thus, G-STEM focuses on providing formally mentored global research experiences for our STEM students. The basic differences between the current study abroad experience and G-STEM is the integration and centralization of study abroad efforts across campus, the development of global research collaborations, the implementation of a formal mentoring program for G-STEM participants, and the evaluation and dissemination of the program. Through this program, a greater number of African American women within the STEM disciplines will pursue international research experiences, and thus graduate as globally-engaged scholars.

Program Goals

1. Modify Spelman College's infrastructure through the creation of a central G-STEM office which will integrate the efforts of various divisions to further develop the global learning experiences available to STEM students.
2. Promote the development of globally engaged STEM scholars by expanding the number of international research collaborative opportunities available to them and creating a formal, long-term mentoring program.

Objectives

1. Establish 15 new research partnerships between Spelman College and international institutions over 5 years.
2. Increase the percentage of undergraduate STEM students who choose to participate in international research experiences to from 15% to 35% over 5 years.
3. Develop an integrated long-term mentoring program for G-STEM scholars.
4. Disseminate the global experiences of our students to audiences internal and external to Spelman College.

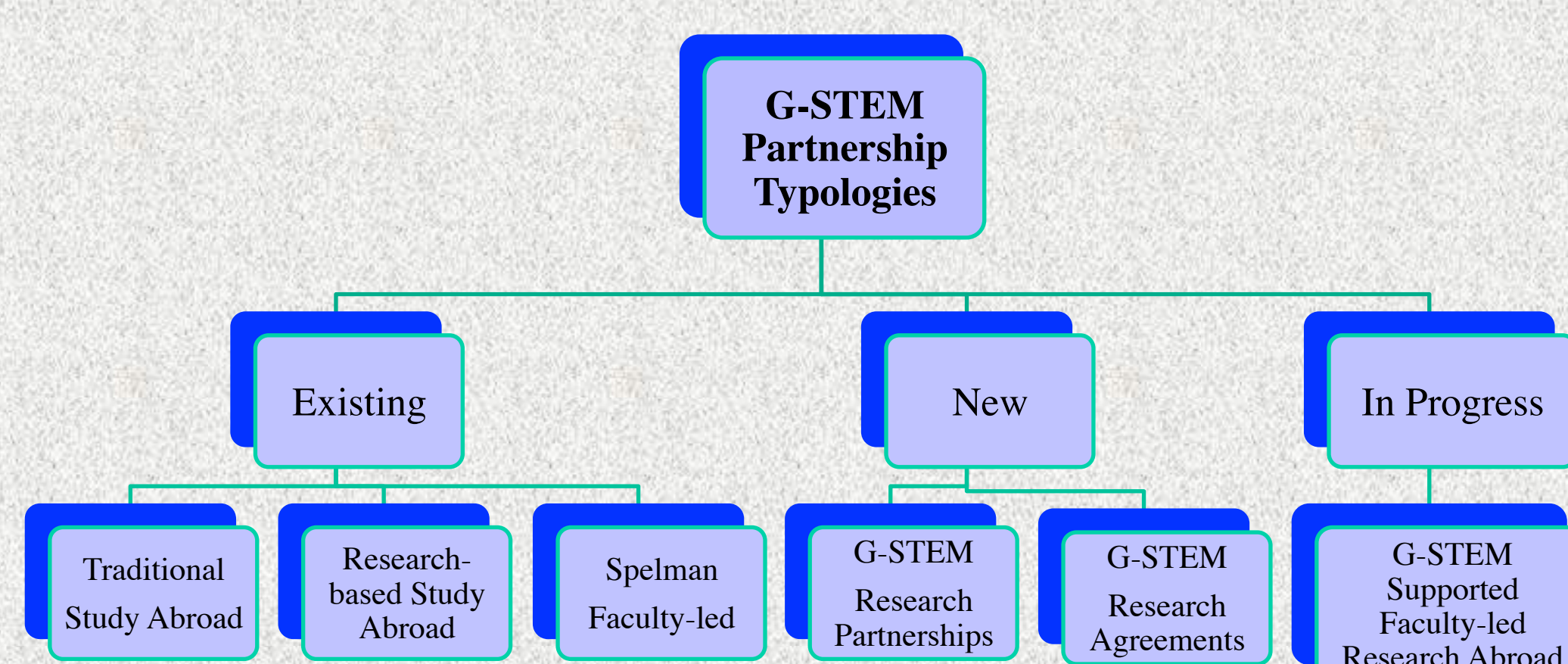
Innovations

Three models have been developed to ensure the success of our program:

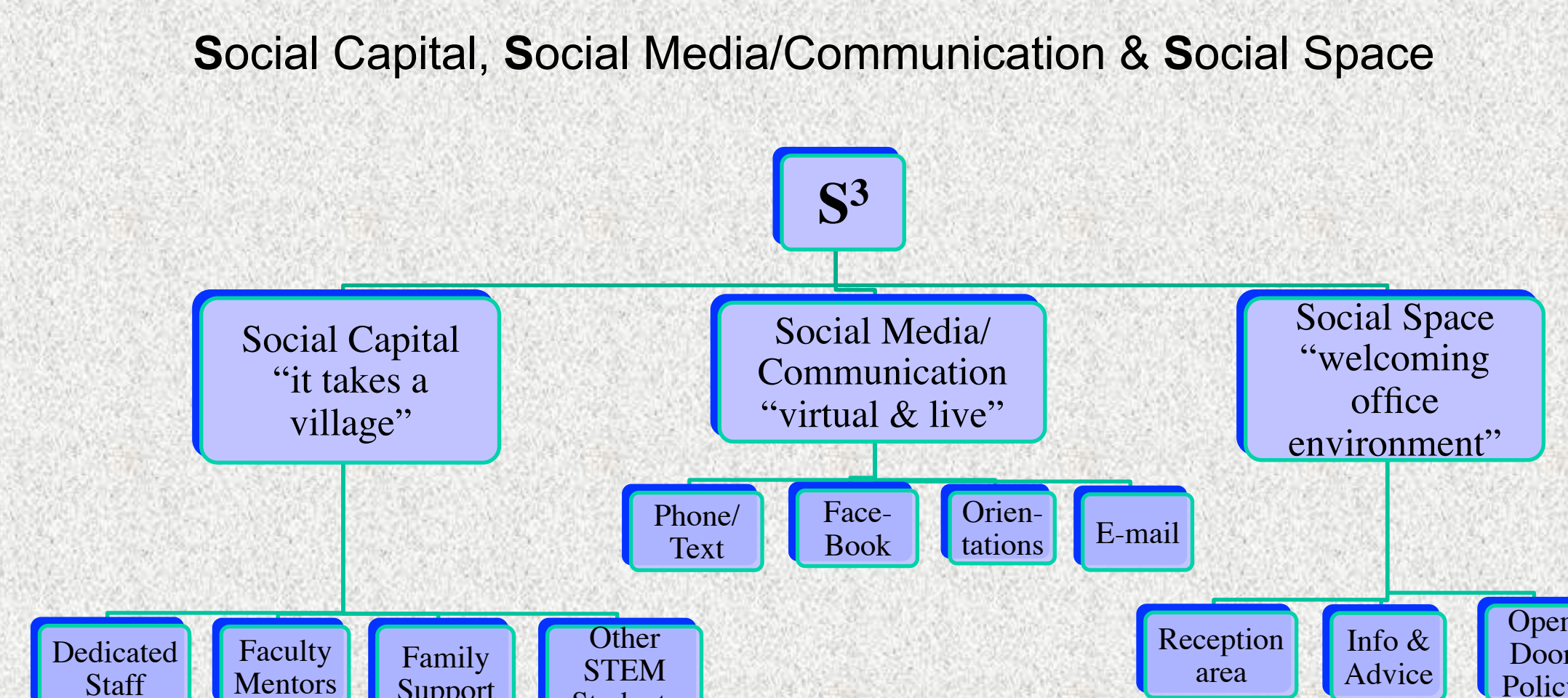
- A. G-STEM Model for Expanding New Research Partnerships
- B. G-STEM Model for the Successful Recruitment and Retention of African American STEM Students into International Research Experiences
- C. G-STEM Model for the Mentoring of African American STEM Students Participating in International Research Experiences

Models

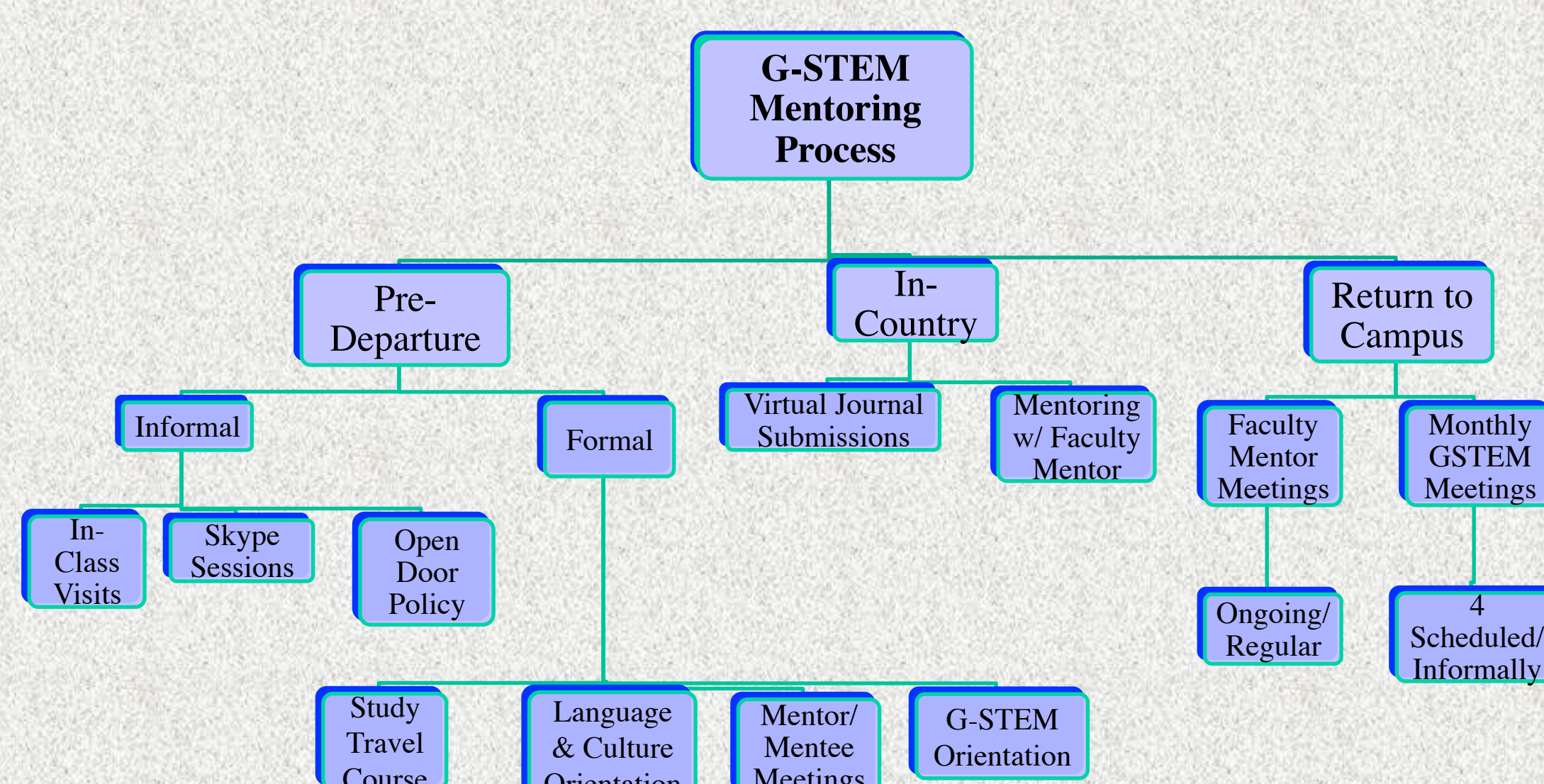
A. G-STEM Model for Expanding New Research Partnerships



B. G-STEM Model for the Successful Recruitment & Retention of African American STEM Students



C. G-STEM Model for the Mentoring of African American STEM Students Participating in International Research Experiences



Institutional Integration



Outcomes

G-STEM has supported 78 students to date, and is set to support a total of 108 by Summer, 2015

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Biology		6	11	10	15	
Chemistry		1	1	3	2	
Environmental Studies		1	3	3	1	
Mathematics		1	1	1	3	
Physics			1		2	
Biochemistry			1	4		
Computer Sciences			1			
Dual Degree Engineering				2	4	
Total	0	9	19	23	27	~30

A Total of 15 Partnerships have been Established to Date

1. Indian Institute of Technology Madras, India
2. Women's University at Seoul, South Korea
3. Queensland University of Technology, Australia
4. Brazil Cultural Travel, UNIDUNAS, Brazil
5. DAAD, Germany
6. Grenoble Innovation for Advanced New Technologies, France
7. Budapest Semesters in Mathematics, Hungary
8. Katholieke Universiteit Leuven, Belgium
9. The University of Cordoba, Spain
10. University Autonoma de Madrid, Spain
11. Consejo Superior de Investigaciones Científicas, Spain
12. Arcadia University (England, Scotland, Spain, Italy)
13. Queen Mary, University of London, Mathematics, England
14. University of Sussex, School of Life Sciences, England
15. AGMUS, Puerto Rico (locations around the globe)

Destinations travelled (2010-2014)



Dissemination

National Presentations:

Clay, K. McCormack, K., Galvao, T., Togunde, D., & Butler, J. (2014). Global Undergraduate Research: Enhancing Knowledge. To be presented at the National Council on Undergraduate Research (NCUR). Lexington, KY, April, 3, 2014

Clay, K. McCormack, K., Galvao, T., Togunde, D., & Butler, J. (2014). . Recruiting and Retaining STEM Students into International Research Experiences: Best Practices for Working with Under-Represented Groups. Presented at Georgia International Educators--Tennessee International Educators Bi-State Conference. Chattanooga, TN, February, 20, 2014.

Elam, T. A. (2014). Owl Butterfly Oviposition Patterns on Banana Leaves Santa Elena - Monteverde, Costa Rica. Presented at the Emerging Researchers National (ERN) Conference in STEM, Washington, D.C., Feb 20-24.

*51 student presentations at the Annual Spelman Research Day.

Websites:

G-STEM: <http://www.spelman.edu/academics/research-programs/g-stem>

Digital Commons: <http://digitalcommons.auctr.edu/scgstem/>

WordPress: <http://spelmangstem.wordpress.com>

Acknowledgements

This Program is supported by the National Science Foundation under Grant #HRD-0963629 (GSTEM) and the U.S. Department of Education; Student Aid and Fiscal Responsibility Act; Title III Grant (SAFRA, Part F). Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.