2013-2016 IBB Girls STEM Initiative: Overview

**Who**

In the first three full years of the program, 65 young women from Cesar E. Chávez High School & George I. Sánchez Charter School participated. The inaugural cohort of 15 women graduated in May 2016 and is now co-creating the IBB Girls STEM Initiative Alumni Network.

**What**

An intensive three year preparatory program designed to empower young women to develop the essential critical thinking, problem-solving, and collaboration skills needed to succeed as STEM industry leaders and community innovators in the 21st century.

**When**

One full residential week in June of each summer during high school and at least two meetings monthly throughout the academic year. Additional opportunities for weekend trainings, field trips and conference participation through the academic year are provided and vary annually.

**Mission**

- **INSPIRE** a group of ambitious, traditionally underserved high school women to pursue careers in STEM (Science, Technology, Engineering, and Mathematics) fields and provide them with the tools to succeed
- **FOSTER** lasting mentoring relationships and role modeling for underrepresented women through committed engagement with Rice undergraduates, graduate students, faculty and staff
- **GROW** a vibrant pipeline of STEM trained female graduates committed to the future of our Houston community

2013-2016 IBB Girls STEM Initiative: Summer Program Highlights

**Communications and Critical Thinking Workshops**

First year girls begin each morning with critical writing exercises, public speaking practice, and discussion of the previous day’s work. Their work is reviewed nightly and they are taught daily by Rice University graduate students from the Rice University Department of English. The second year focuses intensively on SAT Prep while third year girls spend their mornings crafting exemplary college entrance essays. The work begun during the summer sessions continues throughout the academic year through Saturday workshops and monthly meeting intensives.

Additionally, all participants have multiple opportunities to present in front of a supportive and constructive peer environment in order to develop fluency and effectiveness in public speaking. A strong background in communications and critical thinking skills has proven essential for any future career success.
Laboratory Demonstrations
For many of the participating students, this program is their first exposure to the myriad of disciplines that may be explored in STEM. For their first & second summers, their mornings conclude with hands-on workshops in a variety of topics: biochemistry, bioengineering, ecology, computer science, and physics.

Field Trips
Over three years, participants gain a further understanding of the richness of the Houston STEM environment through trips to:

- University of Texas MD Anderson Cancer Center
- University of Texas Dental Branch
- NASA-Johnson Space Center
- Baylor College of Medicine Brain Lab
- Sea Center Texas
- Texas Wildlife Rehabilitation Coalition
- Buffalo Bayou Partnership
- The Health Museum
- Industry Partners
- Houston Museum of Natural Science

Hands-on Learning
Students dive into learning with a variety of hands-on exercises demonstrating force, velocity, pond water ecosystems and engineering concepts. Upon arrival, students are well-trained in the principles of responsible conduct of research, scientific ethics and constructive collaboration.

Second year students (rising juniors) engage in an engineering challenge designed to address deficiencies in developing world medical brigades.

Working with Rice
undergraduates who are currently designing innovative global technologies to solve complex global health challenges, the participants learn the fundamentals of engineering design while learning how to collaborate effectively.

Third year students (rising seniors) work directly in a variety of Rice laboratories, one-on-one with Rice graduate students, learning firsthand about the complexities of scientific research in biomedical engineering, biophysics, computational and applied mathematics, chemical engineering, ecology, and chemistry. If both mentor and mentee agree, students may continue their laboratory internship into their senior year of high school and beyond.

Small Group Mentoring
Each evening, the students gather in their small groups, led by committed female Rice graduate students. They process the events of the day, discuss diverse issues of concern, and focus on topics related to academic success, interpersonal strength, healthy relationships, media literacy, and critical thinking. Small group relationships are the cornerstone of community development and collaborative thinking. Strong, long term peer connections are essential for the academic and personal growth of the participants.
Monthly Meetings
The third Wednesday of each month, the students gather on the Rice University campus to attend seminars on STEM topics, connect with their ongoing graduate student mentored small groups on academic and personal issues, and meet with individual faculty members to pursue exploration in the scientific discipline of their choice. In the past three years, monthly meetings have hosted community leaders on such diverse topics as bioengineering start-up companies, women’s health, drug resistant super bacteria, challenges for first generation college speakers, suicide prevention, healthy nutrition and exercise, and more. The young women identify individuals or topics that they would like to learn more about and then work with the staff to make invitations to the monthly meetings.

Statewide and National Opportunities
In October 2013, the students traveled to San Antonio to attend the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), an incredible opportunity to view the scientific work of students from across the nation, envision their own potential when presented with the work of peers, and visit with representatives from colleges & universities from across the nation. In November 2014, they attended the Annual Biomedical Research Conference for Minority Students (ABRCMS) also held in San Antonio. In October 2015, the Texas Conference for Women in Austin provided a remarkable program for young women from across the state to gather together to talk about issues facing them statewide. Our students spoke eloquently and impressed all the attendees with their thoughtfulness, knowledge, and confidence as they interacted with women of all ages and backgrounds discussing the pressing need for scientific literacy & financial support.

Volunteer Opportunities
Students have the opportunity to be of service to the community through volunteer work with Houston community agencies of their choice. In 2013, students worked with the Rice Coalition on Hunger and Homelessness to provide 300+ sack lunches to area individuals in need and, in 2014, the students worked with the Houston Food Bank to provide volunteer services and also learned about specific programs of interest in their home community. In the fall of 2015, the students began a two-year project to identify pressing challenges in their community and develop STEM solutions that could be implemented by existing non-profit or governmental agencies. This project is presently ongoing.

Mentoring Experience
Students learn the skills of mentoring by providing leadership and advice to the next cohort of students that are selected for the program. Students present at program information sessions, they have individual discussions with potential applicants and parents, and provide valuable support during interviewing and orientation sessions.

More importantly, students from different cohort years are co-roomed with each other during their summer experience, building strong interpersonal relationships across the traditional academic class divide. This translates into a vibrant network of peer mentors during the school year as upperclassmen readily work with their roommates from previous summers to explain challenging concepts in classes that they have already mastered.
The 2016 graduates are the first women to complete the program after having participated for three subsequent residential summers at Rice and monthly throughout the academic year. This first cohort operated as co-creators of the program, providing valuable perspectives on the needs of their East End community & their families, and will continue as the alumni board for the program.

The program’s 100% graduation rate is in stark contrast to the graduation rate at Chavez High School which averages 66% with only 37% of graduates heading to college after graduation.

Each of these women is a first generation college student in their family and 75% are first generation Americans. All have long term plans both to pursue careers in emerging STEM fields that build on their training as critical thinkers. Moreover, as vocal and empowered members of their community, they are committed to helping other women in their neighborhood to break down the cultural, economic, and academic barriers to their success. All plan to build future careers in Houston after college and are working with the program to remain active in the coming year, acting as alumni mentors and staffing next summer’s residential experience as alumni counselors.

Our inaugural cohort of fifteen graduates will be attending:

- University of Texas Austin (4)
- University of Houston (3)
- Houston Community College (3)
- San Jacinto College (2)
- Texas A&M University (1)
- Houston Baptist University (1)
- Texas Southern University (1)

**2013-2016 IBB Girls STEM Initiative: Future Directions**

Our pilot cohort has demonstrated that first generation college students, particularly women, face challenges in four areas: professional, financial, psychological, and academic. The program will continue to address these challenges through the refinement of the following interventions throughout the three full high school years that young women participate in the program:

1. Addressing identified weaknesses in their education background through peer counseling and tutoring provided by Rice graduate students and undergraduates throughout the academic year.
2. Developing wide support networks to help students and families navigate the college preparation process by including Rice staff, faculty, graduate students and undergraduates in recurrent programming throughout the three years.
3. Providing broad exploration of STEM career possibilities and also tailoring immersive laboratory research internships.
4. Normalizing campus experiences so that students internalize that they belong on a college campus. Additional opportunities for parents and guardians to experience campus life should be implemented.
5. Mentoring plays a primary role in addressing the significant psychological concerns that first generation students have as they seek to bridge the worlds between school and home. Mentoring relationships will continue post-graduation for alumni of the program and alumni will also serve as mentors to younger participants.
6. Introduction to the excitement of STEM disciplines needs to occur earlier in students’ academic life. Programming aimed at middle schools in the Chavez High School feeder pattern will be developed and implemented by Rice undergraduates and IBB Girls STEM Initiative alumni.
https://ibb.rice.edu/Content.aspx?id=2147484307


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