



# Addressing the STEM Divide

## STEM Summer Camps to Promote Future STEM Leaders

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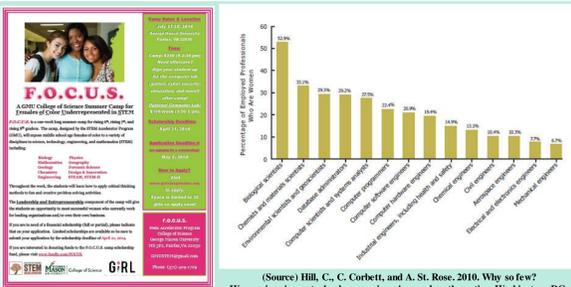


### Engaging Women in STEM

*"If we are going to out-innovate and out-educate the rest of the world, we've got to open doors for everyone. We need all hands on deck, and that means clearing hurdles for women and girls as they navigate careers in science, technology, engineering, and math."*

....First Lady Michelle Obama

A girl or woman of color who wishes to pursue a career in STEM requires a support system that includes mentoring, network building and leadership development. The STEM Accelerator Program in the College of Science at George Mason University has taken steps to provide such a support system. With a goal on recruitment, retention, on-time graduation and finding jobs in STEM, the Accelerator Program has initiated a variety of programs at all levels. Two of these programs include (a) **FOCUS** (Females Of Color Underrepresented in STEM), a program that is jointly coordinated with Girls Inspired and Ready to Lead, Inc. where middle school girls of color worked closely with undergraduate mentors on a week-long STEM program and; (b) a **STEM Boot Camp**, a program that helps incoming freshmen in STEM to get prepared for the college road ahead by immersing them in a content class such as Calculus I, General Chemistry, Introduction to Physics and Cell Biology in one week taught by faculty as well as give them exposure to undergraduate opportunities and other STEM career pathways. Both the FOCUS and STEM Boot camps are great models of intervention that have helped provide great insights to faculty in the STEM Accelerator program to understand important transition that represent the greatest points of loss of women of color from the STEM fields. They have also helped to understand how the recruitment, retention, and advancement of women of color in STEM may be improved through research and practice.



### STEM BOOT CAMP

The President's Council of Advisors on Science and Technology stated that 1 million more college graduates in STEM fields must be produced to meet the growing needs of our economy within the next decade. Unfortunately less than 40% of students entering college and declare science, technology, engineering and mathematics (STEM) majors complete a STEM degree, thus there is an urgent need to solve retention issues for STEM majors across the country. The reasons why students are not successful in postsecondary schools range from personal to academic: economics; adjustment problems to college (first time away from home); poor study skills; poor critical thinking skills. The purpose of the one-week STEM Boot Camp is to introduce our incoming STEM (Biology, Chemistry, Math, Physics & Engineering) majors to the rigors of college prior to the start of the semester. The Boot Camp also serves as an opportunity to form learning communities within the group. The program has helped the students to build strong social and collaborative networks on campus and to become familiar with rules of competitive academic environments and the resulting pressure to manage conflicting priorities and expectations. Although the Boot Camps are open to all incoming College of Science students, we are particularly interested in those underrepresented women of color.

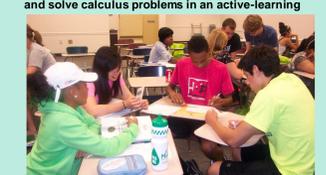
STEM Boot camp is a one-week pre-interventional program to expose incoming freshmen to content in gatekeeper classes such as Calculus I, General Chemistry, Cell Biology, Introduction to Physics along with hands-on labs, study skills and college readiness activities. All students also participate in important college life skills (how to study, how to take an exam, time management and learning styles). Results from our first cohort of students show 83% of those who declared a STEM major are currently in their major. The Camps serve to: (1) reduce the likelihood of a losing a STEM major; (2) introduce students to their first introductory STEM course through lectures and exams; (3) let's students know where their weak points are before the semester begins; allow students to meet fellow classmates; (4) provide structure for first time college students; (5) take the mystery out of 'what am I going to expect when I get to college'.

### Inquiry-based and Active Learning

Participants during the week in seven 75-minute content lectures in biology, physics, chemistry & calculus.



Students engaged to think by doing. Students work in groups to solve strip sequences on cellular respiration and solve calculus problems in an active-learning



In addition to lectures, staff from GMU's Learning Services office lead sessions on learning styles, time management, studying for exams and taking exams



One of the advantages of participating in the Boot Camp is meeting professors prior to the start of the semester. Informal gatherings allow students to begin building a rapport with their professors.



### FOCUS

The FOCUS camp was designed to engage and pique the interest of students by offering exciting hands-on STEM activities. The camp is supported by Mason undergraduate and graduate mentors of color and STEM faculty who have a vested interest in their continued interest in a STEM career. Results from our surveys suggest students were thoroughly pleased with the activities and professionals in STEM they encountered during the week. The data collected from the camp clearly suggests that the program has had a great impact and the students were greatly motivated to pursue STEM degrees after the camp. Such early exposure to STEM supports children's overall academic growth, develops early critical thinking and reasoning skills, and enhances later interest in STEM study and careers.



### FOCUS Schedule

Time	Session	Time	Session	Time	Session	Time	Session
8:30 am	Parent Orientation	8:30-8:55 am	Group D-CHEM 001	8:30-8:55 am	Group D-CHEM 001	8:30-8:55 am	Group D-CHEM 001
8:55-9:10 am	Student Orientation (Content Pre-Assessment)	9:10-9:35 am	Group D-CHEM 002	9:10-9:35 am	Group D-CHEM 002	9:10-9:35 am	Group D-CHEM 002
9:35-9:50 am	Student Orientation (Content Pre-Assessment)	9:50-10:15 am	Group D-CHEM 003	9:50-10:15 am	Group D-CHEM 003	9:50-10:15 am	Group D-CHEM 003
10:15-10:30 am	Group D-Sea Perch	10:30-10:55 am	Group D-Sea Perch	10:30-10:55 am	Group D-Sea Perch	10:30-10:55 am	Group D-Sea Perch
10:55-11:10 am	Group D-Sea Perch	11:10-11:35 am	Group D-Sea Perch	11:10-11:35 am	Group D-Sea Perch	11:10-11:35 am	Group D-Sea Perch
11:35-12:00 pm	LUNCH	12:00-12:25 pm	LUNCH	12:00-12:25 pm	LUNCH	12:00-12:25 pm	LUNCH
12:25-12:50 pm	Group D-Cybersecurity	12:50-1:15 pm	Group D-Cybersecurity	12:50-1:15 pm	Group D-Cybersecurity	12:50-1:15 pm	Group D-Cybersecurity
1:15-1:40 pm	Group D-Sea Perch	1:40-2:05 pm	Group D-Sea Perch	1:40-2:05 pm	Group D-Sea Perch	1:40-2:05 pm	Group D-Sea Perch
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