THE STEM ACCELERATOR PROGRAM
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THE STEM ACCELERATOR

The STEM Accelerator program was created by the College of Science (COS) at George Mason University (GMU) in 2011 with a focus on the success of students in STEM at all levels. In particular, the program is tasked with four major goals of increasing the number of STEM majors, improving retention rates of STEM students, reducing their time to graduation, and helping them join the STEM workforce or continue their education upon completion of their Bachelor's degree in STEM disciplines. Created as an interdisciplinary unit, this division consists of faculty members from multiple departments who have special responsibilities besides teaching that includes coordinating and promoting STEM activities that help achieve the four primary goals. Currently, the program includes faculty from Mathematical Sciences, Chemistry, Biology, Physics, Astronomy, Computer Sciences, Forensic Sciences, Atmospheric and Ocean Sciences.

The STEM Accelerator program runs initiatives at all levels, including STEM Mania (summer camp for grades 3-5 students), Regional STEM Fair (a K-8 Science and Engineering Fair for elementary and middle school students), FOCUS (Females of Color Underrepresented in STEM summer camp for middle school girls), High School Mentorship Research (through partnership with school districts in Northern Virginia), STEM Boot camp (a pre-interventional program for incoming freshmen to get them ready for four-years of college in STEM), Undergraduate Learning Assistants Program (that offers peer-to-peer mentoring opportunities both within the university as well as partnering community colleges), Research Experience for undergraduate and graduate students (through mentorship and experiential learning), Discipline Based Education Research (a platform for sharing best teaching practices between faculty), and STEM Teacher Professional Development (PD) Programs (for engaging teachers in effective pedagogical practices through problem solving and lesson study) and many more.

As Aristotle once said, “The whole is greater than the sum of its parts.” The STEM Accelerator program truly epitomizes this statement with the STEM faculty constantly trying to work together to create new initiatives that will help provide opportunities for excellence, cast a wide net and foster a supportive ecosystem to develop the next generation of STEM innovators. This does not just mean preparing the students at all levels on content in STEM in VA but also includes preparing them to become better collaborators, communicators, critical thinkers and creative problem solvers, the four fundamental pillars of twenty-first century skills.

One of the hallmarks of the program to support the retention and reducing the time to graduate in the college is the Learning Assistant (LA) Program. This peer-to-peer program gives undergraduate STEM students the opportunity each semester to engage in face-to-face and online collaborations to help reinforce content taught in the classroom. The LA program has three main goals: (a) Facilitate the learning of undergraduates in classrooms, labs, help rooms, and other venues through the use of LAs who understand the material and attend the course lectures; (b) Deepen the LA’s understanding of important concepts of the course in which they are working by having them assist the learning of other undergraduates and; (c) Expose LAs to the process of teaching and learning through weekly workshops and hands-on teaching experience. The LAs meet each week to receive pedagogical training from the STEM Accelerator faculty on how to best help the students learn. All LAs are also invited to present a poster that showcases their work as an LA and their experiences. One student shared “by helping the students understand the material, I was able to test my own knowledge and better understand the material as well.” Another student shared that, “Being a LA has also helped to reinforce my own knowledge in preparation for graduate school and to build confidence in my ability to teach at the college level in the future.” In three years the program has tripled in size and supports over 75 LAs each semester who assist faculty in various undergraduate courses.

LEARNING ASSISTANT PROGRAM

STEM Boot Camp

STEM Boot camp is a one-week pre-interventional program to expose incoming freshmen to content in gateway 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.

RESEARCH PROGRAMS

CUR Posters on the Hill: Being selected to represent Virginia for this premier undergraduate research event gave an opportunity to meet and discuss the importance of STEM with Virginia Senators and Congressmen. The work was also commended by both the former and current Virginia Governors. Member of the Congress Robert J. Wittman from 1st District Virginia quotes, “Dear Professor Seshaiyer, Your creative and very practical work offers such valuable insight into our society. As our Nation and Northern Virginia grows in diversity, it is essential that we, especially lawmakers, understand the social interaction between groups in our communities. I also want to commend you for your continued contributions to the fields of science and mathematicians at George Mason University. Given the growing importance of Science, Technology, Engineering and Mathematics (STEM) in our economy and our society, it is encouraging to know we have such compassionate teachers challenging and supporting the next generation of thinkers and innovators.”

GLOBAL STEM PROGRAMS

In Summer 2014, Academic Year Governor’s Schools (AYGS) high school teachers participated in a mentorship institute coordinated through the STEM Accelerator Program where they were exposed to interdisciplinary themes including biodiversity, conservation biology, mathematical modeling, statistics and applications to real-world problems. For all topics, the participants were trained to become good at collecting, organizing and analyzing data for real-world problems through descriptive and inferential data analysis. Follow-up webinar sessions were held in Fall 2014 and provided the participants with continuing support in implementing mentorship, materials and strategies to share interdisciplinary research ideas and analyze student learning.

MENTORSHIP INSTITUTE

Recognitions: The STEM Accelerator Program thanks the GMU College of Science, the 4-Va Consortium, the GMU Office of Student Scholarships, Creative Activities, and Research (OCSAR); the Business Women's Giving Circle, the Virginia Department of Education and the National Science Foundation for supporting our various STEM initiatives.

ORAL REVIEWS

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