

U.S. House of Representatives

Committee on Science, Space, and Technology
Subcommittee on Research and Science Education

STEM Education in Action: Local Schools, Non-Profits and Businesses Doing Their Part to Secure America's Future

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Bob Jones High School, Madison, Alabama

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I want to thank the members of the Subcommittee on Research and Science Education for the opportunity to address the subcommittee, for their service, and their interest in traveling to our area to see STEM education in action.

The University of Alabama in Huntsville is a top tier national research university as ranked by U.S. News & World Report, and we have achieved the highest classification in research activity by standards established by the Carnegie Foundation for the Advancement of Teaching. Our campus serves as the anchor tenant of Cummings Research Park, the second largest university-related research park in the United States with nearly 300 companies and 25,000 employees. Adjacent to Cummings Research Park is Redstone Arsenal, where NASA's Marshall Space Flight Center and several U.S. Army research laboratories and commands are located.

It is this environment in that we find ourselves in the center of workforce development that is heavily dependent upon research, technology, science, engineering and mathematics. It's pretty obvious that the success of this community, the success of the federal agencies at Redstone Arsenal in addressing their missions, and the success of corporations located here to support the Army and NASA, are heavily dependent on creating a pipeline of intellectual and creative talent in the STEM fields.

Last year, our campus supplied the local workforce with more than 630 graduates possessing degrees of a technical nature. Nearly half of our graduates earn a degree in science or engineering, so we are the single largest contributor of professional degrees for the STEM workforce in the greater Huntsville area.

We recognize the need for our university to provide leadership at promoting STEM education and create a pipeline of intellectual and creative talent, and we take this responsibility seriously.

We have made great strides by "teaching the teachers" in STEM education. Our campus was the pilot site for AMSTI, the Alabama Math, Science and Technology Initiative. A recent, multi-year study by the U.S. Department of Education credited AMSTI with providing the equivalency of an additional 28 days of traditional classroom instruction per year.

AMSTI is a program for elementary and middle school teachers, implementing hands-on or inquiry-based learning in classrooms. During the past five years, we have trained more than 4,000 teachers and have had an impact on more than 120,000 students. AMSTI schools outperform non-AMSTI schools in middle-grade science, math and reading significantly. Percentile rank difference on the SAT-10 math test between schools that adopted AMSTI and a control group increased from 3 percentile points to 8 percentile points from grade 6 to 8 and from 3 to 9 percentile points in reading.

This summer marks the beginning of a new master's degree in STEM education on our campus — the Master of Science in Integrated Science, Technology, Engineering, and Math (MSI-STEM). This program is targeted at in-service secondary school science and math educators and seeks to advance their content knowledge and command of subject matter, which in turn have been proven to impact student learning positively in the STEM areas. It is the only program of its nature in Alabama and one of only three in the southeastern U.S.

Meanwhile, UAH outreach efforts are providing opportunities for elementary and middle school students to engage in STEM type activities. This allows us to develop integrated approaches and programs so students anticipate future activities as they progress into later grades. We link these programs to university programs in science, technology, engineering, and math so that students see what the end result is – the degree programs they can pursue and what their careers might look like.

We are working with local corporations on a middle school-through-high school STEM pipeline, aimed at 1) engaging students in STEM activities during a two-week summer science and engineering camp at the critical time before 8th-grade, where research has shown interest in STEM disciplines suffers a precipitous decline; 2) keeping them engaged in STEM activities, education, and career opportunities throughout the academic year; 3) sustaining both the summer camp and academic year experiences in subsequent years through grade 11. This pipeline culminates in their admission to a UAH STEM major.

We are also using the Innovative System Project for the Increased Recruitment of Emerging STEM Students (InSPIRESS) program as an outreach activity that engages high school students in an open-ended design activity that piques their interest, excites their imagination, and gives them a better understanding of what scientists and engineers do. This also increases their interest in science and engineering careers as well as helping them develop more realistic views of what it takes to be a scientist or engineer.

The University of Alabama in Huntsville also provides leadership as the regional coordinator for 10 North Alabama high schools to better prepare Alabama students for engineering careers through the Alabama Engineering Academy Initiative. These academies are embedded in the high schools and provide specific, multi-year curricula geared toward prospective engineering students.

Once they enroll as students on our campus, we prepare engineering students for transition to the workforce by having them work in teams to solve a large-scale systems design project and solutions for real-world problems. Also, our cooperative education program is one of the largest in the southeastern U.S. and partners with scores of local companies and government agencies to give experience in the workforce.

Each of these steps help prepare students for a robust education at UAHuntsville, and for preparation for their lives after being a student, and helps them add value to their employer from the first day they walk in the door.