

Press Release 13-184

## Lab school brings manufacturing technologies to middle-school classrooms

### Virginia engineering design academy is outgrowth of National Science Foundation-funded project



A student shows Joan Ferrini-Mundy a fabricated cam from an engineering project at Buford.

[Credit and Larger Version \(/news/news\\_images.jsp?cntn\\_id=129472&org=NSF\)](#)

October 29, 2013

A partnership among the University of Virginia's (UVA) Schools of Education and Engineering and the Charlottesville Public Schools has led to the launch of Buford Engineering Design Academy, a laboratory school for advanced manufacturing. In conjunction with a ribbon-cutting ceremony on Sept. 30, National Science Foundation (NSF) leaders, UVA faculty and UVA and Buford students toured the site and saw the school's capabilities.

The new academy is the culmination of work undertaken in a project called the [FabLab Classroom](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=127769) <[http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=127769](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=127769)>, an NSF Innovative Technology Experiences for Students and Teachers (ITEST ([/cgi-bin/good-bye?http://itestlrc.edc.org/about-itest](http://itestlrc.edc.org/about-itest))) project led by [Glen Bull](http://www.nsf.gov/cgi-bin/goodbye?http://curry.virginia.edu/academics/directory/glen-l-bull) <<http://www.nsf.gov/cgi-bin/goodbye?http://curry.virginia.edu/academics/directory/glen-l-bull>>, professor at UVA's Curry School of Education, and co-director of the Center for Technology and Teacher Education. The FabLab Classroom provided elementary and middle school students with fabrication technologies such as 3-D printers and computer-controlled die cutters. The students learned science through engineering design using these advanced manufacturing technologies.

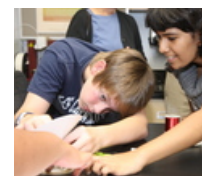
Based on the promising results of the pilot, the Commonwealth of Virginia provided seed funding to design a laboratory school for advanced manufacturing. The funding provided by NSF and the Commonwealth of Virginia was matched by \$1.4 million contributed by the



Gavin Garner shows facilities in UVA's lab to NSF's Joan Ferrini-Mundy and Susan Singer. [Credit and Larger Version \(/news/news\\_images.jsp?cntn\\_id=129472&org=NSF\)](#)



Students in the pilot engineering design cadre demonstrate a digital fabricated speaker system. [Credit and Larger Version \(/news/news\\_images.jsp?cntn\\_id=129472&org=NSF\)](#)



Buford students are enthusiastic about their work on the digital fabricated speaker system. [Credit and Larger Version \(/news/news\\_images.jsp?cntn\\_id=129472&org=NSF\)](#)

Charlottesville Schools. The school will serve as a laboratory for integration of engineering design into science teaching while also serving as an experimental platform for preparing the next generation of science teachers to use these technologies.

"We like to see this kind of impact from a research project where NSF has made an investment," said NSF Assistant Director Joan Ferrini-Mundy, who leads the agency's Education and Human Resources directorate. "As there is more and more emphasis on teaching engineering concepts in K-12 classrooms, it's crucial that we understand the most effective strategies for student learning. The resources brought together through this partnership are building on the initial project and increasing its scope and reach. That's very exciting."

The Buford Engineering Design Academy is the first public school to become part of the Commonwealth Engineering Design Academies, a laboratory school partnership with UVa's Schools of Education and Engineering. The project pairs the expertise of UVa professors with Charlottesville-area public school teachers and students. As part of their professional development, middle-school teachers affiliated with the project spend a half day teaching at Buford and a half-day at UVa learning about advanced manufacturing and advanced manufacturing education.

The Buford Engineering Design Academy--to be followed by similar high-tech labs at Charlottesville High School and Albemarle County's Jack Jouett Middle School and Albemarle High School--will be linked via video to the partner lab at UVa, enabling UVa professors and students to offer lessons and develop innovations for the participating laboratory schools.

This unique network of labs, professors, teachers, and students has already attracted a television crew from Japan; in addition, a representative from China's National Center for Educational Technology will spend a year in Charlottesville to follow the project.

The school has opened its doors at a time when there is increased emphasis on the "engineering" part of science, technology, engineering and mathematics (STEM) education research. Not only are engineering technology and applications of science part of the Next Generation Science Standards <<http://www.nsf.gov/cgi-bin/goodbye?http://www.nextgenscience.org/>>, but technologies such as 3-D printing are increasingly available and affordable.

"The next-generation science standards call for making science and engineering equal, but there are no science teachers today trained to teach science and engineering and, even more importantly, there are no professors of science education prepared to train teachers to teach science and engineering," says Bull. "We wanted to change this."

To help set the stage for K-12 schools successfully adopting science and engineering teaching and technologies, Bull is working with a group of teachers assigned to NSF through the Albert Einstein Distinguished Educator Fellowship Program <<http://www.nsf.gov/cgi-bin/goodbye?http://www.trianglecoalition.org/einstein-fellows>>. Led by elementary science, engineering, mathematics and robotics teacher Kaye Ebel <<http://www.nsf.gov/cgi-bin/goodbye?http://www.trianglecoalition.org/einstein-fellows/current-fellows/kaye-ebelt>>, the teachers have established a lab within NSF's Engineering directorate that parallels classroom manufacturing technologies found in the Lab School. The Einstein Fellows meet with the Lab School teachers each week to pioneer new pedagogical approaches to incorporating engineering design into science teaching. After these approaches to science teaching are piloted in the Lab School, they will be disseminated nationally.

There is more work ahead on the road to bringing this coursework to schools around the country.

"Integrating engineering design into science teaching is an important but challenging goal," said Bull. "The engineering design academies provide a test bed for developing effective practices."

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**Related Websites**

Next Generation Science Standards: <http://www.nextgenscience.org/> ([/cgi-bin/good-bye?http://www.nextgenscience.org/](http://www.nextgenscience.org/))

FabLab Classroom feature story: [http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=127769](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=127769) <[http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=127769](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=127769)>

NSF Innovative Technology Experiences for Students and Teachers: <http://itestlrc.edc.org/about-itest> ([/cgi-bin/good-bye?http://itestlrc.edc.org/about-itest](http://itestlrc.edc.org/about-itest))

Engineering Design Academy Open House press release: <http://www.ccs.k12.va.us/schools/buford/BUFLabOpenHouse2013.html> ([/cgi-bin/good-bye?http://www.ccs.k12.va.us/schools/buford/BUFLabOpenHouse2013.html](http://www.ccs.k12.va.us/schools/buford/BUFLabOpenHouse2013.html))

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