Making Them Stick
Bucknell engineering program aims to keep students in the field.

There are several high-profile programs, like EWeek’s Future City competition and the FIRST robotics competition, driving elementary and high school students toward the fields of science, technology, engineering, and math.

Officials at Bucknell University and engineering giant Parsons Brinckerhoff saw a lack of programs aimed at the college level, however, both to interest students in engineering and to keep them on the engineering track through sometimes grueling fundamental-level courses. The two partnered to launch the Engineering Success Alliance, a retention program aimed at keeping Bucknell students from under-resourced high schools in engineering programs.

ESA combines tutoring help for new engineering students and networking, mentoring, and job searching skills for soon-to-be graduates. It’s too early to tell how well the program works—it launched in 2010—but university officials, the NSPE member spearheading Brinckerhoff’s involvement, and students in the program say it appears to be working.

“I honestly believe that this is one of the best programs that exists on campus because it not only gives us a better understanding of the material we are covering in class, but it has also given us opportunities in learning how to network and become professional engineers,” says Marco Valdez, a freshman mechanical engineering major in the program.

Producing a diverse corps of new young engineers is important in a field that, more often now, is working in diverse communities and international markets, says Keith Buffinton, dean of Bucknell’s College of Engineering. Unfortunately, those diverse faces often come from under-resourced high schools and lack the skills needed to succeed in a top-flight engineering program.

“These students are coming to Bucknell educationally talented and motivated. But they’re not necessarily as well prepared as we and they would like,” he says.

To meet challenges of an evolving U.S. economy and more dynamic world community, engineering must include a wider range of professionals, says NSPE member George Pierson, P.E., president and CEO of Parsons Brinckerhoff. The Bucknell alumnus jumped at the chance to work with his alma mater to drive more underrepresented students, be they white, minorities, poor, or simply undereducated, into the engineering field.

“You see a lot of programs at the junior high and high school levels and a lot of kids getting excited about STEM,” Pierson adds. “There are very few, if any [programs] at the college level.”

It’s students like Valdez that Bucknell’s program is designed for. Classes at Arleta High School in Los Angeles, where Valdez graduated, were advanced enough that he earned acceptance to Bucknell’s engineering college.

Even though he passed high school calculus and earned admittance to Bucknell, resources at Valdez’s high school prevented the in-depth knowledge of math concepts that Bucknell professors demand. At Arleta, Valdez shared some classes with 35–50 students and graduated in a class of 453 seniors. Large class sizes made it difficult for him to ask the questions that would help him understand calculus concepts, he says. Bucknell also uses math computer programs his school didn’t have, he adds.

He simply hadn’t been prepared for the rigorous math training freshman engineering students are expected to master before moving up to high-level engineering concepts, he says.

“I found myself struggling once I arrived on campus,” he says. Math labs in ESA helped him keep up with classroom concepts, and his grades have improved as a result.

That’s not to say he didn’t want to succeed. Valdez says he chose a career in engineering after success in high school versions of the math and science courses now challenging him at the college level.

“There were times that the problems in math lab were more difficult than the ones in my calculus class, but I learned to solve them and explain how I achieved my solutions,” he says.

Pierson hopes Parsons Brinckerhoff’s five-year funding commitment to the program will establish the Engineering Success Alliance and give enough time to establish an endowment to fund it into the future. Other companies have contributed to the program’s operation; Pierson says Parsons Brinckerhoff declined to use the firm’s name in the name of Bucknell program so other companies might be more willing to support it and potentially similar programs on other engineering campuses.

The Engineering Success Alliance mission makes sense for a field—engineering—that must be responsive to the diverse communities it serves.

“It’s part of the business we’re in,” Pierson says. “We serve our local communities, and our local communities are diverse…. We can do a better job of serving diverse communities if we have a diverse workforce doing that.”