

New \$90K tool to bolster BC3's distinctive metrology program

Students 'to be blown away' by FARO gift, BC3 prof says

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Kevin Ruediger, a Butler County Community College associate professor and coordinator of BC3's metrology program, demonstrates measuring the interior of a geowidget with a tactile probe attached to the program's new state-of-the-art \$90,000 FARO Quantum S measurement tool in BC3's metrology lab on June 6, 2019. The Quantum S will allow his students to measure in three dimensions simultaneously. "Students ... are going to be blown away by it," he said. "This is just beyond anything else we have."

(Butler, PA) A state-of-the-art \$90,000 FARO measurement tool gifted to Butler County Community College will enhance a distinctive and nationally known metrology program whose graduates have the highest potential starting salaries among the college's occupational associate degree selections in science, technology, engineering and mathematics, a BC3 administrator said.

The FARO Quantum S 2.5-meter, seven-axis articulating arm coordinate measuring machine, donated by the manufacturer to the BC3 Education Foundation for use in the college's metrology program, will "open up opportunities for measurement," said Matt Kovac, BC3's dean of STEM, "that we would not have had before."

Eric S. Stanfield is a 1991 BC3 metrology graduate and mechanical engineer with the National Institute of Standards and Technology, Gaithersburg, Md., a nonregulatory federal agency within the U.S. Department of Commerce that ensures uniformity in weights and measures nationally and abroad.

Stanfield and Daniel Sawyer, leader of NIST's dimensional metrology group, consulted with Dr. Robert Bridges, FARO chief scientist, Exton, Pa., whose company contributed what Kovac said is the "most cutting-edge measurement tool we now have" in a BC3 program whose highly sought new graduates can earn between \$35,000 and \$60,000.

BC3's graduates in metrology – "the science of precision measurement," said Kevin Ruediger, BC3 associate professor of STEM and metrology program coordinator – have been hired by private industry, governmental contractors and governmental agencies.

"Our top-of-the-line arm"

The addition of the Quantum S, said Ruediger, a 1994 BC3 metrology graduate, gives BC3 students "the ability to measure things in three dimensions at the same time."

"Our top-of-the-line arm," Bridges said of the donation.

The Quantum S allows its operator to choose between a hand-held pea-sized tactile probe to touch an object to create with related computer software a 3-D model – or switch to a laser-line probe to scan items that might deform from contact.

A fully inflated beach ball whose surface is dotted with dimples of varying sizes and at unequal distances from one another could be scanned and replicated into a 3-D model on a computer using the Quantum S, Ruediger said.

"Because of its connection with the computer, the computer can regenerate any kind of dimension that we want, such as it is this long, it is this deep, its hole is this big, it is located in this area," he said.



Kevin Ruediger, a Butler County Community College associate professor and coordinator of BC3's metrology program, demonstrates measuring the interior of a geowidget with a laser-line probe attached to the program's new state-of-the-art \$90,000 FARO Quantum S measurement tool in BC3's metrology lab on June 6, 2019. The Quantum S will allow his students to measure in three dimensions simultaneously. "Students ... are going to be blown away by it," he said. "This is just beyond anything else we have."

“This allows us to measure all sides all at the same time with one setup.”

“I have hit the 100K mark”

The Quantum S, Ruediger said, is “by far and away” the most advanced tool in a BC3 metrology lab that prepares students for professions that directly or indirectly utilize metrology skills and require only an associate degree.

Those professions may include aerospace engineering and operations technician, electrical and electronics engineering technician, and industrial engineering technician – among others.

The average salary of an aerospace engineering and operations technician was \$67,010 in 2018, according to the U.S. Department of Labor’s Bureau of Labor Statistics. For electrical and electronics engineering technicians, \$64,330; and for industrial engineering technicians, \$55,460.

Each field is expected to experience job growth through 2026, according to the Bureau of Labor Statistics.

“I am making basically \$50,000 a year,” said Jacob Wirginis, 22, a former Saxonburg resident, 2018 BC3 metrology graduate and instrumentation engineer at Alcami Corp., a contract pharmaceuticals company in Wilmington, N.C.

“I have hit the 100K mark,” said Bob Dodds, 34, a former Butler resident, former NASA metrologist and 2006 BC3 graduate who is the metrology and maintenance program manager at Xellia Pharmaceuticals in Bedford, Ohio.

“I would say here, in the lab, you could probably start anywhere from \$40,000 to \$60,000,” said Tina Falling, 49, a former Butler resident who said her salary has nearly doubled in the eight years she has been working at a national laboratory in Albuquerque, N.M., since her graduation from BC3 in 2011.

“I was looking for some type of an associate degree where I figured I could get a position relatively easily with a lucrative salary,” said Falling, an engineering support technologist. “In starting a new career, metrology seemed like my best option for what I was interested in.”

“BC3 is absolutely rare”



Jacob Wirginis, 22, left, is a 2018 graduate of Butler County Community College’s metrology program. He is an instrumentation engineer at Alcami Corp. in Wilmington, N.C. Bob Dodds, 34, right, is a 2006 graduate of Butler County Community College’s metrology program. The former NASA metrologist is the metrology and maintenance program manager at Xellia Pharmaceuticals in Bedford, Ohio.

BC3 is among the few community colleges nationwide that offer an associate degree in metrology, according to callabmag.com, the international journal of metrology, which also lists Central Georgia Technical College, Macon, Ga.; and Monroe County Community College, Monroe, Mich.

BC3 is also the only community college in the United States, Ruediger said, that offers an associate degree in metrology with triad coursework in chemical, electrical and dimensional metrology.

“It is the broadest program that I know of today,” Stanfield added.

“BC3,” said Dr. Theodore Doiron, a physicist with NIST, which employs four BC3 metrology graduates, “is absolutely rare. I think most people in the industry know of it.”

While more than 225 students from the United States, Ghana and Kuwait have graduated from the 62-credit program that debuted in fall 1981, “We could put 200 people a year in this program and graduate them and get them jobs,” Ruediger said.

“It pretty much has had 100 percent employment rate from the time of inception,” said Stanfield, a 2015 BC3 distinguished alumnus and 26-year NIST employee who with Dodds is among members of BC3’s metrology program advisory council.

“There are more job opportunities than there are metrology graduates.”

Said Dodds: “The degree in metrology is recession-proof.”

The Quantum S will provide the opportunity for BC3 metrology students to have a “great introduction to some high-tech capability,” Stanfield said.

Added Bridges: “I doubt that very many colleges around have something like this.”

“Students are going to come in and say, ‘This technology is unbelievable,’” Ruediger said. “They are going to be blown away by it. This is just beyond anything else we have.”



Tina Falling, 49, left, is a 2011 graduate of Butler County Community College’s metrology program. She is an engineering support technologist at a national laboratory in Albuquerque, N.M. Kevin Ruediger, right, is a 1994 graduate of Butler County Community College’s program in metrology – “the science of precision measurement,” he said. He is now an associate professor at BC3 and the metrology program coordinator.