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Michael Lawrence / Queensborough Community College

Anatomical hand designed and 3D printed by QCC mechanical engineering student Kevin Hernandez.

CASE STUDY

Developing Workforce-Ready Students

GRANT HELPS COMMUNITY COLLEGE GET WORLD-CLASS 3D PRINTING LAB

The goal of higher education is to prepare its students for the workforce in their chosen fields, but the students in the Engineering Technology 3D printing lab at Queensborough Community College (QCC) in New York already have resources that professionals would envy.

After receiving a \$1.5 million CUNY 2020 grant in 2014, QCC jumped into action to set up its world-class 3D printing lab. Since the grant mandated that recipients connect academic programs with businesses to accelerate local economic development, QCC now provides workshops and courses to students, industry, college and high school faculty, and local organizations.

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The Bold Approach

The grant gave Michael Lawrence, an educator in the engineering department at QCC, a complex task: outfit the lab with 3D printing equipment local businesses could use to collaborate with students, and validate cost and time savings with 3D printed parts.

To meet this demand, QCC needed systems with advanced capabilities to produce high quality, strong and visually appealing parts. Engineering students needed high-performance materials able to withstand high-heat applications, friction and final assembly processes, but students also needed to design parts with smooth finishes and color options to validate new design concepts. Above all, the technology had to stay evergreen — it couldn't become obsolete.

For Lawrence and QCC students, the complementary functionality and unmatched capabilities of both FDM and PolyJet™ technology would ensure the technology would remain relevant for years to come.

“To maximize our budget and impact we focused on the most sophisticated 3D printers possible,” said Lawrence. “If we don't have state-of-the-art equipment, there's no reason for businesses to come to us.”

QCC now has a Fortus 450mc™, which can create rugged, impact-resistant, functional parts in production-grade thermoplastics, and has the ability to build with biocompatible materials; and the Stratasys J750™ 3D Printer, which yields high-resolution models for design verification or ultra-realistic training models.

Real-World Education on Campus

On campus, students solve problems daily with 3D printed solutions. QCC has launched over 100 projects in which students use 3D printing to provide solutions to real-world problems.

QCC students are helping a New York medical organization 3D print anatomical models and prototype custom surgical tools to help increase the accuracy and speed of procedures and decrease patient recovery times.

“3D printing has made patient-specific medical treatment a major focus — design engineers are needed to assist doctors in creating new apparatus and surgical fixtures,” said Lawrence. “This includes anatomical models and fixtures for assisting exact placement of medical devices into a patient's body. This will generate a whole new career field.”

Engineering student Kelvin Henry designed fashion-forward adaptive apparel from his wheelchair, and reimagined more functional and convenient clothing for those with mobile impairments. Henry was recognized as CUNY and Capital One Community College Innovation Challenge stand-out, and won the competition. Kevin Fernandes, a mechanical engineering major, has designed innovative tooling and prototypes including a 3D printed a bionic hand assembled with nuts and bolts.



QCC student 3D printed art project.



QCC students have 3D printed many parts and designs now on display in the new lab, including the lamp base.

With 3D printing, QCC undergraduates can transfer project experience directly to career paths, both through fostering working relationships with potential employers and hands-on experience with actual business cases.

“The experience is symbiotic. Our students get real-world experience working on meaningful projects and see the interworking of organizations. This is an excellent way to align formal internships and build relationships with hiring managers,” said Lawrence.



This 3D printed art project is on display in the QCC 3D printing lab.

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