

# Helping Students Produce Proof-of-Concept Models

## Reliable 3D Printing Makes the Grade at Georgia Tech

Nothing helps a future engineer learn like seeing a design come to life. The award-winning biomedical engineering (BME) program at the Georgia Institute of Technology (Georgia Tech) and Emory University uses 3D printing to help students test their ideas. “3D printing helps the student experience,” notes Marty Jacobson, a design instructor in Georgia Tech’s Wallace H. Coulter Department of Biomedical Engineering and director of BME’s design shop. “They quickly get to see how something that might seem right in design theory might not work in reality. Holding their 3D-printed models in their hands increases their learning of what’s working and what isn’t.”

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3D printing gives students the opportunity to test their designs in a practical way and lets them iterate faster. It helps them learn, and that’s what we’re all about.

Marty Jacobson

**Design Instructor and Director,  
BME Design Shop  
Georgia Institute of Technology**



# Build a Strong Program

Along with developing their engineering and design skills, students need to learn key disciplines that range from opening their minds to explore fresh ideas to intense focus on specific design elements. That requires a unique learning environment. “We’re set up more like a design studio than a traditional classroom or lab,” said Jacobson. “It’s a highly entrepreneurial atmosphere with lots of making and doing.”

3D printing is an important part of that atmosphere. “Design for design’s sake isn’t enough. Students need to be able to prove their concepts, to show that they’ve understood what they’ve been learning and can apply it in a practical way. Because medical devices need to be made from specific materials, 3D printing isn’t the end. But it gives our students a fast way to test their designs and make proof-of-concept models.”

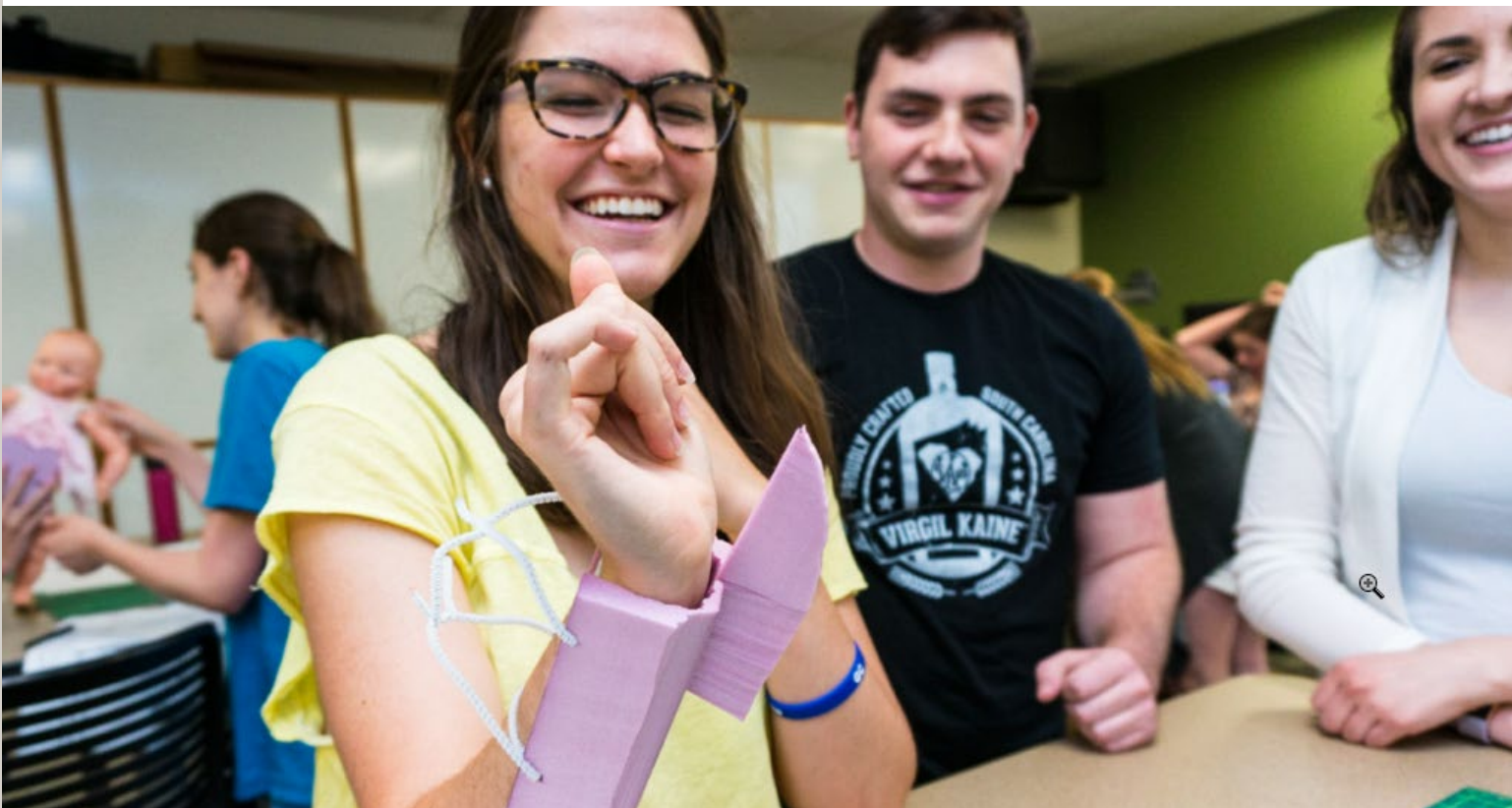
## Reliability is Essential

“One of the worst decisions we ever made,” notes Jacobson, “was buying several first-generation,

consumer-grade 3D printers. They just don’t hold up, so we couldn’t sustain the investment of time needed to keep them tuned and working.”

Things got much better when the design shop added a Stratasys® F170™ 3D printer. “Oh, what a difference,” said Jacobson. “It really is plug-and-play, so the students started prototyping with it right away. No other printer delivered on that promise like the Stratasys machine. The F170 was also a real game-changer for us because of the low cost to print. It’s really an agile 3D printing solution.”

There’s a constant stream of student projects in progress in the biomedical engineering program, so the consistent reliability of the F170 has dramatically helped students and staff. “It just works and works and works. We can spend more time teaching because we aren’t losing hours to repairs and calibrations, and students can print their proof-of-concept models without worrying that they won’t actually print. From a student’s perspective, all the best prototyping experiences have been on the Stratasys machine.”



# Saving Time and Money

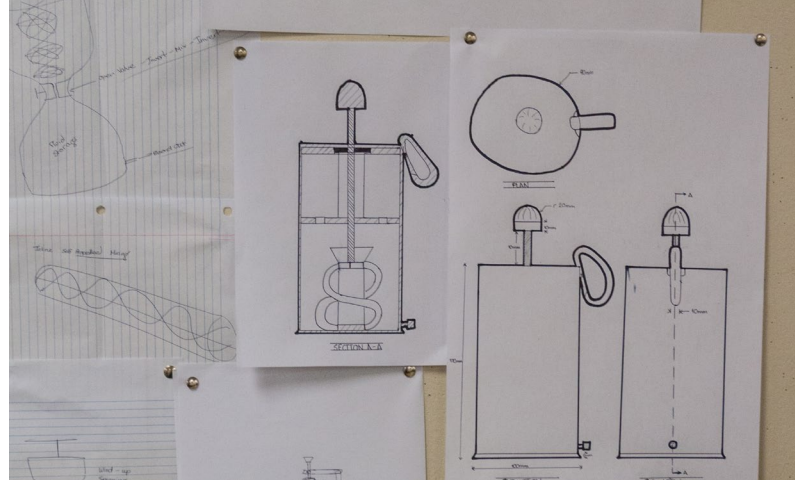
The addition of the F170 3D printer delivered a variety of results for the Georgia Tech biomedical engineering program. “The F170 is the learning tool we hoped it would be,” said Jacobson. “Students see that it’s just that, a tool. They still have to do their design work, and they don’t want to endlessly tinker with a 3D printer. With the F170, they’re excited to take their idea to the next level. And because it prints faster than our other printers, the students have more time to learn from their errors and make corrections.”

The F170 also delivers great results for the department itself. “We have a budget just like any other school. The F170 is affordable. In fact, I’d say it’s cheaper than the maker systems because there’s no downtime and the cost per print is significantly lower. Plus, the reliability helps keep our classes on schedule.”

## Material Savings

The most common material used on the F170 is PLA, a thermoplastic made from renewable resources. “It’s ideal for the students,” said Jacobson. “It’s very economical, it prints quickly, and it has high strength and stiffness. They can print just about any design with it, and, again, the low cost per print is huge for all of us.”

“Simply put,” adds Jacobson, “the F170 is a great value, both in terms of cost and in terms of enhancing the educational experience here.”





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