

February move to bigger, higher-tech space

Center for Surgical Innovation Expands Operations

By Tyler Smith

Late last week, a five-person surgical team hunched over the hip of a figure lying on a table under OR lights. They manipulated the joint while they talked quietly. One wielded a marker he used to target the points of incision. Minutes later they began cutting through the skin and pushing aside tissue.



CSI Executive Director Sarah Massena believes the new lab will bring more business opportunities.

The team, from Porter Hospital in Denver, was working through a hip-replacement procedure with unfamiliar surgical equipment. Rather than iron out the kinks in a live setting, the group worked on a cadaver in a technologically well-equipped room the size of several ORs at the new home of the [Center for Surgical Innovation](#) (CSI) on the edge of the University of Colorado Anschutz Medical Campus.

The CSI has been part of the CU School of Medicine for about a decade, and its purpose hasn't changed. It's a venue for surgeons running the gamut of experience to learn and practice surgical techniques. Coursework is developed by [CU faculty](#) in five founding departments: Neurosurgery, Obstetrics and Gynecology, Orthopedics, Otolaryngology, and Surgery.

Major move. The CSI was housed in the Education 1 building on campus until mid-February, when it moved west to the new space in the Bioscience Park Center on Montview Boulevard. It is a major upgrade in terms of both space and technology. The new lab is 1,900 square feet, more than 70 percent larger than the Ed 1 facility, and the entire center is more than double the size of the original. The lab is equipped with five 65-inch television screens that display high-definition images of the work done on the operating tables. The procedures can also be beamed to another big screen in a nearby conference room or via the Web to facilities around the world, said CSI Executive Director Sarah Massena.



Thomas Robinson, MD, medical director for the CSI, helped to build its operations over a decade.

As the Porter team began working, CSI lab manager Peter Mouser used an iPad to wirelessly control the cameras shooting the action. Walking past stacks of instrument trays and tables covered with enough tools to open a medical Ace Hardware store, Mouser pointed to other major additions: a \$60,000 Steris washer for decontaminating instruments – in the old lab, they had to be washed by hand and then sent to Sterile Processing at University of Colorado Hospital – and a C-arm for imaging. The CSI owns the

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arm, saving the \$2,700-a-day rent that another training facility would have to charge, Mouser said.



The CSI is now housed in the Bioscience Park Center, just across from the Anschutz Medical Campus.

"We have everything here that you would have in an OR," Mouser said.

Slow start. It's a far cry from the CSI's humble beginnings in 2004, said CSI Medical Director [Thomas Robinson](#), MD. "We had nothing to start," Robinson said. He and a couple of colleagues won a \$300,000 grant from endoscope manufacturer Karl Storz in 2006, enough to bring in Massena to create and implement a business strategy.

The long-range goal, Robinson said, was to free the individual departments from the chores of creating courses, writing protocols, and finding and paying for their own equipment. Instead, he and Massena envisioned a centralized, well-equipped facility with established coursework and education delivered in lab and didactic settings.

"We wanted to create the infrastructure so that the faculty of the course wouldn't have to do any of the logistics. ... They could just come in and teach it." The logistics, such as procuring cadaveric tissue, proved to be a difficult barrier, Robinson said.

But the CSI built a sustainable financial model around donations and grants from equipment companies and income from surgeons around the country and internationally who come in for training. Since its opening in 2007, the center has either broken even or finished in the black every year, Massena said.

The success is reflected in the number of training courses offered, which grew more than fivefold between 2009 and 2014. School of

Medicine residents in the five founding departments, who account for 20 percent of all trainees, get free quarterly access to the CSI, but nearly all the remainder are mid-career surgeons seeking additional training.

Successful debut. The center got off to a quick start in its new space, hosting a contingent of 65 surgeons working with DJO Surgical equipment for shoulder and hip replacement procedures, Massena said. Following that, 60 more arrived to practice using Stryker spine surgery instruments, she said.



CSI lab manager Peter Mouser uses an iPad to wirelessly control cameras shooting procedures.



Mouser shows surgical tools from device manufacturer DePuy Synthes used for hip replacement procedures.

Next week, chief residents and fellows from 19 neurosurgery programs in the United States and another from France will come to the CSI for a convention and exposition to learn and practice surgery on complex brain and skull base tumors, said [Samy Youssef](#), MD, PhD, director of the Skull Base Surgery Program with the CU School of Medicine's Department of Neurosurgery.

The gathering will feature a three-day mix of didactics and hands-on training, led by 20 leading neurosurgery and otolaryngology (ENT) faculty from the United States, France, Germany, Japan, and other nations, Youssef said. Students will practice on cadavers, using the most up-to-date computerized tools, microscopes, and endoscopes. Industry representatives from more than a dozen different companies will provide equipment and technical support, he added.



Surgical tools surround a cadaver in the CSI.



Mouser speaks with surgeons from Porter Hospital preparing to practice a hip replacement procedure in the CSI.

The training will also help students learn the teamwork necessary in skull base surgery, which involves both neurosurgery and ENT specialists, Youssef said. "Each student station will have one otolaryngologist and one neurosurgeon, who will learn to work together as a team in the future. The students will learn state-of-the-art microsurgical and endoscopic concepts and take them back to their centers to practice on their own."

Only a handful of centers offer this type of training, Youssef added. "It shows that CU is a leading center in the world and brings the name of the university worldwide."

Off the drawing board. At present, research and development comprises only a small portion of CSI training, but that could change soon. [Robin Shandas](#), PhD, professor and chair of the CU Department of Bioengineering, said that he sees many possibilities for collaboration with CSI when his department moves into the adjacent Bioscience 2 building, now under construction, sometime this summer.

It's important, Shandas said, for bioengineering students to gain an understanding of the clinical and surgical worlds if they are to design and build medical devices that improve patient care.

"We're trying to bring engineers and physicians together in the early stages of training," Shandas said. "If a student is working on a new device, we want him or her to talk to the physician early and not wait until building a prototype."



One of the Porter surgeons marks the incision spot.

In a biodesign pilot class developed last fall, 14 students visited the CSI to observe procedures and generate ideas based on what they saw, Shandas said. At the end of the semester, they pitched the products they developed to clinicians and investors – the final market arbiters.

"We noticed that the interaction with the CSI was useful for this perspective," Shandas said. "The students saw how a surgeon looks at a product – not just whether or not it works, but can he use it."

To close the loop, Shandas foresees bioengineering students walking across the street to the CSI with products they design to test them, observe the results, and bring them back for necessary changes.

The CSI will become even more training friendly in late April with the opening of the lab's own surgical suite. Constructed with the help of a \$1.5 million grant from Storz, the suite will include a camera, big screen, and a boom that houses surgical equipment, Massena said.

It's large enough to accommodate surgeons and nurses working together to simulate the entire sequence of a surgical procedure, in a "top-of-the line OR suite," she noted. It offers a strong training opportunity for UCH nurses, she added, many of whom will be coming online with the opening in June of four new ORs in Anschutz Inpatient Pavilion 2.



The surgeons' work is displayed on one of the CSI's 65-inch TV screens.

Massena, Robinson, and Mouser will be on the lookout for as many opportunities as they can find because the CSI's move to the new digs didn't come cheaply. The rent more than quadrupled when they moved off campus and became tenants of the Fitzsimons Redevelopment Authority instead of the School of Medicine, Massena said.

It will take a while to grow enough new business to cover the added costs, Massena acknowledged, but she believes the concept behind the CSI will continue to attract interest from groups seeking to develop their skills and education and enhance patient safety.

"Wouldn't you rather have a surgeon practice in the lab before performing a procedure on your mom?" she said.

The Center for Surgical Innovation will hold an open house from 4 p.m. to 6 p.m. April 22 at the Biosciences Park Center, 12635 E. Montview Boulevard, Aurora.