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Surgeon-engineer team produce training software for robot-assisted surgery

June 1, 2010

Two Buffalo scientists have paired up to create technology that has the potential to revolutionize surgical training worldwide, developing the first procedure-based, hands-on surgical training software. Their patent-pending system, Hands-On Surgical Training (HOST), guides surgeons through real-time operative procedures using the Robotic Surgical Simulator (RoSS) interface.

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Khurshid Guru, MD, a staff physician in Urology at Roswell Park Cancer Institute (RPCI), and Thenkurussi "Kesh" Kesavadas, PhD, director of the Virtual Reality Laboratory and a professor of mechanical and aerospace engineering at the University at Buffalo (UB), created RoSS as a way to help surgeons hone their skills in robot-assisted surgery so that they've logged hours of training before they perform a particular surgical procedure. The HOST [software system](#) takes this concept further, immersing the surgeon in a surgical environment using automation technology and an interactive checklist-based process.

"It's as close to operating as you can get outside the operating room," says Dr. Guru, who is also director

of RPCI's Center for [Robotic Surgery](#). "HOST literally holds the surgeon's hands."

The HOST [software system](#) takes surgeons through surgical steps, prompting and guiding them through the critical stages of an operation before proceeding to the next step. A metrics tool evaluates user performance so that surgeons can track their progress. That step-by-step prompting system is unique in the field of computer-assisted surgical learning tools, as is HOST's basis in observational learning. It's an extremely effective system for training surgeons on emerging robot-assisted surgical techniques, says Dr. Guru.

"Even though it uses these new computer-aided tools, our system is rooted in mentored, hands-on surgical training, just like the traditional training model," he says. "They both come back to responding to cues and the opportunity to observe master surgeons."

"Building on our past [collaborations](#)," notes Dr. Kesavadas, "we developed a process for capturing the cognitive and motor skills of a trained surgeon and developed a virtual surgical experience for other surgeons to train on. This new system teaches the steps by guiding users in actually performing a surgery in tandem with the master surgeon —outside the operating room. "

Kesavadas and researchers from the UB Virtual Reality Lab are leaders in the development of haptic technologies that bring a sense of touch to virtual reality (VR). They have developed advanced VR applications for medical, surgical and educational applications.

At present, the HOST software system has been programmed to demonstrate two of the most common procedures within the field of robot-assisted surgery: prostatectomy and hysterectomy. Applications that would expand the HOST software for use in other types of surgeries are in development. "This concept, which we've been working on since 2007 at UB and Roswell Park, has been licensed to Simulated Surgical Systems LLC (SSS) and will be ready for implementation with RoSS by the end of the year," says Dr. Kesavadas, Chief Technology Officer of the Williamsville, NY company. Dr. Guru is SSS' Chief Medical Officer.

Provided by University at Buffalo ([news](#) : [web](#))

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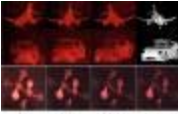
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