

Fourth Biennial North American Summer School on Surgical Robotics

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The Fourth Biennial North American Summer School on Surgical Robotics was held in Pittsburgh, Pennsylvania, 21–25 July 2014. The school was held at the Robotics Institute of Carnegie Mellon University and at Allegheny General Hospital (part of Allegheny Health Network) and drew 62 trainees from six countries. Figure 1 shows the trainees, which included engineering graduate students and postdoctoral fellows, medical residents, and other early-stage researchers. An international group of leading engineering and surgical faculty members was recruited to serve as instructors.

The summer school provided the attendees with a comprehensive overview of the current state and future directions of surgical robotics, to a degree that no single university is able to offer. The combination of lectures presented by experts in the field and hands-on laboratory experiences highlighted the skills that are important for developing a deeper understanding of the challenges facing researchers in the

area and the background needed to address them. The summer school organization and setting also provided plenty of opportunities for attendees to develop relationships with their peers and to interact informally with the instructors and representatives from industry.

The North American Summer School on Surgical Robotics was inspired by the European Summer School on Surgical Robotics, which was started in 2003 and is held in odd-numbered years (the sixth European School was held in 2013). The European School is funded by the European Commission and organized by Prof. Philippe Pognet and Prof. Etienne Dombre of the University of Montpellier 2. In 2007, Russell Taylor and Blake Hannaford proposed a North American version of the Surgical Robotics Summer School, with the intention of it being held in even-numbered years. Due to scheduling constraints, the first North American Surgical Robotics School was held in the winter of 2009 at Johns Hopkins University, with support from the U.S. National Science Foundation and the IEEE Robotics and Automation Society (RAS). The second

North American Summer School on Surgical Robotics was held in July 2010 at the University of Washington. The third North American Summer School was held in July 2012 at the University of Western Ontario, with partial financial support from RAS. Funding for the fourth North American school was provided by grants from RAS, the U.S. National Institutes of Health, Intuitive Surgical, Inc., Covidien Ltd., Medtronic, Inc., and Blue Belt Technologies, Inc.

This year's summer school involved four days of 75-min lectures at Carnegie Mellon University and a full day of hands-on laboratory activities at Allegheny General Hospital. Following the lead of past North American summer schools, a notable feature of this year's school was a live open-heart surgery case using the da Vinci surgical system from Intuitive Surgical, Inc., performed by Dr. Vinay Badhwar of the University of Pittsburgh Medical Center and broadcast to the auditorium at Carnegie Mellon. An Industry Forum was held one evening, providing an opportunity for the attendees to learn from several representatives with experiences both past and present in a number of surgical robotics companies. A social highlight of

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Figure 1. The attendees on the final day of school.



Figure 2. The attendees participating in hands-on experiences at Allegheny General Hospital. (a) A hands-on demonstration of Carnegie Mellon's Micron handheld microsurgical robot. (b) A demonstration of Laerdal SimMan manikin from STAR Center of Allegheny Health Network. (c) A hands-on session with laparoscopic trainers.

the summer school was the dinner in the World Series Suites at PNC Park at the baseball game between the Pittsburgh Pirates and the Los Angeles Dodgers on Wednesday evening.

The laboratory day was organized by James Burgess, M.D., and Michael Passineau, Ph.D., of Allegheny Health Network. There were four 90-min laboratory rotations: 1) a live hands-on porcine surgery session focusing on general surgery skills; 2) a robot-assisted surgery session in which students operated the da Vinci surgical robot; 3) a session on training techniques that included laparoscopic box trainers, suturing skills training, and a Laerdal

SimMan manikin from the Simulation, Teaching, and Academic Research Center; and 4) a demonstration of Micron, an active handheld tremor-canceling microsurgical instrument under development in the Robotics Institute at Carnegie Mellon. Several Allegheny Health Network clinicians, residents, and technicians assisted with the laboratories (Figure 2).

There is no doubt that this meeting inspired a large body of young investigators starting their research careers. Students made clear their appreciation for the lectures but even more so their appreciation for the hands-on labs. For many students, the summer school labs

represented their first opportunity to operate a da Vinci surgical robot; for most, the porcine lab gave them their first opportunity to perform live animal surgery. This year, the educational impact of this series of Summer Schools on Surgical Robotics is seen in the fact that the schools have now “come full circle:” Prof. Yong-Lae Park, a new faculty member of the Carnegie Mellon Robotics Institute and an invited speaker at this year’s summer school, was a student at the first North American summer school in Baltimore in 2009.

