

MINI SYMPOSIUM

2026



Peter Kazanzides is a renowned expert in the field of medical and space robotics, with a career that spans several decades of pioneering work. He co-founded Integrated Surgical Systems in 1990, which developed the ROBODOC Surgical System, the first FDA-approved robotic system used in orthopedic surgeries for hip and knee replacements. This innovation was groundbreaking, helping to standardize surgical procedures and significantly improve the precision and outcomes of joint replacement surgeries. His work has had a lasting impact on both medical robotics and surgical practices worldwide, with over 20,000 surgeries performed using the ROBODOC system.

In addition to his impressive career in medical robotics, Kazanzides has made significant contributions to the development of mixed reality and its application in surgical systems. As a Research Professor at Johns Hopkins University, Kazanzides has worked extensively on projects involving the intersection of robotics, artificial intelligence, and healthcare. His expertise also extends to space robotics, where he has contributed to advancing the technology for robotic operations in extreme environments. His research and academic endeavors are highly aligned with the mission of Óbuda University's Bejczy Antal iRobottechnikai Központ (IROB Lab), where the intersection of robotics and healthcare is a key focus area. The collaboration with Kazanzides led to the establishment of the dVRK program at Óbuda University, enabling the research version of the da Vinci Surgical Robot to boost Hungary's robotics research and innovation, and further providing a fertile ground for the exchange of ideas and advancing both academic and industrial progress in the field of robotics.

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Obuda University-Room F09

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Developing Medical Robotic Systems for Research and Clinical Use

The talk summarizes my journey building medical robot systems for widespread deployment, both in operating rooms and in research labs. I begin with a historical overview of the Robodoc System for orthopedic surgery, first used clinically in 1992. Robodoc represents the first use of autonomous motion in robotic surgery, with the robot milling a cavity in the patient's femur for a hip prosthesis, but the overall goal was to provide better planning capabilities for the surgeon, with instrumentation to accurately execute that plan. Presently, the most widely-used medical robot is the da Vinci Surgical System (Intuitive Surgical) for minimally-invasive surgery. It employs a telerobotic approach that provides the surgeon with high-quality stereo visualization and dexterous manipulation through small incisions. While this has proven to be immensely valuable to surgeons, researchers have identified the possibility to introduce intelligent assistance to improve surgical outcomes. I created the da Vinci Research Kit (dVRK) as an open research platform to support these research endeavors. The dVRK combines open-source electronics and software with the mechanical components from retired da Vinci systems, and has been disseminated to approximately 50 research institutions worldwide. I present an overview of the dVRK system, followed by several examples of enabled research. I conclude with a perspective on the future of medical robotics, including the role of artificial intelligence.