

# Enhancing Robotic Surgery with a Plug-and-Play Multi-Robot Surgical Platforms

Case study

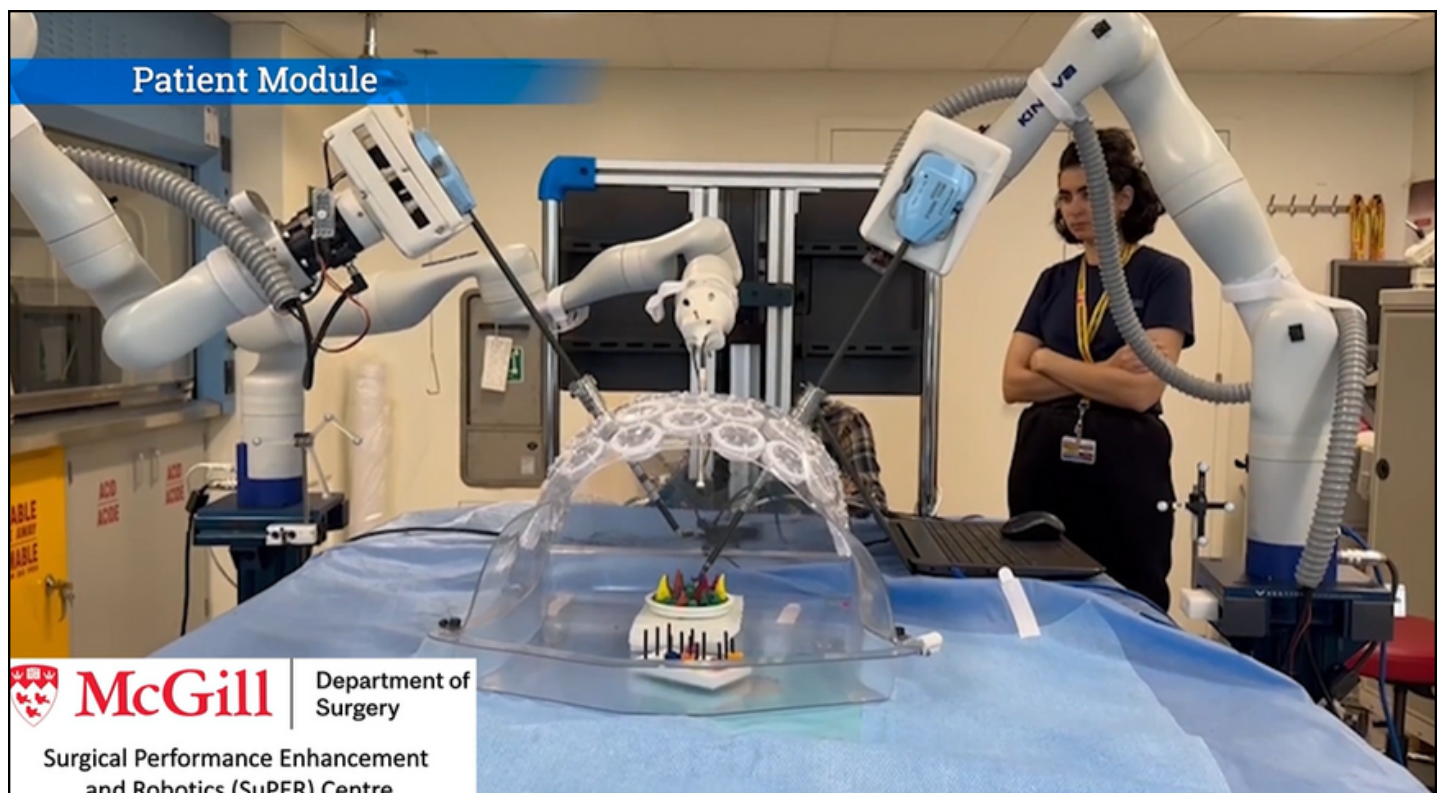
Kinova and the Surgical Performance Enhancement and Robotics (SuPER) Centre of the Department of Surgery of McGill University, have partnered up in the context of an NSERC Alliance Missions led by Dr. Liane Feldman, Dr. Jake Barralet, Dr. Javad Dargahi (Concordia University) and Dr. Amir Hooshier.

This research will enable Kinova to provide the Original Equipment Manufacturer (OEM) with an integrated “plug-and-play” multi-robot platform with its Gen3 7-DoF robots for surgical procedures such as the Laparoscopic Surgery (RLS).

“ The partnership with Kinova will develop, implement, and validate a versatile control framework for a system of multiple Kinova robotic arms that simultaneously controls the configuration of multiple surgical arms while performing multi-robot collision avoidance inside and outside the abdomen.

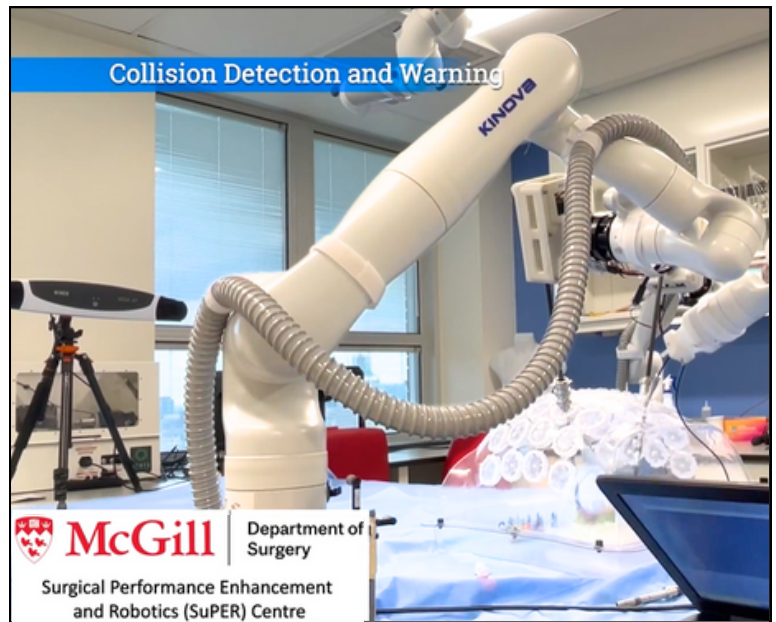


Dr. Amir Hooshier, Assistant Professor of Surgery at McGill University and specialist in medical devices development and haptics. ”

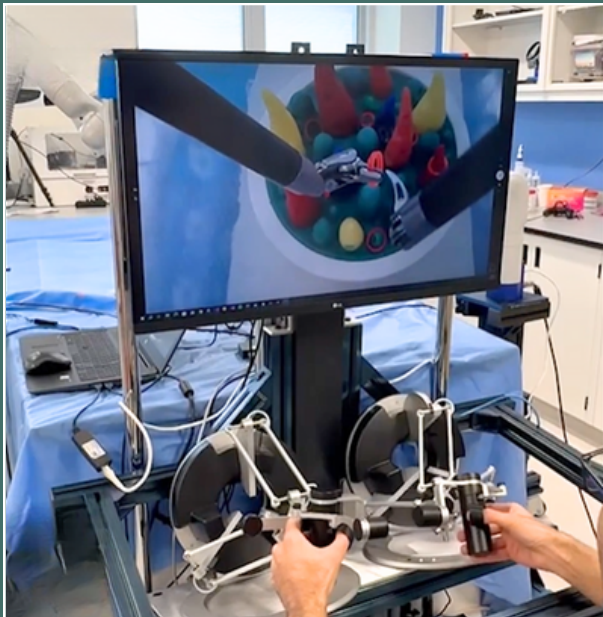


## Advancing Multi-Robot Control with Integrated Safety Features

The team has developed and validated a cutting-edge multi-robot control framework with built-in safety features that will empower Medical OEM's to easily integrate multi-robot platforms into hospitals and clinics. The research has involved the development of proprietary methods for AI-driven collision detection and avoidance and haptics rendering.



## Stable Haptic Feedback: Once a Dream Now, an Experience



Interestingly, haptic feedback has not been incorporated into existing Robotics in Laparoscopic Surgery (RLS) systems. The current method used for haptics rendering is the direct force reflection. However, it is not unconditionally stable and needs the surgeon to keep pushing back against the surgeon's interface's motion. With the team's proprietary methods, unconditionally stable haptic feedback has been added to the platform. This revolutionary approach has the potential to redefine robotic-assisted surgeries by introducing a stable and reliable haptic feedback system.

It positions the OEM to offer versatile "plug-and-play" robotic arms and controllers with minimal integration development for RLS systems, setting it apart from the competition.

## Shaping the Future of Robotic Surgery

The partnership between Kinova and the SuPER Centre of McGill University marks a significant advancement in robotic surgery. Through the development of a plug-and-play multi-robot surgical platform with advanced safety features and stable haptic feedback. This collaboration promises to simplify integration and enhance surgical capabilities. By offering OEMs versatile robotic arms with minimal integration requirements, Kinova is poised to revolutionize robotic-assisted surgeries, setting new standards for innovation in the field. This partnership represents a promising future for the advancement of robotic surgery and underscores the importance of interdisciplinary collaboration in driving technological progress.

“With Kinova's unique line of compact robots and market needs pushing for more complex systems, we are seeing a continuous increase for multi robot platforms. Our collaboration is set to address a recurrent challenge for those systems by developing multi robots control frameworks. This venture signifies our commitment to advancing surgical technology and providing plug-and-play solutions, shaping the future of medical robotics.”

—François Boucher, VP Business Development at Kinova



Kinova is a global leader in designing and manufacturing robot arm for various applications in the Industrial, Professional, Academic and Medical markets and for Assistive technologies. We have for mission to provide humanity with robots that empower them to achieve the extraordinary everyday.

**KINOVA**  
Together in robotics

