Robotic Surgery
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LapaRobot Summary
The LapaRobot System is a 5 DoF Master-Slave pair of robot manipulators that allows 2 users at different physical locations to perform interactive teaching (telementoring) and interactive learning in laparoscopic procedures, as well as cooperative telesurgery. In other words, the LapaRobot System allows less experienced or new surgeons to be taught and/or guided through laparoscopic procedures via a more experienced master surgeon.

LapaRobot Capabilities:
- Functions as a Fundamentals of Laparoscopic Surgery Evaluation Platform
- Remote Operation for Telesurgery/Telementoring
- Master-Slave Position Tracking, Force Estimation, Feedback, and Gravity Compensation
- Uses Commercially available Laparoscopic Tools that accepts Multiple End-Effectors
- Ergonomic and Mobile
- Can be used as a Joystick for other Surgical Manipulators and Robots

Intraocular Robotic Interventional & Surgical System (IRISS)
The IRISS surgical platform is capable of performing anterior and posterior surgical procedures via teleoperation and/or automation. The IRISS has the unique capability to manipulate two surgical instruments simultaneously through ocular incisions spaced millimeters apart. The large 6 DoF range of motion of the manipulator allows for both anterior and posterior surgical instrument positioning. To facilitate comprehensive surgical procedures, the IRISS can automatically alternate between multiple surgical instruments on each arm. Dedicated master surgical manipulators and microscope mounted cameras allow for 3-D teleoperated surgical visualization based commands. This configuration also lends itself to computer vision based intervention.

Conclusions
- Accuracy: Stabilizes the Surgeons Hand Motions and Hand Tremors
- Added Degrees of Freedom: End-Effectors can Articulate
- Scaled Motion Control: Scale Instrument Tool Motion
- Workspace/Range of Motion: Ability to Work in Much Smaller Work Areas with Increased Range of Motion, Remote Center of Motion
- Telesurgery: Provide Surgery at a Distance
- Teleoperation: Virtual Classroom for Novice Surgeons
- Automation: Tasks can be Performed Autonomously
- Reliability: Robots are Reliable/Robust and Save Time and Money

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