

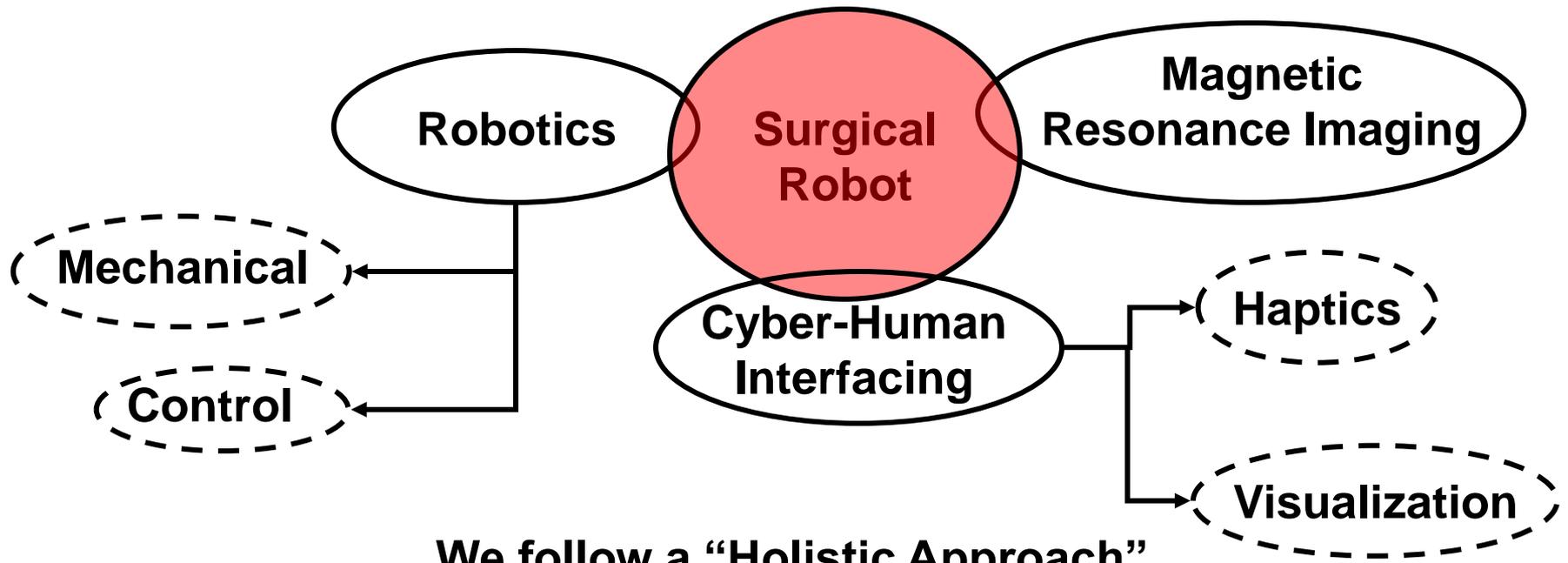
Image-guided and Robot Assisted Procedures

Nikolaos V. Tsekos

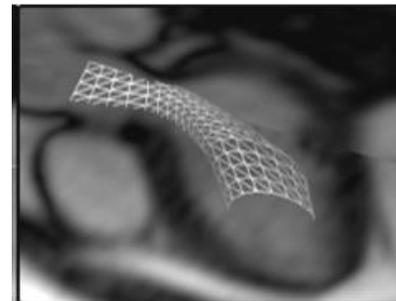
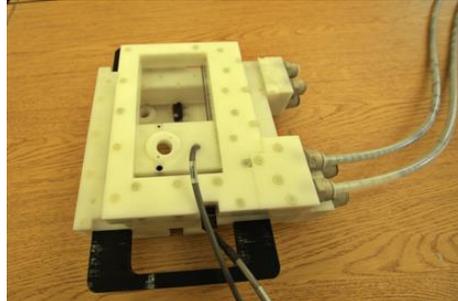
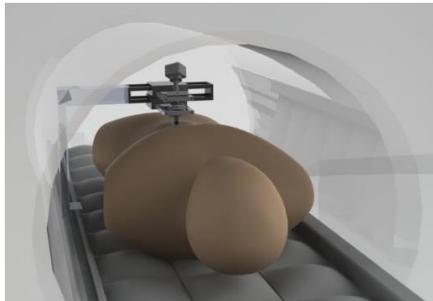
Image-guided and Robot Assisted Procedures



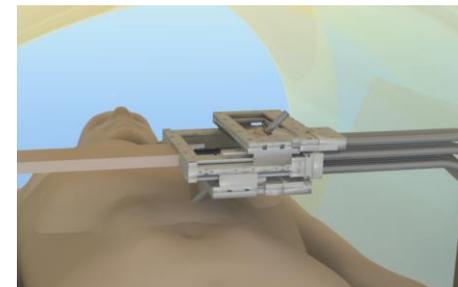
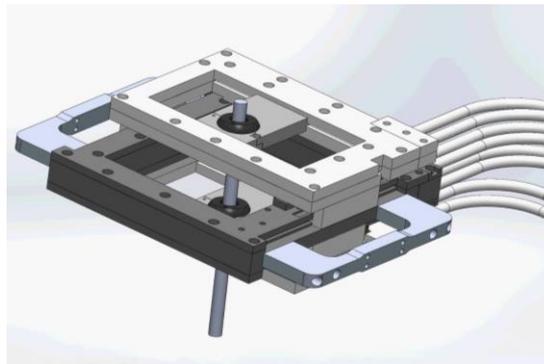
Image While Operating for improved patient outcome and cost-effectiveness



We follow a "Holistic Approach"



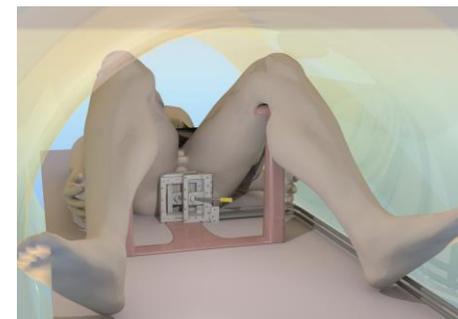
Innovative Robots for Surgeries Inside the MRI Scanner



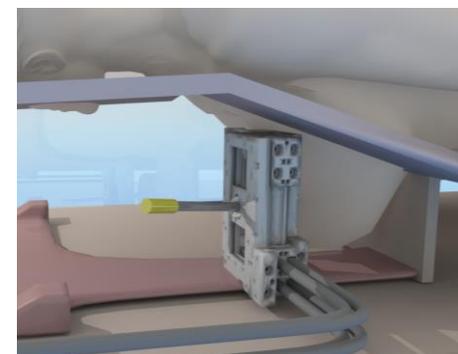
Abdomen



- One Robot Many Applications
- Leak-free
- Environmentally friendly
- Low cost
- Simple Control



Prostate Cancer



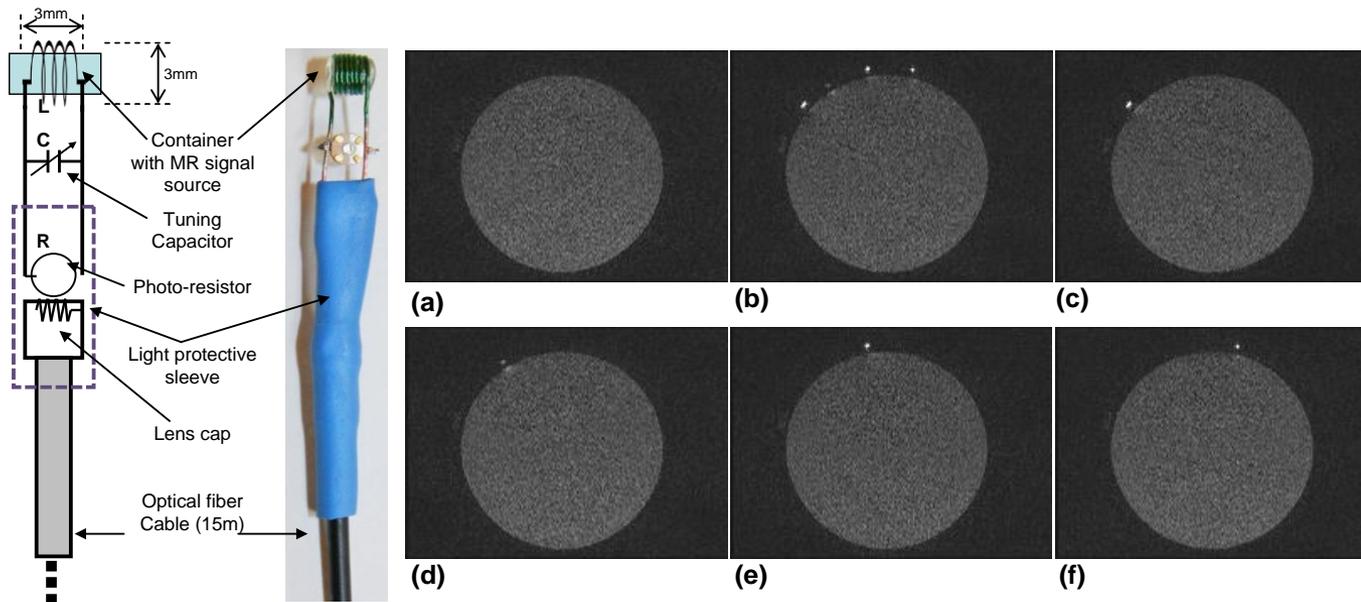
Breast Cancer

New MRI Methods: Generating Data On-the-Fly!



- Programming the MRI Scanner!
- Controlling What Data and How they are collected

CASE 1: The Robot “tells” the Scanner which Markers Need to be Folowed for its Unambiguous Tracking!



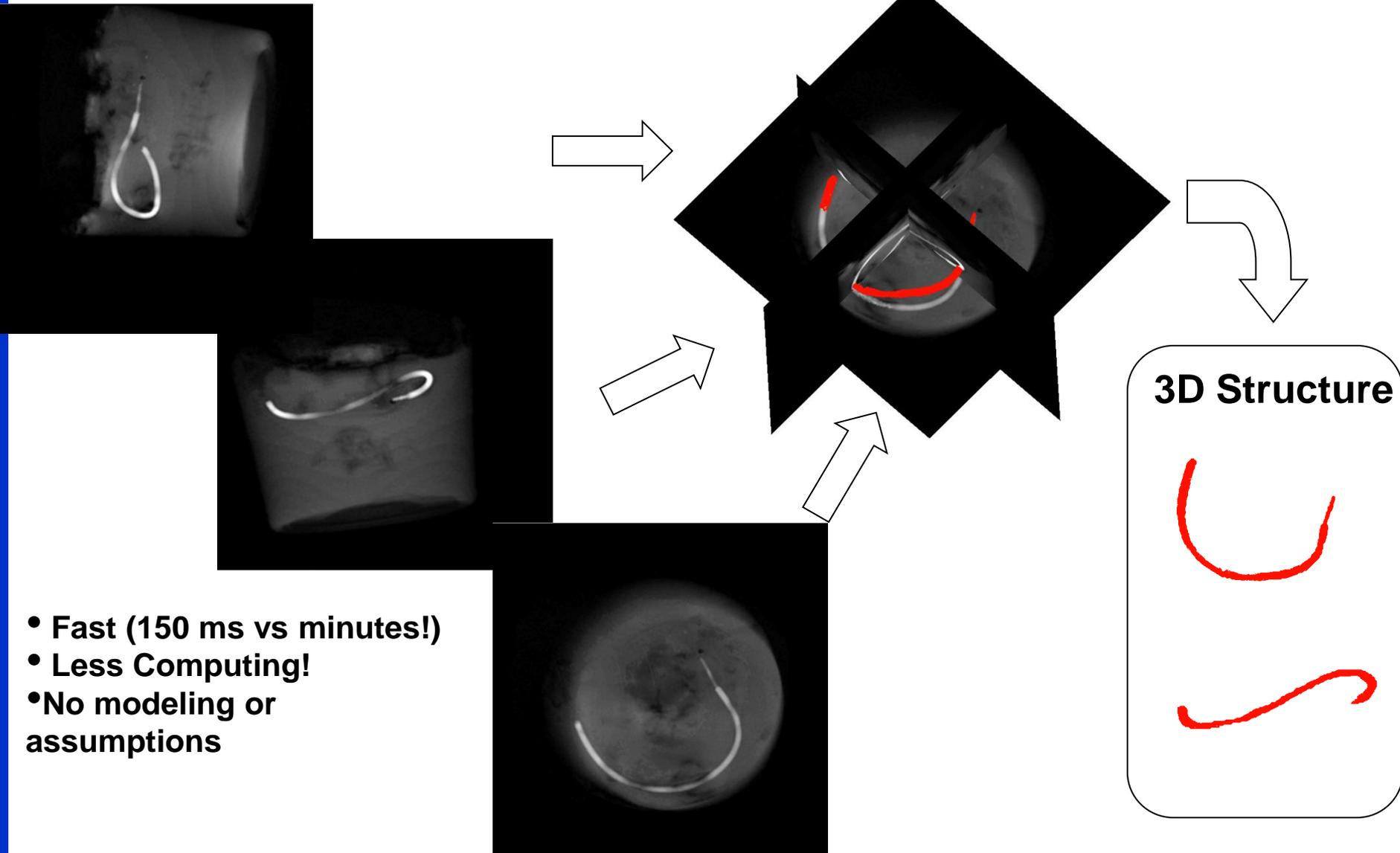
MRI visible markers that are turned ON and OFF from the robot control:

- Faster!
- Less Computing!

New MRI Methods: Generating Data On-the-Fly!



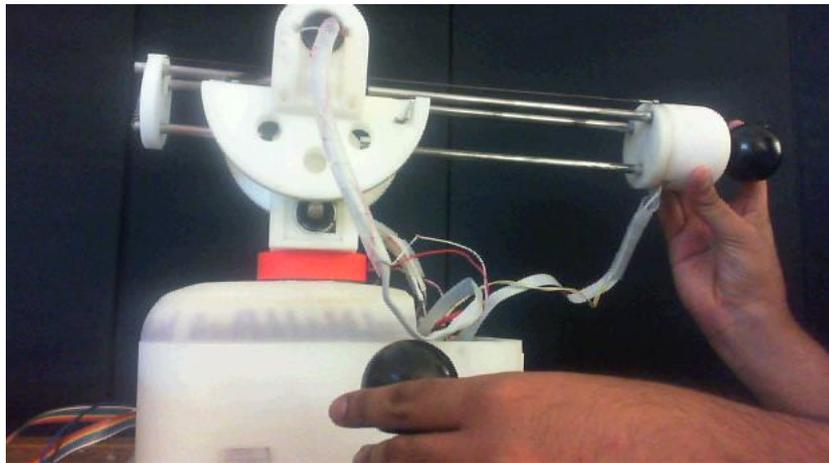
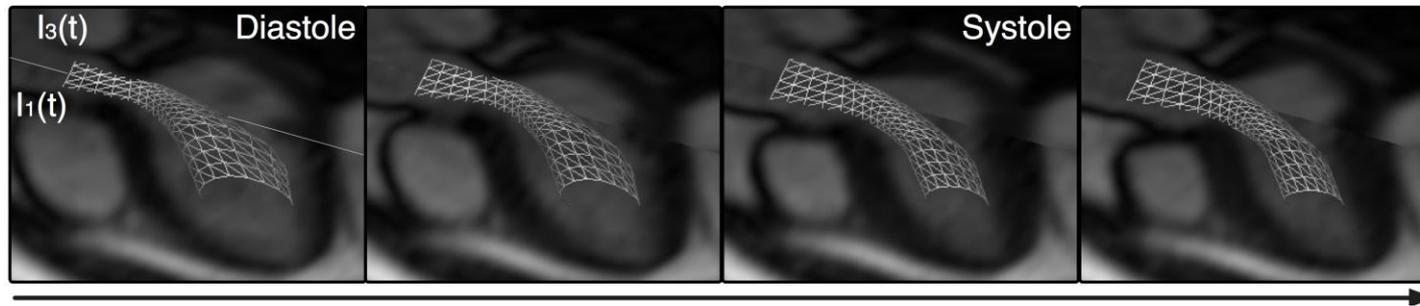
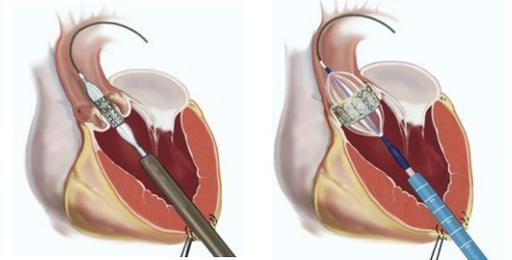
CASE 2: Real-time 3D MRI of Vessels and Catheters



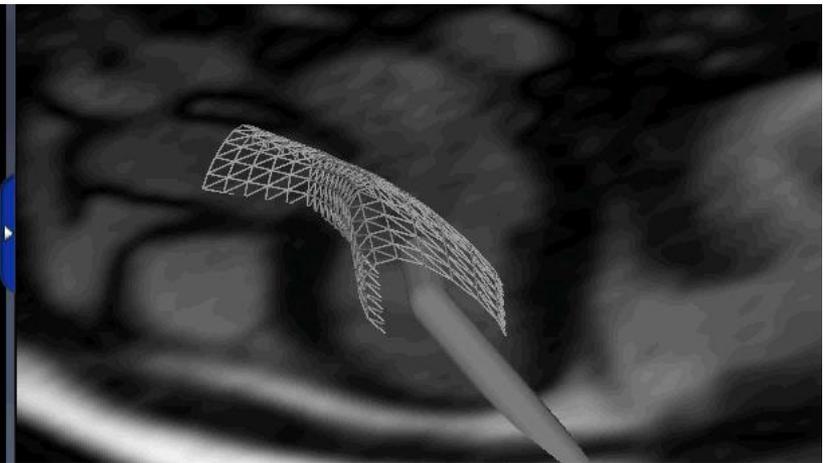
Interactive Robot Control with Real-time MRI



- Multi-thread & GPGPU implementation!
- Virtual Reality
- Haptics

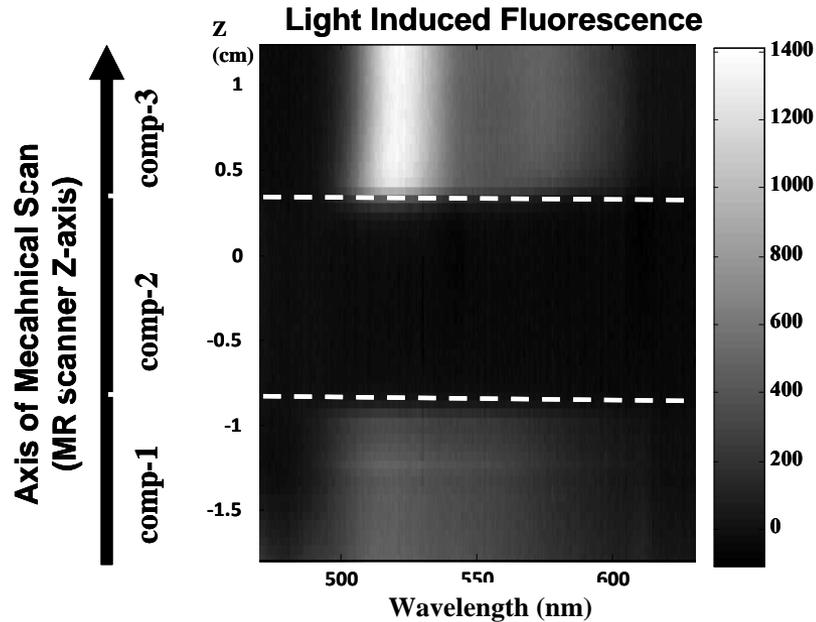
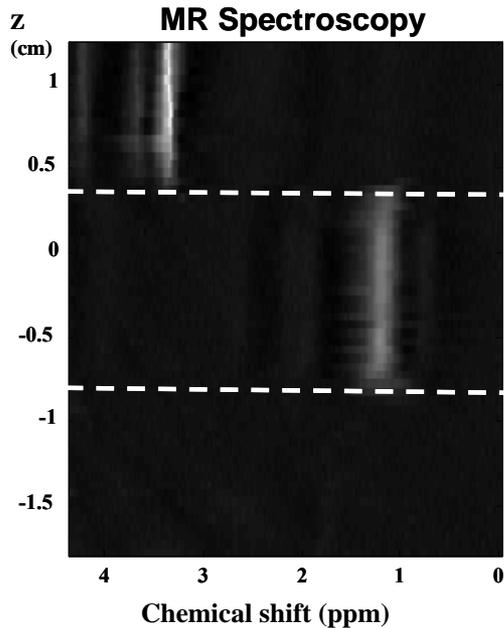
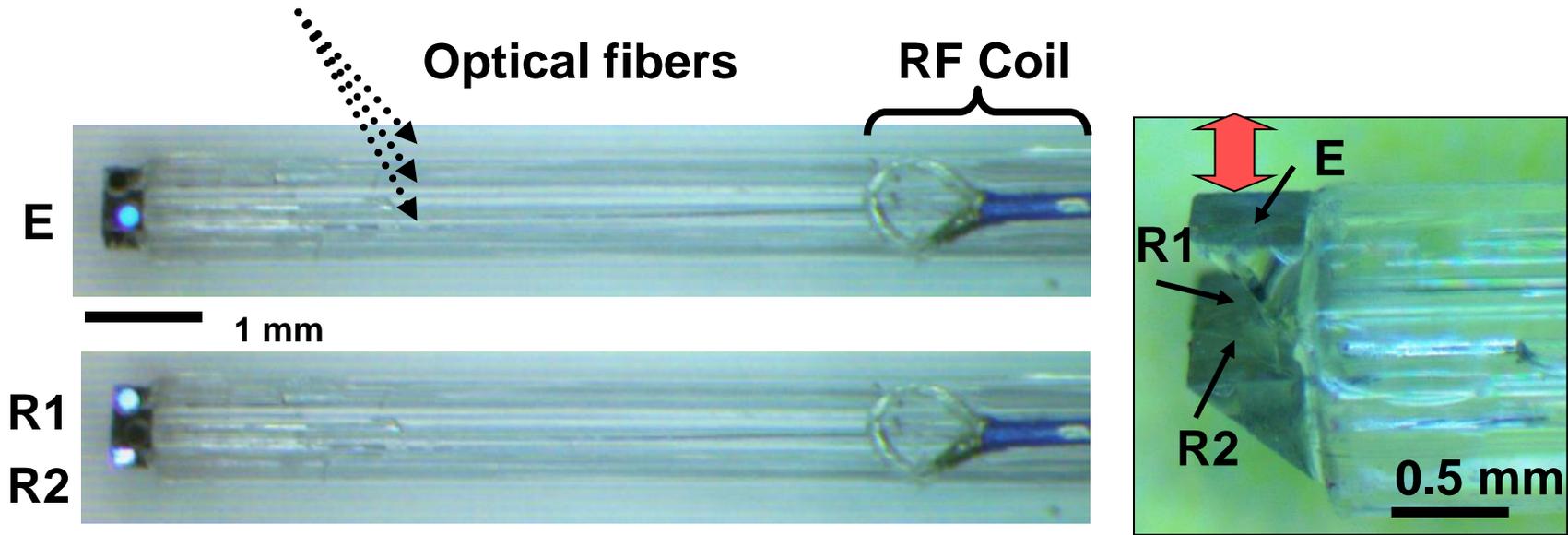


Force-Feedback Interface
(In-house developed 5 DoF)



Visualization Interface
(High Definition LCD)

Optical and MR Endoscopic Dual Probe



Light Reception: Light Emission:
Tissue Response Tissue Excitation

Available Positions for Graduate and Undergraduate Students

Email: ntsekos@cs.uh.edu

Web Site: <http://mrl.cs.uh.edu/Home.html>