The Biomedical Robotics research focus area is centered on the design, development, and evaluation of medical robotics systems and smart assistive robotic platforms that enhance the physical capabilities of both patients and clinicians via advancements in mechanical design, modeling and control, sensors and instrumentation, computing, and image processing. Core research topics in this area include medical robotics, haptic interfaces, machine learning, soft robotics, robot-assisted surgery and rehabilitation, tissue modeling, human augmentation, biomechanics, and human-robot interaction.

Biomedical robotics research innately draws from several disciplines including mechanical, biomedical and electrical engineering, interactive computing, applied physiology, and materials science, and is conducted in close collaboration with clinical partners at Emory and CHOA. Key areas of application and translation include feedback-enabled robotic surgery systems, robot-assisted caregiving, macro-meso-micro-scale image-guided surgical interventions, wearable devices for occupational training and injury prevention, and neurointegrated prosthetic devices.

Three main focus areas within Medical Devices & Robotics include Neural Computation & Neural Engineering, Cardiovascular Fluid & Solid Mechanics, and Cardiovascular & Surgical Devices.

The Department of Biomedical Engineering has a strong focus on designing devices that interface directly with the nervous system and the cardiovascular system. An overarching principle in this research area is that good design of medical devices must be based on a solid understanding of the basic science behind the organ system. Our research in this area thus spans everything from basic science and modeling through clinical application.