CHANGING THE WORLD

Through our integrated research and education programs, the Institute for Robotics and Intelligent Machines develops innovative solutions for areas such as manufacturing, healthcare, and autonomous systems. Using state-of-the-art facilities and working with strategic partners, IRIM improves society by investigating novel robotics technologies that enhance the lives of everyone.

Research

Emphasizing personal and everyday robotics, as well as industry and defense automation, our more than 70 faculty members and researchers define the future role of robots in society. The study of basic engineering problems is central to our work, but equally important is the integration of innovation and discoveries into real-world systems and applications. The exceptionally high quality of our programs, faculty, and laboratories positions IRIM as a global leader in robotics research.

Education

As an international leader in education, IRIM helped establish Georgia Tech’s Ph.D. program in robotics, the first interdisciplinary program of its kind that spans several engineering units and interactive computing. IRIM also engages in undergraduate education across all six of the Institute’s colleges and in K-12 outreach activities. We recruit and educate outstanding students who will provide future leadership in a world that is increasingly dependent on technology. Currently, more than 50 faculty members from various units across campus participate in robotics educational activities.

Tech Transfer

Advancements in robotics technology have enabled new applications in fields as diverse as manufacturing, logistics, healthcare, and many other commercial and consumer market segments. IRIM leverages the strengths and resources of research by transcending traditional boundaries and embracing a multidisciplinary approach to bringing useful innovations to market more quickly. Our commitment to innovation is evident in more than 30 laboratories performing robotics research.

TRANSFORMING THE NEXT GENERATION OF ROBOTS
DESIGNING ROBOTS TO EMPOWER PEOPLE

Our researchers develop the next generation of robots that will change the world.

Launching on November 4, 2012, the Institute for Robotics and Intelligent Machines (IRIM) evolved into an Interdisciplinary Research Institute (IRI), built upon the foundational work developed over the previous seven years in the former Robotics & Intelligent Machines Center at Georgia Tech.

IRIM brings together robotics researchers from across campus—spanning colleges, departments and individual labs—to create new collaborative opportunities for faculty, strengthen partnerships with industry and government, support robotics education, and maximize the societal impact of the transformative robotics research conducted at Georgia Tech.

Henrik I. Christensen
Executive Director, IRIM

Mechanisms
Research in mechanisms provides a better understanding of system dynamics, modeling, and control in various robotic systems, including unmanned autonomous vehicles, manipulators and hands, assistive and rehabilitation robots, biologically inspired systems, and human-robot interfaces. IRIM investigates innovative ways to improve interaction, intelligent sensing and actuation, and motion control.

Interaction
Human-robot interaction (HRI) research focuses on developing robots that can work cooperatively with people in dynamic human environments. Applications include building systems that are integrable, compatible with human partners, mechanical systems that account for human capabilities, and control systems that model interactions with humans. IRIM has a broad portfolio of projects in HRI.

Systems
IRIM explores both traditional and emerging fields of robotic system design and integration. We develop new technologies that allow robots to perform difficult and hazardous tasks, leading to improved human safety and reduced maintenance costs. Better-designed automated and computer systems provide economic benefits to all industries, including defense, manufacturing, healthcare, and biotechnology.

Artificial Intelligence (AI) & Cognition
Fundamental research in AI and cognition involves building autonomous agents that live and interact with large numbers of other intelligent agents, including humans, to accomplish tasks more efficiently and to respond to changing situations more efficiently. In the context of scalability, IRIM uses machine-learning techniques to model human behavior and develop new discovery, recognition, and planning techniques for intelligent machines.

Perception
With higher dexterity skills, robots can navigate in a more friendly fashion. Our work improves robot perception with reliable object detection, registration, and tracking techniques. Using continuously updated geometrical maps, as well as vision and laser sensors, IRIM experiments with new technologies that allow robots to gather data from different sensory inputs in order to create combined, purposeful perception.

Control
Precision control is vital to the success of robotic systems, enabling robots to move in safe, effective and predictable ways. IRIM explores new approaches to the challenges associated with placing human operators in robotic control loops, including better collaborative teleoperation, disturbance rejection, and collaborative locomotion. We focus on developing new methods for hybrid and behavior-based controls to improve coordinated sensing and actions.

IMPACT ON SOCIETY

Manufacturing
Robots play an integral role in keeping the U.S. competitive in the global marketplace and retaining more jobs for U.S. workers. From materials-handling to spot-welding and assembly tasks, robots increase productivity and efficiency. IRIM focuses on technologies that enable humans and robots to work side by side across all areas of manufacturing and in a wide variety of industries.

Healthcare
The growing older adult population has increased the demand for assistive technologies. IRIM investigates ways to improve health care by advancing the capabilities of mobile robots that provide physical assistance. Essential components of this research include providing people with independence in their daily lives and improving their quality of life through the use of robot technology.

Autonomy
Robots help preserve human lives in hazardous situations. They navigate through dangerous environments, provide critical communications, and deliver essential supplies. IRIM develops improved mobility, manipulation, and autonomous capabilities of robots used in disaster and emergency response, resulting in improved safety for first responders and greater potential to save lives.

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