**Title:** Rehabilitation in MRI via Pneumatically Driven Systems

**Abstract**
Magnetic resonance imaging (MRI) has been the flagship scanning technology for brain studies over the last two decades, by virtue of its spatial resolution and ability to monitor human soft tissue. In the recent years, there has been a growing interest in developing MRI-compatible robots to exploit MRI's capabilities for healthcare applications such as surgical operations and physical rehabilitation. Fluid-driven systems offer the ultimate MRI compliance as such systems can be built with non-ferrous materials; however, they are generally oriented for slow operations with large time constants. Rehabilitation, on the other hand, requires a relatively larger bandwidth for a stable human-robot interaction. This talk will focus on the recent developments at Georgia Institute of Technology towards the use of pneumatically driven tele-operated systems for stroke rehabilitation in MRI. The challenges in the tele-operation of the pneumatic actuators and novel approaches to mitigate the adverse effects of long transmission in pneumatic drive will be presented. The talk will conclude with a discussion on the potential of pneumatically driven systems in human-machine interaction and the corresponding challenges.

**Melih Turkseven** received his BS degree in Mechanical Engineering from Bogazici University in 2010, and Ph.D. degree in Mechanical Engineering from Georgia Institute of Technology in 2016. As a student member of the Center of Compact and Efficient Fluid Power (CCEFP), he has worked on the design and control of an MRI-compatible rehabilitation robot at the Bio-Robotics and Human Modeling Lab, Atlanta. Currently, he is a postdoctoral research associate at the Center for Modeling, Simulation, and Imaging in Medicine (CemSIM) at Rensselaer Polytechnic Institute. His research interests include human-robot interaction, and dynamic systems and control of compliant systems.