Biologically Inspired Soft Mechanisms in Robotics

April 4, 2014 | 10:30 AM | DeWalt Seminar Room, 2164 Martin Hall

**ABSTRACT:** Incredible biological mechanisms have emerged through evolution, and provide a wellspring of inspiration for engineers. One promising area emerging from biological inspiration is the design of mechanisms and robots made of compliant materials, as part of a larger field of research in “soft robotics.” In this talk, the topics of designing soft biologically inspired mechanisms will be presented in two case studies: mechanical adhesives and soft wearable sensors. Additionally, the talk will cover the methods of fabricating soft devices through 3D printing, soft lithography, and laser micromachining. Surfaces covered in arrays of micro-fibers, inspired by the toes of a gecko, rely on compliance to repeatedly and controllably adhere to almost any surface while simultaneously shedding dirt. Sensors made of liquid metal encapsulated in rubber as soft as skin can track motion of the human body while naturally moving with its kinematics. However, these exciting soft mechanisms have certain challenges. The biological mechanisms that serve as a source of inspirations are made of materials that are vastly more compliant than the metal and plastic that engineers and roboticists normally use. To imitate and improve on nature’s design, we must create mechanisms with materials like fabric and rubber.

**BIO:** Yiğit Mengüç works at the interface of mechanical science and robotics, creating soft mechanisms inspired by nature and applied to robotics. He received his B.S. (2006) in Mechanical Engineering at Rice University in Houston and his M.S. (2008) and Ph.D. (2011) in Mechanical Engineering at Carnegie Mellon University in Pittsburgh. He is currently a postdoctoral fellow in Harvard University’s School of Engineering and Applied Sciences and the Wyss Institute for Biologically Inspired Engineering.

For more information: Kim Frye (kfrye@umd.edu)