

Magneto-Acoustic Micro-Manipulation for Precision Microfactories

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Abstract

This talk will overview our work in manipulation of sub-millimeter size parts using a magnetic/acoustic microrobotic system. First, it will introduce our flexible magnetic microgrippers and ability to pick and place parts. Then, we combine the advantages of magnetic and acoustic micromanipulation methods to achieve three-dimensional, contactless, and semi-autonomous micromanipulation, with potential for full automation. Solid and liquid materials, with sizes less than 3 mm (down to 300 micrometers), are handled using acoustic levitation while an externally-applied magnetic field controls the orientation of magnetically active components. Characterization and demonstrations will be shown for difficult 3D microassemblies glued together from multiple components.

Biography

Dr. Eric Diller is an Assistant Professor in the Department of Mechanical and Industrial Engineering at the University of Toronto. He received his B.S. and M.S. in Mechanical Engineering at Case Western Reserve University, and Ph.D. at Carnegie Mellon University in 2013. His research is in non-invasive medical procedures, micro-factories and scientific tools. He uses magnetic fields and other smart-material actuation methods to make mobile functional devices. Dr. Diller has received the UofT Mechanical and Industrial Engineering Early Career Teaching Award, the UofT Connaught New Researcher Award, the Ontario Early Researcher Award, and the I.W. Smith Award from the Canadian Society for Mechanical Engineers.