NANO-TO-MICRO ROBOTICS

Session co-chairs: Sarah Bergbreiter, University of Maryland, College Park, and Samuel Sanchez, Max Planck Institute for Intelligent Systems

Richard Feynman was perhaps the first to mention the idea of small-scale robots in his 1959 lecture, ”There’s Plenty of Room at the Bottom,” in which he described the possibility of tiny hands building even tinier hands. Applications for robots smaller than millimeters in size include medicine, manufacturing, and search/rescue. However, mobile robots and robotic assembly at these size scales must overcome many challenges related to their fabrication, control, and power delivery. For example, when moving into fluids, surface forces at these scales become dominant over inertial forces that dictate robot design at larger dimensions leading to new requirements for swimming robots that can be used in biological applications. Manufacture of nanoscale functional objects is also extraordinarily challenging leading to the adaptation of biological constructs like DNA and molecular motors for nanorobotics.

The first half of the session will focus on nanoscale robotics and assembly – specifically molecular motors as a potential driver for nanorobots and DNA origami for assembly of nanoscale objects. The second half will focus on microscale robotics and will include both robotic structures at micron- and nano-scales as well as microfabricated robotic components approaching millimeter scales.

The speakers represent both top university and research lab experience.