Miniature Crawling Robots

Abstract: Miniature crawling robots, on the order of centimeter scale and below, have a variety of applications including medical procedures, search and rescue operations, maintenance, reconnaissance, environmental monitoring, assisted agriculture, cave exploration, mapping, studying biological organisms, security, defense, exploration of hazardous environments. Their small size allows them to navigate in remote areas otherwise inaccessible to wheeled or larger robots such as collapsed building and caves and biological vessels, while their low cost makes them disposable and allows their use in large quantities and swarm formations. As miniature crawling robots at this scale are under-actuated are achieving stability at high velocities over varying terrain, reducing the cost of transport, overcoming obstacles, controlling jumping and landing, adhering quickly to different surfaces, transitioning between horizontal to vertical motion, and climbing.

This talk will address some of the modeling and actuation challenges of crawling robots inside biological vessels and outdoors, while taking into account contact compliance and sliding.

Biography: David Zarrouk is currently a Lecturer at the ME depart of BGU. He received his M.S. (2007) and Ph.D (2011) degrees from the faculty of mechanical engineering at the Technion. Between Aug. 2011 and Oct. 2013, he was postdoctoral scholar at the Biomimetics and Millisystems Lab. in the EECS dep. of U.C. Berkeley, working on miniature crawling robots. His research interests are in the fields of biomimetics, millisystems, miniature robotics, flexible and slippery interactions, underactuated mechanisms and theoretical kinematics. He received many prizes for excellence in research and teaching, which include a **Fulbright** postdoctoral Fellowship**, Fulbright**-**Ilan Ramon** postdoctoral Fellowship, **Hershel Rich** Innovation award, **Aharon and Ovadia Barazani** prize for excellent Ph.D. thesis, and **Alfred and Yehuda Weisman** prize for consistent excellence in teaching.