

מיקרו מערכות, רובוטים ומערכות חישה בהשראת הטבע

## Bio-inspired micro systems, robots and sensing systems

One of the emerging fields in robotics in recent years is bioinspired and biomimetic robotics. Nature's solutions for challenging systems in robotics, such as swimming micro robots, a miniature robot in unstructured environment and sensing system for mobile robot is intriguing and often overwhelms our capabilities.

In the RBM<sup>2</sup>S laboratory, ME, TAU in collaboration with the department of zoology we are developing several robotic projects that are using bioinspired principles. We are developing swimming actuators that are inspired by the spermatozoa's swimming patterns, a miniature jumping/gliding robot inspired by the desert locust and an agricultural mobile robot with air sonar inspired by bats' echo-location and classification abilities.

In this presentation we will present microrobots, microsystems, robots and sensing systems inspired by nature. We developed swimming micro robots based on piezoelectric and magnetic actuation principles, a particle manipulating system replacing optical trapping, a miniature jumping gliding robot, an agricultural robot using sonar sensing and a multimodal mobile robot for indoor SLAM.

Based on the lessons learned from nature the recent advances in these systems will be presented.

**Gabor Kosa** Born in 1972 Szatmar-Nemeti, Transylvania, Romania. He received his B.Sc. degree cum laude in mechanical engineering from the Technion in Haifa, Israel in 1995. From 1995 to 1998, he served in the Israel Defense Force (IDF) as a research engineer. In 2001, he received his M.Sc. degree in non-linear dynamics and control from the Technion. He was employed in RAFAEL, the Armament Development Authority, in Haifa from 2000 to 2001 as a research and development engineer of MEMS. He received his Ph.D. in the field of micro-robots for medical application from the Technion in 2007. He was post-doc in the Computer Vision Laboratory in ETH Zurich, Switzerland working on novel sensing for haptics, swimming micro robots, leading the biomedical micro systems group. Currently he is senior lecturer at the School of Mechanical Engineering in Tel Aviv University and head of the laboratory of Robots and BioMedical Micro Systems (RBM2S) and the Education Robotics Laboratory (ERL). His research projects are in the field of Micro Systems and Micro Robots for biomedical applications, Medical Robotics, Bio Inspired Sensing Systems and Robots. His expertise is in micro robotics, sensing and actuation, micro fluidics, piezoelectricity, dynamics and control.