Date: April 27, 2026

Speaker: Prof. Bat-El Pinchasik, School of Mechanical Engineering, Faculty of Engineering, Tel Aviv University, Center for Physics and Chemistry of Living Systems, Tel-Aviv University

Time: 10:10-11:00

Location: Nano Building 51, seminar room 015

Title: Insects Inspired Robotics

Abstract:

Insects are remarkable engineers. Small, tough, and highly capable, they have spent hundreds of millions of years solving problems that still challenge modern robotics. Various small animals, specifically insects, are subjected to interfacial forces, dominant at scales of a few millimeters and weights of up to a few grams. Specifically, capillary forces generated at interfaces between liquids and solids in air or between gas bubbles and solid surfaces underwater. These forces may be deadly for small insects. However, they can be also used for propulsion and locomotion and help insects and other animals survive. The ability to control forces at interfaces opens many opportunities to mimic natural systems and miniaturize robots. Therefore, new materials, propulsion and adhesion mechanisms are needed.

This talk is about the conversation between biology and robotics, and how it runs in both directions. We build robots inspired by insects. But we also use those robots to better understand the insects themselves. When a robot fails to move the way a real insect does, that failure points us back to something we had missed in the biology. I also discuss what gets lost, and what gets gained, when we simplify biology into engineering.

Bio:

Bat-El Pinchasik is a professor at the School of Mechanical Engineering, Tel Aviv University, where she leads the Biomimetic Mechanical Systems and Interfaces Lab since 2018. Her research sits at the intersection of biology and engineering, drawing on insect biomechanics, wetting and interfacial phenomena, and the science of surfaces to design bio-inspired materials and robotic systems. She received her B.Sc. in Materials Engineering and Physics from the Technion – Israel Institute of Technology, followed by an M.Sc. in Polymer Science through a joint program between the University of Potsdam and the Max Planck Institute of Colloids and Interfaces, Germany. She completed her Ph.D. at the same institute, working across the Departments of Interfaces and Biomaterials, before joining the Max Planck Institute for Polymer Research in Mainz as a postdoctoral fellow in 2015.