Prof. Oded Millo
Racah Institute of Physics, The Hebrew University of Jerusalem

I did my Ph.D. thesis at the Hebrew University of Jerusalem. My research (combined experiment and theory) focused on electronic excitations at metallic surfaces. Then I moved to Yale University, where I performed my post-doc research in the field of mesoscopic physics, studying ‘Universal Conductance Fluctuations’ in diffusive 2D-electron systems and quantum-chaos signatures in the conductance of ballistic ‘chaotic billiards’ defined in the 2D electron gas.

After joining the Racah Institute of Physics (at the Hebrew University) as a faculty member in 1993, my research interests moved to hybrid superconductor, nanostructured semiconductor and composite-material systems, and more recently to solar-cell materials. The investigations in superconductivity address the phase-diagram of the cuprate high-temperature superconductors, and proximity effects in superconductor/nanoparticles hybrids and superconductor/ferromagnet bilayers, where we find evidence for induced triplet-pairing superconductivity. Our studies of nanostructured semiconductors span form the electronic level structure of individual nanocrystals to the (photo)transport properties of their assemblies. In metal-insulator nano-composites we treat fundamental issues such as the emergence of a percolation-like transition in the tunneling-transport regime. Finally, we also investigate polycrystalline CIGSe films in order to understand why solar-cells prepared with them as absorbers outperform their single-crystal counterparts.

A unique aspect of our research is that we combine various local-probe methods, mainly scanning tunneling microscopy and spectroscopy and various AFM-based techniques, with ‘global’ transport, optical and magnetic measurements. This combination is highly effective for studies of nanostructured and non-homogeneous materials and can provide deep insight into the microscopic origin of the global behavior of such complex systems.