Micro Robotics and Its Application in Bio Science

Our micro robotics covers dexterous high speed micro manipulation, micro assembly, cell characterization, and 3D cellular system construction [1]. The basic idea is to devise and to utilize dexterous two finger micro hands, and to achieve total micro manipulation system with high speed vision and interfaces for bio applications. Our system is multi-scalable and can manipulate micro object with the size ranging from one to hundreds micron meters seamlessly. Our constant system improvement and refinement have achieved wide range of workspace with real time 3D information, simple finger setting-up procedure, fine force sensing capability as well as automated calibration, automated picking-and-placing, etc. Based on these activities and our collaboration experiences with biologists and medical doctors we launched 5 year national project on “Bio Assembler” in 2011, whose target is a challenge of constructing 3D cellular system or tissues in vitro [2]. The major topics are high speed cell characterization & sorting, 3D cellular system construction, and cell functionalization analysis. Currently 34 research groups join the consortium and work together in the internal and/or external research collaborations to achieve bio innovation.


Short Bio: received B.S., M.S. and Ph.D. degrees from the University of Tokyo in 1975, 1977, and 1986 respectively. He moved to Osaka University in 1997 and since then he has been a full professor at Graduate School of Engineering Science, Osaka University, Osaka, Japan. His current research topics are mechanism design including parallel mechanisms, legged working robot, micro robotics for bio applications, humanoid robot, haptic interface.