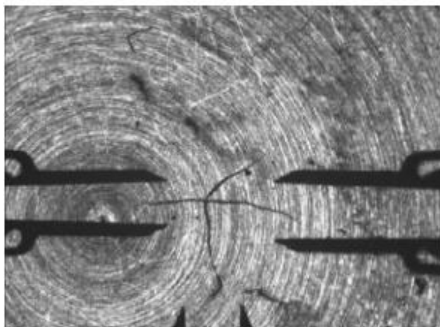
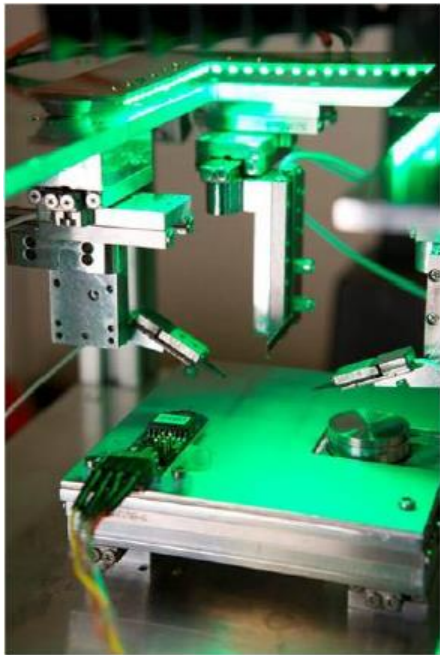


Pasi Kallio “Automatic Microrobotic Systems in Mechanical Characterization of Micro-scale Biomaterials”

The talk will give an overview of Prof. Kallio’s research activities on automatic microrobotic systems in mechanical characterization of micro-scale biological objects. Testing mechanical properties of micro-nanoscale materials has experienced a significant increase in importance with the development and industrialization of micro-nanodevices. This is evident in a recent survey on this field, where as many as 600 papers published since 1920 were investigated (Pantano et al. 2012). According to the survey, more than 70% of the papers have been published in the last decade. In addition to testing materials in micro- and nanodevices, interests in characterizing biological materials at micro- and nanoscales have increased with the improved testing devices. Micro- and nanorobotic manipulation systems refer to devices which extend



the human capabilities into micro- and nanoscales. In addition to applications in assembly and manufacturing applications, microrobotic manipulation systems have demonstrated their capability in manipulation and characterization of living cells and other biomaterials. In the first part of this talk, we will focus on microrobotic characterization of fiber materials which have importance in manufacturing industry such as paper making. In the second part, we will move to cell mechanobiology and discuss micromechatronic systems developed for cultivation and mechanical stimulation of bone and heart cells. These cells have been derived from human stem cells and the goal is to enhance the differentiation to the desired cell type.



Pasi Kallio is a Professor of Automation Engineering at Tampere University of Technology (TUT), Tampere, Finland. He received his M.S. degree in electrical engineering and the D.Tech. degree in automation from TUT in 1994 and in 2002, respectively. Currently, he leads Micro- and Nanosystems Research Group in the Department of Automation Science and Engineering. Prof. Kallio has more than 90 international referee papers and twelve patent applications. He is also a founder member of one spin-off company. Prof. Kallio’s main research interests include microrobotics and microfluidics, and their application in the development of automatic systems for cell manipulation, paper fiber characterization and medical diagnostics.

Top: Microrobotic platform. **Bottom:** fiber bond characterization