MEMS
Organizers & Chairs: Peter Will, Bradley J. Nelson

MEMS and Robotics: Promises and Problems
Peter Will
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3D Viewpoint Selection and bilateral Control for Bio-Micromanipulation
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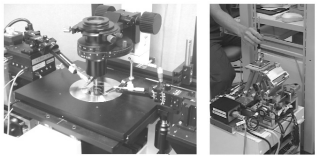
[1]Nagoya University and [2]Tokai Rika Co

- The image of the microscope is two dimensional, so it is hard to manipulate the biological small target in the 3D space. The object is fragile, so it is hard to manipulate safely.
- We propose a viewpoint selection method in the VR space, and a new bilateral control system using a micro tri-axial force sensor to improve manipulation of the micro object under the microscope.
- We were able to feel the strength of the cell in x, y, and z direction. It is the fist achievement in the teleoperation of the biological small object to demonstrate the real 3D bilateral control.
- We developed the bilateral 3D bio-micromanipulation system. We improved the operability by the free viewpoint selection strategy and bilateral control.



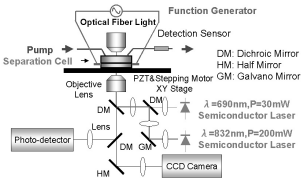
(a) 3D Bio-micromanipulator (b) Master Manipulator

Bilateral 3D Bio-Micromanipulation System

Track-following Controller Design of MEMS Based Dual-stage Servos in Magnetic Hard Disk Drives
Yunfeng Li and Roberto Horowitz
University of California, Berkeley

Issues in Precision Motion Control and Microhandling
Hannes Bleuler, Reymond Clavel, Jean-Marc Breguet and Eric Pernette
Institute of Robotic Systems - EPFL

- Small devices for precision position control & microfactory
- Size of the devices: Between MEMS and
- Piezo-actuators, SMA micro gripper, Micro Discharge Machining
- Closed loop control is a must for precision applications



Bilateral Laser Scanning Manipulation System

Micropart Feature Design for Visually Servoed Microassembly
Bradley J. Nelson and Bharath Mukundakrishnan
University of Minnesota