

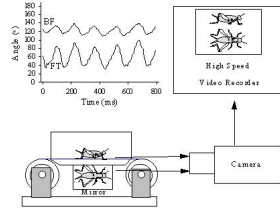
## Micro Robots

### Chairs: Fumihito Arai, Il Hong Suh

#### Biomechanics and Simulation of Cricket for Microrobot Design

S. Laksanacharoen, A. J. Pollack, G. M. Nelson, R. D. Quinn and R. E. Ritzman  
Case Western Reserve University

- Biologically based microrobot design
- High-speed video analysis of cricket leg structure and movement
- Derivation of three dimensional patterns of leg movements
- Simplification of animal legs for robot maintaining jumping and walking locomotion capability

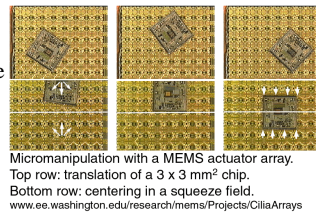


#### Fully Programmable MEMS Ciliary Actuator Arrays for Micromanipulation Tasks

J. W. Suh<sup>1</sup>, R. B. Darling<sup>2</sup>, K. F. Bohringer<sup>2</sup>, B. R. Donald<sup>3</sup>, H. Baltes<sup>4</sup> and G. T. Kovacs<sup>1</sup>

<sup>1</sup>Stanford University, <sup>2</sup>University of Washington, <sup>3</sup>Dartmouth College and <sup>4</sup>ETH Zurich

- Manipulation with individually addressable MEMS actuator arrays
- Integrated CMOS and polyimide thermal bimorph actuators
- Distributed manipulation with programmable force fields
- Complex manipulation tasks: positioning, orienting, ...



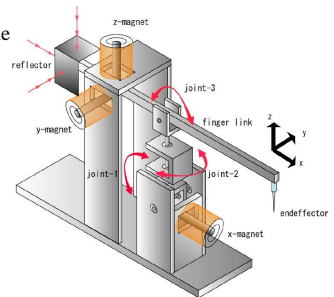
#### The Effect of Material Properties and Gripping Force on Micrograsping

Yu Zhou and Bradley J. Nelson  
University of Minnesota

#### A Micro Operation Hand and its Application to Microdrawing

Tatsuya Nakamura, Yoshiyuki Kogure and Koichiro Shimamura  
Tokyo Metropolitan University

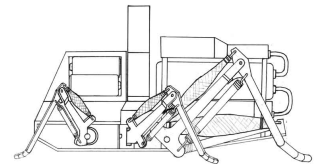
- Development of Force-Controllable Micro-Operation Hands
- Use of Magnetic Suspension Technology
- Applied to Micro Drawing Using One Finger Subsystem
- Characteristics of the System were Analyzed



#### Design of a Cricket Microrobot

M. C. Birch, R. D. Quinn, C. Hahm, S. M. Phillips, B. Drennan, A. Fife, H. Verma and R. D. Beer  
Case Western Reserve University

- Design a two-inch robot that can walk and jump.
- Use cricket for inspiration in the robot's design.
- Control of prototype rear leg was successful.
- Technologies needed for robot have been tested.



#### Planning a Microassembly Task in a Flexible Microrobot Cell

Sergej Fatikow, Airat Faizullin and Jorg Seyfried  
University of Karlsruhe

- Microrobot-based assembly of hybrid microsystems
- Bottom-up assembly planning using specific criteria
- Assembly planning of the worldwide smallest micromotor
- Automation of microassembly by flexible microrobots

