

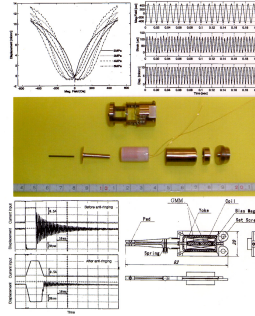
## Actuators 2

### Chairs: Howie Choset, Yoshio Yamamoto

#### Micro Positioning and Actuation Devices Using Giant Magnetostriction Materials

Yoshio Yamamoto<sup>1</sup>, Takaaki Makino<sup>2</sup> and Hiro Matsui<sup>2</sup>  
<sup>1</sup>Tokai University and <sup>2</sup>Moritex Corporation

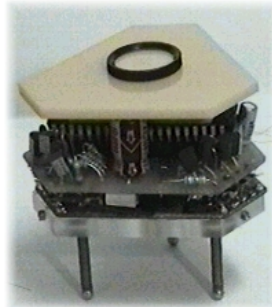
- Novel applications of Giant Magnetostriction Materials
- Self-sensing and thermal compensation mechanism
- Design optimization via FEM analysis
- Micro positioning and wire clamping



#### Development of Platform for Micro-Positioning Actuated by Piezo-Legs

L. Juhas, A. Vujanic, N. Adamovic, L. Nagy and B. Borovac  
 University of Novi Sad

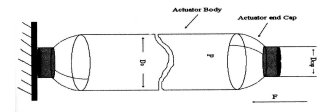
- In this paper we present the design and testing results of a simple platform for micropositioning.
- The platform has three legs, and can move freely over the supporting surface.
- With the onboard control electronics, translation, as well as complex planar motion can be achieved.
- With its practically unlimited range of motion and the simultaneous possibility of highly precise positioning, the present platform performances represent a good basis for whole spectrum of laboratory and industrial applications.



#### Improved Modelled and Assessment of pneumatic Muscle Actuators

N. Tsagarakis and D. G. Caldwell  
 University of Salford

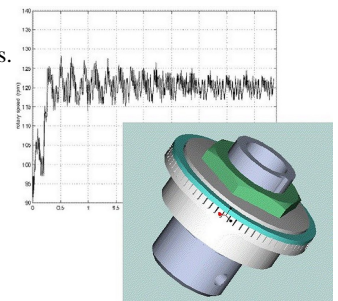
- Modelling of Bio-mimetic pneumatic Muscle Actuators.
- Improved prediction of forces and displacements
- Comparison of theoretical and experimentation using ultra large actuators
- Better planning of designs and assessment of performance requirements



#### A ZPET-Repetitive Speed Controller for Ultrasonic Motors

H. Rodriguez, J. L. Pons and R. Ceres  
 Consejo Superior de Investigaciones Cientificas, Spain

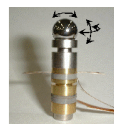
- To Reduce the Speed Ripples of Rotary Piezoelectric Motors.
- Zero Phase Error Tracking with Repetitive Control is used.
- Results: A 77
- Fair Control of Ripples but still Room for Improvement.



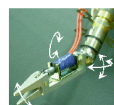
#### Characteristics of an Ultrasonic Motor Capable of Generating a Multi-Degrees of Freedom Motion

Kenjiro Takemura and Takashi Maeno  
 Keio University

- Multi-DOF actuators are effective for dexterous robots.
- A multi-DOF ultrasonic motor is constructed using three natural vibrations of the stator.
- Driving and control characteristics of the multi-DOF ultrasonic motor are measured.
- The multi-DOF ultrasonic motor is applied to the multi-DOF forceps for a laparoscopic surgery.



Multi-DOF ultrasonic motor



Multi-DOF forceps for laparoscopic surgery

#### Closed-Loop Operation of Actuator Arrays

J. E. Luntz, W. Messner and H. Choset  
 Carnegie Mellon University