

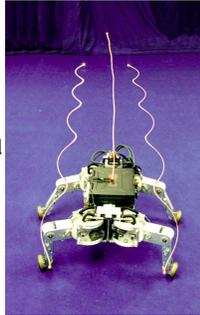
## Novel Locomotion Techniques

### Chairs: Arthur Sanderson, M. Uchiyama

#### Study on Roller-Walker (Multi-mode Steering Control and Self-contained Locomotion)

Gen Endo and Shigeo Hirose  
Tokyo Institute of Technology

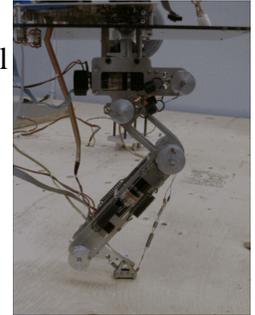
- Leg-Wheel Hybrid Vehicle with Passive Wheels
- Proposition of Basic Motion Control Method
- Velocity Simulations and Experiments
- Wireless Maneuvering Experiments



#### Low-Energy Control of a One-Legged Hopping Robot with 2 Degrees of Freedom

R. Dummer and M. Berkemeier  
Utah State University

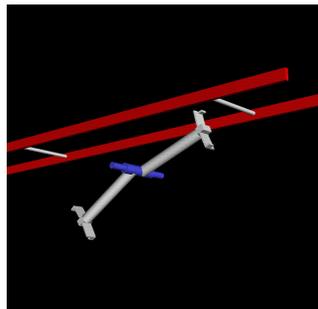
- Biologically Inspired Model
- Forward Hopping Analysis
- Poincare Return Map
- Experimental Results



#### A Leaping Maneuver for a Brachiating Robot

J. Nakanishi and T. Fukuda  
Nagoya University

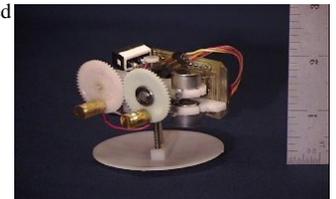
- Investigation of the leap problem.
- The task of transferring from a branch to the next which is far out of reach involving a component of free flight.
- Formulation of swing and flight control strategies for a two-link robot to achieve such a leaping maneuver.
- Numerical simulations suggest the effectiveness of the proposed strategy.



#### Design of a 5cm Monopod Hopping Robot

T. E. Wei, G. M. Nelson, R. D. Quinn, H. Verma and S. L. Garverick  
Case Western Reserve University

- Fully Autonomous Single-Legged Hopping Robot
- Fits Entirely Into a Cube 2
- Able to Climb Steps
- Statically and Dynamically Stable

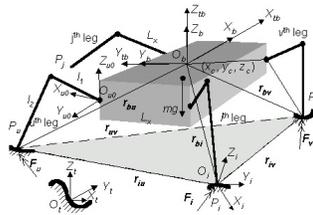


#### Stability Analysis of Walking Robots via Leg-end Supporting Moments

D. Zhou<sup>1</sup>, K. H. Low<sup>1</sup> and T. Zielinska<sup>2</sup>

<sup>1</sup>Nanyang Technological University and <sup>2</sup>Warsaw University of Technology

- To measure the stability margin of walking robots
- Leg-end Supporting Moment (LSM) method
- With and without external body forces on various terrain
- Capable for drilling, dragging and manipulating



#### Dynamic Rolling of Modular Robots

W. H. Lee and A. C. Sanderson  
Rensselaer Polytechnic Institute

- Active shape-induced rolling
- Dynamic models of tipping, rolling, and impact
- Active rolling control simulation of rolling Tetrobots
- Execution of the continuous rolling locomotion

