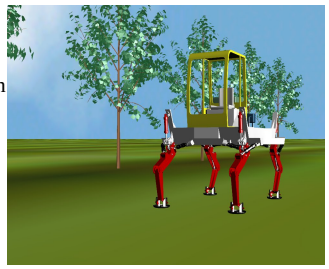
Mechatronics
Organizers & Chairs: Manfred Hiller, Okyay Kaynak

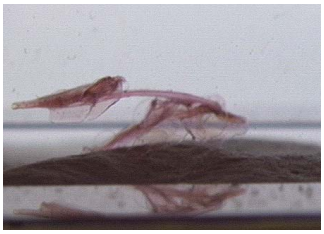
An Overview of Mechatronics
Manfred Hiller
Gerhard-Mercator-Universitt-Duisburg

- Large Scale and Heavy Mobile Manipulators in Unstructured Terrain
- Design, Modelling and Simulation as Mechatronic Systems
- ALDURO: Anthropomorphically Legged and Wheeled Duisburg Robot
- Virtual Prototyping for a wide Class of Heavy Manipulators



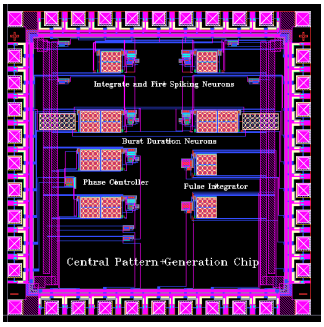
Kinematics of Gel Robots made of Electo-Active Polymer PAMPS Gel
M. Otake, M. Inaba and H. Inoue
The University of Tokyo

- To control elastic robots made of ionic gel
- Kinematic model based on chemical reaction
- Simulation and experimental deformation of the gel
- Applicable to various shapes of the gel and various types of the electric field



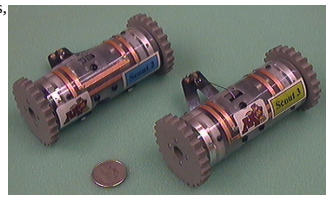
Toward Biomorphic Control Using Custom aVLSI CPG Chips
M. A. Lewis[1], R. Etienne-Cummings[2], A. H. Cohen[3] and M. Hartmann[4]
[1]Iguana Robotics, Inc.,[2] John's Hopkins University,[3] University of Maryland, and [4] CA. Institute of Technology

- Future robots will need powerful, miniature controllers.
- An adaptive CPG chip was designed following biological principles.
- Chip was used to control an under-actuated, running robot leg.
- Successful 1st demonstration of robotic control using an adaptive CPG chip.



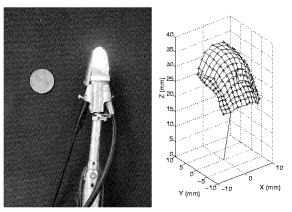
A Miniature Robotic System for Reconnaissance and Surveillance
D. F. Hougen, S. Benjaafar, J. C. Bonney, J. R. Budenske, M. Dvorak, M. Gini, H. French, D. G. Krantz, P. Y. Li, F. Malver, B. Nelson, N. Papanikolopoulos, P. E. Rybski, S. A. Stoeter, R. Voyles and K. B. Yesin
University of Minnesota

- The objective is to construct a miniature robot that can roll and hop.
- Several sensors (e.g., video, magnetometers, tiltmeters, etc.) were integrated along with two CPUs and various communication units in each robot. The robot is 110mm long and 40mm wide.
- The robot can clear various obstacle courses and its jump has an average height of 200mm.
- It is a powerful design with a lot of potential.



The performance of a deformable-membrane tactile sensor:basic results on geometrically-defined tasks
Dimitris Hristu[1], Nicola J. Ferrier[2] and Roger W. Brockett[3]
[1]University of Maryland, [2]University of Wisconsin and [3]Harvard University

- Rigid, force-sensing devices are not well suited for the study of manipulation tasks.
- A deformable sensor, capable of estimating the shape of the tactile surface.
- Quantitative assesment: a battery of generally-applicable tactile sensing experiments.
- Numerical statements defining contact localization, spatial resolution, curvature discrimination.



PolyBot: a Modular Reconfigurable Robot
Mark Yim, David G. Duff and Kimon D. Roufas
Xerox Palo Alto Research Center

- N-modular systems may be versatile, robust and inexpensive
- PolyBot is 2-modular with up to 32 modules built (so far)
- Demonstrated locomotion, and distributed manipulation and control
- 1st system to self-reconfigure into topologically different gaits