CONFERENCE TITLE: Electro-active Polymer Actuators and Devices (EAPAD) (ss04)  
CONFERENCE CHAIR: Yoseph Bar-Cohen, Jet Propulsion Lab.  
ABSTRACT TITLE: Electro-statically stricthed polymers (ESSP)  
AUTHOR LISTING: C. Liu* a, Y. Bar-Cohen b, S. Leary b, and J. Simpson c  
   a University of Illinois at Urbana-Champaign (UIUC) Microelectronics  
      Laboratory, MC 249, Urbana, Illinois  
   b Jet Propulsion Laboratory, Caltech, MS 82-105, 4800 Oak Grove Dr., Pasadena,  
      CA 91109-8099, 818-394-2610, fax 818-393-4057, yosi@jpl.nasa.gov  
   c NASA LaRC, Composites and Polymers Branch, Hampton, VA  

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ABSTRACT TEXT: Electro-statically stricthed polymers (ESSP) have been shown to  
produce large displacements when subjected to high voltage field. Coulomb forces are  
responsible for the actuation and these forces are proportional to the square of the electric  
field magnitude. A soft polymer film that is coated with electrodes on both surfaces is  
being squeezed under this electric field causing lateral extension. Polymers such as  
silicone were reported to induce displacements at the range of 30 percent, which are  
relatively large values. The material can be shaped as a rope to have a muscle  
configuration, however in this shape under electro-activation extension is induced. To  
produce contraction as in biological muscles it is necessary to modify the electric field  
and to induce the field in the lateral direction. Such a field can be produced by comb  
electroding, which can be shaped in various configurations to allow electric field  
manipulation. Tailoring the field offers unique capabilities but taking full advantage of  
the potential requires adequate understanding of the field interaction. Finite element  
modeling of the field interaction is underway while developing the fabrication  
methodology for such actuators  

KEY WORDS: Electroactive Polymers, Artificial Muscles, Actuators, Ionomers,  
Equivalent Circuits.  

BRIEF BIOGRAPHY: Prof. Chang Liu…