**Submit to**: SPIE Smart Structures, SS03

**ABSTRACT TITLE**: Numerical modeling of electroactive polymer mirrors for space applications

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**PRESENTATION** - Oral Presentation

**ABSTRACT**

Thin-film mirrors are attractive for large aperture, lightweight optical system and microwave antennas operating in micro-gravity space. The surface shape of these deployable thin film structures requires control to a precision range that depends on the specific applications. For optical systems, such surfaces need to be deployed and refined in the range of submicrons. Electroactive polymers (EAP) are potential candidates for making such thin film materials. Generally, EAPs are produced in thin film form with electrodes on their major surfaces. Depending on the reflectivity of the electrodes and surface roughness of the polymer they can also be produced with mirror finishes. A numerical model to predict the controllability of EAP film mirrors/reflectors will be presented. The mirror is assumed to be a curved multi-layer surface in 3D space. The effects of the original geometry and the optical reflecting layer are considered. Results for selected mirror geometries and EAP materials will be discussed.

**KEYWORDS**: Electroactive polymer, thin film mirror, thin film antenna, controllable membranes.

**BRIEF BIOGRAPHY: Dr. Xiaoqi Bao** is a Member of the Engineering Staff at the NDE and Advanced Actuators (NDEAA) team of the Jet Propulsion Laboratory. He joined JPL in May 1997 after serving for about ten years as a Research Associate at Pennsylvania State University. He received his Ph. D., Physics, in 1985 and M. Sc., Physics, in 1982 from the Chinese Academy of Sciences, Beijing, China. In 1986, Dr. Bao was a Visiting Scientist at the Dept. of Electrical Engineering of Toyama University, Japan. He has research experience in piezoelectric materials, composites, and actuators, ultrasonic NDE, SAW sensors, active vibration and sound control, as well as intelligent materials/structures. He has published more than 30 papers in related research areas.