



**Ronald E. Hatcher**  
**Science on Saturday Lecture Series**  
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*Synthetic Muscle for Deep Space Travel*  
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**ABSTRACT:**

In anticipation of deep space travel, new materials are being explored to assist and relieve humans in dangerous environments, such as high radiation, extreme temperature, and extreme pressure. Ras Labs Synthetic Muscle™ – electroactive polymers (EAPs) that contract and expand at low voltages – which mimic the unique gentle-yet-strong nature of human tissue, is a potential asset to manned space travel through protective gear and human assist robotics and for unmanned space exploration through deep space. The purpose of the Ras Labs-CASIS-ISS Experiment on the International Space Station was to test the radiation resistivity of the third and fourth generation of these EAPs, as well as to make them even more radiation resistant. The results were very good, with the survival of all flown samples, which compared very well with the ground control samples.

**BIOGRAPHY:**

Lenore Rasmussen is the CEO, CTO and Founder of Ras Labs. Ras Labs produces Synthetic Muscle™, which is a class of electroactive polymer (EAP) based materials and actuators that contract and expand at low voltages (battery levels), offering a high level of control with low power consumption and with minimal heat/noise signatures. EAP contraction-expansion can be cycled repeatedly, and the amount of movement can be controlled by adjusting the voltage, which lends these materials to biofeedback. With the additional intrinsic ability to sense pressure, Ras Labs EAPs can provide for self-adjusting prosthetic liners, closed loop impact attenuating devices, or self-sensing robotic grippers/hands.