



Thursday, September 26, 2019
Smith Hall Rm 111 / 1:30pm
Refreshments @ 1:15pm

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ELECTRO-ACTIVE IONIC ELASTOMERS

Motivated by the low voltage driven actuation of ionic Electroactive Polymers (iEAPs) [1] [2], recently we began investigating ionic elastomers. In this talk I will discuss the preparation, physical characterization and electric bending actuation properties of two novel ionic elastomers; ionic polymer electrolyte membranes (iPEM), and ionic liquid crystal elastomers (iLCE).[3] Both materials can be actuated by low frequency AC or DC voltages of less than 1 V. The bending actuation properties of the iPEMs are outperforming most of the well-developed iEAPs, and the not optimized first iLCEs are already comparable to them. Ionic liquid crystal elastomers also exhibit superior features, such as the alignment dependent actuation, which offers the possibility of pre-programmed actuation pattern at the level of cross-linking process. Additionally, multiple (thermal, optical and electric) actuations are also possible. I will also discuss issues with compliant electrodes and possible soft robotic applications.

[1] Y. Bar-Cohen, *Electroactive Polymer Actuators as Artificial Muscles: Reality, Potential and Challenges*, SPIE Press, Bellingham, 2004.

[2] O. Kim, S. J. Kim, M. J. Park, *Chem. Commun.* 2018, 54, 4895.

[3] C. Feng, C. P. H. Rajapaksha, J. M. Cedillo, C. Piedrahita, J. Cao, V. Kaphe, B. Lussem, T. Kyu, A. I. Jákli, *Macromol. Rapid Commun.* 2019, 1900299.