

CORE-CM SEMINAR

Michigan State University

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Applying the Tools of Materials Genomics to Address Charge-Transport Bottlenecks in Electrochemical Devices

Abstract:

In the past, active materials and other components in energy devices have largely been discovered by chemical intuition and by analogy to natural systems. As physical models of complex materials phenomena get into their stride alongside increasingly robust computing prowess, it is now possible to invert the process of materials design. To that end, I will present our work in using materials genomics screens to guide the design of new polymeric materials as ion-selective membranes and, separately, as reconfigurable charge-transporting molecular networks. Our efforts validate theoretical predictions with deep experimental insight, and will be showcased in the context of electrochemical energy storage. I will also outline foundations on which to build further our understanding of the transport of energy carriers within and along the surfaces of these materials, and how to redirect and amplify the interfacial transport using molecular switches. There remains much to be learned about the origins of their adaptive and dynamic properties, and how these feed back across multiple length and time scales.

Thursday, March 16, 2017

12:00 NOON

Room 1400 – Biomedical & Physical Sciences

Professor Rémi Beaulac- Host