For condensed matter physicists, materials are often separated into two classes: simple materials and strongly correlated materials. Because the interested problems are very different, there is, traditionally, very little overlap between the two fields. However, in the world of reduced dimensionality, the line is no longer well defined. Simple materials can become complex, and complex materials can become even more complex, or, sometimes, simple. In this talk, I will use a complex material La$_{5/8-x}$Pr$_x$Ca$_{3/8}$MnO$_3$ (LPCMO) to demonstrate how emergent phenomena appear in reduced dimensionality. The emergent phenomena mostly originate from the electronics phase separations (EPS) in the LPCMO system. Helped by spatial confinement, the nature of the EPD including their dynamics can be cleanly studied using conventional transport measurements. It is hoped that these work will lead to a new field where the interplay between complexity and quantum effect will lead to fascinating new properties for future technology.

**Publications:**

