

# Chez Pierre

Presents ...

Monday, September 25, 2023

12:00 pm -1:00 pm

Duboc Room – 4-331



## Chez Pierre Seminar

**Julia A. Mundy, Harvard University**

### **“Superconductivity in a layered square-planar nickelate”.**

Since the discovery of high-temperature superconductivity in copper oxide materials, there have been sustained efforts to both understand the origins of this phase and discover new cuprate-like superconducting materials. One prime materials platform has been the rare-earth nickelates; indeed, superconductivity was recently discovered in the doped compound  $\text{Nd}_{0.8}\text{Sr}_{0.2}\text{NiO}_2$ . Undoped  $\text{NdNiO}_2$  belongs to a series of layered square-planar nickelates with chemical formula  $\text{Nd}_{n+1}\text{Ni}_n\text{O}_{2n+2}$  and is known as the ‘infinite-layer’ ( $n = \infty$ ) nickelate. Our work reports the synthesis of the layered nickelate compounds. We observe a superconducting transition beginning at  $\sim 13$  K in the optimally doped 5-layer  $\text{Nd}_6\text{Ni}_5\text{O}_{12}$ . Electronic structure calculations, in tandem with magnetoresistive and spectroscopic measurements, suggest that  $\text{Nd}_6\text{Ni}_5\text{O}_{12}$  interpolates between cuprate-like and infinite-layer nickelate-like behavior. I will also discuss our work further engineering superconductivity in this family with a combination of doping and dimensionality.