Chez Pierre

Presents ...

**Wednesday, October 4, 2023**
**10:00 am- 11:00 am**
**Duboc Room 4-331**

## Special Chez Pierre Seminar

**Wenjin Zhao, Cornell University**

## "Gate-tunable heavy fermions in a moiré Kondo lattice. "

**Abstract**: Moiré materials provide a highly tunable platform for exploring strongly correlated electron phenomena and topological physics. A Mott insulator with local magnetic moments has been realized in semiconductor moiré materials at half-filling of the moiré band. In this talk, I will describe the realization of a synthetic Kondo lattice in AB-stacked $MoTe_2/WSe_2$ moiré bilayers, where the $MoTe_2$ layer is tuned to a Mott insulating state, supporting a triangular moiré lattice of local moments and the $WSe_2$ layer is doped with itinerant conduction carriers. We observe heavy fermions with a large Fermi surface below the Kondo temperature and the destruction of the heavy fermions by an external magnetic field with an abrupt decrease of the Fermi surface size and quasiparticle mass. We also observe a Chern state at the boundary between the light and heavy fermions. Finally, I will demonstrate the emergence of ferromagnetism from a density-tuned Kondo destruction at zero magnetic field.