

October 10, 2025**4:10 – 5:00 PM****Barnard 103****Spins, Magnons, and Microwaves: A Molecule-Based Architecture for
Quantum Information****Zeke Johnston-Halperin**
Ohio State University**Abstract:**

In this talk I will present a molecule-based architecture for quantum information that integrates the atomic-scale synthetic and design flexibility of molecular systems with advances in device-scale integration of molecular and solid-state components. This integrated architecture promises, for example, spin-magnon-microwave coupling that can be exploited for the development of hybrid qubits, quantum transduction, and inherent non-reciprocity at the single quantum level. I will discuss advances within this framework including the demonstration of encapsulation of molecular qubits within a tunnel junction fabricated from 2D materials [1], the demonstration of strong magnon-microwave coupling in integrated superconducting circuits [2], and the prediction of spin-magnon quantum transduction mediated by dipole-dipole interactions [3]. Tying these advances together, I will discuss potential pathways for integration of all these elements on-chip in a platform compatible with other solid-state quantum information technologies.

Host: Matt Jaffe**** Refreshments served in the Barnard Hall second floor atrium at 3:45 PM ****