**Idaho State University  
Physics Colloquium**

**Exploring Interactions among Nanocrystals with Multidimensional Nanoscopy**  
  
[Dr. Duncan Ryan](http://cint.lanl.gov/)  
[Los Alamos National Laboratory](https://www.lanl.gov/)  
  
Quantum dot nanocrystals (NCs) are bright single-photon sources with strong absorption below their emission wavelength. Because their optical properties can be engineered through their composition, size (typically < 10nm), and surface chemistry, NCs are frequently incorporated into photovoltaics and display technologies, used as probes for biological research, and studied as fundamental particles for understanding physical phenomena at the nanoscale. Some applications involve packing NCs together to accumulate the responses of many individual particles. However, at sufficiently high densities and small length scales, NCs interact and energy transfer among the particles can occur. Clusters, aggregates, films, or solids made up of NCs exhibit collective behavior due to such interactions. Separation distances, spectral profiles, and relative orientations of NCs in larger assemblies impact coupling efficiency. I will present on studies of interacting NC systems using nanoscopy methods that simultaneously measure multiple linked properties of the particles. NC dynamics can reveal the roles of individual NCs within clusters and indicate how local interactions affect the properties of larger scale NC systems.  
LA-UR #21-28627

**Monday, October 4 2021  
Via Zoom(**[**https://isu.zoom.us/j/89065651239**](https://isu.zoom.us/j/89065651239)**)  
4:00 – 4:50 pm**