



Birck Nanotechnology Center and Purdue Quantum Science Engineering Institute

**Special Seminars by Associate Lab Directors of Oak Ridge National Laboratory
Wednesday, June 26, 2019**

10:30 a.m. – 12:00 p.m., BRK 1001

Jeffrey A. (Jeff) Nichols, Ph.D., *Associate Laboratory Director for Computing and Computational Sciences*
“How do we solve big science problems using all the modern tools and technologies at our fingertips?”

The new Summit supercomputer provides unprecedented opportunity to perform modeling and simulation and artificial intelligence at a scale that is an order of magnitude greater than prior supercomputer systems. Exascale is on the horizon and ORNL just announced our next new system called Frontier to be delivered in 2021 – another order of magnitude more powerful! I will discuss the technologies used in Summit and Frontier. I will also talk about how, over the past couple of decades, supercomputers have changed the way we conduct science in the national lab complex. I will give examples of how integrating supercomputers, artificial intelligence, experiments, and new theories help to solve the nation’s largest science problems.

David Jarvis Dean, *Associate Laboratory Director for Physical Sciences*
“Approaching Quantum Computation”

How do we harness a novel quantum mechanical property in a material to perform computation? This question lies at the multidisciplinary intersection of theoretical physics, information theory, materials R&D and algorithm development. The question drives an increasing portfolio of R&D at ORNL. During this talk, I will describe current and future research directions that will enable us to tackle this question.

The goals are (1) to learn how the sometimes surprising and unexpected properties of quantum materials can be tailored to address technological needs, and (2) to dramatically improve the ability to synthesize, characterize, and control quantum materials.

(Host: Yong Chen)