

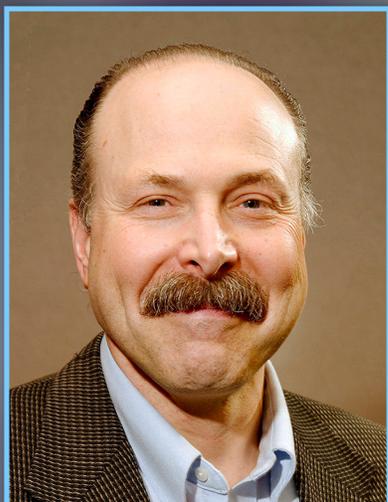


# *Distinguished* LECTURE SERIES

## **Beyond Electronics: abandoning perfection for quantum technologies**

*Presented by:* Prof. David Awschalom

Liew Family Professor and Deputy Director of the Institute for Molecular Engineering at the University of Chicago, and a Senior Scientist at Argonne National Laboratory

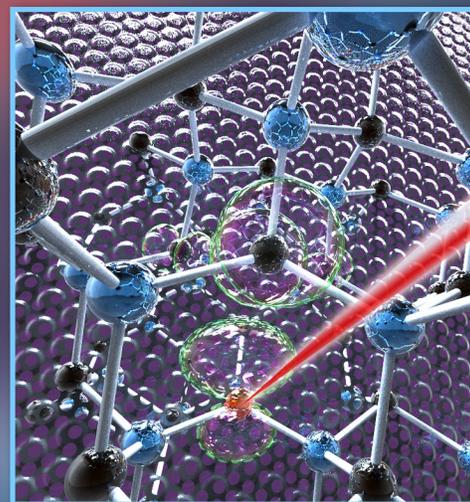


**SEPT 12**

**2017**

**11:30 a.m.**

**IN THE JUNKER CENTER**



**Office of Naval Research**  
875 N. Randolph St., Arlington, Virginia  
Bobby Junker Executive Conference Center, 14<sup>th</sup> Floor

# Beyond electronics: abandoning perfection for quantum technologies

Our technological preference for perfection can only lead us so far: as traditional transistor-based electronics rapidly approach the atomic scale, small amounts of disorder begin to have outsized negative effects. Surprisingly, one of the most promising pathways out of this conundrum may emerge from recent efforts to embrace defects and construct 'quantum machines' to enable new information technologies based on the quantum nature of the electron. Recently, individual defects in materials have attracted interest as they possess an electronic spin

state that can be employed as a solid state quantum bit at and above room temperature. Research at the frontiers of this field includes creating, manipulating, and entangling these unusual states in a new generation of nanometer-scale structures. We describe recent developments that have launched technological efforts aimed at applications ranging from secure data encryption to quantum communication and radical improvements in computation speed and complexity.

## ABOUT Prof. David Awschalom

David Awschalom is the Liew Family Professor and Deputy Director of the Institute for Molecular Engineering at the University of Chicago, and a Senior Scientist at Argonne National Laboratory. Before arriving in Chicago, he was the Director of the California NanoSystems Institute and Professor of Physics, Electrical and Computer Engineering at the University of California – Santa Barbara. He works in the emerging fields of spintronics and quantum information engineering, where his students develop new methods to explore and control the quantum states of individual electrons and nuclei. Professor Awschalom received the

American Physical Society Oliver E. Buckley Prize and Julius Edgar Lilienfeld Prize, the European Physical Society Europhysics Prize, the Materials Research Society David Turnbull Award and Outstanding Investigator Prize, the AAAS Newcomb Cleveland Prize, the International Magnetism Prize and the Néel Medal from the International Union of Pure and Applied Physics, and an IBM Outstanding Innovation Award. He is a member of the American Academy of Arts & Sciences, the National Academy of Sciences, the National Academy of Engineering, and the European Academy of Sciences.

