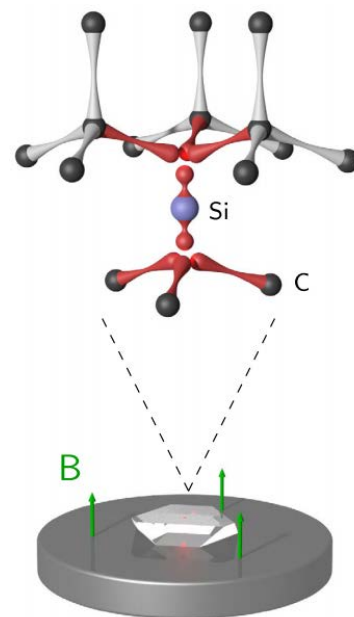


# SPIE Purdue Student Chapter Visiting Lecturer Program 2015

## Engineering Diamond Color Centers for Quantum Information and Sensing

by Prof. Philip Hemmer (Texas A&M University)

For over a decade diamond color centers like the nitrogen-vacancy (NV) have been investigated for applications ranging from quantum storage registers to room temperature quantum computers to quantum enhanced bio-sensors. Recently silicon-vacancy (SiV) centers in diamond have showed potential to replace the NV for applications requiring strong coupling between spins and photons, and also for molecule-sized bio-sensors. However the existing top-down fabrication approaches for these color centers are not very scalable. What is needed is a bottom-up approach wherein the NV (or SiV) plus its detailed surroundings are determined by chemistry (i.e. where the diamond is grown around a custom modified diamondoid molecule). Not only will this give superior NV-based quantum registers, but will allow engineering of new color centers to replace the NV, like the new super-high contrast optically detected magnetic resonance color centers, and possibly variations on the silicon-vacancy center. In this talk I will discuss preliminary experimental results toward this goal.



### Speaker's Bio



Dr. Hemmer received his B.S. in physics from the University of Dayton, and his Ph.D. in physics from MIT. He worked many years as a physicist for the Air Force Research Laboratory at Hanscom, AFB, MA. Since 2002, he has been with the ECE Department at Texas A&M University. Dr Hemmer's current research interests include Quantum Optics especially with nitrogen-vacancy diamond, subwavelength imaging, quantum computing in solids, plasmon-based nano-optics, slow and stopped light, and ultrasound imaging.

**November 23<sup>rd</sup>, Monday**

**12:00pm-1:00pm**

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