**Abstract**

Innovative concepts and approaches will be discussed to design, fabricate, and exploit novel nanophotonic and nanoelectronic devices/systems for applications in healthcare and information technology. Strongly coupled plasmonic nanocavity arrays can support a new type of subradiant lattice plasmon resonances, which exhibit very narrow resonance line-widths, good spectral tunability, and high local field enhancement. By surrounding plasmonic nanocavity arrays with a gain medium and overcompensating the losses, ultrafast plasmonic lasing action can be enabled with good emission directionality. On the other hand, nanowire nanoelectronic field-effect-transistors in 3D arrays can be integrated into 3D macroporous polymeric scaffolds to create synthetic cyborg tissues, in which 3D real-time electric mapping of heart activities with drug responses was demonstrated. Moreover, a bio-inert coating technique was developed to achieve long-term stability of semiconductor nanoelectronic bio-sensors for chronic real-time physiological studies. The innovations discussed in this talk could be inspiring for the development toward integrated nanosystems for applications including ultra-compact optoelectronics and nonlinear-optics devices, handheld point-of-care diagnostics platforms, lab-on-a-chip biomedical architectures, and implantable bio-integrated nanosystems.

**Biography**

Dr. Wei Zhou is an Assistant Professor of Electrical and Computer Engineering at Virginia Tech. He conducts interdisciplinary research on the design, manufacturing, and investigation of nano-enabled photonic and electronic materials, devices, and systems targeting applications in the areas of information technology, healthcare, and energy.

Dr. Zhou earned his Ph.D. in Materials Science and Engineering at Northwestern University in 2012, and later he worked as a Postdoctoral Fellow in Prof. Charles Lieber’s lab at Harvard University. He was honored Chinese Government Award for Outstanding Self-Financed Students Abroad in 2012, and he has also won other highly selective awards/Fellowships including International Institute for Nanotechnology (IIN) Outstanding Research Award (2011), Ryan Fellowship (2009-2011), and MRSEC Fellowship (2009-2012). He has published 25 peer-reviewed papers. Most publications are in top journals, such as Nature Nanotechnology, Nano Lett., ACS Nano, PNAS, and others.