



# Columbia University Optics and Quantum Electronics Seminar



## “Graphene Photonics and Electronics”

**Dr. Fengnian Xia**

*IBM Thomas J. Watson Research Center*

**Date/Time:** Monday, November 12<sup>th</sup>, 11 – 12 noon

**Location:** Sindeband East 414/CEPSR

**Abstract:** Graphene has been intensively explored by physicists and engineers due to its unique electronic and photonic properties. In this talk, I will first address the physics of light-graphene interaction under the single-electron approximation, followed by a discussion of light excitation of collective oscillations of the carriers, i.e., plasmons in graphene. A variety of photonic devices operating in different wavelength ranges and based on these two different light-graphene interaction mechanisms discussed above, such as photodetectors, optical modulators, electro-magnetic wave shieldings, notch filters, and linear polarizers will then be covered. Finally I will talk about the carrier transport at metal-graphene junction, bandgap engineering in graphene, and their possible impact on electronics based on other two-dimensional materials.

**Bio:** Fengnian Xia received the B.Eng. degree with the highest honor in electronics engineering from Tsinghua University, Beijing, China, in 1998 and M.A. and Ph.D. degrees in electrical engineering from Princeton University, Princeton, NJ, USA in 2001 and 2005, respectively. He joined IBM Thomas J. Watson research center in Yorktown Heights, NY, USA as a postdoc in March 2005, and currently is a Research Staff Member. His current research focuses on nanophotonics and nanoelectronics using group IV materials such as graphene, carbon nanotubes, silicon, and germanium. He is also actively involved in transport research in low-dimensional semiconductors.

Dr. Xia received an IBM corporate award, three IBM research division level awards, and many IBM invention achievement awards. In 2011, he was selected by MIT technology review magazine as a top young innovator under the age of 35.

*Hosted by Prof. Chee Wei Wong • For further information: call 212 854 4275*