



Yale Institute for Nanoscience
and Quantum Engineering

YINQE SEMINAR

Friday- October 3, 2014

12:00 to 1:00 p.m.

BECTON SEMINAR ROOM

Light lunch will be served at 11:45 a.m.

Jeehwan Kim

IBM T.J. Watson Research Center, Yorktown Heights, NY

“Atomic-precision Control of Single-crystalline 2D Materials

& Recent Progress on Thin Film PV in IBM”

The fabrication of large-scale single-domain graphene is one of the most important research goals in the field of graphene research. Recently, we have developed a technique for fabricating an unprecedented form of a flat, single-oriented, monolayer graphene in a 4-inch wafer-scale. This graphene was proven to be crystallographically and electrically single-domain in a wafer-scale. The physics behind forming single-crystalline graphene will be discussed. This single-crystalline graphene was used as a seed for growing single-crystalline films. We demonstrated direct van der Waals growth of high-quality single-crystalline films on this graphene with low defectivity. The single-crystalline film was then released precisely from a graphene surface and transferred onto Si substrates. The graphene/SiC substrate was reused for multiple growth and transfer cycles without any post-release surface treatment. I will talk about the detail of this process and how this accomplishment can be applied to current semiconductor research. I will also present our recent progress on fabricating high efficiency thin film solar cells including $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$, amorphous silicon, and organic solar cells.