Energy dissipation and light emission in graphene

Energy dissipation in nanoscale electronics has become an important subject in modern electronic industry and energy conversion system. From this perspective, graphene with very high mobility and thermal conductivity, which are about ten times higher than silicon, is a very attractive nano-material to study energy dissipation in nano-electronics. My talk will present recent studies for the gate-controllable Joule heating, Peltier cooling and light emission in graphene devices. I will also talk about the in-plane thermal conductivity of graphene nanoribbons, to explore the nano-engineering of phonon flow.