

Electronic Transport in Atomically Precise Graphene Nanoribbons

Thesis Defense
Juan Pablo Llinas
EECS PhD Candidate
Advisor: Jeff Bokor

Abstract: Atomically precise graphene nanoribbons (GNRs) have promising electronic properties for high performance field effect transistors (FETs) and ultra-low power devices such as tunneling FETs. However, the short length, wide band gap, and random orientation of bottom-up synthesized GNRs have impeded the fabrication of devices with the expected performance and switching behavior. I will discuss our progress in integrating these GNR into electronic devices. I will show our results on high on-current and high on-off ratio FETs with a 9-atom wide GNR as the channel material. Furthermore, I will discuss devices fabricated with parallel arrays of GNRs transferred from single crystal Au(788), which greatly improves device yield. Finally, I will discuss how we can use GNR heterostructures to design a low-voltage switch.