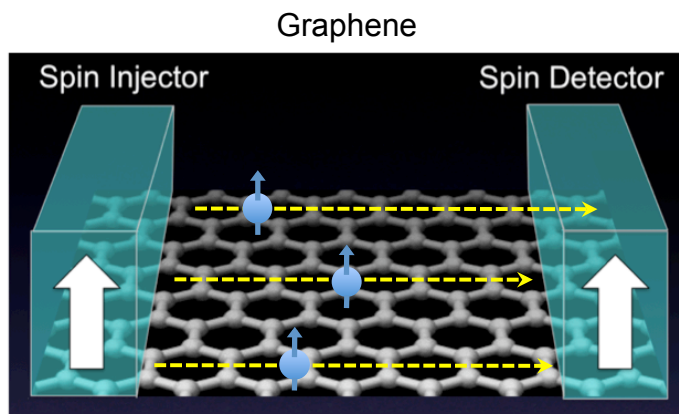


# IRG-1: Towards Spin-Preserving, Heterogeneous Spin Networks

## World Record Performance of Graphene Spin Valves

Wei Han, Kyle Pi, Kathy McCreary, **Roland Kawakami\***

Graphene (two-dimensional carbon) is an attractive material for spintronics due to weak spin-orbit coupling for robust spin transport properties. This could lead to spin-based computers that integrate logic and memory for much greater computing power.



CEM researchers have successfully fabricated graphene spin valves with ultrathin magnesium oxide (MgO) tunnel barriers, which result in the largest non-local spin transport signal ( $130 \Omega$ ) ever reported in graphene or any other material at room temperature (previous record is  $0.017 \Omega$  in GaAs, but at  $-223^\circ \text{C}$ ). This breakthrough enables the development of a graphene spin computer.

\* University of California, Riverside

*arXiv:1003.2669, preprint (2010)*



Center for  
Emergent Materials

An NSF Materials Research Science and Engineering Center (MRSEC)  
Supported under NSF Award Number DMR-0820414