Spin Transport and Dynamics in Ferromagnet-Semiconductor Heterostructures

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I will review recent progress in spin injection, transport, and detection in ferromagnet-semiconductor heterostructures. After covering recent results on the direct and inverse spin Hall effects, I will comment on the state of our knowledge in two areas that have received much less attention. First, although there is general agreement that interfacial band structure is an important consideration in modeling the ferromagnet/III-V semiconductor structures, there are several outstanding mysteries, including the bias dependence of the spin injection and detection efficiencies. Second, with the exception of some very preliminary data, we have very little information about the real-time spin dynamics in these systems. I will discuss these in the context of the workshop goals.