Title: Epitaxial Growth and Properties of Nanoscale Oxides for Spintronics
Type: Faculty
Awardee: Diedrich Schmidt
Mentors: Marjorie Olmstead – UW; Scott Chambers – PNNL
Description: The discovery and utilization of new semiconducting materials that are ferromagnetic at room temperature is required for the realization of spintronics – a potentially very important development in electronics and magnetics technology. In spintronics, the spins of electrons, holes, ions, and/or atoms are utilized to develop faster, smaller, and less power dissipative ways of processing, transmitting, and storing information. Applications range from on-chip integration of magnetic storage and electronic processing functions over nanometer length scales to quantum computing. In all cases, the essential physics occurs over length scales that are of the order of a few to a few tens of lattice spacings in crystalline solids. Over the next year, we propose to continue our work in the synthesis and properties of candidate oxide semiconductors that may be ferromagnetic at ambient temperature. These include $Mn_xZn_{1-x}O$ ($x < \sim 0.35$) and $Co_xTi_{1-x}O_2$ anatase ($x < \sim 0.8$).