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Spin Valves and Magnetic Tunnel Junctions KURT IVERSEN, University of Portland, MATTHEW PUFALL, RANKO HEINDL, National Institute of Standards and Technology — This is a presentation of research conducted through the National Institute of Standards and Technology's Summer Undergraduate Research Fellowship program. A spintronic device is one that uses the electron's magnetic moment (its spin) as well as its charge to perform operations, such as data storage or logic. Many of today's spintronic devices are based on the "tunneling magnetoresistance" effect of CoFeB/MgO/CoFeB tunnel junctions. The MgO barrier in devices must be highly uniform and only 1-2 nm thick. Relevant background, including electron spin and tunneling, is supplied. The fabrication, operation, and behavior of spin-valves and magnetic tunnel junctions are described, and applications in Hard Disk Drives, Magnetic Random Access Memory, Magnetic Field Sensors, and Spin-Torque Oscillators are discussed.

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