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Major Research Interest: **Spintronics**

Other Interests: **Integrated Nanoscale Devices**

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Immunoassay is a technique used to detect the presence or quantity of a substance (e.g. antigen) based on its capacity of bio-molecular recognition between the substance and a specific receptor (e.g. an antibody) that is tagged with a label or marker. Magnetic immunoassay uses the concept of immunoassay in which the magnetic field generated by the magnetically tagged targets is detected directly with high sensitive magnetic sensor or the commonly named spin electronics devices. My current research work addresses the development of such a bio-magnetic sensor integrated system. The project is an interdisciplinary research of spintronics and nanomagnetism, nanoscale device, microfluidics, and biological materials.

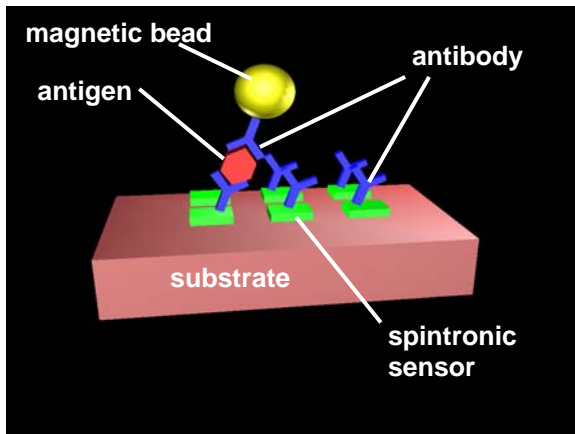
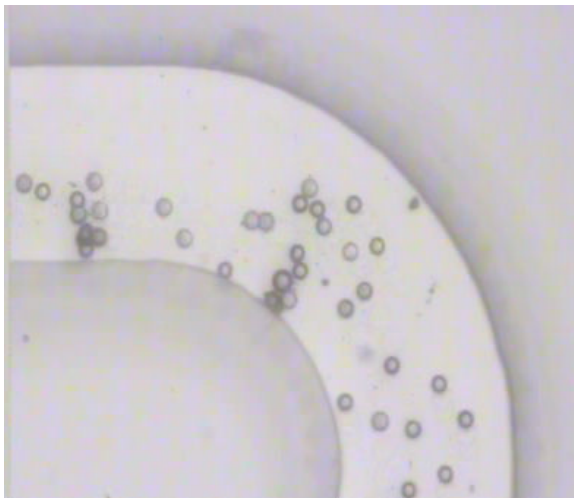


Illustration of a bio spintronic sensor



Flow of magnetic microparticles in a microchannel

Selected Publications

W. S. Lew, S. P. Li, and J. A. C. Bland, "Two-jump magnetic switching in ultrathin Co(001) films probed by giant magnetoresistance measurements", *J. Magn. Magn. Mater.* 307, 232 (2006)

F. van Belle, W.S. Lew, C.A.F. Vaz, and J.A.C. Bland, "Coercivity and switching field-engineered magnetic multilayers for 3-D patterned media", *IEEE Tran. Magn.* 42 (10): 2957 (Oct 2006)

Z.H. Wang, W.S. Lew, and J.A.C. Bland, "Manipulation of superparamagnetic beads using on-chip current lines placed on a ferrite magnet", *J. Appl. Phys.* 99, 08P104 (2006)

S. Steinmüller, T. Trypiniotis, A. Hirohata, W. S. Cho, W. S. Lew, C. A. F. Vaz, and J. A. C. Bland, "Highly efficient spin filtering of ballistic electrons", *Phys. Rev. B* 69, 153309 (2004)

W. S. Lew, S. P. Li, L. Lopez-Diaz, D. C. Hatton, and J. A. C. Bland, "Mirror Domain Structures Induced by Interlayer Magnetic-Wall Coupling", *Phys. Rev. Lett.* 90, 217201 (2003)

S. P. Li, W. S. Lew, J. A. C. Bland, L. Lopez-Diaz, M. Natali, C. A. F. Vaz, and Y. Chen, "Microstructure - Spin-Engineering Magnetic Media", *Nature* 415, 600 (2002)

S. P. Li, W. S. Lew, J. A. C. Bland, L. Lopez-Diaz, C. A. F. Vaz, M. Natali, and Y. Chen, "Magnetic Domain Confinement by Anisotropy Modulation", *Phys. Rev. Lett.* 88, 087202 (2002)