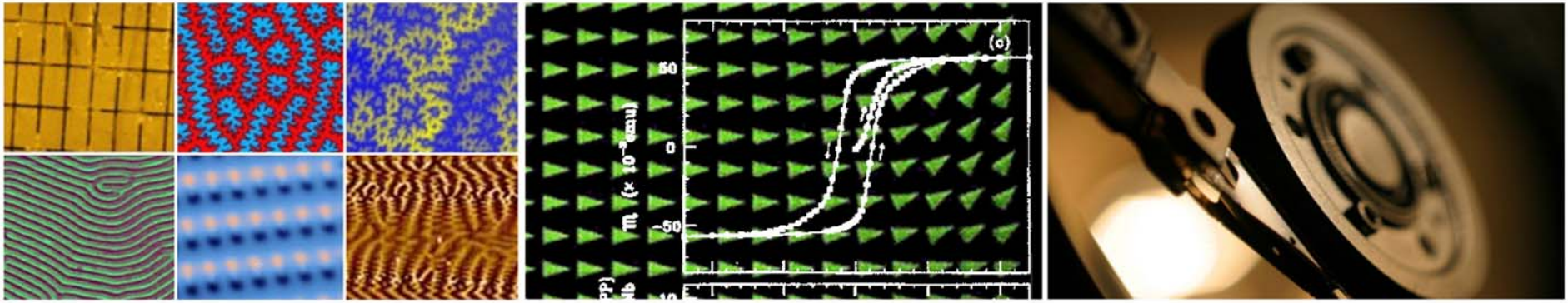
IEEE MAGNETICS



The IEEE Magnetics Society is proud to present

2008 Distinguished Lecture series

Patterned Nanomagnetic Bits and Devices

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Abstract: As conventional magnetic recording technology extends to ever higher areal density, it is possible the often predicted, and constantly increasing, density limit will be reached. This limit will likely be in the range of 750 – 1000 Gb/in2. The use of nanofabrication to create patterned magnetic elements, or patterned media, is one of the proposed approaches with the promise of delaying the onset of superparamagnetism and thus enabling higher areal density. I will discuss many of the challenges that must be overcome for patterned media to be successful, including fundamental physics and material science issues, new fabrication technologies, nm-scale manufacturing tolerances, and low cost budgets. One of these challenges is to controllably reverse one magnetic element, or bit, without affecting the neighboring elements. A narrow anisotropy distribution will be required, yet data suggest that as the element size shrinks, the distribution widens. This distribution arises from a number of sources, including shape and size distributions, edge effects, variations in the full film anisotropy and magnetostatic fields from neighboring elements. As will be discussed, understanding and controlling the switching properties of magnetic nanostructures is critical not only for patterned media, but for device applications such as MRAM cells and spintronic devices and, for current induced as well as field induced reversal.