関係各位

Sara A. Majetich　教授（Carnegie Mellon 大学）講演会のお知らせ

きたる１１月２日（金曜日）に　Carnegie Mellon 大学の Sara A. Majetich　教授が大阪大学を訪問され、１３時３０分より最近の研究内容を紹介して下さいます。国際学会などでも広くご活躍ですのでご存知の方も多いかと思いますが、同教授は、同大学の物理学科の教授でナノ粒子の磁性が専門家で Distinguished Lecturer of IEEE Mag. Soc.でもあります。多くの関係各位のご出席を期待しております。

講演題：　**Magnetic Nanoparticles: Self-Assembly and Nanoscale Behavior**
（アブストラクトを貼付いたします）

講演者：　**Prof. Sara Majetich**
(Carnegie Melon Univ., Distinguished Lecturer of IEEE Mag. Soc.)

日付：　１１月２日（金曜日）

時間：　１３時３０分～１４時３０分

場所：　大阪大学工学研究科　材料開発・物性記念館
（http://www.eng.osaka-u.ac.jp/ja/access/index.html#03 の R5 の建物）

お問い合わせ先：
大阪大学工学研究科ビジネスエンジアリング専攻　山本孝夫
06-6879-7888、　takao@mit.eng.osaka-u.ac.jp
ご出席の方はご連絡くだされば幸いです。

この講演会は、グローバル COE プログラム（「構造・機能先進材料デザイン教育研究拠点」　拠点リーダー　掛下知行）の一環として開催いたします。

Magnetic Nanoparticles: Self-Assembly and Nanoscale Behavior

Sara A. Majetich, Carnegie Mellon University

The magnetic behavior of a monodomain nanoparticle was first described by Stoner and Wohlfarth nearly sixty years ago, yet this simple system is frequently invoked in discussions of high-density magnetic recording media, magnetic refrigeration materials, and a host of biomagnetic applications. Here we will examine two cross-cutting themes of current research on magnetic nanoparticles: self-assembly and nanoscale magnetic behavior.

Different types of superstructure can be self-assembled from the same type of particles. In organic solvents, two-dimensional arrays with long-range order can be formed using Langmuir layer techniques. These monolayers are also used as nanomasks for crystallographically oriented thin films, which provide an alternative approach to preparing nanoparticle arrays for data storage media. Faceted three-dimensional single "grain" nanoparticle crystals are formed by colloidal crystallization methods. Magnetic field gradients can also be used to guide self-assembly. For example, gold-coated iron oxide particles can be used to image self assembly dynamics in aqueous media, in response to patterned magnetic elements, using plasmon scattering and dark field optical microscopy to track single particles.

The ability to make magnetic nanostructures creates a need for new tools that enable us to visualize their magnetization patterns. Small angle neutron scattering provides average magnetic correlation lengths within three-dimensional assemblies, where correlations of hundreds on nanometers may be present at low temperature. Electron holography shows real-space magnetization patterns of magnetic monolayers, where vortices and transverse domain walls are present as low energy excitations. Scanning probe techniques have the potential for single-particle-per-bit magnetic information storage.

Sara Majetich received her A.B. degree in chemistry at Princeton University, and a Masters Degree in Physical Chemistry at Columbia University. Her Ph.D. was in Solid State Physics from the University of Georgia, and following that she did postdoctoral work at Cornell University. She has been a faculty member in the Physics Department at Carnegie Mellon University since 1990 and is now a full professor there. Her awards include the Ashkin Award for excellence in teaching, the Carnegie Mellon University Undergraduate Advising Award, and a National Young Investigator Award from the National Science Foundation. . She has three patents and over 100 publications. Her research interests focus on magnetic nanoparticles and nanocomposites and their applications.