

## Center for Nanoscale Materials and Biointegration (CNMB)

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The University of Alabama (UA) Board of Trustees in their meeting on February 3, 2006 has approved the formation of "Center for Nanoscale Materials and Biointegration (CNMB)". This new center at UAB is housed in the Department of Physics with participation of faculty from the **School of Natural Sciences and Mathematics, School of Business, School of Dentistry, School of Engineering, and School of Medicine.**

### Vision Statement

UAB envisions the creation of a world-class interdisciplinary research and student training center focusing on the synthesis and characterization of nanoscale materials and structures with applicability and integration into the biomedical arena that will position the Center to be at the forefront of nanotechnologies and biomaterials for human health.

The ability to synthesize materials and structures increasingly smaller to one-billionth of a meter (nanometer) has played a key role in the advancement of materials research and their applications to numerous other fields, including the biosciences and medicine. The reasons for this are manifold. Foremost, the physical size of these nanoscale materials is comparable in size to many biological systems and thus there exists the opportunity to integrate the materials into these systems (biointegration). Moreover, these nanoscale materials exhibit fundamentally different properties from their bulk properties such that they can be actually tailored to give rise to properties that are optimal to a specific application. For example, nanostructured diamond coatings gives rise to a superhard nanomaterial that has can be used as an industrial abrasive or as a wear-resistant coating for hip implants, graded nanostructured metalloceramic materials and coatings can improve osseointegration at bone/implant interfaces, and metallic and magnetic nanoparticles can enhance the signal response for biomedical imaging and biomarkers of diseases. Thus the Center for Nanoscale Materials and Biointegration (CNMB) at UAB would build upon these and other opportunities resulting from recent developments in nanomaterials and its applications to the biomedical field by bringing together the research expertise at UAB from a variety of fields, including physics, materials science, biomaterials and biomedical engineering, cell biology, and orthopedic surgery. The establishment of the CNMB will permit a more efficient and effective use of institutional resources by providing the infrastructure to enhance the research through communication, coordination of research, and the sharing of resources as well as support the development of new initiatives in this area. The approval of this Center signals an institutional commitment to this area of research, and thus strengthens extramural funding applications and opportunities for commercialization of discoveries in the fields of nanomaterials and nanotechnology.

### Research Focus Areas in CNMB:

- (i) *Nanostructured diamond and other superhard materials*
- (ii) *Nanostructured coatings for biomedical implants*
- (iii) *Nanostructured porous biomaterials for tissue engineering*
- (iv) *Nanoparticles for enhanced biomedical imaging and biosensing*
- (v) *Dental and Orthopedic Implant Applications*
- (vi) *Industrial Partnerships and Commercialization*