

Nanotechnology will increase our standard of living. If it is done right, it will make our lives more secure, improve healthcare delivery, and optimize our use of limited resources. Mankind has spent millennia trying to fill these needs, because it has always known that these are the things it needs to ensure a future for itself. If nanotechnological applications pan out the way we think they will pan out, we are one step closer to ensuring that future. The governments of the world are not immune to nano-fever. Many countries understand the great potential value of nanotechnology in various areas, including defense and as an engine for economic growth. Nanotechnology is largely in a research phase – and a great deal of that is being done on university campuses. Because a lot of this research work requires some big bucks - not in big supply on many campuses today - much of this work goes on in conjunction with business and governments. For example, in September of 2001, the U.S. government selected six schools as Centers of Excellence in Nanotechnology. The National Science Foundation has several partnerships with academia. But more than a hundred schools now have nanotechnology research underway - and that is just in the United State. Japan, China, and Israel are also active. In order to see how academic websites provide information on nanotechnology, the websites of both the Rice University and University of Michigan, Ann Arbor nanotechnology facilities have been analyzed

Rice University in Texas is home to Richard Smalley, Nobel Laureate in Chemistry with an impressive reputation in nanotechnology research. Smalley heads up The Smalley Group at Rice. The Center for Nanoscale Science and Technology at Rice (<http://cnst.rice.edu/index.cfm>) involoves 14 academic departments, ranging from Earth Science to the Jones School of Management to Chemistry and even to Religious Studies. The center focuses on three areas; wet, dry, and computational nanotechnology. First, wet nanotechnology is the study for biological systems that live in the water. This is the area where genetics, enzymes, and various cellular components are studied. Second, dry nanotechnology relates to surface chemistry and materials fabrication, including the study of nanotubes, silicon, and other inorganic materials. Dry nanotechnology can involve metals and semiconductors. Last, a computational focus involves modeling and simulation of very complicated nanometer-scale structures. The study of nano-

computation can have a huge impact on the evolution of both its wet and dry brethren. Rice often works with Texas-based NASA on projects involving SWNT (single walled nanotubes) and sci-fi-sounding stuff like pulsed-laser vaporization (a process used to produce SWNTs)

The goal of the Smalley Institute is to maintain its leadership role in nanoscale science and engineering, which is the creation, investigation, and application of functional structures with nanometer dimensions. There is no specific bias in the site's mission statement. Over the past ten years the Smalley Institute has expanded to meet those goals. The Smalley Institute's focus includes Nano-Vivo, single walled nanotubes, nano in energy, social and ethical issues, and nanoengineering. The Center for Biological and Environmental Nanotechnology (CBEN) is one of six centers created by the National Science Foundation (NSF) in 2001. About this web site of Rice University, I think that the information is presented in a well-organized manner, and the organization's advisory boards are easily accessible.

The University of Michigan, Ann Arbor has several nanotechnology centers: Solid State Electronics Laboratory (SSEL: <http://www.mnf.umich.edu/SSEL/>), Michigan Nanofabrication Facility (MNF: <http://www.mnf.umich.edu/MNF/>), and Michigan Nanotechnology Institute for Medicine and Biological Sciences (*M-NIMBS*: <http://nano.med.umich.edu/index.htm>). First, the SSEL manages academic programs and conducts research on the theory, design, and fabrication of electronic, optoelectronic devices, circuits, and microsystems (MEMS), as well as on organic devices, novel characterization and metrology techniques and nanofabrication technology. Second, the MNF is available, on a fee basis, for use by research groups from government, industry and universities. Equipment and processes are available for research on silicon integrated circuits, MEMS, III-V compound devices, organic devices and nanoimprint technology. Last, the Michigan Nanotechnology Institute for Medicine and Biological Sciences (*M-NIMBS*) is a multidisciplinary team of chemists, physicists, engineers, pharmacists, (bio) informatics specialists, and biologists collaborating on nanoscience in biology and medicine. The interaction among these groups should accelerate discovery in

Nanoscience. It currently involves approximately 60 faculty, in a "no-walls" model using facilities in the Engineering, Medical and LSA schools.

SSEL traces its history back to 1946, when the Electron Tube Laboratory (ETL) was established at the University of Michigan. ETL was renamed the Electron Physics Laboratory (EPL) in 1958 to reflect the emerging role of electronics. Currently, SSEL has a very broad research program in all aspects of solid-state devices and technologies, including solid-state physics and theory, integrated photonics and optoelectronics, organic and molecular electronics, optical displays and devices, microwave devices and circuits, semiconductor materials, semiconductor characterization and metrology, nanotechnology and nanofabrication, integrated RF, analog, digital, and VLSI circuits, solid-state sensors, actuators, microelectromechanical systems (MEMS), and integrated Microsystems, optical measurement systems. The mission of *M-NIMBS* is to harness nanoscale science and engineering for biological and medical applications, as well as to use bio-inspired nanostructures to develop new forms of materials, sensors and electronics. The long-term goals of this Institute are to advance science and commercialize discoveries, to enhance competitiveness for externally funded grants and contracts, to establish a Rackham Certificate program in Nanotechnology, and to design and offer an undergraduate overview Nanotechnology course taught by multiple faculties. In 1998, we formed the Center for Biologic Nanotechnology at the University of Michigan. At its core, the Center was formed to take advantage of the advances in the basic sciences and engineering and apply them to biological systems for medical applications. The Center has successfully competed for funding from a variety of sources, including the NIH Unconventional Innovations Program and NASA. As like Rice University, the information on this web-site of the University of Michigan, Ann Arbor is presented in a well-organized manner, and the organization's advisory boards are easily accessible. The intended audiences of the website are the prospective students including undergraduate, graduate students, and research center of companies and government for funding.