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"Nanotechnology: A Multidisciplinary approach"

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Abstract: Nanotechnology is an emerging branch of science for designing tools and devices of size 1–100 nm, with unique functions at the cellular, atomic and molecular levels. Nanotechnology combines solid state physics, chemistry, electrical engineering, chemical engineering, biochemistry, biophysics, and materials science. It is thus a highly interdisciplinary area – integrating ideas and techniques from a wide array of traditional disciplines.

Introduction: Nanotechnology literally means any technology on a nanoscale that has applications in the real world. Nanotechnology encompasses the production and application of physical, chemical, and biological systems at scales ranging from individual atoms or molecules to submicron dimensions, as well as the integration of the resulting nanostructures into larger systems. Nanotechnology is likely to have a profound impact on our economy and society in the early 21st century, comparable to that of semiconductor technology, information technology, or cellular and molecular biology.

The Structure of Nanotechnology

Nanotechnology is distinguished by its interdisciplinary nature. For one thing, investigations at the nanolevel are occurring in a variety of academic fields. More important, the most advanced research and product development increasingly requires knowledge of disciplines that, until now, operated largely independently. These areas include:

• *Physics* — The construction of specific molecules is governed by the physical forces between the individual atoms composing them. Nanotechnology will involve the continued design of novel molecules for specific purposes. However, the laws of physics will continue to govern which atoms will interact with each other and in what way. In addition, researchers need to understand how quantum physics affects the behaviour of matter below a certain scale.

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• *Chemistry* — The interaction of different molecules is governed by chemical forces. Nanotechnology will involve the controlled interaction of different molecules, often in solution. Understanding how different materials interact with each other is a crucial part of designing new nanomaterials to achieve a given purpose.

• *Biology* — A major focus of nanotechnology is the creation of small devices capable of processing information and performing tasks on the nanoscale. The process by which information encoded in DNA is used to build proteins, which then go on to perform complex tasks including the building of more complex structures, offers one possible template. A better understanding of how biological systems work at the lowest level may allow future scientists to use similar processes to accomplish new purposes. It is also a vital part of all research into medical applications.

• *Computer Science* — Moore's Law and its corollaries, the phenomena whereby the price performance, speed, and capacity of almost every component of the computer and communications industry has improved exponentially over the last several decades, has been accompanied by steady miniaturization. Continued decreases in transistor size face physical barriers including heat dissipation and electron tunneling that requires new technologies to get around. In addition, a major issue for the use of any nanodevices will be the need to exchange information with them. Finally, scientific advances will require the ability to manage increasingly large amounts of information collected from a large network of sensors.

• *Electrical Engineering* — To operate independently, nanodevices will need a steady supply of power. Moving power into and out of devices at that scale represents a unique challenge. Within the field of information technology, control of electric signals is also vital to transistor switches and memory storage. A great deal of research is also going into developing nanotechnologies that can generate and manage power more efficiently.

• *Mechanical Engineering* — Even at the nanolevel issues such as load bearing, wear, material fatigue, and lubrication still apply. Detailed knowledge of how to actually build devices that do what we want those to do with an acceptable level of confidence will be a critical component of future research. Unfortunately, most of academia and the research community do not facilitate this type of multidisciplinary research. Yet in nanotechnology most of the great possibilities are precisely in these gaps.

Conclusions

Nanotechnology is a fast-expanding area of science. Nanotechnology is a field that applies to many different branches of science. Nanotechnology is at the leading edge of chemistry, molecular biology, engineering and other disciplines. Nanotechnology is a fundamental, enabling technology, allowing us to do new things in almost every conceivable technological discipline. Nano means small but of high potency and emerging with large applications piercing through all the discipline of knowledge, leading to industrial and technological growth. The world in which our children live will surely be a different one. Whether it is a better one is largely up to them to decide. Continued technological advancement, including on the nanoscale, will not automatically make the world any fairer or safer, but it will increase the resources available to those who want to ensure that it is.

References

- http://en.wikipedia.org/wiki/Nanomaterials
- http://en.wikipedia.org/wiki/Silver_nanoparticles
- http://en.wikipedia.org/wiki/Platinum_nanoparticles
- http://en.wikipedia.org/wiki/Nanoscale_iron_particles
- http://en.wikipedia.org/wiki/Colloidal_gold
- http://en.wikipedia.org/wiki/Nanotechnology