

# Nano Technology: An Overview

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## Abstract

India is one of the major global leaders in production of nanotechnology and has made tremendous effort to serve to the betterment of human life in this world. While Nanotechnology has deeply penetrated the workings of the technological world, the knowledge of its worlds and its prominence has been clandestine to commonfolk. Through this paper, the author aims to throw light on the working and the significance of Nanotechnology. A detailed description of the importance of Nanotechnology has been provided aiming at educating and creating awareness among general public. This has also been corroborated with the use of contemporary issues and examples

**Keywords:** Nanotechnology, contemporary, biological, military, ecological, engineering

## I. INTRODUCTION

As commonly known, Nanotechnology is nothing but maneuvering of matter to molecular, atomic and even subatomic. The precise word nanotechnology means the manipulation of matter from sizes of 1-100 nanometers. The word nanometer shows how tiny the particles and how small the technology created based on it are. The word “nano” is derived from Greek word “nanos” (meaning “dwarf” in Latin). The word in the context of technology means, that the implementation of particles which when compared in the physical realm (Quantum realm) or in real world is very concise. The molecular technology also comes in the reference of this nanoparticles. Nano particles can be of various types i.e., they exist in various dimensions. They have a large impact in the industrial sector.

It can be noticed that, this technology has become extremely common and is widely used in a plethora of fields today. Nanotechnology has great potential for growth and the wide spread knowledge of its use is gaining momentum with the government sector as well, resulting in huge investments being made with respect to time and technology.

While most of the common masses may be familiar with the word Nanotechnology. However, many still parry the knowledge of its workings and advantages. Therefore, it is now imperative to know the use in commonplace activities now.

## II. NANOTECHNOLOGY: IMPLICATIONS IN DIFFERENT SECTORS

Some fields in which nanotechnology is significant are medicine, agriculture, military-grade technology, artificial intelligence, microfabrication, energy storage, molecular engineering, etc.

### A. Medicine

Crafting a cure for Cancer has been a colossal task for about two centuries. There have been many advancements, but the fact that all of those methods have proven to have major side effects cannot be ignored. In such a scenario, nanotechnology has proven to be the answer. In Medical sector, nanotech has been in use for the treatment of cancer. Nanoparticles which are used for chemotherapy drug carriers have shown to have major effects. By merely focusing these nanocarriers on the cancerous cells it has been seen that further damage can be prevented to the healthy cells.

Cutting-edge biosensors with unique structures can be developed with the aid of carbon nanotubes. These bio sensors can be used for astrobiology and can throw light on study of origin of life.

Besides the aforementioned features, nanotech is being used in the study for regeneration of brain cells, to cure neuro diseases, etc. Many major diseases can be detected and even cured at an early stage with this technology.

### B. Agriculture

Despite, the numerous advancements, in the field of agriculture, we all have been witnessing the drawbacks of the long waits for the harvest of some of the vital crops. Due to the ration of the developing countries to the developed countries, it is imperative that we must focus on the sustenance and well - being of the populations in these countries. Only then can problems such as the ongoing crisis in Venezuela can be averted.

These developing countries face a horde of critical issues such as lack of new arable soil, reduction of the existing agricultural land due to competing economic and development activities, surging consumerism, poverty and malnutrition, which need to be solved in a holistic manner. Great mechanical advancements in the agricultural sector have ensued due to the rapid development of technological innovations. However, they are posed with challenges such as sustainable production keeping in view issues

such as food security, poverty reduction and public health.

Nanotechnology comes into play in such circumstances. Some of its advantages have been elaborated further.

There are few techniques which have proven to stimulate the growth of crops and plants and help them withstand harsh climatic conditions in addition to other problems that affect the crops regularly. Techniques like, use of Nano-capsules detectors to detect the life span, nanotubes to detect the diseases in plants and the detection of the availability of water for plant growth, etc. are all the applications of nanotechnology.

Study of applications of nanotechnology in materials' science and biomass conversion technologies applied in agriculture are the basis of providing food, feed, fiber, fire and fuels.

### C. Defense Sector

Defense is one of the major government - controlled branches that uses nanotechnology. Nanotechnology is used for critical work in defense. The depiction of this technology on the silver screen is a pauper's fantasy to say the least.

Nanotechnology has paved way for the conception of cloaking devices (which are theoretical for now, but research is in process), advanced medical treatment for defense personnel, sophisticated weaponry propelling the defense industry into the space age as we would call it.

All the above are merely, the positive effects. As a flipside, improper use of this technology has serious negative implications as well capable of massive catastrophes.

Introduction of micro bots and nanobots by the Department of Defense in the United States of America, have enabled the military sector in the creation of equipment to prevent potential theft of technology and misuse.

They have even succeeded in the creation of a better military automobiles in addition to the weaponry.

Nanotechnology has been used in the creation of submarines for deep water excavations thus creating a great opportunity for researchers to explore more avenues in the field of oceanography.

### D. Artificial intelligence

Artificial intelligence has a fundamental relationship with nanotechnology. Nanotech is an integral and a fundamental unit in the software world. Nanotech powered computer hardware could surpass the GPU and lead to major breakthroughs via extensive research and enabling stochastic processes even beyond bleeding edge work like that existing in the press today.

The field of AI can be broken down into several categories like the Conventional Artificial Intelligence (neural networks), Robotics/Androids, Molecular Nanotechnology. The use of nanotechnology by NASA is one of the major breakthroughs in the history of science.

Another approach to nanotechnology is supramolecular self-assembly, where molecular systems are designed to attract each other in a particular orientation to form larger systems. Hollow spheres large enough to be visible in a standard light microscope have been created this way using self-assembling lipids.

All of the major inventions which are made in AI are supported by this technology. The future of the computers is AI, but if nanotech is used with it more constricted systems which might not even need the use of minimal human effort can be created which could also possibly work only with the aid of the signals of the human brains.

## III. OVERVIEW AND CONCLUSION

The three paths of protein design (biotechnology), biomimetic chemistry, and atomic positioning are parts of a broad bottom up strategy: working at the molecular level to increase our ability to control matter. Traditional miniaturization efforts based on microelectronics technology have reached the submicron scale; these can be characterized as the top down strategy.

The future advancements which is expected from this field is the creation of unlimited energy. This establishment will lead to a new era in the world of resources. This will also create a reduction in exploiting the natural resources. This creates an opportunity for all the humans from facing extinction.

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## REFERENCES

- [1] Rajak A, (2018) Nanotechnology and Its Application. J Nanomed Nanotechnol 9: 502. Doi: 10.4172/2157-7439.1000502
- [2] Nikalje AP, (2015) Nanotechnology and its Applications in Medicine. Med chem 5: 081-089.
- [3] Thakur S, Thakur SK, Kumar R, (2018) Bio-Nanotechnology and its Role in Agriculture and Food Industry. J Mol Genet Med 12: 324. Doi: 10.4172/1747-0862.1000324
- [4] Echiegu EA, (2016) Nanotechnology as a Tool for Enhanced Renewable Energy Application in Developing Countries. J Fundam Renewable Energy Appl 6: e113. doi:10.4172/2090-4541.1000e113
- [5] <https://www.frontiersin.org/articles/10.3389/fenvs.2016.00020/full>