

# Nanotechnology: A Revolution in Technology

Somesh Kumar Dewangan

Department of Computer Science and Engineering  
GD Rungta College of Engineering and Technology  
Bhilai, Durg, India

Jyotir Moy Chatterjee

Department of Computer Science and Engineering  
GD Rungta College of Engineering and Technology  
Bhilai, Durg, India

**Abstract**— This paper provides a concise portrayal of Nanotechnology. Furthermore, its various application in different areas like processing, pharmaceutical, nourishment technology, Robotics, Solar cells and so forth. This additionally manages the future points of view of Nanotechnology, chances in cutting edge nanotechnology.

**Keywords**— Nanotubes, NanoFilms, Grey Goo, anoelectronics, Nanomedicine.

## 1. Introduction

Nanotechnology ensures the ability to build correct machine and parts of nuclear size. In this one of a kind sense" nanotechnology alludes to the foreseen ability to manufacture things from the base up, using strategies and contraptions which are being made to make world class things. As indicated by National Science Foundation and NNI, Nano development is the ability to fathom , control and control matter at the level of individual particles and molecules[1].

Nanotechnology pushed variation it will have noteworthy impact on all organizations and all scope of society[2].

The Convergence at the nanoscale accomplished its quality in about yea 2000 and 2005, and one way gage a distinction of the nanosystem models in the accompanying joined to response.

## 2. Nanotechnology to use in different purpose.

Specialists and architects have been acing the complexities of working with nanoscale materials. Thing using nano scale materials and process are as of now available. A nonoscle dry powder can murder gas. Batteries for gadgets are being delivered in view of nanoscale materials keeping the ultimate objective to pass on more power more rapidly with less warmth. Distinctive techniques and things in perspective of nanoscale particles are depict basically.

### 2.1 Drug-Delivery Technology

Nanotechnology treatment can be precisely formed and created for a wide grouping of uses, including the treatment of wipe out and other disease[3]).

### 2.2. Nano Films:

It can be used as a piece of thin films to impact them to water repellent, against astute, self-cleaning, Ultraviolet or

infrared-protected, antagonistic to fog anti0microbial scratch-safe, or electrically conductive.

### 2.3 Water Filtration technique

Nanoscale materials that can possibly channel and decontaminate water incorporate nanoscale titanium dioxide, which is utilized as a part of sunscreen and which has been appeared to kill microbes [3].

### 2.4 Nano Tubes

Nanotubes have been developed with length-to-distance across proportion of up to 28,000,000:1, which is altogether bigger than some other material. They show exceptional quality and remarkable electrical properties, and are productive transmitters of warmth. Their last use, be that as it may, might be restricted by their potential lethality [3].

### 2.5 Nanoscale Transistors

In PCs, the more transistors, the more noteworthy the power. Transistors sizes have been diminishing, so PC have turned out to be all the more intense. As of not long ago, the industry's best business innovation created PC chips with transistors having 45-nanometer features[3].

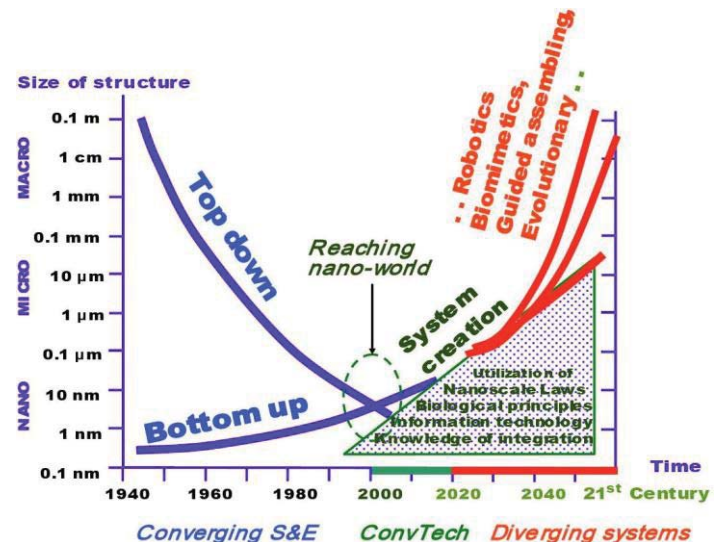


Figure 1. Coming to at the nanoworld (around 2000) and "merging advancements" approach for framework creation from the nanoscale (2000-2020) towards new standards for nanosystem structures in applications (after 2020) [1].

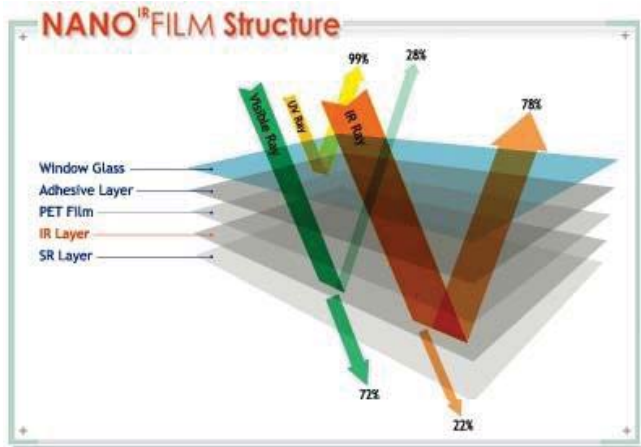


Figure 2. Nano Films [1]

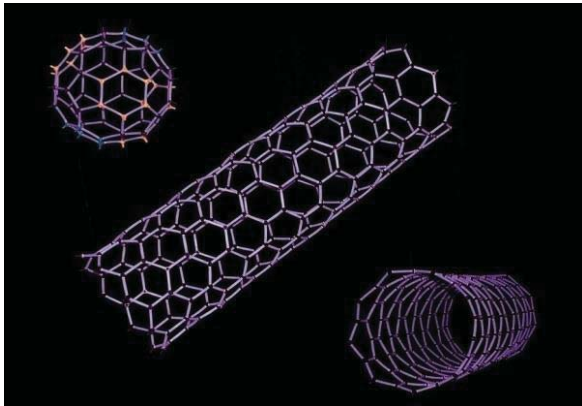


Figure 3. Nano Tubes [1].

### 3. Nanotechnology applications

Nanotechnology applications are being created that could affect the worldwide market for agrarian, mineral, and other non-fuel wares. As of now, Nanotechnology is portrayed as progressive teach regarding its conceivable effect on modern applications. Nanotechnology offers potential answers for some issues utilizing developing nano techniques. We endeavored to give a short review about some nanotechnology and nanoscience current improvements. Here are a few fields where nanotechnology has been executed [5].

#### 3.1 Nanorobot Development for Defense

The defense section ought to strikingly profit by accomplishments and patterns on current nanobiotechnology frameworks incorporation. Such patterns on innovation have additionally brought about a current developing enthusiasm from the universal academic group, including medicinal and pharmaceutical segments, towards the innovative work of sub-atomic machines. Keeping up the Integrity of the Specifications.

#### 3.2 Medical Nanorobots

As incorporated control instruments at minuscule situations contrast from ordinary control systems, approaches utilizing occasion based bolster forward control are looked to successfully progress new restorative advancements. Similarly, the improvement of microelectronics in the 1980s has prompted new devices for biomedical instrumentation, the assembling of nanoelectronics, will likewise allow facilitate scaling down towards incorporated restorative frameworks, giving effective techniques to obsessive visualization.

A first arrangement of nanotechnology models for atomic machines are being explored in various ways, and some intriguing gadgets for drive and sensing have been presented. More complex molecular machines, or nanorobots, having embedded nanoscopic features represent new tools for medical procedures.

### 4. Applications under Development

Scientists were examining the accompanying with employments of nanotechnology in space:

- Use of carbon nanotubes for making the connection required for the space lift, a system which could basically reduce the cost of sending material into space.
- Employing materials created utilizing carbon nanotubes to diminish the weight of spaceships.
- Producing thrusters for rocket that use MEMS contraptions to animate nanoparticles.
- Using carbon nanotubes to gather lightweight sun arranged sails that use weight of light from the sun considering the mirror-like sun situated cell to drive a van
- Deploying an arrangement of nanosensors to look for immense zones of planets, for instance, Mars for indications of water or diverse chemicals [6].

#### 4.1 Nanotechnology and Space

Its influencing space-to flight more handy. Progressions in nanomaterials make lightweight sun based sails and a link for the space lift conceivable. What's more, new materials joined with nanosensors and nanorobots could enhance the execution of spaceships, spacesuits [6].

#### 4.2 Nanotechnology in Electronics: Nanoelectronics

we may expand the abilities of hardware gadgets while we decrease their weight and power utilization.

- Improving show screens on hardware gadgets.
- Increasing the thickness of memory chips.
- Reducing the measure of transistors utilized as a

part of coordinated circuits.

#### 4.3 Nanotechnology in Medicine

Designing particles to be utilized as a part of along these lines permits discovery and additionally treatment of infections or wounds inside the focused on cells, consequently limiting the harm to solid cells in the body [8].

#### 4.4 Current Applications

Nanocrystalline silver is as of now being utilized as an antimicrobial operator in the treatment of wounds [8].

#### 5. Risks of Nanotechnology

Atomic assembling operations could be completed with disappointment rates short of what one in quadrillion. A little nanomachine fit for replication could in principle duplicate itself too often. On the off chance that it were fit for surviving outside, and utilizing biomass as crude material, it could seriously harm the earth [8].

Engineering particles to be used in this way allows detection and/or treatment of diseases or injuries within the targeted cells, thereby minimizing the damage to healthy cells in the body [8].

#### 4.4 Current Applications

Nanocrystalline silver is already being used as a antimicrobial agent in the treatment of wounds [8]. Following applications also will be released very soon:

Adequately effective items would either antagonistic governments or furious individual, to wreak destruction. Ruinous nanomachines could do gigantic harm to unprotected individuals and articles. In the event that the wrong individuals picked up the capacity to fabricate any coveted item, they could govern the world, or cause enormous decimation in the endeavor.

The unlimited accessibility of nanotechnology postures grave dangers, which may well exceed the advantages of spotless, shabby, advantageous, independent assembling [8].

It must be managed with considerably more care. Reckless utilization of sub-atomic assembling could prompt underground markets, flimsy arms races finishing off with colossal decimation, and conceivably an arrival of dark goo [9]. At the point when the measure of coin silver contained in a silver dollar is rendered into 1 nm particles, the surface zone of those particles is 4.115 million times more noteworthy than the surface region of the silver dollar! [12].

## 6. Complications

### 6.1 Environmental issue

In free frame nanoparticles can be discharged noticeable all around or water amid generation. On the off chance that they do, we additionally don't know yet how such poisons could be expelled from air or water on the grounds that most customary filters are not appropriate for such errands. The figure shows how nanotechnology impacts the earth [10].

### 6.2 Health issue

Healthcare and natural issues join in the working environment of organizations occupied with delivering or utilizing nanomaterials and in the labs occupied with nanoscience and nanotechnology inquire about. The effect on people or the earth may shift at various phases of the life cycle [10].

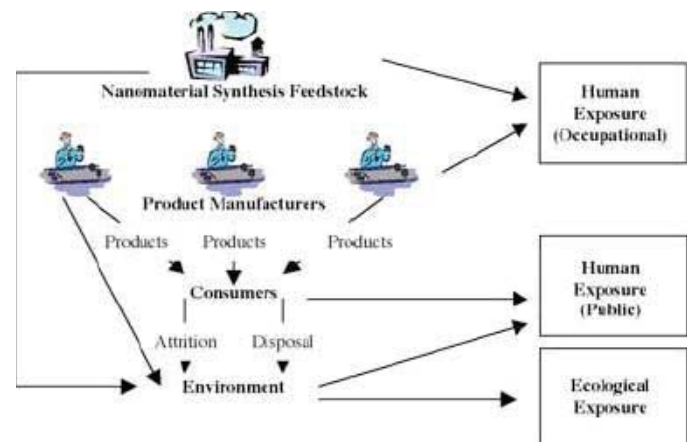


Figure 4. Potential for release and exposure to nanoscale substances [12].

## 7. Conclusion

These scientists imagine a world in which new materials, outlined at the nuclear and sub-atomic level, give sensible, savvy techniques for bridling sustainable power sources and keeping our condition clean. They picture new innovations for ensuring both our military powers and regular folks from customary, organic, and compound weapons. It has opened logical Inquiry to the level of particles and a universe of new open doors.

## References

- [1] Nanotechnology, Thinking big from a small world: a Review, Debnath Bhattacharyya, Shashank Singh, Niraj Satnalika, Ankesh Khandelwal, and Seung-Hwan Jeon
- [2] Handbook on Nanoscience, Engineering and Technology, 2nd Ed., Taylor and Francis, 2007.
- [3] Centre Responsible For Nanotechnology, <http://www.crnano.org/whatis.html>

- [4] National Nanotechnology Initiative.  
<http://www.nano.gov>
- [5] Nanotechnology: A Brief Literature Review M.Ellin Doyle, Ph.D Food Research Institute, University of Wisconsin–Madison, Madison, WI 53706.
- [6] NASA Institute for Advanced Concepts report: The Space Elevator. <http://www.nanotech-now.com>
- [7] Nanoelectronics: Nanotechnology in electronics.  
<http://www.understandingnano.com>
- [8]<http://www.nanotechproject.org/inventories/medicine> and Nanotechnology in medicine, <http://www.nanomedjournal.com>
- [9] Chris Phoenix and Mike Treder, “Safe Utilization Of Advanced Nanotechnology”, Center for Responsible Nanotechnology (CRN), January 2003, Revised on December 2003. <http://www.crnano.org/safe.htm>
- [10] Laura Wright. “Nanotech Safety: More on How Little We Know”, OnEarth Magazine, December 12, 2007.
- [11] Nanotechnology Risks-the real issues.  
<http://www.nanowerk.com>
- [12] Research Strategies for safety Evaluation of Nanomaterial. Part IV: Risk Assessment of Nanoparticles.



**Somesh Dewangan** was born in Raipur, India. He received the MCA from the University of Bhoj, Bhopal, India, in 2005, and the M.Tech. and Ph.D(P). degrees in Computer Science and Engineering from the Chhattisgarh Swami Vivekananda Technical University Bhilai, , India, in 2009 and in progress, respectively.

In 2005, he joined the Department of Computer Science and Engineering, Disha Institute of Management and Technology (Affiliated to CSVTU Bhilai), as a Lecturer, and in 2008 became a Reader. Since October 2015, he has been with the Department of Computer Science and Engineering, CIT Abhanpur Raipur, where he was an Assistant Professor, became an Associate Professor in 2015. Presently working as Asst. Professor at GD Rungta College of Engineering and Technology, Bhilai Since 2017. His current research interests include Natural Language processing, Network Security, Mobile Computing, Image Processing, Remote Sensing Network.Mr. Dewangan is a Treasurer of the CSI Raipur Chapter Since 2012. He is a Life Member of the Computer Society of India, International Association of Engineers, International Association of Computer Science and Information Technology, and Yearly Membership of IEEE. He is Member of Editorial Board in International journal of Engineering and Innovative Technology(IJEIT) and International Journal of Computer Networks and Communications Security (IJCNCS). He is reviewer of many

journals like International Journal of Computer System and Information Security (IJCSIT Publication Pittsburgh, PA 15213, USA), International journal of Computer and applications (ACTA, Canada),IJCSI ,Mauritius etc.



**Jyotir Moy Chatterjee** is working as Assistant Professor in Department of Computer Science and Engineering at GD-RCET, Bhilai, C.G, India. He received M. Tech from KIIT University, Bhubaneswar, Odisha and B. Tech in Computer Science & Engineering from Dr. MGR Educational & Research Institute University. He is the member of

CSI. His research interests include the cloud computing, big data, privacy preservation and data mining. He is also Oracle Certified OCA 10g and IBM Certified Associate System Administrator Lotus Notes and Domino 8. He is in the Editorial Board of Sodh, Samiksha Aur Mulyankan Journal (UGC approved).