



**A Report on**

**GUJCOST SPONSORED TWO DAYS STATE LEVEL**

**Seminar on**

**“IMPORTANCE AND RELEVANCE OF  
NANOTECHNOLOGY IN ENGINEERING FIELDS”**

**Held on 16<sup>th</sup> and 17<sup>th</sup> September 2019**



**Organized by**

**Mechanical Engineering Department**

**Dr. Jivraj Mehta Institute of Technology**

Mechanical Engineering Department, Dr. Jivraj Mehta Institute of Technology, Mogar organized the GUJCOST Sponsored State Level Seminar on '**Importance and Relevance of Nanotechnology in Engineering Fields**' on 16th and 17th September 2019.

### **ABOUT THE SEMINAR AND ITS OBJECTIVE**

- Nanotechnology is very precise and highly specialized fields having multi-disciplinary applications like mechanical, electrical, thermal, material science, space, medicine, automation, civil, etc.
- It has strong socio-economic relevance to provide novel solution for improved results in all domains.

**The objectives of the Seminar** were:

- To introduce the basic concepts and understanding the importance and relevance of Nanotechnology in today's world of engineering.
- To encourage interaction of experts with the target audience from different institutes including UG/ PG students and faculty members to put forth its relevance in field of engineering.
- To give environment wherein experts will share ideas about current trends and interest fields of nanotechnology in specific fields to bring awareness for research and academic progress and
- To give exposure to current status of research in Nanoscience and Nanotechnology.

### **REGISTRATION:**

- The registration began from 9:00 a.m. onwards. The total of 80 participants registered for the seminar including UG students, PG students and Faculty members.
- Spot registration was allowed for participants. Some students and faculties were even give free registration or with token fee for the seminar.
- Registered participants received the Kit which included the seminar brochure and schedule of two days sessions.

## SCHEDULE OF TWO DAYS SEMINAR ON NANOTECHNOLOGY

<b>DAY– 1, MONDAY, 16<sup>th</sup> SEPTEMBER 2019</b>	
9:00 am	Registration
9:30 am	Inaugural Function
10:00 to 10:15 am	Hi-Tea
10:15 to 12:00 noon	<b>Session-1: Nanoscience and Nanotechnology: Facts and Future Perspectives</b> by Dr. J. K. Valand, Material Science Dept, Sardar Patel University
12:00 to 1:00 pm	Lunch
1:00 to 2:45 pm	<b>Session-2: Exploring the Concepts of Chemistry to Synthesize Monodispersed Semiconducting Nanoparticles and their Applications</b> by Dr. Hemant Soni, Chemistry Dept, Faculty of Science, The Maharaja Sayajirao University of Baroda
2:45 to 3:00 pm	Tea & Snacks
3:00 to 4:30 pm	<b>Session-3: Frontiers of Nanomaterials and its Diverse Applications</b> by Dr. Anand Joshi, Mechatronics Engg. Dept, G. H. Patel College of Engineering And Technology
<b>DAY– 2, TUESDAY, 17<sup>th</sup> SEPTEMBER 2019</b>	
10:00 to 10:15 am	Hi-Tea
10:15 to 12:00 noon	<b>Session-4: Nanoparticle Mediated Engineered Textile for Functional Applications</b> by Dr. Satyajeet Chaudhari, Textile Engg. Dept, Faculty of Technology and Engineering, The Maharaja Sayajirao University of Baroda
12:00 to 1:00 pm	Lunch
1:00 to 2:45 pm	<b>Session-5: Nanotechnology and Nanomaterials for Economic, Energy Efficient and Durable Products</b> by Dr. Jaysukh Markna, Nanotechnology Dept, VVP Engineering College, Rajkot
2:45 to 3:00 pm	Tea & Snacks
3:00 to 4:30 pm	<b>Session-6: Nanotechnology: A Role in Solar Energy Harvesting for Domestic Water Heating Systems</b> by Dr. Rupesh Ramani, Mechanical Engg. Dept, VVP Engineering College, Rajkot

### **INAUGURATION FUNCTION:**

The inauguration session began with welcome to all the dignitaries on the dais. Prof. Jugal Shah of Mechanical Department, DJMIT gave warm welcome to the dignitaries on the dais and off the dais as well as all the faculties and participants to the Seminar.



**Welcome to Dignitaries and Lighting of Lamp**

For an auspicious beginning, the prayer was sung by Ms. Shikha Gupta when the lighting of lamp done by all the dignitaries.

After that the floral welcome to all the dignitaries was done.

The dignitaries on dais included Dr. B. R. Parekh, Principal, DJMIT, Session Expert Dr. J. K. Valand, Dr. Manish Mehta, Head, Mechanical Department, DJMIT and Prof. Avdhoot Jejurkar, Convener of the Seminar.

### **SPEECHES:**

#### **DR. B. R. PAREKH. PRINCIPAL, DJMIT**

Welcome speech was given by Dr. B. R. Parekh, Principal, DJMIT. He briefed about the very purpose of organizing the event and gave warm welcome to dignitaries and participants. He briefed about history of Nanotechnology and emphasized on the importance of Nanotechnology in various fields. He congratulated the convener for organizing such sponsored seminar and wished all success to the department for conducting seminars.

#### **PROF. AVDHOT JEJURKAR, CONVENER**

Prof. Avdhoot Jejurkar, Convener of the Seminar brief about the seminar as well as the 2-Days schedule during which he wished that the participants would enhance their knowledge and get enlightened by the interaction with various s experts.



**Speech by Principal, DJMIT and Convener during Inaugural Session**



**Audience during Inaugural Session**

Dignitaries were presented mementoes as a token and memory of the Seminar from the college.

### **VOTE OF THANKS:**

Vote of thanks for the inaugural function was proposed by Prof. Avdhoot Jejurkar, Reader, Mechanical Engg. Dept. DJMIT. He thanked GUJCOST for financial support. He thanked DJMIT Management, Chairman, Directors and Principal for encouraging and supporting in various activities including this seminar.

He thanked all those who were involved directly and indirectly to make the seminar successful including the participants. He thanks those who were involved in activities like registration (Prof. Vivek Patel and Prof. Darshan Gajdhar with support of students like Dipen Munjani), food and other activities by Prof. Sunil Bachani, Prof. Manish Rohit and others), decoration and stage activities (Prof. Jugal Shah with help of dept staff as well as help of other department faculties).

Participants were invited for Hi-Tea after the inaugural session.

## Session I: Nanoscience and Nanotechnology: Facts and Future Perspectives

by **Dr. J. K. Valand**,

Material Science Dept, Sardar Patel University

**On First Day** - Session began with introduction to Speaker and floral welcome.

- **Dr. J K Valand** covered various topics starting from the basics, applications, measurement, milestones, scientists, etc related to nanotechnology through picturesque slides during his presentation.
- He briefed about measurement standards, terminology of nano, nanometer, nanotechnology, nanoscience, nanomaterials as well as standards like ISO, ASTM, IECTE, etc.
- He focused on the importance of nanotechnology and its relevance in various fields by means of variety of examples and images related to the same.
- He compared various distances and sizes at nanoscale to brief importance and examples of different sciences.
- He discussed advances in the world of nanotechnology in terms of a revolution. He emphasized about the collaboration of various streams which lead to Nanotechnology.
- He gave credit to Noble laureate Richard Feynman for his contribution and initiation of field of Nanotechnology by saying his famous quote.
- He compared old with new nanotechnology applications and also discussed the property changes in optical, mechanical and other properties when material is treated at nanoscale to enhance features as desired for specific applications.
- He discussed topics like Hell-Patch Relationship and the 'Top-Down' and 'Bottom-Up' approach of nanofabrication processes.
- He highlighted about of graphine, composites, carbon nanotubes and its varieties and well as characterization techniques and use of various special equipments for this purpose.
- He enlightened the distances related to computer and communication peripherals by quoting distances of tracks in CD, DVD, etc.
- At the end of session he briefed application of nanotechnology in automotive sector, sports, textile, cosmetics, etc for enhanced performance and aesthetics.



**Photos during Session by Dr. J. K. Valand**

Memento was presented to Speaker by Dr. Manish Mehta, Head, Mechanical Dept., DJMIT at the end of Session.

Participants and guests were then invited for Lunch.

## **Session II: Exploring the Concepts of Chemistry to Synthesize Monodispersed Semiconducting Nanoparticles and their Applications**

**By Dr. Hemant Soni,**

Chemistry Dept, Faculty of Science, The Maharaja Sayajirao Uni. of Baroda

Post-Lunch Session began introduction to the Speaker and floral welcome.

- **Dr. Hemant Soni** started the session with basics, history and nanochemistry-a branch having nanoscale synthesis, characterization & assembling.
- He discussed about colloidal nanocrystals its controlled growth, monodisperse nanocrystals, its synthesis and varieties associated with its study.
- He tried to update considering back dated history till date, about nanocrystals and compared nanocavity route and bulk solution route as well as various factors affecting it. He briefed about organometallic approach and various reactions associated with it for different compounds. He also explained the process of making it and associated drawbacks. He elaborated about improved nanochemistry synthesis and techniques associated with it
- He talked on various topics associated with nanochemistry like doping, semiconductor nanomaterial and its importance in terms of synthesis, its measuring patterns, instruments associated as well as how to interpret the readings generated for understanding the effect, various spectra generated, photocatalytic activity and its comparison, effect of doping, etc.

- He focused about detection of hydroxyl radicals, doping ions, spectra, VSM data, carrier mediated ferromagnetism, etc. Participants gained knowledge of nanochemistry and useful applications. He discussed on nanocarriers, its problem, treatment, strategies, physiological barriers and related solutions.
- He discussed magnetic resonance principle, problems and solution and also development of Iron Oxide Nanoparticles as Drug Delivery Vehicle, preparation and formulation of nanoparticles and about  $T_1$ - $T_2$  Dual Contrast Agent for MRI. He also briefed about XRD, TEM, etc and about results generated from graph.
- At the end of session, he highlighted some of the aspects of histopathological analysis, phantom study and compared various samples with respect to coating, dimensions and properties.



**Photos during Session by Dr. Hemant Soni**

Memento was presented to Speaker by Dr. Manish Mehta, Head, Mechanical Dept., DJMIT at the end of Session.

Participants were offered Hi-tea after the session.

### **Session III: Frontiers of Nanomaterials and its Diverse Applications**

**By Dr. Anand Joshi,**

Mechatronics Engg. Dept, G. H. Patel College of Engg. and Technology

- The second session continued little longer.
- Then the participants were invited for Tea break.
- Due to some urgent issue, Dr. Anand Joshi could not take the session so there was general interaction with the participants

## **Session IV: Nanoparticle Mediated Engineered Textile for Functional Applications**

**By Dr. Satyajeet Chaudhari,**

Textile Engg. Dept, Faculty of Technology and Engineering,  
The Maharaja Sayajirao University of Baroda

**On Day- Two,** Session began with introduction to Speaker and floral welcome

- Dr. Satyajeet Chaudhari started with introduction to nanotechnology, various applications and gradually shifted towards textile as upcoming field in nanotechnology. He discussed various centers focusing on research in nanotechnology.
- He quoted famous texts related to nanotechnology spoken by various researchers and scientists as well as research centers.
- He briefed about nano-sized additions.
- He presented and discussed on slides related to applications of nanomaterials based products like in case of automotive industry, electronic industry, textiles, fabrics and non-woven type, food and drinks, chemical industry, construction, energy sector, household products, engineering fields, medicine and pharmaceuticals, cosmetics, sports, etc.
- He then focused on targeted textile products like apparel fabric, home furnishings, garments, toys, public products, etc.
- He discussed about the functional application of nanomaterial on Fiber, Fabric and Garments.
- He highlighted various aspects like conductive textiles, reinforced textiles, antibacterial textiles, self-cleaning textiles by photocatalytic coatings, UV blocking textiles, insulating textiles, luminescent textiles and flame retardant textiles. He elaborated for each case the techniques and its applications and products available.
- He discussed properties associated for such varieties mentioned like hydrophobic textiles, anti-adhesive properties,
- He also discussed use of nanotechnology in controlled release of active agents, drugs or fragrances.
- At the end of session he emphasized on understanding the impact of any textile product manufactured based on economical and environmental aspects.



**Photos during Session by Dr. Satyajeet Chaudhari**

Memento was presented to Session Speaker by Prof. Darshan Gajdhar, Mechanical Department.

Participants and guests were then invited for Lunch

### **Session V: Nanotechnology and Nanomaterials for Economic, Energy Efficient and Durable Products**

**By Dr. Jaysukh Markna,**

Head, Nanotechnology Department, VVP Engineering College, Rajkot

Post-Lunch Session began with introduction to Speaker and floral welcome

- **Dr. Jaysukh Markna** started the session with slides mentioning the energy saving and energy efficiency as it is related with all topics in today's world. He shared his nanotechnology experiences about techno-economic aspects as well as output based market in terms of product durability and efficiency.
- He talked about T&D losses theory as well as practical revenue losses due to it. He told that like other technologies, in nanotechnology also examples are taken from nature to generate new techniques like hydrophobic property like in lotus, water strider, etc. same can be used for products like car, cloths, water race, etc to minimize resistance of water and help for speed, cleaning, etc features as desired for any given product i.e. converting product basic design from hydrophilic to hydrophobic to add such features.
- He highlighted nanotechnology enhanced features like in textile related products. He emphasized more on idea, innovation and motivation and urged participants to get involved in research and innovation to convert idea into useful product which is saleable.
- He mentioned NANOTECHNOLOGY as SIXTH REVOLUTION.

- He briefed about advantage of high ratio of surface area to volume which can be used for manufacturing product at nanoscale. He urged participants to think nano and convert it into dollars or rupees by any idea or technique applied for the use of society considering economic impact in various fields. He said nanotechnology would be about 10 Trillion dollars industry by 2020 AD and briefed about Forbes top 10 products based on nanotechnology.
- He also shared details about DST site having Nano Mission and urged all to go ahead to harness maximum benefit out of it. He discussed about nanosilver and its varied applications e.g. toothpaste and brush, medicine, food products, packaging, wrapping, cloths, vessels, domestic appliances, cosmetics, drinking water and related products, etc and its effect compared to regular practices.
- He discussed advantages of nano engine oil and nano additives in automotive fuels for smooth operation of vehicles and overall annual saving by usage of this as well as saving of environment. He briefed how the nanotechnology can also enhance performance of athletes, sports persons, aviation, and various other useful products. He listed various manufacturing categories where nanotechnology can be boon for overall growth of various sectors and country.
- Lastly, he briefed about achievements at his college by his students and colleagues in the field of nanotechnology and invited participants to visit his premises for knowing the updates in the field. He ended his talk by mentioning participants to focus on innovation, invention and collaboration
- At the end of the talk, Expert congratulated the Convener and team involved for arranging such seminar for the benefit of students so as to peep into the world of nanotechnology for project, startup, etc.



**Photos during Session by Dr. Jaysukh Markna**

Memento was presented to Session Speaker by Prof. Vivek Patel, Mechanical Department.

Participants and guests were then invited for Tea.

## **Session V: Nanotechnology: A Role in Solar Energy Harvesting for Domestic Water Heating Systems**

**By Dr. Rupesh Ramani,**

Mechanical Engineering Department, VVP Engineering College, Rajkot

Session began with introduction to Speaker and floral welcome

- **Dr. Rupesh Ramani** started the session by discussing basics of solar energy and major uses as renewable energy source. He then discussed solar water heater and its significance wrt government for installations in different states of India.
- He talked about flat plate collector and evacuated tube collector and benefits of later as enhanced device.
- He then discussed about the use of nanoparticles in nanofluid in increasing the performance of solar device and various devices to check the coating and examination of materials.
- He briefed about synthesis of such material for coating and talked about precision devices like XRD, SEM, TEM, to identify correctness at atomic level. He talked his research field having combinations of nanoparticles to prepare nanofluids to check performance enhancement using different nanofluids.
- He briefed about use of various measuring instruments and their role in performing experiment for useful and authentic results.
- At the end of talk he encouraged participants to apply for various grants wherein one can pursue research using the funds by sponsoring agencies and encouraged to convert idea into patents.



**Photos during Session by Dr. Rupesh Ramani**

Memento was presented to Speaker by Prof Manish Rohit, Head, Mechanical Dept., DJMIT at the end of Session.

### **VALEDICTORY FUNCTION:**

The session began with inviting dignitaries on the dais. Principal Sir appreciated the team efforts of the department for successfully conducting the seminar. The certificates were distributed to Convener, Coordinator as well as participants.



**Briefing the Seminar by Expert and Convener before Certificate Distribution**



**Certificate to Convener and Coordinator**

Vote of thanks was proposed by Prof. Avdhoot Jejurkar, Mechanical Department. The participants and guests were then invited for tea at the end of two days seminar.

### **CONCLUDING STATEMENT:**

- Seminar on Nanotechnology helped the participants to learn various aspects and also to exchange ideas.
- The event helped in bringing together experts to discuss and share views and experiences on various topics related to Nanotechnology with the participants.
- This helped develop interest amongst the participants to peep into nanotechnology field for academic and research possibilities.

**FEEDBACK:**

- Dignitaries and Experts present during Two-Days Seminar highly appreciated the efforts for the seminar as well as for the variety of topics that were covered by different experts.
- Participants were impressed by the organization of the Seminar and also appreciated the ideas, views and knowledge shared by experts during various sessions.
- They could gain knowledge right from fundamentals of Nanotechnology to the variety of application and innovation and applications involved in various fields.
- Dignitaries, Experts and Participants appreciated the overall ambiance of the campus, institute building, schedule of presentation and food and other arrangements of seminar.
- Videos as well as Question-Answer at the end of each session helped to solve the queries of participants and developed an urge to think more in this field.
- Demonstration by some experts after the presentation wherein the participants could directly see the application and understand the relevance and importance was highly welcome by participants.
- Participants were eager for such more sessions and also to visit the specific institute for understanding more details about the topic.

**Report Prepared by:**  
**Prof. Avdhoot Jejurkar**  
**GUJCOST Seminar Convener**