MIT-WPU
॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

Dr. Vishwanath Karad
MIT WORLD PEACE UNIVERSITY | PUNE
TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

National Scientists
NSRTC
Round Table Conference
विश्वकल्याणाय् विज्ञानम्।

1st NATIONAL SCIENTISTS ROUND TABLE CONFERENCE 2024

FOR VIKSIT BHARAT 2047

19th, 20th & 21st July 2024

MIT-WPU and Hotel Tip Top International, Pune, Maharashtra, Bharat

The first round table conference of the Scientists of Bharat on **SCIENCE and TECHNOLOGY** for **ARTIFICIAL INTELLIGENCE, QUANTUM TECHNOLOGY, ADVANCED MATERIALS & MANUFACTURING, SUSTAINABILITY, HEALTH CARE, CLIMATE CHANGE, DIGITAL TRANSFORMATIONS, and SCIENCE & SPIRITUALITY** towards VIKSIT BHARAT

REPORT

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Editorial

We have the pleasure of furnishing you herewith the **Report of First National Scientists Round Table Conference (NSRTC 2024)** for **Viksit Bharat@2047** which herein contains the comprehensive details of NSRTC 2024 organized by **Dr. Vishwanath Karad MIT World Peace University (MIT-WPU), Pune, Bharat.** The conference held on July 19–21, 2024 at MIT-WPU, Pune and Hotel Tip Top International, Pune.

The **NSRTC 2024** is a scientific forum of eminent scientists, technologists, academicians, and researchers of Bharat. The NSRTC 2024 is significant as it takes an innovative approach to addressing India's evolving scientific and technological priorities. The conference is a response to the ambitions laid out in the vision of **Viksit Bharat 2047**, which aspires to elevate India into a developed, forward-thinking nation by 2047. By aligning itself with this vision, the NSRTC acts as a critical platform for ideating, strategizing, and setting a definitive course for India's technological and scientific landscape in the decades to come. The conference aims to diffuse research findings and create a conductive environment among the participants to debate and exchange new ideas that could lead to development in the social and economic spheres of Bharat to realize Viksit Bharat @2047.

The conference is designed with a strong emphasis on **roundtable discussions** rather than conventional lecture-style sessions. This structural choice underscores a commitment to fostering **engaged, participatory dialogue** over passive information dissemination. By using this approach, NSRTC ensures that diverse voices are heard, and stakeholders from various scientific and technological domains can contribute meaningfully to shape the research priorities for India's future. The topics covered span a range of pressing scientific, technological, and socio-economic challenges, all of which are crucial to fulfilling the vision of Viksit Bharat 2047.

The NSRTC 2024 consists of an inaugural session, a special technical session, and theme-wise parallel technical sessions (including plenary talks)—Artificial Intelligence, Agri-tech, Advanced Materials and Processing, Biotechnology, Climate Change, Digital Transformation, Health Care, and Science, Scientific Temper, and Spirituality—round table discussion, poster presentation sessions from research scholars of the university, followed by a valedictory session.

We express our sincere thanks to Rev. Prof. Dr. Vishwanath D. Karad, Dr. R.A. Mashelkar, Dr. Vijay P. Bhatkar, Dr. Rahul V. Karad, Dr. Ashok Joshi, Dr. Prakash B. Joshi, Dr. R.M. Chitnis, Dr. Sanjay Kamtekar, Prof. Dr. Murthy Chavali, and Prof. Dr. Milind Pande for giving us this opportunity to prepare this report under their guidance. We are also thankful to all the members of the advisory committee for extending cooperation and guidance.

We thank all the faculty members, students, and researchers of the university for their cooperation and support both during the conference and pre-conference activities.

Prof. Dr. Gopinath T.
Editor

Prof. Dr. Bharat B. Kale
Editor-in-Chief

Introduction

Rev. Prof. Dr. Vishwanath D. Karad MIT World Peace University (MIT-WPU), Pune, organized the First National Scientists Round Table Conference (NSRTC 2024) for Viksit Bharat @2047 which was held on 19–21 July 2024. The significance of the 1st NSRTC 2024 lies in its novel approach to address India's scientific and technological needs in the context of the Vision of Viksit Bharat 2047. The conference is strategically designed to foster in-depth discussions on various themes, which are integral to devising a research roadmap for India's future. By prioritizing roundtable discussions, the NSRTC aims to generate actionable insights and develop a cohesive strategy to meet the country's long-term goals for development and innovation as outlined in the vision of Viksit Bharat 2047. The involvement of distinguished speakers and the emphasis on collaborative dialogue highlights the conference's role in driving forward India's progress in science and technology. Strategically, the conference had 8 unique themes, i.e., Artificial Intelligence, Agri-tech, Advanced Materials and Processing, Biotechnology, Climate Change, Digital Transformation, Health Care, and Science, Scientific Temper, and Spirituality. Eminent scientists (around 116)—most of them were Shanti Swarup Bhatnagar awardees, fellows of national science academies, JC Bose fellows, Royal Society of Chemistry (FRSC), and DirectorsVice-Chancellors of the research institutes and universities—of the Bharat have participated in the roundtable conference.

The conference was inaugurated by Padma Vibhushan Dr. R.A. Mashelkar, Padma Bhushan Dr. Vijay Bhatkar, Padma Shri Prof. Dr. G.D. Yadav, Padma Shri Prof. Dr. T. Pradeep, Dr. Ashok Joshi, Prof. Dr. Vishwanath Karad, Prof. Prakash B. Joshi, Dr. Rahul V. Karad, Prof. Dr. R.M. Chitnis, Dr. Sanjay Kamtekar, Secretary (NSRTC 2024), and Prof. Dr. Milind Pande and Prof. Dr. Bharat B. Kale, National Conveners (NSRTC 2024). There was a special technical session, along with the inauguration, where Prof. G.D. Yadav, Padma Shri. Prof. Dr. T. Pradeep, Prof. Umesh V. Waghmare delivered talks. For the next two days, the 116 distinguished speakers delivered talks on the 8 themes in parallel sessions. There was an overwhelming response to NSRTC 2024. Around 228 faculties and 643 students of Science, Engineering, and Pharmaceuticals participated in the conference. The conference has reached more than one lakh researchers through all the media. There was extremely good feedback on the conference from the speakers, guests, faculties, and students. There were also suggestions from all speakers for the next edition of NSRTC 2025. The present report highlights the summary of the inaugural function as well as all the technical sessions. A summary of the speech of all speakers has been presented along with suggestions. Also, the feedback received from all speakers and participants has been furnished. We are very grateful to Dr. R.A. Mashelkar, Dr. Vijay Bhatkar, Dr. Ashok Joshi, and Prof. Dr. G.D. Yadav for their active participation and guidance throughout this event. We are very grateful to Dr. Rahul Karad, Executive President, MIT-WPU, for visualizing the concept of the National Scientists Round Table Conference and its realization. We will never forget our Founder, Prof. Dr. Vishwanth Karad, for his motivation and support.

Prof. Dr. Bharat Kale
National Convener
NSRTC 2024

Prof. Dr. Milind Pande
National Convener
NSRTC 2024

Dr. Sanjay Kamtekar
Secretary
NSRTC 2024

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Former Director General
CSIR, New Delhi

Padma Bhushan
Dr. Vijay P. Bhatkar
Founder Director
C-DAC

Revered
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Founder President, MIT-WPU,
Creator - World Peace Dome, Pune

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Founder, Microlin Technologies
Founder, Clean Joule, USA

Prof. Dr. R. M. Chitnis
Co-Chairman, NSRTC 2024
Vice Chancellor, MIT-WPU

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Former DG, C-MET, Pune

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Co-Convener, NSRTC 2024
Dean, Research & Development
MIT-WPU

Revered
Prof. Dr. Vishwanath D. Karad
Founder President
MAEER's MIT-WPU, Pune
Creator - World Peace Dome, Pune

I would like to congratulate Rahul for organizing the remarkable NSRTC 2024 Conference, which received an overwhelming response. I also want to thank the organizing committee members for their hard work, as the smooth and efficient execution made a significant difference. I particularly enjoyed the session on science, scientific temper, and spirituality; it was truly inspiring. The exploration of ayurveda, yoga, meditation, and pranic healing was a wonderful journey. I am extremely delighted to see such strong participation from both faculty members and students in the conference.

Dr. Rahul V. Karad
Executive President, MIT-WPU

I want to extend my heartfelt congratulations to my fellow organizing committee members on the tremendous success of the NSRTC 2024 Conference, which was truly a dream come true. I feel that this conference has created necessary platforms for all the academicians, scientists, and industrial partners to come forward and build their think-tank which would eventually propose a mission, vision, and milestones with their timeline to the policy makers for the realization of Viksit Bharat. The academic institutions including private are the growth engines of the country. I am looking for public-private institutions collaborations to make the country really a Viksit Bharat, as the private institutions also have a good potential to perform better.

The event was splendid, showcasing both intellectual depth and social engagement. Everything was organized smoothly and efficiently, which made a significant difference.

I am incredibly proud of what NSRTC has achieved and grateful for the contributions of the MITWPU staff and students. Looking ahead, I am eagerly anticipating NSRTC 2025, which I believe will be even more effective, innovative, and inspiring for young researchers.

Padma Vibhushan
Dr. Raghunath A. Mashelkar, FRS
Former Director General, CSIR, New Delhi

NSRTC– 24 was a unique pioneering conference for several reasons.

First, the topics chosen were not only at the very frontiers of science and technology but also very futuristic. Second, the excellence of any conference can be only as good as the excellence of the eminent participants. NSRTC-24 had the participation of the very best minds across the country, both established as well as the rising stars. The third was the structure of the conference, with an opportunity for the free and dynamic exchange of ideas, including the participation of the young scientists from MITWPU, who were inspired by no end. Finally, the wonderful response received from the participants after the conference, is a key measure of the success of the conference.

It must be emphasized that the very idea of the conference was born out of the ever-visionary thinking Dr. Rahul V. Karad, the executive president of MITWPU-of course blessed by the visionary founder Prof. Dr. Vishwanath D. Karad.

I must especially acknowledge the painstaking efforts of the organizing committee, who showed amazing patience despite my continuing to raise the bar in every meeting that I had with them.

I am convinced that the NSRTC series of MITWPU is capable of becoming a global conference of great repute that will make India proud.

I am eagerly looking forward to NSRTC-25 already.

I congratulate MITWPU for successfully organizing the NSRTC-24 Round Table Conference. The inaugural session on Science and Technology featured eight diverse and thought-provoking themes, including the fascinating intersection of Science and Spirituality. Such academic gatherings play a vital role in enriching the knowledge and experience of students, teachers, and researchers alike.

The conference also highlighted emerging fields like Quantum Materials and Technologies, as well as the critical role of Ayurveda and innovative healthcare systems. I was delighted to witness the engaging discussions on these important topics, which are essential for the advancement of our nation. These conversations not only foster collaboration but also inspire fresh ideas and innovative solutions in these fields.

Padma Bhushan
Dr. Vijay P. Bhatkar
Founder Director, C-DAC
Chancellor, Nalanda University

The National Scientists Round Table Conference 2024 organized by MITWPU was a major success! It's wonderful to hear that the event brought together top scientists from across India and facilitated such engaging and fruitful discussions. Having leading experts deliver insightful lectures must have been a great opportunity for everyone involved. The inaugural session on Science and Technology was a rich and intellectually stimulating event! The inclusion of diverse themes, particularly the intersection of Science and Spirituality, is quite compelling. This topic often sparks deep discussions about how scientific advancements and spiritual understanding can complement each other, offering a holistic perspective on human experience.

Prof. Prakash B. Joshi
Member Trustee
MAEER's MIT Group of Institutions

Academic gatherings like these are indeed important for fostering collaboration and dialogue among students, teachers, and researchers. They create an environment where individuals can share ideas, challenge assumptions, and expand their horizons. By addressing such varied themes, these events contribute to a more well-rounded approach to learning and innovation, encouraging attendees to explore not just the technical aspects of science but also its broader implications for society and personal growth.

Dr. Ashok Joshi
Chairman, NSRTC 2024
Founder, Microlin Technologies, USA
Founder, Clean Joule, USA

I must congratulate Dr. Rahul V. Karad for his yet another great vision and success of the round table conference NSRTC-24. I also congratulate the organizing committee members for their hard work in making this conference successful.

The session on science and spirituality was memorable which I particularly enjoyed. I must say that this is the best and most unique conference in the last 30 years of the history of the MITWPU. Of course, it is wonderful team efforts and lovely support of Dr. Karad which is the ultimate success of the event. I am more curious about NSRTC-25 which will be much more fruitful with focused themes based on NSRTC-24 conference.

Prof. Dr. R. M. Chitnis
Co-Chairman, NSRTC 2024
Vice Chancellor, MIT-WPU

Prof. Dr. Milind Pande
National Convener, NSRTC 2024
Pro Vice-Chancellor, MIT-WPU

Conception

Dr. Rahul V. Karad had ideated for this conference had been on his mind for several years, it was not until conversations with visionaries like Dr. Ashok Joshi, Dr. R. A. Mashelkar, and Dr. Vijay P. Bhatkar that his dream truly took shape. These discussions inspired him to transform a personal vision into a meaningful initiative, creating a platform to unite India's brightest minds around a shared purpose.

Dr. Karad passionately believes that this conference can be more than just an event—it can be a movement towards a "Viksit Bharat", a fully developed, self-sufficient India. He envisions a space where academicians, scientists, and industry leaders come together to exchange ideas, collaborate, and create real change. He hopes that this gathering will inspire the creation of a think tank that can set clear, achievable goals for India's progress and offer practical guidance to policymakers. For Dr. Karad, this is about more than policies or proposals; it is about a shared commitment to a **Viksit Bharat 2047**.

Themes

The NSRTC 2024 is structured around the following eight broad themes:

1. Artificial Intelligence

a. Ethical AI Frameworks, Regulations, & Governance
b. AI for Social Good and Sustainability
c. AI for Affordable Healthcare
d. AI and Future of Jobs
e. Generative AI and IPR Laws

2. Advanced Materials and Processing

a. Nanomaterials / Nanohybrids / Nanocomposites
b. Organic Electronics
c. Bioinspired Materials and Biomimetic Designs
d. Biodegradable & Sustainable Materials
e. Device Engineering, 3D Printing, etc.

3. Agri-Tech

a. Precision Agriculture and Digital Farming
b. Genetic Engineeing and Agriculture 2.0
c. Climate Smart Agriculture
d. Urban Agriculture and Vertical Farming
e. Promoting Agritech Startups

4. Biotechnology

a. Synthetic Biology
b. Bioinformatics / Bioengineering
c. Bio-Medical Devices
d. Biopharmaceuticals
e. Bio-Manufacturing

5. Climate Change

a. Climate Modelling
b. Circular Economy
c. Smart & Sustainable Mobility Solutions
d. Green Buildings and Sustainable Infrastructure
e. Managing Rapid yet Just Transition

6. Digital Transformations

a. Grid Technology
b. Quantum Computing
c. Blockchain Technology
d. Cyber Security
e. Digital Inclusion and ICT for Development

7. Health Care

a. Tissue Engineering
b. Regenerative Medicine
c. Wearable Devices
d. Impact of Digital Transformations
e. High Technology led Affordable Health Care

8. Science, Scientific Temper & Spirituality

a. Role of Scientific Temper in Building Bharat@100
b. Scientific Method, Philosophy, and Spirituality
c. Neuroscience of Spirituality
d. Relation between Brain, Mind & Consciousness
e. Spiritual Practices in Promoting Holistic Wellbeing

Group photo during Inaugural Session of NSRTC-24 at Swami Vivekananda Hall, MIT-WPU

Day 1

Date: 19th July 2024

Venue: Dnyaneshwar Hall, MIT World Peace University, Pune

Inaugural Session Glimpses

Dr. Milind Pande, Prof. Dr. R. M. Chitnis, Prof. Dr. G. D. Yadav, Prof. P.B. Joshi, Dr. R. A. Mashelkar, Prof. Dr. Vishwanath Karad, Dr. Vijay Bhatkar, Prof. Dr. T. Pradeep, Dr. Rahul V. Karad, and Prof. Dr. Bharat B. Kale (from L to R)

The conference was inaugurated by Padma Vibhushan Dr. R. A. Mashelkar, Padma Bhushan Dr. Vijay Bhatkar, Padma Shri Prof. Dr. G.D. Yadav, Padma Shri Prof. Dr. T. Pradeep, Dr. Ashok Joshi, Prof. Dr. Vishwanath Karad, and Dr. Rahul V. Karad along with Prof. P.B. Joshi, Prof. Dr. R.M. Chitnis, Dr. Sanjay Kamtekar, Secretary (NSRTC 2024), and Prof. Dr. Milind Pande and Prof. Dr. Bharat B. Kale, National Conveners (NSRTC 2024).

Dr. Sanjay Kamtekar, Prof. Dr. Bharat B. Kale, Padma Shri Prof. Dr. T. Pradeep, Dr. Rahul V. Karad, Prof. Dr. P.B. Joshi, Dr. R.A. Mashelkar, Prof. Dr. Vishwanath D. Karad, Dr. Vijay Bhatkar, Prof. Dr. G. D. Yadav, and Prof. Dr. R. M. Chitnis (from L to R)

Dr. Sanjay Kamtekar, Prof. Dr. Bharat B. Kale, Padma Shri Prof. Dr. T. Pradeep, Dr. Rahul V. Karad, Prof. Dr. P.B. Joshi, Dr. R.A. Mashelkar, Prof. Dr. Vishwanath D. Karad, Dr. Vijay Bhatkar, Prof. Dr. G. D. Yadav, and Prof. Dr. R. M. Chitnis (from L to R)

Dr. Sanjay Kamtekar warmly welcomed all the dignitaries, distinguished speakers, and participants. He also briefed about the themes of the conference and distinguished speakers. Prof. Dr. Vishwanath Karad felicitated the dignitaries on the dais.

The chief guest of the conference, **Dr. R. A. Mashelkar**, addressed the gathering and shared an overview of the conference and its origins. He praised the leadership of Dr. Rahul V. Karad for initiating such a unique roundtable conference on science and technology, which is considered the first of its kind in Bharat. Dr. Mashelkar also acknowledged the support of Prof. Dr. Vishwanath Karad for this conference.

He spoke about Bharat's journey toward becoming "Viksit Bharat" and highlighted the critical role of fuel cell

technology in meeting the country's energy needs. Dr. Mashelkar emphasized the importance of collaboration between academia and industry to address challenges in manufacturing across various sectors. He noted that developing indigenous manufacturing capabilities, using technologies created within the country will naturally propel Bharat forward on the path to becoming a developed nation.

Dr. Rahul V. Karad, Dr. Sanjay Kamtekar, Prof. Dr. Bharat B. Kale, Prof. Dr. T. Pradeep, Prof. Dr. Ashok Joshi, Prof. Dr. P. B. Joshi, Dr. R. A. Mashelkar, Prof. Dr. Vishwanath D. Karad, and Dr. Vijay Bhatkar (from L to R)

Dr. Rahul V. Karad emphasized that this conference would serve as an essential platform for academicians, scientists, and industry partners to come together and form a collaborative think-tank. This think-tank aims to draft a mission, vision, and clear milestones with timelines to guide policymakers in achieving the vision of a "Viksit Bharat." He also highlighted MIT-WPU's dedication to supporting India's development journey through such conferences. Expressing gratitude, he acknowledged Dr. Sanjay Kamtekar, Prof. Dr. Bharat Kale, Prof. Dr. Milind Pande, and Prof. Dr. Chavali for their invaluable contributions in making this event a success.

Prof. Prakash B. Joshi provided an overview of the hydrogen economy and its current status in the country.

Prof. G. D. Yadav shared his views on green technologies, such as hydrogen, and noted that the cost of hydrogen should ideally be in the range of $1–$2 per kg to benefit sectors like automotive, energy, and others. He emphasized the need to explore various hydrogen production strategies to bring down costs. Efforts toward green hydrogen production should also consider the use of byproducts such as CO, CO_2, H_2S, and NH_3. He added that the current conference would also spotlight green hydrogen initiatives.

Prof. T. Pradeep mentioned the education policy of the country. He added that most of the universities and colleges are not paying the teachers' remuneration as per the norms set by the pay scale suggested by the Government of India. He said, "I found so many highly qualified teachers (Masters and PhDs) were underpaid which is not even sufficient for their basic survival. This situation should change so that good teachers will be attracted to the rural areas which ultimately improve India's Education Quality."

Prof. Dr. Vishwanath D. Karad appreciated MIT-WPU and Dr. Rahul V. Karad for organizing such a unique conference in MIT-WPU which will eventually help to all the stake holders of the university.

Dr. Vijay Bhatkar congratulated Dr. Rahul V. Karad and MIT-WPU for organizing such a great conference. He appreciated the important themes of the conference like, advanced materials and processing, digital transformations (including quantum technologies), and scientific temperament & spirituality. He also congratulated the organizing team of the conference.

Dr. Ashok Joshi mentioned the nucleus and the conception of the conference, by detailing his earlier discussions with Dr. Rahul V. Karad and follow-up meetings with the organizing committee of the conference. He also mentioned his environmental technology work, which is becoming more promising today considering the sustainability factor. He suggested that the conference also highlight energy and the environment.

The inauguration concluded with a vote of thanks from **Prof. Dr. Bharat B. Kale** where he mentioned the research program of MIT WPU, such as quantum technology, hydrogen generation and storage, batteries, super capacitors, and the creation of central research facilities (CRFs)—materials characterization lab, incl. scanning electron microscopy and X-ray diffraction—to augment the research output of the university and improve the ranking of the university. He thanked Dr. Rahul V. Karad for taking initiatives in improving the research infrastructure of the university which is happening for the first time in the state of Maharashtra. Dr. Kale included dignitaries, both on and off the dais, distinguished speakers, and faculty members in his vote of thanks address.

Day 1: Special Technical Session

Date: 19th July 2024

Venue: Dnyaneshwar Hall, MIT World Peace University, Pune

The special technical session at NSRTC 2024, held in Dnyaneshwar Hall at MIT-WPU, featured notable talks from Prof. G.D. Yadav, Prof. T. Pradeep, and Prof. Umesh Waghmare. Dr. Kale welcomed the speakers and set the tone with an introduction to the conference. Prof. Yadav discussed the importance of sustainable, green technologies, including hydrogen production for industry and the conversion of CO_2 into valuable compounds like methanol and ethanol. He emphasized the need for these technologies in India's future. Prof. Pradeep presented research on soil formation through water microdroplets, demonstrating how minerals like quartz and ruby can transform into nanoparticles via electrospray, suggesting a role for atmospheric aerosols in soil creation. Prof. Waghmare discussed quantum density functional theory simulations, highlighting their significance in materials science by blending theoretical and experimental methods for technological advancements. Prof. Chavali gave a vote of thanks for the session.

The key takeaways from the special technical session of NSRTC 2024 are:

Green and sustainable technologies are essential for India's future.

Prof. Yadav briefly discussed about net-zero carbon technologies (carbon-neutral) and further, he went to explain on carbon-negative footprints. Prof. Yadav highlighted innovative processes like converting CO_2 into valuable compounds (e.g., methanol and ethanol) and the conversion of ammonia into hydrogen and nitrogen, demonstrating practical applications for industries.

Emphasis was placed on the economic and environmental benefits of adopting these sustainable technologies.

Soil Formation from Microdroplets:

Prof. Pradeep discussed a novel process in which micrometre-sized minerals like quartz and ruby transform into nanoparticles (5–10nm) via electrospray-generated aqueous microdroplets. This rapid weathering process could significantly contribute to soil formation through charged aerosols, offering insights into natural soil creation mechanisms.

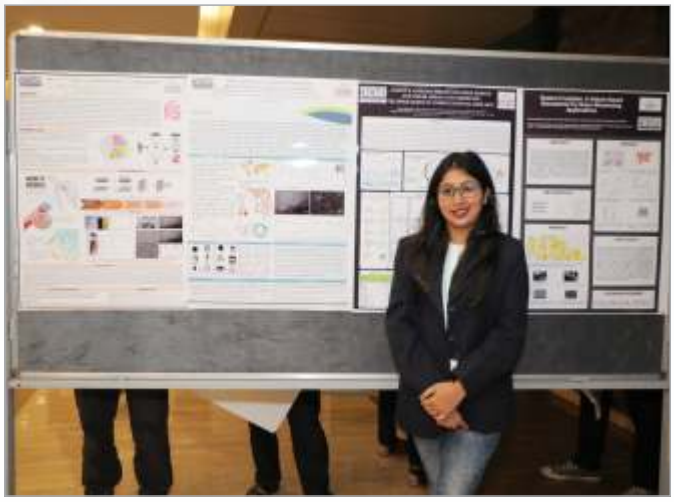
Prof. Waghmare spoke on the value of **Quantum Density Functional Theory (DFT)** simulations in materials science. The simulations enable a powerful combination of theoretical and experimental research, aiding in the design and application of advanced materials for technology. His discussions underscored the importance of sustainable technology, innovative scientific insights into natural processes, and advanced simulations for materials science to support India's scientific and technological development.

Dignitaries at the Conference Venue

Day 2:

Date: 20th July 2024
Venue: Hotel Tip Top International, Pune

Dr. Rahul V. Karad welcoming guests



Exhibition Stalls at Hotel Tip Top International, Pune

Cultural Program

Day 2: Technical Session

Date: 20th July 2024 (Forenoon and Afternoon)
Venue: Hotel Tip Top International, Pune

Theme 1: Artificial Intelligence

No. of Attendees: 150 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. Jay P. Gore**, *Purdue University, USA*
- **Dr. Sasikumar M.**, *Executive Director, C-DAC Mumbai*
- **Prof. Dr. Abhijit Mukherjee**, *IIT Kharagpur*
- **Prof. Dr. K. Palanikumar**, *Sri Sai Ram Institute of Technology, Chennai*
- **Dr. Pratap Sanap**, *Neilsoft, Pune*
- **Prof. Dr. Vivek Kumar Singh**, *University of Delhi*
- **Prof. Dr. Siba Kumar Udgata**, *University of Hyderabad*
- **Prof. Dr. Akash Saxena**, *Central University of Haryana*
- **Dr. Praveen C. S.**, *Cochin University of Science and Technology, Kochi*
- **Mr. Aishwarya Jagetia**, *Boston, USA*

The NSRTC 2024 conference at MIT-WPU highlighted several critical takeaways regarding the transformative role of Artificial Intelligence (AI) across diverse fields, presented by esteemed experts. Here are the main takeaways:

1. **AI's Role in Advancing Innovation**

   AI is pivotal in advancing research, innovation, and interdisciplinary integration across fields like materials science, bioengineering, and advanced technologies, with MIT-WPU actively integrating AI into academic programs to prepare students for the future.

2. **Industry-Specific Applications of AI**

   AI has significant applications in safety, with discussions on addressing risks like power plant shutdowns, aircraft engine blowouts, and forest fires due to climate change. Information security and image recognition were explored as critical for mitigating these risks.

In the energy sector, AI was suggested for optimizing power plant efficiency through hyperparameter tuning in Adaptive Neural Networks (ANNs), focusing on fuel cost reduction, lower CO_2 emissions, and job preservation.

4. AI in Environmental Management

AI's potential for predicting and managing environmental risks, including groundwater vulnerability, coastal erosion, drought, and pollution, is crucial for food and water security, particularly in South Asia.

Dr. Sasikumar M.

6. Ethics, Governance, and Legal Compliance

The governance of AI was underscored, stressing the need for legally sound frameworks and ethical considerations. Legal compliance in AI research is essential, and caution was advised against placing undue blame on AI for negative outcomes.

Prof. Dr. Akash Saxena

3. Current AI Challenges and Future Directions

The session covered limitations of current AI, especially in tasks like planning, scheduling, and optimization, with an eye toward General AI and PAC learning as future milestones. Model explainability and data quality remain key challenges.

Prof. Dr. Jay P. Gore

5. Manufacturing and Productivity

AI algorithms can enhance manufacturing productivity, quality, and sustainability, with a case study on cryogenic coolant optimization using Grey Relational Analysis (GRA) and ANFIS showcasing how AI can improve process efficiency.

Prof. Dr. K. Palanikumar

7. AI in Decision-Making and Student Engagement

AI's role in enhancing decision-making across sectors like healthcare and manufacturing was emphasized, with encouragement for students in engineering disciplines to engage with AI, while remaining mindful of its ethical implications and imperfections.

The discussions showcased AI's expansive potential to drive innovation, tackle complex global challenges, and reshape decision-making while highlighting the importance of ethical responsibility and legal frameworks.

Prof. Dr. Praveen C S

Day 2: Technical Session

Date: 20th July 2024 (Forenoon and Afternoon)
Venue: Hotel Tip Top International, Pune

Theme 2: Advanced Materials & Processing

No. of Attendees: 150 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. Ashok Kumar Ganguli,** *IISER Berhampur*
- **Prof. Dr. Vijayamohanan Pillai,** *IISER Tirupati*
- **Prof. Dr. Amitava Patra,** *INST Mohali*
- **Prof. Dr. Satish Patil,** *IISc, Bengaluru*
- **Prof. Dr. Samit Kumar Ray,** *IIT Kharagpur*
- **Prof. Dr. Satishchandra Ogale,** *IISER Pune*
- **Prof. Dr. Shobha Shukla,** *IIT Bombay*
- **Prof. Dr. S.B. Krupanidhi,** *IISc, Bengaluru*
- **Prof. Dr. B.R. Sankapal,** *VNIT Nagpur*
- **Prof. Dr. Chandana Rath,** *IIT BHU*
- **Prof. Dr. Ajay Soni,** *IIT Mandi*
- **Prof. Dr. Sarang Gumfekar,** *IIT Ropar*
- **Prof. Dr. S K S Parashar,** *KIIT, Bhubaneswar*
- **Prof. Dr. P S Anil Kumar,** *IISc, Bengaluru*
- **Prof. Dr. Vilas G Pol,** *Purdue University*
- **Prof. Dr. Gopi Sharma,** *Kanya Maha Vidyalaya, Jalandhar*
- **Prof. Dr. Sachin Rondiya,** *IISc, Bengaluru*
- **Prof. Dr. R. Jayavel,** *Anna University, Chennai*
- **Prof. Dr. Balasubramanian K.,** *DIAT, Pune*
- **Prof. Dr. Shantanu Madge,** *IIT Jammu*

Nanoscience: A Truly Interdisciplinary Science

The key takeaways from Prof. Dr. Ashok Ganguli's session on battery technology are the following:

- **Interdisciplinary Nature of Nanoscience**
  Nanoscience bridges multiple fields, including core sciences, materials science, engineering, and medicine, illustrating its broad applicability across both living and non-living systems.
- **Diverse Applications of Nanostructures**
  Nanostructures come in various shapes and designs tailored for specific uses, such as water purification, paints, medicine, cosmetics, and catalysis, each requiring different nano-dimensions for optimal performance.
- **Natural Examples of Nanoscience**
  Phenomena like the optical illusions on butterfly wings, which change colors due to light intensity, are examples of nanoscience in nature. Prof. Ganguli highlighted the potential of materials like gold aerogel, which is incredibly lightweight and could sit on a butterfly's wing.
- **Market Potential of Nanomaterials**
  Nanomaterials have a strong market presence, particularly in cosmetics (nano-silica, worth 34.2 billion USD) and nanomedicine (174.20 billion USD). Upcoming markets include nanomaterials for batteries, water purification, and green hydrogen generation, indicating a growing economic impact.

Designing V-gap Engineering Nanohybrids for Energy Storage Applications

The key takeaways from Prof. Dr. Vijayamohanan Pillai's session on battery technology are the following:

- The demand for battery materials is projected to increase significantly, from 7.7 to 9.7 billion USD by 2047, driven by the global energy storage needs and India's ambitious EV30@2030 initiative, which will further boost demand for rechargeable batteries.
- The shift from lithium-ion to lithium-metal batteries is expected to meet the need for faster charging and higher energy density. Emerging technologies like sodium-ion batteries are also gaining attention for being cost-effective, though they require material modifications to address current limitations.
- AI and ML techniques, such as v-gap engineering, can optimize battery materials, allowing for the design of batteries with higher capacities and smaller sizes, contributing to more efficient energy storage solutions.
- Developing expertise and scaling up domestic battery production will be crucial for India's sustainable future. Prof. Pillai suggested implementing a "battery lifecycle analysis" using Aadhar for tracking battery usage and performance, helping to ensure sustainability and efficiency.

The Emergence of Nanoscience for a Sustainable Future

The key takeaways from Prof. Dr. Amitava Patra's session are:

- Efficiently converting solar energy to electrical energy is complex and material-dependent. The efficiency of this process is influenced by the properties and phase purity of the materials used. Photosynthesis serves as a natural model for energy conversion, inspiring research in creating efficient systems to convert solar energy into chemical or electrical energy.
- Inorganic nanocrystals are gaining attention in developing nanoscale-based light-harvesting systems, which hold the potential for high-efficiency energy conversion applications.

Prof. Patra highlighted promising materials for light harvesting, including perovskite nanocrystals, 2D materials, conjugated polymers, and quantum dots. These materials require a multidisciplinary approach to develop practical, efficient solar energy devices.

Emerging Renewable Energy Technologies to Enable Net-Zero

The key takeaways from Prof. Dr. Satish Patil's session are:

- The reliance on fossil fuels for energy is contributing to catastrophic climate change, making it urgent to transition to low-carbon, renewable technologies to reduce CO_2 emissions and ensure sustainability.
- Organic semiconductor-based renewable energy devices have gained significance as a sustainable solution to meet global energy demands, especially for energy generation and storage.
- India's goal to install 100 GW of grid-connected solar power presents significant challenges but is essential to meet energy demands, with advancements needed in solar technologies like perovskite and organic solar cells to compete with traditional silicon-based solar cells.

Prof. Patil highlighted his NetZero village project and solar-powered microgrids in Bengaluru (1.3 kW) and Karnataka (5.2 kW), showcasing practical applications of solar energy for rural development and healthcare.

He emphasized his involvement in creating two startups in the renewable energy sector, reflecting his commitment to innovation and sustainable energy solutions.

Emergent Materials for Nanophotonic and Energy Harvesting Devices

The key takeaways from Prof. Dr. Samit Kumar Ray's session are:

- The price of solar systems has dropped by 90% in the last decade, making solar energy more accessible and economically viable.
- Prof. Ray emphasized the importance of emerging materials for nanophotonic and energy harvesting devices, highlighting the role of lead halide perovskites and the need for 2D/3D heterostructures in improving energy efficiency. Current solar cell research is heavily focused on perovskite solar cells due to their higher efficiency and ease of fabrication, with the hot injection method being a key synthesis approach. India requires 20 billion transistors/chips annually, highlighting the urgent need for a focus on chip manufacturing in the nanoelectronics sector.
- Research on integrated silicon photonics for creating low-power devices is another key area of focus, contributing to more energy-efficient technologies.

Prof. Ray concluded with a strong message on the importance of energy conservation for a sustainable future, particularly for India.

Day 2: Plenary Sessions

Date: 20th July 2024
Venue: Hotel Tip Top International, Pune

3D Printing of Nanomaterials for Photonics Application

Prof. Dr. Shobha Shukla's plenary talk focused on her research in nanophotonic devices, nanomaterials, and metamaterials. She discussed two-photon lithography (TPL), a femtosecond-laser assisted additive manufacturing technique as a state-of-the-art technique which can be used as an alternative method for fabricating high-resolution, precise, and accurate 2D and 3D micro/nanostructures. This enables the fabrication of intricate 3D micro/nanopatterns tailored for diverse functionalities. Prof. Shukla presented her research on specific applications such as sensing (heavy metals in wastewater), anticounterfeiting, photovoltaics, and plasmonics using TPL.

Energy, Sustainability and Self-Reliance

Prof. Dr. Satishchandra Ogale's plenary talk focused on the integration of diverse functional materials, including nanomaterials like quantum dots, to enhance performance and affordability in energy devices. He highlighted the importance of interfaces in energy technologies and discussed the seven pillars of the circular economy, emphasizing waste-to-value conversion.

He also presented data on the projected mass of photovoltaic waste from 2020 to 2050 and addressed challenges in battery technology. Additionally, Prof. Ogale introduced his research on a high-performance photocatalytic reduction of CO_2 and explored sodium ion technology and water extraction methods inspired by the Namib Desert beetle.

2D/III-Nitrides Hybrids based Heterostructures for Efficient Photo-detection

Prof. Dr. S.B. Krupanidhi's plenary talk focused on optoelectronic devices, including solar cells, lasers, photodiodes, and LED traffic lights. He discussed the suitability of III-Nitrides, such as AlN and GaN, for photodetectors, with InN presented as a potential less toxic alternative.

Prof. Krupanidhi highlighted the use of 2D and 3D heterostructures for self-powered photo detection, such as MoS_2/AlN/Si epitaxial layers. He shared data on Raman spectra, X-ray photoelectron spectroscopy, and TEM-EDS results of MoS_2/GaN nano rods, noting their enhanced performance. He concluded that III-Nitride semiconductors, combined with 2D materials, hold great potential for next-generation optoelectronic devices.

Quantum Multibody Interactions Across the Charge Density Wave Transition in Metal Chalcogenides

Dr. Ajay Soni delivered an invited talk on quantum multibody interactions in metal chalcogenides, focusing on charge density wave (CDW) transitions. He provided an overview of his research on charge density and lattice reconstruction, presenting spectroscopic evidence of collective modes in materials like VSe_2, $NbSe_2$, and TaS_2. Dr. Soni discussed the effect of dimensionality on CDW instabilities, particularly in 2H-TaS_2, and the development of flexible thermoelectric generators using nanomaterials. His team also investigates light-matter interactions, examining emissions, adsorption, and transmission properties. He illustrated lattice distortions and CDW through graphical representations and Raman scattering analyses.

Advanced Flexible Solid-State Supercapacitor

Prof. Dr. B. R. Sankapal focused on advancement of technology with flexible approach in wearable energy generation and storage devices. Environmentally benign and low-temperature nanomaterial architecture need to be emphasized and can be integrated from small scale to large scale for roll-to-roll technologies. Specifically, energy storage process relies on electric double layer capacitance (EDLC) and pseudo capacitance. He further explained that EDLC possess high stability with low capacitance; on contrary, pseudo has high capacitance and low stability. Generally, carbon-based materials are used in EDLC, whereas metal oxides, chalcogenides and polymers are used in pseudo. More significantly, hybridization of EDLC and pseudo along with 'material mutualism' exhibited high capacitance along with high stability. He further presented device grade demo using advanced flexible energy storage devices.

Advanced Functional Materials: Synthesis and Applications in Textiles, Water Treatment, and Energy Storage

Dr. Sarang Gumfekar focused on thermoregulation textiles, particularly fabrics coated with phase change materials (PCM). He presented diagrams illustrating temperature changes and the processing of PCMs, demonstrating their use in creating commercially viable materials. Real-time testing on army jackets showed flexible heat patches for extremely cold conditions.

He discussed nanoparticle synthesis at both lab and large scales, highlighting micro-reactors for silver nanoparticle production. A video showcased printing silver and graphene ink on PET substrates for electrodes and sensors. Additionally, he covered hierarchical porosity in ultrafiltration membranes and emphasized continuous flow micro-reactors for material scale-up and applications in flexible electronics and heavy metal detection.

Roadmap of Advanced Materials in the Emerging Field of Microwave Technology & Energy Storage

Dr. S. K. S. Parashar discussed the application of metamaterial-based lens antennas for high microwave frequencies, highlighting the limitations of conventional lens antennas. He explained four electromagnetic material properties: ENG, DPS, DNG, and MNG, and their role in overcoming challenges in lens antenna technology.

Dr. Parashar presented the design of the Wood Zone Plate (WZP) fishnet meta-lens and a metamaterial fixture developed at CTTC, Bhubaneswar, for radiation pattern measurements. He also outlined the development of a BNT ceramic microstrip patch antenna, replacing traditional substrates. He concluded by emphasizing the transformative potential of nanotechnology in shaping the future.

Round Table Discussion

- **Challenges in Nanomaterial Development:** While the demand for nanomaterials is growing globally, challenges remain in scaling up production and recycling technologies. Industries often focus on short-term goals, while advanced research is overlooked.
- **Industry vs. Academic Research:** There is a need for both basic research and industry-driven applications. Effective collaboration between academia and industry is essential for translating innovations into real-world products, but there is often a disconnect between research outputs and industry needs in India.
- **Future of Nanomaterials in Emerging Sectors:** Nanomaterials will play a key role in sectors like solar cells (perovskites), flexible electronics, and batteries. New research in thin films, perovskite solar cells, and stable organic semiconductors will be critical for advancing technologies in renewable energy and consumer electronics.
- **Importance of Translational Research & Collaboration:** Academic institutions need to focus on translational research while maintaining fundamental science. Industry should invest in fundamental research, and there should be a greater focus on interdisciplinary collaborations to drive innovation, with an emphasis on long-term research investments.

Day 3: Technical Session

Date: 21st July 2024 (Forenoon)

Venue: Hotel Tip Top International, Pune

Theme 2: Advanced Materials & Processing

No. of Attendees: 100 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. R. Jayavel**, *Anna University*
- **Prof. Dr. Shantanu Madge**, *IIT Jammu*
- **Prof. Dr. M. S. Santhanam**, *IISER Pune*
- **Prof. Dr. Vilas G. Pol**, *Purdue University, USA*
- **Prof. Dr. P. S. Anil Kumar**, *IISc Bengaluru*
- **Prof. Dr. Balasubramanian K.**, *DIAT Pune*
- **Prof. Dr. Sachin R. Rondiya**, *IISc Bengaluru*

Quantum Materials for Future Transformative Applications

Prof. Dr. R. Jayavel explored the realm of quantum materials has been an exciting journey for upcoming researcher. Prof. Jayavel suggested the materials which have wide application such as spintronics, laser technology, optoelectronics and photonics and quantum computing. The vastness of the solar resource and its universal distribution is a sufficient reason to immerse himself in the world of solar cells, and nano packaging material. Also, he influenced through his interdisciplinary approach the importance of 2D functional quantum materials for energy storage and sensor application. He pondered these new reports and the original reports with great curiosity in the field of energy.

Quantum Materials and Heterostructures

Prof. Dr. P. S. Anil Kumar spoke about the quantum materials and heterostructures-based materials for electronic devices. He has discussed materials such as graphene, topological insulators etc. Moreover, he illustrated benefits of Weyl semimetals, topological superconductors and heterostructure materials are important towards the specific electronic application. The topological superconductors are of great significance because of their potential to host major and zero energy modes. In this way, he has now formed the bedrock of his research in the field of physics and technology encourages the researcher to work in this area.

Next Generation Manufacturing: 3D & 4D Printing

Prof. Dr. Balasubramanian shed light on the next-generation manufacturing of 3D & 4D printing technology. He has elaborated on the approach where the construction of products in a consecutive layering sequence creates a complex structure with traditional manufacturing technology. Further, he has explored the highly intricate functional polymer with the help of advanced manufacturing technology. The integration of biomimic architecture into natural materials such as honeycombs or mollusc shells boosts the mechanical robustness of the corresponding products.

Similarly, he has mentioned the impacts of architecture design and their parameter on the controlled 3D prototype of triblock copolymer through the tablet orientation and tailoring site-specific positions. Additionally, he addressed the 4D printing technology where the employed materials endure the physical transformation in the vicinity of the environment.

Next-Generation Semiconductor Materials for Solar Cells: Understanding Basics and Exploring New Horizons

Prof. Dr. Sachin R. Rondiya has explored next-generation semiconductor materials for solar cell devices. He has explained the fundamental mechanism of solar cell device and their fabrication process. Later, he talked about the effective commercialization of solar cells towards cost-effective, large-scale techniques. The earth's abundant semiconductor materials have great potential to fabricate solar cells. The basic requisite to use any semiconductor material it should have a direct band gap with optical absorption in the visible region and have a high absorption coefficient ($>10^4$ cm^{-1}). The band alignment and related properties at the interface are of major importance that affects the device performance.

Bulk Metallic Glasses

Prof. Dr. Shantanu Madge discussed metallic glasses. Metallic glasses have come a long way from a laboratory curiosity to serious engineering materials. The talk traced the development of bulk metallic glasses and their mechanical behaviour. He highlighted the strategies to improve their toughness. He also focused on the current applications of BMGs, along with the latest issues in the 3D printing of metallic glasses.

Glass Technology and Viksit Bharat: A Technological Journey from the 18th to 21st Century

Prof. Dr. Gopi Sharma discussed the field of glass science and technology. The most researched materials include oxide glasses, metallic glasses, amorphous carbon, and amorphous silicon, which continue to receive significant focus today. The renaissance saw the development of glass for scientific purposes, including lenses for telescopes and microscopes, which were crucial for advancements in astronomy and biology. The 20th century's breakthroughs in x-ray diffraction, microscopy, and optical properties revolutionized glass applications, from heat-resistant kitchenware to lossless optical fibers and large TV screens. Luminescent glasses and glass ceramics, celebrated for their exceptional thermal and chemical stability, present an intriguing alternative to LCD and LED phosphors. In the realm of nonlinear optics, highly nonlinear glasses emerge as formidable candidates for crafting all-optical switching devices. The ongoing advancements in photochromic/photosensitive glasses are reshaping diverse fields, from high-density data storage to holographic optical elements, and beyond. The future innovation in glass science and technology includes the development of smart glasses that can change their properties (e.g., transparency) in response to electrical signals or environmental changes. Innovations in 3D printing technologies are enabling the creation of complex glass structures that were previously impossible to produce using traditional methods.

Pioneering Safer Quasi-Solid-State and Ultralow Temperature (<-100 °C) Li-ion Batteries

Prof. Dr. Vilas G. Pol mentioned that Purdue University's ViPER (Vilas Pol's Energy Research) group specialized in innovating anodes, cathodes, binders, ion conductive ceramics, salts, fire suppressing molecules as well as understanding their fundamental interplay to make semi-solid-state LIBs fundamentally safer. He has presented the case study of a Li-ion cell i.e. $LiFePO_4$ /tailored electrolyte/graphite was in-situ monitored between 25 and 300 °C employing multimodule calorimetry for its thermal runaway behavior to check the thermal and mechanical stability of the cell.

Prof. Dr. Vilas Pol discussed ViPER's recent efforts to make LIBs thermally and mechanically safer. A glimpse into the recent invention on the early detection/sensing of gases/VOCs informing battery management systems to circumvent calamitous LIBs thermal runaway. Further, he demonstrated the ultra-low temperature (≤-100 °C) performance of LIBs with solvation shell tailoring of innovative electrolytes.

Day 3: Technical Session

Date: 21st July 2024 (Forenoon)

Venue: Hotel Tip Top International, Pune

Theme 3: Agri-Tech

No. of Attendees: 100 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Dr. Sanjay Kumar Singh**, *Central Institute for Subtropical Horticulture, Lucknow*
- **Prof. Dr. Dinesh Amalnerkar**, *SPPU Pune*
- **Prof. Dr. Vilas K. Kharche**, *Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola*
- **Prof. Dr. Ravindra Patil**, *Agharkar Research Institute, Pune*
- **Dr. Sujoy Saha**, *National Research Centre for Grapes, Pune*
- **Dr. Sangram Patil**, *Vasant Dada Sugar Institute, Pune*
- **Shri Yashwant L. Jagdale**, *Krishi Vigyan Kendra, Baramati*
- **Dr. Sachin Jadhav**, *Cognizant Technology, Pune*
- **Prof. Dr. Sunil Pareek**, *NIFTEM, Sonepat, Haryana*

Ensuring Income and Nutritional Security through Farming of under-utilized Subtropical Fruits of India

Prof. Dr. Sanjay Kumar Singh discussed under-utilized sub-tropical fruits for high production potential in degraded lands (unfertile soils). The developments in this production will have an immense impact on rural India in the coming years. India has opened new vistas for horticulture growth to enhance small farmers' profitability and also nutritional security. He has examined the crops aonla, bael, jamun, tamarind, and jack fruit which have lots of diversity and offer immense potential for commercialization. Crops like mulberry, barhal, wood apple, khirni, chironji, and carambola have exhibited tremendous variability in fruit traits for the selection and commercialization of cultivars. In conclusion, he said India has many medicinal fruits which are available in tribal areas where currently the production is limited which could be enhanced with some efforts.

Highly Sensitive Label-free Biointerfacial Colorimetric Sensor Based on Silk Fibroin-gold Nanocomposite for Easy Detection of Organophosphate Pesticide

Prof. Dr. Dinesh Amalnerkar discussed about sensing and response of pesticides. Generally, pesticides need to be analyzed on the right equipment which requires sample collection and subsequent testing which generally takes longer duration. Dr. Amalnerkar has demonstrated that gold nanoparticle-based silk fibroin for the detection of organophosphate pesticides, namely: chlorpyrifos at ppb level. This silk fibroin-mediated gold nanoparticles have a plasmonic effect and hence, this solution gives calorimetric differences for different pesticides. This enables to analyze pesticides in water, soil, as well as other secondary sources of water in ppb level.

Strategies for Climate Resilient Agriculture

Prof. Dr. Vilas K. Kharche said that India has made significant progress in the production of food grain and green revolution in the country; however, Indian agriculture is facing problems of declining availability of natural resources. Climate change and its impact in the form of abiotic and biotic stresses are likely to further aggravate the situation. He further said that climate-resilient agricultural practices are crop and location-specific and could be tailored to fit into the agro-ecological, socio-economic conditions and priorities of farmers. Consistent efforts are required for climate-resilient adaptation to reduce the vulnerability of agriculture due to the adverse impacts of climate change. New advanced developments in the form of various types of sensors, mechanisms, control systems and information communication tools through advanced computing systems are aiding the faster adoption of precision agricultural practices.

Alternative Dwarfing Genes to Develop Semidwarf Wheat Genotype with Improved Establishment Traits suitable for Semi-arid Environments and Conservation Agriculture

Prof. Dr. Ravindra Patil mentioned in his talk that ~40% of the people around the world are using wheat as a stable food. Considering the increasing population, 360 MT of wheat will be needed by 2050. This wheat production target must be achieved despite the challenges posed by biotic and abiotic stresses. He stressed that early vigor in wheat has been identified as a crucial trait that can significantly impact grain yield through efficient water usage practices in dry environments. In conclusion, he said that the study on wheat delivers useful genetic resources compatible with early and deeper sowing to use residual moisture from the rainy season that allows farmers to save one irrigation and thus increase water usage efficiency.

Strategic Management of Crop Disease: A Discourse

Dr. Sujoy Saha deliberated that climate change is severely affecting crops due to the growth of diseases owing to humidity and temperature; hence, management of crops as per the climatic conditions is very essential to curtail the effect of diseases on the crops. This climate change management includes forecasting and monitoring using image-based sensory technology. This is required for precise remote sensing geographic information systems (GIS) for real-time monitoring of early detection of diseases. This will eventually help farmers to increase their crop yield irrespective of climate change.

Precision Agriculture

Prof. Dr. Y. L. Jagdale addressed that there should be a provision to import agri-based technologies directly to benefit Indian farmers. There are many day-to-day problems faced by Indian farmers which need to be sorted out with serious and sincere efforts using indigenous or imported technologies. Further, he discussed the inclusion of precision agriculture, drone and aerial imaging, autonomous machinery, vertical farming, block chain technology, smart irrigation, and IoT for farming practices.

Food Technologies

Prof. Dr. Sunil Pareek discussed the top 10 food technologies and innovations and approaches like the involvement of global start-ups and heat maps for betterment. He talked about algae as a food alternative for sugar, salt, and fat. He further discussed ultrasound technology for better food and DNA-based diets, edible water bottles, natural foods and probiotics. Food item production through 3D printing technology can be used for food fortification and functional food.

Green Hydrogen

Prof. Dr. Sangram Patil from VSI, Pune, representing Dr. Kakasaheb Konde, discussed the role of green hydrogen in reducing pollution in the automotive sector. He highlighted that India currently uses 6 million tons of hydrogen annually for ammonia and methanol production, with demand projected to rise to 28 million tons by 2050. India aims to meet 80% of this demand with green hydrogen to cut carbon emissions. Patil emphasized that hydrogen production from sugarcane is a cost-effective option, with the potential to use byproducts like bagasse for gasification and press mud and spent wash for biogas production. He also noted that hydrogen production via electrolysis technology is being evaluated but requires further development.

Digital Farming

Dr. Sachin Jadhav presented the past agriculture journey and what is required in future and also the future challenges towards 2047. He has discussed a few case studies on precision agriculture and simulated models for yield production. He also said we should focus on digital farming which is the need of the current problems of agriculture. Based on this, factors affecting the yield of crops and the possibility of a hybrid approach and development of a crop growth model.

Day 3: Technical Session

Date: 21st July 2024 (Forenoon)

Venue: Hotel Tip Top International, Pune

Theme 4 Biotechnology

No. of Attendees: 130 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. Ashok C. Khandkar**, *University of Utah and Elute Inc., USA*
- **Prof. Dr. Rajesh Bhosale**, *Ganpat University, Mehsana*
- **Dr. Janaki Chintalapati**, *C-DAC, Bengaluru*
- **Dr. Ashok Giri**, *NCL Pune*
- **Dr. Rajesh Singh**, *Gennova Biopharmaceuticals Ltd., Pune*
- **Prof. Dr. Rekha Singhal**, *ICT, Mumbai*
- **Prof. Dr. Absar Ahmad**, *Aligarh Muslim University, Aligarh*

Controlled Drug Release Medical Devices: Application to Orthopaedics

Prof. Dr. Ashok C. Khandkar highlighted the interdisciplinary nature of biotechnology, drawing on his experiences working alongside surgeons in the U.S. despite his background in materials science. He emphasized that merging diverse fields is key to solving complex biotech challenges. He introduced a company that has developed a unique platform technology for delivering therapeutic agents effectively, specifically targeting bone infections. This platform ensures a controlled, sustained release of antibiotics, addressing the limitations of traditional methods, which often struggle to treat chronic infections. The device maintains therapeutic antibiotic levels over extended periods, crucial for managing both acute and persistent infections. Additionally, Dr. Khandkar discussed the customization of drugs to make medicines more affordable. He concluded by underscoring the value of interdisciplinary collaboration and practical problem-solving, advocating for integrating diverse expertise to create affordable, effective solutions in biotechnology.

Harnessing Green Nanotechnology to Combat Antimicrobial Resistance for a Viksit Bharat 2047

Prof. Dr. Anima Nanda discussed antimicrobial resistance (AMR) and its impact referring to WHO's guidelines about the rising threat of AMR and its potential to cause millions of deaths by 2050. She highlighted the problem of overuse of antibiotics, which contributes to the development of drug-resistant pathogens. The research focuses on using green nanotechnology to address AMR. This involves employing microorganisms to treat other microorganisms, instead of relying on traditional antibiotics. She said that her research was focused on: (a) Collecting and analyzing blood samples for isolation of pathogens, and their susceptibility to antibiotics, (b) Nanomaterial synthesis by bioprocess and characterization, (c) Testing the efficacy of nanoparticles which show enhanced effectiveness compared to antibiotics, (d) Toxicity study of nanoparticles, and (e) Clinical trials on animals. Dr. Nanda summarized the silver nanoparticles process and its antibacterial properties, and demonstration of clinical trials on animals. Her research demonstrated that nanoparticle-antibiotic conjugates can significantly enhance antibiotic efficacy and reduce the necessary dosage.

Nanobiotechnology: Bridging the Gap between Biology and Nanoscience

Prof. Dr. Absar Ahmad discussed his team's work in nanoscience, focusing on bridging biology and nanotechnology. His group is advancing the biosynthesis of various nanomaterials—such as metal, metal oxide, sulfide, quantum dots, biominerals, and carbon nanoparticles—using non-toxic endophytic fungi, commonly found in fruits and vegetables. Notably, they are using these fungi to produce Taxol (paclitaxel), an anticancer drug, and conjugating it with nanoparticles for targeted delivery.

Prof. Ahmad's group has developed protein-capped, water-dispersible, stable nanoparticles with diverse applications across healthcare (e.g., liver cancer drug delivery, imaging, diagnostics), agriculture, energy, environmental management, and defence. They even explored nanoparticle-based treatments for black fungus during the COVID-19 pandemic, demonstrating the antifungal efficacy of selenium and silver nanoparticles. Prof. Ahmad highlighted the scalability challenges of nanoparticle production and the fungi-mediated reduction-oxidation reactions involved. He emphasized translating basic research into practical applications, underlining the need for safe, effective, and scalable biosynthetic nanomaterials.

Towards the Development of Novel AIE Active Organic Fluorescent Materials: Bio-imaging & Self-assembly Evaluation

Prof. Dr. Rajesh S. Bhosale explored the intersection of fluorescence and mythology, using the Ramayana as a starting point to examine the concept of luminescence and its potential for scientific advancements. He recounted the story of Hanuman bringing the entire Dronagiri mountain to Trivandrum to find the glowing Sanjeevani plant, symbolizing ancient intrigue with light-emitting substances. This mythological reference, along with natural bioluminescence like that of fireflies (resulting from luciferin oxidation *via* luciferase), inspired discussions on the evolution of fluorescence research.

Dr. Bhosale highlighted significant advancements in fluorescence and luminescent materials, focusing on their applications in DNA visualization, sensory detection, and medical imaging. Notably, Aggregation-Induced Emission (AIE) molecules, which emit light upon aggregation, have overcome limitations seen in traditional chromophores and offer applications in bioimaging and sensory detection.

His team's projects include developing conductive polymers that mimic AIE behavior, synthesizing luminescent molecules, designing pH probes to study disease mechanisms, and exploring AIE molecules with phosphonate groups to analyze emission properties. Dr. Bhosale emphasized the blend of mythological inspiration and scientific research in advancing luminescent technology.

Biosynthetic Pathways Alphonso Mango Fruit Flavor Molecules

Dr. Ashok Giri resented his research on mango aroma, delving into its biochemical and genomic characteristics. His work covers eco-friendly crop protection, aroma metabolic pathways in mangoes, and plant-based nanoparticles. Collaborating with Israeli scientists, his team also focuses on reducing anti-nutritional compounds in tomatoes and potatoes. By studying the genetic diversity among mango cultivars, they identified specific volatiles—such as monoterpenes, sesquiterpenes, lactones, and mesifurans—unique to Alphonso mangoes, aiding farmers in securing a Geographic Indication (GI) for Alphonso in 2012.

Further analysis of mangoes from various locations showed that certain volatiles, especially lactones and mesifurans, increase notably during ripening, particularly in Dapoli-grown mangoes. Dr. Giri's team also cloned genes involved in flavor biosynthesis, identifying multiple enzyme isoforms, while tackling the challenges of engineering these pathways in yeast and bacteria. He highlighted "spongy tissue" in Alphonso, comparing it to cancer due to shared biochemical pathways, and underscored the complex, still-unresolved nature of Alphonso mango flavor.

Affordable Health Care Solutions

Dr. Rajesh Kumar Singh highlighted the aspirations of Gennova, a biomanufacturing company in Pune, focusing on innovation and affordable healthcare solutions, which is a trillion-dollar economy, aligning with the broader goals of Atmanirbhar Bharat (self-reliant India) and Viksit Bharat (developed India). He discussed about Gennova's commercialized products such as Tenecteplase for heart attacks, Fasciomas, mRNA platforms, and COVID-19 and Omicron-specific vaccines. He elaborated that Gennova developed Tenecteplase for heart attacks and acute ischemic stroke which is economical and affordable in the market. He further added about the development of the drug Asparonase for cancer treatment. During the COVID-19 pandemic, his organization developed COVID-19 and Omicron-specific vaccines that is thermostable at 2-8 °C, addressing the distribution challenges faced by vaccines requiring ultra-low temperatures.

Sustainable Food Production and Processing

Prof. Dr. Rekha Singhal discussed the critical importance of "Sustainable Food Production and Processing," emphasizing the need to adapt Sustainable Development Goals (SDGs) to local conditions, as approaches in Europe may not suit India. Citing India's 120th rank in the 2021 Sustainable Development Report, she stressed the need to improve this position and create strategies to address global impacts. Dr. Singhal highlighted the food chain's role in climate change.

She underscored the need for plant-based meats to reduce emissions and advocated for sustainable food management, focusing on water and energy conservation, waste reduction, and non-thermal processing technologies. She explained the concept of a circular economy in food production and its ties to SDGs. Prof. Singhal suggested integrated farming systems (like rice-aquaculture), precision agriculture, vertical farming, and sustainable food processing methods, such as edible coatings and biodegradable packaging. She concluded by emphasizing the environmental impact of food waste and the need for innovative, multidisciplinary solutions across sectors.

Multidisciplinary and Collaborative Approach for Mental Health

Dr. Janaki Chintalapati highlights the interdisciplinary nature of bioinformatics, combining biology and computational skills. She transited to the main topic, mental health, explaining the multidisciplinary approach needed to address mental health issues. She noted the significant challenges and dimensions involved in mental health, particularly among the youth. She also shared the study reported by Kaa University that during the COVID-19 pandemic, the mental health coefficient among Indian youth is alarmingly low. Dr. Chalapati discussed the decline in mental health from childhood to teenage years, the impact of stress and anxiety, and the resulting economic burden estimated at 5 trillion USD due to reduced productivity. Dr. Chalapati emphasized the need for prevention rather than cure in mental health, highlighting C-DAC's focus on early intervention.

Day 3: Technical Session

Date: 20th July 2024 (Afternoon) and 21st July 2024 (Forenoon)
Venue: Hotel Tip Top International, Pune

Theme 5 Climate Change

No. of Attendees: 100 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. G.D. Yadav**, *ICT Mumbai*
- **Prof. Dr. Rafat Siddique**, *Thapar Institute of Engineering and Technology, Patiala*
- **Prof. Dr. Ambrish Singh**, *Nagaland University*
- **Dr. Tata Rao**, *ARCI Hyderabad*
- **Prof. Dr. Shailendra Kumar Shukla**, *IIT BHU*
- **Dr. Ilangovan S A**, *Vikram Sarabhai Space Centre, Thiruvananthapuram*
- **Dr. R. Gopalan**, *ARCI Chennai*
- **Mr. Amol Chaphekar**, *StrataEnviro Pvt. Ltd., Pune*
- **Dr. Mansa Nouni**, *Ministry of New and Renewable Energy, New Delhi*
- **Dr. Dinesh K Aswal**, *BARC, Mumbai*
- **Dr. Sujata Chaklanobis**, *DSIR, New Delhi*
- **Prof. Dr. D. P. Kothari**, *Former VC, VIT Vellore, Vellore*
- **Prof. Dr. Vadivel Murugan**, *Pondicherry University*
- **Prof. Dr. Jitendra Sangwai**, *IIT Madras*
- **Dr. Nagahanumaiah**, *CMTI Bengaluru*
- **Dr. Pramod Borse**, *ARCI Hyderabad*
- **Prof. Dr. Ramesh Chandra**, *IIT Roorkee*

Radiation, Nuclear Energy, and Environment

Dr. Dinesh K. Aswal said that nuclear energy is important to combat climate change as well as important for improving the human development index of the nation. Nuclear energy is a low-carbon, clean and renewable source of electricity, and it is useful in many beneficial effects related to health, societal and industrial growth. Further, he presented an overview of radiation which is an integral part of civilization. He covered a myriad of topics related to radiation such as its advantages concerning other energies, India's 3 stage nuclear program, the feasibility of nuclear energy, and sources of Uranium in India. He also went on to bust some popular myths about the perils of using nuclear energy which made the session even more enriching.

Impact of Climate Change on Renewable Energy Sources

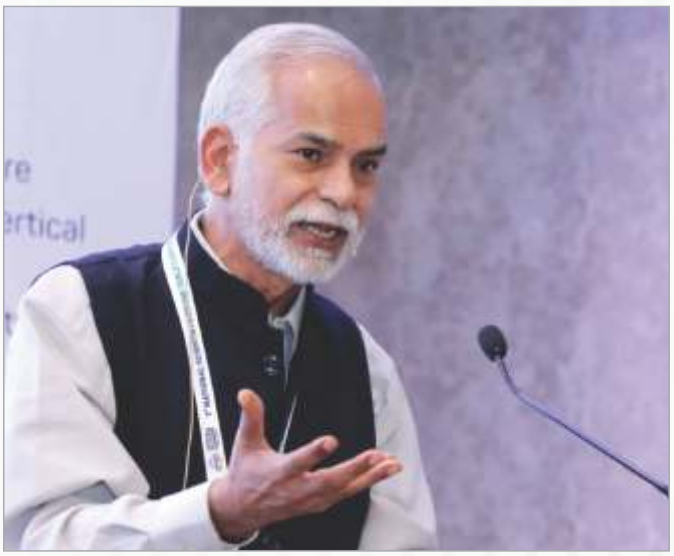
Prof. Dr. Shailendra Kumar Shukla shared his thoughts about climate action and further, he mentioned that the large consumption of fossil fuel is the real culprit for the same. He said developing options for low-carbon growth and reducing carbon footprints are important activities towards limiting the degree of future climate change where water and energy sectors are closely and dynamically linked. He also spoke about the impact of increased cloud cover on solar energy, how changes in wind patterns can affect the performance of wind turbines, and how climate change impacts the availability of biomass feedstock for energy production. He also presented a few case studies set in California and Scandinavia.

Battery Frontiers: Challenges & Sustainability

Prof. Dr. Ilangovan S A elaborated on the importance of batteries as an important energy storage device, and it is pivotal to mitigate greenhouse gas emissions while nurturing a clean energy landscape. As batteries are widely used in automobiles as well as consumer electronics, efforts have been taken to decrease the cost of the battery which includes materials, fabrication process, safety issues, and environmental effects. He further added that battery recycling technology will enhance the sustainability of the battery usage/technology. His talk was filled with detailed explanations about fossil fuel use and its economy, the importance of alternate energy sources and their storage systems, and an in-depth explanation of Lithium-ion batteries and their significance. Finally, he said the battery frontiers highlight the need for a holistic approach for the transition to a low-carbon future.

Sensors Advancements in Climate Change and Possible Future

Dr. Pramod Borse showcased various known sensors specifically emphasizing climate change areas and corresponding automation. Their pivotal role in enhancing the accuracy of climate models. The talk further extended to foresee the advanced sensors with automation, IoT, and quantum sensors for the precision climate change measurement systems.



Role of Green Hydrogen in Electricity Systems with Increasing Penetration of Renewable Power

Dr. Mansa R. Nouni introduced the audience to the concept of Green Hydrogen and the extent of its global demand and supply, the challenges faced by green hydrogen development, and the National Green Hydrogen Mission implemented in India. He also talked about how energy storage technologies, such as pumped hydro, compressed air, batteries, and hydrogen energy can be utilized to accommodate fluctuations in renewable energy generation and demand on the grid.

Challenges in Engineering Advanced Machines and Equipment during the Innovation Cycle: Product, Process, People, and Production Perspectives

Dr. Nagahanumaiah talked about the importance of engineering advanced machines and equipment which are a crucial part of the innovation cycle, though it includes a range of multi-faceted challenges. He has explained the challenges through four key perspectives: product, process, people, and production. He described all the challenges in the product, like, high high-development costs and rapid obsolescence. The process-related challenges are complexity in integration, maintaining quality control, and managing supply chain dependencies. The third category, like people, was the need for specialized skills, extensive training, and managing workforce adaptability to new technologies. The production-related challenges are scaling up manufacturing, minimizing downtime, and ensuring environmental and safety compliances. Finally, he concluded our objective is to provide a comprehensive understanding of the obstacles faced in the field and offer insights into strategies for overcoming the challenges.

Translational Materials Research in Energy Storage Technologies

Dr. Tata N. Rao informed that the necessity of batteries is ever increasing due to the target set by the Prime Minister that 30% of the vehicles manufactured in India should be electric-operated by 2030. Li-ion battery (LiB) is going to be used in these vehicles and hence the manufacturing of LiB is necessary in the country. Currently, all demand for LiBs is met through imports. This is largely due to a lack of indigenous technologies which are essential to make the batteries. Additionally, the necessary equipment required for manufacturing needs to be initiated to compete with the world market through indigenous production of LiBs. Alternatively, India should work on batteries like sodium-ion batteries as plenty of sodium is naturally available in the country. He informed that his organization (ARCI) works on LiBs and transferred technology of $LiFePO_4$ (LFP) to an industry.

Key Materials Technology for Sustainable Transport Applications

Dr. R. Gopalan discussed the increasing energy demands in today's world, the looming energy crisis specifically in the transportation sector in the 21st century, the potential advantages of Electric Vehicles (EVs), and the history of development of EVs and the current strategies implemented for storage energy to power EVs. He also mentioned that the motor based on permanent magnets is considered as the key component for the EVs. Currently, Li-ion battery is mainly used in all Evs due to their high energy density and good cyclability. He mentioned that he has established LiB facilities in ARCI. Considering the demand for permanent magnets in the motors of the EVs, he has initiated the project on Nd–Fe–B alloy-based permanent magnets.

2D Materials for Room Temperature NO_2 Gas Sensor Applications

Prof. Dr. Ramesh Chandra said gas sensing devices have gained immense importance by using semiconducting heterojunctions composed of 2D metal chalcogenides. These materials offer increased sensitivity, stability, selectivity, and full recoverability. He has presented PN heterojunction of hexagonal molybdenum diselenide and tungsten disulphide ($MoSe_2$-WS_2) on a silicon wafer. The sensors made out of these materials exhibited exceptional sensitivity, quick response time, and full recovery towards NO_2 at room temperature. He also explained the different properties of nano-silver, ceramic coatings, and surface engineering, the need for gas sensors, and the science behind the entire human body functioning as one big sensor.

Sustainability in Concrete Construction by Utilization of Industrial Byproducts and Waste Materials

Prof. Dr. Rafat Siddique informed that millions to tons of industrial byproducts and waste are generated every year from manufacturing processes, service industry, and municipal solid waste. In such a situation, managing waste for the sustainability of technologies has immense importance. Utilization of byproducts with some modifications is quite economical and supports the mainstream of manufacturing. He mentioned there are several types of waste materials/byproducts such as fly ash, bottom ash, foundry sand, scrap tyres, cement kiln dust, waste glass, recycled plastics, etc. Finally, he mentioned the use of such materials in concrete, is not only economical but also helps in reducing disposal and environmental-related issues.

Progress in the Field of Corrosion and its Monitoring Techniques

Prof. Dr. Ambrish Singh explained concepts such as the basics of corrosion and its relation with climate change, how we can reduce the environmental impact of corrosion, what are the economic losses due to corrosion, and the strategies to develop eco-friendly corrosion inhibitors. He discussed about testing of corrosion inhibitors using contemporary electrochemical techniques such as electrochemical frequency modulation (EFM), potentiodynamic polarization (Tafel), and electrochemical impedance spectroscopy (EIS). Finally, he said to understand the mechanism of corrosion various techniques need to be used. To support the mechanism for corrosion mitigation, the significance of various techniques such as contact angle studies, AFM, and SEM will be more useful.

Mitigation Initiatives & Measures to Curb Rising Outdoor Air Pollution Level

Mr. Amol Chaphekar shared about the current efforts to curb air pollution and his work in the modification of building walls (cladding) and retrofitting government vehicles to absorb and reduce air pollution respectively. He discussed air filters, i.e., purifiers, and the challenges associated with them. He said as part of development, the filters and the filtration systems were modified to be anticlogging and self-cleaning. This will drastically reduce the cost of maintenance and durability of the filters.

Latest Advancements and Challenges in Sustainable Sodium Metal Battery Technology for Self-Reliant India

Prof. Dr. Vadivel Murugan explained the advantages of sodium-ion batteries over lithium-ion batteries. Considering the limited sources of lithium, particularly current Indian scenario and its high cost, the alternative sodium-ion batteries technology is picking up worldwide. Further, he focused on liquid electrolyte of current lithium-ion battery electrolyte which has lots of safety issues. As a low-cost alternative, sustainable solid-state electrolyte based sodium metal batteries have shown greater competitive advantages and extensive application prospects. He focused his research work on the solid state electrolyte for sodium batteries which includes ceramic-polymer based electrolytes.

Energy & Environmental Problems Facing India & World and their Probable Solutions for Sustainable Development and Poverty Alleviation

Prof. Dr. D. P. Kothari's speech urged the audience to come up with innovative ideas to tackle the ill effects of climate change and ways to usher in a sustainable future. He discussed some important energy problems faced by both India and the world and presented the data related to the current electricity generation scenario in most of the developing countries. He further said systematic advanced planning measures like cogeneration, energy management, energy conservation, voltage fluctuations, etc. need more attention.

Day 3: Technical Session

Date: 20th July 2024 (Afternoon) and 21st July 2024 (Forenoon)
Venue: Hotel Tip Top International, Pune

Theme 6 Digital Transformations

No. of Attendees: 90 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. Raghunath Shevgaonkar**, *Professor Emeritus, IIT Bombay*
- **Prof. Dr. Parvinder Singh**, *Vice Chancellor, Rayat-Bahra University, Greater Mohali*
- **Ms. Priyamvadha Vembar**, *Bosch Global Software and Technologies Pvt. Ltd., Bengaluru*
- **Mr. Sunil Gupta**, *Co-Founder and CEO, QNu Labs, Bengaluru*
- **Prof. Dr. M. S. Santhanam**, *IISER Pune*
- **Prof. Dr. Bijoy Krishna Das**, *IIT Madras*
- **Prof. Dr. Ahlad Kumar**, *National Forensic Sciences University, Gandhinagar*
- **Mr. Jayam Sonani**, *Founder and CEO, Diamond Elements Pvt. Ltd., Surat*
- **Dr. Ranjit Kashid**, *National Center on Quantum Materials Technology, C-MET, Pune*

Digital Transformation for Developed Bharat

Prof. Dr. Raghunath Shevgaonkar has compared India's internet speed with the top 50 countries, highlighting areas for improvement in infrastructure development to support a robust digital ecosystem, and presented the data on the growing number of internet users in India, highlighting the potential for digital inclusion and economic growth. The presentation also discussed the significance of Ekranti (MeitY's initiative) in light of India's digital sovereignty and user privacy concerns. He further added the challenges in telecom infrastructure (networks, towers, etc.) and truly digital India (digital literacy, cybersecurity threats, data privacy, affordability of internet services, etc.).

Digital Transformation in Higher Education Institutions: A Viksit Bharat-An Outlook

Prof. Dr. Parvinder Singh presented his talk on Digital Transformation for NEP and Teacher Empowerment. In his talk, he further added that the quality of education can be enhanced through E-learning resources, digital tools, and adequate training on digital technology and its use in the implementation of NEP.

Business Relevance of Self-Awareness

Ms. Priyamvadha Vembar has presented the risks associated with cybersecurity in the country and increased reliance on digital infrastructure creates vulnerabilities for businesses and individuals. She advocated robust cybersecurity practices which can act as a catalyst for economic growth as well as a strong governance framework to manage cybersecurity effectively in the country. This framework should involve collaboration between the public and private sectors to create clear regulations, raise awareness, and promote best practices.

Making India a Leading Player in Quantum Secure Communications

Mr. Sunil Gupta presented about Quantum Security for India's Digital Future and its importance. He further added the vulnerability of current encryption methods to future advancements in quantum computing and the need for quantum-resistant cryptography. Mr. Gupta presented a potential roadmap for positioning India as a leading player in quantum security which includes: industry-academia collaboration and building expertise in quantum physics and cryptography.

The Promise and The Gaps in Quantum Computing

Prof. Dr. M. S. Santhanam provided an overview of quantum computing principles and how they harness the unique properties of quantum mechanics to solve problems intractable for classical computers. He explored how the quantum chaotic behaviour can emerge in quantum systems, potentially impacting the design and operation of quantum computers. He has discussed how to mitigate or even leverage quantum chaos for specific applications. Further, Prof. Santhanam mentioned the necessity of understanding the nonlinear dynamical system to model and control quantum systems. Dr. Santhanam explained how the principles of statistical physics, which deals with the collective behaviour of large numbers of particles, can be applied to analyse and optimize the performance of quantum computers.

Silicon Photonics: Technology and Applications

Prof. Dr. Bijoy Krishna Das discussed the role of silicon photonics in enabling faster and more efficient data transmission. This technology could play a crucial role in supporting the infrastructure needed for future advancements, including quantum computing. His presentation differentiated quantum computing from classical computing by explaining concepts like superposition and entanglement. Prof. Das also emphasized how these principles allow quantum computers to tackle problems intractable for classical computers. Prof. Das clarified that quantum computers are not meant to replace traditional desktop computers. Instead, they are specialized machines designed for specific computational tasks that are difficult or impossible for classical computers.

Deepfake Technology: A Rising Threat to Cybersecurity

Prof. Dr. Ahlad Kumar highlighted the dangers of deepfakes, hyper-realistic manipulated audio and video content created using machine learning. He emphasized the potential for deepfakes to erode trust in digital media, spread misinformation, and fuel cyberattacks, identity theft, and fraud. His presentation advocated for robust cybersecurity measures to combat deepfakes, by including advanced detection algorithms using deep learning and blockchain technology for content verification.

Introduction of Lab-grown Diamonds in Industrial and Scientific Application

Mr. Jayam Sonani talked about the exciting developments in India's quantum technology landscape and he found a brighter future for this cutting-edge field. He also explained in detail about lab-grown diamonds. Further, Mr Sonani talked about myths about the quality, value, and environmental impacts of lab-grown diamonds. Mr Sonani aimed to educate the audience and promote these sustainable alternatives to mined diamonds.

Single Electron Transistors for realizing Donor based Spin Qubits in Silicon

Dr. Ranjit Kashid delivered a talk on "Single-Electron Transistors for Spin-based Quantum Technologies". He focused on using Single-Electron Transistors (SETs) to realize donor-based spin qubits, a promising approach for quantum computing. Spin qubits utilize the spin of an electron as the information carrier, offering exciting possibilities for quantum computers. His presentation explored the role of SETs as a crucial building block for controlling and manipulating the spin of these donor atoms. Different materials for creating these spin qubits were likely discussed, as specific materials are essential for effective spin manipulation. Dr. Kashid also addressed the potential of single-atom transistors in this context. These transistors offer even greater control over electron behaviour and could be another avenue for building spin-based quantum devices.

In a nutshell, the digital transformations in all sectors need to be focused on the societal benefits which have been discussed during the roundtable discussion. It is also opinioned that quantum technology is going to do miracles in all sectors it touches. Hence, it is necessary to work together in this area, share the resources and knowledge and help respective industries with the commercialization of this technology.

Dr. Rahul V. Karad interacting with the Dignitaries at the Conference Venue

Day 3: Technical Session

Date: 20th July 2024 (Forenoon and Afternoon)
Venue: Hotel Tip Top International, Pune

Theme 7 Health Care

No. of Attendees: 100 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. Ajit R. Kulkarni**, *IIT Bombay*
- **Prof. Dr. Kakoli Bose**, *ACTREC, Navi Mumbai*
- **Prof. Dr. T. Govindaraju**, *JNCASR, Bengaluru*
- **Prof. Dr. Sangeeta Kale**, *DIAT, Pune*
- **Prof. Dr. Shrikant Joshi**, *Uka Tarsadia University*
- **Prof. Dr. Rajesh Bhosale**, *Ganpat University*
- **Dr. Dhiraj Kumar**, *ICGEB, New Delhi*
- **Dr. Soumen Basak**, *NII, New Delhi*
- **Prof. Dr. Kaushik Das Sharma**, *University of Calcutta*
- **Dr. Omkar Singh**, *NIT Srinagar*
- **Dr. Yogesh Bendale**, *Rasayu Clinic, Pune*
- **Prof. Dr. Shivaji H. Pawar**, *Sinhgad Institutes, Solapur*
- **Dr. Kaviarasu Balakrishnan**, *Manushyaa Blossom, Chennai*

Flow Synthesis of Defect-rich CeO_2—A Potential "Drug-free" Cancer Nanomedicine

Prof. Dr. Ajit R. Kulkarni focused on the advanced applications of cerium oxide (CeO_2) quantum dots (QDs), especially in the context of cancer therapy and environmental pollution remediation. Bulk CeO_2 is recognized for its ability to act as an oxygen reservoir, which is beneficial for applications in sensing, therapeutics, environmental pollution remediation, and catalysis. The speaker provided insights into how reducing the size of CeO_2 particles to sub-10 nm can enhance their surface area and increase the concentration of surface defects, making them highly effective in various technological and medical applications.

Prof. Kulkarni discussed the challenges with traditional wet-chemical batch processes that often suffer from issues such as inhomogeneous mixing, uneven temperature distribution, and low yield, limiting their effectiveness. Further, he explained the benefits of continuous flow reactors (particularly, helical coil reactor-HCR) for improved synthesis. HCRs provide enhanced hydrodynamics and transport phenomena, enabling better control over the formation of CeO_2 quantum dots (QDs). More specifically, he demonstrated the scaling up of CeO_2 quantum dots (E-CeO_2 QDs). He demonstrated the QDs for biological and cancer therapy applications as a drug-free therapy with minimal side effects, addressing the limitations of conventional drug-based and chemotherapy methods. By 2040, cancer cases are expected to reach 29.9 million globally, highlighting the need for novel and effective treatments. Finally, he concluded that E-CeO_2 QDs present a promising alternative with their high photo-transduction efficiency and selective action against cancer cells.

Targeting the Apoptotic Pathway for Therapeutic Intervention Against Cancer

Prof. Dr. Kakoli Bose informed apoptosis, also known as programmed cell death, is a vital biological process that plays a key role in maintaining cellular homeostasis in multicellular organisms. This energy-dependent mechanism is particularly crucial for eliminating aged, damaged, or unnecessary cells without causing inflammation. The process is characterized by distinct morphological changes, including cell shrinkage, membrane blebbing, and DNA fragmentation, ultimately resulting in the formation of apoptotic bodies. These bodies are subsequently phagocytosed by surrounding cells, ensuring the removal of dead cells in a controlled manner. She explained both mechanisms (intrinsic pathway and extrinsic pathway) behind apoptosis. She also explained the function of caspases and the formation of crucial signalling complexes. This knowledge is found to be fundamental for advancing our understanding of cell death processes and developing potential therapeutic approaches for conditions involving dysregulated apoptosis.

Academic Inventions and Their Translation for Sustained Human Health and Societal Benefit

Prof. Dr. T. Govindaraju addressed several crucial topics, including sustainability, the circular economy, and the translation of scientific innovations into practical health interventions. The speaker emphasized the importance of good science and technology for sustainable development, bridging gaps between academia and industry, and discussed sustainability and circular economy (sustainability, circular economy, affordable and scalable solutions, and equity and collaborations), translation of inventions into health interventions (challenges in translation and translation research), role of science and technology in sustainable development (Viksit Bharat and bridging academia and industry), recent advancements in functional amyloids, biomaterials, biomarkers and diagnostic (Theranostic probes for Malaria) technologies.

The speaker emphasized that health is not merely the absence of disease but involves a holistic approach to well-being. The comprehensive definition of health includes physical health, mental health, social health, emotional health, spiritual health, environmental health, and economic health. He pointed out that economic status plays a crucial role in health, noting that wealthier individuals tend to prioritize their health more than those from lower socioeconomic backgrounds. The discussion included an overview of sustainable development goals aimed at disease prevention. The speaker illustrated how common behaviors, such as the use of plastic, can have detrimental health effects. He cited that the risk of cancer increased due to toxins found in plastic bottles, containers, plates, toothbrushes, and paper cups. The lecture addressed the growing issue of mobile device addiction, linking it to an increase in musculoskeletal disorders. The lecture also focused on the long-term effects of child abuse and neglect. The speaker explained how such adverse experiences can lead to numerous physical (osteoarthritis, rheumatoid arthritis, back and neck pain, diabetes, obesity, cardiovascular diseases and mental health issues (anxiety, depression, and PTSD) later in life. The speaker emphasized the connection between adverse childhood experiences (ACEs), such as violence, substance abuse, and parental aggression, and their physiological consequences. The speaker concluded the lecture by addressing the disconnect between knowledge and action regarding health behaviors. He referenced cultural practices, such as the reluctance to wear helmets in India, which lead to increased accidents and health problems. He encouraged attendees to take proactive measures to improve their health, stressing that perceptions often hinder our ability to act in our best interest. Stakeholders must embrace sustainability as a collective responsibility to promote planetary health and human health, integrating health considerations into sustainability efforts to create a healthier world for future generations.

Advancing Human Healthcare through Regenerative Medicine: Harnessing the Power of Cellular Restoration

Prof. Dr. Shrikant Joshi provided a comprehensive overview of regenerative medicine, a multidisciplinary field that integrates health science, medicine, materials science, and engineering technology. The focus of regenerative medicine is on cellular restoration, particularly through stem cell research, aiming to develop innovative therapies for repairing, replacing, or regenerating damaged tissues and organs. Regenerative medicine seeks to harness the body's natural healing mechanisms to restore normal function in diseased or injured tissues. Dr. Joshi presented two case studies, such as junctional epidermolysis bullosa (where after 21 months, the skin demonstrated full growth with no blister) and Parkinson's disease (where cell-based therapy showed a significantly favorable result by increasing the level of F18 dopa). He also discussed the types of stem cells and their applications. He also mentioned a few innovative techniques and discoveries, including Yamanaka's discovery and Waddington's model under stem cell research. Next, Dr. Joshi focused on challenges (quality and quantity of progenitor cells, embryonic stem cell concerns about isolation ethics and risk of teratomas, and controlled environments) and solutions in regenerative medicine. He also discussed clinical trials and protocols and stressed Edmonton protocol and protective encapsulation biomaterials.

Opportunities in Indigenous Sensor Development for Viksit Bharat

Prof. Dr. Sangeeta Kale provided an overview of indigenous sensor development in the medical industry, discussing challenges, opportunities, and challenges faced by Indians, students, young researchers, and senior individuals. The lecture focused on the evolving landscape of sensor technology and its implications for indigenous manufacturing in India. The lecture highlighted the significant growth anticipated in the global sensor market, projected to reach $165 billion by 2028, and emphasized the critical need for advancements in indigenous manufacturing to meet domestic and global demands. She discussed the key areas of growth in sensor technology such as (i) IoT-based sensors for smart cities, automotive systems, and healthcare; (ii) machine learning integrated sensors for more advanced data collection and analysis; and (iii) miniaturization of devices. Prof. Kale has discussed the significance of sensors in aerospace and aviation sectors for automation, navigation, radar, and military applications which are imported currently; hence, seeks indigenous manufacturing. Because of the high cost of imported sensors and medical devices, life-saving technologies are limited to access for all; hence, there is a huge impact on the medical industry. She added that there are challenges like failure rate and lack of professional training on the medical equipment.

Probing Cell-signaling Pathways Directing Anti-viral Immunity

Dr. Soumen Basak said that his group examined two key viruses: Chandipura and Chikungunya, especially focusing on their epidemiology, immune responses, and the effects of macrophage signaling pathways. He said his team reviewed two cellular pathways involved in the immune response—the canonical and non-canonical NF-kappa B pathways—to viral infections. The canonical pathway is crucial for inducing interferon responses and pro-inflammatory cytokine production. It was highlighted that NF-kappa B signalling plays a significant role in generating an antiviral state and can also lead to inflammatory side effects. The non-canonical pathway is involved in lymph node development, which is essential for antiviral antibody responses. He explained macrophage functions in viral infections. He emphasized effective and efficient management of inflammation to avoid tissue destruction and prevent collateral damage during the infections. He cited an example from the COVID-19 pandemic, that excessive inflammation rather than the virus itself leads to severe lung damage in COVID-19 cases. Preclinical studies suggest that elevated NF-kappa B activity enhances interferon production, aiding in the control of the Chandipura virus. Also, in another preclinical study it was observed that the NF-kappa B activity offers protection against the Chikungunya virus, potentially through mechanisms beyond just interferon response. He discussed the protective role of NF-kappa B signalling in macrophages highlighting the complexity of managing inflammatory responses during viral infections. While NF-kappa B is involved in inflammation, its role in antiviral defence suggests that suppressing this pathway might not always be beneficial. Thus, understanding and modulating NF-kappa B signalling could lead to more effective treatments for viral infections, balancing inflammation and immune protection.

Innovative Approach to Cancer Drug Research: Integrating Ayurveda and Modern Medicine

Dr. Yogesh Bendale's presentation provided an insightful exploration of integrating traditional Ayurvedic medicine with modern nanotechnology and healthcare practices. He expressed gratitude to the conference organizers and humorously contrasted his work in Ayurveda with the previous speaker's focus on physics. As the head of Rasayu Group, Dr. Bendale underscored their commitment to both research and manufacturing, aiming to establish Ayurveda as a rational science, particularly in cancer drug development. He clarified a common misconception: Ayurveda does incorporate metal-based treatments alongside plant-derived medicines, a perspective that lays the groundwork for blending these traditional practices with modern innovations. Addressing the global cancer crisis, he shared alarming statistics from 2020, noting around 20 million new cases, with India facing the highest rates of oral cancer and significant incidences of breast, lung, prostate, and colorectal cancers. He pointed out the critical issue of late-stage diagnoses in India (often stages 3 or 4), highlighting the frequent disconnect between doctors and patients regarding treatment intentions, which tend to be more palliative than curative at these stages. Dr. Bendale emphasized the urgent need to improve survival rates and enhance the quality of life for patients facing advanced cancer. His presentation compellingly argued for the potential of Ayurveda to complement modern medicine, particularly in tackling pressing health challenges like cancer. This thoughtful integration of traditional wisdom with contemporary scientific advancements offers a promising outlook for the future of integrative healthcare.

Wearable Robotics: Intelligent Adaptive Control Approach for Actuated Ankle–Foot Orthosis

Prof. Dr. Kaushik Das Sharma delivered an engaging plenary talk focusing on the intersection of wearable robotics and intelligent adaptive control, highlighting innovative applications aimed at assisting individuals with mobility impairments. With a background in electrical engineering, Dr. Sharma specializes in control systems within robotics, a multidisciplinary field that incorporates elements from mechanical engineering, materials science, and computer science. He began by explaining the concept of wearable robotics, designed to support movement for individuals, particularly those facing severe mobility challenges due to conditions like spinal cord injuries or strokes. He discussed leg wearables, such as exoskeletons, which provide essential support, and hand wearables, including prosthetic hands and electronic gloves that replicate natural gestures. Emphasizing the importance of these technologies for the elderly, Dr. Sharma noted the high risk of falls in this demographic and the potential for wearable robotics to enhance mobility and reduce fall risks. A key focus of his talk was the control of Actuated Ankle Foot Orthosis (AFO). He detailed the human gait cycle, highlighting the swing phase as particularly challenging for those with mobility issues. He explained how foot drop can lead to falls and how AFOs provide the necessary torque to assist during this phase. Dr. Sharma introduced the concept of personalized control in wearable robotics, emphasizing that each individual's residual human torque varies, necessitating adaptive and personalized device responses. He elaborated on the mathematical modelling and control architectures employed, including fuzzy logic controllers, which mimic human decision-making in uncertain situations—a crucial feature for adaptive systems. He also addressed energy efficiency, discussing the balance between computational demands and battery life. Techniques like Gaussian selection schemes and particle swarm optimization were highlighted as methods to enhance energy management in mobile devices. Dr. Sharma acknowledged the practical challenges in testing these technologies, particularly in collaborating with government hospitals due to their high patient loads. The talk further explored ongoing research in hand gesture mimicry using prosthetic arms. His team is developing a system where sensory gloves are worn on a functional hand to control a prosthetic arm, enabling the replication of gestures through a blend of 3D-printed components and machine-learning algorithms. In conclusion, Dr. Sharma outlined future research directions, emphasizing the need for improved sensors, enhanced AI integration, and the development of cost-effective materials to further advance the field of wearable robotics. His presentation offered a promising view of how these technologies can transform mobility assistance for individuals with impairments, highlighting both current achievements and future potential.

Signal Processing in Healthcare

Prof. Dr. Omkar Singh highlighted the essential role of signal processing in medical instrumentation and healthcare. He explained how techniques like Fourier theory, wavelet transform, and empirical mode decomposition enhance the diagnosis and treatment of health conditions through the analysis of electrical signals like ECG and EMG. These signals offer valuable insights into physiological processes, particularly in diagnosing myocardial abnormalities. He addressed challenges in medical signal processing, such as mixed signals from interconnected body systems and data contamination from patient movement and environmental factors, emphasizing the importance of clean data for accurate analysis. Prof. Singh also detailed applications of signal processing, including ECG analysis, multimodal heartbeat detection, seizure detection, and medical imaging. In conclusion, he discussed future directions for medical signal processing, stressing the need for adaptive data analysis methods to better understand physiological signals and the potential for developing new techniques to enhance diagnostic accuracy and patient care.

Pediatric Neurology

Dr. Kaviarasu Balakrishnan explored the advancements in nanomedicine and pediatric neurology, emphasizing significant progress in understanding and treating complex neurological disorders. He highlighted the development of nanomedicines with particle sizes of 10-100 nm, which enhance targeted drug delivery in pediatric cases. Notably, he discussed the innovative use of molecular robotics for autism treatment. Dr. Balakrishnan also examined the mechanisms behind the onset of diseases such as renal failure, cardiac arrest, cancer, and neurological disorders, stressing the importance of this understanding for developing effective preventive and therapeutic strategies. He noted a troubling rise in the prevalence of autism and other neurodevelopmental disorders, from 1 in 10,000 children in the 1970s to 1 in 50 today, underscoring the urgent need for ongoing research and innovative treatments in pediatric neurology.

New Developments in TB Treatment

Dr. Dhiraj Kumar addressed the global challenge of tuberculosis (TB) elimination, emphasizing the need for transformative approaches due to the limitations of traditional prevention and treatment methods. He highlighted the major hurdle of long-duration treatment (6–9 months), which complicates patient compliance and contributes to antibiotic resistance. Dr. Kumar suggested that developing new, unconventional therapies could potentially shorten treatment to 2–3 months, significantly impacting TB management worldwide. He also noted that the existing BCG vaccine has limited effectiveness in controlling TB. His research group is focused on developing novel host-directed strategies by identifying host dependency and susceptibility factors, as well as understanding the host functions that bacteria target.

Nanotechnology Applications in Medicinal Plants: A New Approach for Healthcare in Ayurveda

Prof. Dr. Shivaji H. Pawar deliberated on the situation of COVID-19, i.e., communicable disease, which was persistent for 2-3 consecutive years. Considering such situation for communicable diseases which will be more dangerous in future due to mutation of the viruses. In this context, his research group has been actively involved right from the inception of COVID-19 and has taken the initiative in fighting against COVID-19 based on nanoscience and nanotechnology. His talk was focused on the field of healthcare based on advances in nanomaterials and bionanocomposites. He said nanotechnology applications in medicinal plants are a recent addition to Ayurveda, an ancient Indian medical system. He mentioned that nanotechnology is a powerful tool which offers immense opportunities for the improvement of quality of life through applications in nanomedicine and food systems. He discussed new approaches to health care in Ayurveda. In the conclusion, the speaker said that by leveraging materials such as silk fibroin, advancing cancer nanotechnology, and exploring innovative treatments like magnetic hyperthermia, significant progress has been made in improving patient's health.

Day 3: Technical Session

Date: 21st July 2024 (Forenoon)

Venue: Hotel Tip Top International, Pune

Theme 8 Science, Scientific Temper, & Spirituality

No. of Attendees: 80 (Students, Researchers, and Faculty Members)

Eminent Speakers:

- **Prof. Dr. Bhushan Patwardhan**, *SPPU, Pune*
- **Dr. Ashok Joshi**, *Microlin, USA*
- **Prof. Dr. Bhag Chand Chauhan**, *Central University Himachal Pradesh*
- **Prof. Dr. Deepak M. Ranade**, *Consultant Neurosurgeon, Pune*
- **Shri. Gautam Kumar Ailani**, *Renowned Pranic Healing Trainer*
- **Prof. Dr. Ramakrishna Bhat**, *IISER Pune*
- **Ms. Priyamvadha Vembar**, *Bosch Global Software and Technologies, Bengaluru*
- **Prof. Dr. Jayant Khandare**, *MIT World Peace University, Pune*

Evolving Journey of Modern Science into Meta-science

Prof. Dr. Bhushan Patwardhan emphasized the significance of the Sanskrit language and Ayurvedic concepts such as Prakriti and Dosha. He also highlighted the importance of a holistic approach to medicine and medical examination, PCR technology, and advocated for a thoughtful approach supported by experiential / collaborative knowledge. He advocated for open minds and the concept of "Aarogya" (well-being) as a holistic approach rather than just a physical state.

Understanding Consciousness

Dr. Ashok Joshi shared personal reflections on spirituality and silence, and how these experiences led him to contemplate the concept of God. Criticized the notion of India being the third most powerful country and emphasized that youth should focus on innovation with a monetary mindset. He further expressed that the goal of the "Union of Monetary Mindset and Spirituality" for harmony and peace to mankind needs deeper insights to see it bearing tangible fruits in the society.

Neuroscience of Spirituality

Prof. Dr. Deepak M. Ranade explained the importance of "Aum" both in spirituality and science (physics). In Spirituality, "Om" (or "AUM") is a sacred sound and a spiritual symbol in Indian religions. It is considered the sound of the universe and is often used in meditation practices. In Physics, Ohm is a unit of electrical resistance, named after Georg Simon Ohm. It is crucial to understand how electric circuits operate. He said to explore "AUM" or "Ohm" which symbolizes harmony, balance, and understanding in both spiritual and scientific contexts. He compared MRI results of the brain in resting state and active state. Resting-state MRI scans show the brain's default mode network (DMN), which is involved in daydreaming, thinking about the past or future, and self-referential thoughts. However, active-state MRI scans can reveal which parts of the brain are involved in various functions, such as problem-solving, movement, and sensory processing. He conceptualized the human brain as a "2 kg machine" made up of about 86 billion neurons with remarkable capabilities. Despite its small size compared to the rest of the body, it controls all bodily functions, thoughts, emotions, and behaviours. He also explored how this "machine" can comprehend complex concepts, create art, solve problems, and generate consciousness. Highlight the brain's ability to process information, learn, and adapt. He explained further about the role of the brain in creating consciousness and awareness. Further, he discussed how intuition and self-denial are linked to intelligence. He also wisely explained about the five senses and their limitations and explained how the sixth sense come into play in our understanding of reality. He also discussed the reliance on our senses to understand the universe. Further, he explored the balance between trusting our senses and being sceptical of their accuracy. He also mentioned the broader implications of Heisenberg's principle for understanding the limits of human knowledge and perception. He also emphasized that the manifestation of the ultimate truth (Brahma Satya) is not merely a myth but a reality. Dr. Ranade briefly discussed about the idea of Einstein that "Reality is merely an illusion." He further discussed the relation of quantum physics to consciousness and intelligence.

Union of Science & Spirituality

Shri. Gautam Kumar Ailani emphasized the importance of uniting science with spirituality. He believed that true healing and understanding came from integrating scientific knowledge with spiritual practices. This union was not just theoretical but was practically applied in disciplines like Pranic Healing and Arhatic Yoga. Pranic Healing is a no-touch energy healing system that utilized 'prana,' or life energy to heal physical and emotional imbalances in the body. According to him, Pranic Healing is effective for achieving a balanced life, promoting health, and enhancing overall well-being. Dr. Ailani advocated for the practice of Arhatic Yoga as a means to deepen one's spiritual journey and achieve a higher state of consciousness. This advanced spiritual practice was designed to accelerate the evolution of the soul. As per the definition, Prana is the life energy that sustains all living beings. It is the vital force that keeps the body alive and healthy. Dr. Ailani taught that understanding and working with prana could lead to improved health and spiritual well-being. The concept of prana was recognized across various cultures, although it might have been known by different names. For example, it was referred to as 'Qi' in Chinese traditions, 'Ki' in Japanese, and 'Ruach' in Hebrew. Despite cultural differences, the essence of prana as life energy remained the same. He emphasized that ignorance did not change reality; rather, it altered our perception of it. This insight encouraged individuals to seek knowledge and awareness, as understanding reality as it truly is can lead to enlightenment and holistic well-being. Dr. Ailani conducted experiments with the audience to help them feel the energy within their bodies. These exercises were designed to make participants aware of the life force (prana) flowing through

them and how it could be harnessed for healing and spiritual growth. According to Shri. Ailani, understanding and balancing chakras (energy centres) is essential for maintaining overall health (physical, emotional, and spiritual) and harmony. Shri. Ailani advocated for a holistic approach to healing that combined spirituality with scientific understanding. He believed that by integrating these two realms, one could address both the material and spiritual aspects of existence, leading to complete and lasting well-being. Shri Ailani reflected that science could explain many aspects of life, the essence of creation and the divine could not be fully captured by scientific methods alone. It served as a reminder of the mystery and beauty of life that went beyond the material world.

Intertwining Science and Spirituality for the Conscious Planet

Prof. Dr. Ramakrishna Bhat discussed the importance of integrating science and spirituality to foster a more conscious planet. He believed that a holistic understanding of our world could be achieved by bridging scientific knowledge with spiritual insights. This integration, he argued, would lead to a deeper awareness of our place in the universe and promote a more sustainable and harmonious coexistence. Prof. Bhat acknowledged that advances in science and technology have significantly shaped the modern world. These innovations have brought about remarkable progress and opportunities, transforming industries, communication, and everyday life. However, he also highlighted the challenges associated with these advances, such as ethical dilemmas, environmental concerns, and the potential for technological dependencies that might overshadow human values. According to Prof. Bhat, the rapid pace of scientific and technological advancements posed several challenges, like: ethical concerns, environmental impact, and human values. Prof. Bhat advocated for a philosophical approach to understanding the human self, especially in the context of brain science. He suggested that exploring philosophical perspectives could provide valuable insights into the nature of consciousness and the self. By examining philosophical questions about identity and awareness, individuals could gain a deeper understanding of their minds and the essence of their existence. He believed that knowledge had the power to dispel fear. He said that acquiring knowledge—particularly through spiritual and philosophical inquiry—could help individuals overcome fears and uncertainties. By understanding the deeper truths of existence and our place in the universe, people could cultivate a sense of inner peace and resilience. Prof. Bhat emphasized the importance of learning from a perspective of divine knowledge. He argued that viewing the world through the lens of spiritual wisdom could enrich one's understanding and appreciation of life. By turning towards philosophy and divine knowledge, he believed that individuals could gain a deeper understanding of themselves and their place in the world, ultimately fostering a more conscious and harmonious planet.

Business Relevance of Self-Awareness

Ms. Priyamvadha Vembar said that I, me, myself, and other active-voice sentences in the English language were used without giving a thought to it, and she emphasized the importance of inquiry into the concept of the self. She also felt that Life and Consciousness-awareness are unsolved problems in science. With the understanding of the DNA, life to an extent, is understood to have been decoded. However, she claimed that "Dharmic traditions" of Bharat have inquired into life and consciousness over millennia and continue to do so, even to this day. She focused on "self-awareness" and its utilitarian value in the business context, with examples of literature available today. The talk makes a case as to why "Bharat" should lead this movement; with the vision that the citizens of Bharat are engaged in self-mastery as their goal. She suggested that this transformation needs joint contributions from society and academia.

Consciousness: Ultimate Reality

Prof. Dr. Jayant Khandare delivered an insightful presentation that explored the intricate connections between (cellular) science, consciousness, and the ultimate reality. His talk spanned various scientific and philosophical concepts, highlighting the importance of curiosity, and continuous learning in the pursuit of knowledge. He discussed the science of a single cell, emphasizing its complexity and the profound implications it has for understanding consciousness. He linked cellular biology to broader philosophical questions about the nature of reality, suggesting that the study of a single cell could provide insights into the ultimate reality. Dr. Khandare quoted the renowned physicist Richard Feynman, who said, "My interest in science is to simply learn about the world. The more I learn, the better it gets." This quote encapsulates Dr. Khandare's approach to science—an ongoing journey of discovery that continually deepens one's understanding and appreciation of the world. He highlighted the remarkable journey of Dr. Jennifer B., who created the first COVID-19 laboratory. He also referenced the work of a Nobel laureate in cancer research, emphasizing the ongoing battle against cancer, particularly in developed countries. He pointed out that the modern lifestyle, with its emphasis on modernization, often leads to the creation of free radicals, which contribute to the increasing prevalence of cancer. He underscored the importance of scientific inquiry in improving our understanding of the world and addressing pressing global challenges.

Day 3

Date: 21st July 2024 (afternoon)
Venue: Hotel Tip Top International, Pune

Valedictory Session

The session included contributions from Dr. Raghunath Mashelkar, Dr. Vijay Bhatkar, Prof. Dr. G.D. Yadav, Prof. Dr. Sunil S. Bhagwat, Dr. Ashok Joshi, Dr. Sujata Chaklanobis, Prof. Dr. Vishwanath Karad, Prof. Dr. Murthy Chavali, Dr. Sanjay Kamtekar, Dr. Bharat B. Kale, and Dr. Rahul V. Karad, MIT World Peace University.

In this session, around four hundred and fifty participants, including students, researchers, and faculty members, participated to witness the talks delivered during the valedictory session.

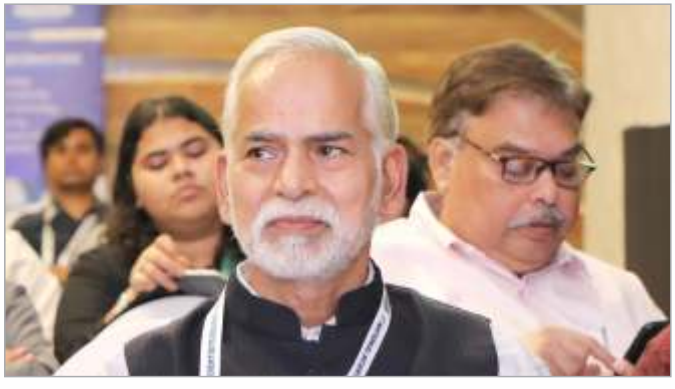
After the felicitation of all distinguished guests, **Prof. Dr. Kale** gave the introductory remarks of the valedictory session, where he mentioned about 120 invited speakers had participated and delivered their invited/plenary talks. He also shared the statistics and summary of the distinguished speakers who participated in different themes of the conference. He also mentioned that students and research scholars have interacted with the speakers intensely with their questions both during the parallel sessions and poster presentations. He emphasized that the conference laid a necessary golden opportunity to all faculty members of MIT-WPU for the potential collaboration with renowned scientists and academicians of Bharat. He thanked all the invited speakers for the invitation acceptance and for sparing their invaluable time for the talk at the conference. Finally, Dr. Kale thanked Dr. Mashelkar, Dr. Bhatkar, Dr. Rahul V. Karad, Prof. Chavali, Prof. G.D. Yadav, Dr. Ashok Joshi, and Dr. Kamtekar for their generous support, as well as all faculties and students of MIT-WPU. He said Prof. Shekhar Mande was unable to attend the conference due to his poor health; however, MIT-WPU is always thankful to him for his contribution in organizing this program.

Dr. Ashok Joshi said that the concept of NSRTC 2024 was envisioned by Dr. Rahul V. Karad about a year ago. Although Dr. Rahul V. Karad appointed Dr. Joshi as the chairman of the conference, Dr. Joshi felt that the four pillars of the success of NSRTC 2024 are Dr. Sanjay Kamtekar, Prof. Dr. Bharat Kale, Prof. Dr. R.M. Chitnis, and Prof. Dr. Milind Pande. He also said that many would have seen him talking in Theme 8: Science, Scientific Temper, and Spirituality about "GDP, GDP, and GDP", for him it is that GDP is very important to the theme; as in his experience, India is very rich in spirituality, but to promote spirituality we need bigtime finances, all over the country, and that would only come from higher GDP. In roundtable conferences, the students and faculty members of the university would engage themselves in discussions with the speakers, not just delivering a presentation of the phenomenal work of the speaker, but seeing what ideas and products can be generated from the research findings of the distinguished speaker to generate entrepreneurship and promote startup culture in India will be the focus for the forthcoming NSRTC.

Prof. Dr. Sunil S. Bhagwat said "when a student prepares for the examination, its not just for the examination but must also be for getting a job. Similarly, when a teacher is only teaching that is just the beginning, teacher if he does research you start counting the number of publications and you therefore target producing. But if you can all of us together work towards the social benefit coming out of the work that we do and we keep that as aim, and this would eventually do the transformation from Aviksit to Viksit Bharat." He congratulated once again MIT-WPU for taking a big step towards achieving this very goal through this conference. He said that the definition of science is different for many, and earlier it was called philosophy. Further, he said any simple mundane activity becomes science when we start to understand the principles of it, we start to call it science. So, we need to make everything understood as a way of life that is what the way to be Viksit Bharat @2047. Finally, he expressed "All the Best Wishes" to every participant in this journey.

Prof. Dr. G. D. Yadav before starting his valedictory speech, requested the audience to pray for the well-being and prosperity of their Gurus as every one of us had a Guru or has a Guru, and the day was coincidentally Guru Purnima Day. This program is a wonderful one, as the whole idea is to have no boundaries in science, as we have seen all aspects of engineering and science were taken into the Climate Change theme. He referred to the earlier statement made by Prof. Dr. Sunil Bhagwat concerning the definition of science and said that until 1832 the word "Science" did not exist, and we used "Natural Philosophy", and hence, we have PhD referring to Doctor of Philosophy. In modern science from 1832, USA started to use Science for the first time, and from then onwards we all became scientists and technologists. He mentioned that all three things: energy, environment, and electrons are connected. At any moment, we produce new information that is translated, augmented, and flashed across the world within no time, and this is what today's science. He emphasized that this conference brought together the best of the minds in the nation and across the world, and many among the audience learnt many things from this conference. He admitted that he got a wonderful opportunity to learn many things and to learn new ideas while coordinating some of the roundtable sessions in the conference. So, he is confident that the conference had immensely benefitted him individually and also collectively for audiences. To the end, he cited the Rig Veda "Let the noble thoughts come to us in all directions"

Dr. Vijay Bhatkar congratulated Dr. Rahul V. Karad for arranging such a unique conference which had an extremely favorable outcome as per the objective of the conference. He also congratulated the organizing team of the conference for its success. The conference had excellent speakers in their area as well as fruitful roundtable decisions. The gathering of scientists in all areas is necessary to tackle the problems faced by the country, as well as to draft the future roadmap of Viksit Bharat. He said that the conference laid the foundation/ground for recognizing private universities for their capability even without support from any national funding agencies. Presently, as per government policies, there is no discrimination between a private institution and a government body when it comes to collaboration and research funds/grants. There are many institutions and universities are coming up which require the support from public sector. Dr. Bhatkar also expressed that India will become a great educational hub.



Dr. Sujata Chaklanobis said that to realize Viksit Bharat, we need to create necessary infrastructure in both urban and rural areas; secondly to create green roads through innovation in biodiversity; thirdly, healthier society, well-being, and respected culture; fourthly, expand digitalization; fifthly, affordable healthcare, education, agriculture, etc., and lastly, the factors in climate change like: green mobility (reducing carbon footprint), green technology, and renewable energy using blockchain, AI, and sustainable technologies. She also said that one of the visions of the PM of India is to see Bharat as a developed nation by 2047. She said in this context, the government has supported funding to create newer IITs, NITs, IIMs, AIIMSs, etc. In 2014, there were seven IITs; however, in 2023, we have around 23 IITs. Similarly, the same ratios for medical education institutes. She expressed that the government is going to focus more on sustainable energy, such as new solar energy devices, hydrogen, liquid hydrogen at room temperature, etc., design and development of new materials with huge manufacturing capability, adoption of circular economy in all processes, strong international collaborations in the earlier research areas with European countries, and other advanced countries. Finally, she said the conference was very much successful, due to its fruitful outcomes. And she expressed thanks to the organizing committee and MIT-WPU.

Prof. Dr. Murthy Chavali gave all the updates of R&D in MIT-WPU. He said the university is being under transformation from being a teaching-based university to a research-based university. He also said that recently, MIT-WPU has come up with on campus Central Research Facility (CRF) with a grant of Rs. 25 crores. The CRF houses necessary advanced instrumentation facilities, like, FE-SEM, ICP-MS, RF/DC sputtering, E-beam, Thermal evaporators, etc. to cater for the research needs of the students, scholars, and faculty members of the university. He also shared the recent success of MIT-WPU in getting the DSIR certificate to support the staff to apply for funding from many governmental agencies and other agencies. He also expressed that now, MIT-WPU has 23 Centers of Excellence in different research areas (sustainability, women's studies, environment, etc.). He said that the university's research output in terms of research paper publications, patents, and research projects (Rs. 150+ crore) submitted rose to a new higher level. He thanked faculties, and management (Dr. Rahul V. Karad, Dr. Sanjay Kamtekar, and Dr. Bharat Kale) to realize the positive outcomes. He emphasized the management's initiatives to support the university's research output through a. incentive schemes for publications, conference travel support (both within India and outside), and seed grants to support research projects. Finally, he also expressed the First NSRTC 2024 provided a necessary platform for students, scholars, and faculty members to collaborate with all the distinguished speakers for innovativeness in the research and to make the university one of the top private universities in India.

During the valedictory session, the lifetime message of Rev. Prof. Dr. Vishwanath Karad for the union of science and spirituality was shown through a short video clip. Also, the video showed the details of his trip to Oxford University, UK, and Brigham Young University (visited to receive his honorary doctorate), Utah, US.

Rev. Prof. Dr. Vishwanath Karad said to the gathering that the manifestation of pure intelligence and consciousness is the one which drives the orderly harmony of the universe, and these two words gave him strength to be an engineer and a man in a Vaishnavite family. Rev. Prof. Dr. Karad said he got enriched and enlightened after attending a few sessions of the conference, although he was unable to attend it fully. He said the whole world is waiting and has a huge expectation from India with many other background troublesome noises due to poverty, war, terrorism, violence, etc. With an appropriate understanding of the role of science and spirituality, only India can promote peace in the world. He also discussed the talk of Swami Vivekananda in Chicago at the same venue where he recently visited, and he said he feels privileged to be at the same venue. He highlighted the fundamental difference between knowledge and wisdom. He also quoted a statement "Give me a few men with muscles of iron and nerves of steel" made by Swami Vivekananda to change the face of Mother India. Further, he explained the basic definition of religion under the umbrella of 'Vasudhaiva Kutumbakam'. Further, he wondered why Indians were not considered the top philosophers of the world, like: Aristotle, Socrates, Plato, etc.? and he urged many famous scholars to start consciousness studies to understand reality, hence, MIT-WPU started the School of Consciousness. Finally, he said let's come together to promote peace for the well-being of mankind, and he is happy that the first NSRTC 2024 would pave the way for this.

Dr. R. A. Mashelkar said that he feels privileged for the rare opportunity to give the opening talk of the conference during the inauguration session and a talk at the valedictory session. He said he has been in association with MIT group of institutions for more than 40 years, and he is very happy to be part of drafting the syllabus for the polymer engineering program at MIT. He said an innovator is one who sees what everyone sees but thinks what none of us ever thought about which perfectly suits Prof. Dr. Karad. He also said that the success of a man is not decided by what he does, but by how he finds a successor and what his successor does, this goes well with Dr. Rahul V. Karad, and I appreciate him. He suggested the young students take Dr. Vijay Bhatkar as a role model not just for creating a supercomputer but for the spirit of taking up such a huge responsibility on his shoulders, and he was able to complete the first supercomputer project with less than the allotted budget and less than the stipulated time through denial driven innovation as USA rejected to give the supercomputers to India during Rajiv Gandhi era. He also said Dr. Bhatkar did Atmanirbhar Bharat with Atma Vishwas well long ago. Further, he said how technology and science are important to India concerning first insights report on Microsoft outage that occurred in mid-July 2024 in India. He also said that the year 2020 should not considered as the year of COVID-19, but the year of Indian Science for its capability to meet the challenges of the pandemic and export the vaccine throughout the world. So, only our Indian science and technology could make us more resilient to all these problems and challenges. He also said the success of a conference is measured by what we take as outcomes, new learnings, and innovative ideas, not by mere clapping of hands inside the session. He appreciated the statement "Vishwa Guru" of Rev. Prof. Dr. Karad; however, he said he is sad that Indian students going abroad for higher education is more than India's higher education budget, so he emphasized to have more quality educational institutions in India to overcome this. He also stressed upon using technology for reduce inequality and the power of search engines (like, Google, You, Meta, etc.) for self-education. He said that India's talent should be considered as resource to make the country really a Viksit Bharat, as we are the land of ideas, and hence, we also need to be the land of opportunity like US.

Dr. Rahul V. Karad gave the concluding remarks on the First NSRTC 2024. He said his vision culminated due to the long-standing support received from Dr. R.A. Mashelkar and Dr. Vijay Bhatkar. He shared the story of Dr. Bhatkar to stand and contributing when demanded the nation building. He also told the audience that academic institutions are the growth engines of the country. He is warmly looking for public-private institutional collaborations to make the country really a Viksit Bharat, as the private institutions also have a good potential to perform better. He also informed the audience about how the faculty members of MIT-WPU went to USA for some academic engagements and meetings with many US universities' Presidents and Vice-Presidents for the co-creation of valuable academic outputs and results. Finally, he appreciated Prof. Dr. Bharat Kale, Prof. Dr. Murthy Chavali, Prof. Dr. Milind Pande, Dr. Sanjay Kamtekar, Prof. Dr. R.M. Chitnis, Prof. Dr. G.D. Yadav, and Dr. Ashok Joshi for their great efforts to make this conference a possible one.

Dr. Rahul V. Karad gave the concluding remarks on the First NSRTC 2024. He said his vision culminated due to the long-standing support received from Dr. R.A. Mashelkar and Dr. Vijay Bhatkar. He shared the story of Dr. Bhatkar's contribution when needed for nation-building.

Prof. Dr. Murthy Chavali, Prof. Dr. R. M. Chitnis, Prof. Dr. Bharat Kale, Prof. Dr. Milind Pande, Dr. Sanjay Kamtekar, Dr. Rahul V. Karad, Dr. Ashok Joshi, Dr. Sujata Chaklanobis, Dr. R. A. Mashelkar, Dr. Vijay Bhatkar, Dr. Vishwanath Karad, Prof. Dr. G. D. Yadav, and Prof. Dr. Sunil S. Bhagwat (from L to R).

The abstract book of the conference was unveiled by all the dignitaries on the stage. Finally, the program concluded with a National Anthem.

Dignitaries with students at the Conference venue

Feedback from Distinguished Speakers

"I am very happy to be part of this historic First National Scientists Round Table Conference (NSRTC 2024) for Viksit Bharat @2047 organized by MIT-WPU, Pune, Bharat. The Advisory Committee and the Organizing team of NSRTC have taken enough planning, care, and execution to see the assembling of a galaxy of top scientists, researchers, and academicians from different parts of the country and outside of the country to discuss the future of research tracks and course of actions to realize the visions of Viksit Bharat 2047.

Particularly, the round table discussions in each technical session, under different themes of NSRTC 2024, discussed issues that would benefit the young research minds to think for the next 20 years of their career. First NSRTC allowed me to meet many well-known experts from other institutions and with faculty and students of MIT-WPU. Special thanks to mention about the inclusive and visionary leadership of Dr. Rahul V. Karad for creating such an open discussion platform for the benefit of the country in both the short and long term.

I wish a grand success for the future versions of NSRTC to be organized by MIT-WPU".

Prof. Dr. S. K. Shukla *(HAG), FRSC, FIE*
Department of Mechanical Engineering, IIT BHU

"Theme behind the conference, conduct of the events were novel and logical - Highly appreciated. Kudos to each and every one of you who executed the assignments on Military perfection...

Conference fetched me the impeccable opportunity to interact with fellow Scientists from multidisciplinary area around the country.

Indeed, Thank you so much for the wonderful arrangements and nice hospitality".

Dr. Ilangovan SA
Former Deputy Director, VSSC/ISRO

"At the outset, I must acknowledge that "1st NSRTC Viksit Bharat 2047" was a wonderful event organised by MIT WPU, Pune. The organisers under the able guidance of the mentors must be congratulated for assembling a galaxy of scientists/professors/academicians/industry representatives/freelancers for the eight tracks that were finalised with a lot of thought and in a very imaginative manner. The event was organised in a very professional manner with faculty and volunteers working like well-oiled machinery. The presentations made by the different experts were very insightful and the round table that was held at the end of each technical session discussed issues that would benefit the young faculty, researchers and students from the University in shaping their careers.

I am thankful to you for providing me an opportunity to deliver a talk in one of the technical sessions related to Climate Change. I also benefited by attending technical sessions in the tracks related to AI and Science, Scientific Temper and Spirituality. 1st NSRTC also provided me with an opportunity to personally interact with many well-known experts from different institutes/organisations/universities and also with some faculty of MIT WPU. It was a matter of happiness and great satisfaction that I could also meet again a visionary person like Prof. Viswanath Karad during the NSRTC after nearly two decades.

I once again convey my sincere thanks to MIT-WPU for organising such a wonderful event and providing me an opportunity to be a part of it".

Dr. Mansa Nouni
Ex Adviser/Scientist-G at Ministry of New and Renewable Energy, GoI
Ex Sr. Consultant (Hydrogen Energy) at National Institute of Solar Energy - India

"It was a great event indeed. WPU Team in the visionary leadership of Prof. Dr. Vishwanath D. Karad and Dr. Rahul V. Karad has created a history for all other Govt. and Private agencies/ institutes to follow and lead India towards the goal of Viksit Bharat 2047. I am thankful to the WPU Team for inviting me and giving an opportunity to be a part of this mission.

I wish you all success in your future endeavours e.g. NSRTC 2025 and would be happy to contribute and collaborate on the topic of our common interests, e.g. Quantum Mechanics, Consciousness studies and Indian Knowledge Systems".

Prof. B. C. Chauhan
Campus Director, CUHP Campus Shahpur

Feedback from Distinguished Speakers

"One suggestion I would have for NSRTC2025 is to invite the 58 Scientists from Pune highlighted in the attached article from today's Indian Express, Friday, September 20th, 2024. A second suggestion I have is to narrow the topics to three grand challenge problems: (i) Sustainable Energy, Food, Water, and Healthcare, (ii) Climate Change, and (iii) Information Security. A third suggestion I have is to invite half a dozen international scientists to participate along with 108 (auspicious number) Indian scientists including the 58 highlighted above."

Prof. Dr. Jay P. Gore
Purdue University, USA

"Thanks for your mail expressing my gratitude for attending me the NSRTC 24 and willingness of faculties and students of MIT-WPU to collaborate with our group here at CRTD, Sinhgad Institutes, Solapur. It will be our honour to associate with your group. Maybe we will arrange a meeting with your faculty and students shortly and discuss collaborative work on " Silk Fibroin and Sericulture Resources " or on " Nanotechnology Applications in Medicinal Plants and their Bionanocomposites ". These are new and frontier areas where we have expertise and published the books. These are related to rural developments and Viksit Bharat 2047, where 70 % population is in rural areas. Hope that you will agree with me".

Prof. Dr. Shivaji H. Pawar
Centre for Research and Technology Developments (CRTD), Sinhgad Institutes, Solapur
Distinguished Professor & Former Vice-Chancellor, D. Y. Patil University, Kolhapur

"It was a pleasure to meet and interact with many scientists and academicians".

Prof. Vijayamohanan K Pillai,
IISER, Tirupati

"The pleasure was mine to be part of NSRTC 2024."

Prof. Dr. T. Pradeep
IIT Madras

It was a pleasure to be with you all. I enjoyed the sessions in NSRTC for Viksit Bharat @2047

Ashok K Ganguli
Director & Professor of Chemical Sciences
IISER, Berhampur

"It was a great learning experience in NSRTC 24. We can collaborate on some research activities involving your M.Tech/PhD students in the near future".

Dr. Ahlad Kumar
National Forensic Sciences University

"It was a pleasure and learning experience to participate in NSRTC-2024.
Thank you very much for providing me with this opportunity. Congratulations, the event was organized flawlessly."

Dr. Nagahanumaiah
Director, Central Manufacturing Technology Institute, Bengaluru

"I enjoyed the conference and the visit to your beautiful University campus and the interaction with scientists from all over India.
Please let me know can I be helpful and will be happy to collaborate".

Prof. Dr. Ajay Soni
IIT Mandi

"Thank you for the kind invitation. Delighted to support with sessions/interactions for students at MIT-WPU as per your guidance".

Dr. Richard Lobo
Tata Chemicals

Will be happy to explore joint avenues and proceed.

Dr. Sasikumar M.
C-DAC, Mumbai

Feedback from Distinguished Speakers

"Thank you very much for the opportunity to interact with so many intellectuals in that meeting along with your university's staff and students. It was indeed a wonderful experience, and I will be always happy to collaborate with you and your group".

Prof. Ramesh Chandra
Institute Instrumentation Centre, IIT Roorkee

Greetings from Rasayu Healthcare.

Here is our Feedback for the round table conference NSRTC held in July 2024.

1. I had the pleasure of attending the National Scientists Round Table Conference (NSRTC) at MIT World Peace University (MITWPU), Pune, in July 2024. The conference was organized exceptionally well, reflecting the meticulous planning and dedication of the organizing committee.
2. One of the highlights was the impressive student participation. It was heartening to see so many young minds actively engaging in discussions and presenting their research. Their enthusiasm and innovative ideas added a vibrant energy to the event.
3. Meeting renowned scientists was another significant aspect of the conference. Interacting with esteemed figures was an inspiring and enlightening experience. These interactions provided invaluable insights and fostered a spirit of collaboration and mentorship.
4. The conference successfully maintained a balance between traditional scientific disciplines and interdisciplinary approaches.
5. Sessions covered a wide range of topics, from Artificial Intelligence and Quantum Technology to Sustainability and Healthcare, ensuring a comprehensive exploration of current scientific challenges and advancements.

Overall, the NSRTC at MITWPU was a remarkable event that not only showcased cutting-edge research but also promoted a collaborative and inclusive scientific community".

Dr. Yogesh Bendale
CMD, Rasayu Healthcare, Pune, Bharat

"It was indeed pleasure for me to participate in NSRTC held at MITWPU. This meeting not only gave platform to faculty and researchers across globe but was an excellent platform for students of all streams be it engineering or management or humanities. Our nation progress depends on research and vision of our Hon'ble PM is on Viksit Bharat and this can be achieved only through such events. Here we get chance to share our findings, join our head on unresolved questions and directions for new pathways. I am indeed grateful to management of MITWPU for this wonderful initiative and wish many successes ahead".

Prof. Dr. Gopi Sharma
Kanya Maha Vidyalaya, Jalandhar, Punjab

"I hope this message finds you well. It was a pleasure participating in the National Scientists Round Table Conference held at MIT-WPU on July 2024. The discussions were highly insightful, covering critical advancements and challenges in the field of sustainable research and technologies. The focus on building a "Vikshit Bharat" through innovation and collaborative efforts was particularly inspiring, as it aligns with our national goals of self-reliance and global leadership in science and technology. The event was well-organized, facilitating meaningful exchanges and fostering future collaborations. I look forward to supporting and contributing to the NSRTC 25 initiative".

Prof. Dr. Anima Nanda
Department of Biomedical Engineering
Sathyabama Institute of Science and Technology

Feedback from Distinguished Speakers

"The NSRTC 2024 held at MIT World Peace University in July 2024 was a remarkable event that provided a unique platform for students, researchers, and academicians to share their insights and innovations across a variety of disciplines. The round table conference was particularly notable for fostering an environment of open dialogue and collaboration among participants.

The keynote sessions were well-curated, addressing pressing topics in science, technology, and society. The speakers offered thought-provoking insights that not only broadened our academic horizons but also inspired practical applications in our respective fields.

One of the highlights was the interactive nature of the discussions. Participants actively engaged with the speakers, raising critical questions, and offering diverse perspectives. This collaborative atmosphere allowed for deeper exploration of complex issues and paved the way for potential interdisciplinary research collaborations.

However, a few logistical aspects could be improved. The time allocated for each session was slightly constrained, which limited the depth of some discussions. Ensuring more structured time slots in future editions would help maintain the quality of debates without rushing through key points.

Overall, the NSRTC at MITWPU was a success, bringing together bright minds to tackle contemporary challenges. I look forward to seeing how this platform continues to evolve and influence the future of research and technical innovations".

Prof. Dr. Dinesh K. Aswal
Director, Health, Safety and Environment Group, Bhabha Atomic Research Centre
Senior Professor, Homi Bhabha National Institute

"It's a great honor for me to be part of NSRTC 2024. Its well-planned, wide variety of fields with mind-provoking scientific discussions is well explored towards VIKSIT BHARAT @2047.

I know, it is a very difficult task to bring all stalwart personalities together on one platform and I am quite sure, with the leadership of Vishwanathji Karad and Rahulji, along with the team, it became convincingly achieved.

Thought of world peace and spirituality will be well spread along with S&T.

Your new Research & Development Centre will take your institute to a right position not only in NIRF Ranking but QS Global Ranking as well.

My expertise is about how low-cost chemical methods can be explored for device-grade development of supercapacitor, solar cell, gas sensor without much instrumentation about synthesis facilities. Also, about 'Writing quality research and review articles' & 'Funding agencies and effective research proposals' and I will be always ready wherever you require please don't hesitate to contact me.

Thank you once again for inviting me.

Remains sincerely!".

Prof. Dr. Babasaheb R. Sankapal
Department of Physics, Visvesvaraya NIT Nagpur

"It was a wonderfully organized event. I understand how difficult it to organize in this scale immediately after joining a new institute for you.

Thanks for the invitation and excellent hospitality.

Please convey my heartfelt greetings to Dr. Mashelkar, Dr. Bhatkar and Dr. Rahul V. Karad, the Executive President.

Looking forward to the next meeting in near future".

Prof. Dr. Samit K. Ray
Department of Physics, IIT Kharagpur

Feedback from Distinguished Speakers

"It was pleasure being part of the NSRTC 2024 conference at MIT WPU, Pune. I have enjoyed my talk and the response from audience. It was indeed great time interacting with you all. I have already started working with your faculty on joint publications, guidance, and part of the MIT's PhD scholars committee. I have also delivered a workshop at MIT-WPU in the April 2024. I hope the collaboration will results in good publications in near future.

Best wishes!".

Prof. Dr. Jitendra Sangwai
Department of Chemical Engineering, IIT Madras

"Thank you for the opportunity to participate in the NSRTC-2024. It was a great initiative by the MIT-WPU. Congratulations to the Management, Administration and the dedicated team of faculty and enthusiastic students for meticulously planning and executing this flagship event. All Scientific sessions were held with perfect planning. All topics were of current trends in Science and Technology. My suggestion for the future conference would be to have more focused discussions on the National Mission Programs like, Semiconductor Mission, Quantum Mission, Energy Mission, Water Mission, etc., which will have more impact to move forward towards Viksit Bharat 2047.

We are very optimistic that collaboration on mutual area of interest can be established towards Nation Building.

Look forward to have the pleasure participating in the future events at MIT-WPU.

With best regards".

Prof. Dr. R. Jayavel
Anna University, Chennai

"I am grateful for giving me this opportunity to participate and present my work in this event.

Visionary leadership of Karad ji and Rahul sir is beyond description and needs appreciations.

I shall be happy to be a part of it in future.

Wishing you all the best".

Prof. Dr. Parvinder Singh
Vice Chancellor, RBU Mohali, Chandigarh

"Indeed, it was a pleasure to be part of the NSRCT Conference. The conference was very well organized with the presence of well-known experts in the fields. I was part of digital transformation section. In this section, organizer has called up experts from Photonics to electronics to quantum and renowned industries. It was very good intellectual gathering. Especially, after talks the panel discussion was very well targeted for the students so that they also get some motivation out to do good science.

Over all it was very well organized and productive conference to my opinion. I wish this trend will continue for next year as well.

Best wishes,".

Dr. Ranjit V Kashid
C-MET, Pune

"I enjoyed the conference. I congratulate the team for putting together such an excellent scientific program.

Best wishes,".

Prof. Dr. Satish A. Patil
Solid State and Structural Chemistry Unit
IIS Bangalore

Feedback from Faculty Members and Students

"All the resource persons were very good in that particular area. Nicely arranged & the food quality was also very good. Thanks to all those who worked very hard to organize a successful conference. My request is to arrange such type of conference at our campus only that means maximum faculties will take participation".

Dr. Kiran Kisan Kokate

"The conference was very thought provoking for all the students and all the students were inspired by the talks by the eminent guest speakers. The faculties also got chance to interact with the industrialists and scientists. The conference was organized very well. Still, if the venue of the conference was closer to the college, more students could have been benefitted. The students who presented their work in poster session were requesting for the participation certificates to the faculties. Overall, it was excellent conference and such conferences should be continually organized by MIT".

Dr. Sagar Kanekar

"It was a great experience at this conference. We should conduct conferences on engineering and science, where researchers and scientists can get a platform to present their research work and get benefits".

Dr. Shivani Gupta

"Extremely informative, and knowledgeable sessions of all tracks. Lunch and other arrangements were superb".

Dr. Chinmay Deshmukh

"Must have event looking forward for next year. Do consider having Social Sciences and Liberal arts for similar event".

Dr. Vishal Ghule

"Excellent technical sessions and experts. Need such conferences / international congress every year. This helps faculty and students to level up knowledge, niche research areas, & collaborations".

Prof. Dr. Kundlik V Mali

"The conference was overall good. Lot of scientific presentations and good networking opportunities. However, need to improve in some aspects. Collar mike was not provided to the speakers. The pointer was not working at any time. The staff who were flipping slides one after the other were not doing the job efficiently. This created a wrong impression in front of speakers. I am not sure though if this was the scenario in all the sessions".

Prof. Dr. Summon Koul

"The lunch served in the hotel was really good but otherwise the NSRTC was just okay in terms of a scientific conference. We should avoid to waste university money in such unstructured scientific conferences".

Dr. Deobrat Singh

Feedback from Faculty Members and Students

"All the speakers were excellent. The knowledge disseminated by the speakers was very good. The venue and food was good. However, due to more number of speakers, the time scheduled had exceeded. Looking forward to the next NSRTC".

Dr. Anand D Kulkarni

"Overall, I was extremely impressed with how well the conference was organized. From the seamless registration process to the well-structured schedule, everything ran smoothly, allowing participants to fully engage with the sessions.

The speakers were another highlight of the event. Each presentation was insightful and delivered with clarity and enthusiasm. I particularly appreciated (all the AI sessions where I participated), which offered valuable perspectives and sparked meaningful discussions.

Thank you for the hard work and dedication that went into making this conference a success. I look forward to future events and the opportunity to continue learning from such knowledgeable professionals".

Dr. A. Akilbasha

- Good learning experience.
- Received insights to know latest developments of the field from the eminent experts of the field.
- Once again it was confirmed the importance of the interdisciplinary domains.
- A good opportunity of networking and knowing thrust areas for writing projects.

Dr. Shikha Gaikwad

"Thank you for organizing NSRTC, it was amazing and interesting conference indeed. It was my first MIT conference. All the sessions and speakers were excellent. Congratulations and All the Best!".

Vaishnavi Giri

It was very good conference and our many students presented posters / papers in NSRTC. Such more technical conferences are needed in both the semester where more number of students can show their learnings in technical areas. Also, NSRTC provided platform of networking for faculty members with outside world faculty members and researchers. NSRTC will also help in improving the perception among the academic and research community.

Prof. Dr. Dinesh Bhutada

"It was an excellent conference. If we could allocate some activity for students then it would create more engagement".

Dr. Shilpa S. Chapadgaonkar

"It was the very first and of its kind event, the event was mutinously planned and very well executed".

Dr. Aarti Shastri

It was really a very great initiative...Thanks for such a mental feast.

We could develop many new contacts with the research dignitaries.

One suggestion is that it should be very precise and with daily 3 sessions only.

Though all the lectures were fantastic but how much one can digest in one go! that must be taken in account.

Vaishali Gaikwad

Feedback from Faculty Members and Students

"It was a great experience to attend the NSRTC 2024. I had registered for the Track 1: AI and it was a great opportunity to attend and learn from the eminent speakers talking on various aspects of Artificial Intelligence. Thanks to NSRTC Team".

Dr. Rahul Vishwanath Dandage

"It was really a great experience to attend National Scientists Round Table Conference, got insight of scientific and technological domains from leading and eminent academic scientists, researchers, and research scholars on a single platform. Thank you so much!".

Dr. Akshita Chanchlani

"I had a great experience at the event, learning about various industry-level insights from professionals. I'm definitely looking forward to participating in the next one as well".

Mandar Dolas

"It was very useful to attend. Very good interactions of experts and attendees. Many experts from diverse areas. Very good sensitisation opportunity to the new subject/ technologies".

Prof. Dr. Vishnu Choudhari

"NSRTC 2024 is wonderful event, it's good for our staff members as discussion is interdisciplinary".

Dr. Umesh Kumar Bhayyalal Dubey

"The sessions were well planned and topics covered were updated ones. I liked the sessions I attended".

Dr. Madhuri Rao

"NSRTC 2024 was a well-organized multi-disciplinary conference. I had an opportunity to interact with scientists from various fields, and I am looking forward to more such events".

Dr. Vijayapandi Pandy

"Was ok, can be much better. Q&A after every session is important, otherwise it's of no use. Please leave the speakers alone to interact with students, after the talk is over. Most of the time it was just media sessions for the speakers which defeats the purpose of networking. Please consider panel discussions and fireside chats".

Gaurang Potdar

"NSRTC 2024 was wonderful experiences for both teachers and students. I got to know about amazing works of our scientist are doing across the different fields. This Conference is a constructive attempt by our university to build and enrich scientific temperament in our students and academicians".

Dr. Jyotsna Srivastava

"It was great experience three days listening to subject Experts. Thanks to MIT for organising this event in very beautiful decorum".

Farhadeeba Shaikh

Feedback from Faculty Members and Students

"First edition of NSRTC was fruitful. Speakers = 5, Venue = 5, Topics= 4, (parellel sessions was more), overall arrangments = 4, Suggestion: For second edition few inputs: we will execute oral presentations of PhD Scholars and posters on second day of the conference. We need to prepare the printed badges of confirmed speakers to identify them during the interactions. Overall, First NSRTC was good. Congratulations to the team NSRTC".

Dr. Chandrashekhar Bobade

"NSRTC 2024 was organised well and all the speakers were excellent. The sessions were mapped with SDG of UN. All the emerging topics have been covered. If we could select the venue at our campus, then it would reach to more students and scientifc faternity".

Dr. Ganesh Bhaurao Choudhari

"It was a good initiative taken by MIT-WPU. It will help to create network. Many of the speaker from biotechnology theme said that the faculty is doing research on very recent topics. She also said as compared to other private university very good quality of faculty members are here. This conference is good opportunity for recent research topics".

Dr. Neha Bokey

"NSRTC 2024 set a high standard for future conferences by promoting intellectual exchange and collaboration, emphasizing innovation and interdisciplinary approaches for India's scientific and sustainable advancement".

Nikhil V. Soniminde

"Overall Organization was good. We got excellent opportunity to interact with eminent Scientists. My suggestion is, if we could reduce number of invitees per session we will get more time to interact with them".

Dr. Shraddha Suyog Kulkarni

"Kudos to the entire team! The conference was well-organized providing an opportunity to listen to eminent speakers. A good platform for networking and interaction. However, it was observed that the admin and management team were having a tough time. Also, we did not receive the certificates as promised earlier. We are still waiting for our certificates. Hoping improvement in this direction. Looking forward for this conference next year".

Rituja Gupta

"NSRTC 2024 was a great opportunity to learn about new research and connect with other scientists. There was a good mix of poster presentations, and time for networking. Overall, it was well-organized and valuable".

Komal Balasaheb Bankar

"The NSRTC 2024 set a platform for scholars, researchers, and thought leaders to engage in meaningful discussions about the future of scientific exploration in India and its role in global advancements.

It was an impressive gathering of minds from across scientific domains. The event was well-structured, with diverse sessions covering interdisciplinary themes".

Dr. Sandeep Namdev Dhikale

Feedback from Faculty Members and Students

"Nice Conference for specially PHD Research Scholars...".

Nagaraj D. Patil

"Excellent conference, well managed with knowledgeable speakers".

Dr. Anuja Askhedkar

"It was well-organized with clear scheduling and smooth transitions between sessions. Sessions are Informative and relevant topics".

Mrunal Sabale

"It's really amazing session, personally I like it very much. So much informative, we also learnt".

Ishwari Khade

"Informative sessions by experts it has definitely helped us and our students".

Yogesh Jayant Gaikwad

"Thanks for such a wonderful platform to interact with the stalwarts in the field. Although 2024 was really a good one, I am sure 2025 will be absolutely wonderful. Eagerly await the same".

Prof. Dr. Ratnadip R. Joshi

"Firstly, I thank you for all the members who conducted these rich knowledge sessions it was very inspiring and knowledgeable which help to implement the knowledge in real world, thank you!".

Anurag Ajay Bhole

"It was a great event that allowed us to get to know many Research Scholars. May be similar meet for one day can be organized for Industry connect that shall give good placements as well as help in getting funding under CSR to develop labs and infrastructure".

Anagha Mukul Khare

"It was an enriching experience as a researcher. Had the opportunity to interact and discuss my work with senior scientists like Dr G D Yadav and Dr Rekha Singhal".

Tejaswini Pachpor

"Amazing experience with a lot to gain from the panel. The NSRTC was the best to top the event and last but not the least the services provided like food and management of timely breaks to freshen up the mood were well managed".

Shriyanshu Naik

"The event was really good overall, however it took us almost 2.5 - 3 hrs to reach the campus from the tip top international hotel by the bus due to extreme traffic conditions. Hence a change in location would be good next time".

Aditya Lakhe

Feedback from Faculty Members and Students

"I had the opportunity to attend the NSRTC 2024 conference, which primarily focused on materials science, chemical engineering, and AI-related topics. The conference featured outstanding speakers, and the content of the lectures, particularly in the field of materials science, was exceptional.

If possible, it would be appreciated to include additional themes from other areas of mechanical engineering, such as energy, manufacturing, and digital manufacturing, if they align with the scope of the conference. These topics could offer valuable insights into current industry trends and research directions".

Dr. Deepak Kumar

"It was an enriching experience learning from the experts in the particular fields. Though it was organised much far away then what I expected. Yet the event was organised very well. One more thing to add on is not just me but many students did not receive their ABSTRACT copies .I. would like to appeal to the committee to make it available for us as it would be a good guide to have. Rest all was perfectly done. Rather, I am looking forward to attend the next one as well. Thank you!".

Omkar Ashok Jadhav

"Overall, the arragnments and the idea for this conference was really good. But i think if there were few things, like giveaways for students, and discussion session with the speakers would have been a really good point. Cause many people had doubts but were unable to speak to them due to their business and other reasons, so seperate discussion sessions for like just 1 hr per panel would be really good".

Rishabh Zambre

"The National Scientist Round Table Conference (NSRTC) was a highly insightful and well-organized event. The keynote speeches were both inspiring and informative, the venue was comfortable and conducive to networking, and the food provided was excellent. Overall, it was a valuable experience".

Amit Gupta

"It was an amazing experience meeting top scientists, researchers, and professors from all over the world. I learned a lot from them and am now implementing those insights into my project".

Himanshu Lanjewar

"The event was well-organized, and the opportunity to interact with such esteemed scientists broadened my understanding of the current technological landscape in India. I appreciated the diversity of topics and the depth of discussions, which spanned multiple disciplines. I look forward to attending future editions of NSRTC, and I commend MITWPU for hosting such a valuable event that bridges the gap between research and practical innovation".

Sankalp Kadam

"Event was good and it hosted very brilliant talks. The only issue we faced was that there was not enough sitting space for the sessions".

Shutija Kharade

"It was one of kind experience and first one in case of such seminars I got to interact with scientists and professionals on top of their fields as a student it was elevating ".

Chakradhar Londhe

Feedback from Faculty Members and Students

"Overall conference organization, lectures were good. More time for faculty presentations, PhD scholars poster presentation with some awards would have been good".

Dr. Nithya N Kutty

"Well organized sessions. Invited expert speakers are of high repute and able to network with them. Should be organized every year".

Dr. Rohit Ghadge

"NSRTC was a great success, with its impact reflected in the enthusiastic participation of students. They attended the event voluntarily and with great zeal, actively engaging with the speakers throughout. The interaction of speakers and students were meaningful, not only learning but also building connections for future guidance. All the invited speakers were experts in their respective fields and expressed their readiness to support future endeavors. This experience has provided valuable insights, and we are confident it will lead to significant outcomes by the end of this academic year".

Akshay Motilal Baheti

"NSRTC 2024 was very well organized. With a stellar lineup of esteemed speakers sharing their expertise, the event proved highly beneficial for researchers, students, and faculty alike. The integration of emerging technologies alongside established scientific principles was well-received. The keynote speeches and panel discussions offered a balanced blend of individual insights and collaborative dialogue. The platform fostered interdisciplinary presentations and collaborations, bringing together scientists and industry professionals from various fields, sparking fresh ideas.

A few suggestions- speakers could have focussed more on future prospects, may have included interactive workshops.

Overall, it was a great experience".

Dr. Meghana Gote

"Extremely informative, and knowledgeable sessions of all tracks. Lunch and other arrangements were superb".

Dr. Chinmay Deshmukh

"Conference was all up to the mark and satisfying. Overall, the NSRTC was well organized and appreciable".

Pranali Polshettiwar

"Very encouraging and were able to see unexplored areas and very new and novel ideas of research".

Atharva Pandharikar

"Great conference and a whole new exposure to practicality!".

Ridham Patel

"Excellent. I request organizers to also share soft copy of participation certificates".

Mihir Umesh Inamdar

"It was a very good conference, had a chance to meet and talk to reputed scientist".

Amrita Sinharay

"Good management of NSRTC and I build up my research knowledge to the help of NSRTC".

Ambar B. Marne

"The program held was very great.It was very informative and helpful for all".

Sakshi Desai

Feedback from Faculty Members and Students

"Knowledgeable experience, got new innovative, project ideas".
Nikhil Kamnurkar

"Well Organised, good speakers (in AI)".
Vipul Deshmukh

"The conference was organized very well".
Jyoti M. Sandur

"It is very good and informative conference".
Ankita Bhujbal

"It was a great experience attending those sessions".
Srushti R. Parekh

"Sessions on Material Sciences were very interesting".
Sanjay B. Bhagwat

"Good and Informative sessions".
Prajakta Wagh

"Great initiative & informative sessions".
Vanshika Verma

"Good platform to interact with scientists".
Rucha

"Good, informative and well organized".
Dhanashri Pendse

"Excellent conference!".
Dr. Rohini Pujari

"Very good!".
Mrs. Pallavi Nehete

"Informative!".
Dr. Ashwini R. Gawade

"Highly Informative!".
Dr. Dayeeta Roy

"Great initiative!".
Kaushal Konde

"It was great!".
Shiv Patel

"Good".
Prof. Dr. Baidehish Sahoo

"Excellent!".
Vaishnavi Thorat

"It's good experience".
Prashant Joshi

"Good!".
Tayade V. Parmeshwar

"Great experience".
Rishika Agarwal

"Good experience".
Raghav Dubey

"It was very good".
Ritesh P. Patil

"Very informative".
Vilobh

"Awesome!".
Nakshatra Kakani

"Nice!".
C S K Anvitha

"Good!".
Shivani Suryavanshi

"Verygood!".
Ankita Sutar

"Very good experience".
Ruta V. Khaladkar

"Event was great".
Tarishi Baranwal

"A wonderful experience".
Munmun Kumari

"A great conference".
Siddhant Buchade

"A very good event".
Ajita Jadhav

"Thought provoking".
Arajush Payra

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The NSRTC 2024 session wise Technical Committee Members:

1. Artificial Intelligence
- Prof. Dr. Anand J. Kulkarni
- Prof. Dr. Anuradha Phadke
- Prof. Dr. Monica Apte
- Prof. Dr. Apoorva Shastri
- Prof. Jyoti Lele
- Prof. Dr. Ishan Kale
- Prof. Dr. Vrushali Pagire

2. Advanced Materials and Processing
- Prof. Dr. S. Radhakrishnan
- Prof. Dr. Bharat B. Kale
- Prof. Dr. Murthy Chavali
- Prof. Dr. Vikrant Gaikwad
- Prof. Dr. Malhari Kulkarni
- Prof. Dr. Ganesh Borikar
- Prof. Dr. Debabrata Saha
- Prof. Dr. Devkumar Thapa
- Prof. Dr. Soumava Biswas

3. Agri-Tech
- Prof. Dr. Parul Jadhav
- Prof. Dr. Krishna K. Warhade
- Prof. Dr. Shivprakash Barve
- Prof. Dr. Ratnadip Joshi
- Prof. Dr. Anand D. Kulkarni
- Prof. Dr. Rohit Ghadge
- Prof. Dr. Balaji M. Patil
- Prof. Dr. Nithya N. Kutty

4. Biotechnology
- Prof. Dr. Anup Kale
- Prof. Dr. Jayant Khandare
- Prof. Dr. Shilpa Chapadgaonkar
- Prof. Dr. Shraddha Kulkarni
- Prof. Dr. Manasi Mishra
- Prof. Dr. Rehan Deshmukh
- Prof. Dr. Mukul Godbole

5. Health Care
- Prof. Dr. Neeraj Mahindroo
- Prof. Dr. Amol A. Tagalpallewar
- Prof. Dr. Akshay M. Baheti
- Prof. Dr. Sudhirkumar Shinde
- Prof. Dr. Shikha Vikrant Gaikwad
- Prof. Dr. Anil Pawar
- Prof. Dr. Amruta Naik

6. Climate Change
- Prof. Dr. Sanjay Kamtekar
- Prof. Dr. Akshay Malhotra
- Prof. Dr. Bharat B. Kale
- Prof. Dr. Prasad Kulkarni
- Prof. Dr. Sarita Zele
- Prof. Dr. Prasanta Kumar Ghosh

7. Digital Transformations
- Prof. Dr. Mangesh Bedekar
- Prof. Dr. Bharat S. Chaudhari
- Prof. Dr. Apurv C. Nellikka
- Prof. Dr. Angha Karne
- Prof. Dr. Balaso Jagdale
- Prof. Dr. Aavishkar C. Katti

8. Science, Scientific Temper & Spirituality
- Prof. Dr. Vijay P. Bhatkar
- Prof. Dr. Priyankar Upadhyaya
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- Prof. Dr. Milind Pande
- Mr. Ganesh Pokale

Organizing Committee

- Prof. Dr. Murthy Chavali
- Prof. Dr. Vikrant Gaikwad
- Prof. Dr. Anup Kale
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Program Planning Committee

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- Prof. Dr. Gopinath T.

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Overall Coordination Committee

- Mrs. Shubhangini Karad
- Mr. Kshitij Sangale
- Mr. Parag Khanvilkar
- Dr. Avinash Patil
- Prof. Veshal Pawar
- Mrs. Sangita G. Bhaskarwar
- Ms. Pallavi Lakhe
- Mrs. Vasanti Bhandwalkar
- Mrs. Vijaya Yadav
- Prof. Dr. Bharat Kale
- Prof. Dr. Vikrant Gaikwad
- Prof. Dr. Gopinath T.

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- Prof. Dr. Milind Pande
- Prof. Dr. Bharat Kale
- Dr. Ashok Joshi
- Mr. Ganesh Pokale
- Mr. Vishal Bora
- Mr. Jay More
- Mrs. Shubhangini Karad
- Prof. Dr. Gopinath T.

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- Mr. Manas Kapoor
- Mrs. Noella D'souza
- Mr. Omkar Gite
- Mr. Ankur Vaidya

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- Mr. Ujwal Khelkar

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- Dr. Chandrashekhar Bobde
- Dr. Shital Kahane
- Prof. Anagha Karne

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Venue Setup Committee (Stage decoration, Dais planning, and seating arrangement of the attendees)

- Mr. Vilas Shinde
- Mrs. Shubhangini Karad
- Mr. Parag Khanvilkar
- Dr. Aditya Tandle
- Mr. Yogesh Shedge

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Compères Committee

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- Prof. Dr. Ratnadip Joshi
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- Prof. Dr. Bharat Kale
- Prof. Dr. Gopinath T.

Felicitation Ceremony

If agriculture goes wrong, nothing else will have a chance to go right in the country.

M.S. Swaminathan

Biotechnology is providing us with the opportunity to literally write the software of life.

Ray Kurzweil

Felicitation Ceremony

Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world.

Louis Pasteur

When digital transformation is done right, it's like a caterpillar turning into a butterfly, but when done wrong, all you have is a really fast caterpillar.

George Westerman

Questions & Answers

The idea that machines can't do things humans can is a pure myth.

Marvin Minsky

Carbon, the basis of all known life on earth, has surprised us once again.

Andre Geim

Glimpses

> **The absence of evidence is not the evidence of absence.**
>
> Carl Sagan

> **The real problem is not whether machines think but whether men do.**
>
> John McCarthy

Glimpses

Glimpses

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