

SOUVENIR

**Science Communication Conference on
Public Understanding of
Quantum Science & Technology**



INTERNATIONAL YEAR OF
Quantum Science
and Technology

2025 INTERNATIONAL YEAR OF
QUANTUM SCIENCE & TECHNOLOGY



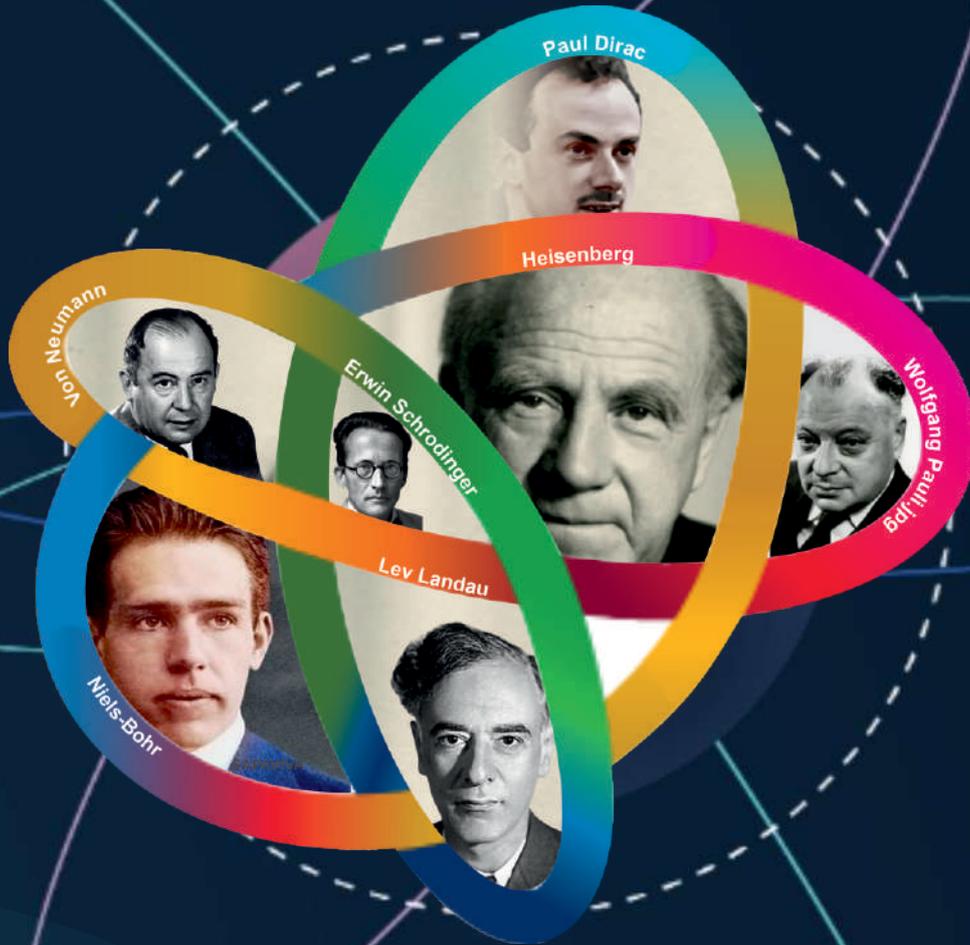
GUJARAT COUNCIL ON SCIENCE AND TECHNOLOGY

Department of Science and Technology, Government of Gujarat

www.gujcost.gujarat.gov.in



INTERNATIONAL YEAR OF
Quantum Science
and Technology



2025 INTERNATIONAL YEAR OF QUANTUM SCIENCE & TECHNOLOGY

The International Year of Quantum Science and Technology
brings together nations, institutions, and innovators
emphasizing collaboration over competition.



SOUVENIR



**INTERNATIONAL YEAR OF
Quantum Science
and Technology**

Science Communication Conference on Public Understanding of Quantum Science & Technology

Gujarat Science City, Ahmedabad

22-23rd December, 2025



GUJARAT COUNCIL ON SCIENCE AND TECHNOLOGY

Department of Science and Technology, Government of Gujarat

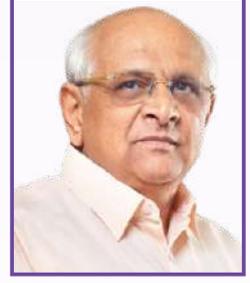
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Shri Bhupendra Patel

Hon'ble Chief Minister
Government of Gujarat



-: MESSAGE :-

The United Nations' declaration of 2025 as the International Year of Quantum Science & Technology is both timely and visionary. I am happy to note that the GUJCOST has been recognized as a UN Patron Institution and has undertaken year-long outreach initiatives to make quantum science accessible to students, teachers, and the wider public.

This recognition reflects Gujarat's growing leadership in science, communication and its commitment to bringing advanced scientific knowledge closer to society. Guided by a progressive Science, Technology & Innovation Policy, Gujarat continues to nurture ideas, encourage curiosity, and translate science into inclusive development. With a clear roadmap for quantum education, awareness, research and innovation, the State is preparing young minds to engage confidently with the frontiers of science from classrooms and laboratories to startups and advanced research ecosystems.

I am much pleased to learn that the Gujarat Council on Science & Technology (GUJCOST), under the aegis of the Department of Science & Technology, Government of Gujarat, is organizing the Science Communication Conference on "Public Understanding of Quantum Science and Technology" at Gujarat Science City, Ahmedabad during 22nd-23rd December, 2025.

I warmly welcome scientists, researchers, educators, science communicators, students, innovators and all stakeholders from across the country to this important two-day conference. The forum provides a timely and meaningful opportunity to reflect, deliberate and collaborate on quantum education, public awareness, research and innovation fields that will profoundly influence the technologies, economies and societies of the future.

I am confident that the discussions and outcomes will inspire innovation, strengthen future-ready talent, and contribute meaningfully to India's quantum journey. My compliments to DST, GUJCOST, Science City and all other organizations.

I extend my best wishes for the success of the conference and hope it becomes a landmark in shaping India's quantum future.

(Bhupendra Patel)





Shri Arjun Modhwadia

Hon'ble Minister
Forest and Environment,
Climate Change and
Science and Technology
Government of Gujarat



-: MESSAGE :-

I am pleased to learn that the Gujarat Council on Science and Technology (GUJCOST) is organizing the Science Communication Conference on Public Understanding of Quantum Science & Technology on 22-23 December 2025 at Gujarat Science City, Ahmedabad.

This conference holds special significance in the context of the International Year of Quantum Science and Technology (IYQ 2025), proclaimed by the United Nations. It reflects a sustained, year-long commitment to spreading awareness and deepening understanding of quantum science and technology among students, teachers, and the wider public-across Gujarat and beyond.

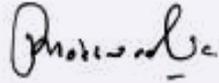
I am happy to note that GUJCOST has been recognized as a United Nations Academic Partner for IYQ 2025 and has undertaken impactful outreach initiatives throughout the year. These efforts reaffirm a vital belief science achieves its true purpose when it reaches everyone-not only researchers in advanced laboratories, but also young learners in classrooms, communities, and even the most remote villages. By nurturing curiosity and access to modern scientific knowledge, GUJCOST is helping shape an informed and inspired generation.

Quantum science is often perceived as abstract and complex. Our collective responsibility is to make it simple, relatable, and engaging. connecting frontier ideas with everyday learning experiences for students and teachers alike. In this regard, the introduction of indigenous quantum education kits and interactive exhibits is a commendable step. Such hands-on approaches move education beyond rote learning and foster inquiry, exploration, and discovery.

The collaboration with organizations such as the Indian Science Writers' Association and the Society for Information Science further strengthens the mission of clear, effective, and inclusive science communication-an essential bridge between knowledge and society.

I warmly welcome all delegates to this two-day conference in Gujarat. I am confident that this gathering will inspire more young minds to pursue careers in science, technology, and research, and will further reinforce Gujarat's role as a vibrant hub of knowledge, innovation, and scientific temper.

My best compliments to the Department of Science & Technology (DST), GUJCOST, Gujarat Science City, and all partnering organizations for organizing this meaningful initiative, and I wish the conference every success.


(Arjun Modhwadia)





Shri Manoj Kumar Das, IAS
Chief Secretary
Government of Gujarat



-: MESSAGE :-

I am pleased to learn that the Gujarat Council on Science and Technology (GUJCOST), working under the aegis of the Department of Science & Technology, Government of Gujarat, is organizing the two-day Science Communication Conference on Quantum Science and Technology at Gujarat Science City, Ahmedabad, during 22–23 December 2025. Being held in the context of the International Year of Quantum Science and Technology (IYQ 2025), this conference brings together scientists, researchers, policymakers, and science communicators to engage with one of the most transformative frontiers of modern science.

Quantum science and technology hold immense potential across critical sectors such as secure communication, finance, healthcare, drug discovery, and climate research. For an industrially strong and innovation-driven state like Gujarat, the ability to understand, adopt, and responsibly apply these emerging technologies will be vital to sustaining future economic growth and global competitiveness.

However, the success of any advanced technology depends not only on infrastructure and investment, but also on societal readiness. Public awareness, ethical understanding, and the development of skilled human resources are equally essential. Our institutions must be prepared to anticipate change, adapt to new paradigms, and guide technological progress in a manner that benefits society at large.

I am happy to note that GUJCOST has been recognized by the United Nations as an Academic Partner for IYQ 2025 and has undertaken extensive year-long outreach programs across the State. These initiatives are playing an important role in demystifying quantum science and fostering curiosity and understanding among students and citizens.

This conference offers a valuable platform to deliberate on the social, educational, and policy dimensions of quantum technology. I am confident that the discussions will generate meaningful insights and forward-looking recommendations.

I congratulate the Department of Science & Technology, GUJCOST, Gujarat Science City, and all collaborating organizations for organizing this timely and significant conference, and I wish the program great success.

(M. K. Das)



Dst GUJARAT COUNCIL ON SCIENCE AND TECHNOLOGY
Department of Science & Technology, Government of Gujarat
State Level Competition on National Science Seminar - 2025
First Prize
Rupees Ten Thousand Only
₹ 10,000/-
25th September 2025
Theme: The Quantum Age Begins - Potentials and Challenges

Arishmadat Explorations



P. Bharathi, IAS
Secretary

Department of Science & Technology
Government of Gujarat



-: MESSAGE :-

Science and technology have always been the driving forces of human advancement from the stone age to the space age, and now to the transformative threshold of the quantum era. As our understanding of nature deepens, quantum science stands before us as a powerful new frontier, poised to reshape knowledge systems, technologies, and the future of humanity.

I am delighted to know that the Gujarat Council on Science & Technology (GUJCOST) is organizing the two-day Science Communication Conference on “Public Understanding of Quantum Science and Technology” during 22–23 December 2025 at Gujarat Science City, Ahmedabad. This initiative reflects Gujarat's forward-looking vision to place cutting-edge science at the heart of public awareness and national development.

GUJCOST has played a pioneering role in taking quantum science beyond laboratories and into classrooms and communities across the State. Its recognition by the United Nations as an Academic Institution for the International Year of Quantum Science and Technology (IYQST 2025) is a reflection of its sustained commitment to science outreach. Through science centres, hands-on learning experiences, and programs conducted in regional languages, GUJCOST has made complex quantum ideas accessible, engaging, and relevant to students and citizens alike. This conference stands as a significant milestone in Gujarat's year-long quantum engagement.

Organized in the spirit of IYQST 2025 and in collaboration with the National Quantum Mission, Department of Science & Technology, Government of India, and leading science communication organizations, the conference provides a unique platform for dialogue. It seeks to bridge advanced research with everyday understanding, inspire young minds, and build public confidence in emerging quantum technologies.

Gujarat's journey from Viksit Gujarat to Viksit Bharat is firmly anchored in knowledge, research, and innovation. I am confident that this conference will nurture a quantum-aware society, empower future talent, and contribute meaningfully to India's technological self-reliance.

I extend my best wishes for the success of this conference and a truly enriching experience for all participants.


(P. Bharathi, IAS)

विश्व हिन्दी परिषद

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भारतीय दार्शनिक अनुसंधान परिषद,
नई
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राष्ट्रीयता
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अंतररा

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Prof. Dr. Manoj Kumar Patairiya
President
Society for Informaon Science



-: MESSAGE :-

The Sambat Prabhakar, a popular magazine founded by Shri Iswar Gupta in 1839, used to publish well-informed editorials with an orientation towards science and technology, writes: "No country can progress without the advancement of science and technology, the work of Kalidas, Shakespeare and others may provide literary pleasure, but the real progress will be made through scientific instruction." It underscores the significance of scientific innovation and its communication to the masses.

It gives me pleasure to note that the Gujarat Council on Science & Technology (GUJCOST), Department of Science & Technology, Govt. of Gujarat is organizing a Science Communication Conference on "Public Understanding of Quantum Science & Technology" at Gujarat Science City, Ahmedabad during 22-23 December 2025 to emphasize on public communication and outreach of quantum science and technology amongst all.

The United Nations has announced the year 2025 as the "International Year of Quantum Science & Technology" (IYQ) that recognises 100 years since the initial development of quantum mechanics took place, with an objective to wider public awareness and understanding, and has recognized GUJCOST as an UN Academic Partner for the same. The conference is put together in collaboration with IYQ, UNESCO, and the National Quantum Mission (NQM), Department of Science & Technology, Govt. of India, jointly with the International Science Writers' Association, Indian Science Writers' Association, Society for Information Science, and Indian Science Communication Society to provide broader platform, reach, and inclusion.

I also extend my best wishes on the "National Mathematics Day" as the Conference begins on 22 December. It is also an advantage that the partnering organizations have in conjunction the activities, i.e. the 25th Indian Science Communication Conference, 5th International Science Communication Conference, and 50th National Convention of the Society for Information Science. We are grateful for the efforts, guidance and support from the GUJCOST, DST, Govt. of Gujarat, NQM, DST, Govt. of India, all partnering organizations, and esteemed delegates.

On behalf of the organizers and on my own behalf I am pleased to welcome all the dignitaries, experts, speakers, delegates, guests, scientists, academicians, media persons, scholars and students, etc., from India and abroad to the conference and looking forward for their active participation leading the vision of IYQ in engaging with quantum science and technology in particular, and promoting public communication of science and technology in general.

I wish the programme a success.



(Manoj Kumar Patairiya)



Dr. Narottam Sahoo
Advisor & Member Secretary
Gujarat Council on Science & Technology
Dept of Science & Technology
Govt of Gujarat



-: PREFACE :-

The year 2025 marks a defining chapter in the history of modern science with the celebration of the International Year of Quantum Science and Technology (IYQST 2025), commemorating one hundred years since the emergence of quantum mechanics. This global observance is both a tribute to one of humanity's most transformative scientific revolutions and a reminder of the responsibility to bridge advanced scientific knowledge with society at large. At the Gujarat Council on Science and Technology (GUJCOST), we championed this historic moment as a focused, year-long mission to make quantum science understandable, accessible, and meaningful for every learner and citizen.

We are deeply honoured that GUJCOST has been recognized by the United Nations as an Academic Partner for IYQ 2025. This recognition affirms our sustained commitment to education, outreach, and public engagement in frontier areas of science and technology. It further strengthened our resolve to take quantum science beyond laboratories and scholarly journals and bring it into classrooms, science centres, and community spaces across Gujarat and beyond, ensuring that cutting-edge science reaches minds at every level.

Throughout the year, GUJCOST emphasized simplicity, inclusivity, and experiential learning. By developing low-cost, indigenous quantum education and outreach kits and organizing interactive workshops at Gujarat Science City, Regional and District Community Science Centres, and STEM institutions across the state and the nation, we translated complex concepts such as superposition and entanglement into clear, hands-on learning experiences. These efforts were aimed at demystifying quantum science while nurturing curiosity, confidence, and scientific temper among students, teachers, and the wider public.

The two-day Science Communication Conference on Public Understanding of Quantum Science & Technology represents both the culmination and evaluation of these year-long efforts. Organized as part of IYQST 2025, in collaboration with the National Quantum Mission, Department of Science & Technology, Government of India, the conference provides a vital platform for reflection, dialogue, and forward-looking discourse. We gratefully acknowledge the strong support and cooperation of the Society for Information Science (SIS), the Indian Science Writers' Association (ISWA-India), the International Science Writers' Association (ISWA-International), the Indian Science Communication Society (ISCOS), and Gujarat Science City, whose partnership has enriched this forum.

We express our sincere gratitude to Ms. P. Bharathi, IAS, Secretary, Department of Science & Technology, Government of Gujarat, for her continuous guidance, encouragement, and visionary leadership. The collaborative support of the National Quantum Mission, DST, Government of India, has significantly strengthened the objectives and impact of this conference.

I also convey my heartfelt thanks to Dr. Manoj Kumar Patariya, President, ISWA, for his invaluable guidance, as well as to our partner organizations, scientists, researchers, and science communicators. My sincere appreciation is due to the dedicated staff of GUJCOST, Gujarat Science City, and the Regional and District Community Science Centres across Gujarat for their continued support.

We hope that the insights emerging from this conference will guide future initiatives and contribute to building a society that not only understands quantum science and technology but engages with it confidently and responsibly - preparing Gujarat and India for the scientific frontiers of tomorrow.

(Narottam Sahoo)

When the **quantum world** meets
public understanding, science
becomes a shared journey.



**Science Communication Conference on
Public Understanding of
Quantum Science & Technology**

 Gujarat Science City, Ahmedabad | 22–23 December 2025

Where curiosity connects society to the quantum future. 



2025: International Year of Quantum Science and Technology (IYQ2025)

The United Nation has announced 2025 to be celebrated as the International Year of Quantum Science and Technology (IYQ2025). According to the proclamation, this year-long, worldwide initiative will "be observed through activities at all levels aimed at increasing public awareness of the importance of quantum science and applications."

GUJCOST, working under the aegis of the Dept of Science & Technology, Govt of Indian and Govt of Gujarat has been recognized as an Academic Institution Partner for the IYQ2025 celebration. This recognition has help us to promote our scientific programs and outreach activities of Gujarat in the sprawling campus of the Science City and Regional and District Science Centres and the schools, colleges and university departments at the national and international level.

GUJCOST, with approval of the Executive Committee, has designed a series of scientific programs and outreach activities that invite all stakeholders to explore and connect with the remarkable advancements in quantum science.

A strategic outline for year-long outreach have been planned and executed to engage students, teachers, science communicators, and members of media effectively as per the following:

Monthly Themes and Focus Areas

January: Introduction to Quantum Science Basics of quantum mechanics, historical developments, and core principles.

February: Quantum in Nature Explore quantum phenomena in natural processes like photosynthesis and animal navigation.

March: Quantum Technologies - Basics of quantum computing, cryptography, and sensors

April: Quantum Computing Month - Dive deeper into qubits, superposition, and applications in data processing.

May: Quantum in Health-Applications in MRI, imaging, and potential healthcare innovations.

June: Quantum and Energy - Role of quantum technology in energy solutions, efficiency, and solar cells.





July: Quantum Mechanics and Philosophy Engage in discussions on interpretations, observer effect, and paradoxes.

August: Quantum in Communication - Quantum Internet, cryptography, and data security

September: Quantum Artificial Intelligence - Intersection of quantum computing and AI

October: Quantum Technology & Innovation breakthroughs. Highlight start-ups and research

November: Quantum for Environment - Quantum applications for sustainability and climate change

December: Future of Quantum Science-Projections and potential impact on various fields

Quarterly Events

Lectures, Seminars and Webinars: Invite experts for a series of popular science talks each quarter to deepen understanding. Topics could include quantum materials, computing, and ethical implications

Student Competitions: Organize a quantum science project competition with categories for different age groups, encouraging hands-on experiments or theoretical explorations.

Workshops for Teachers: Training sessions on how to introduce quantum concepts in school curricula with engaging teaching materials.

Regional Science Centers and District Community Science Centres: Host interactive exhibits that visualize quantum phenomena using VR or simulations.

Hands-On Activities and Digital Resources

School Workshops Conduct sessions on quantum encryption, basic programming for quantum computers (using simulators), and simple quantum experiments. A specialized kit for the students is also being designed for easy understanding of the quantum principals by kids.



IYQ 2025





Digital Contents on Website: All the contents of IYQ2025 has to be prepared in digital format and to be uploaded on GUJCOST website with interactive learning modules, video lectures, simulations, quizzes, and downloadable resources for students and teachers.

Annual Concluding Symposium

GUJCOST is organizing a Science Communication Conference on Public Understanding of Quantum Science & Technology during 22 – 23rd December 2025 by inviting the scientists, researchers, and other stakeholders from national and international institutions to Gujarat Science City, Ahmedabad.

The two-day program has been organized in collaboration with International Year of Quantum Science & Technology (IYQ-2025), UNESCO and National Quantum Mission (NQM), Govt. of India.

The International Science Writers' Association (ISWA International), Indian Science Writers' Association (ISWA India), Society for Information Science (SIS) and Indian Science Communication Society (ISCOS) have also joined hand with GUJCOST for this conference to take Quantum Science & Technology to students and common citizens.

The conference aims to highlight the significance of quantum science in advancing our understanding of the physical world and its growing role in shaping sustainable solutions across energy, education, and communication. The key objectives are:

- Presenting quantum science in an accessible and engaging manner for the public
- Fostering awareness, trust, and informed curiosity about quantum technologies
- Bringing academia, industry, and policymakers together on a shared knowledge platform
- Inspiring students and young professionals to pursue opportunities in quantum science and technology

Aligned with IYQ-2025 and GUJCOST's mission to strengthen scientific outreach, the program will feature expert talks, interactive exhibits, demonstrations, and workshops for students and educators—contributing to national priorities such as Make in India and Atmanirbhar Bharat in the field of Quantum Science and Technology.

Celebration of Learning and Innovation: Summarize the year with a symposium where students can present projects, and researchers can showcase the latest in quantum science..

The support and recognition of IYQ2025 has enhanced the Science and Technology ecosystem of the state, and inspire a new generation of quantum scientists and engineers, and raise awareness of the immense potential of quantum technologies to transform our state.





SCIENCE COMMUNICATION CONFERENCE ON PUBLIC

Introduction

The Science Communication Conference on Public Understanding of Quantum Science & Technology marks a landmark milestone in India's growing engagement with quantum technologies and scientific communication. Organized as a special initiative under the International Year of Quantum Science & Technology (IYQ-2025), this conference brings together scientists, educators, information specialists, researchers, journalists, communicators, and policymakers from across India and the world.

As part of a historic convergence, this conference is being hosted alongside three major scientific and communication forums:

50th Annual Convention of the Society for Information Science (SIS)

25th Indian Science Communication Congress (ISCC India)

5th International Science Communication Congress (ISCC International)

This collaborative platform underscores the shared commitment of the scientific and communication communities to demystify quantum science,

strengthen scientific temper, and promote wider societal awareness.

Vision and Objectives

Quantum science has emerged as one of the most influential frontiers shaping the future of computing, communication security, precision measurement, materials innovation, and national strategic capabilities. Yet, its principles are abstract, counterintuitive, and often misunderstood by the general public.

Key Objectives

Enhance public understanding of quantum principles, technologies, and applications.

Promote scientific temper and evidence-based discourse in the quantum era.

Showcase national and international initiatives, including India's National Quantum Mission (NQM).

Develop strategies for science communication that simplify complex quantum concepts.

Strengthen the ecosystem of quantum education, hands-on learning, and public engagement.

THE NOBEL PRIZE IN PHYSICS 2025



John Clarke

Michel H. Devoret

John M. Martinis



UNDERSTANDING OF QUANTUM SCIENCE & TECHNOLOGY

Encourage collaboration among scientists, educators, information professionals, and communicators.

Address ethical, societal, and policy dimensions of quantum technologies.

This multi-disciplinary vision positions the conference as a catalyst for building a quantum-ready society.

A Landmark Conjunction of Scientific Bodies

50th SIS Annual Convention

Celebrating five decades of leadership in information science, the SIS Convention brings forward discussions on data management, digital knowledge systems, quantum information processing, and the evolution of information ecosystems in the quantum era.

25th ISCC India

The Indian Science Communication Congress completes a quarter century of empowering science communicators. Its participation ensures that the conference includes diverse voices from media, outreach, education, and public engagement.

5th ISCC International

The international dimension of ISCC adds a global perspective, enabling cross-country exchange of best practices in science writing, science journalism, and quantum communication literacy.

Together, these platforms enrich with multi-disciplinary insights and create a globally relevant forum.

Significance for India and the Global Community

India stands at a decisive moment in quantum advancement through the National Quantum Mission (NQM). Public literacy, responsible communication, and informed participation are essential for leveraging these technologies responsibly.

- Building quantum-aware citizens and skilled youth
- Enabling inclusive access to scientific knowledge
- Countering misinformation, pseudoscience, and hype
- Supporting national innovation ecosystems
- Strengthening international collaboration

"For the discovery of macroscopic quantum mechanical tunnelling and energy quantisation in an electric circuit"



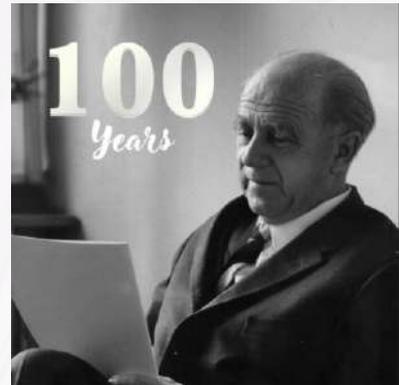
INTERNATIONAL YEAR OF
Quantum Science
and Technology



GLOBAL QUANTUM INITIATIVES (IYQ 2025)

The International Year of Quantum Science and Technology (IYQ 2025), proclaimed by the United Nations General Assembly on June 7, 2024, celebrates 100 years since the birth of quantum mechanics with Heisenberg, Born, Jordan's matrix mechanics and Schrödinger's wave mechanics. Led by UNESCO, it promotes global awareness of quantum's role in sustainable development, bridging the "quantum divide" especially in the Global South through education, partnerships, and outreach events.

Over 70 countries co-sponsored the resolution, initiatives spanning K-12 resources, university programs, and public festivals to inspire diverse pioneers.



In 1925, Werner Heisenberg pioneered matrix mechanics, followed by Max Born and Pascual Jordan's formalization, marking the birth of quantum mechanics.

Key Global Events and Launches

IYQ launched February 4-5, 2025, at UNESCO Headquarters in Paris with 1200+ participants, including Nobel laureates, focusing on inclusive progress in health, energy, and communications. Regional hubs organize national conferences, like India's National Conference at Gujarat Science City tying into GUJCOST efforts, alongside Europe's Quantum Flagship showcases on computing and sensing. World Quantum Day (April 14) expands into year-round activities, with surveys inviting stakeholders for programming on quantum's societal impacts.

Regional Initiatives

Europe's Quantum Flagship highlights R&D in computing, communication, and metrology, emphasizing its historical roots and sustainable goals alignment. The U.S. National Quantum Initiative coordinates events for quantum information science, while Africa's Ghana led the UN resolution push for equitable access. Asia-Pacific efforts, including quantum2025.org calendars, feature seminars and demos; IUPAC ties in chemistry applications.

Capacity Building and SDGs

IYQ targets UN Sustainable Development Goals via gender equality in STEM, infrastructure innovation, and climate action, with resources for low-income nations. Partnerships foster startups, research hubs, and policy guides, projecting quantum's \$97B market by 2035 while ensuring broad benefits. This global push, mirrored locally by NQM and GUJCOST, underscores quantum's transformative potential for humanity.





INDIA'S QUANTUM LEAP: AN OVERVIEW OF THE NATIONAL MISSION ON QUANTUM TECHNOLOGIES & APPLICATIONS (NM-QTA)

The National Mission on Quantum Technologies & Applications (NM-QTA), officially launched in April 2023, marks India's ambitious stride to establish itself as a global leader in the rapidly evolving field of Quantum Technology (QT). Approved by the Union Cabinet with a substantial outlay of 6,003.65/- crore (approximately \$740 million USD) for the period 2023-24 to 2030-31, the mission is a strategic initiative under the Prime Minister's Science Technology and Innovation Advisory Council (PM-STIAC).

Core Aims and Objectives

The primary goal of the NM-QTA is to seed, nurture, and scale up scientific and industrial Research & Development (R&D) to create a robust and innovative ecosystem for Quantum Technology within the nation. The mission is designed to achieve specific, high-impact technological targets across key domains:

- **Quantum Computing Development:**
 - Developing intermediate-scale quantum computers with 50-100 physical qubits in 5 years, and 50-1000 physical qubits in 8 years.
 - Focusing on various platforms, including superconducting and photonic technologies.
- **Secure Quantum Communication:**
 - Establishing satellite-based secure quantum communication links between ground stations over a range of 2,000 kilometers within India.
 - Developing inter-city Quantum Key Distribution (QKD) over 2,000 km.
 - Creating a multi-node Quantum network with quantum memories.
- **Quantum Sensing and Metrology:**
 - Developing high-sensitivity quantum devices, such as advanced magnetometers and ultra-stable Atomic Clocks for precision timing, communication, and navigation.
- **Quantum Materials and Devices:**
 - Supporting the design and synthesis of novel quantum materials like superconductors, topological materials, and new semiconductor structures essential for fabricating next-generation quantum devices, single-photon sources, and detectors.



Implementation Strategy: Thematic Hubs (T-Hubs)

To drive coordinated R&D efforts, the NM-QTA follows a hub-and-spoke model, establishing Four Thematic Hubs (T-Hubs) at India's premier academic and national R&D institutions. Each hub specializes in one of the four critical domains:

Sr. No.	T-Hub Location (Institution)	Technology Domain Focus
1.	IISc, Bengaluru	Quantum Computing
2.	IIT Madras & C -DOT, New Delhi	Quantum Communication
3.	IIT Bombay	Quantum Sensing & Metrology
4.	IIT Delhi	Quantum Materials & Devices

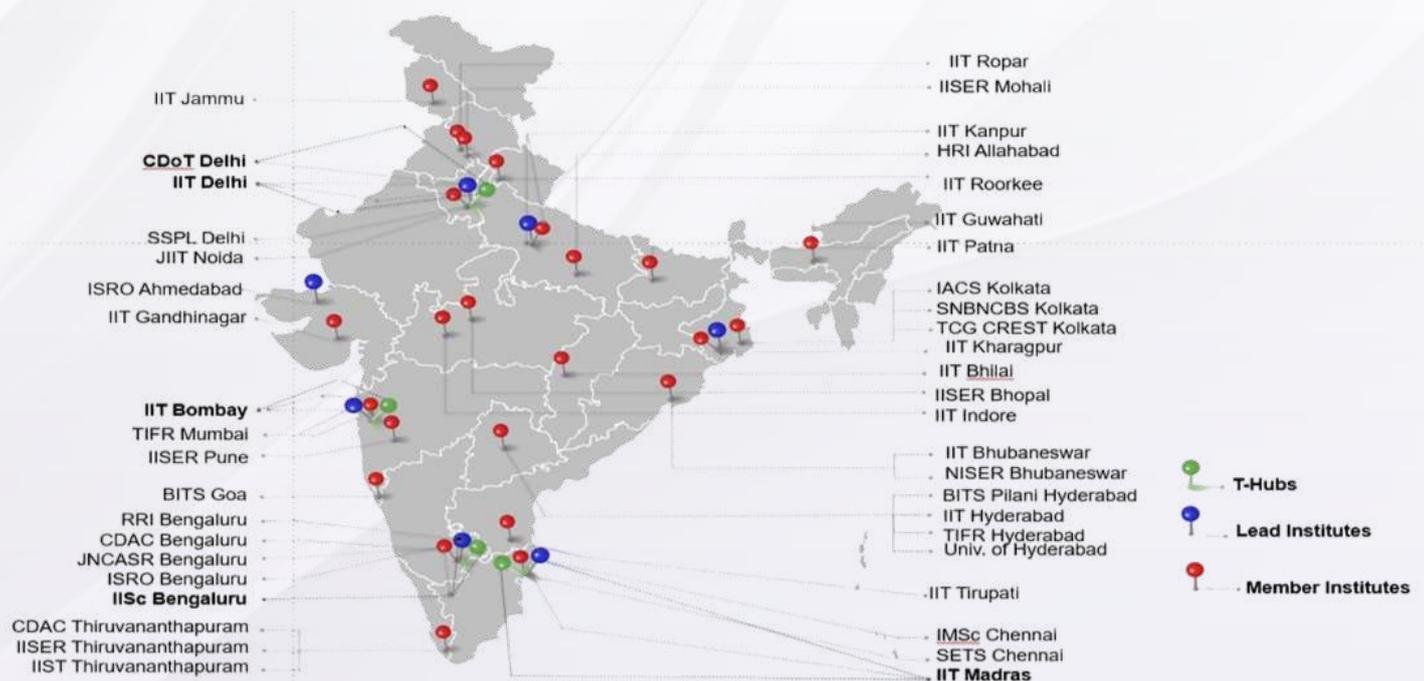
These T-Hubs serve as central nodes for innovation, skill development, industry collaboration, and global partnerships, ensuring the mission's impact is truly national.

Significance for India

The NM-QTA is a critical step that positions India alongside an elite group of nations (including the US, China, and Canada) with dedicated quantum missions. Its significance is multi-faceted:

- **Technological Self-Reliance (Aatmanirbhar Bharat):** It aims to build indigenous capability in a strategic, disruptive technology, reducing dependence on foreign sources.
- **National Security:** Quantum encryption (QKD) provides unhackable communication, which is vital for defence, finance, and critical infrastructure.

Four Thematic Hubs Institutions supported under NQM



152 researchers from 43 Institutions (Lead & Member) across 17 states and 2 UTs involved in the 14 TGs



- **Economic Growth:** The mission is expected to catalyze innovation, spur the creation of quantum-focused start-ups, attract investments, and create a highly-skilled quantum workforce.
- **Applications Across Sectors:** Quantum technologies are poised to revolutionize sectors like:
 - **Healthcare:** Faster drug discovery and material science through quantum simulations.
 - **Finance:** Optimized financial modeling and risk analysis.
 - **Space & Defence:** Precision navigation, remote sensing, and secure communication.

Early Progress and Way Forward

- Initial progress under the mission includes the successful demonstration of indigenous quantum communication technologies by organisations like ISRO and the development of initial quantum processors (e.g., a 6-qubit superconducting processor by a DRDO-TIFR-TCS collaboration). The establishment of the four T-Hubs and the emphasis on developing a quantum-skilled workforce through curriculum development (in collaboration with AICTE) highlight a strong commitment to foundational development.
- The NM-QTA is not merely a scientific funding program; it is a long-term strategic investment aimed at making India a significant global player in the coming quantum era, driving innovations that will underpin the future economy and national security.

BUILDING INDIA'S QUANTUM FUTURE

Key pillars of India's strategy to harness quantum technology for national advancement.



QUANTUM-AI SYNERGY:

The National Quantum Mission (NQM) and the India AI Mission are complementary, with ₹6,003.65 crore allocated to quantum computing research and ₹2,000 crore to AI development, aiming to leverage quantum capabilities for future AI prowess.



INDIGENOUS QUANTUM DEVELOPMENT:

The NQM aims to create a self-sustaining Indian quantum ecosystem by promoting R&D in quantum computing, communication, sensing, and materials, targeting economic growth and technological leadership.



PHASED QUBIT ROADMAP:

India plans to indigenously develop quantum computers with 20-50 physical qubits in three years, 50-100 qubits in five years, and 100-1,000 qubits in eight years, exploring superconducting and photonic technologies.



THEMATIC HUB NETWORK:

Four thematic hubs at IISc Bangalore (Computing); IIT Madras and C-DOT, Delhi (Communication); IIT Bombay (Sensing & Metrology); and IIT Delhi (Materials & Devices).



TRANSFORMATIVE PROBLEM SOLVING:

Quantum computers are meant to tackle complex problems currently almost impossible for classical computers. Key application areas gaining importance for businesses include advanced molecular simulation for accelerated drug discovery and materials.



THE GLOBAL MANDATE: THE SIGNIFICANCE OF IQST-2025

The UN International Year of Quantum Science and Technology (IQST-2025) represents a global mandate to celebrate quantum mechanics' centenary while harnessing its potential for sustainable progress. Proclaimed by the UN General Assembly on June 7, 2024, under UNESCO's leadership, it marks 100 years since Heisenberg, Born, Jordan's matrix mechanics and Schrödinger's wave mechanics, recognizing quantum's transformative role in energy, health, and communications.

Historical Milestone and Awareness Goals

IQST-2025 elevates quantum from niche physics to a societal force, akin to past UNESCO years for light (2015) and crystallography (2014). It aims to raise public awareness of quantum's impacts on daily life, from secure networks to advanced materials, through worldwide events, educational resources, and festivals. Over 70 countries co-sponsored the resolution, with launches like the February 2025 Paris event drawing 1200+ participants, including Nobel laureates, to spotlight inclusive innovation.

Alignment with Sustainable Development Goals

Quantum R&D directly supports UN SDGs: SDG 3 (health via precise simulations), SDG 7 (clean energy optimization), SDG 9 (resilient infrastructure), and SDG 13 (climate action through modeling). The initiative bridges the "quantum divide" by prioritizing Global South capacity-building, gender equality in STEM, and remote access to quantum tools, ensuring equitable benefits amid projected \$97B markets by 2035.



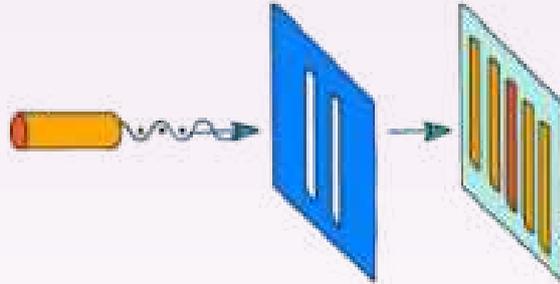
Global Collaboration and Legacy

UNESCO drives a Global Quantum Agenda for policy, training, and ethical frameworks, fostering partnerships across regions like Europe's Quantum Flagship and India's NQM. Events such as World Quantum Day expansions and national conferences, including Gujarat's at Science City, inspire diverse pioneers and build research networks. IQST-2025 positions quantum as a unifier for humanity's challenges, securing its legacy in education and innovation.

Key Quantum Phenomena

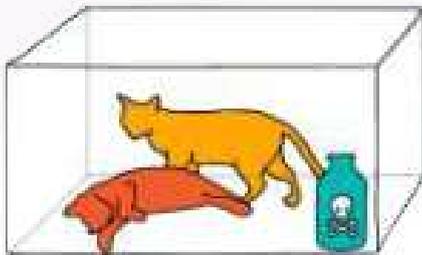
Wave-Particle Duality

Particles like electrons exhibit both wave-like and particle-like properties. This is most famously demonstrated by the **double-slit experiment**.



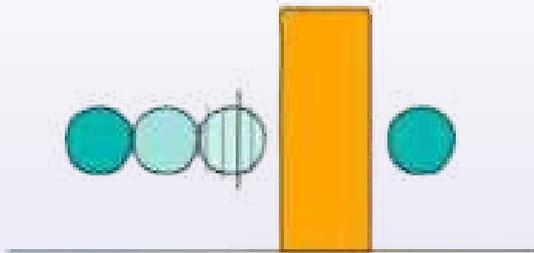
Superposition

Quantum particles can exist in multiple states simultaneously until observed or measured. **Schrödinger's cat paradox** delves into this concept.



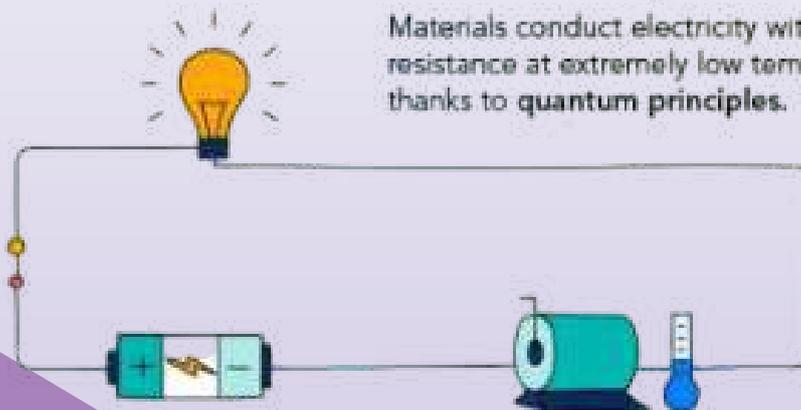
Quantum Tunneling

Particles can pass through **barriers** that, according to classical physics, should be impenetrable.



Quantum Superconductivity

Materials conduct electricity without resistance at extremely low temperatures, thanks to **quantum principles**.





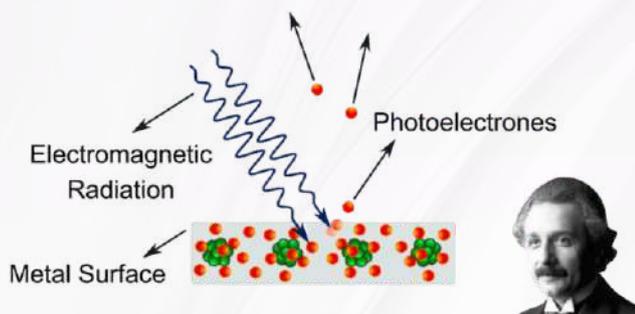
KEY EXPERIMENTS AND PHENOMENA

Key experiments and phenomena in quantum mechanics form the bedrock of the field, demonstrating behaviors that defy classical intuition and underpin modern technologies. These milestones, from the early 1900s onward, revealed wave-particle duality, quantization, and entanglement, directly relevant to the National Conference's focus on public understanding.

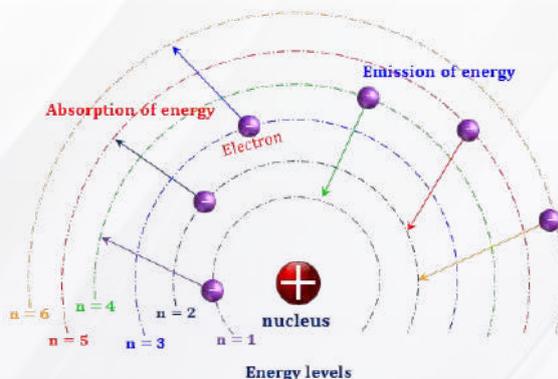
Blackbody Radiation and Photoelectric Effect

Max Planck's 1900 resolution of the ultraviolet catastrophe introduced energy quanta ($E = h\nu$), where h is Planck's constant, explaining blackbody spectra through discrete emissions rather than continuous waves.

Albert Einstein extended this in 1905 with the photoelectric effect, showing light ejects electrons from metals only above a threshold frequency, proving photons as particle-like quanta and earning him the 1921 Nobel Prize. These laid the foundation for quantum theory by quantifying light-matter interactions.



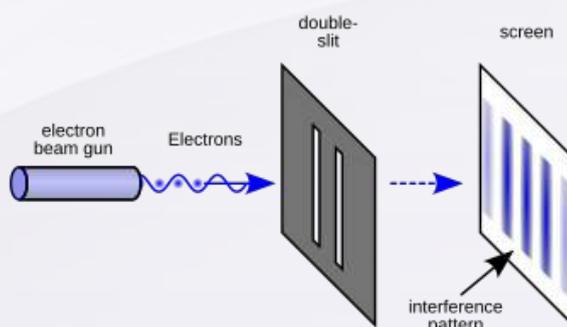
Atomic Models and Spectral Lines



Niels Bohr's 1913 model quantized electron orbits in hydrogen (angular momentum $L = n\hbar$), predicting spectral lines matching observations and resolving stability issues in Rutherford's planetary atom. Franck-Hertz experiment (1914) confirmed quantized energy levels: electrons colliding with mercury atoms lost energy in discrete 4.9 eV jumps, verifying Bohr's postulates experimentally.

Wave-Particle Duality

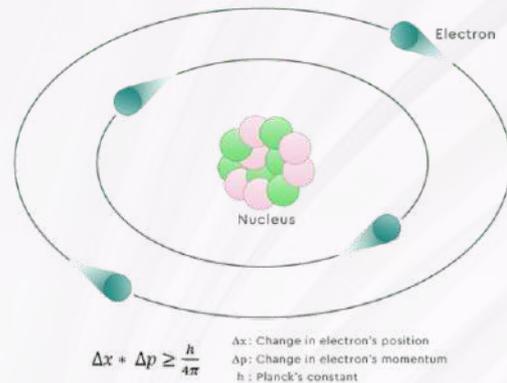
Thomas Young's 1801 double-slit experiment showed light interference, but J.J. Thomson's 1897 cathode rays identified electrons as particles. Louis de Broglie's 1924 hypothesis ($\lambda = h/p$) predicted matter waves, confirmed by Davisson-Germer electron diffraction (1927) and Claus Jönsson's electron double-slit (1961), proving massive particles interfere like waves.



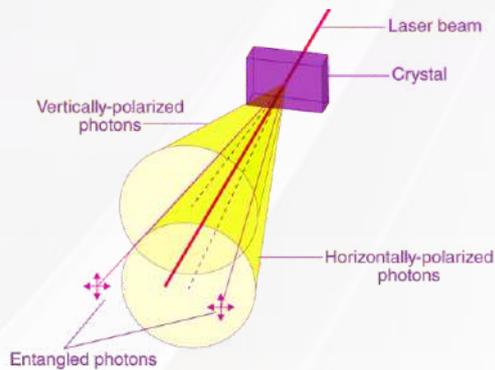


Uncertainty and Complementarity

Heisenberg's 1927 uncertainty principle ($\Delta x \Delta p \geq \hbar/2$) arose from matrix mechanics, showing simultaneous precision limits for conjugate variables. Complementarity, per Bohr, reconciles duality: particles and waves are mutually exclusive views depending on the experiment.



Spin and Entanglement

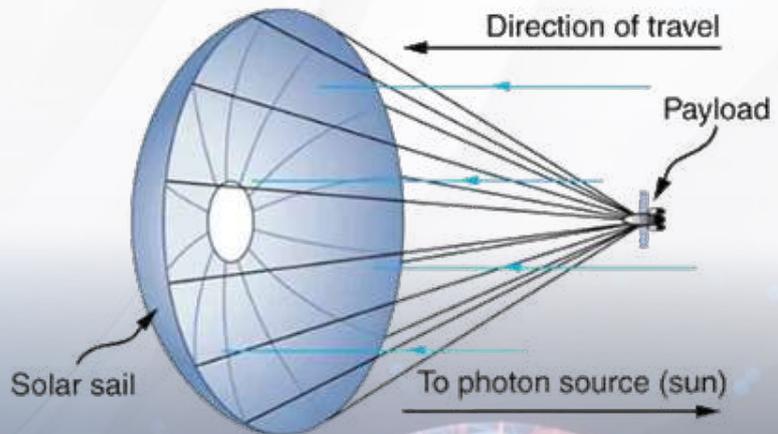


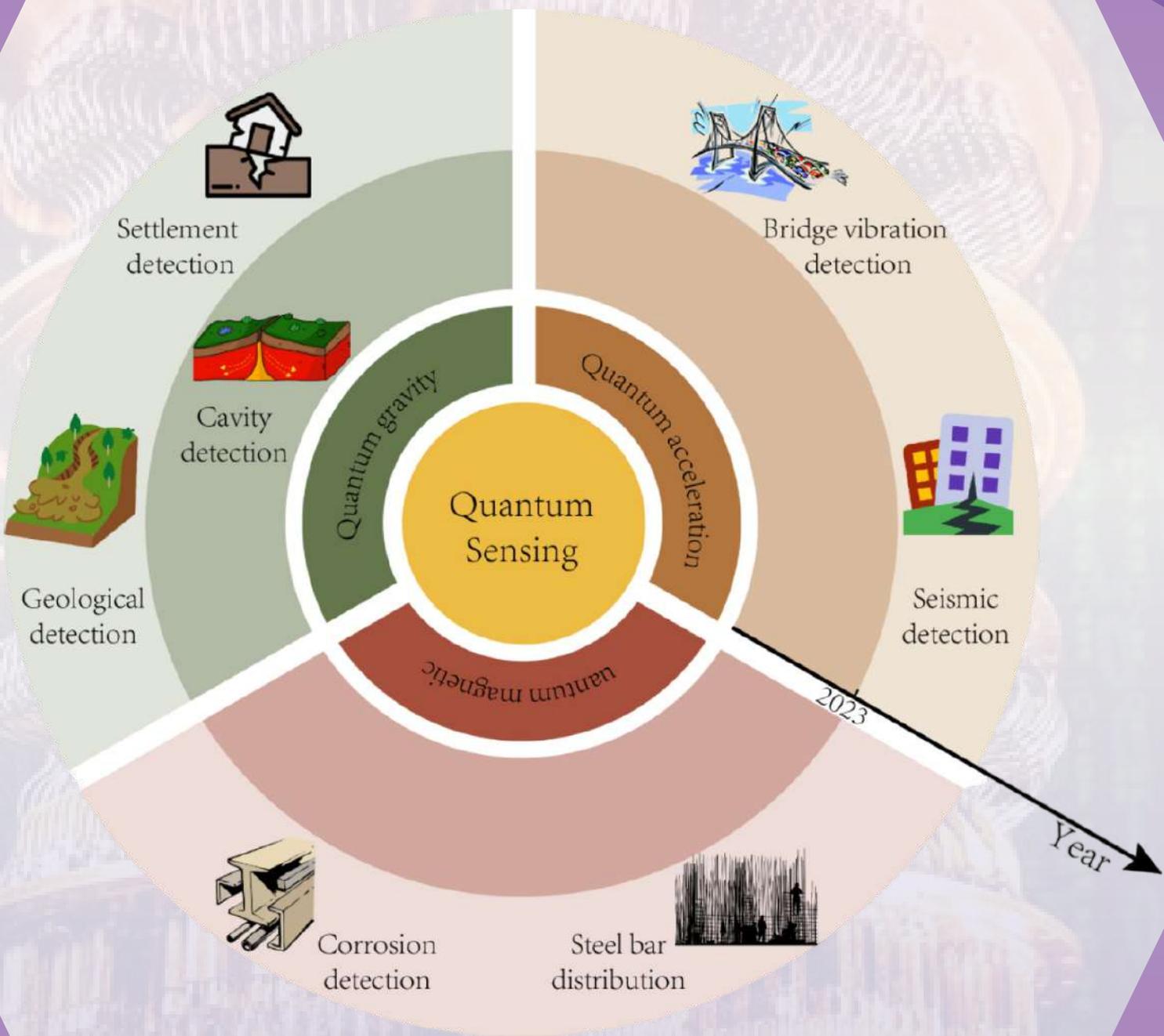
Stern-Gerlach (1922) revealed quantized spin: silver atoms deflected into discrete beams, confirming intrinsic angular momentum.

Bell tests (1972 by Clauser-Freedman, 1982 by Aspect) verified entanglement spooky action at a distance violating local realism via correlated measurements.

Modern Phenomena

Compton scattering (1923) showed photon momentum transfer ($\Delta\lambda = h(1-\cos\theta)/m_{ec}$), affirming particle nature. Quantum Hall effect (1980) quantized conductance ($G = \nu e^2/h$), enabling precise resistance standards. These experiments, spanning a century, drive quantum tech like computing and sensing highlighted at the conference.







QUANTUM TECHNOLOGIES OVERVIEW

Quantum technologies harness quantum mechanics principles like superposition, entanglement, and interference to enable breakthroughs beyond classical limits. These span computing, communication, sensing, and materials, with global markets projected at \$97 billion by 2035, driven by India's National Quantum Mission (NQM). The 2025 International Year of Quantum (IYQ) accelerates public awareness through events like the National Conference at Gujarat Science City.

Quantum Computing

Quantum computers use qubits that exist in superposition (multiple states simultaneously) and entanglement (linked states), enabling parallel processing for complex problems. In 2025, advances include logical qubits with error rates below threshold, as Google demonstrated memory with doubled coherence, and Microsoft-Quantinuum entangled 12 logical qubits for chemistry simulations. Applications target drug discovery, optimization in finance, and climate modeling, with NISQ devices networking for hybrid classical-quantum systems; India's NQM aims for 50-1000 qubit prototypes.

Quantum Communication

Quantum key distribution (QKD) ensures unhackable encryption via entanglement: measuring one particle instantly determines its pair's state, detecting eavesdroppers. Post-quantum cryptography (PQC) resists quantum attacks on classical systems, leading 2024-2025 commercial maturity. India's satellite-based networks target 2000 km secure links, with pilots in defense and finance; global quantum internet visions include modular interconnects and regional networks.

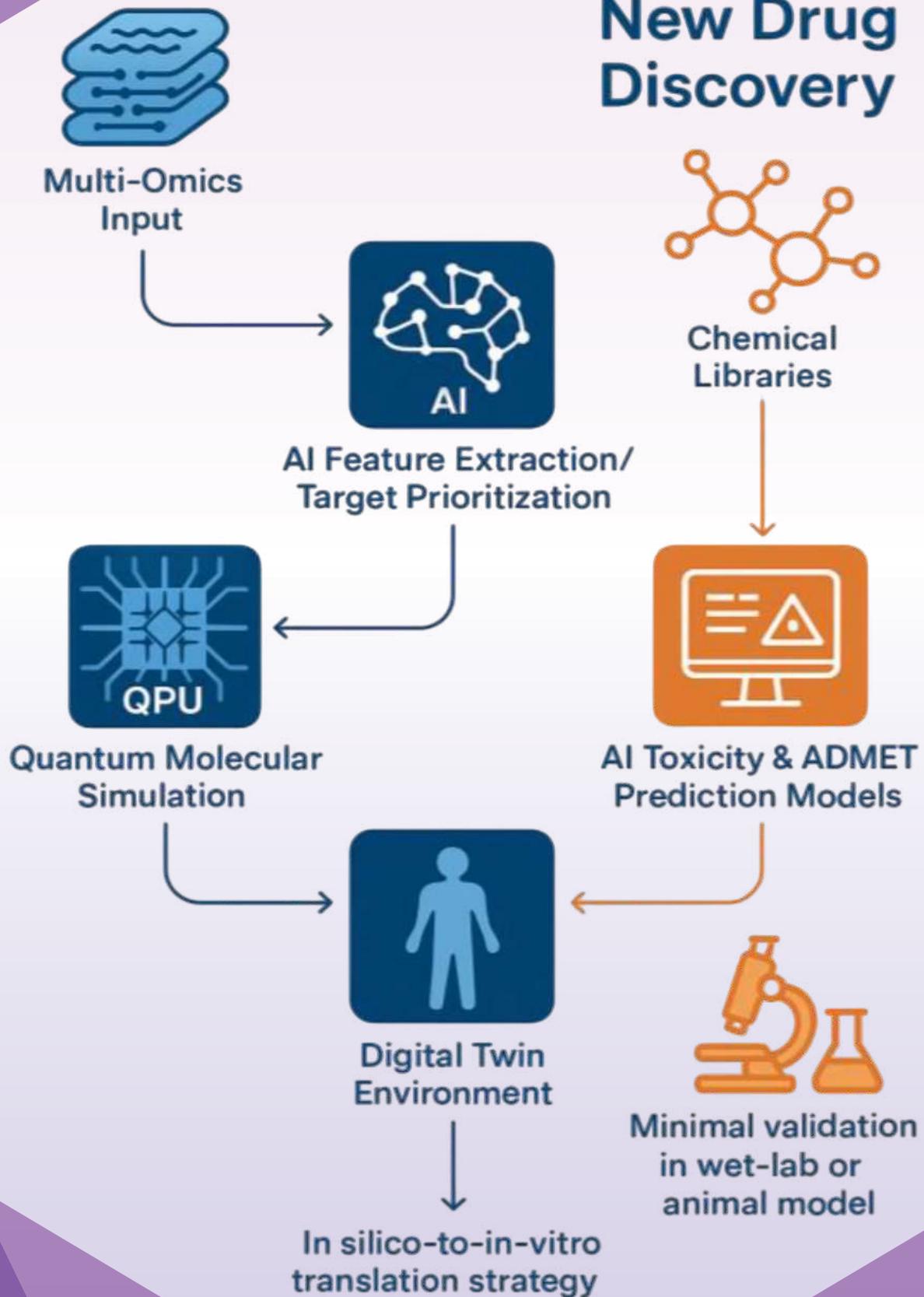
Quantum Sensing and Metrology

Quantum sensors exploit interference for ultra-precise measurements, surpassing classical tools in magnetic fields, gravity, and time. 2025 breakthroughs focus on defense (navigation without GPS) and semiconductors, with atomic clocks at 10^{-15} stability and medical imaging for early disease detection. NQM hubs develop single-photon detectors and magnetometers for healthcare and geophysics.

Quantum Materials and Emerging Synergies

Topological materials enable fault-tolerant qubits, while photonic and superconducting platforms scale hardware. AI accelerates material discovery, and quantum enhances AI training; robotics benefits from precise sensors and secure networks. Sustainability gains include optimized energy processes, with India's ecosystem fostering 20+ startups for economic impacts in chemicals, life sciences, and mobility.

New Drug Discovery





FUTURE IMPACTS AND APPLICATIONS

Quantum technologies promise transformative impacts across sectors by 2035, with global revenues reaching \$97 billion, driven by computing, sensing, and communication advances tied to India's NQM and IYQ 2025. These applications will optimize complex systems, enhance security, and accelerate discoveries in healthcare and energy, positioning quantum as a cornerstone for sustainable development. Conference discussions at Gujarat Science City highlight India's role in realizing these benefits through public-private synergies.

Healthcare and Drug Discovery

Quantum simulations enable precise molecular modeling, slashing drug development from decades to years by solving protein folding and catalyst design challenges. Roche-IBM collaborations exemplify pilots for personalized medicine, while quantum sensors improve early disease imaging via ultra-precise magnetometry. India's NQM targets biotech hubs for affordable therapies, addressing healthcare access in line with SDGs.

Finance and Cybersecurity

Quantum algorithms like QAOA optimize portfolios and risk analysis, potentially unlocking \$2 trillion in value by 2035 per World Economic Forum estimates. JPMorgan's quantum randomness advances secure transactions, with QKD ensuring unhackable networks against "harvest now, decrypt later" threats. Post-quantum cryptography (PQC) standards protect India's digital economy, with NQM funding satellite links for defense finance.

Energy, Climate, and Materials

High-resolution climate models and smart grid optimization via quantum computing aid renewable integration and carbon capture. Room-temperature superconductors from quantum-designed materials could revolutionize energy transmission, while battery innovations boost EVs. NQM's materials hub in Kolkata drives chemical processes for net-zero goals.

Logistics, AI, and Broader Economy

Route optimization and supply chains gain 2-10x efficiency in near-term pilots, transforming mobility. Quantum machine learning (QML) enhances AI pattern discovery and fraud detection, with hybrid models scaling by 2030. India's 20+ quantum startups project economic ripple effects in manufacturing and agriculture, fostering a \$1 trillion global market share.





COMMUNICATING THE INVISIBLE: CHALLENGES AND STRATEGIES FOR SCIENCE WRITERS IN THE QUANTUM ERA

Introduction: Writing About a World No One Can See

Quantum science is fundamentally invisible its particles cannot be photographed, its processes defy everyday intuition, and its mathematics is notoriously abstract. Yet the quantum revolution is rapidly becoming central to India's technological ambitions, from quantum computing and secure communication to advanced sensors and materials.

In this landscape, science writers carry a crucial responsibility: to make the unseen understandable, meaningful, and engaging for diverse audiences ranging from students and policymakers to the general public. Communicating quantum science is not simply reporting facts it is translating a new language of nature into stories people can relate to.

Quantum Communication Is Uniquely Challenging

a. Counterintuitive Concepts

Phenomena like superposition, entanglement, tunneling, and quantum randomness contradict everyday experience. Explaining ideas that have no classical analog while avoiding oversimplification requires careful storytelling.

b. Heavy Mathematical Foundations

Quantum mechanics is built on complex mathematical formalisms, which are inaccessible to most readers. Writers must extract the essence of concepts without relying on equations.





c. Rapidly Evolving Technology Landscape

Quantum technologies change at a pace that outstrips traditional publishing cycles. Writers must keep up with research announcements, policy developments, startup innovations, and global collaborations.

d. Avoiding Hype and Misconceptions

Pop culture often exaggerates quantum ideas teleportation, faster-than-light effects, mystical interpretations creating misconceptions. Writers must provide clarity without losing public excitement.

e. Communicating Uncertainty

Quantum science thrives on probabilities, not certainties. Explaining nuanced uncertainty to a public that often expects “yes/no” answers is a constant challenge.

Strategies for Effective Quantum Communication

a. Build from Familiar Analogies But Use Them Responsibly

Analogies such as “a coin in two states” or “twin photons behaving like dancers” help convey superposition or entanglement. However, writers must clarify where analogies break down to avoid misconceptions.

b. Use Storytelling to Humanize Science

Profiles of Indian researchers, startups, laboratory breakthroughs, and student innovators make quantum relatable. Narratives help readers connect emotionally to complex science.

c. Visualizing the Invisible

Infographics, conceptual illustrations, animations, and AR/VR tools help readers imagine quantum processes. Writers should collaborate with designers to produce visual clarity.

d. Focus on Applications and Real-world Impact

Explaining how quantum computing helps in drug discovery, how quantum sensors improve medical imaging, or how QKD secures communications makes the science tangible.

e. Embrace Multilingual Science Communication

To expand quantum literacy across India, writers must produce content in regional languages. Terminology should be standardized, culturally adapted, and accessible to local contexts.



f. Simplify Without Distorting

The golden rule: reduce complexity, not accuracy. Writers must avoid sensationalism while still capturing the wonder of quantum mechanics.

g. Retain Scientific Uncertainty

When reporting, clearly explain what scientists know, what they don't know, and what is still debated. Transparency builds trust.

The Evolving Role of Science Writers in India

A Bridge Between Researchers and the Public

Writers interpret technical papers, policy documents, and lab breakthroughs into digestible content for newspapers, magazines, digital media, and educational platforms.

Curators of Public Understanding

India's National Quantum Mission (NQM) and IQST-2025 have expanded public engagement, requiring communicators who can distill national initiatives into narratives of progress and opportunity.

Collaborators in Education

Writers are increasingly working with teachers, curriculum developers, and science outreach organizations (like Vigyan Prasar, GUJCOST, IISERs) to create learning materials that demystify quantum concepts.

Combatting Misinformation

With social media amplifying pseudoscience and exaggeration, writers act as fact-checkers ensuring that quantum communication remains accurate and credible.

Case Examples from India

Coverage of Quantum Startups

Indian startups working on quantum cryptography, quantum processors, and photonic technologies have become story-rich areas where writers explain innovation in accessible terms.

Reporting on National Quantum Mission Milestones

Whether covering India's QKD satellite demonstrations or indigenous quantum simulator progress, writers play a critical role in framing national achievements for the public.



Grassroots Outreach

Stories from student workshops, school exhibitions, and hands-on quantum kit demonstrations humanize quantum science and show its societal relevance.

Recommendations for Future Science Writers

- Develop a strong conceptual understanding of quantum basics.
- Build relationships with researchers and institutions for authentic insights.
- Use mixed media podcasts, animations, social media to reach diverse audiences.
- Integrate ethical and societal implications of quantum technologies into writing.
- Continuously update knowledge through conferences, seminars, and online courses.

Conclusion

Communicating quantum science in the 21st century demands creativity, accuracy, and empathy. Science writers must illuminate a world that cannot be seen, yet profoundly shapes the future. As India steps boldly into the quantum era, effective communication becomes essential not just for public understanding but for inspiring new generations of students, innovators, and policymakers. By mastering strategies to simplify complexity without losing truth, writers become essential partners in building an informed, quantum-literate society.

National Quantum Mission (NQM) to scale up R&D & leverage India into a leading nation in the area

- NQM to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology (QT)**
- It targets developing intermediate-scale quantum computers with 50-1000 qubits in 8 years, quantum communication with complete quantum key distribution**
- Mission can provide a great fillip to invention of new products and services as well as create world class Start-ups, HRD and International Collaborations**



TAKING QUANTUM TO THE CLASSROOM: MOVING BEYOND ROTE LEARNING TO HANDS-ON KITS

1. Introduction: The Need for Experiential Quantum Education

Quantum science is shaping the next generation of technologies computing, secure communication, precision sensing and advanced materials. As India advances through initiatives such as the National Quantum Mission (NQM), there is an urgent need to cultivate a scientifically literate youth capable of understanding and contributing to quantum innovation. However, conventional classroom methods often rely on rote memorization and formula-driven instruction, leaving students disconnected from the wonder, creativity, and experimental nature of quantum physics. To bridge this gap, educators across India are turning toward hands-on, activity-based learning kits that demystify quantum concepts at the school and undergraduate levels.

2. Traditional Teaching Falls Short in Addressing Modern Learning Needs

Classical physics experiments pendulums, prisms, circuits are accessible, but quantum phenomena occur at scales difficult to observe directly. As a result, students often learn quantum theory abstractly, without intuition.

Limitations of the traditional approach include:

- Heavy mathematical formalism with limited conceptual grounding
- Minimal exposure to real-world quantum applications
- Lack of student engagement due to abstract nature
- Absence of low-cost experimental tools in classrooms

To move beyond this, India requires democratized, scalable and low-cost quantum teaching tools.

3. Emergence of Hands-on Quantum Kits in India

Over the past five years, several Indian scientific institutions, startups, and educational bodies have developed hands-on kits that translate quantum principles into tactile experiences. These include modules for:

- Single-photon experiments (beam splitters, interference, polarization)
- Quantum cryptography demonstrations (BB84 protocol simulations)
- Quantum random number generators
- Spin and superposition models using mechanical analogies
- Quantum circuitry simulators with microcontrollers
- Interactive VR/AR experiences of wave–particle duality

Initiatives by IITs, IISERs, Vigyan Prasar, GUJCOST, and private ed-tech innovators have made these tools accessible to school and college educators across India.



4. Transforming Learning: What Hands-on Kits Achieve

a. Conceptual Clarity

Using laser modules, polarizers, LED photon sources, or even inexpensive plastic models, students can see interference, understand superposition, or mimic entanglement protocols. This builds intuition before introducing mathematics.

b. Inquiry-Based Learning

Students perform experiments, make observations, and question results mirroring the scientific process. Instead of passively receiving equations, they explore “why” and “how”.

c. Democratizing Access

Low-cost kits, priced between ₹1,500–₹12,000 depending on complexity, are affordable for many schools and science clubs. Open-source designs further reduce costs.

d. Linking Theory with Applications

Quantum sensors, secure communication setups, and qubit models help students connect curriculum with real-world technologies essential for India’s growing quantum ecosystem.

5. Case Studies and Impact

Gujarat’s IQST–2025 Education Outreach

Through GUJCOST and partner institutions, over 20,000 students participated in hands-on workshops using quantum demonstration kits. Students reported:

- A 40–60% improvement in conceptual understanding (as per feedback surveys)
- Increased interest in STEM careers
- Better performance in physics assessments

IISER Pune’s “Curious Kits”

These kits allow undergraduate students to perform polarization and interference experiments. They have been adopted by 30+ colleges across India and integrated into laboratory courses.

School-level DIY Kits

Several student science clubs demonstrated self-built quantum kits using LEDs, diffraction gratings, and Arduino-controlled optics systems highlighting how quantum education can flourish even with limited resources.





6. Supporting Teachers: Training and Capacity Building

Teachers are central to transforming classrooms. Professional development workshops have emerged to equip them with:

- Pedagogical techniques for introducing quantum concepts
- Experiment design using low-cost materials
- Curriculum planning aligned with NCF and NEP 2020
- Use of digital quantum simulators like Qiskit, QuNetSim and Indian platforms such as QSim

Teacher training ensures hands-on kits are not just novelty items, but integrated teaching tools.

7. The Path Forward: Scaling Quantum Education in India

To mainstream hands-on quantum learning, India must adopt:

- Standardized school-level quantum modules with experiment components
- Funding support for affordable lab infrastructure
- Open-source designs and community-based innovation ecosystems
- Collaborations between academia, industry, and government
- Inclusion of quantum literacy goals in state-level science curricula

The future classroom should resemble a small quantum lab vibrant, experimental, and discovery-driven.

Conclusion

Moving beyond rote learning toward hands-on quantum kits is not merely a pedagogical shift it represents India's commitment to preparing its youth for the technological frontier. By empowering students with experiential tools, curiosity-driven exploration, and intuitive understanding, we strengthen the foundation of a quantum-ready nation. The classroom becomes a playground of ideas, where the next generation of quantum thinkers, innovators, and creators take shape.





YEAR-LONG ACTIVITIES TO PROMOTE QUANTUM SCIENCE AND TECHNOLOGY

Quantum technologies represent the frontier of scientific innovation, with transformative potential across communication, computing, cybersecurity, healthcare, and defence. The United Nations has declared 2025 as the International Year of Quantum Science and Technology (IYQ-2025) to celebrate a century of quantum mechanics and to raise awareness about its transformative potential across disciplines. Bharat's National Mission on Quantum Technologies & Applications (NM-QTA), launched by the Government of India, seeks to position the country among global leaders in quantum research and innovation.

The 100 years of quantum was a Darwinian moment in the history of physics. It is rare for a scientific idea/theory to fundamentally change our perspective on reality. One such revolutionary moment is being celebrated in 2025, which the United Nations has declared to be the International Year of Quantum Science and Technology.

The aim is not only to celebrate the centenary of quantum mechanics, but also the science and applications that arose from it in the past century — and to explore how quantum physics might bring further change in the century to come as well as to bring it to the people in simpler terms.

Gujarat Council on Science & Technology (GUJCOST) working under the aegis of the Dept. of Science & Technology, Govt. of Gujarat is the nodal agency for the S&T promotion, awareness, education, research and development through its various programs and outreach activities across the state. GUJCOST is engaged in popularization of science at grass root level and promotion of R&D in state.

Through STI Policy of Gujarat, GUJCOST is promoting high end research as well establishing the state-of-the-art facilities to support research and development to enhance Gujarat's scientific capabilities and drive progress in various fields.

The International year of Quantum Science and Technology 2025 (IYQST- 2025) is a global initiative that aims to strengthen national capacities in the basic sciences and science education. GUJCOST has been recognized as an Academic Institution for the International Year of Quantum Science & Technology (IYQ 2025), declared by the United Nations.

GUJCOST had curated a dynamic series of yearlong programs and outreach initiatives aimed at bringing quantum science and technology closer to students, schools, and STEM institutions across Gujarat, inspiring young minds and nurturing a future-ready scientific community.





Quantum Age Begins: Hands on Activity Kit on Quantum Science & Technology

The United Nations has announced 2025 as the International Year of Quantum Science and Technology (IYQ2025), recognizing the transformative impact of quantum science and its applications. This global initiative aims to raise public awareness and inspire engagement at all levels by showcasing the importance of quantum science through various outreach programs.

GUJCOST has been recognized by the United Nations as an Academic Institution Partner for IYQ2025, allowing us to promote our scientific programs and outreach activities on Quantum Science and Technology at Science City, Regional Science Centres, and District Science Centres as well as other STEM institutions in the state.

With a committee of scientists and science communicators, GUJCOST has curated a list of 34 engaging hands-on activities and demonstrations under four broad sections related to quantum science and technology. These activities have been developed into an exciting IYQ2025 Activity Kit, designed to provide hands-on learning experiences that introduce complex quantum concepts in an interactive and engaging manner.

About the Kit

The kit has been carefully curated by a committee of scientists and science communicators and includes 34 interactive, hands-on activities and demonstrations. These activities are designed to simplify complex ideas of quantum science, making them accessible and exciting for students, teachers, science communicators, and the general public.

The Quantum Science & Technology Kit consists of kit materials for conducting 33 activities along with an Introductory Sheet, A User Manual of the kit and 2 posters.

The activities are grouped into four thematic sections that trace the journey of quantum science from its origins to its futuristic applications:

Section A: Before Quantum Science

Explores the historical discoveries and classical foundations that paved the way for quantum theory — from black body radiation and radioactivity to atomic structure and energy absorption.

Section B: Fundamentals of Quantum Science

Introduces learners to core quantum concepts such as wave-particle duality, Schrödinger's cat, quantum tunneling, entanglement, and atomic models through interactive demonstrations.

Section C: Use of Quantum Technology

Showcases practical applications of quantum principles in modern technology, including the photoelectric effect, lasers, MRI, nuclear fission and fusion, and tokamak models.



Section D: Understanding Quantum Computing and the Future

Encourages exploration of cutting-edge frontiers like qubits, quantum teleportation, and DIY models of a quantum computer, while contrasting classical and quantum computing.

This kit is not just a collection of experiments, but a gateway into the fascinating world of quantum science and technology. By empowering young minds with accessible demonstrations, GUJCOST aims to nurture the next generation of innovators and problem-solvers, making Gujarat and India active contributors to the quantum revolution.

Alignment with the National Quantum Mission (NQM)

India's National Quantum Mission envisions making the country a global leader in the development and deployment of quantum technologies in computing, communication, sensing, and materials science.

The IYQ2025 outreach program by DST/GUJCOST is an attempt to:

- Build early interest among school students about quantum concepts.
- Create a tool for the teachers who can use it to explain the concepts to the students.
- Strengthen and help communicating quantum to the layman and make Indian youth ready for the quantum age
- Through this initiative, GUJCOST not only celebrates IYQ2025 but also attempt to contribute to the long-term goals of India's National Quantum Mission by nurturing a quantum empowered knowledge in the very young.

How it is useful to students and teachers

- The kit will spark curiosity, encourage inquiry-based learning, and provide clarity on abstract quantum concepts through hands on demonstrations.
- By connecting quantum science with real-life applications, it will build scientific temperament, creativity, and problem-solving skills, inspiring more students to pursue higher studies and careers in quantum technologies.
- The kit will serve as a powerful teaching aid, enabling teachers to explain complex topics with simple models and activities.
- It will enhance classroom engagement, and help teachers to guide students towards advanced STEM learning.

Impact and Outreach

Distribution of the kits to schools across Gujarat and India, along with structured training programs, will benefit 20,000 teachers and reach over 10.00 lakh students in the state and the country. This large-scale initiative will create a strong foundation of quantum literacy at the grassroots level.



INTERNATIONAL YEAR OF
Quantum Science
and Technology
#IYQ2025



GUJCOST : UNITED NATIONS RECOGNIZED ACADEMIC INSTITUTION PARTNER FOR #IYQ2025



Department of Science & Technology
Government of Gujarat



CONCEPTUALISED AND PRODUCED BY:
**GUJARAT COUNCIL ON
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Dept. of Science & Technology, Govt. of Gujarat

Block B, 7th Floor, M5 Building,
Sector 11, Gandhinagar, Gujarat - 382011
Email: info-gujcost@gujarat.gov.in
Website: www.gujcost.gujarat.gov.in

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**BEFORE
QUANTUM SCIENCE**



**MATERIAL
BOX**



**FUNDAMENTALS OF
QUANTUM SCIENCE**



**MATERIAL
BOX**



**QUANTUM
TECHNOLOGY
& APPLICATIONS**



**MATERIAL
BOX**



INTERNATIONAL YEAR OF
Quantum Science
and Technology
#IYQ2025

Explore the fascinating world of quantum science and technology with this hands-on kit designed for students!

Featuring 33 engaging hands-on activities, experiments, models, explanations and two inspiring posters, this kit presents complex concepts in a simplified manner and sparks curiosity and creativity in the minds of young students in the area of Quantum Science and Technology.

Designed to build awareness about the International Year of Quantum Science & Technology, it inspires young minds to delve deeper into quantum science and technology, paving the way for future innovations.



HANDS-ON ACTIVITY KIT ON QUANTUM SCIENCE AND TECHNOLOGY

BEFORE QUANTUM SCIENCE

1. CHARACTERISTIC LIGHT EMITTED BY ELEMENTS
2. CD SPECTROSCOPE
3. BLACK BODY RADIATION AND BEGINNINGS OF QUANTUM THEORY
4. X-RAYS
5. APPLICATION OF X-RAYS
6. DISCOVERY OF RADIOACTIVITY
7. RADIOACTIVE DECAY AND TRANSFORMATION OF ELEMENTS
8. CLASSICAL MECHANICS AND QUANTUM MECHANICS: A RAMP AND A STAIRCASE
9. ELECTRON ORBITS AND ATOMS
10. HOW ATOMS ABSORB AND RADIATE ENERGY

FUNDAMENTALS OF QUANTUM SCIENCE

11. INTERFERENCE AND DIFFRACTION OF LIGHT WAVES
12. ARE ELECTRONS WAVES TOO?
13. WAVE PARTICLE DUALITY
14. SCHRÖDINGER'S CAT
15. QUANTUM TUNNELLING
16. WHAT IS ENTANGLEMENT?

17. SPOOKY ACTION AT A DISTANCE
18. BUILD A MODEL OF AN ATOM
19. HOW SMALL IS QUANTUM

QUANTUM TECHNOLOGY & APPLICATIONS

20. PHOTOELECTRIC EFFECT
21. PHOTOELECTRICITY AND PHOTOCONDUCTIVITY
22. MAGNETIC RESONANCE IMAGING
23. ELECTRON MICROSCOPE
24. HOW LASERS ARE PRODUCED?
25. NUCLEAR FISSION
26. NUCLEAR CHAIN REACTION
27. NUCLEAR FUSION
28. A SIMPLE MODEL OF TOKAMAK

UNDERSTANDING QUANTUM COMPUTING AND FUTURE

29. CLASSICAL COMPUTER & QUANTUM COMPUTER
30. MEET THE QUBITS
31. UNDERSTANDING A QUANTUM COMPUTER
32. DIY MODEL OF A QUANTUM COMPUTER
33. QUANTUM TELEPORTATION

POSTERS: MY WORLD OF QUANTUM SCIENCE | MEET THE QUANTUM SCIENTISTS



Department of Science & Technology
Government of Gujarat



Concept:

Dr. Narottam Sahoo
Advisor & Member Secretary
GUJCOST

Dr. Poonam Bhargava
Principal Scientific Officer,
GUJCOST

Activity and Content Guidance:

Dr. Vinay B. Kamle
Former Director,
Vigyan Prasara

IYQ Mascot Courtesy:

Jorge Cham



The Quantum Science & Technology Kit consists of kit materials for conducting 33 activities along with an Introductory Sheet, A User Manual of the kit and 2 posters as follows:

Section A:

Before Quantum Science

1. Characteristic Light Emitted by Elements
2. Cd Spectroscope
3. Black Body Radiation And Beginnings Of Quantum Theory
4. X-Rays
5. Application Of X-Rays
6. Discovery Of Radioactivity
7. Radioactive Decay And Transmutation Of Elements
8. Classical Mechanics And Quantum Mechanics: A Ramp And A Staircase
9. Electron Orbits And Atoms
10. How Atoms Absorb And Radiate Energy

Section B:

FUNDAMENTS OF QUANTUM SCIENCE

11. Interference And Diffraction Of Light Waves
12. X-Rays Are Waves. Are Electrons Waves Too?
13. Wave Particle Duality
14. Schrödinger's Cat
15. Quantum Tunnelling
16. What Is Entanglement?
17. Spooky Action At A Distance
18. Build A Model Of An Atom
19. How Small Is Quantum

Section C:

USE OF QUANTUM TECHNOLOGY

20. Photoelectric Effect
21. Photoelectricity And Photoconductivity
22. Magnetic Resonance Imaging
23. Electron Microscope
24. How Lasers Are Produced?
25. A Simple Model Of Tokamak
26. Nuclear Fission
27. Nuclear Chain Reaction
28. Nuclear Fusion

Section D:

Understanding Quantum Computing and Future

29. Understanding Classical Computer And Quantum Computer
30. Exploring The Transistor
31. Meet The Qubits
32. Diy Model Of A Quantum Computer
33. Quantum Teleportation



GUJCOST: Promoting Science and Technology in Gujarat

Gujarat Council on Science and Technology (GUJCOST), working under the aegis of the Department of Science and Technology, Government of India and Government of Gujarat, is emerging as an effective and large-scale science education and popularization platform in the area of S&T education, awareness, research and scientific practices through its various programs and outreach activities across the state.

Established on September 1986 under the aegis of Dept. of Science & technology, Govt. of India to play catalytic role in promoting the use of Science and Technology in the development process of the State, GUJCOST became an autonomous body registered under the Societies Registration Act in February 2000.

GUJCOST works on four verticals. Developing Infrastructure to inculcate scientific temper, Promoting research and development, Popularization of Science and promoting IPR.

To spread scientific temper GUJCOST is already successfully running the 4 Regional Science Centres and is in the process of developing 4 more Regional Science Centres and 25 District Science Centres in the state. To add on GUJCOST has a network of Community Science Centres which has been topped with the IP labs and Innovation Labs in each district.

Further GUJCOST has been implementing the Science, Technology and Innovation (STI) Policy of the State and promoting the Research and Development activities in the State by encouraging scientists, researches, faculties and students for taking up research activities in emerging areas of Science, Technology and Innovation for the benefit of the society. As of now GUJCOST is in the process of revamping the state STI policy with the objectives of developing STI Cluster. enhancing research support and taking the scientific competitions global.

The State Government has created an "enabling environment to promote investments and technology development and its transfer for societal benefit. Technology partnerships and networks can be means of sharing knowledge, enhancing technological capabilities, fostering innovation, improving market access and strengthening competitiveness.





Gujarat Science City, Ahmedabad Igniting Curiosity, Inspiring Innovation

The Gujarat Science City, is one of India's most dynamic and visionary science education destinations. Developed under the Department of Science and Technology, Government of Gujarat, Science City is designed to make science engaging, interactive, and accessible to people of all ages. It serves as a bridge between scientific knowledge and public understanding.

Spread over hundreds of acres, Gujarat Science City is a world-class science and innovation hub that brings together theme-based pavilions, interactive galleries, live demonstrations, and large-scale exhibits showcasing the wonders of science and technology. The facility is part of the state's broader mission to promote scientific temper and nurture a culture of innovation among students, youth, and citizens. Among its many attractions, the Aquatic Gallery, inaugurated by the Hon'ble Prime Minister Shri Narendra Modi, is one of the most spectacular. It is India's largest public aquarium, housing a diverse range of marine and freshwater species from around the world. Visitors can walk through a glass tunnel surrounded by aquatic life, gaining insights into ocean ecosystems and marine conservation.

The Robotics Gallery is another highlight, showcasing how robots are transforming industries, healthcare, and daily life. Through interactive exhibits, humanoid demonstrations, and workshops, it helps young minds understand the fundamentals of automation, coding, and artificial intelligence. Similarly, the Nature Park and Planet Earth Pavilion take visitors on an immersive journey through the story of our planet, biodiversity, and sustainability. One of Science City's most iconic structures is the IMAX 3D Theatre, which brings scientific documentaries and educational films to life on a massive screen, creating an unforgettable learning experience. The Energy Park, Hall of Science, Amphitheatre, and Children's Activity Centre further add to its appeal as a holistic learning environment.

Beyond being a visitor attraction, Gujarat Science City functions as a center for science communication, outreach, and research. It regularly organizes science fairs, innovation workshops, student training programs, and exhibitions that bring scientists and learners together. By blending modern technology with engaging exhibits, Science City plays a key role in fostering scientific awareness and innovation-driven learning across Gujarat.





INTERNATIONAL YEAR OF QUANTUM SCIENCE & TECHNOLOGY, UNESCO

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has declared 2025 as the International Year of Quantum Science and Technology (IYQ-2025) to highlight the transformative power of quantum physics in shaping the 21st century. This global celebration recognizes that quantum science once the domain of theoretical physics now drives innovations in computing, secure communication, precision sensing, and materials research. IYQ-2025 aims to deepen public engagement, inspire students and educators, and promote international cooperation in quantum research and education.

Through conferences, exhibitions, public talks, hands-on demonstrations, and outreach events across continents, IYQ-2025 seeks to demystify quantum concepts and make them accessible to broader audiences. UNESCO emphasizes that quantum literacy is essential for sustainable development, technological independence, and scientific empowerment of nations. The initiative prioritizes inclusivity by encouraging participation from emerging economies, women in science, and under-represented communities.

IYQ-2025 also fosters collaboration between academia, government agencies, industry leaders, and science communication organizations to build a globally connected quantum ecosystem. By strengthening education, creating open learning resources, and amplifying public understanding, UNESCO envisions that the International Year will inspire a new generation of quantum thinkers, innovators, and communicators. As nations worldwide invest in quantum technologies, IYQ-2025 serves as a timely and unifying platform for celebrating achievements and preparing societies for the quantum future.





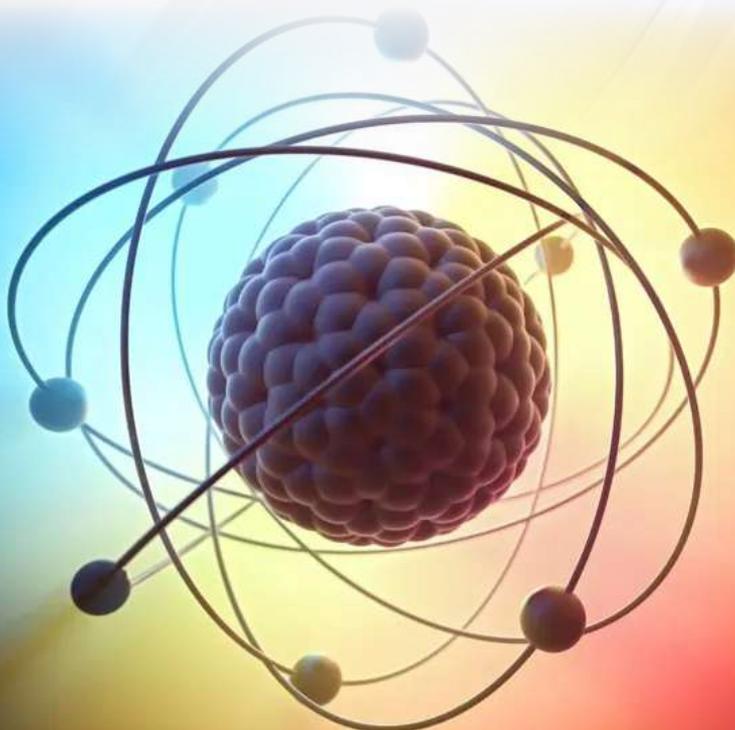
NATIONAL QUANTUM MISSION (NQM), GOVERNMENT OF INDIA

The National Quantum Mission (NQM), launched by the Government of India, represents a landmark effort to position India among the world's leading nations in quantum technologies. With a long-term investment, the mission aims to accelerate indigenous research, build world-class infrastructure, and nurture a quantum-skilled workforce. NQM focuses on four major verticals: Quantum Computing, Quantum Communication, Quantum Sensing & Metrology, and Quantum Materials & Devices, each essential for national security, advanced industry, and scientific leadership.

The mission envisions the development of intermediate-scale quantum computers, secure quantum communication networks linking metros and states, advanced sensors for healthcare and navigation, and cutting-edge materials platforms. It also supports national testbeds, collaborative research hubs, and partnerships between IITs, IISERs, national laboratories, academic institutions and industry.

Crucially, NQM recognizes the importance of capacity building and public engagement. It integrates outreach activities, training programs, and educational modules to cultivate quantum literacy among students, teachers, and young researchers. Through international collaborations, the mission seeks to position India as a trusted global partner in emerging quantum technologies.

By combining scientific excellence with societal awareness, the National Quantum Mission stands as a powerful strategy to advance India's technological sovereignty and innovation ecosystem. It marks a decisive step toward shaping a vibrant, secure, and economically robust quantum future for the nation.



NATIONAL QUANTUM MISSION (NQM)



INTERNATIONAL SCIENCE WRITERS' ASSOCIATION (A global platform for promoting science communication)

Founded in 1967, the International Science Writers' Association (ISWA) is one of the world's oldest global associations of individual science journalists and communicators. Established at a time when science was becoming increasingly international but journalism remained largely national, ISWA has, for nearly six decades, provided a trusted global network enabling accurate and responsible reporting of science across borders.

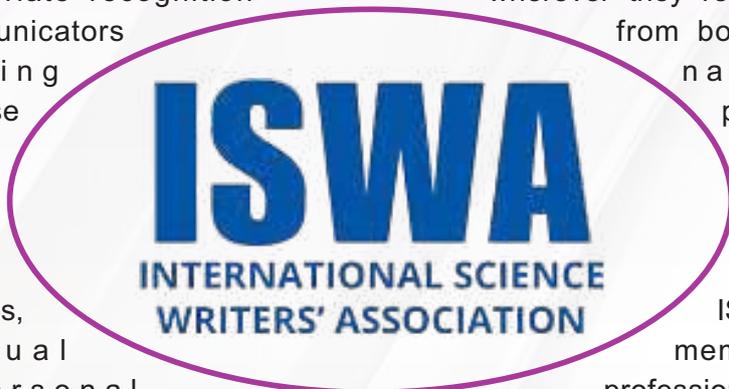
ISWA's mission is to connect science writers, editors, and broadcasters covering science, technology, medicine, and related fields, and to strengthen international cooperation in science journalism. The Association works to improve media conditions for science coverage worldwide, uphold high professional and ethical standards, and ensure that science writers receive appropriate recognition wherever they report. By bringing together communicators from both industrialized and emerging nations, ISWA promotes diverse perspectives on shared global scientific challenges.

Distinct from institutional bodies, an individual built on personal national or ISWA operates on membership model, professional relationships. This unique structure fosters a collegial culture in which members support one another through cross-border collaboration sharing contacts, verifying sources, facilitating introductions to scientists and institutions, and assisting with international reporting assignments.

ISWA is particularly valuable for science writers in countries without national science writers' associations, offering professional support, development opportunities, and international representation.

ISWA played a significant role in the establishment of the World Federation of Science Journalists (WFSJ) and continues to serve as an important gateway for individual journalists to the global science journalism community. Over the years, the Association has supported workshops, meetings, and collaborative initiatives aimed at skill development, ethical reporting, and innovation in science communication.

In an era marked by rapid scientific advancement, global crises, and the spread of misinformation, ISWA's commitment to clear, accurate, and responsible science communication is more relevant than ever. As the world confronts common challenges in health, climate change, energy, space, and artificial intelligence, ISWA remains a vital international platform connecting science writers across borders and strengthening public understanding of science worldwide.

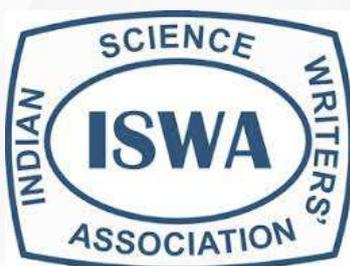




INDIAN SCIENCE WRITERS' ASSOCIATION (ISWA INDIA) (Connecting Science to the Masses through Indian Languages)

The dissemination of scientific information and the cultivation of scientific temper among the public are essential for building a rational and informed society. Science writers and communicators play a pivotal role in this process by interpreting scientific knowledge and concepts for the public through print, broadcast, folk, interactive, and digital media. Established on 14 April 1985, the Indian Science Writers' Association (ISWA) is a professional body dedicated to promoting science writing and science communication in India.

ISWA aims to popularize science, strengthen scientific temper, and bridge the gap between scientists and society by communicating with the brings together freelance and communicators and actively conferences, and outreach Its flagship annual event, the Congress (ISCC), features participation and focuses on capacity building in science communication, often aligned with global science initiatives.



connecting science scientific community. ISWA staff science journalists and organizes seminars, workshops, programmes across the country. Indian Science Communication national and international research, education, and

The Association recognizes excellence through honours such as the ISWA Fellowship and the National Award for Science Writing, encouraging both distinguished contributors and young talent. ISWA follows a strict Code of Ethics, ensuring accuracy, integrity, and responsible reporting while discouraging pseudoscience and misleading communication.

With over 300 members and nine active state chapters, ISWA promotes science communication at both national and grassroots levels. It maintains a scientific events calendar and is an associate member of the European Union of Science Journalists' Associations (EUSJA). Through its initiatives, ISWA continues to strengthen public understanding of science and reinforce the vital link between science and society.





SOCIETY FOR INFORMATION SCIENCE
(*Science for Information; Information for Science*)

The Society for Information Science (SIS) is a national professional body established in 1975 to promote the advancement of information science and its effective application in India. The Society aims to facilitate the exchange of information among professionals, strengthen professional competence and integrity, and foster collaboration among individuals and institutions engaged in information-related disciplines.

SIS advocates a systematic and cost-effective adoption of information technologies, emphasizing infrastructure development, skilled manpower creation, and sustainable maintenance support. It is committed to providing a collaborative platform that integrates information innovation, industry, technology management, and socially relevant information services in the national interest. The Society functions through an Executive Committee, supported by expert sub-committees. Since 1981, SIS has been organizing annual national conferences, bringing together professionals from diverse sub-disciplines of information science to share experiences, research, and best practices.



The first national convention, held in 1981 at the Regional Research Laboratory, Hyderabad, focused on information as a vital national resource, emerging contours of information science, and trends in information analysis. Subsequent conferences have addressed contemporary themes such as distributed databanks, information technology for socio-economic development, national information policy, online information processing, bibliometrics and informetrics, scientific communication, multimedia information services, open access, library consortia, and patinformatics.

SIS has also conducted capacity-building programmes and workshops on computer applications in information management, information technology, reprography, programming, agricultural and biomedical information management, and technical communication. To recognize excellence, SIS confers Fellowships for outstanding contributions to information science and instituted the Young Information Scientist Award in 1989 in memory of Late Shri A.S. Raizada, Founder Secretary of SIS.

The Society publishes SISCO, a monthly newsletter (since 1981), and SISTRANS (since 1982), which includes conference proceedings and scholarly papers. SIS has also published the NISSAT Newsletter on behalf of the Government of India. SIS offers Individual, Life, and Institutional Memberships, open to information professionals and institutions involved in information management. Through its sustained activities, SIS continues to strengthen professional excellence and support the evolving information science ecosystem in India.

Estd. 1976

Society for Information Science
India



INDIAN SCIENCE COMMUNICATION SOCIETY

(Nurturing Science Communication Research and Academia)

The Indian Science Communication Society (ISCS) is a voluntary, non-governmental organization established in 1994 by a group of self-motivated science writers and scientists committed to the popularization of science and the promotion of scientific temper among the Indian masses. The origins of ISCS can be traced to a CSIR-inspired Science Club founded on 2 October 1978 at Singhamau village, Lucknow, reflecting Gandhian ideals of village development, Antyodaya, and rural reconstruction.

This initiative led to the formation of the All India Science Clubs Association, which actively organized science writers, science clubs, and communicators across the country. In recognition of its impactful activities, the Council of Scientific and Industrial Research (CSIR) encouraged the Association in 1981 to initiate a Diploma course in Science Journalism. Although this could not be realized at that time due to resource constraints, the vision was revived with renewed commitment through the establishment of ISCS in 1994. ISCS aims to position science communication and science journalism as serious scholarly and professional disciplines, while fostering public understanding of science and combating myths, superstitions, and misinformation. The Society works to organize science communicators on a common platform, support rural development, strengthen education and training in science journalism, and encourage rational public opinion through scientific explanations.



The Society adopts a participatory and outreach-based methodology, including field surveys, science awareness campaigns, exhibitions, workshops, seminars, conferences, training programmes, and collaborations with scientific institutions and NGOs. Its activities span science journalism training, science exhibitions and melas, science rallies and padyatras, skill development programmes, environmental and public hygiene campaigns, science theatre and slogan writing, and science popularization among children and rural communities. The Indian Science Communication Congress is one of its flagship initiatives.

ISCS provides a wide range of services, including training in science journalism, consultancy in science communication, skill development programmes, science reporting and feature writing, science toys and low-cost learning aids, soil and water testing, food adulteration analysis, and publication of popular science literature. The Society jointly publishes the Indian Journal of Science Communication (IJSC) a half-yearly international research journal along with the Indian Science Writers' Association. IJSC provides a platform for research, reviews, and practical insights in science communication, supporting professionals, researchers, media organizations, and science institutions.

Among its future initiatives, ISCS plans to launch an online Diploma Course in Science Journalism, a popular science newspaper, web radio on science, women empowerment programmes through S&T communication, and short-term skill-based training for rural and marginalized sections. Through its sustained efforts, ISCS continues to play a vital role in strengthening science communication and nurturing scientific temper across India.



**Science Communication Conference
on
Public Understanding of Quantum Science & Technology**

List of Dignitaries, Invited Guests, and Subject Matter Experts

- 1. Shri Arjun Modhwadia**
Hon'ble Minister of Science and Technology,
Govt. of Gujarat,
Gandhinagar - 382011, Gujarat.
- 2. Smt. P. Bharathi, IAS**
Secretary, Department of Science & Technology (DST),
Govt. of Gujarat,
Gandhinagar - 382011, Gujarat.
- 3. Dr. Narottam Sahoo**
Advisor & Member Secretary,
Gujarat Council on Science & Technology (GUJCOST),
Gandhinagar - 382011, Gujarat.
- 4. Prof. Manoj Kumar Patairiya**
President,
Society for Information Science (SIS),
New Delhi, India.
- 5. Dr. Rajni Kant Srivastava**
Scientist & Director,
ICMR - Regional Medical Research Centre (RMRC),
Uttar Pradesh – 273013.
- 6. Dr. V.P. Singh**
Executive Secretary,
Indian Science Communication Society (ISCOS),
Chandrika Bhawan, Lucknow – 226022.
- 7. Dr. M. Sai Baba**
Honorary Visiting Professor,
National Institute of Advanced Studies (NIAS),
Bengaluru, Karnataka – 560012.
- 8. Prof. Kanan Purakayastha**
Director, Education Lab UK,
London, United Kingdom.
- 9. Prof. Arul Aram**
Professor,
Anna University, Chennai – 600004.
- 10. Dr. Nguyen Tuong Lan**
Lecturer,
Vietnam Institute of Science Information,
Hanoi, Vietnam.
- 11. Dr. S.K. Varshney**
Former Advisor,
Dept. of Science and Technology,
Govt. of India
- 12. Mr. Tariq Badar**
Formerly Controller of Stores & Purchase,
CSIR-NPL, New Delhi – 110012.
- 13. Dr. B.K. Tyagi**
Scientist-F (Ex) & Consultant,
Vigyan Prasar,
Uttar Pradesh – 201309.
- 14. Prof. Dr. Anjana Singh**
Academician & Former Head,
Nepal Academy of Science and Technology (NAST)
Kathmandu, Nepal.
- 15. Prof. Dr. S. Vincent**
Member Secretary,
Tamil Nadu State Council for Science and Technology (TANSCST),
Chennai – 600025.

SCIENCE COMMUNICATION CONFERENCE
ON

PUBLIC UNDERSTANDING OF QUANTUM SCIENCE & TECHNOLOGY



- 16. Dr. Debjit Mahanta**
Joint Director,
Arunachal Pradesh State Council for
Science & Technology (APCS&T),
Arunachal Pradesh– 791121.
- 17. Mr. Harish Yadav**
Science Communicator, SciMind
Jaipur – 302012.
- 18. Prof. Raja Ram Yadav**
Former VC (Purvanchal Univ.) &
Professor of Physics, University of
Allahabad,
Prayagraj, Uttar Pradesh.
- 19. Dr. Punit Kumar**
Professor,
Department of Physics,
University of Lucknow, Uttar
Pradesh.
- 20. Dr. C. P. Sharma**
Group Director,
Quantum Technology Group, SAC -
ISRO,
Ahmedabad – 380015.
- 21. Dr. Anil Bhardwaj**
Director,
Physical Research Laboratory
(PRL),
Gujarat – 380009.
- 22. Dr. Shashi Prabhakar**
Assistant Professor,
Physical Research Laboratory
(PRL),
Gujarat – 380009.
- 23. Dr. Rajeev Singh**
Professor,
Delhi University,
New Delhi.
- 24. Mr. Sreeprasad M. Kuttan**
Regional Organising Secretary,
Vijnana Bharati (VIBHA),
Mumbai, Maharashtra.
- 25. Dr. Rupali Mishra**
Assistant Professor,
Roorkee-Dehradun Highway (NH-
73),
Roorkee, Uttarakhand – 247667.
- 26. Dr. V. B. Kamble**
Former Director,
Vigyan Prasar & Emeritus Scientist,
New Delhi.
- 27. Prof. Rajat Moona**
Director,
Indian Institute of Technology (IIT)
Gandhinagar, Gujarat.
- 28. Shri B. H. Talati, IAS**
Commissioner of Technical
Education,
Government of Gujarat,
Gandhinagar.

ATION CONFERENCE ON PUBLIC UNDERSTANDING OF QUANTUM SCIENCE & TECHNOLOGY





Science Communication Conference on Public Understanding of Quantum Science & Technology

22 - 23 December 2025
Gujarat Science City, Ahmedabad

Organized by:
Gujarat Council on Science & Technology
Dept. of Science & Technology, Govt. of Gujarat

In collaboration with
International Year of Quantum Science & Technology (IYQ-2025), UNESCO
National Quantum Mission (NQM), Government of India
International Science Writers' Association (ISWA International)
Indian Science Writers' Association (ISWA India)
Society for Information Science (SIS)
Indian Science Communication Society (ISCOS)

Program Schedule

22 December 2025 | Monday | Science Dome

- | | |
|-----------------|--|
| 9:00 hrs | Reporting, Registration and Breakfast at Science City, Ahmedabad |
| 10:00-11:00 hrs | Inaugural Session |
| 11:30 hrs | Keynote Address1
Shri C. P. Sharma , Scientist/Engineer-G, Space Applications Centre (SAC- ISRO), Ahmedabad
"Quantum Technology: Concepts, Technologies and Space-based Systems" |
| 12:00 hrs | Plenary Talk 1 (Virtual)
Prof. Kanan Purakayastha, London, UK
"Heisenberg's Thoughts on Language and Reality in Quantum Mechanics: Important issues in the Public Understanding of QM" |
| 12:45 hrs | Interactive Session (1)
Dr. V. P. Singh , Executive Secretary, Indian Science Communication Society
"Quantum Sensors: Seeing the unseen through folk science" |
| 13:15 hrs | Lunch |
| 14:00 hrs | Panel Discussion 1: Simplifying the Unseen: How to Make Quantum Ideas Accessible to All?
Chair: Prof. Anjana Singh , Nepal Academy of S&T, Kathmandu
Panellists: Science communicators, educators, media professionals
Dr. Debjit Mahanta , Joint Director, APSCS&T & Project Director, DBT-APSCS&T CoE for Bioresources and Sustainable Development
Prof. S. Vincent , Member Secretary, Tamil Nadu State Council for S & T
Prof B. K. Tyagi , Former Director, Vigyan Prasar |
| 15:00 hrs | Expert Talk (1) (Virtual)
Dr. S.K. Varshney , Former Advisor, DST, Govt. of India
"Achievements in Quantum Science & Technology in 2025" |
| 15:30 hrs | Tea Break |
| 16:00 hrs | Expert Talk (2) |



Mr. Tariq Badar, Formerly Controller of Stores & Purchase, CSIR
 “Exploring Quantum Science & Technology for Environmental Sustainability: Opportunities, Challenges and Public Understanding”

- 16:20 hrs Interactive Session (2)
Dr. V. B. Kamble, Former Director, Vigyan Prasar
 Demonstration Session on Hands-on Quantum Education Kit
- 17:30 hrs Visit to Astronomy and Space Science Gallery
- 19.00 hrs Dinner with sky gazing and departure for the accommodation place

23 December 2025 | Tuesday | Science Dome

- 9:00 hrs Reporting and Breakfast at Science City, Ahmedabad
- 10:00 hrs **Special Session on Quantum Age: Our Collective Future**
Shri Arjun Modhwadia, Hon'ble Minister of Science and Technology, Forest and Environment and Climate Change, Government of Gujarat
- 11:00 hrs Keynote Address 2
Prof. Arul Aram, Anna University, Chennai
 “Quantum Technologies for Society: Challenges in Public Communication”
- 11:20 hrs Expert Talk (3)
Prof. Punit Kumar, University of Lucknow (Virtual)
 “A century of quantum revolution and why it matters: Communicating the science and technology of the 21st century”
- 11:40 hrs Tea Break
- 11:50 hrs Plenary Talk (2)
Dr. Shashi Prabhakar, Asst. Professor, AMOPH division, Physical Research Laboratory (PRL), Ahmedabad
 “Quantum Sciences in PRL”
- 12:10 hrs Plenary Talk (3)
Prof. Manoj Kumar Patairiya, President, International Science Writers Association
 “Digital Media, AI and the Future of Science Communication”
- 12:30 hrs Panel Discussion 2: **Opportunities for young researchers in the field of quantum, science, technology and industry for future workforce**
Chair: Dr. N. T. Lan, Vietnam Institute of Science Information, Hanoi
 Panellists: Senior Science Communicators, and Researchers
Dr. Sai Baba, Professor, National Institute of Advanced Studies, Bengaluru
Dr. Raja Ram Yadav, Former V.C., Purvanchal University
Dr. Rupali Mishra, Assistant Professor, Uttarakhand
Dr. Rajni Kant Srivastava, Scientist and Director, ICMR, Uttar Pradesh



13:30 hrs Lunch

14:15 hrs Technical Session: Research Paper Presentations
Chair: Dr. Rajiv Singh, Delhi University
Mr Sreepasad MK, Regional Organising Secretary, Vijnana Barati and Coordinator Gulf Countries
Track: Communicating Complex Quantum Concepts, Tools, Methods & Innovations in Quantum Science Communication Public engagement models
 Popular science writing on quantum
 Science museums and exhibits
 Cognitive challenges in quantum learning
 Visual storytelling
 Digital learning & VR
 Citizen science
 Museum-based outreach
 Quantum curriculum design

15:00 hrs Interactive Session (3)
Mr. Harish Yadav, Science Communicator
 (Mind reading Mentalism Show-Interactive session for educators and students)

16:00 hrs **Valedictory Session**

Chief Guest: **Shri B. H. Talati, IAS**
 Commissioner of Technical Education
 Government of Gujarat

Guest of Honour: **Prof. D. Pallam Raju, FASc**
 Senior Professor & Dean
 Physical Research Laboratory

17:00 hrs High Tea

17:30 hrs Departure



Welcome to Quantum Age - It is our Collective Future!
Quantum Science Activity Kit

33 Hands-on-activities, 2 inspiring and illustrative Infographics and a gateway to Quantum Science and Technology





Science Communication Conference
on
Public Understanding of Quantum Science & Technology
22-23rd December 2025

List of Delegates

1. **Dipin Damodharan**,
Science Communicator,
EdPublica,
Kerala – 683104.
2. **Suhas B. Naik-Satam**
Science Communicator, National
Centre for Science
Communicators, New Delhi.
3. **Harish Mohan Yadav**
Science Communicator, ISWA,
New Delhi.
4. **Er. Milan Kumar Raul**
Science Communicator, SCVC,
Santaragadia, Baleswar,
Odisha – 756042.
5. **Dr. Subhanarayan Sahoo**
Faculty Member, Adani
University, Adani Shantigram,
Ahmedabad.
6. **Dr. Shweta Dour**
Faculty Member, Navrachana
University, Vasna Bhayli Road,
Vadodara, Gujarat – 391410.
7. **Dr. Tarun Kumar Jain**
Science Communicator, Vaigyanik
Drishtikon
Mansarovar, Jaipur.
8. **Trilochan Pattanaik**
Senior Research Fellow /
Scientist, Department of Marine
Sciences, Berhampur University,
Bhanja Bihar, Berhampur
9. **Leena Bharadwaj**
Faculty Member, Gandhinagar
University, Khatraj, Gujarat
10. **Patel Daxkumar Rameshbhai**
Junior Research Fellow,
Gandhinagar University, Khatraj,
Gujarat.
11. **Barot Himani Naginbhai**
Faculty Member, Gokul Global
University, Siddhpur – 384151.
12. **Dr. Sarita Mishra**
Faculty Member, Gandhinagar
University, Moti Bhoyan, Kalol,
Gandhinagar – 382721.
13. **Dr. Abhay Dasadia**
Scientist / Science Communicator,
A.D. Patel Institute of Technology,
CVM University, New Vallabh
Vidyanagar – 388121.
14. **Anjali Satpal Verma**
Faculty Member, Gokul Global
University, Siddhpur.
15. **Patel Nimaben Natvarbhai**
Research Associate,
Gandhinagar University, Moti
Bhoyan, Kalol, Gujarat – 382725.
16. **Chetna Chauhan**
Faculty Member, Institute of
Technology, Nirma University,
S-G Highway, Ahmedabad.
17. **Divya Chintankumar Barot**
PG Student, Anand Pharmacy
College, Rahtlav, Mathiya Chora,
Anand, Gujarat – 388001.
18. **Ramya Patel**
Junior Research Fellow / Science
Communicator,
Adani University, Adani
Shantigram, Ahmedabad.
19. **Patel Manthan Rajendrakumar**
Faculty Member, Adani
University, Shantigram Township,
SG Highway,
Ahmedabad – 382421.
20. **Ajit Kumar Parwani**
Faculty Member, Institute of
Infrastructure Technology
Research and Management
(IITRAM, Ahmedabad – 380026.
21. **Ahir Anjani Jitubhai**
PG Student, Anand Pharmacy
College, Rahtlav, Mathiya Chora,
Anand, Gujarat – 388001.



Science Communication Conference
on
Public Understanding of Quantum Science & Technology
22-23rd December 2025

- 22. Bhayani Prachi Bharatbhai**
PG Student, Anand Pharmacy
College, Anand, Gujarat.
- 23. Vaghasiya Dhruvi Umeshbhai**
PG Student, Anand Pharmacy
College, Anand, Gujarat –
388001.
- 24. Dr. Papu Kumar Naik**
Faculty Member, Parul Institute of
Applied Sciences, Parul
University, Vadodara, Gujarat –
391760.
- 25. Avinash Vyas**
Science Communicator, IP &
Innovation Lab, OVSRCSC,
Rajkot, Gujarat.
- 26. Kalpesh Dinbandhubhai Akhani**
Faculty Member, Vivekamand
Vidyalaya, Vadnagar, Patan,
Gujarat.
- 27. Balar Darshan**
PG Student, P.D. Patel Institute of
Applied Sciences, CHARUSAT
Campus, Changa, Anand –
388421.
- 28. Tulshi Shiyani**
Scientist, Shiyani Research
Institute, Kuwadava Road, Rajkot.
- 29. Gamit Jinalkumari Rambhai**
Junior Research Fellow, Indrashil
University, Rajpur, Mehsana,
Gujarat.
- 30. Nandini Dipakkumar Dave**
Senior Research Fellow, Pandit
Deendayal Energy University
(PDEU), Raisan, Gandhinagar –
382426.
- 31. Sharad Gangadhar Survase**
Junior Research Fellow, Indrashil
University, Rajpur, Kadi,
Mehsana.
- 32. Mohd Tariq**
Faculty Member, Sumandeep
Vidyapeeth Deemed to be
University, Piperia, Waghodia.
- 33. Prof. Mitul M. Makwana**
Science Communicator,
Government Engineering College,
Modasa, Arvalli.
- 34. Chudasma Krishna Sanjaybhai**
Junior Research Fellow, Indrashil
University, Rajpur, Mehsana.
- 35. Daraksha**
Science Communicator, Parul
University, Waghodia, Vadodara.
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Faculty Member, Shri M.M. Patel
Institute of Sciences and
Research, Sector 23,
Gandhinagar.
- 37. Patel Chandanben Sumanlal,**
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College Campus, Modasa.
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Science Communicator, Kalyan
Regional Community Science
Centre, "Vigyan Bhawan",
Bhavnagar – 364002.
- 39. Mehta Vatsal Pareshkumar**
Science Communicator, Dr. Homi
Bhabha CSC, J.P. Street No. 1,
Surendranagar.
- 40. Pratik Diyora**
Junior Research Fellow, Indrashil
University, Rajpur, Kadi, Mehsana
– 382715.
- 41. Sumi Bhadauria,**
Faculty Member, Pandit
Deendayal Energy University
(PDEU), Raisan Road,
Gandhinagar – 382421.
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Chemistry, Bhavnagar, Gujarat.
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Sciences, Maharaja
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University.
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Parmar**
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of Computer Studies,
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University, Limda, Waghodia,
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PG Student, Saurashtra University
Campus, Rajkot – 360005.
- 52. Kavya Prakashkumar Prajapati**
Faculty Member, SVNIT,
Ichchhanath, Surat – 395007.
- 53. Mehta Harsh Jayeshkumar,**
Junior Research Fellow, Indian
Institute of Technology (IIT)
Roorkee, Uttarakhand – 247667.
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Junior Research Fellow, Indian
Institute of Technology (IIT)
Roorkee, Uttarakhand – 247667.
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PG Student, Anand Pharmacy
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- 56. Gola Saloni Kumari**
PG Student, Indian Institute of
Teacher Education (IITE),
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PG Student, Indian Institute of
Teacher Education (IITE),
Sector 15, Gandhinagar.
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College, Rahtlav,
Anand – 388001.
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Research, Koba Institutional Area,
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Deendayal Energy University
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PG Student, Pandit Deendayal Energy University (PDEU), Raisan, Gandhinagar.
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Faculty Member, Indian Institute
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Sector 15, Gandhinagar.
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Scientist, IITRAM, Khokhara
Circle, Maninagar, Ahmedabad –
380026.
- 114. Yadav Devang N.**
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University, Rajpur, Kadi.
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Scientist, IITRAM, Maninagar
East, Ahmedabad – 380026.
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Faculty Member, Gandhinagar
University, Kalol-Khatraj Road,
Gandhinagar.
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Scientist / Faculty Member,
Gujarat Technological University
(GTU), Chandkheda, Ahmedabad
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Junior Research Fellow,
OVSRCSC, Race Course, Rajkot.
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University, Gota, Ahmedabad –
382481.
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Faculty Member, Community
Science Centre, Modasa College
Campus, Aravalli.
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Faculty Member, Pandit
Deendayal Energy University
(PDEU), Gandhinagar.
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Faculty Member, Community
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University, Gota, Ahmedabad
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Bhagvanbhai**
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- 134. Kirtan Swaroop Bhardwaj,**
PG Student, Indian Institute of
Teacher Education, Sector 15,
Gandhinagar.
- 135. Ritu Sahni,**
Faculty Member, Nirma
University, Near Vaishnodevi
Circle, Ahmedabad.



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 Faculty Member, Indian Institute of Teacher Education (IITE), Sector 15, Gandhinagar.
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 PG Student, St. Xavier's College, Navarangpura, Ahmedabad
- 138. Patel Ansh Udaykumar**
 Faculty Member, Indrashil University, Rajpur, Kadi.
- 139. Mistry Jagrav Manishkumar**
 Faculty Member, Indian Institute of Teacher Education (IITE), Sector 15, Gandhinagar
- 140. Ishan Jayendra Kumar Patel**
 PG Student, HVHP Institute of PG Studies, Kadi.
- 141. Krish Hitendrakumar Patel**
 PG Student / Faculty Member, HVHP Institute of PG Studies and Research, Kadi – 384440.
- 142. Thakkar Khush Jatinbhai**
 Faculty Member, Indrashil University, Rajpur, Kadi – 384440.
- 143. Mithilesh Patel**
 Scientist / Faculty Member, Vraj Innovator, Vasna Road, Vadodara.
- 144. Patel Kalp Rajendrakumar**
 Faculty Member, Sankalchand Patel College of Engineering, Visnagar.
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 Faculty Member, Sankalchand Patel College of Engineering, Visnagar.
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 Faculty Member, Sankalchand Patel College of Engineering, Visnagar.
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 Research Associate / Faculty Member, Sankalchand Patel College of Engineering, Visnagar.
- 148. Mayank Rajendrasinh Pawar**
 Science Communicator, CSC Dahod, Dahod.
- 149. Manoj Kumar**
 Faculty Member, Sankalchand Patel University, Visnagar, Gujarat.
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 Faculty Member, Sankalchand Patel College of Engineering, Visnagar.
- 151. Sashreek Satapathy**
 Faculty Member, Delhi Public School, Vadsar Road, Vadodara – 390010.
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 Science Communicator, Dainik Bhaskar, Patna.
- 153. Adifaah Farzeen**
 High School Student, Sarvodya Kanya Vidyalaya, Okhla Vihar, New Delhi – 110025.
- 154. Patel Krimi Jayesh Kumar**
 Junior Research Fellow, Indrashil University, Kadi.
- 155. Harsh Joshi**
 Faculty Member, CSC Porbandar, Swaminarayan Gurukul, Porbandar.
- 156. Mehta Nidhi Devendrakumar**
 Faculty Member, L. D. College of Engineering, Circular Road, Ahmedabad – 380015.
- 157. Makwana Kavya**
 PG Student, Institute of Technology, Nirma University, Ahmedabad.
- 158. Jaypal Singh,**
 Faculty Member, Sankalchand Patel College of Engineering, Visnagar, Gujarat.



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- 159. Dr. Heena Patel**
Science Communicator,
Sabarmati University, Greenwood
Resort, Ahmedabad.
- 160. Patel Jainishkumar Sanjaybhai**
Faculty Member, Sankalchand
Patel College of Engineering,
Visnagar.
- 161. Parth Vijaykumar Vaghela**
PG Student, Institute of
Technology, Nirma University,
Gota, Ahmedabad – 382481.
- 162. Patel Krishna Dilipbhai**
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Patel College of Engineering,
Visnagar.
- 163. Dr. Mahi Patel**
Scientist, Silver Oak University,
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Faculty Member, IITRAM, Near
Khokhra Circle, Ahmedabad.
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Faculty Member, Pandit
Deendayal Energy University
(PDEU), Raisan, Gandhinagar.
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Maninagar East, Ahmedabad.
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PG Student, IIT Gandhinagar,
Palaj, Gandhinagar.
- 168. Nimish Trivedi**
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Polytechnic, Near Panjarapol,
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ASIA Campus, Drive-In Rd,
Thaltej, Ahmedabad – 380054.
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Faculty Member, L. D. College of
Engineering, Navrangpura,
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1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



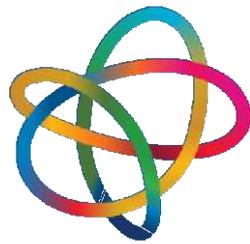
7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY INNOVATION AND INFRASTRUCTURE



OUR GLOBAL GOALS

For Sustainable Development

10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



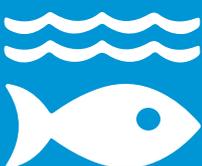
12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE AND LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS





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