



**International Conference On
Trends And Innovations In
Science & Engineering
Bridging The Industry-Academia Interface**

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Conference Proceedings TISE CON 2025

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Preface

In a world increasingly shaped by science, technology, and interdisciplinary innovation, it is no longer sufficient for research to exist in silos. The pace of change and the complexity of global challenges demand collaboration—between nations, between institutions, and most importantly, between academia and industry. It was with this understanding that the **International Conference on Trends and Innovations in Science and Engineering (TISE CON 2025)** was conceived and executed at **Integral University, Lucknow**, from **20th to 22nd February 2025**, under the overarching theme: **“Bridging the Industry-Academia Interface.”**

Jointly organized by the **Department of Bioengineering** and the **Integral Startups Foundation**, and supported by esteemed partners including the **AFSTI Lucknow Chapter**, **Indian National Young Academy of Sciences**, and **The Biotech Research Society (India)**, the conference brought together a powerful coalition of thought leaders, researchers, policymakers, entrepreneurs, and students. It created a platform not merely to showcase research but to translate that research into actionable insights, technologies, and ventures.

The vision behind TISE CON 2025 was clear—to build an inclusive ecosystem that promotes **translational science**, encourages **entrepreneurship**, and nurtures **future-ready talent**. At its core, the conference sought to ignite new conversations and collaborative solutions that can address some of the most pressing needs of our time, from sustainable agriculture and green technologies to healthcare innovation and the future of education.

True to its theme, the event served as a remarkable convergence of both global and national intellect. Delegates participated from across borders, including Uzbekistan, Thailand, Kazakhstan, and Qatar, while academic collaborations were established with prestigious institutions such as **University College London (UCL)**, **Bundelkhand University**, **Netaji Subhash Chandra Bose Institute of Higher Learning**, and the **Indian Institute of Science Education and Research (IISER), Kolkata**. Other eminent universities represented at the conference included **ICT Mumbai**, **IIT Delhi**, **Jawaharlal Nehru University (JNU)**, the **University of the United Arab Emirates**, **Chandra Shekhar Azad University of Agriculture and Technology (Kanpur)**, and the **Islamic University of Science and Technology (IUST), J&K**. The event also saw active involvement from over **10 prominent government organizations**, including **Startin UP**, **DBT**, **DST-SERB**, **CSIR**, and **ICAR**. In addition, **11 leading industry participants**—notably **Sun Pharma**, **Novartis**, **Aurigene Oncology**, **AMA Herbals**, and **Fruz India Pvt. Ltd.**—shared their expertise and insights, further enriching the discourse.

One of the most meaningful outcomes of the conference was the strengthening of dialogue around **national capacity-building and global scientific relevance**. Discussions emphasized that the goals of *Viksit Bharat 2047* will only be achievable if India's research ecosystem becomes agile, industry-responsive, and globally networked. The need for **curriculum reforms**,

industry-integrated learning, and the **development of ethical leadership** was emphasized as central to these transformations. The conference became a space to deeply explore the future of education in science and engineering. Conversations around bridging the skill gap highlighted how the scientific community must not only generate new knowledge but ensure it empowers communities, nurtures innovators, and solves real-world problems. The emphasis on ethics and moral clarity—alongside technical expertise—served as a powerful reminder that true progress demands both brilliance and responsibility.

Another key dimension of the conference was the nurturing of **startups and innovation ecosystems**. Through curated sessions on incubation and entrepreneurship, several participants from research and industry emphasized how technologies must move from labs to the market. These sessions underscored the importance of funding mechanisms, mentorship, and public-private partnerships in transforming research into scalable ventures. What emerged was a renewed commitment to turning India's scientific output into global products and solutions that are both sustainable and impactful.

A hallmark of TISE CON 2025 was the variety and quality of **interdisciplinary research** presented through keynote lectures, technical sessions, poster presentations, and round-table discussions. Themes ranged from **green energy, biomaterials, food science, artificial intelligence, sustainable packaging, cold plasma preservation**, to **machine learning in drug resistance prediction, molecular farming, and structure-based drug design**. The diversity of topics reaffirmed that modern scientific advancement is rarely confined to one discipline—and that the future lies in the intersections of biology, chemistry, physics, computer science, and engineering.

Many of the sessions offered rich insights into how sustainability must be woven into the fabric of science and technology. Topics such as **bioconversion of agricultural waste, cultivated meat, biodegradable packaging**, and **AI-driven innovations** pointed to a collective urgency to align innovation with environmental stewardship. The conference thus helped catalyze new frameworks that connect economic viability with ecological responsibility. In the area of healthcare and biotechnology, participants engaged in deep explorations of next-generation solutions in **drug discovery, metabolic engineering, targeted protein degradation**, and

diagnostic innovation. The emphasis on **intellectual property rights (IPR)**, **technology readiness levels (TRLs)**, and **strategic patenting** provided young researchers and entrepreneurs with valuable insights into how to protect and commercialize their inventions.

The inclusion of industry-focused talks on **food safety compliance**, **supply chain management**, and the intersection of **biotechnology and textile innovation** further enriched the discourse. These engagements provided real-world context to academic discussions, reinforcing the need for **practical problem-solving**, **regulatory awareness**, and **cross-sectoral agility**. Equally noteworthy was the space given to **young researchers and students** through poster sessions and mentorship interactions. These platforms enabled them not just to present their work, but to refine their ideas, gain critical feedback, and connect with senior professionals. For many, it was their first exposure to such a collaborative and intellectually stimulating environment, and the experience will likely shape their scientific journeys for years to come.

In spirit and execution, TISE CON 2025 reaffirmed the timeless idea that *“Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world”* (Louis Pasteur). It was not just a gathering of scholars—it was a **celebration of collective curiosity**, a **convergence of disciplines**, and a **renewed declaration of intent to solve global challenges through shared knowledge**. The conference’s core message—*“Bridging the Industry-Academia Interface”*—was not just spoken about but practiced. New relationships were built. Ideas were exchanged with openness. Problems were framed with clarity. And solutions, both conceptual and practical, were imagined together. In every session, keynote, and corridor discussion, the power of dialogue was evident, and the promise of collaboration was real.

We take this opportunity to express our heartfelt gratitude to all **delegates, speakers, sponsors, institutional partners, and volunteers** who made this event possible. Heartfelt appreciation extended to the **Organizing Committee, Scientific Review Board, Student Coordination Teams**.

Special thanks are extended to the **eminent leadership at Integral University**, led by our **Hon’ble Founder and Chancellor, Prof. S. W. Akhtar**, whose visionary guidance and

unwavering support were instrumental in transforming an ambitious concept into a remarkable and successful reality.

The proceedings that follow are not merely a record of the past; they are an inspiration for the future. They represent the voices of a community determined to **think beyond boundaries, innovate beyond labs, and collaborate beyond disciplines**. As you read through the contributions, may you find not only knowledge but inspiration—and may you be encouraged to join us in this journey of building a better world through science and innovation.

As **Eleanor Roosevelt** once said, “*The future belongs to those who believe in the beauty of their dreams.*” At TISE CON 2025, we dared to dream collectively—and we invite you to be part of that ongoing dream.

Organizing Committee

TISE CON 2025

Integral University, Lucknow