INDIAN INSTITUTE OF TECHNOLOGY DELHI

Presents

PROF. T. K. GHOSE MEMORIAL AWARD 2025

15 OCTOBER 2025

2.45 PM- 5.30 PM

SEMINAR HALL
MAIN BUILDING, IIT
DELHI

011-2659-1001
DBEB OFFICE

https://beb.iitd.ac.in

DEPARTMENT OF
BIOCHEMICAL ENGINEERING
AND BIOTECHNOLOGY

PROGRAMME SCHEDULE

2.45 PM - 3.10 PM

Inauguration and Introduction

3.10 PM - 3.20 PM

Director's Note

3.20 PM - 4.00 PM

Memorial lecture

4.00 PM - 4.45 PM

Awardees presentation

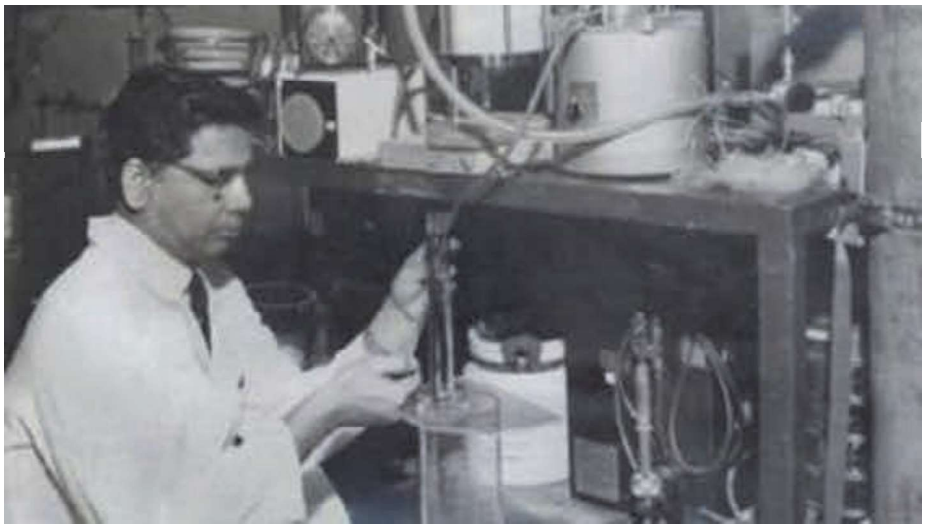
4.45 PM - 5 PM

Vote of Thanks

5.00 PM – 5.30 PM

High -Tea

PROF. T. K. GHOSE ENDOWMENT



He was the initiator of Biotechnology and Biochemical Engineering research in India. Born on Sep 01, 1924, in West Bengal, he got a doctorate in Science from ETH, Switzerland. He held Professorship in Jadavpur University (Koltata), HBTI Kanpur and IIT Delhi. He worked with many world renowned scientists from US Natick Lab to France, Switzerland, Australia, Russia, Japan, Brazil,Germany, Poland, Sweden, Spain, Italy, Singapore, etc.

He founded Biochemical Engineering in India and chaired the department in IIT Delhi until 1985. He inspired huge number of graduate students, teachers and bio-industry professionals in the field of Biotechnology, Bioprocessing and Biofuels for about five decades, until his last day Sep 24, 2019.

The Prof. T.K. Ghose Memorial Award for Best PhD Thesis in Biochemical Engineering and Biotechnology was instituted in the year 2021 and is administered by the Office of Alumni Relations. This is supported by an endowment created from donations by the erstwhile colleagues and students of Prof. T.K. Ghose.

ABOUT THE AWARD

Prof. T.K. Ghose Memorial Award for Best PhD Thesis in Biochemical Engineering and Biotechnology

About

The Award aims to recognize a student of IIT Delhi whose PhD thesis in Biochemical Engineering and Biotechnology has been adjudged to be the best in that particular year.

Eligibility

All students who have completed their PhD thesis (including oral defence) in the area of Biochemical Engineering and Biotechnology in the year preceding July 31 of a given year will be eligible for consideration that year.

Selection Process

A selection committee constituted by the Head DBEB, comprising external experts and a nominee of the donors selects the awardee.

Value of the Award and presentation

An amount of Rs 50,000 is awarded as the 'Prof. T. K. Ghose Memorial Award for Best PhD Thesis in Biochemical Engineering and Biotechnology'. In case of joint awardee, the amount of Rs. 50000 is equally distributed between the awardees. The award is presented at a ceremony organised by DBEB following the annual convocation of the Institute

PROF. T.K GHOSE BEST PHD THESIS AWARDEE

In recognition of his pioneering research in developing hybrid models and Process Analytical Technology (PAT) tools for enabling continuous biopharmaceutical manufacturing. His outstanding contributions include the development of PAT frameworks for CHO and *E. coli* bioreactor operations and the integration of acoustic wave–based CHO cell clarification into a continuous Trastuzumab production platform. His work has advanced process understanding, automation, and control, contributing significantly to the realization of smart, data-driven biomanufacturing

Dr. Shantanu Banerjee

PhD Chemical Engineering

Current Position
Advisor, Eli Lilly & Company, Lilly Bengaluru, India

Process Analytical Technology–Enabled Monitoring and Control of Upstream and Harvest Biopharmaceutical Operations

This work focuses on the application of Process Analytical Technology (PAT) to enable real-time monitoring and control in upstream and harvest unit operations for continuous biopharmaceutical manufacturing. In upstream processes, near-infrared (NIR) spectroscopy combined with convolutional neural network (CNN)-based chemometrics was developed for multianalyte quantification of amino acids, glucose, lactate, and acetate in CHO and *E. coli* cultures. These models enabled non-invasive process monitoring and laid the foundation for model-predictive control strategies to enhance biomass growth and product yield.

For harvest operations, a hybrid PAT framework integrating mechanistic and empirical models was established for CHO cell clarification using acoustic wave separation. The framework accurately predicted cell separation efficiency and protein recovery and was implemented within a cyber-physical system and digital twin architecture for automated, real-time control. A hybrid-model predictive control approach maintained high process consistency, while multi-objective optimization identified optimal chamber configurations for integrating acoustic clarification into a continuous Trastuzumab production platform.

Overall, this work demonstrates the power of PAT-enabled hybrid models and digital twins in achieving smart, automated, and data-driven biomanufacturing, paving the way toward fully continuous and intelligent bioprocessing systems.

PROF. T.K GHOSE BEST PHD THESIS AWARDEE

Development and Implementation of Control Strategies for Production of Biotherapeutic Products

My research focuses on developing advanced control strategies for continuous protein purification—an area that is becoming increasingly important for improving efficiency and consistency in biopharmaceutical manufacturing. Through my doctoral work, I have contributed to the development and implementation of end-to-end continuous downstream processing platforms for biotherapeutic production. This includes process optimization, reactor innovations, and automation frameworks designed to enhance real-time control and product quality. Specifically, my work involved optimizing refolding processes for microbial products such as L-asparaginase, developing continuous PEGylation strategies for therapeutic proteins like G-CSF using novel coiled flow inversion reactors (CFIRs), and automating multi-step polishing chromatography for monoclonal antibodies (mAbs) using Python-integrated BioSMB systems. Additionally, I explored the integration of advanced process analytical technologies (PAT), including Raman spectroscopy coupled with AI/ML algorithms, for real-time monitoring of critical quality attributes such as aggregation and charge heterogeneity.

The work advances continuous biopharmaceutical manufacturing by optimizing downstream processes and enabling real-time control. Enhanced refolding strategies improved L-asparaginase yield and stability. A novel coiled flow inversion reactor (CFIR) enabled continuous operations like PEGylation and viral inactivation with consistent product quality. Automated multi-step chromatography with in-line conditioning ensured precise control without extra equipment. Raman spectroscopy combined with AI/ML enabled real-time monitoring of protein aggregation and charge variants. These innovations streamline downstream processing, reduce variability, and support robust, end-to-end continuous manufacturing for improved efficiency and product quality in biologics production

Dr. Nitika

PhD Chemical Engineering

Current Position

Research Associate.

IIT Delhi

PROF. T.K GHOSE MEMORIAL AWARD LECTURE

Dr. Taslimarif Saiyed

CEO and Director; C-CAMP

Dr. Taslimarif Saiyed is the CEO and Director of C-CAMP from 2009 till present. His initial training has been in neurosciences, where he received his PhD from Max-Planck Institute for Brain Research, Germany from 2002-2006 and followed it up by postdoctoral training at University of California San Francisco (UCSF) from 2006-2009. At the same time, he also underwent training in management for Biotech and Innovation from QB3 at UC Santa Cruz, UC Berkeley and UC San Francisco from 2007-2009. He has also completed a biotech management program for biotech executives at Wharton School of Management in the year 2012. In the Bay area, he served as a Management Consultant with QB3 New Biotech Venture Consulting and in an individual capacity, he also consulted for many biotech firms in the US. Dr. Saiyed is an Adjunct Faculty at Indian Institute of Technology (IIT) Madras and also Amrita Institute - School of Biotechnology since 2015. He also heads the Discovery to Innovation Accelerator program at C-CAMP. He is actively involved in promoting innovation in lifescience / healthcare by supporting translation of discoveries to application, entrepreneurship and technology development. Dr. Saiyed is also Co-chair of India AMR Innovation Hub (IAIH), a National Level Initiative anchored at the Office of Principal Scientific Adviser, Govt. of India

PROF. T.K GHOSE MEMORIAL AWARD LECTURE

Building Ecosystem for Fostering cutting-edge Life science/ Healthcare innovation

This seminar will explore the vibrant life sciences and healthcare innovation ecosystem, offering a detailed overview of its robust research environment, strong collaborations with government funding bodies, industry linkages, and a diverse collection of promising biotech startups. C-CAMP has been instrumental in fostering an entrepreneurial culture within academic settings. Through extensive initiatives, C-CAMP supports early-stage discoveries, guiding them from initial concepts and proof-of-concept validations all the way to commercialization readiness. Beyond funding, the center provides startups with scientific and business mentorship, access to state-of-the-art laboratories, and advanced technology platforms through its Bio-incubation program. This combination of resources, mentorship, and seed funding within a nurturing academic ecosystem equips biotech startups with critical tools to fast-track their journey to market. To date, C-CAMP has funded and mentored nearly 600 life science startups and spin-offs, while partnering with around 500 academic and industry organizations via its technology platforms and entrepreneurship efforts. The Early Translation Accelerator further helps translate lab discoveries into industry-ready innovations, facilitating licensing or spin-off opportunities to bring these technologies closer to market.