



**INDIAN INSTITUTE OF TECHNOLOGY DELHI**  
HAUZ KHAS, NEW DELHI, 110016

# **Prof. T. K. Ghose Memorial Award 2021**

**November 22, 2021**

**Department of Biochemical Engineering and Biotechnology  
IIT Delhi**



# Programme



**Nov 22, 2021 (Monday)**

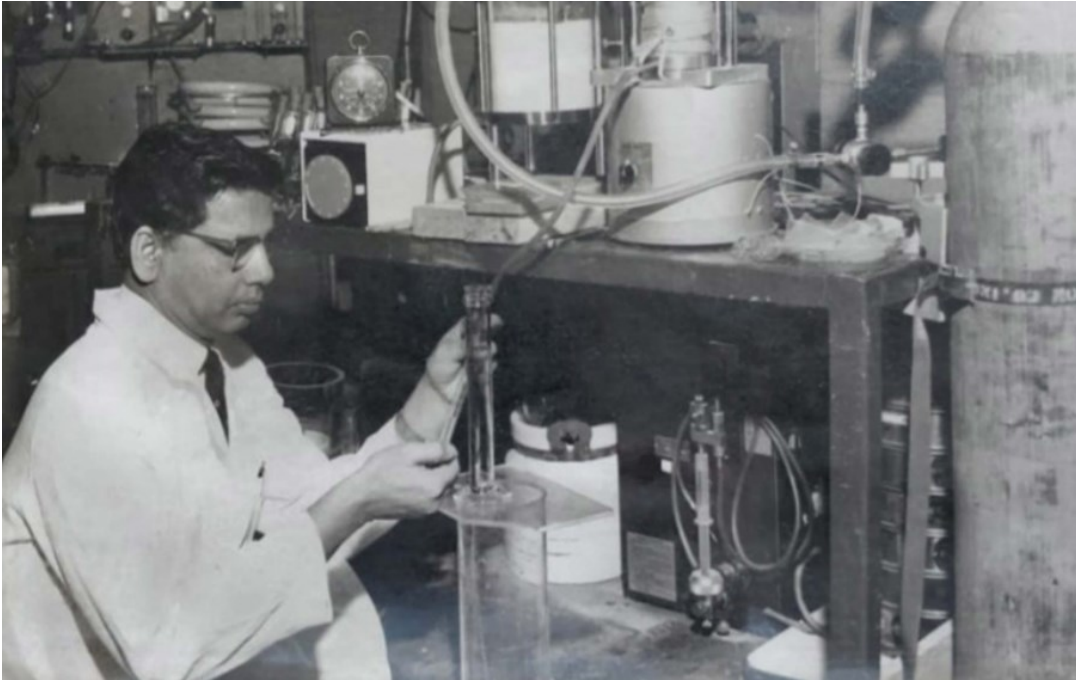
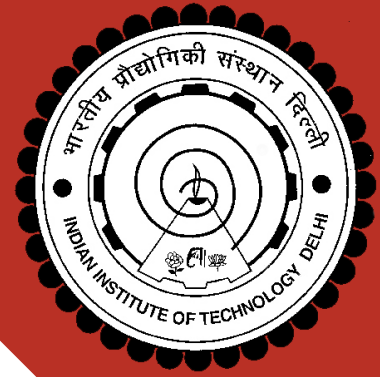
**Weblink for joining in the meeting**

<https://teams.microsoft.com/l/meetup-join/19%3a87acf8b2b45843leadac5d455e210c7e%40thread.tacv2/1637210247914?context=%7b%22Tid%22%3a%22624d5c4b-45c5-4122-8cd0-44f0f84e945d%22%2c%22Oid%22%3a%22f2ef5f99-61c2-4e2d-9329-ed01df181b32%22%7d>

## Time (IST)

- |         |   |
|---------|---|
| 5:00 PM | <b>Prof. D. Sundar</b> , Head, DBEB<br>Introduction to the Memorial Award   |
| 5:10 PM | <b>Prof. Subhash Chand</b> (PhD, IIT Delhi, 1978)<br>Reminiscences about Prof. Ghose  |
| 5:15 PM | <b>Prof. Purnendu Ghosh</b> (PhD, IIT Delhi, 1976)<br>Reminiscences about Prof. Ghose   |
| 5:20 PM | <b>Dr. Gopal Chotani</b> (BTech, IIT Delhi, 1975)<br>Reminiscences about Prof. Ghose  |
| 5:25 PM | <b>Dr. Jananee Jaishankar</b> , DBEB (Awardee)<br>Isolation and molecular characterization of promoters from <i>Gordonia</i>                              |
| 5:40 PM | <b>Dr. Vishwanath Hebbi</b> , ChE Dept. (Awardee)<br>Low-cost therapy for snakebite treatment for rural India   |
| 5:55 PM | <b>Prof. Virendra S. Bisaria</b> (PhD, IIT Delhi, 1978)<br>Introduction of the Speaker, Dr A K Panda  |
| 6:00 PM | <b>Dr. A. K. Panda</b> , Former Director, NII, New Delhi<br>Memorial award lecture on <i>Renaissance in Biological Manufacturing through Fermentation</i> |
| 6:30 PM | End of the Function   |

# Prof T.K. Ghose Endowment

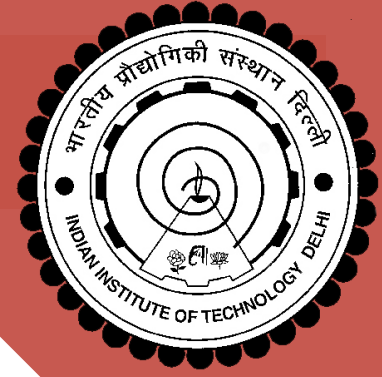


## Prof. Tarun Kumar Ghosh

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. Held Professorship in Jadavpur (Kolkata), HBTI Kanpur and IIT Delhi. 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, 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 seven 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

<https://unlimiitd.iitd.ac.in/research/prof-t-k-ghose-endowment/>



# About the award

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



<https://alumni.iitd.ac.in/home/index.php/prof-t-k-ghose-memorial-award/>

### 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 Criteria

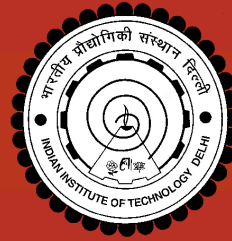
All students who have completed their PhD thesis (including oral defence) in the area of Biochemical Engineering and Biotechnology in the year preceding Sep 30 of a given year will be eligible for consideration that year.

### 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'. The award is presented at a ceremony organised by DBEB in the week following the annual convocation of the Institute.



## Best PhD thesis Awardee



in recognition of her research in the area of promoters and gene expression systems. Her major accomplishments include the development of strong synthetic stationary phase promoter-based gene expression system for recombinant protein production and identification of regulatory mechanism of a pair of divergent promoters in *Gordonia*. The work resulted in 5 publications and 1 patent.

### Dr. Jananee Jaishankar

Ph.D. Dept. of Biochemical Engg. and Biotechnology, IIT Delhi (2021)

**Current Position:** Postdoctoral Researcher, Department of Molecular Biology, University of Texas Southwestern Medical Centre, Dallas, Texas, USA

### Isolation and molecular characterization of promoters from *Gordonia*

Novel regulatable promoters serve as effective tools for the construction of gene expression systems. In this aspect, promoters with varying strength and regulatability are required for use in different process-specific applications. Understanding the promoter functionality and characteristics is essential for their exploitation. In view of this, the study focused on (a) isolation of promoters from *Gordonia* sp. IITR100, an industrially relevant Actinobacteria, and (b) promoter engineering of candidate promoters to develop novel gene expression systems. Two significant outcomes of the study include the development of a synthetic promoter and isolation of a novel pair of divergent promoters. Noteworthy is the characterization of two divergent promoters, manipulation of which has revealed key cis-elements playing a major role

in their regulation. A proof-of-concept with the synthetic promoter for expressing single-chain insulin has been demonstrated. A novel gene expression system for the two subunits of hCG (human Chorionic Gonadotropin) using the divergent promoters has been developed which is currently under characterization.



## Best PhD thesis Awardee



in recognition of his work on a novel drug candidate molecule **rLTNF** (recombinant Lethal Toxin Neutralizing Factor), which has potential to be used for snake-bite treatment. He did end-to-end development of a completely novel process for manufacturing of rLTNF at high purity. The work resulted in 11 publications and 4 patents.

### Dr. Vishwanath Hebhi

Ph.D. Department of Chemical Engineering, IIT Delhi (2020)

**Current Position:** Senior Scientist II, Biofusion Therapeutics (subsidiary of Biocon), Bengaluru

### Low-cost therapy for snakebite treatment for rural India

Snakebite has been a neglected disease for decades until the World Health Organization (WHO) included it in the list of tropical neglected diseases in 2009. The estimated number of envenoming around the world is as high as 1.84 million, resulting in death of more than 1 million people every year. Most number of cases are reported in rural areas specially in Africa and India putting these countries in red list for number of snakebite cases. Existing treatments for snake bites include heat treated multivalent antisera produced from horse or sheep, which is facing criticism for its ineffectiveness and irreversible side reactions. The aim was the development of safe, efficacious and affordable therapy for snakebite treatment. It is a well-known fact that certain species of marsupials and mongooses have natural resistance towards majority of snake venoms. This valuable information was harnessed.

The process developed produces peptide in the form of concatemer that has been specifically designed to accumulate as insoluble inclusion bodies (IB) during expression in

E.coli. A cation exchange chromatography step has been developed to capture the rLTNF concatemer at 140 g L<sup>-1</sup> dynamic binding capacity. Further, the purified concatemer is cleaved completely into monomeric rLTNF using alpha-chymotrypsin enzyme. Finally, reversed phase high performance liquid chromatography has been designed to purify rLTNF with a recovery of more than 90% and purity greater than 98%. The overall process recovery is 78±2% resulting in 3.36 g of purified product per batch. Techno-economic evaluation of the process has been performed to demonstrate its economic feasibility against currently marketed antivenom products. The production cost of rLTNF was estimated to be \$5–6 per gm (or \$0.09 per 15 mg dose), significantly lower in cost.

**Prof. T. K. Ghose Memorial Award (2021)**



# Memorial Award Lecture

Renaissance in Biological Manufacturing  
through Fermentation



## Associate Director

Panacea Biotec Limited, New Delhi

Formerly, **Director, NII**, New Delhi  
(DBT-National Institute of Immunology)

## Dr. Amulya K. Panda, FRSC (PhD, IIT Delhi, 1991)

Dr. Amulya K. Panda obtained his B. Tech degree from HBTI (Kanpur) and M.Tech. in Chemical Engineering from IIT Madras in 1986. He did his Ph.D from IIT Delhi and worked at DBT-National Institute of Immunology (NII), New Delhi from 1990 to 2021. He retired from NII as its Director in May 2021. He was a Visiting Scientist at the Department of Chemical Engineering, University of California at Berkeley, USA. His area of expertise in bioprocess engineering encompassing fermentation, protein purification and formulation of biologicals using polymeric nanoparticles. He has published the very first report on high cell density fermentation studies from India in 1995 and is an expert on refolding of proteins from inclusion bodies. Dr. Panda has reported the highest amount of recombinant protein expression among the earliest Indian studies (1999). Novel protein refolding methods developed by him has been accepted world-

wide for high throughput recovery of bioactive protein from inclusion bodies of E. coli (2005). Because of his contribution on applications of chemical engineering principles to biological processes, he was awarded the Young Asian Biotechnologist Prize from the Society for Biotechnology, Japan, for the year 2004. His other area of research is on vaccine delivery using biodegradable polymeric nanoparticles and Immunoengineering. He has published 150 research papers, 12 book chapters and has guided 25 Ph. D students and around 60 master students. He has the credentials of generating highest number of IPRs (35 pending/granted patents) while working at National Institute of Immunology (working since 1990). He was the President of the Association of Microbiologist of India (AMI) in 2017. He has been a Fellow of the Royal Society of Chemistry (FRSC) since 2020.

**Prof. T. K. Ghose Memorial Award (2021)**



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