

**Department of Biotechnology
IIT Madras, Chennai
and
Dr. Joseph Thomas Memorial Science Club**

cordially invite you to the

17th Dr. Joseph Thomas Memorial Lecture

Speaker : **Professor Karthik Anantharaman**
Associate Professor of Bacteriology
University of Wisconsin – Madison
United States of America

Title : **AI-Based Frameworks for Harnessing Viruses in
Health and Sustainability**

Date : 5th March 2025, Wednesday

Time : 3:00 pm IST

Venue : Seminar Hall, Dept. of Biotechnology,
Bhupat and Jyoti Mehta School of BioSciences,
IIT Madras, Chennai – 600036

5th March 2025, Wednesday

Program

3:00 pm	Welcome address	Dr. Sanjib Senapathy Professor and Heade Dept of Biotechnology, IIT Madras, Chennai
3:05 pm	Remembering Dr. Joseph Thomas	Dr T S Lokeswari (Dr. Joseph Thomas Memorial Science Club)
3:10 pm	Dr. Joseph Thomas, an IIT perspective	Dr. Guhan Jayaraman Professor, Dept of Biotechnology, IIT Madras, Chennai
3:15 pm	Introduction of the speaker	Dr. Karthik Raman Professor, Wadhvani School of Data Science and AAI IIT Madras, Chennai
3:30 pm	AI - Based Frameworks for Harnessing Viruses in Health and Sustainability	Dr Karthik Anantharaman Associate Professor of Bacteriology University of Wisconsin – Madison USA
4:30 pm	Vote of Thanks	Dr Richa Karmakar Dept of Biotechnology, IIT Madras, Chennai

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About **Dr. Joseph Thomas**

Born on March 20, 1935, Joseph Thomas was destined to leave his mark on biological research and its application in the country. He did his PhD at the Institute of Science, Bombay and got his degree from the University of Bombay in 1962. He continued his research as a UNESCO fellow at the Institute of Microbiology in the Prague, Czechoslovakia working on mass cultivation of algae. In 1966, he joined the Biology and Agriculture Division of Bhabha Atomic Research Centre. It is at BARC that Joe (as he was popularly known among his peers) did his pioneering research that led to several outstanding and original contributions to cyanobacterial/rhizobial nitrogen fixation research in India. Joe worked at BARC till 1987 as Head, Biological Nitrogen Fixation Laboratory, before moving to SPIC to head two separate activities there- one developing Biotech industry and the other developing R & D of academic and industrial relevance.

In the laboratory of Prof. Peter Wolk at Michigan State University, East Lansing in 1974-76 he pioneered the work on ammonia assimilation pathway in cyanobacteria using the short-lived radioisotope ^{13}N . Subsequent to his return to BARC, he also used stable isotope of nitrogen (^{15}N) to obtain reliable estimates of nitrogen fixation by cyanobacterial biofertilisers and their contribution to rice yields. This work formed the foundation for a series of classical publications by Joe Thomas and collaborators that established the pathway of nitrogen fixation in microbes and plant cells (Thomas *et al*, 1975; 1977; Wolket *al*, 1976; Skokutet *al*, 1978).

Joe, the Institution builder

Joe set up the Biotech Division at SPIC for commercialization of Biotech products. They established a ten million capacity facility at Coimbatore for tissue cultured plants and a production facility for fermentation and down-stream processing of the BIOGOLD and NEEMGOLD products. He also had a successful seeds business initiated at SPIC with the farms and seed processing units set up at Chennai, Coimbatore and Hosur. At SPIC Science Foundation, he set up the Centre for Biotechnology with emphasis on three areas: plant molecular biology, plant tissue culture and microbial technology. Microbial technology group developed several technologies that were taken up by the SPIC Biotech Division for commercialization. **After his retirement from SPIC group, he was active in building up and developing the Biotechnology Department at IIT Madras.**

Memberships, Awards, Honours

UNESCO fellow, Institute of Microbiology, Prague 1962

Visiting Scientist, Michigan State University, East Lansing, Michigan, USA 1974-76

Fellow, Indian National Science Academy; Fellow, India Academy of Sciences

Fellow, National Academy of Agricultural Sciences, India

Member, Governing Body, CSIR and Member, CSIR Society chaired by the Prime Minister of India 1992-95

Recipient of FICCI Award for "Outstanding Achievements in Research in Science and Technology (Life Sciences and Agriculture)" at the hands of the Prime Minister of India 1992; Member, Scientific Advisory Committee, Department of Biotechnology, 1995-99

Member, Council, Indian National Science Academy; Member, Performance Appraisal Board, CSIR, Govt of India

Member, Research Council, National Chemical Laboratory, Pune

Member, Expert Committee on Genetically Modified Foods, Ministry of Health, Govt of India

Member, High Power Committees of Experts on Biotechnology of the states of Tamil Nadu, Kerala and Gujarat

Member, Academic Council, Anna University;

Member, Working Group on Crop Productivity set up by US National Science Foundation, USDA and USAID

Member, International Advisory Group on Nitrogen Fixation

Member, Research Advisory Council of Centre for Cellular and Molecular Biology

Member, Research Advisory Council of National Botanical Research Institute

Member, Guha Research Conference; President, Madras Science Foundation, Chennai

Advisor, Women's Biotech Park, Siruseri

Karthik Anantharaman

*Associate Professor of Bacteriology
University of Wisconsin-Madison
USA*



About the Speaker:

Karthik Anantharaman did his Ph.D. in earth and environmental sciences, studying the microbiology of hydrothermal vents from the University of Michigan in 2014, under the supervision of Gregory Dick, Ph.D. During his postdoctoral training with Jillian Banfield, Ph.D., at the University of California-Berkeley, he studied the microbial biogeochemistry of the terrestrial subsurface using high-resolution metagenomics. Karthik Anantharaman is the recipient of several awards, including the NSF CAREER and the NIH Outstanding Investigator (Early Stage Investigator-MIRA) Award.

Research Interests

Dr. Anantharaman leads an interdisciplinary research program at the University of Wisconsin-Madison that integrates computational biology, ecology, and geosciences to uncover the role of viruses in shaping human and environmental health. His work focuses on phages (viruses that infect microbes) which are among the most abundant and influential biological entities on Earth. By infecting and regulating microbial populations, phages play a crucial role in ecosystem dynamics, and human health and disease.

Recent advances in DNA sequencing, such as metagenomics, have revealed vast amounts of viral genetic material, often referred to as "viral dark matter," much of which remains unexplored. To bridge this gap, Dr. Anantharaman's team has developed cutting-edge AI-powered tools to analyze viruses and their interactions within microbiomes. These tools not only enhance our understanding of viral ecology but also have transformative applications in human health, such as combating antibiotic-resistant infections through phage therapy, and in environmental sustainability, including microbiome engineering and ecosystem management.

Abstract of the Talk

This talk will highlight how AI-based frameworks are revolutionizing virus research and demonstrate how innovations in one domain, such as human health, can drive breakthroughs in another, shaping a sustainable and resilient future.