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In Celebration

Professor Arcot R. Balakrishnan on his 65th birthday



Our colleague and friend, Dr. A.R. Balakrishnan, Professor, Department of Chemical Engineering, Indian Institute of Technology (IIT) Madras, Chennai, India, celebrates his 65th birthday this year. It is our great pleasure to express our sincere acknowledgement for all his outstanding contributions and achievements in the field of heat and mass transfer.

Professor Balakrishnan was born in Madras (now Chennai), southern part of India, on October 3, 1950. During his pre-college years, he excelled in Mathematics, Physics and Chemistry and simultaneously, developed a special interest in the applied sciences. Subsequently, he enrolled in the Bachelors program in Chemical Engineering at the University of Madras in 1967. He graduated with distinction in 1972 and subsequently, pursued graduate studies at the University of Waterloo, Canada. He obtained his Masters and PhD degrees in 1974 and 1977, respectively. During his graduate studies, he was fascinated by various heat transfer applications and carried out fundamental studies on heat transfer in packed and fluidized beds under the supervision of Professor David C.T. Pei. Much of his research outcome on heat transfer at that time involved the analysis on heat transfer in fixed beds, fluid particle heat transfer in gas-fluidized beds, convective heat transfer in gas–solid suspension flow through packed beds and heat transfer characteristics on gas–solid packed-bed systems. His contributions on gas–solid packed bed systems from his doctoral work have been highlighted in his review article in *Industrial & Engineering Chemistry Process Design and Development*. His doctoral training was also enriched by his association with eminent Professors including Professors C.L. Tien, K. Reitma,

K.G.T. Hollands, M.M. Yovanovich, M.M. Young and Darsh T. Wasan.

Professor Balakrishnan started his professional career as a Research Engineer with the Waterloo Research Institute where he worked on contract research with a consortium of industries on a project to develop solar domestic space heating systems. His contribution was primarily on developing thermal energy storage sub-systems. He returned to India in 1978 and subsequently applied his expertise in heat and mass transfer with particular emphasis on Energy and Environment. His major industrial contribution was during his association with BHEL (Bharat Heavy Electricals Limited) at their R&D Center in Hyderabad, where he developed prototypes of energy storage devices for medium to high temperature applications suitable for small electric utilities. Subsequently, he was associated with a consulting engineering company in Chennai, whose German principals, Fichtner at Stuttgart prepared the feasibility report for a 30 MW Solar Thermal Power Plant. Professor Balakrishnan joined as Assistant Professor at the Indian Institute of Technology (IIT) Madras, Chennai in 1988, was promoted to Associate Professor in 1993 and then to full Professor in 1995. He served as the Chairman of the Department of Chemical Engineering at IIT Madras during 2003–2006.

Since 1988, his passion for energy and environmental applications of Chemical Engineering continued in both fundamental and applied research areas. His research work during this period includes work on heat pump assisted distillation, energy storage using phase change material, liquid desiccant dehumidification of air and gases suitable for use with low grade energy sources such as waste heat or solar energy, augmentation of boiling heat transfer using enhanced surfaces, pool and flow boiling of multicomponent liquid mixtures, two-phase flows with phase change under oscillating conditions and at or near critical conditions, simplified design procedures for heat and mass transfer processes that account for the thermal effects thereby avoiding over design, a relook at reactive distillation, etc. He was involved in an Indo-German project on alternatives to CFC's, an issue of great urgency in view of the global concern over the depletion of the ozone layer. He is also involved with a technology development mission on high temperature heat pump applications. His current research work continues to address the problems of two phase flow and boiling heat transfer at or near critical conditions and under low frequency oscillations in addition to the study of the phenomena in narrow tubes. Separation of azeotropic mixtures using inorganic salts and ionic liquids as entrainers to shift the vapor–liquid equilibrium are also under investigation.

Professor Balakrishnan has been involved in a number of research and development projects for various industries.

Significant among these include the regeneration of Carbon Molecular Sieves for Tube Products of India Ltd.; Modeling of Gas Pipeline Networks in Steel Plants for Electronics Research and Development Centre, Thiruvananthapuram, southern part of India (an organization which functions from the premises of the former Keltron Ltd.); and has been a consultant to Fichtner Consulting Engineers Pvt. Ltd. In addition, he has been the principal coordinator for a number of sponsored research projects for organizations such as Department of Atomic Energy (BARC); Department of Space (ISRO); Ministry of Human Resources Development (MHRD)-Government of India through IIT Madras and KFA, Julich, Germany; Planning Commission through MHRD; Department of Science and Technology-Government of India etc.

Professor Balakrishnan has guided sixteen doctoral and thirty four masters students. Two doctoral and two masters students are currently under his guidance. He has taught courses on Fluid Mechanics and Heat Transfer in Chemical Engineering at IIT Madras in addition to new and innovative courses such as Heat Exchanger Technology and Network Synthesis when this was a new area of research. He was a University Grants Commission Visiting Fellow at the Department of Chemical Engineering at the Indian Institute of Science, Bangalore in September 2006.

Professor Balakrishnan is a member of many prestigious professional bodies such as the American Institute of Chemical Engineers (since 1974), the Indian Society for Heat and Mass Transfer (since 1989), the Indian Institute of Chemical Engineers (since 1990), the American Society of Mechanical Engineers (since 1992) and the Indian Society for Technical Education (since 1996). In addition, he was elected a Fellow of the Tamil Nadu Academy of Sciences in 1996, Fellow of the Indian National Academy of Engineering in 2003 and Fellow of the Institution of Engineers (India) in 2013.

Professor Balakrishnan is the Scientific Secretary of the Asia Pacific Centre for Energy and Environment. He has edited three conference proceedings and is the author or coauthor of over hundred and thirty papers published in refereed journals and conference proceedings. He is Editor of the prestigious International Journal of Heat and Mass Transfer and its companion publication International Communications in Heat and Mass Transfer, published by Elsevier Science (Oxford) UK. He is the Editor-in-Chief of The Journal of The Institution of Engineers (India) Series E: Chemical Engineering and Textile Engineering published by Springer-Verlag He also serves as the Editor of the Journal of Energy, Heat and Mass Transfer. He was a member of the International Scientific Committee of the 12th International Heat Transfer Conference held in Grenoble, France in August, 2002 and member of the International Scientific Committee of the 2nd Minsk International Forum in Heat and Mass Transfer held at Minsk, Belarus in March 2004.

Over the last three decades, Professor Balakrishnan has trained many young scholars to meet the needs of industry, research institutes and academia. He is still active and full of ideas about science,

engineering applications, learning, and how they may evolve. We congratulate him warmly on his 65th birthday and wish him and his wife, Anita good health and happiness for many more years to come. We are grateful for his exemplary contributions in the field of heat transfer. We look forward to his continued service in academia marked by achievements and interactions at the highest scientific and educational level. May he have many more years of happiness and success ahead.

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