

Dr. Sukumar Devotta



Hon. Professor of Eminence, Anna University, Chennai;
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Date of Birth: 03.04.1948

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Academic Qualifications: B.Tech. Chem. Engg. (1971), M.Tech. Chem. Engg. (1973), Ph.D. (1978) from University of Madras and M.Sc. Chem. Engg. (1984) from University of Salford, England

Positions Held:

- Lecturer, A. C. College of Technology, University of Madras (1977 -79)
- Senior (Post-Doctoral) Research Fellow, University of Salford, England (1979 - 84)
- **Scientist** in various capacities (Sci. EI to Sci. G during 1984-2003), & Head of Engineering Divisions (1993-98), Process Engineering Unit (1997-99), Process Development Division (1999-2003), National Chemical Laboratory, Pune
- **Director**, National Environmental Engineering Research Institute (NEERI), Nagpur (August 2003-January 2008)
- **Environment Consultant (Research Coordination)**– Alcoa, Pittsburgh, USA (Feb 2008- Jan 2011)
- **Advisor & Consultant** – Chemical & Environmental Engineering (2008-)
- **Professor of Eminence (Hon)**, Anna University, Guindy, Chennai (2022-)

Awards and Honours:

- **Noble Peace Prize 2007 to IPCC**, as one of the members of IPCC.
- **Environmental Leadership Award** for Outstanding Contributions made through Working in Partnership to Improve the Environment and Quality of Life for the People of Asia, United States - Asia Environmental Partnership (USAID/ASIA) in 2005
- **CSIR Technology Award** of the year 2003 and 2005 for the Chemical Technology, Council of Scientific & Industrial Research, New Delhi
- **ICICI Technology Award** of the Year 2004
- **USEPA "Stratospheric Ozone Protection Award"** for Technical & Scientific Leadership to eliminate CFCs in the Refrigeration Sector, United States Environment Protection Agency in 1997
- **Honorary Visiting Fellow**, University of Salford, England (1984-90, 1994-95)

Membership on Professional Bodies:

- **Fellow**, Maharashtra Academy of Sciences (Since 1993)
- **Fellow**, The Institution of Engineers (India), Kolkata (Since 2003)
- **Fellow**, Indian Institute of Chemical Engineers (Since 2004)
- **Fellow**, Madras Science Foundation (Since 2012)
- **Chairman**, Indian Institute of Chemical Engineers - Pune Regional Centre (1993-96, 1998-

2001)

- **Chairman**, Indian Institute of Chemical Engineers – Nagpur Regional Centre (2004-07)
- **President**, Indian Association of Environmental Management, Nagpur (2003-08)
- **President**, Association of British Scholars, Nagpur Chapter (2004-08)

Academic and Scientific Bodies

- **Member**, INSA IGBP Sub-committee, Environment (2009-14)
- **Member**, IUPAC, Environment Sub-Committee (2009-14)
- **Chairman**, DST PAMC, National Programme on Carbon Sequestration - NCPS (2012-15)
- **Member**, DST Task Force on Green Chemistry, New Delhi (2006-12)
- **Member, Executive Council**, Dr. Babasaheb Ambedkar Technological University, Lonere, Maharashtra (2009-2013)
- **Expert Review Member, European Commission** - Director General for Research & Innovation Projects on Environment, Brussels.
- **Editorial Board Member**, International Journal of Refrigeration of IIR, Elsevier, UK (1997-2008)
- **Editorial Board Member (1985-2008) & Regional Editor (1997-2008)**, Applied Thermal Engineering, Elsevier, UK
- **International Advisory Board Member**, International Journal of Refrigeration of IIR, Elsevier, UK (2008-16)
- **International Advisory Board Member** Applied Thermal Engineering, Elsevier, UK (2008-16)
- **Member**, Project Advisory Committee for International Division in the area of Earth Sciences, DST, Ministry of Science & Technology, New Delhi (2003-08)
- **Member**, Board of Studies (Chem. Engg.), Shivaji University (2000-2005)
- **Chairman**, Local Advisory Committee of Raman Science Centre, Nagpur (2003-08)
- **Chairman**, Board of College & University Development, Nagpur University (2004-08)
- **Member**, Senate, Visvesvaraya National Institute of Technology, Nagpur (2003-08)
- **Member**, Academic Council, Nagpur University (2003-2008)
- **Member**, Committee for considering the Autonomous Status to Laxminarayan Institute of Technology (LIT), Nagpur University, Nagpur (2003-2006)
- **ILTP Area Coordinator** for Ecology and Environment, DST, Ministry of Science & Technology, New Delhi (2003-)
- **Member**, Committee for governance and management of Laxminarayan Institute of Technology, Nagpur (2004-08)
- **Member**, Advisory Board of Central Institute of Business Management Research & Development, Nagpur (2005-08)
- **Member**, Advisory Board for the Integral Development of the S.F.S. Centre for Biotechnology, St. Francis De Sales' College, Nagpur (2005-08)
- **Member**, Senate of the Rashtrasant Tukdoji Maharaj Nagpur University (2006-08)
- **Member**, Board of College and University Development of Amravati University (2006-08)
- **Member**, Academic Senate of Sri Ramchandra Medical College and Research Institute, A Deemed University, Chennai, (2006-08)

National & International Committees:

- **Member**, Central Pollution Control Board (CPCB), New Delhi (2015-)
- **Member of UNEP Technical Options Committee (1991-), Co-chair of DTF (1991-92), RTF and Safety Standards (2016-17)**
- **Chairman**, Research Advisory Board, A.M. Murugappa Chettiar Research Centre

(MCRC), Chennai (2014-)

- **Member**, Empowered Steering Committee and Technology & Finance Standing Committee on Montreal Protocol, Ozone Cell, Ministry of Environment & Forest, New Delhi (1992-2016)
- **Member**, High Level Task Force for Multilateral Environmental Agreement (Montreal Protocol), Ozone Cell, Ministry of Environment & Forests, New Delhi (1992-2016)
- **Member, World Bank Ozone Operation Research Group** (March 2008-2013)
- **Chairman, Maharashtra State Expert Appraisal Committee (SEAC)** (2011-2013)
- **Director**, Board of Directors, and Member, Audit Committee, KIOCL, Bangalore (2006-09)
- **Director**, Board of Directors and Member, Audit Committee, HOCL Mumbai (2006-09)
- **Member**, Accreditation Committee- EIA Consultants, QCI-NABET, New Delhi (2011-14)
- **Coordinating Lead Author (CLA)**, LA and member of IPCC (1999-2003)
- **Member**, Supreme Court Monitoring Committee on Hazardous Waste Management in the matter of WP 657/95, Ministry of Environment & Forests, New Delhi (2003-07)
- **Member**, Expert Group on Basel Convention on Hazardous Wastes, Ministry of Environment & Forests, New Delhi (2003-08)

Areas of Specialization

- Chemical Process Engineering & Development
- Environmental Science & Engineering
- Industrial Energy Conservation
- Alternatives to CFCs
- Global Environment Policy and Protocols

Research activities

Dr. Devotta has done pioneering research in the field of energy and environment. Dr. Devotta has contributed for over a decade to the issues on environmental protection. He has been deeply involved in the issue of CFC replacement both nationally and internationally particularly for the refrigeration sector. He was actively involved in the process engineering and development of environment friendly chemical and process technologies. He is widely consulted by Indian and International agencies and industries in the area of environmental management. He was also actively involved in the Montreal Protocol and Climate Change joint study under UNEP and IPCC including

Dr. Devotta, with his technical and leadership skills, has collaborated with many national and international industries and agencies for R&D on a variety problems and areas.

Dr. Devotta has participated in many international committee meetings and international conferences, mostly on invitations. He has traveled widely on various assignments and deputations to Argentina, Australia, Austria, Bahrain, Belgium, Bhutan, Cambodia, Canada, China, Czech Republic, Denmark, Ethiopia, Finland, France, Germany, Hong Kong, Hungary, Indonesia, Italy, Jamaica, Japan, Jordan, Kuwait, Luxembourg, Malaysia, Mexico, Nepal, Netherlands, Norway, Philippines, Russia, Singapore, South Africa, Spain, Switzerland, Thailand, Turkey, U.A.E., U.K., and U.S.A.

Dr. Devotta has been active consultant for a variety of R&D areas to many prestigious national and international companies and agencies including Alcoa, EU, GE, GIZ, Infrac and UNDP.

Leadership in Chemical & Environmental Engineering Science and Technology

- A variety of experience including heading the various research groups, Units and Divisions e.g. Chemical Engineering Division, Process Engineering Unit, Engineering Services Division and Process Development Division at NCL, Pune (1984-2003).

- As the Director, NEERI, directed the institute for a variety of environmental science and engineering areas including, Air Pollution Control, Environmental Impact Assessment, Environmental Materials, Environmental Modelling, Water & Wastewater Technology, Solid Waste Management (2003-2008).
- As an independent Director in both KIOCL and HOCL, has been contributing to the growth of these industries and solving some of their chemical and environmental problems (2004-07).
- As an advisor to a US MNC, was coordinating R&D activities in India on a variety of subjects related to environmental science, engineering and management (2008-2011).

Scientific and Technical Leadership in Environmental Protection

Green Chemical Technologies:

As the Head of Process Development Division at NCL, was actively involved in the process engineering design, simulation and development of environment friendly chemical and process technologies, including 'Use of eco-friendly catalysts'; Better raw material utilisation and solvent recovery; Effluent treatment for pulp and paper mills and distilleries; Hazardous waste identification, characterization and minimization; Fuel Cell power pack; Biodegradable polymers and so on.

Montreal Protocol:

- Since 1990, even before India became a party to the Montreal Protocol, was actively involved in the search for alternatives to CFCs with fundamentals and applied research.
- Was one of the pioneering members in the formulation of GOI's policy on Montreal Protocol by the Ministry of Environment & Forests through India's Country Programme, CSIR Task Force, MOEF Task Force, MOEF Ozone Cell Steering committee and Monitoring Committee.
- Played a key role in the phase out CFCs in India to comply with the Montreal Protocol, including R&D for using HFC-134a, Policy formulations to MOEF, Technical and Financial Audit of CFC production in India on behalf of MOEF.
- Actively involved in an Indo-Swiss Ecofrig Project to phase out CFC in Refrigerator plants in India using HC refrigerant and Cyclopentane as the blowing agent,
- Was and is still safeguarding the interests of India and other developing countries in various National (CII, FICCI and ICMA) and international forums.
- Actively participating since 1992 in the UNEP Technical Option Committee and Technology and Economic Assessment Panel (Task Forces) under the Montreal Protocol for various reports, with special reference to developing countries.
- Collaborating with many national and international industries and agencies for R&D on a variety of problem in this area, particularly on Ozone friendly and Climate friendly technologies.

GHG Emission Mitigation and Kyoto Protocol:

- Was actively involved in the India's First National Communication and is now in the Third National Communication on Greenhouse Gas Inventory on behalf of MOEF to assess the GHG emission and their coefficients in Indian industries, particularly for Chemicals, Cement and Nitric acid production.
- Was involved in the joint study by UNEP and IPCC on "Safeguarding the Ozone Layer and the Global Climate System : Issues related to Hydrofluorocarbons and Perfluorocarbons".

Publications

Books:

Holland, F.A., Watson. F.A. and **Devotta, S.**, "Thermodynamic Design Data for Heat Pump Systems", Pergamon Press, Oxford, UK, (1982)

Mitra, A.P., Sharma, S., Bhattacharya, S., Garg, A., **Devotta, S.** and Sen, K., “Climate Change and India : Uncertainty Reduction in Greenhouse Gas Inventory Estimates”, Universities Press, Hyderabad, (2004)

Raman, N.S. and **Devotta, S.**, “Handbook on Indian Environmental Standards”, NEERI, Nagpur (2006)

Goyal, S.K., Chalapati Rao, C.V. and **Devotta, S.**, “Urban Air Pollution in India - Status and Future Challenges”, Indian National Science Academy, New Delhi, (2007)

Devotta, S., Wate, S.R., Godfrey, S., Labhsetwar, P.K., Swami, A., Saxena, A., Dwivedi, H.B., and Parihar, G., “Guidance Manual - Greywater Reuse in Rural Schools”, NEERI, Nagpur, sponsored by UNICEF, Bhopal (2007)

Devotta S. and Chalapathy Rao, C.V., “Environmental Status of India”, Atlantic Publishers (2008)

Devotta, S. and Thacker, N. “Dioxins and Furans”, Springer (2014)

Monographs:

Devotta S., High Temperature Heat Pump Working Fluids, HTFS Design Report, (1986)

Devotta, S., Finkelstein, A. and Kuijpers, L., Report of the Task Force on Destruction Technologies, UNEP 2002 Report of the Technology and Economic Assessment Panel, (2002)

Rao, C.V.C., Nema, P. and **Devotta, S.**, Proceedings of the Indo-US Workshop on Modelling of Transport of Air Pollutants, Jointly organized by NEERI, Nagpur and Ohio Supercomputer Center, Ohio, USA, (2003)

Ramanathan, V., M. Agrawal, H. Akimoto, M. Aufhammer, **S. Devotta**, L. Emberson, S.I. Hasnain, M. Iyengararasan, A. Jayaraman, M. Lawrance, T. Nakajima, T. Oki, H. Rodhe, M. Ruchirawat, S.K. Tan, J. Vincent, J.Y. Wang, D. Yang, Y.H. Zhang, H. Autrup, L. Barregard, P. Bonasoni, M. Brauer, B. Brunekreef, G. Carmichael, C.E. Chung, J. Dahe, Y. Feng, S. Fuzzi, T. Gordon, A.K. Gosain, N. Htun, J. Kim, S. Mourato, L. Naeher, P. Navasumrit, B. Ostro, T. Panwar, M.R. Rahman, M.V. Ramana, M. Rupakheti, D. Settachan, A. K. Singh, G. St. Helen, P. V. Tan, P.H. Viet, J. Yinlong, S.C. Yoon, W.-C. Chang, X. Wang, J. Zelikoff and A. Zhu, Atmospheric Brown Clouds: Regional Assessment Report with Focus on Asia, United Nations Environment Programme, Nairobi, Kenya. (2008),

Chapters:

Sukhatme, S.P. and **Devotta, S.**, “Classification of Heat Transfer Equipment” in “Heat Transfer Equipment Design”, Hemisphere Washington D.C., Eds. R.K. Shah, E.C. Subba Rao, R.A. Mashelkar, (1988)

Devotta, S., Iyer, M. and Kammen, D.M., “Section-III: Case Studies” in "Methodological and Technical Issues in Technology Transfer, A Special Report of IPCC Working Group III", Cambridge University Press, 16, 375-444, (2000)

Andersen, S.O., Carvallho, S.U.M., **Devotta, S.**, Fujimoto, Y., Harnisch, J. Polak, B.K., Kuijpers, L., McFarland, M., Moomaw, W. and Moreira, J.R., “Options to Reduce Global Warming Contributions from Substitutes for Ozone Depleting Substances” in "Climate Change 2001: Mitigation", Cambridge University Press, (2001)

Gaikwad, S.A., Kumar Sunil, **Devotta, S.** and Singh, R.N., “Methane Emissions from Solid Waste Management in India and its Uncertainty Analysis” in "Climate Change and India : Uncertainty Reduction in Greenhouse Gas Inventory Estimates", Universities Press, Hyderabad, Eds. A.P. Mitra, S.K. Sharma, S. Bhattacharya, Amit Garg, S. Devotta, Kalyan Sen, 14, 302-318, (2004)

Rao, P.V., Qureshi, M.S. and **Devotta, S.**, “Carbon Dioxide Emission Factor from Cement Production Process in India” in "Climate Change and India : Uncertainty Reduction in Greenhouse Gas Inventory Estimates", Universities Press, Hyderabad, Eds. A.P. Mitra, S.K. Sharma, S. Bhattacharya, Amit Garg, S. Devotta, Kalyan Sen, 7, 127-146, (2004)

Devotta, S. and Asthana, S., “Uncertainties in HFC, PFC and SF₆ Emissions from Industrial Processes” in "Climate Change and India: Uncertainty Reduction in Greenhouse Gas Inventory Estimates", Universities Press, Hyderabad, Eds. A.P. Mitra, S.K. Sharma, S. Bhattacharya, Amit Garg, S. Devotta, Kalyan Sen, 8, 147-170, (2004)

Jager, D., Manning, M., Kuijpers, L. (Coordinating Lead Authors) and **Devotta, S.** (Lead Author), “Technical Summary” in "IPCC/TEAP Special Report Safeguarding the Ozone Layer and the Global Climate System : Issues related to Hydrofluorocarbons and Perfluorocarbons" Cambridge University Press, USA, Eds. B. Metz, L. Kuijpers, S. Solomon, S.O. Andersen, O. Davidson, Jose Pons, D. Jager, T. Kestin, M. Manning, L. Meyer, 19-82, (2005)

Devotta, S. and Sicars, S. (Coordinating Lead Authors), “Refrigeration” in "IPCC/TEAP Special Report Safeguarding the Ozone Layer and the Global Climate System : Issues related to Hydrofluorocarbons and Perfluorocarbons" published by Cambridge University Press, USA, Eds. B. Metz, L. Kuijpers, S. Solomon, S.O. Andersen, O. Davidson, Jose Pons, D. Jager, T. Kestin, M. Manning, L. Meyer, 4, 227-267, (2005)

Goyal, S.K., Rama Krishna, T.V.B.P.S., Singh, R.N. and **Devotta, S.**, “Indian Air Quality Monitoring and Modelling” in "Glimpses of the Work on Environment and Development in India", Eds. J.S. Singh, V.P. Sharma, 9, 124-158, (2005)

Juwarkar, A.A. and **Devotta, S.**, “Pollution and Diseases : Soil Pollution” in "Textbook of Environmental Emergencies", Eds. A.C. Anand, A.S. Narula, R. Kakkar, R. Kalra, 10(3), 202-211, (2006)

Nandy, T., **Devotta, S.** and Verma, A.K., “Pollution and Diseases : Water Pollution” in "Textbook of Environmental Emergencies", Eds. A.C. Anand, A.S. Narula, R. Kakkar, R. Kalra, 10(2), 173-201, (2006)

Ashford, P., Baker, J.A., Clodic, D., **Devotta, S.**, Godwin, D., Harnisch, J., Irving, W., Jeffs, M., Kuijpers, L., McCulloch, A., Peixoto, R.D., Uemura, S. and Verdonik, D.P., “Emissions of Fluorinated Substitutes for Ozone Depleting Substances” in 2006 IPCC Guidelines for National Greenhouse Gas Inventories for Industrial Processes and Product Use, Simon Eggleston, Leandro Buendia, Kyoko Miwa, Todd Ngara and Kiyoto Tanabe, 3, 7.7-7.70, (2006)

Research Papers: More than 250 research papers in reviewed international journals and more than 100 papers in international and national conferences. Listed as **Top 2% most cited scientist** in the world by Stanford University during 2019-22.

US Patents: Granted 5 patents and few more filed.