Curriculum Vitae

RAKESH AGRAWAL

Work Address:

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Education:

Sc.D. Massachusetts Institute of Technology, 1980 (Ch.E.)
M.Ch.E. University of Delaware, 1977
B. Tech. Indian Institute of Technology, Kanpur, India, 1975

Professional Experience:

Winthrop E. Stone Distinguished Professor, School of Chemical Engineering, Purdue University. (2004-Present)
Faculty Affiliate, Division of Environmental and Ecological Engineering, Purdue University (2011- Present)
Director, Solar Economy Integrative Graduate Education and Research Traineeship (IGERT) Center
Visiting Professor, Ecole Polytechnique Federale de Lausanne (Sept 2010)
Visiting Scientist, Helmholtz-Zentrum Berlin für Materialien und Energie (Oct 2010-Feb. 2011)
ExxonMobil Visiting Chair Professor, Department of Chemical and Biomolecular Engineering, National University of Singapore, 2011-Present

Past: Air Products and Chemicals, Inc., Allentown, USA. (1980-2004)

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2003-2004

Air Products Fellow (The highest technical position at Air Products)
Chair, Air Products' Technology Board
Participating Member, Air Products' Technology Executive Team.

1980-2003

Process Engineer, Principal Research Engineer, Senior Principal Research Engineer, Lead Research Engineer, Process Manager, Senior Engineering Associate, Principal Engineering Associate; Chief Engineer.

Managerial Experience:

At Air Products, supervised and coordinated teams of about a dozen chemical engineers; provided technical leadership in the areas of gas separation and gas liquefaction; provided linkage between research, development, process, and business groups; supported technical sales; prepared R&D budgets and planned long and short-term R&D projects. Established a state-of-the art Process Synthesis group for separation process evaluation, development and commercialization.

Instrumental in developing and driving Air products' "New Waves" document that set out some major growth opportunities for Air Products based on the emerging social and technological trends and many of the opportunities were implemented.

Research Interests: Energy systems analysis, Energy transformation and use issues for solar, coal, biomass and hydrogen economy; Novel separation processes using distillation, membranes and adsorption; Process development, Cryogenics and gas liquefaction processes.

Patent Activities:

- One hundred and nineteen U. S. patents; nearly five hundred non-U.S. patents; and five pending US Patent Applications.
- The patented ideas have been applied to over 100 operating plants with the total capital investments of multibillion dollars.

Publications and Presentations

- One hundred twenty three technical papers (eighty two in refereed journals)
- One hundred eighteen technical presentations and one hundred sixty three invited lectures
- Co-author of ten annual technology symposium papers. This is a prestigious proprietary annual symposium at Air Products and Chemicals

Professional Societies:

- Member of the American Institute of Chemical Engineers (AIChE), American Chemical Society (ACS) and the U.S. National Academy of Engineering (NAE); Fellow of the American Academy of Arts and Sciences (AAAS) and Indian National Academy of Engineering (INAE).

Professional Service:

- AIChE's Separations Division: Second Vice Chair to Chair and then past Chair (1993-1995); Awards Committee Member (1992-1994); Publications Committee Co-Chair (1992-1994)
- Chair, AIChE's 2nd Topical Conference on Separations (1995)
- AIChE Publications Quality Team, Member (1995-1996)
- IChemE's Distillation and Absorption '97 Conference, Technical Committee Member (1995 -1997)
- U.S. Member of International Institute of Refrigeration (IIR): Commission A3 (1996-1999), Commission A2 (2000-2007); vice President of commission A2 (2003-2007)
- Trustee CACHE Corporation (1997 - 2005)
- Chemical Engineering Technology Operating Council (CTOC) of AIChE: Member (1999-2007); Vice Chair and then Chair (2001-2002)
- Consulting Editor, Separations, AIChE Journal (1999 - 2008)
- Fifth International Conference on Foundations of Computer-Aided Process Design (FOCAPD), Organizing Committee Member (1999)
- 12th Intersociety Cryogenic Symposium in Atlanta, Co-Chair (2000)
- Chair, Gordon Research Conference 2000 on Separation and Purification
- Member, AIChE Awards Committee (1999-2003)
- Member, Search Committee for AIChE Journal's Chief-Editor (2000)
- Review Committee Member, International Dictionary of Refrigeration, IIR (2001-2003)
- Advisory Council member, School of Chemical and Biochemical Engineering, Cornell University (2002-2007)
- Member, U.S. National Research Council (NRC) Committee on Alternatives and strategies for Future Hydrogen Production and Use (2002-2004)
- Member, Bourns College of Engineering Council of Advisors, University of California, Riverside (2003 – 2005)

- Workshop participant, NRC Committee on Novel Approaches to the Management of Greenhouse Carbon (2003)
- Member, Department of Energy's (DOE) Hydrogen Merit Review Panel, NETL, Pittsburgh (2003, 2004, and 2007)
- Member, Technology Board, Air Products and Chemicals (2004-2007)
- Co-chair, Sixth FOCAPD (2004)
- Consultant, Air Products and Chemicals (2004- Present)
- Member, U.S. National Academy of Engineering (NAE) Nominating Committee (2005)
- Member, NAE Peer Committee, Chemical Engineering Section (2004-2007)
- Co-chair, National Science Foundation (NSF) Workshops on 'Separations Research Needs for the 21st Century', (2004)
- Member, NRC Panel on Fuel Cell Research (2004)
- Participant, AIChE Board's Strategy Planning Meeting (2004)
- Member, International Advisory Committee, Joint IIChE and AIChE conference, Mumbai, India (2004)
- Co chair, Energy Workshop at the Joint IIChE and AIChE conference, Mumbai, India (2004)
- Participant, U.S. Department of Energy's workshop on Separations (2005)
- Member, NSF Panel on Process Design and Control (2005)
- Member, AIChE Energy Commission (2005-2007)
- Member, NRC Board on Energy and Environmental Sciences (2005-11)
- Member, NRC Panel on DOE's Integrated Gasification Combined Cycle R&D Program (2005)
- Panel member, The H-Prize, Panel chaired by the U.S. Representative Bob Inglis, Chairman of the Science Research Subcommittee, U.S.Congress (2005)
- Member, Scientific Committee, Distillation & Absorption (2006)
- Member, AIChE Board of Directors (2006-2008)
- Member, NSF Panel on Separations (2006)
- Member, AIChE Fellow Review Committee (2006 – 2008)
- Member, NRC Committee on Assessment of Resource Needs for Fuel Cell and Hydrogen Technologies (2006-2008)
- Chemical Engineering Department Advisory Committee member, Worcester Polytechnic Institute, Worcester, MA (2007-)
- Member, Technical Advisory Board, Dow Chemical (2007- Present)
- Member, Technical Advisory Board, Kyrogen Ltd. (2007-2010)
- Member, Technical Advisory Board, Weyerhaeuser (2008- Present)
- Member, AIChE Board Award Committee, (2008)
- Member, International Scientific Committee, Distillation & Absorption (2010)
- Member, AIChE International Committee, (2008 – 2009)
- Member, Technical Advisory Committee, FOCAPD (2009)
- Member, Scientific Committee, 10th International Symposium on Process Systems Engineering, PSE'09, Brazil (2009)
- Member, National Academies' Renewables Panel for the Committee on America's Energy Future (2007-2008)
- Participant, NRC planning meeting for a Carbon Summit (2009)

- Member, NRC Committee on Plug in Hybrid Electric Vehicles (PHEV) (2009-2010)
- Member, Engineering Advisory Board, Genomatica (2009 -)
- Member, International Program Committee, ESCAPE-21, Greece
- Member, Technical Advisory Board, ATMI (2010-)
- Guest member, European Federation of Chemical Engineering's (EFCE) Working Party on Fluid Separations (2010-)
- Member, Editorial Advisory Board, Industrial & Engineering Chemistry Research (2010-2012)
- Member, Board of Trustees AIChE Foundation (2011)
- Member, Editorial Board, Current Opinion in Chemical Engineering (2011-)
- Vice Chair, Chemical Engineering Section, NAE (2011)
- Member, Editorial Advisory Board, Chemical Engineering Progress (2012-)
- Chair, Chemical Engineering Section, NAE (2012)
- Team Member for the NSF international benchmarking study on Systems Engineering for Renewable and Clean Energy Manufacturing (SEEM), (2012-)
- Member, Department of Chemical and Biomolecular Engineering Advisory Council, University of Delaware (2012-)
- Member, Scientific Committee, Distillation & Absorption-Conference 2014 in Friedrichshafen, Germany.
- Member, Consulting Editors Board, AIChE Journal (2012- 2016).
- Member, Editorial Board, Chemie Ingenieur Technik - Chemical Engineering and Technology – Energy Technology (2012-)
- Member, Aspen Tech Academy, Aspen Tech (2012 -)
- Member, Scientific Committee, 7th International Symposium on Feedstock Recycling of Polymeric materials (7th ISFR), New Delhi, India, October 2013

Awards and Honors:

- Youngest Ever Recipient of the Air Products' Prestigious Chairman's Award (1992)
- Extraordinary Quality Award from Air Products and Chemicals (1992)
- Presidential Citation for Outstanding Achievement from the University of Delaware (1995)
- Institute Award for Excellence in Industrial Gases Technology from the AIChE (1998)
- Clarence G. Gerhold Award, Separations Division, AIChE (2001)
- Alkyl Amines Dr. B. D. Tilak Chemcon Distinguished Speaker, Indian Institute of Chemical Engineers (IIChE) 2001
- Honorary Fellow, Indian Institute of Chemical Engineers (2001)
- Who's Who in the World, (Marquis, 18th Edition, 2001)
- Diamond Award for Inventor on One Hundred United States Patents, Air Products and Chemicals (2001)
- Member, U. S. National Academy of Engineering, NAE (2002)
- BAYER Lecture, Carnegie Mellon University (April, 2002)
- Air Products' Equipment Innovation Award for The AP-X™ Hybrid LNG Process (2003)
- J&E Hall Gold Medal, Institute of Refrigeration, UK (2004)

- Who's Who in America, Who's Who in Science and Engineering, Who's Who in Finance & Business
- Regents' Lecturer, University of California, Los Angeles (2004)
- Distinguished Faculty Seminar: Advanced Power Sources, University of Michigan, Ann Arbor (2004)
- Professor B. D. Tilak Visiting Fellowship Lecture, Institute of Chemical Technology, University of Mumbai, India (2004)
- AIChE Institute Lecturer (2005)
- Chemical Engineering Practice Award, AIChE (2006)
- V.V. Mariwala Visiting Professorship, UICT, Mumbai, India (2007)
- Industrial Research Institute (IRI) Achievement Award (2007)
- Chemical Weekly's Padmashri Dr. G. P. Kane CHEMCON Distinguished Speaker Award, IIChE (2007)
- AIChE Fuels and Petrochemicals Division Award (2008)
- Lecture on 'Energy Systems Analysis' voted as the best presentation at the Pan American Institute (PASI) workshop, Argentina (2008)
- W.R. Marshall Founders' Lecture, University of Wisconsin (2008)
- Tis Lahiri Lecture, Vanderbilt University (2008)
- C. K. Murthy Memorial Lecture, IIChE (2008)
- Inaugural winner of Excellence in Gas Processing Award, Annual Gas Processing Symposium, Qatar (2009)
- AIChE Fellow (2009)
- Pirkey Lecture, University of Texas, Austin (2010)
- Hugh M. Hulbert Memorial Lecture, Northwestern University, (2011)
- Hess Lecture, University of Virginia, (2011)
- AIChE Founders Award (2011)
- Foreign Fellow, Indian National Academy of Engineering (2011)
- ExxonMobil Visiting Chair Professor, Department of Chemical and Biomolecular Engineering, National University of Singapore, (2011-Present)
- National Medal of Technology and Innovation from the President of the United States of America, (2011), (The highest honor given by the U.S. goverment for Technology and Innovation)
- Ken Nobe Founders Lecture, Univ. of California, Los Angeles (2012)
- Distinguished Alumnus Award, Indian Institute of Technology, Kanpur (2012)
- Padmavibhushan Professor M. M. Sharma CHEMCON Distinguished Speaker Award, IIChE (2012)
- Fellow, American Academy of Arts and Sciences, AAAS (2013)
- Shreve Award for excellence in Teaching, Chemical Engineering, Purdue University, (2013)
- Allan P. Colburn Honorary Lecturer, E. I. du Pont de Nemours and Company (2013)
- Annual KAIST CBE Global Distinguished Lecturer, Korea, (2013)
- Fellow, National Academy of Inventors (2013)