
CURRICULUM VITAE

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EDUCATION

Doctor of Science (D. Sc.) in Chemical Engineering

Washington University in St. Louis, USA, December 2000

Dissertation: **Quantification of Two-Phase Flow in Liquid-Solid Risers**

Advisors: Prof. M. P. Dudukovic and Prof. M. H. Al-Dahhan

Master of Science (M. S.) in Chemical Engineering

Washington University in St. Louis, USA, December 1996

Advisors: Prof. M. P. Dudukovic and Prof. M. H. Al-Dahhan

Bachelor of Technology (B. Tech.) in Chemical Engineering

Indian Institute of Technology, Delhi, India, August 1994

Dissertation: **Kinetic Invariant Analysis of Dissolution with Chemical Reaction**

Advisor: Prof. A. N. Bhaskarwar

PROFESSIONAL EXPERIENCE

Executive Director, IIT Delhi – Abu Dhabi

January 2024 – present

Institute Chair Professor

July 2019 – present

Department of Chemical Engineering

Indian Institute of Technology – Delhi (IIT Delhi)

Coordinator – IIT Delhi – Abu Dhabi

September 2022 – January 2024

and Institute Chair Professor

Department of Chemical Engineering

Indian Institute of Technology – Delhi (IIT Delhi)

Dean – Academics

September 2019 – September 2022

and Institute Chair Professor

Department of Chemical Engineering

Indian Institute of Technology – Delhi (IIT Delhi)

Associate Dean – Academics

August 2016 – August 2019

and Professor

Department of Chemical Engineering

Indian Institute of Technology – Delhi (IIT Delhi)

Professor Department of Chemical Engineering Indian Institute of Technology – Delhi (IIT Delhi)	December 2012 - present
Associate Professor Department of Chemical Engineering Indian Institute of Technology – Delhi (IIT Delhi).	August 2008 – December 2012
Assistant Professor Department of Chemical Engineering Indian Institute of Technology – Delhi (IIT Delhi) Hauz Khas, New Delhi 110 016, INDIA.	January 2004 – August 2008
Senior Project Engineer Corning Incorporated Science and Technology Division (Modeling and Simulation Group) Corning, NY 14831, USA.	March 2000 – September 2003

PROFESSIONAL ROLES AND RECOGNITIONS

DuPont Young Faculty Award (2004) awarded by E I DuPont de Nemours Company, Wilmington, Delaware, USA.

EECE Distinguished Alumnus Award (2022), Washington University in St. Louis, USA.

Member of NITI Aayog's "Technical Standing committee on Coal Gasification", (2020 – present).

Member of NITI Aayog's "Task Force on Carbon Capture and Applications", (2022 - present).

Chairperson, "UGC Regulations on Recognition and Equivalence of Qualifications", University Grants Commission, Govt. of India (2022 – present).

Member, Advisory Committee to the Government of India for drafting the National Auto Fuel Vision and Policy: 2025 (Bharat Stage IV – VI standards).

Chairperson, UGC Regulations on Recognition and Equivalence Qualifications obtained from Foreign Higher Education Institutions (2023-24).

Core Member, Project Assessment Committee (PAC) for Chemical and Environmental Engineering, Department of Science and Technology (DST), Govt. of India (2015-18)

Scientific Advisory Committee (SAC), apex body of the Ministry of Petroleum and Natural Gas, Govt. of India for review of technology development projects (2010-2014, 2014-2017)

Associate Editor, Advanced Powder Technology (Elsevier, 2015 - 2020).

Editorial Advisory Board of the Asia-Pacific Journal of Chemical Engineering (John Wiley, 2007 – present).

Co-Chair, ISCRE 26 Conference (International Symposium of Chemical Reaction Engineering), New Delhi, India (2021).

Scientific Committee of the ISCRE 25 Conference (International Symposium of Chemical Reaction Engineering), Italy (2018).

International Scientific Organizing Committee of the Gas-Liquid-Solid (GLS) Reactor Engineering Conference (2007-present).

Co-Chair, GLS17 (17th International Conference on Gas-Liquid-Solid Reactor Engineering), New Delhi (2026).

Principal consultant, Coordinated Research Project (CRP) for Radioactive Particle Tracking (RPT) techniques by International Atomic Energy Agency (IAEA), Vienna, Austria (2007).

IAEA invited expert on Radioactive Particle Tracking to visit Malaysian Nuclear Agency (Nuklear Malaysia), Bangi, Malaysia (2011).

IAEA invited expert on Radiotracer and Computational Modeling to deliver a series of lectures for UN member states, Xi'an, China (2013).

IAEA invited expert on Radioactive Particle Tracking (RPT) and Single Photon Emission Computed Tomography (SPECT) to deliver a series of lectures for UN member states, Kajang, Malaysia (2014).

Nominated to the International Scientific Organizing Committee (ISAC) of the International Gas-Liquid-Solid Reactor Engineering (GLS) Conferences (2006).

CURRENT AREAS OF RESEARCH

- ❑ **Non-invasive monitoring of multiphase flows**, using radiation based techniques for mapping flow patterns and volume fractions inside opaque multiphase reactors and vessels. (Experimental, involving demanding computations for image reconstruction and processing of experimental data)
- ❑ **Modeling of multiphase flows in reactors**, using CFD based techniques (specifically particulate tracking techniques for granular flows using hard-sphere modeling approaches). Primary focus is on computations and modeling aspects, but also involves cold flow experiments from radiation based imaging techniques.
- ❑ **Process intensification through monolithic and mini-scale reactors**, specifically for multiphase reactor applications (focus on two-phase hydrodynamics in monolith channels). (Experimental and modeling)

Current and past research and consultancy projects sponsors / collaborators:

- ❑ Board of Research in Nuclear Sciences, Dept. of Atomic Energy (Govt. of India)
- ❑ Corning Incorporated (USA)
- ❑ TotalEnergies (France)
- ❑ Defense Research and Development Organization (DRDO), India
- ❑ Engineers India Limited (India)
- ❑ Bharat Heavy Electricals Limited (India)
- ❑ Department of Science and Technology (Govt. of India)
- ❑ Ministry of Human Resource Development (Govt. of India)
- ❑ Shell B. V. (The Netherlands)
- ❑ Engineers India Limited (India)
- ❑ Thermax Limited (India)
- ❑ Air Products and Chemicals (USA)
- ❑ MEMC Electronic Materials (USA) [now SunEdison]
- ❑ Oil and Natural Gas Commission (India)
- ❑ General Motors (USA)

PATENTS

"System and Process for Pyrolysis Gasoline Hydrotreatment", *US Patent 7,014,750*, Granted March 21, 2006 (with Boger, T. and Sorensen, C. M.).

"Flow Distributor for Monolith Reactor", *US Patent 7,032,894*, Granted April 25, 2006 (with Adusei, G. Y., Campbell, S. A., Liu, W., and Odinak, M. E.).

"Fuel Cell Device with Varied Active Area Sizes", *US Patent 7,494,732*, Granted February 24, 2009 (with Ketcham, T. D., St Julien, D. J., Brown, J. L., Badding, M. E).

"Compact Coiled Flow Inverters as In-Line Mixers", PCT filed December 15, 2017 (with Sharma, Loveleen, Nigam, K. D. P.)

"Liquid Distributors for Three-Phase Applications of Monolith Catalysts And Substrates", Indian Patent number 479973 granted on 11/12/2023 (Application Number 201711023863, filed on 06/07/2017). (PCT filing number: PCT/IB2018/054741)

"Passive and Active Oxygen Generation Systems", Indian Provisional Patent application number: 202111029508, Filed on June 30, 2021.

PUBLICATIONS

Deepshikha Singh, Shantanu Roy, Harish Jagat Pant, and Jyoti Phirani. "Can fluid-solid contact area quantify wettability during flow?—a parametric study." *Chemical Engineering Science* (2023): 118992.

Aashna Suneja and Shantanu Roy, "Liquid flow distribution in trickle bed reactors containing trilobed extrusions packed using different techniques", *Results in Engineering* **17**, (2023) 100704.

Sangram Roy and Shantanu Roy, "Modelling of binary fluidization of coal and ash and validation using radioactive particle tracking and densitometry", *Canadian Journal of Chemical Engineering* **101(3)**, (2023) 1660-1679.

Akarsha Srivastava, Krishna D. P. Nigam, and Shantanu Roy. "Bed structure and its impact on liquid distribution in a trickle bed reactor." *AIChE Journal* **69**, no. 1 (2023): e17649.

Deepshikha Singh, Shantanu Roy, Harish Jagat Pant, and Jyoti Phirani. "A novel approach for wettability estimation in geological systems by fluid–solid interfacial area measurement using tracers." *Journal of Petroleum Science and Engineering* **215** (2022): 110722.

Ashutosh Yadav and Shantanu Roy, "Quantification of boiling flows in single and multiple heater rods assembly by recurrence plots and recurrence quantification analysis", *Chemical Engineering Journal Advances* **10**, (2022) 100241.

Aashna Suneja and Shantanu Roy. "Structure of packed bed probed by Micro-Computed tomography, and Collision Guided Packing." *Authorea Preprints* (2022).

Ashutosh Yadav and Shantanu Roy. "Void fraction distribution for convective boiling flows in single and multiple heater rods assembly." *Chemical Engineering Science* **247** (2022): 117063.

Shantanu Roy, "Enhancing the efficiency of chemical processes: the triad of Radio tracing, Radioactive Particle Tracking (RPT) and Computational Fluid Dynamics (CFD)", *Proceedings of the DAE-BRNS two-day theme meeting strategic planning for enhancing research reactor utilization, IAEA International Nuclear Information System*, 2022.

Sangram Roy, Harish Jagat Pant, and Shantanu Roy. "Velocity characterization of solids in binary fluidized beds." *Chemical Engineering Science* **246** (2021): 116883.

Brajesh K. Singh, Shantanu Roy, and Vivek V. Buwa. "Eulerian Simulations of Bubbling Behavior in a Gas–Solid Fluidized Bed: Role of Solid Frictional Viscosity." *Industrial & Engineering Chemistry Research* **60**, no. 48 (2021): 17677-17693.

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- Pranav V. Kherdekar, Shantanu Roy, and Divesh Bhatia. "Dynamic modeling and optimization of a fixed-bed reactor for the partial water–gas shift reaction." *Industrial & Engineering Chemistry Research* **60**, no. 25 (2021): 9022-9036.
- Prapanch Nair, Sebastian Mühlbauer, Shantanu Roy, and Thorsten Pöschel. "Can Minkowski tensors of a simply connected porous microstructure characterize its permeability?" *Physics of Fluids* **33**(4), 2021, 042010.
- Kaushal R. Parmar, K. K. Pant, and Shantanu Roy. "Blue hydrogen and carbon nanotube production via direct catalytic decomposition of methane in fluidized bed reactor: Capture and extraction of carbon in the form of CNTs." *Energy Conversion and Management* **232**, 2021, 113893.
- Deepshikha Singh, Shantanu Roy, Harish Jagat Pant, and Jyoti Phirani. "Solid-fluid interfacial area measurement for wettability quantification in multiphase flow through porous media." *Chemical Engineering Science* **231**, 2021, 116250.
- Prapanch Nair, Luis A. Torres Cisneros, Christopher Robert Kit Windows-Yule, Nikhil Agrawal, Shantanu Roy, and Thorsten Pöschel. "A first-order segregation phenomenon in fluid-immersed granular systems." *Powder Technology* **373**, 2020, 357-361.
- Vandana Kumari Jha, Loveleen Sharma, Shantanu Roy, K. D. P. Nigam, and Soubhik Kumar Bhaumik. "Comparative assessment of mixing in compact coiled flow inverters under diffusion free laminar flow condition." *Chemical Engineering Research and Design* **159**, 2020, 455-467.
- Ashutosh Yadav, T. K. Gaurav, Harish J. Pant, and Shantanu Roy. "Machine learning based position-rendering algorithms for radioactive particle tracking experimentation." *AIChE Journal* **66**(6), 2020, e16954.
- Brajesh K. Singh, Shantanu Roy, and Vivek V. Buwa. "Bubbling/slugging flow behavior in a cylindrical fluidized bed: ECT measurements and two-fluid simulations." *Chemical Engineering Journal* **383**, 2020, 123120.
- Ashutosh Yadav, Harish Jagat Pant and Shantanu Roy, "Velocity Measurements in Convective Boiling Flow using Radioactive Particle Tracking (RPT) Technique", *AIChE Journal* **66** (1), 2020, e16782.
- Sangram Roy, Harish Jagat Pant and Shantanu Roy. "Solids flow pattern in cold flow mockup of fluidized bed gasifier." *Chemical Engineering Science* **210**, 2019, 115225.
- Brajesh Kumar Singh, Shantanu Roy and Vivek V. Buwa, "Dynamics of Segregation and Fluidization of Binary Mixtures in a Cylindrical Fluidized Bed", *AIChE Journal* **65**, 2019, e16682.
- Rajesh K. Upadhyay, H. J. Pant and Shantanu Roy, "Experimental Validation of Design and Performance Parameters of Radioactive Particle Tracking (RPT) Experimentation", *Applied Radiation and Isotopes* **153**, 2019, 108814.
- S. Azizi, A. Yadav, Y.M. Lau, U. Hampel, S. Roy, M. Schubert, "Hydrodynamic Correlations for Bubble Columns from Complementary UXCT and RPT Measurements in Identical Geometry and Conditions", *Chemical Engineering Science* **208**, 2019, 115099.
- Kaushal R. Parmar, D.T.K. Dora, Kamal K. Pant and Shantanu Roy, "An ultra-light flexible aerogel-based on methane derived CNTs as a reinforcing agent in silica-CMC matrix for efficient oil adsorption", *Journal of Hazardous Materials* **375**, 2019, 206-215.
- Tejas Puneet Kaur Sidhu and Shantanu Roy, "Optimal Design of Washcoated Monolith Catalyst for Compact, Heat-integrated Ethanol Reformers", *International Journal of Hydrogen Energy* **44** (23), 2019, 11472-11487.
- Surbhi Soni, Loveleen Sharma, Priya Meena, Shantanu Roy and K. D. P. Nigam, "Compact Coiled Flow Inverter for Process Intensification", *Chemical Engineering Science* **193**, 2019, 312-324.

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- Nikhil Agrawal, Prapanch Nair, Thorsten Pöschel and Shantanu Roy, "Isotropy of Sphere Packings in a Cylindrical Confinement", *Chemical Engineering Journal* **377**, 2019, 119820.
- Akarsha Srivastava, K.D.P. Nigam and Shantanu Roy, "Quantification of Local Structure of Disordered Packing of Spherical Particles", *Chemical Engineering Journal* **377**, 2019, 119771.
- D. V. Kalaga, V. Bhusare, H. J. Pant, J. B. Joshi and S. Roy, "Impact of Dense Internals on Fluid Dynamic Parameters in Bubble Column", *International Journal of Chemical Reactor Engineering* **16(12)**, 2018.
- V. H. Bhusare, D.V. Kalaga, M. K. Dhiman, J. B. Joshi, Shantanu Roy, "Mixing in a Co-current Up flow Bubble Column Reactors with and Without Internals", *Canadian Journal of Chemical Engineering* **96 (9)**, 2018, 1957-1971.
- J. Phirani, S. Roy, H. J. Pant, "Predicting Stagnant Pore Volume in Porous Media using Temporal Moments of Tracer Breakthrough Curves", *Journal of Petroleum Science and Engineering* **165**, 2018, 640-646.
- D.V. Kalaga, H.J. Pant, S.V. Dalvi, J.B. Joshi and Shantanu Roy, "Investigation of Hydrodynamics in Bubble Column with Internals using Radioactive Particle Tracking (RPT)", *AIChE Journal* **63 (11)**, 2017, 4881-4894.
- Meenakshi Mazumdar and Shantanu Roy, "Gravity Induced Coalescence in Emulsions with High Volume Fractions of Dispersed Phase in the presence of Surfactants", *AIChE Journal* **63 (10)**, 2017, 4379-4389.
- Supratim Das, Chaitanya Narayanam, Shantanu Roy, Rajesh Khanna, "A Model of Wetting of Partially Wettable Porous Solids by Thin Liquid Films", *Chemical Engineering Journal* **320**, 2017, 104-115.
- V. H. Bhusare, M.K. Dhiman, D.V. Kalaga, S. Roy, J. B. Joshi, "CFD Simulations of a Bubble Column with and without Internals by using Open FOAM", *Chemical Engineering Journal* **317**, 2017, 157-174.
- Loveleen Sharma, K. D. P. Nigam and Shantanu Roy, "Investigation of Two-Phase (Oil-Water) Flow in Coiled Geometries using "Radioactive Particle Tracking-Time of Flight (RPT-TOF)" and "Radioactive Particle Tracking-Volume Fraction (RPT-VOF)" Measurements", *Chemical Engineering Science* **170**, 2017, 422-436.
- Dinesh V. Kalaga, Ashutosh Yadav, Sunil Goswami, Vishal Bhusare, Harish J. Pant, Sameer V. Dalvi, Jyeshtharaj B. Joshi and Shantanu Roy, "Comparative Analysis of Liquid Hydrodynamics in a Co-current Flow-through Bubble Column with Densely Packed Internals via Radiotracing and Radioactive Particle Tracking (RPT)", *Chemical Engineering Science* **170**, 2017, 332-346.
- Salar Azizi, Ashutosh Yadav, Yuk Man Lau, Uwe Hampel, Shantanu Roy, Markus Schubert, "On the Experimental Investigation of Gas-Liquid Flow in Bubble Columns using Ultrafast X-ray Tomography and Radioactive Particle Tracking", *Chemical Engineering Science* **170**, 2017, 320-331.
- Tejas Puneet Kaur Sidhu, Akash Govil and Shantanu Roy, "Optimal Monolithic Configuration for Heat Integrated Ethanol Steam Reformer", *International Journal of Hydrogen Energy* **42(12)**, 7770-7785 (2017).
- Ashutosh Yadav, Manojkumar Ramteke, Harish J. Pant and Shantanu Roy, "Monte Carlo Real Coded Genetic Algorithm (MC-RGA) for Radioactive Particle Tracking (RPT) Experimentation", *AIChE Journal* **63(7)**, 2017, 2850-2863.
- Loveleen Sharma, K. D. P. Nigam, and Shantanu Roy, "Single phase mixing in coiled tubes and coiled flow inverters in different flow regimes", *Chemical Engineering Science* **160**, 2017, 227-235.
- Deepali Chugh, Shantanu Roy, Jianbin Shao and Muthanna H. Al-Dahhan, "Experimental Investigation of Gas-Liquid Flow in Monolith Channels Using Monofiber Optical Probes", *AIChE Journal* **63(1)**, 2017, pp. 327-336.

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- Shantanu Roy, "Radiotracer and Particle Tracking Methods, Modeling and Scale-up", *AIChE Journal* 63(1), 314-326 (2017).
- Loveleen Sharma, K. D. P. Nigam, and Shantanu Roy, "Axial dispersion in single and multiphase flows in coiled geometries: Radioactive particle tracking experiments." *Chemical Engineering Science* 157, 116-126 (2017).
- Ashutosh Yadav and Shantanu Roy, "Axial and radial void fraction measurements in convective boiling flows." *Chemical Engineering Science* 157, 127-137 (2017).
- Meenakshi Mazumder, Aniruddh S Jammoria, and Shantanu Roy, "Effective Rates of Coalescence in Oil-Water Dispersions under Constant Shear", *Chemical Engineering Science* 157, 255-263 (2017).
- Ashutosh Yadav, Ashish Kushwaha, and Shantanu Roy, "An Algorithm for Estimating Radial Gas Holdup Profiles In Bubble Columns from Chordal Densitometry Measurements", *Canadian Journal of Chemical Engineering* 94(3), 524-529 (2016).
- Tejas Puneet Kaur Grewal and Shantanu Roy, "Modeling the effect of coke deposition in a heat integrated ethanol reformer." *International Journal of Hydrogen Energy* 41(44), 19863-19880 (2016).
- Arnab Atta, Shantanu Roy, F. Larachi and K. D. P. Nigam, "Cyclic Operation of Trickle Bed Reactors: A Review", *Chemical Engineering Science* 115, 205-214 (2014).
- Rajesh K. Upadhyay, H. J. Pant and Shantanu Roy, "Liquid flow patterns in rectangular air-water bubble column investigated with Radioactive Particle Tracking", *Chem. Engng. Sci.* 96, 152-164 (2013).
- Anil K. Magoo, Akash Mittal and Shantanu Roy, "Modeling Packed Bed Fischer-Tropsch Reactors with Phase Evolution", *Ind. Chem. Engr.* 55 (1), 29-37 (2013).
- Ganesh Velluswamy, Rajesh Upadhyay, Ranjeet Utikar, Moses Tade, Geoffrey Michael Evans, Michael Glenny, Shantanu Roy, and Vishnu Pareek, "Hydrodynamic Study of Fluid Catalytic Cracker Unit (FCCU) Stripper", *I&EC Res.* 52(12), 4660-4671 (2013).
- Ankur Gupta and Shantanu Roy, "Euler-Euler Simulation of Bubbly Flow in a Rectangular Bubble Column: Experimental Validation with Radioactive Particle Tracking", *Chem. Eng. J.* 225, 818-836 (2013).
- Shubh Bansal, Shantanu Roy and Faical Larachi, "Support Vector Regression Models for Trickle Bed Reactors", *Chem. Eng. J.* 207-208, 822-831 (2012).
- Vimlesh K. Bind, Shantanu Roy and Chitra Rajagopal, "A Reaction Engineering Approach to Modeling Dust Explosions", *Chem. Eng. J.* 207-208, 625-634 (2012).
- Rajesh K. Upadhyay, Shantanu Roy and Harish J. Pant, "Benchmarking Radioactive Particle Tracking (RPT) with Laser Doppler Anemometry (LDA)", *Int. J. Chem. Reactor Engng.* 10, S4 (2012).
- Vimlesh Kumar Bind, Shantanu Roy and Chitra Rajagopal, "CFD Modelling of Dust Explosions: Rapid Combustion in a 20 L Apparatus", *Can. J. Chem. Engng.* 89(4), 663-670 (2011).
- Ganesh K. Veluswamy, Rajesh K. Upadhyay, Ranjeet P. Utikar, Geoffrey M. Evans, Moses O. Tade, Michael E. Glenny, Shantanu Roy and Vishnu K. Pareek, "Hydrodynamics of a Fluid Catalytic Cracking Stripper Using γ -ray Densitometry", *I&EC Res.* 50(10), 5933-5941 (2011).
- V. Balamurugan, D. Subbarao and Shantanu Roy, "Enhancement in Gas Holdup in Bubble Columns through use of Vibrating Internals", *Can. J. Chem. Engng.* 88, 1010-1020 (2010).

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- Rajesh K. Upadhyay and Shantanu Roy, "Investigation of Hydrodynamics of Binary Fluidized Beds via Radioactive Particle Tracking and Dual-Source Densitometry", *Can. J. Chem. Engng.* **88**, 601-610 (2010). [Special Issue of Peer-Reviewed Papers from GLS9 Conference]
- S. Vaishali, Shantanu Roy and Patrick L. Mills. "Modeling of Partial Oxidation in Gas-Solids Downer Reactors", *AIChE J.* **56(8)**, 2150-2162 (2010).
- Akash Mittal, Shantanu Roy and Faical Larachi, "Modeling of Heat Uptake and Release with Embedded Phase Change Materials in Monolithic Microfluidized Bed Reactors", *I&EC Res.* **49**, 1086–1097 (2010).
- Arnab Atta, Markus Schubert, K. D. P. Nigam, S. Roy and Faical Larachi, "Co-current Descending Two-Phase Flows in Inclined Packed Beds: Experiments versus Simulations", *Can. J. Chem. Engng.* **88**, 744-750 (2010).
- Arnab Atta, Shantanu Roy, K.D.P. Nigam, "A Two-Phase Eulerian Approach using Relative Permeability Concept for Modeling of Hydrodynamics in Trickle-bed Reactors at Elevated Pressure", *Chem. Eng. Res. Des.* **88**, 369–378 (2010).
- Arnab Atta, Mohsen Hamidipour, Shantanu Roy, K. D. P. Nigam and Faical Larachi, "Propagation of Slow/Fast-Mode Solitary Liquid Waves in Trickle Beds via Electrical Capacitance Tomography and Computational Fluid Dynamics", *Chem. Engng. Sci.* **65**, 1144-1150 (2010).
- S. Vaishali and Shantanu Roy, "DEM Simulation of Gas-Solids Circulating Fluidized Beds", *J. Chem. Eng. Japan* **42(1)**, s130–s136 (2009). [Special Issue of Peer-Reviewed Papers from ISCRE20 Conference]
- Rajesh K. Upadhyay, Jayant Kaim and Shantanu Roy, "Investigation of Downflow Bubble Columns: Experiments and Modeling", *J. Chem. Eng. Japan* **42(1)**, s156–s161 (2009). [Special Issue of Peer-Reviewed Papers from ISCRE20 Conference]
- Arnab Atta, Shantanu Roy and K. D. P. Nigam, "CFD Prediction of Hydrodynamics in Trickle Bed Reactor: Liquid Distribution and High Pressure Operation", *J. Chem. Eng. Japan* **42(1)**, s119–s124 (2009). [Special Issue of Peer-Reviewed Papers from ISCRE20 Conference]
- Yi-Ning Wang, S. Roy and F. Larachi, "Simulating the Dynamics of Gas-Solid Flows in Multichannel Microcirculating Fluidized Bed", *I&EC Res.* **48**, 7928–7937 (2009).
- B. Harish Kumar, Shantanu Roy, John Pitney, Tom Torack and Srikanth Kommu, "Theoretical Analysis of Thermally Induced Structural Deformation and Relaxation of Silicon Wafer", *J. of Electrochem. Society ECS Trans.* **16(6)**, 261 (2008).
- S. Vaishali, S. Roy and P. L. Mills, "Hydrodynamic Simulation of Gas-Solids Downflow Reactors", *Chem. Engng. Sci.* **63**, 5107-5119 (2008).
- Mayank Behl and S. Roy, "Experimental Investigation of Gas-Liquid Distribution in Monolith Reactors", *Chem. Engng. Sci.* **62**, 7463-7470 (2007). [Special Issue of Peer-Reviewed Papers from GLS8 Conference]
- S. Vaishali, Shantanu Roy, Satish Bhusarapu, M. H. Al-Dahhan and M. P. Dudukovic, "Numerical Simulation of Gas-Solid Dynamics in Circulating Fluidized Bed Riser with Geldart Group B Particles", *I&EC Res.* **46**, 8620-8628 (2007).
- Arnab Atta, Shantanu Roy and K. D. P. Nigam, "Investigation of Liquid Maldistribution in Trickle Bed Reactors using Porous Media Concept in CFD", *Chem. Engng. Sci.* **62**, 7033-7044 (2007).
- Arnab Atta, Shantanu Roy and K. D. P. Nigam, "Prediction of Pressure Drop and Liquid Holdup in Trickle Bed Reactor using Relative Permeability Concept in CFD", *Chem. Engng. Sci.* **62**, 5870-5879 (2007).
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- W. Liu and S. Roy, "Effect of Channel Shape on Gas/Liquid Catalytic Reaction Performance in Structured Catalyst/Reactor", *Chem. Engng. Sci.* **59**, 4927-4939 (2004).
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- M. P. Dudukovic, M. H. Al-Dahhan, S. Roy, and A. Kemoun, 'Experimental Validation of Computational Fluid Dynamic Codes (CFD) for Liquid-Solid Risers in Clean Alkylation Processes', *Chem. Ind. (Hemijaska industrija)* **60 (12)**, 497-505 (2002).
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- S. Roy, A. Kemoun, M. H. Al-Dahhan and M. P. Dudukovic, "Dense, Vertical Liquid-Solid Flow in a Riser: Experimental Analysis", Presented at *NHTC '99: The 33rd National Heat Transfer Conference, Albuquerque, NM, USA*, August 15-17, 1999.
- S. Roy, M. P. Dudukovic, M. H. Al-Dahhan and F. Larachi, "Flow Mapping in a Gas-Solids Riser using Computer Automated Radioactive Particle Tracking (CARPT): A Proposed Study", Presented at the *DOE/OIT-MFDRC Review Meeting, Washington DC, USA*, February 10, 1999.
- S. Roy, S. B. Kumar and M. P. Dudukovic, "Modeling of Two-Phase Flows in Bubble Columns: Comparison with Experiments", *Paper 311h* Presented at the *AICHE Annual Meeting, Miami Beach, FL, USA*, November 15-20, 1998.

S. Roy, A. Kemoun, M. H. Al-Dahhan and M. P. Dudukovic, "Experimental Investigation of Flow in a Liquid-Solid Riser", *Paper 165g* Presented at the *AICHE Annual Meeting, Miami Beach, FL, USA*, November 15-20, 1998.

S. Roy, J. Chen, S. Degaleesan, P. Gupta, M. H. Al-Dahhan and M. P. Dudukovic, "Non-Invasive Flow Monitoring in Opaque Multiphase Reactors via CARPT and CAT", *Paper FEDSM98-5077* Presented at the *FEDSM'98 - ASME Fluids Engineering Division Summer Meeting, Washington DC, USA*, June 21-25, 1998.

S. Roy, J. Chen, S. B. Kumar, M. H. Al-Dahhan, and M. P. Dudukovic, "Liquid Phase Mixing in Liquid-Solid Circulating Reactors", Presented at the *AICHE Annual Meeting, Chicago, IL, USA*, November 1996.

S. Roy, J. Chen, S. B. Kumar, M. H. Al-Dahhan and M. P. Dudukovic, "Preliminary Experimental Studies of the Flow in Liquid-Solid Risers", Poster presented at the *Engineering Foundation Topical Conference: Computational Fluid Dynamics in Chemical Reaction Engineering, San Diego, CA, USA*, October 1996.

Plenary/Keynote/Invited Lectures

(underline signifies person delivering the lecture)

Shantanu Roy, "Annual Meeting on Reaction Engineering and ProcessNet Subject Division Heat and Mass Transfer
2022, 18.-20. Juli 2022, Würzburg

Shantanu Roy, Akarsha Srivastava and K. D. P. Nigam, "Bed Structure and its Impact on Liquid Distribution in a Trickle Bed Reactor", Invited keynote lecture at the 16th International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering (GLS-14), Guilin, China (2019).

Shantanu Roy, Loveleen Sharma and K. D. P. Nigam, "Single and Multiphase Flow Patterns in Coiled Tubes for Process Intensification", Invited keynote lecture at the 10th International Symposium on Catalysis in Multiphase Reactors and the 9th International Symposium on Multifunctional Reactors (CAMURE-10 & ISMR-9), Qingdao, China (2017).

Shantanu Roy, "Radiotracer and Particle Tracking Methods, Modeling and Scale-Up", Invited keynote lecture at the 24th International Symposium of Chemical Reaction Engineering (ISCRE24), Minneapolis, MN, USA (2016).

Shantanu Roy, "Radioactive Particle Tracking for Flow Visualization in Multiphase Reactors: Theory, Current Applications and Future Development", Presented at the *National Symposium of Multiphase Flow (NSMF-2016)*, NIT Durgapur, India (2016).

Shantanu Roy, "Radioactive Particle Tracking for Flow Visualization in Multiphase Flow Reactors: Current Status", Invited lecture delivered at ARCEBS-14: Third International Conference on Application of Radiotracers and Energetic Beams in Sciences", Kolkata, India (2014).

Shantanu Roy, "Radioactive Particle Tracking: A Technique for Looking Inside Multiphase Reactors", Invited lecture delivered at 24th Annual Conference of the Indian Nuclear Society (INSAC 2013)", Mumbai, India (2013).

Shantanu Roy, "Looking Inside Multiphase Reactors: Some Recent Work on RPT, Euler-Euler-PBM and DEM Modeling", Invited talk delivered at topical conference on "Trends in Physical and Numerical Modeling of Multiphase Flows: CFD and its Experimental Validation for Multiphase Flows: The State-of-the-Art", Cargèse, Corsica, France, 2012.

Shantanu Roy, "Multi-Scale Modeling: Some Perspectives from Chemical Engineering", Invited lecture delivered at the BRNS theme meeting on Multiphysics Coupling and Multiscale Modeling (MULTI-2012), Mumbai, 2012.

Shantanu Roy, Rajesh K. Upadhyay, Ashish Abhinit and Nitesh Kansal, "Looking Inside Multiphase Reactors: Some Observations from RPT and DEM Modeling", Invited lecture delivered at *the 2nd Indo-German Workshop on Advances in Reaction and Separation Processes*, Bad Herrenalb, Germany, 2012.

Shantanu Roy, "Dynamic Flow Structure in Multiphase Systems using Single Radio-Labelled Particle Tracking", Invited lecture presented at the *IUTAM Symposium on Mobile Particulate Systems: Kinematics, Rheology and Complex Phenomena*, Bangalore, 2012.

Rajesh K. Upadhyay and Shantanu Roy, "Dynamics of binary fluidized Beds, *Keynote lecture* presented at *the Ninth International Conference on Gas-Liquid-Solid Reactor Engineering (GLS-9)*, as part of the *World Congress of Chemical Engineering (WCCE-8)*, Montreal, Canada (*Session GLS1B, Paper 0784*), 2009.

Shantanu Roy and M. P. Dudukovic, 'Flow Mapping and Modeling of Liquid-Solid Risers', Presented at *Chemical Reactor Engineering VIII: Novel Reactor Engineering for the New Millennium*, Barga, Italy, June 24-29, 2001.

M. P. Dudukovic, Shantanu Roy and M. H. Al-Dahhan, 'Flow Mapping and Modeling of Liquid-Solid Risers', Presented at *XV International Conference of Chemical Reactors CHEMREACTOR XV*, Helsinki, Finland, June 5-8, 2001.

OTHER PROFESSIONAL ACTIVITIES

- Reviewer for: AIChE Journal, Chemical Engineering Science, Industrial and Engineering Chemistry Research, Chemical Engineering and Processing, Chemical Engineering Journal, International Journal of Chemical Reactor Engineering, Asia-Pacific Journal of Chemical Engineering, Fuel, Energy and Fuels
- Reviewer (project proposals and assessment) for Department of Science and Technology (India), Board for Research in Nuclear Sciences (India), NSERC (Canada), Australia Research Council, International Atomic Energy Agency (IAEA)
- Service as expert for Technology Development Board (TDB), Department of Science and Technology (DST), Govt. of India, for assessing business feasibility, progress and commercialization of incubated and start-up companies
- Co-organizer of IAEA/RCA Regional Training Course on Application of Radiotracing and Radioactive Particle Tracking Technique for Flow Visualization and Design, New Delhi, 2011.
- On organizing committee of ChemCon 2005, the Annual Meeting of the Indian Institute of Chemical Engineers, New Delhi, December 2005
- On organizing committee and International Scientific Advisory Board (ISAC) of GLS 8: International Conference of Gas-Liquid-Solid Reactor Engineering, to be held in New Delhi, December 2007
- On International Scientific Advisory Board (ISAC) of GLS 9: International Conference of Gas-Liquid-Solid Reactor Engineering, Montreal, August 2009 (as part of the World Congress of Chemical Engineering)
- Represented IIT Delhi at the Total Education and Energy Seminar organized by Total S.A., Paris, France, March 2009
- Department Research Committee convener for Dept. of Chemical Engineering, IIT Delhi (2006-2012)
- Coordinator, Curriculum Review Committee (CRC), Dept. of Chemical Engineering, IIT Delhi (2012 - 2013)
- Coordinator, Faculty Search Committee (FSC), Dept. of Chemical Engineering, IIT Delhi (2012 - 2016)

REFERENCES

Available on request.