

Summary of Select Professional Activities

- A. Teaching Interests
 - B. Research interests
 - C. Select Sponsored Projects Undertaken
 - D. Products / Technologies Developed
 - E. Technology Transfer
 - F. Consultancy Projects Undertaken
 - G. Outreach Activities (Continuing Education Courses Conducted for Industries)
 - H. Institute Administrative Activities
 - I. Other Professional Activities
 - a) *Journal Review*
 - b) *Advisory work*
 - c) *Conferences Organized*
 - J. Awards received
-

A. Teaching Interests

1. Chemical Engineering Thermodynamics I
2. Chemical Engineering Thermodynamics II
3. Introduction to Transport Phenomena
4. Process Safety and Risk Management
5. Stochastic Processes
6. Probabilistic Methods in Engineering Planning and Design
7. Chemical Process Plant Design

B. Research Interests

1. Process Safety and Risk Management
2. Industrial Risk Governance
3. Socio-economic Aspects of Risk Management
4. Supercritical Fluid-based Processing
5. Colloidal and Interfacial Engineering

C. Select Sponsored Projects Undertaken

1. Supercritical Fluid Extraction Systems (SCFE) Design; Sponsor: Ministry of Human resources and Development (1999-2003)
2. Development of Supercritical Fluids as Media in Semi-conductor Applications; Sponsor: Applied Materials Inc., USA (2015-16)
3. Supercritical Fluid-based Dyeing of Polyester and Cotton; Sponsor: Synthetic Art Silk Mills Research Association Mumbai (SASMIRA) (2015-16)
4. Extraction of Impurities from Ion-exchange Resins using Supercritical Carbon Dioxide Sponsor: Thermax Ltd. (2018-19)

5. Extraction of Algal Metabolites using Supercritical Carbon Dioxide (2019-20); Sponsor: Vectrogen Biologicals Pvt. Ltd (2019-2020)
6. Supercritical Fluid Extraction of Vanillin, Sponsor: M/s. Tevichem Pvt. Ltd. (2024-25)
7. Recycling of PVDC using Supercritical Fluid Water Medium, Sponsor: M/s. Solvay Ltd. (2024 – till date)

D. Products / Technologies Developed

1. Supercritical Fluid Extraction Pilot Plant (1997)
2. Pilot plant sold to M/s. Paints and General Industries (Sri Lanka, 2000); Commercial Plant Sold to M/s. Sami Labs (Bangalore, 2002)
3. Supercritical Fluid Textile Dyeing Plant: Pilot plant designed, developed and manufactured for M/s. Synthetic and Art Silk Mills Research Association (SASMIRA, Mumbai), (2013).
4. An experimental system and an improved protocol for carrying out nano-scale etching of semiconductor surfaces in supercritical CO₂ atmosphere was developed as part of the project on "Development of Supercritical Fluids as Media in semiconductor Applications" sponsored by M/s. Applied Materials Inc., USA (2015-16)

E. Technology Transfer

1. Supercritical Fluid Extraction System Design: transferred to M/s Deven Supercriticals Pvt. Ltd. (Mumbai)
2. Pilot plant sold to M/s. Paints and General Industries (Sri Lanka, 2000); Commercial Plant Sold to M/s. Sami Labs (Bangalore, 2002)
3. Supercritical Fluid Textile Dyeing Plant: Pilot plant designed, developed and manufactured for M/s. Synthetic and Art Silk Mills Research Association (SASMIRA, Mumbai), (2013).

F. Select Consultancy Projects Undertaken

1. HAZOP Study of a Batch Reactor (2004)
2. Risk Assessment of Modification and Re-Allocation Upstream Cooler Train 2 of LLDPE Plant (2005)
3. Safety Assessment of a Batch Oxidation Reactor (2006)
4. Case Study of Supercritical Fluid Plant Operation (2007)
5. Study of feasibility of extraction of spice oils from turmeric and ginger in Southern Orissa (2008)
6. Production of API Nanoparticle using Super Critical Carbon Dioxide (2009)
7. Supercritical carbon dioxide extraction of Oil and Squalene from Amaranthus seeds (2008)
8. Review of Export Oriented Project for Spice Extracts by SCFE Technology (2009)
9. De-odourization of Sunflower Wax by Supercritical Fluid Processing (2010)
10. Development of Screening Criteria for Hazardous Raw Materials (2010)
11. Extraction of Organic Matter from Coal Through Supercritical Fluid (2011)
12. Basic Engineering for Bench- and Semi-commercial Scale Supercritical Fluid Extraction Plant (2012)

13. Development of Simulation Model for Vent Protection with CO₂ Fire Protection System (2012)
14. Investigation of a Warehouse Fire Incident (2013)
15. Hazard Analysis of Hydrogen Peroxide Storage System (2013)
16. Design and Development of Supercritical Fluid Textile Dyeing Unit (2014)
17. Investigation of Fire and Explosion Insurance Claim (2015)
18. Review of Hazardous Waste Audit Report for a Chemical Plant (2016)
19. Review of Water Audit for a Chemical Plant (2017)
20. Review and Advice on Treatability Study Report for ETP for a Pharmaceuticals Major (2017)
21. Review and Advice on Treatability Study Report for ETP for a Pharmaceuticals Major Mylan Pharmaceuticals (2017)
22. JNPT Liquid Chemical Berth Users Association - HAZOP Study of Shallow Water Berths (2017)
23. Review of Treatability Studies for Effluent Treatment Plant and Assessment of Adequacy of Air Pollution Control Equipment for a Pharmaceuticals Major (2017)
24. Review of Environmental Audit for M/s. TI Systems (Pvt.) Limited (2017)
25. Evaluation of M/s. IGPL Report on Process Intensification (2017)
26. Assessment of the Existing Water and Air Pollution Control Systems employed by M/s. SGG India (P) Ltd (2018)
27. Assessment of Poly-Aluminum Chloride as an Industrial Coagulant (2018)
28. Assessment of Treatability Study and Design Adequacy for Effluent Treatment Plant of a Chemical Major (2018)
29. Assessment of Study of Groundwater Quality in the Identified Periphery of M/s SGIPL Plant (2018)
30. Assessment of Butadiene Venting System for a Chemical Plant (2018)
31. Review and Assessment of Hazardous Waste Audit Study for a Logistics Plant (2019)
32. Review and Evaluation of Study on "Groundwater Quality Assessment" in the Periphery of M/s. EBL Plant (Ahmednagar) (2019)
33. Investigation of the Failure of Condensers and Reboiler of the Propylene Recovery Unit at HPCL Plant, Vishakhapatnam (2019)
34. Review and Assessment of Treatability Report for M/s. RP Industries (2019)
35. Review and Appraisal of Adequacy Assessment and Performance Audit of the Common Effluent Treatment Plant, MIDC, Mahad, Maharashtra (2020)
36. Review of Design, Efficacy and Adequacy of Effluent Treatment Plant and Adoption of Zero-Liquid-Discharge Strategy by M/s. EKCL (2020)
37. Assessment of Adequacy and Efficacy of Effluent Treatment System for a Pharmaceutical Major (2020)
38. Investigation of a Catastrophic Distillation Column Failure for a Chemical Plant (2021)
39. Assessment of Project Report of a Common Fire Fighting Facility for Indian Oil and Gas Majors (2022)
40. Investigation of Catastrophic Failure of a Large-scale Sulfuric Acid Storage Tank for a Chemical Plant (2023)

G. Outreach Activities (Continuing Education Courses Conducted for Industries)

1. Safety Strategies for the Chemical Industries (1994)
2. Reliability Modeling and Evaluation (1995)
3. Introduction to Colloid & Interfacial Science for FMCG Sector (2000)
4. Risk Assessment for Process Industry (2001)
5. Hazard and Risk Evaluation Methods for the Chemical Industry (2001)
6. Hazard and Risk Assessment in Chemical Process Industry: Current Methodologies (2002)
7. Hazard and Risk Assessment in Refineries and Petrochemical Industry (2002)
8. Loss Prevention in Process Industries (2003)
9. Quantitative Risk Assessment for Chemical Processes (2003)
10. HAZID and HAZAN (2004)
11. Risk Analysis and Management (2004)
12. Learning from Chemical Process Accident Analysis (2004)
13. Risk Analysis and Risk Management: Engineering Aspects (2005)
14. Chemical Process Accident Analysis and Investigation (2005)
15. Advanced Pipeline Technology (2006)
16. Decision Making for Process Risk Management (2006)
17. Pipeline Risk Assessment (2007)
18. Process Safety and Risk Management (2008)
19. Extraction and Processing with Supercritical Fluids (2009)
20. Process Safety through Hazard Evaluation (2015)
21. Process Hazard Evaluation and Loss Prevention (2018)
22. Layer of Protection Analysis (2018)
23. Chemical Process Quantitative Risk Assessment (2018)
24. Reliability, Availability and Maintainability Analysis: Theory and Applications (2019)
25. Assessment of Project Proposal on 10 TPD Synthetic Oil and Syngas from Industrial / Domestic End of the Life Plastic Wastes (2019)
26. Developing Material Safety Data Sheets (2020)
27. Chemical Process Risk Assessment (2020)
28. Chemical Process Accident Investigation (2020)

H. Institute Administrative Activities

1. Faculty-in-charge, Information Management Cell, IIT Bombay (2007-2010)
2. Editor, IIT Bombay R&D Brochure (2012-2015)
3. Member, Institute Safety Committee (2017-2020)
4. Member, Institute Fire and Safety Section Committee (2020-2024)

I. Other Professional Activities

- a) *Reviewer for the following journals*

- i. Journal of Petroleum Science
- ii. Journal of the Indian Institute of Science
- iii. Journal of the Indian Institute of Chemical Engineers
- iv. Chemical Engineering Science
- v. Journal of Loss Prevention in Process Industries
- vi. Journal of Hazardous Materials
- vii. Industrial & Engineering Chemistry Research
- viii. Indian Chemical Engineer
- ix. Journal of the Indian Chemical Society
- x. Engineering Failure Analysis
- xi. Process safety and Environmental Protection

b) *Advisory Work*

- i. Advisor to National Safety Council, Mumbai, on Risk Assessment for Process Plants (2001 - 2004)
- ii. Advice for preparation of document on "Code of Practice on Hazard Identification and Risk Analysis for the Bureau of Indian Standards (February – March 2003).
- iii. Advisor to New M/s. India Assurance Company Ltd. on Investigation of Process Accidents (2004 - 2005)
- iv. Member, Gexcon (Norway) India Advisory Board (2017 – till date)
- v. Member, Committee for Chemical Incident Investigations, established by the National Green Tribunal, India (2020-2024).

c) *Conferences Organized*

- i. Convener, Symposium on "21st Century Chemical Engineering: Visions and Perspectives", IIT Bombay, 24 March, 2001
- ii. Co-convener, 11th National Conference on Surfactants, Emulsions and Biocolloids, Mumbai, 11 – 13 December, 2003.
- iii. Co-convener, International Vision Zero Conference on Occupational Safety and Health, 18 - 20 February, 2019.
- iv. Convener, Workshop on Laboratory Safety, 4 September, 2019, IIT Bombay

J. Awards received

- a) NOCIL Award for Excellence in Design / Development of Process Plant (1997)
- b) P K Patwardhan Technology Development Award (2001)
- c) Best Paper Award at the 11th National Conference on Surfactants, Emulsions and Bio- colloids, Mumbai (2003)
- d) Best Paper Award at the 3rd Indian Congress on Quality, Environment, Energy and Safety Management Systems & 1st National Conference on Business Excellence (2004)
- e) Best Paper Award on "IIT Leadership in Research: Improving the Research Ecosystem of the IITs", at PANIIT Meet, IIT Madras (2008)
- f) Best Teacher Award at IIT Bombay (2019)

Contact

Name: Sandip Roy

Current Position: Professor (Adjunct)

Current Affiliation: Department of Chemical Engineering, Indian Institute of Technology Bombay,
Powai, Mumbai 400 076

Contact number: 022-2576 7249 / 981 929 3590

Email: sr@iitb.ac.in