

Dr. Sudip Das (Ph.D., Chemical Engineering)

Assistant Professor (Grade – I)

323, New Annex Building,

Department of Chemical Engineering, IIT Kharagpur

Email: sudip@che.iitkgp.ac.in; sudipdaschemeng@gmail.com

Member, American Institute of Chemical Engineers (AIChE)

Life Associate Member, Indian Institute of Chemical Engineers (IICChE)

C14 Fire Fitness certified, Fire Department of New York (FDNY)

RESEARCH Path *Sustainable decarbonization*

RESEARCH Foci

- Continuous synthesis of fine and specialty chemicals
- Heterogeneous catalysis-based process development
- Nonthermal plasma-assisted chemical reaction engineering

EDUCATIONAL Background

- Ph.D., Chemical Engineering, 2015-2022

Indian Institute of Technology Bombay, India

Supervisor: [Prof. Sanjay Mahajani](#)

Thesis: Catalyst and process development for cumene hydroperoxide-based synthesis of 2-phenylethanol

- B. Tech (Hons.) and M. Tech Dual Degree, Chemical Engineering, 2008-2013

Indian Institute of Technology Kharagpur, India

Supervisor: [Prof. Narayan C Pradhan](#)

Thesis: Steam methane reforming using Ni-based supported heterogeneous catalysts

WORK Experience

- Postdoctoral Research Associate (2023-25)

New York University, New York, United States

Supervisor: [Prof. Ryan Hartman](#)

Research Focus: Methane upgradation using cold plasma-liquid multiphase microfluidics

- Institute Postdoctoral Fellow (2022-23)

Indian Institute of Technology Bombay, Mumbai, India

Supervisor: [A/Prof. Dr. Ojus Mohan](#),

Research Focus: DFT-assisted Mechanistic Investigation of Perfumery Chemical Synthesis

- Research Engineer (2013-2015)

Process Group, Centre of Technical Excellence

Larsen & Toubro Hydrocarbon Engineering Limited, India

Focus Module: One of the world's largest single-stream ammonia-urea fertilizer complexes at Gujarat Narmada Valley Fertilizer Corp., India

PREDOCTORAL Internships

- Summer Research Intern, 2012

Indian Institute of Petroleum, Dehradun, Uttarakhand, India

Project Title: Study of Dry Reforming of Methane using Ceria-Zirconia Supported Nickel Catalysts

Supervisor: [Prof. Rajaram Bal](#)

- Summer Research Intern, 2011
University of Saskatchewan, Saskatoon, Canada
Project Title: Synthesis and Characterization of Multiwalled CNTs
Supervisor: [Prof. Ajay Dalai](#)
- Undergraduate Intern, 2010
Haldia Petrochemicals Ltd., West Bengal, India
Focus Module: Naphtha Cracking Unit

RESEARCH Skillsets

- **Experimental**

Glass and alloy-made stirred tank type and packed bed type reactor handling for solid catalyst assisted Gas-Vapor/Gas-Liquid/Plasma-Liquid/Liquid-Liquid reaction systems; Vapor-liquid equilibria measurement; Chip-based microreactor fabrication *via* lithography; Organic and inorganic hydroperoxide handling.

- **Analytical**

1-D and 2-D Gas Chromatography, Mass Spectroscopy coupled with GC, Optical Emission Spectroscopy, Raman Spectroscopy, FTIR Spectroscopy, Scanning and Transmission Electron Microscopy, ICP-AES/MS, Energy Dispersive Spectroscopy, X-ray Diffraction, BET Surface Area Analysis, Temperature Programmed Desorption/Oxidation/Reduction, Thermogravimetric Analysis, Oscilloscopic Data Analysis.

- **Computational**

Process modeling (*Aspen Plus, HYSYS, REFORM3PC, PROTreat*), Heat integration (*HINT*), Non-linear regression of family of ODEs and PDEs (*MATLAB, Polymath*), Techno-economic analysis (*TESARREC*), Density functional theory (*VASP*), Design of Experiments (*DesignExpert*), Design (*Creative Cloud, SolidWorks, AutoCAD*), Image analysis (*ImageJ*)

PUBLICATIONS and CONFERENCES

Journal Articles

- [Sudip Das](#), Mackenzie Meyer, Mark Kushner, and Ryan Hartman **Ignition of Non-Equilibrium Methane Dielectric Barrier Discharges in a Multiphase Plasma–Liquid Microfluidic Device**, *Lab on a Chip* 2025, 25, 2182-2192.
DOI: <https://doi.org/10.1039/D5LC00090D>
- [Sudip Das](#) **One-pot synthesis of phenylacetaldehyde from styrene *via* metal oxide catalysed oxidation in presence of cumene hydroperoxide**, *Flavour and Fragrance Journal* 2024, 39 (2), 172-180.
DOI: <https://doi.org/10.1002/ffj.3780>
- [Sudip Das](#), Sanjay Mahajani **Cumene hydroperoxide induced epoxidation of styrene using Cu₂O and PbO as catalysts**, *Industrial & Engineering Chemistry Research* 2022, 62 (3), 1286-1300.
DOI: <https://doi.org/10.1021/acs.iecr.2c03706>
- [Sudip Das](#), Sanjay Mahajani **Kinetics of One-Pot Regioselective Co-hydrogenation of Styrene Oxide and Aryl Alkenes: A Step toward Sustainable Development of a Novel Integrated Process for 2-Phenylethanol Production**, *Industrial & Engineering Chemistry Research* 2021, 60 (19), 6971-6980.
DOI: <https://doi.org/10.1021/acs.iecr.1c00154>

- [Sudip Das](#), Shashwata Ghosh, Mohd Nadeem, Srinivas Seethamraju, Sanjay M. Mahajani **Isobaric vapor liquid equilibria for binary mixtures of 2-phenylethanol with 1-phenylethanol, 2-phenylpropan-2-ol, ethylbenzene, and isopropyl benzene at 101.3 kPa** Journal of Chemical and Engineering Data 2021, 66 (4), 1754–1762.
DOI: <https://pubs.acs.org/doi/abs/10.1021/acs.jced.0c01040>
- [Sudip Das](#), Ayesha Patnaik, Sanjay Mahajani **Saturated vapor pressure, critical state parameters and vaporization enthalpy of 2-Phenyloxirane**, Fluid Phase Equilibria 2020, 530, 112892.
DOI: <https://doi.org/10.1016/j.fluid.2020.112892>
- [Sudip Das](#), Sashwata Ghosh, Akash Shinde, Sanjay Mahajani, Srinivas Seethamraju **Vapor–liquid equilibrium analysis for a binary system of acetophenone with 2-phenylethanol** Journal of Chemical & Engineering Data 2020, 65 (11), 5129-5136.
DOI: <https://doi.org/10.1021/acs.jced.0c00271>
- [Sudip Das](#), Amanraj Gupta, Dheerendra Singh, Sanjay Mahajani **La/Zn bimetallic oxide catalyst for epoxidation of styrene by cumene hydroperoxide: Kinetics and reaction engineering aspects**, Industrial & Engineering Chemistry Research 2019, 58 (18), 7448-7460.
DOI: <https://doi.org/10.1021/acs.iecr.8b05538>
- [Sudip Das](#), Manoj Patil, Pranav Baxi, Kedar Patwardhan, P Balaramakrishna **Characterization of vibration causing a two-phase flow in CO₂-removal process** Indian Chemical Engineer 2016, 58 (3), 268-278.
DOI: <https://doi.org/10.1080/00194506.2015.1044026>

Book Chapters

- Praveen K Ghodke, [Sudip Das](#), and Rohidas G Bhoi. **Reactive Chromatography: A Concept of Multifunctional Reactors** in the book *Chemical Engineering Essentials 2: Advanced Processes, Materials, and Sustainability*
DOI: <https://doi.org/10.1002/9781394372379.ch2>
- [Sudip Das](#), Kedar V Patwardhan, and Monojit Chakraborty. **Air-cooled Heat Exchangers** in the book *Smart Heat Transfer and Thermal Management: Leveraging AI, Machine Learning, and Soft Computing*
DOI: <https://doi.org/10.1016/B978-0-443-33881-6.00019-8>
- Saikat Saha, [Sudip Das](#), and Ajay Dalai. **Traditional Adsorbents** in the book *Adsorption Dynamics - from Technologies to Environmental Solutions*
Status: Manuscript accepted for publication (Cambridge Scholars)
- [Sudip Das](#), and Saswata Bose. **Biochar-Based Strategies for Heavy Metal Removal and Recovery** in the book *Biotreatment of Heavy Metals: Innovative Practices and Applications*
Status: Manuscript under preparation (Apple Academic Press)

Conferences and Symposia

- [Sudip Das](#) and Ryan Hartman **Ignition threshold of argon diluted methane in atmospheric plasma-liquid multiphase microreactor** North American Symposium on Chemical Reaction Engineering **2025**, Houston, United States (accepted for Oral presentation)
- [Sudip Das](#) and Ryan Hartman **Comprehending methane activation for plasma–liquid systems in a dielectric barrier discharge (DBD) microreactor chip** AIChE Annual Meeting **2024**, San Diego, United States [Oral presentation]

- [Sudip Das](#), Sanjay Mahajani, and Ojus Mohan **Mechanistic investigations of styrene epoxidation on Cu₂O** International Conference on Chemical Engineering Innovations and Sustainability **2023** Jadavpur, Kolkata [Oral presentation]
- [Sudip Das](#) and Sanjay Mahajani, **A novel route to produce styrene oxide** 4th North American Symposium on Chemical Reaction Engineering (NASCRE-4) **2019**, Houston, United States [Poster presentation]
- [Sudip Das](#) and Sanjay Mahajani, **A new hydroperoxide-based pathway to synthesize styrene oxide** Symposium on Chemical Reaction Engineering **2018**, CSIR-National Chemical Laboratory, Pune [Poster presentation]
- [Sudip Das](#) and Sanjay Mahajani, **A new pathway for styrene oxide manufacturing** Research Scholars' Symposium (RSS) **2017**, IIT Bombay [Oral presentation – Best presentation, Reaction Engineering and Catalysis]
- [Sudip Das](#), Pranav Baxi, Manoj Patil, P V Balaramakrishna **Root cause analysis and troubleshooting in an industrial amine-based CO₂ capture unit** Outstanding Young Chemical Engineer (OYCE) Award Conclave **2015**, Mumbai Regional Center (MRC) of IChE, Mumbai [Oral presentation – 1st Runner-up, Working Professional]
- [Sudip Das](#), Pranav Baxi, Manoj Patil, P V Balaramakrishna **An in-house developed software for front-end estimation of pressure drop in complex industrial piping network** 4th Technology Conclave **2014**, L&T Knowledge City, Vadodara [Poster presentation]
- [Sudip Das](#), Pranav Baxi, Manoj Patil, Kedar V Patwardhan, P V Balaramakrishna **Modeling of a multibed PSA column for an integrated ammonia syn-gas production plant** 67th Annual Session of IChE (CHEMCON) **2014**, Punjab University, Chandigarh [Oral presentation]
- [Sudip Das](#) and Narayan C Pradhan **MWCNT supported nickel catalysts for steam reforming of methane** 65th Annual Session of IChE (CHEMCON) **2012**, NIT Jalandhar [Oral presentation]

HONORS

- MHRD Travel grant in 2019 to Houston, United States
- NSF Travel grant in 2024 to San Diego, United States
- NSF Travel grant in 2025 to Houston, United States
- Runner-up, Outstanding Young Chemical Engineer, IChE MRC, 2015
- Life Associate Member of IChE
- Member of AIChE
- State Bank of India Asha Scholarship, 2011-13, India
- C14 Safety Certification by Fire Department of New York, United States
- NFPA 70E (United States) Certification for fire and electrical safety
- Summer Internship, University of Saskatchewan, Canada, in 2011
- Summer Internship, Indian Institute of Petroleum, Dehradun, India, in 2012
- NPTEL Teaching Assistance, Chemical Reaction Engineering II, in 2021 and 2022