



Dr. Monisha Mridha Mandal

Assistant Professor

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Academic Qualification

<u>Year</u>	<u>Degree</u>	<u>Institute</u>
2010	Ph. D in Chemical Engineering	IIT Delhi
2003	M.E in Chemical Engineering Process Design	NIT, Raipur
2001	B.E in Chemical Engineering	NIT, Raipur

Lecture Experience

Teaching Assistantship at Indian Institute of Technology Delhi (Jan 2004- Nov 2010)

- Tutorial classes of Chemical Reaction Engineering (CHL 103 & CHL 122)
- Assisted in Graduate and Post-graduate major project supervision and evaluation

Assistant Professor at Guru Gobind Singh Indraprastha University, New Delhi. ('A' Grade accreditation with NAAC, established by Government of NCT of Delhi) (Dec 2010 – Present date)

Job Description

Roles at this level involve a combination of research and teaching activities, with appropriate organization of these activities and contribution(s) to departmental as well as University administration.

Research Experience

Ph. D Research in Chemical Engineering, Indian Institute of Technology Delhi (IITD), (2004 – 2010) Supervisor: Professor K.D.P. Nigam

- Investigated the heat transfer performance as well as pressure drop of compressed air flowing in Tube in tube helical heat exchanger.
- Formulated Computational Fluid Dynamics (CFD) model to investigate the effect of fluid flow at various air pressures on heat transfer coefficient as well as pressure drop in Tube in tube helical heat exchanger.
- Carried out experiments as well as CFD modeling on heat transfer in Coiled Flow Inverter (CFI) heat exchanger at Pilot plant scale. Developed empirical correlation for pressure drop and heat transfer in the CFI heat exchanger.
- Predicted the development of velocity and thermal profiles of fluid flowing with high flow rates in CFI tube with uniform wall temperature by CFD modeling. Estimated the heat transfer coefficients of different fluids flowing through CFI.
- Quantified scalar mixing of fluids in straight helical coiled tube as well as CFI using CFD. Studied the effect of parameters such as number of bends, Reynolds number, Schmidt number on the mixing performance in CFI.

Project Scientist – IITD (Aug 2010-Nov 2010)

- Involved in design, fabrication, commissioning and installation of heat exchangers facility at pilot plant in project funded by Ministry of Chemicals & Fertilizers, India.
- Development of Design strategy for the scale- up and scale-down
- Coordination with the industries for transfer of technology to industrial scale

Research in ECPM and IMFS, Strasbourg, France (2008)

- Developed model for free radical polymerization of styrene in CFI at micro scale.
- Investigated the effect of diffusion coefficient in the device for different parameters such as monomer conversion, number average degree of polymerisation, poly dispersity indexes.
- The performance of CFI was compared with the results obtained in a conventional straight tube reactor having identical length and process conditions.

M.E. Chemical Engineering Project / Thesis (2003)

Project titled “Extraction of alumina from waste Red mud in an alumina refinery plant”.

Study was carried out to study the effect of different parameters such as concentration of solution, temperature and time on the recovery of alumina from waste red mud.

B.E. Chemical Engineering Project/ Thesis: 2001

Project titled “Design of plant for manufacture of Maleic Anhydride”.

Study was carried out to design a plant manufacturing maleic anhydride using the method of oxidation of benzene with vanadium pentoxide as catalyst. Various aspects such as mass balance, energy balance, safety, cost estimation were studied.

Industrial Training

Industry: National Aluminum Company Limited (NALCO), Damanjodi

Period : 4 weeks. (June 1999 to July 1999)

Responsibilities: Study of Alumina Refinery plant, process equipments & quality control

Industry: Fluent India Pvt. Ltd, Pune

Period : 4 days (14 – 17 Feb. 2005)

Responsibilities: Introductory Fluent & Gambit training

Computer Skills

Software: GAMBIT, Ansys FLUENT, CFD-ACE+ V2008, MATLAB

Courses/Workshops/Faculty Development Programme

- Two Week Workshop on “Research Methodology and Data Analysis” from 16th-29th Dec. 2016 at Guru Gobind Singh Indraprastha University, New Delhi.
- “Advanced Rheology Seminar & Workshop” at Jawaharlal Nehru University, Delhi on August 22, 2016
- 92nd Orientation course from 10 Nov. – 5th Dec. 2014 organized by Academic Staff College, Jawaharlal Nehru University, New Delhi.
- Faculty Development Program on “Multidisciplinary Approaches to research” from 17th Feb. – 1st March 2014 at USLLS, GGSIPU, New Delhi.
- Industry – Academia workshop on “Design of Refinery Distillation Columns”, 23-24th Oct.2013 at Indian Oil Institute of Petroleum Management, Gurgaon, Haryana, India.
- Industry – Academia workshop on “Refinery Process Technology: Advances through Research and Development”, 30th July 2013 at Indian Oil Corporation Limited (R&D), Faridabad, India.

Projects Undertaken

Project titled “Flow of Multiphase fluids in Coiled Flow Inverter” funded by Department of Science & Technology, Ministry of Science & Technology, GOI, India (19.03.2012- 19.03. 2015) under Fast Track Scheme For Young Scientists

- Numerically investigated the flow patterns and local phenomenon of oil/oil and oil/water two-phase flows in CFI.
- Numerically investigated the pressure drop of oil/oil and oil/water two-phase flows in CFI.
- Numerical study on mixing performance of crude oils in CFI
- Experiments were carried out on compact CFI heat exchanger at Pilot plant scale to study its heat transfer performance

Project titled “Liquid –liquid mixing in Coiled flow inverter“ funded by Guru Gobind Singh Indraprastha University, India (2016-2017) under Faculty grant research scheme

- To find rheological constants of Non Newtonian solution in straight and curved tubes.

Project titled “Experimental study on flow patterns of liquid-liquid flow in coiled micro tube“ funded by Guru Gobind Singh Indraprastha University, India (2017-2018) under Faculty grant research scheme

- Characterize flow patterns of liquid-liquid flow in coiled micro tube
- Study the effect of different inlets on flow patterns

Project titled “ Liquid-liquid flow in coiled tube“ funded by Guru Gobind Singh Indraprastha University, India (2018-2019) under Faculty grant research scheme

- Investigate the effect of viscosity ratio on hydrodynamics of oil and water flow through coiled tube

Publications

Journals

- Kriti Singh, SK Sharma, AK Jain, **M. M. Mandal**, Pankaj K Pandey, Removal of Copper Ion from Synthetic Wastewater using Aloe Vera as an Adsorbent” European Journal of Advances in Engineering and Technology, 2017, 4 (4): 249-254, ISSN: 2394 - 658X
- Ritu Shiromani, **Monisha Mridha Mandal**, Numerical study on flow and heat transfer of non newtonian fluids, International Journal of Current Research, 9, Issue, 09, 57991-57999, September, 2017, ISSN: 0975-833X
- **Monisha Mridha Mandal**, Palka Aggarwal, K.D.P. Nigam, Liquid-Liquid Mixing in Coiled Flow Inverter, Ind. Eng. Chem. Res., 50 (23), 13230-13235 (2011).

- **Monisha Mridha Mandal**, Christoph Serra, Yannick Hoarau, K.D.P. Nigam, 'Numerical Modeling of Polystyrene in Coiled Flow inverter'. *Microfluidics and Nanofluidics*, 10, 415-423 (2011).
- **Monisha Mridha Mandal**, Vimal Kumar and K.D.P. Nigam, 'Augmentation of heat transfer performance in Coiled Flow Inverter vis-à-vis conventional heat exchanger, *Chemical Engineering Science*, 65, 999-1007 (2010).
- **Monisha Mridha Mandal** and K. D. P. Nigam, Experimental Study on Pressure Drop and Heat Transfer of Turbulent Flow in Tube in Tube Helical Heat Exchanger, *Ind. Eng. Chem. Res.*, 48, 9318–9324 (2009).
- **Monisha Mridha** and K.D.P. Nigam, 'Coiled Flow Inverter as an Inline Mixer', *Chemical Engineering Science*, 63, 1724-1732 (2008).
- **Monisha Mridha** and K.D.P. Nigam, 'Numerical Study of Turbulent Forced Convection in Coiled Flow Inverter', *Chemical Engineering and Processing: Process Intensification*, **47**, **893-905 (2008)**.
- Vimal Kumar, **Monisha Mridha**, Burhanuddin Faizee and K. D. P. Nigam, 'Numerical Studies of a Tube-in-Tube Helically Coiled Heat Exchanger', *Chemical Engineering and Processing: Process Intensification*, 47, 2287-2295 (2008).
- Vimal Kumar, **Monisha Mridha**, A.K. Gupta and K.D.P. Nigam, 'Coiled Flow Inverter as a Heat Exchanger', *Chemical Engineering Science*, 62, 2386-2396 (2007).

Conferences

International

- Shivam Verma, Vivek Chauhan, Sumit Bharti, **Monisha Mridha Mandal**, Hydrodynamics of oil-water flow in coiled tube, International Research Symposium on Engineering and Technology August 28-30, 2018 , Singapore
- **Monisha Mridha Mandal**, Shivam Verma, Vivek Chauhan, A.Kashyap, P.Kaur, Experimental studies on flow of Non-Newtonian fluids in coiled tubes with small diameters, International Conference On Innovative Research in Applied Physical, Chemical, Mathematical Sciences, and Emerging Energy Technology for Sustainable Development (APCMSET-2018), 10th February 2018 held at Jawaharlal Nehru University, New Delhi
- **Monisha Mridha Mandal**, Anshumaan Dey, K.D.P.Nigam Numerical study on hydrodynamics of oil water flow in Coiled Flow Inverter, International Oil and Gas Conference and Exhibition, Petrotech 2016 from 5-7 Dec.2016, N. Delhi. http://uvilfeed.com/PetrotechProceedings/DAY2_MIN-RDS.html
- Vaibhav Kumar, **Monisha Mridha Mandal**, Numerical Study on Flow and Heat transfer of Non Newtonian fluids in Coiled micro tube, International conference on Green

Technology for Environmental Pollution Prevention and Control, 27th-29th September 2014, NIT Tiruchirappalli, Tamil Nadu, INDIA.

- **Monisha Mridha**, Vimal Kumar, and K.D.P Nigam. Temperature-Dependent Viscosity on Fully Developed Laminar Forced Convection of Polymeric Fluids in Curved Tube. 18th International Congress of Chemical and Process Engineering CHISA 2006, August 2006, Czech Republic.

National

- Shivam Verma, Vivek Chauhan, Sumit Bharti, **Monisha Mridha Mandal**, Flow Patterns of oil-water flow in coiled tube of small diameter, TEQIP –III sponsored National conference on Advances in Chemical Science and Technology, April 27-28, 2018 at Department of Chemical Engineering, Dr. B.R. Ambedkar National Institute of Technology, Jalandhar, India.
- Vaibhav Kumar, **Monisha Mridha Mandal**, Computational fluid dynamics (CFD) studies on liquid-liquid flow in tubular flow system, Proceedings of the 30th National Convention of Chemical Engineers' on the Theme "Recent trends in research, development and innovations in chemical Industries", September 6-7, 2014, NIT Agartala, Tripura
- **Monisha Mridha Mandal**, Priyanka Singh, Numerical investigations on hydrodynamics of Reverse Osmosis through porous membrane, National Conference on Innovation and Development in Chemical Technology, IDCT-2014, GGSIPU, New Delhi, INDIA
- Priyanka Singh, **Monisha Mridha Mandal**, Computational Fluid Dynamics study on Reverse Osmosis through porous membrane, CHEMCON 2013, ICT Mumbai, INDIA
- **Monisha Mridha Mandal**, Ritu Shiromani, Non-Newtonian fluid flow and heat transfer in coiled micro tube, CHEMCON 2012, NIT Jalandhar, INDIA.
- **Monisha Mridha**, Vimal Kumar, and K.D.P Nigam, Numerical study on heat transfer of turbulent flow in Coiled flow inverter, CHEMCON 2006, Bharuch, INDIA.

Academic Scholarships/Honors

- Recipient of research project under Fast Track Scheme for Young Scientist funded by Department of Science and Technology under the Ministry of Science and Technology, India.
- Independent reviewer in Peer reviewed international journal, Chemical Engineering and Processing: Process Intensification.
- Recipient of Scholarship from Science and Technology Section of the Embassy of France in India for a six months research project at Strasbourg, France.
- Recipient of project assistantship from Ministry of Chemicals & Fertilizers, India
- Member of IChE

Extra-curricular activities

Convener for organizing visit of delegates from ITESM, Monterrey, Mexico and IIT Delhi to University School of Chemical Technology, GGSIPU, N.Delhi

- Co-Convener of National Conference on Innovation and Development in Chemical Technology (IDCT 2014) held on February 28th - March 1st, 2014 at University School of Chemical Technology, GGSIPU, N.Delhi
- Faculty Coordinator of Poster/painting competition sponsored by Department Of Environment, Govt. Of Delhi at University School of Chemical Technology. GGSIPU, N.Delhi
- Faculty Coordinator of 'Sanshalation 2013', an annual Technical Fest of University School of Chemical Technology. GGSIPU, N.Delhi
- Actively volunteered and participated in organization of 58th Annual session of CHEMCON 2005 at IIT Delhi (14th - 17th Dec. 2005)
- An active member in school and college quiz team
- Member of school dramatics, dance and music team