

Dr. SURESHKUMAR YATIRAJULA

Assistant Professor

Department of Chemical Engineering

Indian Institute of Technology (Indian School of Mines), Dhanbad

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Education

Ph.D. in Chemical Engineering (2022)

Indian Institute of Technology (Indian School of Mines), Dhanbad, Jharkhand, India.

Thesis Title: Studies on structural properties and rheology of polymer solutions for enhanced oil recovery

Thesis Advisors: Prof. V.K.Saxena, IIT (ISM) Dhanbad, Prof. Ajay Mandal, IIT (ISM)

Dhanbad, and Prof. Abhijit P Deshpande, Department of Chemical Engineering, IIT Madras.

M. Tech. in Chemical Engineering (2009-2011)

Indian Institute of Technology (IIT), Madras, Chennai, Tamil Nadu, India.

Thesis Title: Rheology of aqueous CTAB/NaSal wormlike micelles

Thesis Advisor: Prof. Abhijit P Deshpande, Department of Chemical Engineering, IIT Madras.

B. Tech. in Chemical Engineering (2005-2009)

J.N.T.U College of Engineering, Anantapur, Andhra Pradesh, India.

Work Experience

- July 2012 onwards: Assistant Professor,
Department of Chemical Engineering,
Indian Institute of Technology (Indian School of
Mines), Dhanbad, Dhanbad, Jharkhand, India.
- Sep 2011 – June 2012: Engineer,
Projects and Development India Limited,
Sindri, Dhanbad, Jharkhand, India
- May 2011– Aug 2011: Project Associate,
Department of Chemical Engineering,
Indian Institute of Technology (IIT),
Madras, Chennai, Tamil Nadu, India.

Areas of Research Interest

- Rheology of Complex fluids- Supramolecular Gel, Water soluble polymers, Surfactants, Coal water Slurries. Food Rheology -Ragi.
- Heat Transfer applications
- Enhanced oil recovery (EOR)- Chemical/ CO₂
- Flow through porous media
- Drilling Fluids

Research projects

As principal investigator

1. Formulation and determine the viscosity of water-based paint with different concentrations and different batch volumes.
Project no: SCHNEIDER/2023-2034/1022/CHEMICAL] May 2023 –July 2023.
2. Synthesis of rheological and structural properties of thermos-responsive hydrogels.
Project No: FRS (57)/2013-2014/CHE, December 2013 to July 2018.
3. Studies on structure, dynamics, and rheology of colloid- polymer mixture.
Project No: TEQIP- II (15) 2013, July 2013- December 2015.

As co-investigator

1. Conversion of Anthracene Oil into High-Temperature Grease (For Phase I).
Project No: SAIL/2024-2025/1100/CHEMICAL] (April 2024- ongoing)
2. High Ash Coal Gasification and Associated Upstream and Downstream Processes (Coal to Chemicals, CTC).
Project No: CIL (8)/2017-2018/539/CHEMICAL ENGG]. July 2017-July2021 (Completed)

Consultancy work details

As Co-investigator

1. Testing of density and kinematic viscosity, Involved in Testing of HFO sample provided by NTPC, Patratu July 2020- Nov 2021.
Project No:1114(2)/2020/CY CHEMICAL ENGG (Completed)

Courses Taught

Teaching undergraduate and postgraduate courses in Chemical Engineering.

- ✓ Fluid Mechanics (2012-2018)
- ✓ Heat transfer (2012-2018)
- ✓ Rheology of Complex Fluids (2014-2015, 2019-2022)
- ✓ Chemical Process calculations (2018-2023)
- ✓ Chemical Process Plant Design and Economics (2014-2015)
- ✓ Process Equipment & Piping Design (2013-2014)
- ✓ Mechanical Operation (2017-18)
- ✓ Safety and Hazard Analysis in Process Industries (2017-18)
- ✓ Multicomponent Separation (2018-2019)
- ✓ Chemical Process Technology (2019-2020)
- ✓ Nanotechnology (2022-2023)
- ✓ Engineering Thermodynamics (2023-2024)
- ✓ Rheology (2022-2024)

Ph. D. Supervision (Ongoing)

- Mr. Srinivas Koppadi (23DP0099); Registration date 22/12/2023, Part-Time
Thesis Title: Characterization of extensional rheology of polymer solutions.
- Mr. Srinu Pitta (23DP0100); Registration date 22/12/2023, Part-Time
Thesis Title: Development of novel process and technology for reclamation and regeneration of Monoethylene Glycol (MEG) from produced water
- Mr. Vishal Kumar (23DR0204); Registration date 14/07/2023, Full-Time
Thesis Title: Studies on the characterization and rheology of polymeric surfactant Systems in oil recovery.
- Mr. Anurag Kumar Shastri (19DR0017); Registration date 01/08/2019, Full-Time
Thesis Title: Characterization and rheological behavior of coal-water slurries & their applications.

Advising B.Tech and M.Tech students

Advising B.Tech and M.Tech students on rheology of Water soluble polymers, Surfactants, Coal water Slurries, Microfibrillated Cellulose, algae, and enhanced oil recovery applications research projects.

- B.Tech supervision – three students (2011-15), one student (2012-16), four students (2013- 17), two students (2014-18), two students (2015-19). Three (2016-20), Two (2017-21), Three (2018-22), Four (2019-23) and Six (2020-24)
- M.Tech supervision – one Fuel engineering student (2012-14), two students (2014-16), three students (2016-18), three students (2017-19), one Student (2021-2023), and one Student (2022-2024).

List of Publications

1. Indrajit Pal, Supravat Ghosh, Subhajoy Sadhu, Anupam Kundu, Santanu Majumdar, **Suresh Kumar Yatirajula**, Jnanendra Rath, Partha Pratim Ray, Biswajit Dey Zn (II)-based mechanically flexible metallosupramolecular network: Investigating rheology, morphology, anti-bacterial effect and semiconducting device performances, *Inorganica Chimica Acta*, Volume 574, Pages 122413, Elsevier 2025.
2. Deblina Saha, Tamal Dey, Indrajit Pal, Anupam Kundu, Shreyasi Das, **Suresh Kumar Yatirajula**, Jnanendra Rath, Samit K Ray, Biswajit Dey Self-Healing Supramolecular Flexible Network of Zn (II): Exploring Chemo-Responsiveness, Antimicrobial Efficiency, and Variable Microelectronic Device Performances, *Langmuir*, Volume XX, Pages XXXX, ACS 2024.
3. Deblina Saha, Debojit Talukdar, Indrajit Pal, Santanu Majumdar, Gerald Lepcha, Subhajoy Sadhu, **Suresh Kumar Yatirajula**, Gaurav Das, Biswajit Dey. Mechanically Flexible Self-Healing Mg(II)-Metallogel: Approach of Triggering the ROS-Induced Apoptosis in Human Breast Cancer Cells, *Langmuir*, Volume 40, Pages 19816–19829, ACS 2024.
4. Deblina Saha, Tamal Dey, Indrajit Pal, Anupam Kundu, Santanu Majumdar, Subhajoy Sadhu, **Suresh Kumar Yatirajula**, Jnanendra Rath, Samit K Ray, Biswajit Dey Solvent-Directed Bioactive Supramolecular Zinc (II)–Metallogels: Exploring Semiconducting Aptitudes of Fabricating p–n Junction and Schottky Devices, *Journal ACS Applied Bio Materials*, Volume 7, Pages 5609-5621, ACS 2024.
5. Indrajit Pal, Nitesh Kumar Pathak, Santanu Majumdar, Gerald Lepcha, Amiya Dey, **Suresh Kumar Yatirajula**, Umakanta Tripathy, Biswajit Dey Comparative Vision of Nonlinear Thermo-Optical Features and Third-Order Susceptibility of Mechanically Flexible Metallosupramolecular Self-Repairing Networks with Isomeric Organic Acids, *Inorganic Chemistry*, Volume 63, Pages 12003–12016 ACS 2024
6. Indrajit Pal, Nitesh Kumar Pathak, Santanu Majumdar, Gerald Lepcha, Amiya Dey, **Suresh Kumar Yatirajula**, Umakanta Tripathy, and Biswajit Dey, Solvent-Driven Variations of Third-Order Nonlinear Thermo-Optical Features of Glutaric Acid-Directed Self-Healing Supramolecular Ni(II) Metallogels, *Langmuir*, Volume 39, Pages 16584-16595, ACS 2023.
7. Indrajit Pal, Santanu Majumdar, Gerald Lepcha, Kazi Tawsif Ahmed, **Suresh Kumar Yatirajula**, Subhratanu Bhattacharya, Rudra Chakravarti, Bireswar Bhattacharya, Swadesh Ranjan Biswas, and Biswajit Dey, Exploration of Variable Solvent Directed Self-Healable Supramolecular M(II)-Metallogels (M = Co, Ni, Zn) of Azelaic Acid: Investigating Temperature-Dependent Ion Conductivity and Antibacterial Efficiency, *ACS Applied Bio Materials*, Volume 6, Page 5442–5457, ACS 2023.
8. Jinesh Machale, **Suresh Kumar Yatirajula**, and Vinod Kumar Saxena, Implementation of Xanthan Gum–Polyacrylamide Blend, Surfactant, and Alkali Assembly for Enhanced Oil Recovery: A Rheological and Phase Behavior Analyses Approach, *Petroleum Science and Technology*, 1-12, Taylor & Francis 2022.
9. Santosh Routu, Jagan Mohan Rao Malla, **Suresh Kumar Yatirajula**, Nageswara Rao Uppala Effect of hydrogen coverage on elastic and optical properties of silicene: a first-

- principle study Journal of Molecular Modeling, Volume 28, Springer 2022.
10. Sweta Sarangi, **Suresh Kumar Yatirajula**, and Vinod Kumar Saxena Evaluation of linear and nonlinear rheology of micro fibrillated cellulose, Journal of Coatings Technology and Research, volume 18, pages1401–1411, Springer 2021.
 11. **Suresh Kumar Yatirajula**, Anuj Srivastava, Vinod Kumar Saxena, and Jagadeeshwar Kodavaty. Flow behavior analysis of Chlorella Vulgaris microalgal biomass, Heliyon, e01845, Elsevier 2019.

Conferences Proceedings

1. Praveen Kumar Jha, Vinod Kumar Saxena, **Suresh Kumar Yatirajula**, Nikhil Nambiar, Effect of Particle Size Distribution (PSD) on the Rheology of Coal Water Slurry (CWS), International Journal of Chemical Engineering and Processing
2. Ankit Jain, Vivek Bajpai and **Suresh Kumar Yatirajula**, Fabrication and Characterization of Conical Micro Dimple Textures on Ti6Al4V for Higher Biocompatibility ASME 2020 15th International Manufacturing Science and Engineering Conference
3. Rishi Jain, Shreyash Yadav, Sachin Bisht, Jagadeeshwar Kodavaty, **Suresh Kumar Yatirajula**, Effect of concentration, size, granularity, shear time and temperature on rheological properties of coal water slurries, IOP Conference Series: Materials Science and Engineering
4. R Santosh, U Nageswara Rao, M Rao, **Suresh Kumar Yathirajula**, V Kumar, The Anisotropy and Birefringence of Monolayer WS Semiconductor, Micro and Nanoelectronics Devices, Circuits and Systems
5. Sweta Sarangi, **Suresh Kumar Yatirajula**, Microfibrillated Cellulose Based Renewable Smart Material: Preparation and Rheological Studies of Suspension International Journal of Research In Science & Engineering, CHEMCON Special Issue: March 2018
6. Praveen Kumar Jha, Vinod Kumar Saxena, **Suresh Kumar Yatirajula**, Ayanagounder Kumar, Impact of Natural Polymer (Xanthan Gum) and Bentonite Clay on the Development of Oil-In- Water (O/W) Emulsion Drilling Fluids, International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075 (Online), Volume-10 Issue-10, August 2021.

Book Chapter

1. Jagadeeshwar Kodavaty, **Suresh Kumar Yatirajula**, Abhishek Kumar Gupta, and Rejeswara Reddy Erva, **Hydrogels** Fundamentals to Advanced Energy Applications, Characteristics of Hydrogels, Chapter 5, Pages 83-100, 1st Edition, CRC Press, September 2023.

International Conferences

1. **Pinki Kashyap**, Ejaz Ahmad, and Suresh Kumar Yatirajula, “A rheological study of water based drilling fluid Bentonite clay in the presence of natural polymers”, for Oral presentation at 75th Annual session of Indian Institute of Chemical Engineers, Indian Chemical Engineering Congress, December 27-30, 2022, HBTU Kanpur.
2. **Suresh Kumar Yatirajula** and V. K Saxena, “A rheological study of nano particle effect on polysaccharide solutions used for enhanced oil recovery”, Abstract has been **accepted** for Oral presentation at 71th Annual session of Indian Institute of Chemical Engineers, Indian Chemical Engineering Congress (CHEMCON 2018), December 27-30, 2018, National Institute of Technology Jalandhar.
3. **Suresh Kumar Yatirajula**, V.K. Saxena, and Abhijit P. Deshpande, “A rheological investigation of nano particle effect on self-assembling polymeric solutions used for enhanced oil recovery”, Oral Paper presentation at International Conference on Advanced nanomaterial and Nanotechnology(ICANN2017), December 18-21, 2017, Centre for Nanotechnology, Indian Institute of Technology Guwahati, Guwahati, Assam, India.
4. Sweta Sarangi and **Suresh Kumar Yatirajula** , “Rheological Studies of Microfibrillated Cellulose From Agricultural Residues”, Poster presentation at Complex Fluids 2017 (Compflu 2017) (Organized by Indian Society of Rheology), December 2017, 18-20, 2017, Department of Chemical Engineering Indian Institute of Technology Madras, Chennai, Tamilnadu, India.
5. Sweta Sarangi and **Suresh Kumar Yatirajula** , “Microfibrillated Cellulose based renewable smart material: Preparation and rheological studies of suspension”, Oral Paper presentation at 70th Annual session of Indian Institute of Chemical Engineers, Indian Chemical Engineering Congress (CHEMCON 2017), December 27-30, 2017, Department of Chemical Engineering, Haldia Institute of Technology, Haldia, West Bengal, India. [Conference proceedings published in International Journal of Research In Science & Engineering, CHEMCON Special Issue : March 2018, 258-263, E-ISSN:- 2394-8299, P-ISSN:- 2394-8280]
6. Anuj Shrivastava, **Suresh Kumar Yatirajula** and V. K Saxena, “Rheological study of pretreated chlorella vulgaris microalgae slurry for bio refinery operation”, Oral Paper presentation at 70th Annual session of Indian Institute of Chemical Engineers, Indian Chemical Engineering Congress (CHEMCON 2017), December 27-30, 2017, Department of Chemical Engineering , Haldia Institute of Technology, Haldia, West Bengal, India.
7. Vinay Kumar Viswakarma , I.M. Mishra and **Suresh Kumar Yatirajula** , “Rheological study of coal-water slurry prepared from high-ash indian coal”, Oral Paper presentation at 70th Annual session of Indian Institute of Chemical Engineers, Indian Chemical

Engineering Congress (CHEMCON 2017), December 27-30, 2017, Department of Chemical Engineering, Haldia Institute of Technology, Haldia, West Bengal, India.

8. Jinesh Subhash Machale and **Suresh Kumar Yatirajula**, “Preparation, characterization and Rheological behaviour of Polyacrylamide, Polysaccharides and blend solutions in Enhanced Oil Recovery application”, Poster presentation at Complex Fluids 2016 (Compflu 2016) (Organized by Indian Society of Rheology), January 2-4, 2016, Lecture Hall Complex, IISER–Pune, Pune, India.
9. **Suresh Kumar Yatirajula**, V.K. Saxena, and Abhijit P. Deshpande, “Linear and nonlinear rheological characterization of Self assembling polymeric systems for Enhanced oil recovery”, Oral Paper presentation at International Conference on Rheology and Fluid Mechanics, November 10-11, 2016, Alicante, Spain. [Conference proceedings published in Journal of Chemical Engineering & process Technology, November 2016, Volume 7, issue 5, ISSN:2157-7048]
10. Kajal Ingtipi and **Suresh Kumar Yatirajula**, “Rheological studies of anionic and cationic surfactant with β -Cyclodextrin”, Poster presentation at 68th Annual session of Indian Institute of Chemical Engineers, Indian Chemical Engineering Congress (CHEMCON 2015), December 27-30, 2015, Department of Chemical Engineering, Indian Institute of Technology Guwahati, Guwahati, Assam, India.
11. **Suresh Kumar Yatirajula**, V.K. Saxena and Samardeep Prasad., “Rheological behavior of coal water slurries”, Oral Paper presentation at International Conference on Advances in Chemical Engineering (ICACE-2013), April 5-6, 2013, Department of Chemical Engineering, National Institute of Technology Raipur, Raipur, Chhattisgarh, India .
12. **Suresh Kumar Yatirajula**, and Abhijit P. Deshpande, “Rheology of Aqueous CTAB/Nasal Wormlike Micelles”, Oral Paper presentation at 9th World Congress of Chemical Engineering (WCCE9) and 15th Asian Pacific Confederation of Chemical Engineering Congress (APCChE2013), August 18-23, 2013, Coex, Seoul, South Korea.

Workshop/Short-term Course

- ❖ As a Co-Convener of Net-Zero Emission Technologies for Sustainable Development: Challenges and Opportunities NOET national conference 2024
- ❖ Delivered lectures as a resource person on the topic of Rheological measurements and Particle Size Measurement Techniques on 24th and 29th July 2023 a one-week workshop on “Contemporary Techniques in Chemical Engineering Characterizations” from 24th-30th July 2023 under the aegis of DST-STUTI project.
- ❖ As an organizing Committee member of Net-Zero Emission Technologies for Sustainable Development: Challenges and Opportunities NOET conference 2023
- ❖ As Treasurer, a Two-day Conference on " Net-Zero Emission Technologies for Sustainable

Development: Challenges and Opportunities (N0ET - 2022), organized by the Department of Chemical Engineering, IIT (ISM) Dhanbad from 12-13 December 2022.

- ❖ As an advisory Committee member a three-day online workshop on "Future of Chemical Engineering" (FCE 2021) under the support of TEQIP-III, organized Department of Chemical Engineering, IIT (ISM) Dhanbad from 19 March 2021 to 21 March 2021.
- ❖ On Momentum Transfer and Process Control course topics delivered a couple of lectures at the Department of Chemical Engineering JNTUA College of Engineering (Autonomous) Anantapuramu- (2021-2022) through online mode.
- ❖ Attended UGC-Networking Resource Centre (UGC-NRC) workshop on “Soft and Active Matter” at School of Physics, University of Hyderabad, Hyderabad, Telangana, India, February 10 -18, 2018.
- ❖ Attended TEQIP-KIC National course on “Surfactant mediated pollutant removal techniques” at Centre for the Environment, Indian Institute of Technology Guwahati, Guwahati, Assam, India, January 19-23, 2016.
- ❖ Attended Global Initiative of Academic Networks (GIAN) course on "Enhanced Oil Recovery from Heavy Oil and Fractured Reservoirs" at Department of Ocean Engineering, Indian Institute of Technology Madras, Chennai, Tamil Nadu, India, September 11-17, 2016.
- ❖ Attended Workshop on “Intellectual Property Rights” (Under TEQIP-II initiative) at Indian Institute of Technology (Indian School of Mines) Dhanbad, Jharkhand, India, February 14, 2014.
- ❖ Attended Industry-Academia workshop on “Simulation & Modelling in the process industry” at Indian Oil Management Academy (IMA), Haldia Refinery, West Bengal, India, July 25-28, 2012.

Member of the following departmental/Institutes committees:

- Convener, DUGC (Period: Oct 2022 to Oct 2024).
- Member, DFSC (Period: 2021 to 2024).
- Students’ Counsellor (Games & Sports) (2024-25)
- Member, MTech BOCS (Period: 2013 to 2022).
- Member, DPAC (Period: 2012 to Aug 2018 and 2021 to 2024).
- TEQIP-III Departmental Coordinator (Period 2017 to 2021).
- Warden, Amber Hostel (Period 2024 to till date)
- SPEC Board Member for Inter IIT sports Meet (students & staff)
- Member, DRC (Period: 2012 to 2013).
- Departmental Member. CRF committee (Period: 2012 to 2013).
- Faculty-in-charge of Time Table committee (Period: 2012 to 2016).
- Faculty Advisory to B.Tech students (2011-15) and (2015-19) Batch looked after

student's issues, registration/feedback process.

- As a resource person for Malvaiya Mission Teacher Training Programme (NEP 2020) in theme- Research and Development from 2023-2024.
- Member, Departmental Moderation Board for UG programmes. (Period: 2012 to 2013).
- Member, Tabulator Monsoon and winter semester (regular/special) exam session 2012-13.

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