CURRICULUM VITAE

Dr. Pawan Gupta

Assistant Professor

| Ph.D. (IIT Madras)| M. Tech (PE) | B.E. (ME)

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https://iitism.irins.org/profile/339970

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PROFESSIONAL EXPERIENCE

Current Employer : Indian Institute of Technology(Indian School of Mines) Dhanbad

Tenure : August 2022- Present

Position held : Assistant Professor

Research Guidance at IIT(ISM) Dhanbad

PhD Students: 02; M.Tech Students: 02; B.Tech Students: 01

Courses Taught at IIT(ISM Dhanbad):

1. Unconventional HC Energy, B.Tech, M.tech (AY 2022-23)
2. EOR Lab, B.Tech (AY 2022-23)
3. Petroleum Economics, M.tech (AY 2022-23)
4. Reservoir Engineering Lab, B.Tech (AY 2022-23)

Administrative Responsibilities at IIT(ISM) Dhanbad

1. Anti-Ragging Squad 2022-23/2024-25
2. DPAC Member
3. DPGC Member
4. IADC Faculty Advisor
5. Health Committee Member
6. Involved in Physical registration of the documents
7. M.Tech Coordinator
8. Warden Amber Hostel

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RESEARCH AND TEACHING EXPERIENCE DURING PH.D.

Research/Consultancy Experience

- **Research Scholar and Pre-doc fellow** at IIT Madras under the MHRD scholarship from 2015 to 2019 (Link)

- From April to November 2018, I was involved in a project on "**Effect of Lubricants on the Rheology and Foaming Properties of Water-Based Drilling Fluid**". This eight-month project was jointly executed between **TOTAL oil and gas and IIT Madras** under the

supervision of Dr. Jitendra Sangwai. During the project, I was involved in extensive experimental work to study the rheology of various drilling fluids (nano and ester water-based), their modeling studies, literature survey, analysis, and preparing the final report. (Link)

- I have worked on a **GAIL-sponsored project on the CH_4-CO_2 exchange** process from a simulated hydrate reservoir, from 2018-2019 at IIT Madras under the guidance of Dr. Jitendra Sangwai and Dr. Rajnish Kumar.

DISSERTATION

- **Ph.D.**: Phase Equilibrium, Thermodynamic Modeling, Kinetics Natural Gas from Methane Hydrate using Chemical Inhibitors. Under the guidance of Dr. Jitendra Sangwai, IIT Madras.

- **M.Tech.**: "Effect of Suspended and Dissolved Substance on Formation and Dissociation of Gas Hydrates". Under the guidance of Prof. Sukumar Laik and Dr. Ajay Mandal at ISM Dhanbad.

CONSULTANCY PROJECTS

- EDP7200/2023-24: Current workflow in Oil and Gas Industry "Current Workflows in Oil and Gas Industry" is being organised by the Department of Petroleum Engineering during the period 11 – 15 March 2024 at IIIF, IIT (ISM) Delhi Centre, NBCC Building, Okhla Phase 1, Delhi.

SPONSORED PROJECTS

- SERB Sponsored Project, file number SRG/2021/001833 "Methane Production from Gas Hydrates Using Slow Depressurization and Carbon Dioxide Injection" From 14 Jan 2022 to 14 Jan 2024. **Project cost Rs. 30,38,690**. (Link)
- ORSP Sponsored Project on "Study of Hydrate Inhibitors Through Their Thermodynamic and Rheological Properties: Application to Methane Production from Hydrate And Flow Assurance". **Project cost Rs. 1,52,000. (**Link)

PUBLICATIONS

ARTICLES/CHAPTERS PUBLISHED IN THE BOOKS

- Nair V.C., **Gupta P.**, Sangwai J.S. Gas Hydrates as a Potential Energy Resource for Energy Sustainability. In: De S., Bandyopadhyay S., Assadi M., Mukherjee D. (Eds.) Sustainable Energy Technology and Policies. Green Energy and Technology. Springer, Singapore. 2018, 1, 265-287 (link to book)

- Nair V.C., Jadhawar P., **Gupta P.**, Chapter 3 - Rheological characterization of nanofluids, Editor(s): Tushar Sharma, Krishna Raghav Chaturvedi, Japan J. Trivedi, Nanotechnology for CO2 Utilization in Oilfield Applications, Gulf Professional Publishing, Published: June 1, 2022, Pages 37-57, ISBN 9780323905404, https://doi.org/10.1016/B978-0-323-90540-4.00007-7. (Link)
- **Gupta P.,** Bhajan Lal b, Nair V.C., Chapter 14 - Solid CO2 storage by hydrate-based geo sequestration, Editor(s): Tushar Sharma, Krishna Raghav Chaturvedi, Japan J. Trivedi, Nanotechnology for CO2 Utilization in Oilfield Applications, Gulf Professional Publishing, June 1, 2022, Pages 251-273, ISBN 9780323905404, https://doi.org/10.1016/B978-0-323-90540-4.00009-0 (Link)

PATENT

- Nair V.C., **Gupta P.**, Sangwai J.S. System and Method for Recovering Energy or Minerals from a Reservoir. Application number: 201941016768, Filed on 26 April 2019.

PEER-REVIEWED JOURNALS (SCI/SCIE/SCOPUS INDEXED)

- Dadi, N.R., Maurya, N.K. and **Gupta, P.**, 2024. Advancing foam EOR: A comprehensive Examination of key parameters and mechanisms from surfactants to nanoparticles. Journal of Molecular Liquids, p.126177. (https://doi.org/10.1016/j.molliq.2024.126177)

- **Gupta, P.***, Krishna, S. and Maurya, N.K., 2024. Thermodynamic, Rheological, and Electrical Properties of Hydrate Inhibitors: Implications for Natural Gas Production and Flow Assurance. Energy & Fuels, 38(16), pp.15284-15294. (link to paper)

- Patel, S., Wilson, I., Sreenivasan, H., Naveen, P., **Gupta, P.** and Krishna, S., 2024. Proppant transportation and placement in fractures by water and liquid nitrogen: a numerical simulation. Computational Particle Mechanics, 11(2), pp.721-743. (link to paper)
- Wilson, I., Saini, S., Sreenivasan, H., Sahu, C., Krishna, S. and **Gupta, P*.**, 2023. Review and perspectives of energy-efficient methane production from natural gas hydrate reservoirs using carbon dioxide exchange technology. Energy & Fuels, 37(14), pp.9841-9872. (link to paper)

- **Gupta, P**., Mondal S., Sangwai, J.S., Gardas R.L., Investigation on the Effect of Ionic Liquids and Quaternary Ammonium Salts on the Kinetics of Methane Hydrate; Industrial & Engineering Chemistry Research, 2023 **(Link to paper)**

- Mousumi Nandi, Neha Vyas, Rakesh Kumar Vij, **Pawan Gupta*.** A review on the natural gas ecosystem in India: Energy scenario, market, pricing assessment with the developed part of the world and the way forward. ***Journal of Natural gas Science and Engineering****) 2022* (Link)

- **Gupta, P**., Nair, V.C. and Sangwai, J.S., 2021. Polymer-Assisted chemical inhibitor flooding: a novel approach for energy recovery from hydrate-bearing sediments. Industrial & Engineering Chemistry Research, 60(22), pp.8043-8055. (Link)

- Perumalsamy. J, **Gupta, P.**, Jitendra S., Performance Evaluation of Esters and Graphene Nanoparticles as an Additive on the Rheological and Lubrication Properties of Water-Based Drilling Mud. ***Journal of Petroleum Science and Engineering*****.** 204, September 2021, 108680 (Link)

- William, M., **Gupta, P.**, Sangwai, J. Interaction of Lubricants on the Rheological and Filtration Loss Properties of Water-based Drilling Fluids. ***Petroleum Science and Technology***. Pages 235-248, 2021 (Link)

- Swaminathan P., **Gupta, P.**, Jadhawar, P., Nagarajan, R., Sangwai, J. Investigations on the thermal and electrical conductivity of polyethylene glycol-based CuO and ZnO nanofluids. ***Indian Chemical Engineer.*** 2019. (link to paper)

- **Gupta, P.**, Sangwai, J.S. Performance Evaluation of Oilfields Polymers (Polyacrylamide, Xanthan Gum, and Guar Gum) as Low-Dosage Kinetic Hydrate Inhibitors (LDHI). ***Energy & Fuels***. 2019, 337, 6335-6349 (link to paper)

- **Gupta, P.,** Nair, V.C., Sangwai, J.S. Phase Equilibrium of Methane Hydrate in the Presence of Aqueous Solutions of Polyacrylamide, Xanthan Gum, and Guar Gum ***Journal of Chemical and Engineering Data***. 2019 64, 1650–1661 (American Chemical Society publications, Impact factor: 2.323) (link to paper)

- Nair, V. C., **Gupta, P**., Sangwai, J. S. Natural Gas Production from a Marine Clayey Hydrate Reservoir Formed in Seawater using Depressurization at Constant Pressure, Depressurization by Constant Rate Gas Release, Thermal Stimulation and their Implications for Real Field Applications. ***Energy and Fuels.*** 2019, 33, 3108–3122 (link to paper)

- Nair, V. C., Mech, D., **Gupta, P**., Sangwai, J. S. Polymer Flooding in an Artificial Hydrate Bearing Sediments for Methane Gas Recovery. ***Energy and Fuels.*** 2018, 32, 6657–6668 (American Chemical Society publications, Impact factor: 3.091). (link to paper)

- **Gupta, P.,** Nair, V.C., Sangwai, J.S. Phase equilibrium of methane hydrate in the presence of aqueous solutions of quaternary ammonium salts. ***Journal of Chemical and Engineering Data***. **2018**, 63, 2410–2419. (American Chemical Society publications, Impact factor: 2.323) (link to paper)

- **Gupta P.,** Sakthivel, S., Sangwai, J.S. Effect of aromatic/aliphatic based ionic liquids on the phase behavior of methane hydrates: Experiments and modeling. ***Journal of Chemical Thermodynamics***. 2018, 117, 9-20. (Elsevier, Impact factor: 2.726) (link to paper)

- Avula, V.R., **Gupta, P**., Gardas, R.L., Sangwai, J.S. Thermodynamic modeling of phase equilibrium of carbon dioxide clathrate hydrate in aqueous solutions of promoters and inhibitors suitable for gas separation. ***Asia-Pacific Journal of Chemical Engineering***. 2017 12, 709-722. (Wiley online library, Impact factor: 0.84) (link to paper)

- Mech D., **Gupta P.**, Sangwai J.S., Kinetics of methane hydrate formation in an aqueous solution of thermodynamic promoters (THF and TBAB) with and without kinetic promoter (SDS). ***Journal of Natural Gas Science and Engineering***. 2016, 35, 1519-1534. (Elsevier, Impact factor: 2.718) (link to paper)

FULL PAPERS IN CONFERENCE PROCEEDINGS

- Prasad, S. K., Mech, D., Nair, V.C., **Gupta, P**. Sangwai, J. S. Effect of high molecular weight asphaltenes on the phase stability of methane hydrates. Accepted in ***International Society of Offshore and Polar Engineers, ISOPE*** June 10-15, 2018, Sapporo, Japan. (link to paper)

- **Gupta, P.**, Sangwai, J.S. Semiclathrate hydrate of methane and quaternary ammonium salts for natural gas storage and gas separation. In ***Offshore Technology Conference Asia***, Kuala Lumpur, Malaysia, 20-23, March 2018. (link to paper)

- **Gupta, P.**, Sangwai, J.S., Non-isothermal kinetics of methane hydrate formation in aromatic based ionic liquids: Effect of carbon chain length. ***Ninth International Conference on Gas Hydrates, ICGH9***, Denver USA, June 25-30, 2017. (link)

- Laik, S., Mandal, A., Saw, V.K. and **Gupta, P.** Effect of suspended and dissolved substance on formation and dissociation of gas hydrates. In ***SPE Oil and Gas India Conference and Exhibition***, Mumbai, India, 20-22 January 2010. (link to paper)

PAPERS PRESENTED IN CONFERENCES, SEMINARS, WORKSHOPS, SYMPOSIA

- **Gupta P.** Current Challenge towards Hydrogen Storage in the Form of Hydrate, 1st International Conference on Green Hydrogen for Global Decarbonization, March 17 - 18 th , 2023, Pandit Deendayal Energy University,. Gandhinagar, Gujarat, India
- **Gupta, P.**, Bera A., Aljoweshi, A., Investigation on Improved Physical Properties of Water-Based Drilling Fluid in Presence of Ester and Nanoparticles - PDPU 2nd Edition of Global Chemical Application Conference In Oil & Gas Industry Sep 09-10, 2020 (Google Meet) (link)
- **Gupta, P.**, ICAWTM -22

RESEARCH INTEREST

- **Gas Hydrates**: Kinetics of hydrate formation and dissociation, hydrate-based gas storage and transportation, and novel methods for methane recovery.

- **Enhanced Oil Recovery (EOR)**: Development of novel techniques involving chemical flooding, polymer flooding, and nanoparticle-assisted EOR.
- **Drilling Fluids**: Formulation of advanced drilling muds, including esters and graphene nanoparticles to improve rheological properties and lubrication.
- **Unconventional Hydrocarbons**: Research on alternative energy sources such as gas hydrates, including exploration techniques and energy sustainability.
- **Flow Assurance**: Investigating hydrate-based desalination, formation damage mitigation, and flow assurance strategies in offshore reservoirs.

DATE: 25/01/2025 **(Pawan Gupta)**