Vinay Kumar Rajak

Assistant Professor, Department of Petroleum Engineering,
Indian Institute of Technology (Indian School of Mines) Dhanbad, India - 826004
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Marital status Married

Citizenship Indian

Experience

Assistant Professor **September, 2010 – Present**

Department of Petroleum Engineering,
Indian Institute of Technology (Indian School of Mines),Dhanbad,
India

Research interests

- Drilling and Workover Fluids
- Drilling
- Geothermal
- Hydrogen Storage and Transportation
- CCUS
- Well Integrity

Education

Ph. D. **2017**
Department of Petroleum Engineering,
Indian Institute of Technology (Indian School of Mines), Dhanbad, India
Dissertation: ***Optimization of Process Parameters for Separation of Oil from Oil-in-Water Emulsion.***
Guide: Prof. Ajay Mandal

Post-Graduation: M. Tech in Petroleum Engineering **2007 – 2009**
Indian Institute of Technology (Indian School of Mines), Dhanbad, India

Graduation: B. Tech in Mechanical Engineering **2003-2007**
Visvesvaraya National Institute of Technology, Nagpur, India

Research publications

1. Gautam, S., Kumar, S., Kumar, A., **Rajak, V.K.** and Guria, C., 2025. Development of functional polymer-based clay-free HPHT drilling fluid: Effect of molecular weight and its distribution on drilling fluid performance. *Geoenergy Science and Engineering*, 246, p.213616. https://doi.org/10.1016/j.geoen.2024.213616
2. Kiran, R., Upadhyay, R., **Rajak, V.K**., Kumar, A. and Gupta, S.D., 2024. Underpinnings of reservoir and techno-economic analysis for Himalayan and Son-Narmada-Tapti geothermal sites of India. *Renewable Energy*, 237, p.121630. https://doi.org/10.1016/j.renene.2024.121630 (Impact Factor: 9.0, Q1)
3. Kiran, R., **Rajak, V.K.**, Upadhyay, R. and Kumar, A., 2024. Comparative techno-economic assessment of superhot rock and conventional geothermal energy feasibility for decarbonizing India. *Geothermics*, 122, p.103078. https://doi.org/10.1016/j.geothermics.2024.103078 (Impact Factor: 3.5, Q1)
4. Saif, M., Kiran, R., **Rajak, V.K.** and Verma, R.K., 2024. Investigation of an Indian Site with Mafic Rock for Carbon Sequestration. *ACS omega*, 9(28), pp.30270-30280. https://doi.org/10.1021/acsomega.4c00213 (Impact Factor: 3.7, Q2)
5. Doley, A., Mahto, V., **Rajak, V.K.**, Kiran, R. and Upadhyay, R., 2024. Investigation of Filtration and Shale Inhibition Characteristics of Chitosan-N-(2-hydroxyl)-propyl trimethylammonium Chloride as Drilling Fluid Additives. *ACS omega*, 9(19), pp.21365-21377. https://doi.org/10.1021/acsomega.4c01632 (Impact Factor: 3.7, Q2)
6. Banerjee, S., Banik, A., **Rajak, V.K.**, Bandyopadhyay, T.K., Nayak, J., Jasinski, M., Kumar, R., Jeon, B.H., Siddiqui, M.R., Khan, M.A. and Chakrabortty, S., 2024. Two-Phase Crude Oil–Water Flow Through Different Pipes: An Experimental Investigation Coupled with Computational Fluid Dynamics Approach. *ACS omega*, 9(10), pp.11181-11193. https://doi.org/10.1021/acsomega.3c05290 (Impact Factor: 3.7, Q2)
7. Das, D., Anand, A., Gautam, S. and **Rajak, V.K.**, 2024. Assessment of utilization potential of biomass volatiles and biochar as a reducing agent for iron ore pellets.

Environmental Technology, 45(1), pp.158-169. https://doi.org/10.1080/09593330.2022.2102936 (Impact Factor: 2.2, Q3)

8. Doley, A., Mahto, V., **Rajak, V.K.** and Suri, A., 2023. Development of a High-Performance Drilling Fluid Additive for Application in Indian Shale Gas Formations. Energy & Fuels, 37(17), pp.12824-12837. https://doi.org/10.1021/acs.energyfuels.3c02066 (Impact Factor: 5.2, Q2)

9. Kiran, R., Upadhyay, R., **Rajak, V.K.**, Gupta, S.D. and Pama, H., 2023. Comprehensive study of the underground hydrogen storage potential in the depleted offshore Tapti-gas field. *International Journal of Hydrogen Energy*, 48(3), p. 12396-12409. https://doi.org/10.1016/j.ijhydene.2022.12.172 (Impact Factor: 7.1, Q2)

10. Upadhyay, R., Datta Gupta, S. and **Rajak, V.K.**, 2023. Impact of pressure-dependent diffusivity on transient pressure analysis of a dry Coalbed Methane (CBM) wells: A new approach. *Journal of Earth System Science*, *132*(1), p.34. https://doi.org/10.1007/s12040-022-02040-7 (Impact Factor: 1.9, Q3)

11. Sah, R.K., Kumar, A., Gautam, A. and **Rajak, V.K.**, 2022. Temperature independent FBG based displacement sensor for crack detection in civil structures. *Optical Fiber Technology*, *74*, p.103137. https://doi.org/10.1016/j.yofte.2022.103137 (Impact Factor: 2.6, Q2)

12. Gautam, A., Yadav, R.K., Ajit, K.P. and **Rajak, V.K.**, 2023. A review on CDM-based ductile models and its application. Transactions of the Indian Institute of Metals, 76(5), pp.1141-1154. https://doi.org/10.1007/s12666-022-02790-4 (Impact Factor: 1.5, Q3)

13. **Rajak, V.K.**, Gautam, S., Ajit, K.P., Kiran, R. and Madhumaya, A., 2022. Rheological Property Measurement and Application of Formate-Based Drilling Fluids at Elevated Temperatures: A Review. *MAPAN*, 37(3), pp.665-681. https://doi.org/10.1007/s12647-022-00546-5 (Impact Factor: 1.44, Q4)

14. Datta Gupta, S., Upadhyay, R. and **Rajak, V.K.**, 2022. Establishment of economic viability for hydrocarbon production through a geocellular model developed in

challenging geological reservoir of onshore sedimentary basin, India. *Himalayan Geology*, 43(2), pp. 471-489. (Impact Factor: 1.31, Q3)

15. Gautam, S., Guria, C. and **Rajak, V.K.**, 2022. A state of the art review on the performance of high-pressure and high-temperature drilling fluids: Towards understanding the structure-property relationship of drilling fluid additives. *Journal of Petroleum Science and Engineering*, p.110318. https://doi.org/10.1016/j.petrol.2022.110318 (Impact Factor: 5.16, Q1)

16. Kiran, R., Dansena, P., Salehi, S. and **Rajak, V.K.**, 2022. Application of machine learning and well log attributes in geothermal drilling. *Geothermics*, 101, p.102355. https://doi.org/10.1016/j.geothermics.2022.102355 (Impact Factor: 4.56, Q1)

17. **Rajak, V.K.**, Kumar, S., Thombre, N.V. and Mandal, A., 2018. Synthesis of activated charcoal from saw-dust and characterization for adsorptive separation of oil from oil-in-water emulsion. *Chemical Engineering Communications*, 205(7), pp.897-913. https://doi.org/10.1080/00986445.2017.1423288 (Impact Factor: 1.9, Q3)

18. **Rajak, V.K.**, Kumar, H. and Mandal, A., 2016. Kinetics, equilibrium and thermodynamic studies of adsorption of oil from oil-in-water emulsion by activated charcoal. *International Journal of Surface Science and Engineering*, 10(6), pp.600-621. https://doi.org/10.1504/IJSURFSE.2016.081038 (Impact Factor: 1.0, Q4)

19. **Rajak, V.K.**, Singh, I., Kumar, A. and Mandal, A., 2016. Optimization of separation of oil from oil-in-water emulsion by demulsification using different demulsifiers. *Petroleum Science and Technology*, 34(11-12), pp.1026-1032. https://doi.org/10.1080/10916466.2016.1181654 (Impact Factor: 1.3, Q3)

20. **Rajak, V.K.**, Relish, K.K., Kumar, S. and Mandal, A., 2015. Mechanism and kinetics of separation of oil from oil-in-water emulsion by air flotation. *Petroleum Science and Technology*, 33(23-24), pp.1861-1868. https://doi.org/10.1080/10916466.2015.1108987 (Impact Factor: 1.3, Q3)

Conference paper

1. Imtiaz, M., **Rajak, V.K.**, Dei, S., Chhateja, J. and Biswas, A., 2016, March. AquaticOil Spill Remediation by Using Automated Unmanned Boat AUB. In *Offshore Technology Conference Asia*. Offshore Technology Conference.

Awards/ scholarship

- **Graduate Aptitude Test for Engineering (GATE), 2006**
  Mechanical Engineering
- **Graduate Aptitude Test for Engineering (GATE), 2007**
  Mechanical Engineering

Teaching experience

Courses Taught:

- Reservoir Engineering
- Drilling Technology
- Drilling Fluids & Cements
- Oil & Gas Field Development & Planning
- Pipeline Engineering
- Well Intervention and Stimulation Techniques
- Well Servicing
- Well Performance & Artificial Lift Techniques
- Health Safety & Environment in Petroleum Industry
- Petroleum Environment, Health and Safety Practices

Ph. D. students supervised

- Amolina Doley (18DR0024): Degree awarded in 2024 (Supervisor)

Ph. D. students supervising

- Mohit Anand (20DR0078): Registered in 2020 (Supervisor)
- Aditya Suman (23DP0108): Registered in 2023 (Supervisor)
- Parmod Sharma (23DP0071): Registered in 2023 (Co-Supervisor)
- Somen Ghosh (24DP0044): Registered in 2024 (Supervisor)
- Rakesh Kumar Behera (24DR0142): Registered in 2024 (Supervisor)
- Vikash Raj (24DP0070): Registered in 2024 (Co-Supervisor)
- Praveen Kumar (24DP0036): Registered in 2024 (Co-Supervisor)

- Chandana Roy (24DR0248): Registered in 2024 (Co-Supervisor)
- Saptarshi Maji (23MT0352): Registered in 2025 (Supervisor)

Oil and gas field visit & training

- One week field training at CAIRN INDIA, Barmer, Rajsthan From 11-10-2010 to 16-10-2010.
- One-week field training at ONGC Effluent Treatment Plant (ETP) Limbodra, Ahmedabad from 12-09-2016 to 17-09-2016.
- Two-week training at CBM ONGC Bokaro Asset under faculty mobility program (FMP) from 18-07-2019 to 27-07-2019.
- Two-week training at Essar Oil and Gas Exploration and Production Ltd., Durgapur under faculty mobility program (FMP) from 04-07-2022 to 17-07-2022.

Administrative responsibilities (Institute Level)

- Convenor of SRIJAN-2025
- Co-Convenor of BASANT-2024
- Deputy Chief Election Officer of Student Gymkhana Election-2024
- Member of GATE-JAM Committee – 2023-2024
- Treasurer III & BASANT-2023
- Treasurer Concetto 2023
- Institute Representative for conducting JEE Adv. Examination 2024
- Reporting Centre (RC) Officers for Joint Seat Allocation Authority (JoSAA) Counselling-2024
- Institute Representative (Roving Officer) for conducting JEE Adv. Examination 2023
- Reporting Centre (RC) Officers for Joint Seat Allocation Authority (JoSAA) Counselling-2023
- Institute Representative for conducting JEE Adv. Examination 2022
- Reporting Centre (RC) Officers for Joint Seat Allocation Authority (JoSAA) Counselling-2022
- Institute Representative for conducting JEE Adv. Examination 2021
- Reporting Centre (RC) Officers for Joint Seat Allocation Authority (JoSAA) Counselling-2021
- Institute Representative for conducting JEE Adv. Examination 2020

Administrative responsibilities (Departmental Level)

- Reporting Centre (RC) Officers for Joint Seat Allocation Authority (JoSAA) Counselling-2020
- Hostel warden of Diamond Hostel (2013 – 2018)
- Students Training/Internship In-charge (2024 to till date)
- Faculty Convener of PetroTech Society – FIPI IIT (ISM) Dhanbad Chapter (2019-2023)
- Member of departmental Purchase Committee (2022-2023)
- Faculty in-Charge of Drilling Fluids & Cement Laboratory (2020-Present)
- Faculty Co-Coordinator of Society of Petroleum Engineers (2016-2019)
- Timetable in-Charge of Petroleum Engineering Department (2016-2019)
- Faculty in-Charge Training & Placement (2016-2019)
- Faculty Mentor of Foreign Students (2017 – 2018)
- Faculty Coordinator of Petroleum Department of Technical Fest Concetto (2015-2018)
- Faculty in-Charge of Minor Courses (2014-2017)
- Tabulator for Semester Examination (2011-2015)

Sponsored research project

- **Development of Advection-Diffusion Based Chemo-Thermo-Physical Model for Post fracturing Pressure Build-up in Shale Formation.**
  DST SERB **Ongoing**
  New Delhi 2024-2027
  Grant Amont: 6,60,000 INR
- **Feasibility study of existing pipelines for hydrogen storage and transportation Completed**
  Binsys Technologies *2022-2024*
  New Delhi
  Grant Amount: 5,42,800 INR
- **Design, Application and Modeling of drilling fluid for High Pressure and High Temperature (HPHT) wells** **Completed**
  FRS Scheme *2019-2022*
  Indian Institute of Technology (Indian School of Mines), Dhanbad
  Grant Amount: 10,00,000 INR

Consultancy

- **Characterization and Separation of Oil-in-Water Emulsion** **Completed**

  FRS Scheme *2012-2014*

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

  Grant Amount: 1,00,000 INR

- **Pressure Transient Analysis of Wells of Raniganj CBM field for Mining Associates.** **Completed**

  Mining Associates 2022-2023

  Asansol, West Bengal

  Grant Amount: 3,26,766 INR

References

Prof. Ashutosh Kumar
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Institute of Technology (ISM)
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Prof. Rajeev Upadhyay
Professor
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