

Vinay Kumar Rajak

Associate 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	Associate Professor Department of Petroleum Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, India	April, 2026 – Present
	Assistant Professor Department of Petroleum Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, India	September, 2010 – April, 2026
Research interests	• Drilling and Workover Fluids • Drilling • Geothermal • Hydrogen Storage and Transportation • CCUS • Well Integrity	
Education	Ph. D. Department of Petroleum Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, India Dissertation: <i>Optimization of Process Parameters for Separation of Oil from Oil-in-Water Emulsion.</i> Guide: Prof. Ajay Mandal	2017
	Post-Graduation: M. Tech in Petroleum Engineering Indian Institute of Technology (Indian School of Mines), Dhanbad, India	2007 – 2009
	Graduation: B. Tech in Mechanical Engineering Visvesvaraya National Institute of Technology, Nagpur, India	2003-2007

Research publications

1. Upadhyay, R., Kumar, R., Kumar, A., Mobarsha, G., Kiran, R. and **Rajak, V.K.**, 2026. Coalbed methane (CBM) well performance: A new methodology combining IPR and VLP analysis. *International Journal of Coal Science & Technology*, 13(1), p.16. <https://doi.org/10.1007/s40789-025-00844-8> (**Impact Factor: 8.7, Q1**)
2. Kiran, R., Saif, M., Wood, D.A., Datta Gupta, S., Kumar, A., Upadhyay, R. and **Rajak, V.K.**, 2025. Geological Hydrogen Prospectivity of Iron Ore Deposits in India Based on Semiquantitative Analysis. *ACS Omega*. <https://doi.org/10.1021/acsomega.5c02770> (**Impact Factor: 4.3, Q2**)
3. Doley, A., **Rajak, V.K.**, Kiran, R., Mahto, V., Upadhyay, R., Eswaran, U. and Yadav, P., 2025. Enhancing the Shale Drilling Compatibility Using Hydroxyethyl Acrylate Chitosan. *Arabian Journal for Science and Engineering*, pp.1-15. <https://doi.org/10.1007/s13369-025-10371-y> (**Impact Factor: 2.9, Q2**)
4. 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> (**Impact Factor: 4.6, Q1**)
5. 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: 9.1, Q1**)
6. 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: 3.9, Q1**)
7. 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: 4.3, Q2**)

8. 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: 4.3, Q2)**

9. 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 Chakraborty, 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: 4.3, Q2)**

10. 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: 2.0, Q3)**

11. 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, Q1)**

12. 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: 8.3, Q1)**

13. 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: 1.7, Q3)**

14. 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)**
15. 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: 2.7, Q2)**
16. **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: 1.3, Q4)**
17. 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: 0.9, Q3)**
18. 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*, 213, p.110318. <https://doi.org/10.1016/j.petrol.2022.110318> **(Impact Factor: 5.16, Q1)**
19. 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: 3.9, Q1)**
20. **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: 2.0, Q3)**

21. **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: 1.2, Q4**)
22. **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: 1.4, Q3**)
23. **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: 1.4, Q3**)

Conference paper

1. Imtiaz, M., **Rajak, V.K.**, Dei, S., Chhateja, J. and Biswas, A., 2016, March. Aquatic Oil 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
- Pipeline Engineering
- Well Intervention and Stimulation Techniques
- 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 November-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, Rajasthan 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)	• Treasurer BASANT-2026 • 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
- 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)

Administrative responsibilities (Departmental Level)

**Sponsored
research project**

- **Development of an Integrated Workflow Based on Geoscientific Data Analysis for Identification of Coal Bed Methane (CBM) Resource Prospectivity at the Bidding Stage.**

Directorate General of Hydrocarbons (DGH) **Ongoing**
Noida *2025-2027*
 Role (PI/Co-PI) PI
 Grant Amount: 8,80,000 INR
- **Development of Advection-Diffusion Based Chemo-Thermo-Physical Model for Post fracturing Pressure Build-up in Shale Formation.**

Science & Engineering Research Board (SERB) **Ongoing**
New Delhi *2024-2027*
 Role (PI/Co-PI) PI
 Grant Amount: 6,60,000 INR
- **Feasibility study of existing pipelines for hydrogen storage and transportation.**

BinSys Technologies **Completed**
New Delhi *2022-2024*
 Role (PI/Co-PI) PI
 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
 Role (PI/Co-PI) PI
 Grant Amount: 10,00,000 INR
- **Characterization and Separation of Oil-in-Water Emulsion.** **Completed**

FRS Scheme *2012-2014*
Indian Institute of Technology (Indian School of Mines), Dhanbad
 Role (PI/Co-PI) PI
 Grant Amount: 1,00,000 INR

Consultancy	Study on the adsorption isotherm behavior of coal samples conducted for Mining Associates Private Limited <i>Mining Associates private Limited</i> <i>Asansol, West Bengal</i> Role (CI/Co-CI) Grant Amount: 1,18,000 INR	Ongoing 2025-2026 CI
	“Adsorption Isotherm Studies of Shale Formation of Gondwana Basin” for CMPDI <i>Central Mine Planning & Design Institute Limited (CMPDIL)</i> <i>Ranchi, Jharkhand</i> Role (CI/Co-CI) Grant Amount: 5,13,300 INR	Ongoing 2025-2026 CI
	Supervising the Injection/Fall-Off Tests and Performing Pressure Transient Analysis in Five Core Holes of Jharia CBM Block of Prabha Energy Private Limited (PEPL) <i>Prabha Energy Pvt. Ltd. (PEPL)</i> <i>Asansol, West Bengal</i> Role (CI/Co-CI) Grant Amount: 9,44,000 INR	Completed 2024-2025 Co-CI
	Pressure Transient Analysis of Wells of Raniganj CBM field for Mining Associates. <i>Mining Associates</i> <i>Asansol, West Bengal</i> Role (CI/Co-CI) Grant Amount: 3,26,766 INR	Completed 2022-2023 CI

References

Prof. Ashutosh Kumar

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Prof. Rajeev Upadhyay

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