# Sayantan Ghosh

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## Education

- Ph.D. Geology, Univ. of Oklahoma (OU), Norman, OK, USA *Aug. 2013 - Dec. 2017*
- M.S. Petroleum Engineering, Univ. of Oklahoma (OU), Norman, OK, USA *Aug. 2011 - Aug. 2013*
- B.S. Mechanical Engineering, Brigham Young Univ. (BYU), Provo, UT, USA *Sept. 2007 - Apr. 2011*

## Work, Research, and Teaching Experience

**Assistant Professor** (Petroleum Engineering): IIT(ISM), Dhanbad, India *Dec. 2021-Current*

- Taught Reservoir Gomechanics, Research Methodology, Petroleum Resource Management, and Petroleum Environmental Management theory courses
- Taught Enhanced Oil Recovery, Petroleum Product Testing, Petroleum Production Engineering, and Process Engineering laboratory methods to undergraduate students
- Mentored several BTech and MTech students on their class research projects
- Mentoring multiple PhD and MTech research scholars
- Taught an NPTEL course on Petroleum Formation Evaluation
- Signed an MOU with Rara Energy (Abu Dhabi, UAE) on behalf of IIT(ISM) Dhanbad for technical collaboration in geological and modeling

**Assistant Professor** (Petroleum Engineering and Earth Sciences): UPES, Dehradun, India *Jan. 2021-Nov. 2021*

- Taught Petroleum Geomechanics, Petroleum Production Logging, and Artificial Lift Technology theory courses
- Mentored 3$^{rd}$ year/ 4$^{th}$ year undergraduate students with project work

**Postdoctoral Fellow** (Petrophysics and Reservoir Characterization)**:** Univ. of Houston, TX, USA *Aug. 2019-Sept. 2020*

- Prepared a core plug acquisition program and selected appropriate laboratory tests for the required task
- Performed well log corrections and reconstructed missing log zones
- Built petrophysical models using well log and core data for a mature oil field for EOR/IOR
- Wrote reports, memos, and reviews on topics including regular and special core analysis, fluid contact movements, suggested well perforations, and reservoir pressure trends
- Taught well log analysis and facies modeling on Techlog and Petrel to a class of fifteen graduate students for a reservoir management course
- Guided two M.S. students in Master's thesis writing

**R&D Geoscientist** (Structure & Geomechanics)**:** Anadarko Petroleum, Woodlands, TX, USA *Jan. 2018-July 2019*

- Divided a shale, sand, and carbonate sequence of interest into several rock types(using k-means) based on mechanical and stress properties using Interactive Petrophysics Software
- Described a method to correct well log mechanical rock properties to static properties using laboratory triaxial and ultrasonic velocity experimental results
- Automated tectonic stress calculations in different wells to be used for hydraulic fracturing and wellbore-stability calculations by writing a Visual Basic Routine
- Distributed aforementioned rock types into a reservoir volume using various geostatistical algorithms
- Identified relationships between rock texture, depositional environment, and stress-dependent rock types using core photographs from various wells

**Research Assistant** (Res. Geomech., Petrophysics)**:** OU Inst. of Reservoir Char., Norman, OK, USA *Aug. 2013-Dec. 2017*

- Established timing/mechanism of successive formation of different natural fracture sets in the Woodford Shale and adjacent formation using cross-cutting relations, X-ray diffraction, SEM/EDS, and thin section studies of collected rock matrix and associated cement
- Determined the mechanical rock properties of the Woodford Shale and bounding formations comprising carbonates and shales using well logs and DFIT data
- Built Discrete Fracture Network (DFN) models for stage-wise hydraulic fracture simulation on FracMan based on above observations/calculations; validated model with field microseismic data
- Used the above models to predict the stimulated reservoir volumes under scenarios of different well positions, horizontal stress magnitudes, natural fracture permeability values, natural fracture connectivity, and net pressures

**Intern** (Petrophysics)**:** British Petroleum (BP), Houston, TX, USA *May 2014-Aug. 2014*

- Selected relevant well files, organized, depth shifted, and spliced logs from seven deep-water wells producing

from carbonate rocks located in Santos Basin in offshore Brazil

- Assessed reservoir quality based on porosity, permeability, water saturation, clay content, and net pay using Techlog Software
- Integrated petrophysical data from logs to formation pressure data and fluid type for each well
- Predicted reservoir quality in a non-DST interval based on NMR free fluid and porosity data
- Analyzed variation of formation pressure, API, and GOR in the basin using several wells in different fields

**Research Assistant** (Petrophysics, Core Testing)**:** OU Core Char. Center, Norman, OK, USA *Aug.2011-Aug. 2013*

- Conducted long-term flow tests through various types of proppant packs to measure permeability decay and change in fluid chemistry; identified the type of diagenetic minerals deposited on proppant/shale
- Estimated variation in directional mechanical rock properties (anisotropy) in various rock types by measuring P and S wave velocities in three directions and calculating Thomsen parameters
- Determined grain density, mineralogy, porosity, and permeability of shale and other lithologies using FTIR, EDS, NMR, LPP and AP-608 machines
- Analyzed elastic properties and hardness of rock cuttings using a nano-indenter

**Teaching Assistant** (Statics)**:** BYU Civil Eng. Dept., Provo, UT, USA *Aug. 2010-Dec. 2010*

- Assisted a group of 75 students on test/homework problems, and conducted exam reviews

**Teaching Assistant** (Ordinary/Applied Partial Differential Eq.)**:** BYU Math Dept., Provo, UT, USA *Aug. 2009-Dec. 2009*

- Assisted a group of 30 students on test/homework problems, and conducted exam reviews

## Consultancies

**Oilmax Energy** (Mumbai, India)

- Estimation of gas content and prospect evaluation of exploratory CBM block: SR-ONHP(CBM)-2022/6 (Co-CI; INR 1,52,220) *Nov. 2024*

**ERGO Exergies Technologies Inc.** (Montréal, Canada)

- Ultimate and proximate analyses for the proposed underground coal gasification (ucg) pilot operations in the Kasta West project (CI; INR 1,31,688) *Oct. 2024*
- Ultimate and proximate analyses for the proposed underground coal gasification (ucg) pilot operations in the Gare Palma Sector-1 Project (CI; INR 1,12,100) *Aug. 2024*

## Training and Workshop Attended

1. **Oil and Natural Gas Corporation (ONGC):** Ahmedabad, India (1 month) *June 2022*
   - Attended field jobs on open hole logging, cement bond long/variable density logging, and well perforation
   - Attended introductory training on well logging tools
   - Attended field jobs on hydraulic fracturing, gravel packing, coiled tubing, pre fracturing acidization, and well cleaning using Nitrogen
   - Delivered presentation on hydraulic fracturing and suggested steps for improvement
2. **Workshop on Petroleum Resource Management System** (organized by DGH in partnership with DeGolyer and MacNaughton, USA): New Delhi, India (Two days) *Jan 2022*
3. **GIAN (Global initiative of academic network) course in Global Seismology** (Two weeks) *May 2022*

## Administrative Work at IIT(ISM) Dhanbad

- Hostel warden *July 2024-Current*
- Faculty-in-charge of Training & Placement (Petroleum Engineering) *July 2021-Current*
- Petroleum production engineering lab in charge *May. 2021-Current*
- Coordination committee member of IIT(ISM) seismological observatory *May. 2021-Current*
- Scrutineer of Masters and Doctorate admission applications *Apr. 2022*
- Scrutineer of Bachelor admission documents *Apr. 2022*
- Registration committee member for annual alumni reunion and industry interaction *Feb. 2023, 2024*

## Journal and Conference Leadership

- **Technical Committee Chair**: American Rock Mechanics Association/Discrete Fracture Network and Engineering (ARMA/DFNE) Conference (Seattle, WA, USA) *June 2018*
- **Associate Editor**: Petroleum and Petrochemical Engineering Journal *Feb. 2018-Current*
- **Panelist:** Discussion on oil and gas disasters (UPES, Dehradun, India) *Oct. 2021*
- **Poster Competition Judge** (UPES, Dehradun, India) *Apr.2021*

- **Judge and mediator in debate competition** *Sept. 2024*

**Journal and Technical Conference Paper Reviewership**

- MDPI Applied Sciences *June 2023-Current*
- MDPI Sustainability *May 2023-Current*
- MPDI Processes *Apr 2024-Current*
- Iranian Journal of Earth Sciences *Jan 2023-Current*
- Journal of Structural Geology *July 2022-Current*
- Marine and Petroleum Geology *Apr 2021-Current*
- AAPG Bulletin *Mar 2019-Current*
- Interpretation Journal (Society of Exploration Geophysics) *Sept 2017-Current*
- Acta Geophysica *July 2019-Current*
- Geological Journal *Aug 2019-Current*
- Current Journal of Applied Science and Technology *Apr 2019-Current*
- ARMA/DFNE Conference *Mar. 2018*

**Journal Publications**

1. Rasool Y., Agrawal M., Shams R., **Ghosh S.**, Singh D. 2024. Evaluation of Seismic Hazard for northeastern Bihar (India): A Deterministic Approach. ***Indian Geotechnical Journal***
2. Kumar V., **Ghosh S.**, 2024. Estimation of vertical permeability of Hugin sandstone from petrophysical well logs using ensemble methods – An enhanced machine learning approach. ***Arabian Journal for Science and Engineering***
3. Sharma SK., Rani A., Bakhariya H., Kumar R., Tomar D., **Ghosh S.**, 2024. The Role of IoT in Optimizing Operations in the Oil & Gas Sector: A Review. ***Transactions of the Indian National Academy of Engineering*** (9), 293-312
4. Taghichian A., Hashemolhosseini H., **Ghosh S**., Zaman M., Baghbanan A., Alireza E., 2023. Optimal core trip velocity ranges for major US shale plays. ***International Journal of Petroleum Science and Technology***, *17(1), 13-59*
5. **Ghosh S**., Joshi D., Kiran R., Agrawal M., Chakraborty S.S., Yadav R., Kumar A., 2023. A review of reservoir oil-water transition zone characterization and potential recovery methods. ***Geopersia***, *13 (2), 323-336*
6. Aghaei H., Penkov G.M., Solomoichenko D.A., Toorajipour A., Petrakov D.G., Jafarpour H., **Ghosh S**., 2023. Density-dependent relationship between changes in ultrasonic wave velocities, effective stress, and petrophysical-elastic properties of sandstone. ***Ultrasonics***, *132 (2023), 106985*
7. **Ghosh S.**, Kumar S., Khare S.K., Pandey S.K., 2022. Stability assessment of Siwalik rock slopes – A case study from Dehradun area, Uttarakhand, India. ***Journal of the Geological Society of India,*** *98 (2022), 1737–1744*
8. **Ghosh S.**, Zargar Z., Bose S., Thakur G., 2022. Lessons learned from the integrated multifarious study of a poorly performing yet great quality oil reservoir: An example from Assam Basin, India. ***Petroleum Science and Technology***, *40(17), 2101–2122*
9. **Ghosh S.**, 2022. A review of basic well log interpretation techniques in highly deviated wells. ***Journal of Petroleum Exploration and Production Technology***, *12 (2022), 1889–1906*
10. Aghaei H., **Ghosh S**., Behrgani K., 2020. Example of applied outcrop analysis and its significance as an analogue for surrounding giant gas-fields; case study of Kuh-e-Surmeh region, southwestern Iran; ***Ore and Energy Resource Geology***, *5, 100010*
11. Milad B., **Ghosh S**., Slatt R.M., Marfurt K.J., and Fahes, M., 2020. Practical Aspects of Upscaling Geocellular Geological Models for Reservoir Fluid Flow Simulations: A Case Study in Integrating Geology, Geophysics, and Petroleum Engineering Multiscale Data from the Hunton Group; ***Energies***, *13 (7)*
12. **Ghosh S.**, Busetti S., and Slatt R.M., 2019. Analysis and prediction of stimulated reservoir volumes through hydraulic fracturing: Examples from western Arkoma Basin; ***Journal of Petroleum Science and Engineering***, *182 (2019), 106338*
13. **Ghosh S.** and Slatt R.M.; Tectonic joint size, abundance, and connectivity: Examples from Woodford Shale and HuntonLimestone, 2019; ***Shale Shaker***, *70(3), 112-136*
14. **Ghosh S.**, Galvis-Portilla H.A., Klockow C.M., and Slatt R.M., 2018. An application of outcrop analogues to understanding theorigin and abundance of natural fractures in the Woodford Shale; ***Journal of Petroleum Science and Engineering***, *164 (2018), 623-639*
15. Alrefaee H., **Ghosh S**., and Abdel-Fattah M., 2018. 3D seismic characterization of the polygonal fault systems and its impact onfluid flow migration: An example from the Northern Carnarvon Basin, Australia; ***Journal of Petroleum Science and Engineering***, *167 (2018), 120-130*
16. **Ghosh S.**, Hooker J.N., Bontempi C.P., and Slatt R.M., 2018. High-resolution stratigraphic characterization of

natural fracture attributes in the Woodford Shale, Arbuckle Wilderness and US-77D Outcrops, Murray County, Oklahoma; ***Interpretation***, *6(1), SC29-SC41*

17. Milad B., **Ghosh, S.**, and Slatt R.M., 2018. Comparison of rock and natural fracture attributes in karsted and non-karsted HuntonGroup Limestone: Ada and Fittstown area, Oklahoma; ***Shale Shaker***, *69 (2), 70-86*
18. **Ghosh S.**, Milad B., Prasun S., and Ghosh S.S., 2018. Origin and Characterization of Joints in Sedimentary Rocks: A Review; ***Petroleum & Petrochemical Engineering Journal***, *2 (5), 1-12*
19. Prasun S. and **Ghosh S.**, 2018. A new analytical model of ultimate water cut for light oil reservoirs with bottom-water; ***Journalof Oil, Gas and Petrochemical Sciences***, *1 (3), 74-81*

**Full Paper Conference**

1. Sharma P., **Ghosh S.**, Joshi N., Srivastava D.K., 2023. Natural fracture parameterization and connectivity in Rohtas Limestone, Vindhyan Basin, Central India. ***AIP Conference Proceedings***, *2855 (1), 40004*
2. **Ghosh S.**, Sharma S., Kukreti A., Das S., Saini D., Rawat A., 2023. A comparative study of potentially productive Indian shale plays. ***AIP Conference Proceedings***, *2855 (1), 40001*
3. Sen D., Chowdhury D., Mandal PP., **Ghosh S.**, 2023. An Automated Python Script-Based Platform for CCS Screening Feasibility of Subsurface Geological Formations. ***Society of Petroleum Geophysicists, India,*** *14 (2023), 1-5*
4. Sharma P., **Ghosh S.**, Tandon A., 2022. Study of $CO_2$ injection in a depleted oil reservoir using geomechanically coupled and non-coupled simulation models. ***Materials Today: Proceedings***, *57 (4), 1805-1512*
5. Patidar A.K., **Ghosh S.**, Thakur N.K., Sharma A, Baliyan A, 2021. A review and comparative analysis of effectively functionalized eco-friendly and biodegradable nanoparticle based additives for drilling muds. ***Material Today: Proceedings***, *57 (4), 1598-1604*
6. Milad B., **Ghosh S.**, Suliman M., Slatt R.M., 2018. Upscaled DFN models to understand the effects of natural fracture properties on fluid flow in the Hunton Group tight Limestone; ***Unconventional Resource Technology Conference***, 1-6; College Station, TX, USA
7. **Ghosh S.**, Rai C.S., Sondergeld C.H., Larese R.E., 2014. Experimental investigation of proppant diagenesis;
8. ***SPE/CSUR Unconventional Resource Conference***, 1-23; Calgary, AB, Canada

**Oral Conference**

- **Ghosh, S.**; Multiscale natural fracture dimensions in the Woodford Shale, 2017. ***AAPG Southwest SectionMeeting***; 1-18; Midland, TX, USA
- **Ghosh, S.**, Busetti, S; Prediction of hydraulic fracture damaged zone geometries in the Woodford Shale in ArkomaBasin using discrete fracture network models, 2017. ***AAPG Southwest Section Meeting***, 1-25; Midland, TX, USA

**Google Scholar**

https://scholar.google.com/citations?user=MuLUpQoAAAAJ&hl=en&oi=ao

**LinkedIn**

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