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SUMMARY

Work Experience: Around 12 years of professional experience in Petrophysics, Rock Physics, and QI Geophysicist. More than eight years of experience in research/academia. Successfully handled multiple high values projects for helping the management with economic feasibility and timely decision making.

Area of Interest: Petrophysics and Rock Physics for integrated formation characterization/ Applied Geophysics/ Induced Polarization Methods/ Carbon Utilization and Sequestration, Geothermal, Hydrates and Hydrogen Storage.

ACADEMICS

- PhD, OCLASSH/Center for Rock Abuse, Petroleum Engineering, Colorado School of Mines, Golden, CO, USA, May 2015, 3.81/4.0
Thesis: Impact of Texture Heterogeneity and Saturation on Elastic and Viscoelastic Properties of Carbonates
- Master of Science, Petroleum Engineering, Colorado School of Mines, Golden, CO, USA, 2011, 3.85/4.0
Thesis: Sensitivity of elastic properties and flow characteristics in carbonates due to heterogeneity in fabric and fluid saturation
- Master of Technology, Applied Geophysics, University of Roorkee, Roorkee, INDIA, 1999, 1st Division
Thesis: Stability changes (change in Coulomb Failure Stress, ΔCFS) of crustal faults under the influence of nearby earthquakes
- Bachelor of Science (Phy., Chem., Math.), Ch. Charan Singh University, Meerut, INDIA, 1st Division

WORK EXPERIENCE

1. October 10, 2023 - Present: Associate Professor, Indian Institute of Technology Roorkee.

Assignments: Teaching subjects ranging from *Petrophysics and Rock Physics*, *Reservoir Geophysics*, *Geophysical Well Logging*, *Petroleum Geosciences*. **Research methodology includes**, *Integrated Reservoir Characterization using Multiphysics and Multiscale Investigation Methods comprising destructive and mostly non-destructive (NDT) methods such as, Digital Rock Physics (DRP), Acoustic Investigations, and Spectral Induced Polarization methods.*

2. November 23, 2015 – October 9, 2023: Assistant Professor, Indian Institute of Technology Roorkee.

Assignments: Teaching subjects ranging from *Quantitative Interpretation*, *Geophysical Well Logging*, *Petroleum Geosciences*, *Reservoir Geomechanics*, *Unconventional Energy Resources*, and *Geohydrology*. I also use the industry standard software (Geolog, PowerLog, TechLog, Petrel, RokDoc, Hampson-Russell, Jason, Kingdom, etc.) for practical and tutorial classes in addition to encouraging for developing independent codes. Also introducing laboratory methods for Experimental and Modeling Studies in Petrophysics and Rock Physics.

Introduced new elective course on *Petrophysics and Seismic Rock Properties* Planning to introduce one more course on *Reservoir Engineering and Simulations and the Associated Geomechanics*.

Designing in-house software for Rock Physics and Petrophysics Integrated Modeling and Evaluation (**PRIME**). This produced two Masters' dissertation and multiple internships

Established state of the art laboratory facility (**Rock and Fluid Multiphysics Laboratory**) for Integrated characterization of conventional and unconventional resources for storage, flow and elastic property distribution. The laboratory has the

capacity to carry out feasibility studies for CO₂ and Hydrogen storage in sedimentary and basalt provinces.

Well-log and Seismic based lithofacies identification and analysis of sedimentary sequences of the Taranaki Basins, New Zealand.

3. April 6, 2015 – November 10, 2015: Advisor Petrophysics and Seismic Rock Properties, The FerVid Group, Houston, Texas, USA

Assignments: Providing niche technological support for Petrophysics and Rock Physics needs to multiple clients in and outside USA. Designing of customized soft tools and templates for quick plotting and interpretation of petrophysical attributes

3. Sep. 20, 2012 – April 5, 2015: Senior Petrophysicist and Rock Physics Specialist, Petrophysical Technology, ConocoPhillips, Houston, Texas, USA.

Assignments: Conventional and unconventional formation evaluation and seismic rock property analysis

- ✓ Carried out petrophysical overview analysis in unconventional resources like Macos and Eagleford shale oil plays and Poland Shale Gas. Built petrophysical model by utilizing core data information XRD, XRF, SRA (LECO), GRI along with LWD/wireline logs. Used advance logs like Dielectric and Lithoscanner to integrate and verify routine volumetric interpretation. Developing protocols/programs for geomechanical property investigation with implications from anisotropic property distribution.
- ✓ Formation evaluation in soft to hard rock siliciclastic deposition in Gulf of Mexico, West Africa Offshore and other marginal setting, deep water turbidities (Malaysia, Nova Scotia) for net to gross, reservoir and pay estimation using routine and Thomas-Stieber methodology.
- ✓ Experience with operational support for exploration in GOM environment, West Africa Offshore and mixed lithology systems Novascotia Shelf. Experience dealing with complete suite of LWD, MWD, Wireline logs. High familiarity with MDT, RFT and Rotary cores and analysis. Prospects and Consequences of OBM versus WBM in different environments
- ✓ Developing a new methodology for predicting seismic rock properties using textural heterogeneity in paleo-lacustrine pre-salt carbonate deposits (Angola and Brazil deep water) based on analog core samples from Green River outcrop
- ✓ Multilinear regression analysis for mineralogy quantification, porosity and saturation estimation in carbonate and unconventional formations
- ✓ Experience with acquisition and use of NMR data in laboratory for assessing reservoir properties and developing interpretive techniques
- ✓ Quantitatively describe uncertainties and provide recommendations to reduce them. Collaborate with other domains to incorporate existing, and determine future data acquisition programs, including wireline and LWD logging, coring, and core data analyses
- ✓ Expertize with Rock Physics analysis of conventional and unconventional resources and its application in exploration and development of resources. Modeling of dry and saturated seismic rock properties for pressure and saturation changes using Gassmann, Xu-White, DEM and a mix of methods. Dispersion and attenuation analysis, AVO modeling and trend analysis, seismic impedance inversion, Thomsen anisotropy parameter estimation and its impact on shear-sonic logs. Other miscellaneous jobs include support to time-lapse (4D) seismic rock physics for acoustic modelling.

4. Sep. 7, 2010 – Dec. 10, 2010: Internship as Seismic Petrophysicist with Sub-Surface Tech., ConocoPhillips, Houston, Tx, USA

Assignments: Petrophysical and Rock Physics Evaluation of Ekofisk Chalk. To investigate on pressure changes due to compaction and cementation upon saturation.

Achievement: Successfully analyzed saturation related compaction and cementation effects on effective pressure and seismic properties of chalks. Used Hashin-Shtrikman/Hertz-Mindlin/Gassmann modeling concept to model rock physics properties of formations experiencing compaction versus cementation

5. May 25, 2010 – Aug. 20, 2010: Internship as Petrophysicist with Upstream Tech., Marathon Oil Company, Houston, Tx, USA

Assignments: Unconventional Reservoir Evaluation-Petrophysical and Rock Physics Evaluation of Tight Gas Sands in Piceance Basin.

Achievement: Successfully showed significant differences in the petrophysical and geomechanical behavior of the wells as reasons for difference in their production behavior. This model served as an independent fully functional Petrophysical model with the business unit as a substitute for vendors solution. This work was awarded best among 100 odd intern presentations under the technical excellence category

6. May 18, 2009 – August 14, 2009: Internship as Seismic Petrophysicist with Exploration and Production Technology, BP, Houston, Tx, USA

Assignments: Performed full band inversion using low frequency back ground model based on well data and a stochastic mix of seismic. Deliver impedance model and porosity model for Lisburne carbonate field.

Achievement: The impedance/porosity model could delineate stratigraphic imprints between the wells that proved crucial in establishing lateral movement of facie at better resolution. The model was to be developed for reassessment and development of Lisburne carbonate reservoir, Prudhoe Bay, Alaska.

7. Jan. 22, 2008 – Sep. 18, 2012: Graduate Research Assistant, OCCLASH and Center For Rock Abuse, Colorado School of Mines, Golden, CO, USA

Research: Seismic interpretation for 1. fracture anisotropy characterization in tight formation using multicomponent seismic, 2. Sweet spot and new drilling prospect identification in Gulf of Mexico, 3. Time-Lapse seismic interpretation for sweep efficiency determination in an EOR project using CO2 sequestration in Weyburn field.

- ✓ Pre and post stack PSTM and PSDM data interpretation (including attributes) and velocities for geological risks mitigation. Multiple velocity scenarios to de-risk pore pressure & other drilling hazards. Proposal for drillable locations, well proposals, prognosis and well monitoring
- ✓ Seismic inversion for full-band elastic property inversion in the Middle East carbonate reservoirs.
- ✓ Formation Evaluation for petrophysical property estimation in the Middle East carbonate reservoirs
- ✓ Seismic rock properties under static and dynamic loading. Measured and modeled elastic properties at wide range of frequencies varying from 2-2000Hz (low frequency) and 0.8 Hz (ultrasonic).
- ✓ High familiarity with scanning instruments such as; ESEM, μ CT. Experience with XRADIA for raw image processing and with AVIZO and other Matlab codes for cleaning and segmentation for pore space characterization.
- ✓ Experience with nanopore characterization using Nitrogen Adsorption techniques in clastic and carbonate rocks

- ✓ Experience with other routine and SCAL methodologies and data handling and QC

Teaching: Designed and delivered courses such as ‘Petrophysics’ and ‘Basic Rock Physics and Rock Characterization’ to both undergraduate and graduate classes at CSM.

- ✓ Teaching Assistant for Advance Seismic Processing class at Department of Geophysics, Colorado School of Mines

8. Mar. 19, 2001 – Oct. 14, 2007: Senior Geophysicist with Marine Geophysical Operations, ONGC Ltd., Mumbai, India

Assignments: Worked in 2D and 3D seismic acquisition and online QC processing of marine seismic data both in shallow and deep water regimes.

Achievement: Planning and designing of offshore seismic surveys, Navigation operations and QC, acquisition, online QC, pre and post processing QC of seismic data. Contributed in acquisition of high quality 2D and 3D seismic data based on which prospects were drilled successfully.

9. Apr. 19, 2000 – Mar. 7, 2001: Seismological Research Assistant at Earth Sciences IIT Bombay

Assignments: “Geological, Seismological and Co-seismic studies in Thane and Nashik (INDIA)”. Responsible for field site selection, data monitoring, analysis, and interpretation.

Achievement: Delineation of local fault network and seismologic microzonation using the principle of local earthquake tomography.

WORKSHOPS/ CERTIFICATE COURSES/ SYMPOSIUM ORGANIZED (with sponsorship if any)

1. Designed and delivered course on “Carbonate Rock Physics and Petrophysics” at 6th International Symposium of the Society of Petroleum Geophysicist, February 2012, Hyderabad, India.
2. Designed and coordinated and delivered the following GIAN workshops:
 - Induced Polarization of Rocks: From Petrophysics to Tomography and Their Applications to Reservoirs and Geothermal System. Foreign expert Prof. Andre Revil, 2017-18. (**MHRD Sponsorship: INR 5.44 Lakhs + Other funds: INR 0.5 Lakhs**)
 - Seismic Anisotropy: Estimation, Imaging, & Reservoir Characterization. Foreign expert Prof. Jyoti Behura, 2017-18. (**MHRD Sponsorship: INR 5.44 Lakhs + Other funds: INR 0.65 Lakhs**)
 - Applicability of Rock Physics and Rock Mechanics in Shale Reservoirs. Foreign expert Prof. Manika Prasad, 2017-18 (**MHRD Sponsorship: INR 5.44 Lakhs + Other funds: INR 0.65 Lakhs**)
3. Designed, coordinated and delivered the following technical workshops for NHPC:
 - Applications of Remote Sensing and GIS for geological applications. Co-faculty: Prof. Sandeep Bhatt, IIT Roorkee and Dr. Suresh Kannaujiya, IIRS Dehradun. January 2022. (**NHPC sponsorship: INR 3.77 Lakhs**)
 - Geological and Geophysical aspects for hydrological investigations. Co-faculty: Prof. Sudheer Tiwari, IIT Roorkee. February 2022 (**NHPC sponsorship: INR 3.77 Lakhs**)

SPONSORED RESEARCH PROJECTS (Role, Sponsoring Agency, Duration, and Value)

- Texture Impact on Attenuation and Dispersion of Seismic Rock Properties in Partial and Fully Saturated Carbonate Reservoirs (**PI, Sponsoring Agency: ONGC Ltd., Started: October 2018 for three years, extendable up to two years, Value: 178.98 Lakhs**)
- A HPC Software Suite to Aid Seismic Imaging for Oil and Gas Exploration (**Co-PI, Sponsoring Agency: MEITY, G.O.I., Started June 2019 for four years, Value: 66.94 Lakhs**)
- Large Scale Model of the Himalayan Crust Using Finite Difference Modelling of High and Low Frequency Near Field Data and its Effects on Strong Ground Motion in Central Seismic Gap region of Himalaya (**Co-PI, Sponsoring Agency: MoES, G.O.I., Started August 2019 for three years, Value: 23 Lakhs**)
- Permanent sequestration of gigatons of CO₂ in continental margin basalt deposits (**PI, Sponsoring Agency: SERB, Department of Science and Technology, Started: April 2023 for a period of three years, Value: 73 Lakhs approximately**)

INTERNATIONAL SPONSORED PROJECTS (Role, Sponsoring Agency, Duration, and Value)

- Image based feature extraction, using AI & ML for quantification of complex subsurface pore scale structures, to assess the impact of CO₂ & H₂ storage, (**PI, Sponsoring Agency: Lithuanian Research Council, Govt. of Lithuania, Started November 2022 for two years between Kaunas University of**

Technology and IIT Roorkee with a total funding of Value 90K Euros (INR 79.65 Lakhs...as on date), of which a minimum funding of ~24K Euros (Rs. 21.24 Lakhs...as on date) is for India).

CONSULTANCY PROJECTS (Role, Sponsoring Agency, Duration, and Value)

- Electrical Resistivity Profiling of Joshimath and Surrounding Areas in Garhwal Himalaya (**PI, Sponsoring Agency: M/s Gaveshna Geosciences Pvt. Ltd. Started: December 2018 for one month, Value: INR 9.23 Lakhs**)
- Electrical Resistivity Profiling of Sonprayag and Surrounding Areas in Garhwal Himalaya (**PI, Sponsoring Agency: M/s Gaveshna Geosciences Pvt. Ltd. Started: February 2019 for one month, Value: INR 4.58 Lakhs**)
- Preliminary field visit to assess the feasibility of constructing a slime pit in Jamshedpur, Odisha (**PI, Sponsoring Agent: Tata Steel Ltd, Jamshedpur, January 2021, Value: INR 0.79 Lakhs**)
- Monitoring for the segment of major bridge at ch 19+600 RHS to determine PPV values (**Co-PI, Sponsoring Agency: M/s Bharat Geoservices, Delhi, 2021, Value: INR 1.27 Lakhs**)
- Sandalwood Heartwood estimate and oil analysis (**Co-PI, Sponsoring Agency: Dharampal Satyapal Group, April 2023 for one year, Value: INR 45.88 Lakhs**)

THESIS SUPERVISED/ CURRENTLY UNDERWAY (Since July 2017)

- **Ph.D. Dissertation:** 3 Awarded, 17 Ongoing
- **Master Dissertation:** 67 Awarded, 22 Ongoing

INDIAN PATENTS (Current Status)

- **Sharma*, R., Malik, S., Shettar, A. S., 2022, “A SYSTEM AND METHOD FOR CLASSIFYING AND UPSCALING THE DRP OPTIMIZED PARAMETERS OF POROSITY, PORE TYPES AND ASPECT RATIO TO FIELD VALUES”, No. 202211039869, dated 12.07.2022. (Current Status: “Published” at the IPO website vide The Patent Office Journal No. 25/2023 dated 23/06/2023)**
- **Sharma*, R., Panwar, N., Dhiman, A., 2022, A SYSTEM AND METHOD FOR ESTIMATION OF PORE-SIZE DISTRIBUTION IN CARBONATES USING SPECTRAL INDUCED POLARIZATION (SIP)”, No. 202211072354, dated 14.12.2022. Published at the IPO website vide The Patent Office Journal No. 52/2022 dated 30/12/2022. **Current Status:** Granted on 13th February 2024.**

JOURNAL PUBLICATIONS

- Malik, S., Pal, M., Karaliūtė, V., Makuškas, P., **Sharma, R.**, 2024; Assessing the Geological Storage Potential of CO₂ in Baltic Basin: A Case Study of Lithuanian Hydrocarbon and Deep Saline Reservoirs. International Journal of Greenhouse Gas Control (*Accepted for Publication*)
- Kumar, D., **Sharma, R.***, Maurya, A. S., Pandey, R. (2024). Source Rock Characterization for Hydrocarbon Generative Potential and Thermal Maturity of Paleocene – Eocene sequences, Jaisalmer Basin, Rajasthan, India, Arabian Journal of Geosciences, Vol. 17, Article 92, <https://doi.org/10.1007/s12517-024-11872-0>
- Kukshal, A., **Sharma R.***, Kalita, H. J., Yeshwanth, G. M., Jamwal V.D., Lal, H., 2023, Determination of Regions Prone to Sand production and the Linkage to fluid flow by integrating Rock Strength Parameters and the Microphotographs in the Southern Onshore Basin in Journal of Petroleum Exploration and Petroleum Technology, Journal of Petroleum Engineering and Production Technology, <https://doi.org/10.1007/s13202-023-01728-w>
- Chaudhary, M., **Sharma, R*.**, Kalita, H. K., Kukshal, A., 2023, Influence of Rock Texture on the Geomechanical Properties of the Basement Rocks of the Petroliferous Basin in Western Offshore India, Arabian Journal of Geosciences, <https://doi.org/10.1007/s12517-023-11763-w>
- Daqiq, M. T., **Sharma, R*.**, Karunakalage, A., Kaanuajiya, S., 2023, Determination of Groundwater Storage Variation, Deficit and Abstraction in Afghanistan and the Assessment of the Evolution of Vadose Zone in Kabul City, IEEE Transactions on Geosciences and Remote Sensing, <https://doi.org/10.1109/TGRS.2023.3326164>
- Kumar, R., Maurya, A. S*, Laskar, A. S. Liang, Maa. C., **Sharma, R.**, Bhandari, S. L., 2023, “Burial history and hydrocarbon potential of the Harudi and Fulra Limestone of Kachh, western India constrained using carbonate clumped isotope thermometry, Journal of the Geological Society of India, Volume 100, Issue 1, January 2024 Pages (5-152)
- Chaudhary, M., **Sharma*, R.**, and Sadiq, M., Kapoor, D., 2022, “Hydrocarbon Prospectively Analysis of Fractured Basalt Basements of Deccan Trap in the Kutch Offshore Basin in Western India, Journal of Petroleum Science and Engineering, Vol. 217, October 2022, <https://doi.org/10.1016/j.petrol.2022.110854>

- Kukshal, A., **Sharma***, R., Jamwal, V., Yeshwanth, G., 2022, Encapsulation of Elastic Parameters and Pore Pressure for In-situ Stress Determination in Unconventional Shale Formations of the Indian Eastern Onshore, ONE PETRO (ISBN:978-0-9794975-7-5, Paper Number: ARMA-2022-0326, June 2022 (<https://doi.org/10.56952/ARMA-2022-0326>).
- Revil, A., Qi, Y., Panwar N., Gresse, M., Grandis, H., **Sharma, R.**, Geraud, Y., Chibati, N., Ghorbani, A., 2022, “Induced Polarization Images Alteration in Stratovolcanoes”, Journal of Volcanology and Geothermal Research, Vol. 429, September 2022, pp. 31–50
- **Sharma***, R., Malik, S. and Shettar, A. S., 2021, Sensitivity of Digital Rock Method for Pore Space Optimization to Heterogeneity in Carbonates Formations, *SPEJ.* 26 (05): 2914–2927. (doi.org/10.2118/205006-PA)
- Panwar, N., Revil, A., **Sharma, R.**, Schmutz, N., Duvillard, P. A., Garcia, B., Cerepi, A., Garcia-Artigas, R., Vaudelet, P., Malet, E., and Jaillot, S., 2020, “Induced Polarization of Carbonates”, Journal of Geophysical Research: Solid Earth, 126, e2021JB022029 (<https://doi.org/10.1029/2021JB022029>).
- Revil, A., Ahmed, A. S., Coperey, A., Ravanel, L., **Sharma, R.**, and Panwar, N., 2020, “Induced polarization as a tool to characterize shallow landslides”, Journal of Hydrology, Volume 589, July 2020, 125369.
- Revil, A., Razdan, M., Julien, S., Coperey, A., Mao, D., Abdulsamad, F., Ghorbani, A., Gasquet, D., **Sharma, R.**, and Rossi, M.; 2019; Induced polarization response of porous media with metallic particles – Part 9. Influence of permafrost, Geophysics, Vol. 84, No. 5 (September-October 2019); P. E337–E355.
- Revil, A., Ghorbani, A., Gailler, L. S., Gresse, M., Cluzel, N., Panwar, N., and **Sharma, R.**; 2018; Electrical conductivity and induced polarization investigations at Kilauea volcano, Hawai’I, Journal of Volcanology and Geothermal Research 368, December 2018, pp. 31–50
- **Sharma***, R., Prasad, M., Batzle, M. and Vega, S.; 2013; Sensitivity of Flow and Elastic Properties to Fabric Heterogeneity in Carbonates, Geophysical Prospecting, Volume 61, Issue 2, pages 270–286
- Chandra* R. and **Sharma R.**; 2002; Could the main Chamoli earthquake of 1999 have triggered some of the aftershocks, Journal of Himalayan Geology, Vol.23 (1&2), pp.39-43.

JOURNAL PUBLICATIONS UNDER REVIEW/ REVISION

- Kumar, D., Maurya, A. S., **Sharma, R.***, Pandey, R., 2023. Petroleum source rock characterization and depositional environment of Kimmeridgian-Tithonian Sequences, Jaisalmer Basin, Western Rajasthan, India. Petroleum Geoscience (Resubmitted after revision).
- Malik, S., Makauskas, P., **Sharma, R.***, Pal, M., 2024; Evaluating Carbon and Hydrogen Storage Feasibility in Lithuanian Reservoirs through Digital Rock Physics Analysis. Geoenergy Science and Engineering (under review)
- Karunakalage, A., **Sharma, R.***. Daqiq, M. T., Kaaunajiya, S., 2023, Assessment of Climatic and Vegetation Influence on Spatial Distribution of Groundwater Recharge in Humid Subtropical Central Gangetic Plain. ESS Open Archive, May 05, 2023 (<https://doi.org/10.22541/essoar.168332180.04445793/v1>), (*Under review*)
- Panwar, N., **Sharma, R.***, Dhiman, A., Malik, S., Behera, S. K., Khanna, S., Ghosh, A., Soni, P., 2023, “Mercury Intrusion Porosimeter Constrained Inversion of SIP Measurements for Determination of Pore Sizes in Carbonate Rocks, Geophysical Journal International, (*Reviews received, under revision and held back due to patent*)
- Kukshal, A., **Sharma, R.***, Jamwal, V., Yeshwanth, G., 2024, Encapsulation of Elastic Parameters and Pore Pressure for In-situ Stress Determination in Unconventional Shale Formations of the Indian Eastern Onshore Basin, SPE Journal, (*under review*)
- Kukshal, A., **Sharma, R.***, Yeshwanth, G., Chaudhary, M., Sadiq, M., Kalita, H. K., Harilal, 2023, Laboratory Constrained Workflows for Integrated Wellbore Stability Analysis in Clay Rich Sandstone Reservoirs in the Southern Onshore Basin in India, PEPT Journal, (*under review*)

- Kumar D., **Sharma, R***, Maurya, A. S., Pandey, R., 2023, Reservoir Architecture and Depositional Setting of the Proliferous Lower Cretaceous (Pariwar Formation), Jaisalmer Basin, India, AAPG Bulletin, (*Under 2nd Review*)
- Malik, S. and **Sharma*, R.**, Livo, K. and Prasad, M., 2022, “Digital Rock Physics for Porosity Fractionation and Flow Regime Determination in Carbonate Reservoirs, Journal Geophysical Research-Solid Earth, (*Received Reviews, held back due to Patent*)
- Dhiman, A., **Sharma*, R.**, Purohit, V., 2022, “Integrated Petrophysics and Rock Physics Modeling for Characterizing Morphology Dependent Behaviour of Hydrate Bearing Sediments, Journal of Applied Geophysics, (*Reviews received, under revision*)

EXPANDED ABSTRACT

- Malik, S., Makauskas, P., **Sharma, R.**, Pal, M., 2024: Exploring CO₂ storage potential in Lithuanian deep saline aquifers using digital rock volumes: a machine learning guided approach, Accepted for publication in Advances in Carbon Capture Utilization and Storage, JVE Journals (<https://doi.org/10.21595/accus.2023.23906>).
- Dangi, S. L., Malik, S., Makauskas, P., Karaliūtė, V., **Sharma, R.**, Pal, M., 2024: Assessment of CO₂ leakage using mechanistic modelling approach for CO₂ injection in deep saline aquifer of Lithuanian basin in presence of fault and fractures, Accepted for publication in Advances in Carbon Capture Utilization and Storage, JVE Journals.
- Dangi, S. L., Malik, S., **Sharma, R.**, and Pal, M., 2023 "Geomechanical Implications of CO₂ Sequestration in Saline Aquifers", SPG 14th International Conference & Exposition, Kochi, India, 2023.
- Kalita, H. J., Pandey, P., Malik, S., Dhiman, A., **Sharma, R.**, Ghosh, A., and Khanna, S., 2023 "Integrating Ultrasonic Velocity Measurements and Attenuation Behavior with Pore Aspect Ratio Distribution for Heterogeneity Characterizing in Grain Dominated Carbonate Facies", SPG 14th International Conference & Exposition, Kochi, India, 2023.
- Malik, S., Pal, M., **Sharma, R.**, 2023. "Effectiveness of Digital Rock Methods over other Physics Based and Empirical Techniques for Permeability Estimation: A Multiscale Approach", SPG 14th International Conference & Exposition, Kochi, India, 2023.
- Malik, S., Makauskas, P., Karaliūtė, V., **Sharma, R.**, Pal, M., 2023; Assessing Long-Term Fate of Geological CO₂ Storage in Lithuania: A Machine Learning Approach for Pore-Scale Processes and Reservoir Characterization, Expanded Abstract, 12th Trondheim Conference on CO₂ Capture, Transport and Storage (TCCS), Trondheim, Norway.
- Malik, S., Pal, M., Karaliūtė, V., Makauskas, P., **Sharma, R.**, 2023; Assessing the Feasibility of Carbon Capture and Storage Potential in Lithuanian Geological Formations: A Simulation-based Assessment, Expanded Abstract, 84th European Association of Geoscientists and Engineers (EAGE) Annual Conference & Exhibition, Vienna, Austria.
- **Sharma*, R.**, Murugesu, M., Prasad, M., 2022, Multiphysics Investigations of Seismic Signatures of CO₂ injection in Carbonate Reservoirs, SEG Summer Research Workshop on *Toward Gigatonnes of CO₂ Storage, the grand geophysical challenge*, Stanford University, CA, 26-30 June 2022.
- Kukshal, A., **Sharma*, R.**, Kalita, H., Pandey, P., Harilal, 2022, Wellbore Stability Using Integrated Insitu stress and Associated Pore pressure Distribution in Southern Onshore Basin in India. 6th International Workshop on Rock Physics, A Coruna, 13-17 June 2022.
- Panwar N., **Sharma*, R.**, Revil, A., Dhiman, A., Malik, S., Behera, S.K., 2022, Integration of SIP and MIP methods for Pore size distribution in carbonate rocks, Expanded Abstract, International Meeting for Applied Geosciences & Energy (IMAGE), Society of Exploration Geophysicists (SEG), Houston, USA.
- Sharma, K., Singh, G., and **Sharma*, R.**, 2021; “Optimized Petrophysical Evaluation using Nonlinear Volumetric Solvers in Organic Rich Source Rocks”, Expanded Abstract, Society of Exploration Geophysicists (SEG), Annual Meeting 2021, Denver, USA.
- Gautam, T. and **Sharma*, R.**, 2021, “Supervised Machine Learning Algorithms to Predict Velocity Models: Promises and Limitations”, Expanded Abstract, SEG | Dharan Geological Society Workshop: Challenges & New Advances in Velocity Model Building, Dahrán, Saudi Arabia.

- Malik, S., **Sharma***, **R.**, Livo, K., Prasad, M., 2020; Digital Rock Physics for Porosity Fractionation and Flow Regime Determination in Carbonate Reservoirs, Expanded Abstract, Society of Exploration Geophysicists (SEG), Annual Meeting 2020, Houston, USA.
- **Sharma***, **R.**, Malik, S., Shettar, A.S.; 2019; Optimized Workflow in Digital Rock Physics for Pore Space Estimation in Complex Carbonates, Expanded Abstract, 5th International Workshop on Rock Physics (IWRP), Hong Kong, SAR, April 2019
- Malik, S., **Sharma***, **R.**, 2019; Feasibility of Digital Rock Physics for Static and Dynamic Reservoir Property Characterization in Carbonate Reservoirs-I, Expanded Abstract (DOI: 10.30632/T60ALS-2019_QQQQ), SPWLA 60th Annual Logging Symposium, June 15-19, 2019, Woodland, TX, USA.
- **Sharma***, **R.** and Teja, V.; 2017; Textural Control on The Laboratory Measured Acoustic Velocities in Carbonate Rocks, SPWLA INDIA 4th Symposium 2017, Mumbai, India
- Gupta, N. and **Sharma***, **R.**; 2017; Fluid Substitution in Anisotropic Carbonates - A VTI Consideration, Geophysics, 74, No.1, D1–D6, Expanded Abstract, SEG Annual Convention 2017, Houston, Tx.
- Mulchandani, V. and **Sharma***, **R.**; 2017; Sensitivity of effective pressure towards Vp and Vs using Biot's and Effective Stress Coefficient (ESC) in carbonate reservoirs, Expanded Abstract, International Conference on Engineering Geophysics (ICEG) 2017, Dubai, UAE.
- Bhardwaj, A. S. and **Sharma***, **R.**; 2017; Computational Methods in Petrophysics for Addressing Redundancy and Reservoir Property Estimation, Expanded Abstract, SPG Biennial International Conference, SPG, Jaipur, India.
- Liu*, C (Hope)., **Sharma, R.** and Tutuncu, A.; 2012; Shale Gas Resources: Energy Potential and Associated Exploitation Challenges for Coupled Geomechanics and Transport Characteristics, Expanded Abstract, 46th U.S. Rock Mechanics/Geomechanics Symposium, June 24 - 27, 2012, Chicago, Illinois, USA
- Alam*, M. M., **Sharma R.**, Fabricius I., Prasad M.; 2010; Permeability Prediction in Chalk, Search and AAPG Online Journal for E&P Geoscientists, Discovery Article #40506
- **Sharma* R.**, Prasad M., Katiyar G. C. and Surve G.; 2006; Applicability of Gassmann Model in Carbonates, Expanded Abstract, 6th International Conference on “Oil Exploration and Mitigation” by SPG India.
- **Sharma* R.**, Prasad M., Katiyar G. C. and Surve G.; 2006; On The Applicability of Gassmann Model in Carbonates, Expanded Abstract, 76th Annual General Meeting, SEG, New Orleans, USA, RP 1.8, pp 1866 – 1870.
- **Sharma* R.**, Adam, L. and Prasad, M.; 2009; Effects of Fluid, Frequency and Heterogeneity on Elastic Properties of Carbonate Rocks, SPE 125102, ATCE 2009.
- **Sharma* R.**, Prasad, M. and Batzle, M.; 2009; Lab Measured Properties in Carbonates for Better Characterization of Heterogeneity, Expanded Abstract, 79th Annual General Meeting, SEG, Houston, USA, RP --, pp --.

CONFERENCE ABSTARCTS & PRESENTATIONS

- Dhiman, A., Sharma, R., Jamwal, V. D., Kalita, H. J., 2023 “Enhancing Gas Hydrate Saturation Estimation using Forward and Inverse Rock Physical & Petrophysical Mapping of Complex Morphologies”, International Conference on Petroleum, Hydrogen and Decarbonization (ICPHD), IIT Guwahati, India, 3rd-5th Nov,2023.
- Kalita, H. J., Sharma, R., Panwar, N., Ghosh, A., Khanna, S., 2023 "Enhanced Rock Physics Understanding for Bassein Formation Characterization through Ultrasonic Velocity and Attenuation Analysis", International Conference on Petroleum, Hydrogen and Decarbonization (ICPHD), IIT Guwahati, India, 3rd-5th Nov,2023.
- Kumar, T*, Nagarkoti, N., Pandey, P., Sharma, R., Dangi, S. K., 2023 "Geochemical Modelling for Understanding Pressure- Temperature variations for CO2 sequestration ", International Conference on Petroleum, Hydrogen and Decarbonization (ICPHD), IIT Guwahati, India, 3rd-5th Nov,2023.

- Jamwal, V. D*, Vedanti, N., and Sharma, R., 2023 "Temperature-Constrained High-Frequency Evaluation of Damodar Valley Shales", International Conference on Petroleum, Hydrogen and Decarbonization (ICPHD), IIT Guwahati, India, 3rd-5th Nov,2023.
- Dangi, S. L*, Malik, S., Makauskas, P., Sharma, R., Pal, M., 2023 "Assessment of CO2 leakage using mechanistic modelling approach for CO2 injection in deep saline aquifer of Lithuanian basin in presence of fault and fractures", Baltic Carbon Forum 2023 in Riga, Latvia, <https://doi.org/10.21595/bcf.2023.23619>
- Malik, S*, Makauskas, P., Sharma, R., Pal, M., 2023 "Exploring CO2 storage potential in Lithuanian deep saline aquifers using digital rock volumes: a machine learning guided approach", Baltic Carbon Forum 2023 in Riga, Latvia, October 12-13, 2023, <https://doi.org/10.21595/bcf.2023.23615>
- Malik, S*, Makauskas, P., Karaliūtė, V., Sharma, R., Pal, M., 2023 "Improving Understanding of CO2 and Hydrogen Storage in Lithuanian Reservoir Rocks Using Machine Learning Algorithm and Digital Rock Volumes", Abstract, 64th conference of Lithuanian Mathematical Society, Vilnius, Lithuania.
- Malik, S*, Makauskas, P., Karaliute, V., Sharma, R., and Pal, M., 2023 "Assessing Long-term fate of geological CO2 storage in Lithuania: A machine learning approach for pore-scale processes and reservoir characterization", 12th Trondheim Conference on CO2 Capture, Transport and Storage, 2023.
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- Karunakalage, A.*, **Sharma, R.**, Kannaujiya, S., (2022), WetSpacc based groundwater recharge simulation to determine the role of vegetation in the state of Uttar Pradesh, India, Abstract (3018) presented at 2022 The 9th International Groundwater Conference, Roorkee, India, 2-4 Nov. (<https://doi.org/10.13140/RG.2.2.29582.02882>)
- Kukshal, A., **Sharma, R***, Kalita, H., Jamwal, V., Chaudhary, M.,2022; Inferring sand production zone from the interplay of formation strength, mineralogy and grain size distribution in the Eastern onshore basin in India, American Geophysical Union, Fall meeting 2022, Abstract#1198031
- Jamwal, V. D*, **Sharma, R.**, Dhiman, A., Kalita, H., Pandey, P., 2022; Interplay of Porosity, Mineralogy, TOC and Maturity on the Acoustic Properties of Organic Rich Damodar Valley Shales., American Geophysical Union, Fall Meeting 2022, Abstract# 1174799
- Daqiq, M. T*, **Sharma, R.**, Karunakalage, A., Kannaujiya, S., 2022; Determination of Groundwater Shortage in Afghanistan using GRACE data and the Evolution of Vadose Zone in Kabul City using SAR data, American Geophysical Union, Fall Meeting 2022, Abstract# 1105129, Paper ID: GC52I-0251, (<https://doi.org/10.22541/essoar.168332222.27870328/v1>)
- Karunakalage, A*, **Sharma, R.**, Kannaujiya, S., 2022; Spatial and Temporal Distribution of Groundwater Recharge and Assessment of the Factors Controlling Recharge in the Province of Uttar Pradesh, India, American Geophysical Union, Fall Meeting 2022, Abstract# 1166024
- **Sharma, R***, Jaiswal, A., and Sharma, K., 2021; Effectiveness of Hybrid Algorithms for Optimized Sub-surface Property Prediction over Conventional Geostatistics, American Geophysical Union, Fall Meeting 2021, Abstract # IN45A-06
- Purohit, V., Jamwal, V., Yeshwanth G., Dhiman, A., **Sharma*, R.**, 2021; Integrated Petrophysical and Rock Physical Modelling Saturation and Morphological Characterization of Hydrate Bearing Formations, American Geophysical Union, Fall Meeting 2021, Abstract # MR55C-0037
- Malik, S., **Sharma*, R.**, Shettar, A. S., 2019; Pore Space Estimation Using Optimized DRP Workflow in Complex Reservoirs, American Geophysical Union, Fall Meeting 2019, Abstract #MR21C-0087

- Bisui, A., **Sharma***, R., Sharma, K., Sarkar, S., Purohit, V.; Effectiveness of Machine Learning Algorithms To Use Unconstrained Data for Lithofacies Prediction in Carbonate Reservoir, American Geophysical Union, Fall Meeting 2019, Abstract # MR23B-0100
- **Sharma***, R., Prasad, M., Batzle, M. L. and Vega S.; 2016; Attenuation and Dispersion Analysis in Laboratory Measured Elastic Properties in the Middle East Carbonate Reservoir Rocks, AGU Annual Meeting, 12-16 December 2016, San Francisco, USA

BOOK CHAPTERS

- Malik, S., and **Sharma***, R.; 2019; Scaling Issues in Estimation of Pore Space using Digital Rock Physics, in the book titled “Petro-physics and Rock Physics of Carbonate Reservoirs; Likely Elucidations and Way Forward”, Springer Singapore, ISBN No. 978-981-13-1210-6, pp. 177-187
- Panwar, N., and **Sharma***, R.; 2019; A Review on influence of mineralogy and diagenesis on Spectral Induced Polarization in carbonate Rocks, in the book titled “Petro-physics and Rock Physics of Carbonate Reservoirs; Likely Elucidations and Way Forward”, Springer Singapore, ISBN No. 978-981-13-1210-6, pp. 115-125
- Bhardwaj, A.S., and **Sharma***, R.; 2019; Computation Methods in Petrophysics for Addressing Redundancy and Reservoir Property, in the book titled “Petro-physics and Rock Physics of Carbonate Reservoirs; Likely Elucidations and Way Forward”, Springer Singapore, ISBN No. 978-981-13-1210-6, pp 161-176
- **Sharma***, R. and Malik, S.; 2023; Effective Elastic Medium Properties Using Digital Rocks: Existing Practice and Emerging Trends, in the book titled “Reservoir Characterization, Modeling and Quantitative Interpretation”, Elsevier publications, ISBN to be issued

LEADERSHIP, AFFILIATION AND INTEREST

- Active affiliation to PETA, WORLD VISION
- Sponsoring education and health of girl from backward family in India through World Vision
- Elected as Senator to Roorkee University Student Association (RUSA) in 1998
- Membership: Active member of SPE, SEG, SPWLA, AGU, SPG
- Founder member of the student chapter of SEG at Indian Institute of Technology, Roorkee, India and of ARMA and SPWLA at Colorado School of Mines, USA
- Reviewer for journals: *Journal of Geophysical Research-Solid Earth*, *Geophysical Journal International*, *GEOPHYSICS*, *Computers and Geosciences*, *Journal of Applied Geophysics*, *Geophysical Prospecting*, *Petrophysics*, *Journal of Petroleum Science and Engineering*, *Mathematical Geosciences (MATG)*, *Natural Hazards*, *SEG Expanded Abstracts*, *The Portuguese Institute of Science and Technology (FCT.MCTES)*.
- Associate Editor: *Journal of Applied Geophysics*
- Guest Editor: *Frontiers in Earth Sciences*
- Editorial Board: *GEOHORIZONS*, SPG, India

SCHOLARSHIP AND AWARDS

- Council of Scientific and Industrial Research/UGC combined fellowship for the Year 2000.
- Best Graduate Trainee award of ONGC Ltd. for the year 2001
- Gold medal for the best poster presentation at the 6th international conference and exposition of SPG (under the aegis of SEG and EAGE) at Kolkata, India
- Best intern technical presentation at Marathon Oil Company 2010, Houston, USA
- Epsilon-Pi-Tau recognition for outstanding scholastic achievement at Colorado School of Mines, USA
- ConocoPhillips SPIRIT scholarship award (2011, 2012), Colorado School of Mines, USA
- ConocoPhillips ‘Special Achievement Award’ for petrophysics contribution in Gulf of Mexico Exploration, 2013, Houston, USA
- OVDF scholarship by SERB, Department of Science and Technology, Govt. of India for faculty travel and research activity, 2018
- Resource person for AITCE Training and Learning (ATAL) Academy sponsored Faculty Development Program (FDP), November 2020.
- Nomination for Outstanding Teachers Award @ IIT Roorkee, 2021, 2022, and 2023
- Outstanding Teachers Award @ IIT Roorkee, 2023

ADMINISTRATIVE ACTIVITIES@IITR

- June 2016 – Dec. 2019: Faculty In-Charge Department Computer Lab
- June 2016 – June 2019: Chief Warden, Married Hostels
- June 2017 - June 2019: Chief Warden, Khosla International House (KIH) & Married Hostels

- July 2019 – Jan. 2021: Convener, Faculty Search Committee
- June 2019 – Feb. 2022: Member, Departmental Purchase Committee
- June 2016 – July 2022: Faculty In-Charge Department Placement Activities
- June 2018 – Present: Faculty Adviser, AAPG Students Chapter, EVOLVE-SEG,
- June 2019 – March 2023: Member, Departmental Academic Programming Committee
- July 2021 – July 2022: Member, Dean of Resources and Alumni Committee
- July 2021 – July 2022: Department nominee for Institute Safety Committee
- Sept. 2023 – August 2025: Member, Institute Research Day Committee
- Nov.2023 – Present: Faculty Adviser, SPE Internation Students Chapter,

SKILL SET

- **Software:** Techlog, Geolog, PowerLog, IP, Hampson Russell, Rokdoc, Spotfire, Petrel, Seisworks, Decision Space, Kingdom Suite, Eclipse, FRACPRO, MODFLOW
- **Programming:** MATLAB, FORTRAN, C, Python, R

REFERENCES

Available if necessary