Tuli Bakshi

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Currently working as a Postdoctoral Fellow in the Department of Earth sciences, IIT Bombay.

Research Outline: Exploring the possibilities of Indian shale as a probable CO_2 sink. Understanding the pore characteristics of Indian shales and their influence on gas permeability and geomechanical properties. Assessing the impact of organic-inorganic minerals on petrophysical and geomechanical properties of shale; Assessing Indian shale/Coal as a probable carbon dioxide storage sink

Previous Experiences:

PhD from Department of Mining Engineering, IIT Kharagpur (2013-2019)
Thesis Title: Effect of shale composition and pore structure on gas adsorption potential - Gondwana and Upper Assam Shale

Supervisors: Prof Khanindra Pathak & Professor Basanta Kumar Prusty
Skills: Unconventional Energy Resources, Petrophysics, Porous media, Flow in porous media, adsorption.

Research Outline: Assessing CH_4 and CO_2 adsorption behaviors of Permian and Tertiary shales in India, pore characterization of Indian shales and evaluating the effect of pore networks on gas storage capacity, analysing the influence of organic-clay constituents on CH_4/CO_2 adsorption capacity, determination of source rock potential of the Indian shales

2. Graduate Teaching Assistant in in Department of Mining Engineering, IIT Kharagpur (2015- 2018)
3. Post Graduate Teaching Assistant in in Department of Mining Engineering, IIT Kharagpur (2013-2015)

Other Research Experiences:

1. Worked as a Research Assistant (2013-2015) in the European Union CMM research project "**Greenhouse gas recovery from coal mines and unmineable coal beds and conversion to energy**" headed by Imperial College London in association with IIT Kharagpur and CMPDI Ranchi

Research Outline: Study of geomechanical properties, flow properties and methane and carbondioxide storage capacity of the coal seams to characterize the coal reservoir and understand the the gas flow patterns around longwall faces at the Moonidih mine. Reservoir modeling using Minex to thoroughly understand the nature of coal seam as a reservoir. Designing a methane drainage technique at Moonidih coal mine in the Jharia coalfield in India. Attended a workshop in Beijing, on methane drainage technology or CMM extraction technology and it's implementation in Pindingshan Coal Mine.

2. M.Tech thesis (2008-2010) on "**Delineation and Interpretation of II C sand horizon of South Tapti using multidisciplinary data**", under IIT Bombay and British Gas India Pvt. Ltd.

Research Outline: Detailed study of Tapti reservoir by seismic interpretation of IIC horizon with the help of seismic attributes, detailed well log analysis and petrophysical study in Geoframe 4.4 to find out the reservoir potential. In seismic interpretation the main work done is structural interpretation, identifying faults, structural gridding to know topographic variation. Attribute analysis is done to find out reservoir geometry, continuity, heterogeneity and lithological properties. Lastly integration of well log and seismic data is done for a better analysis and interpretation.

3. M.Sc Thesis (2007-2008) on "**Studies of laterite of Konkan region around Velas Bankot area, Ratnagiri district Maharashtra**" under guidance of Prof. H.S.Pandalai, IIT Bombay.

Outline: Study regarding the autochthonous or allochthonus nature of Laterite in the Konkan coast region

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Professional Experience

Well-site Geologist in Dart Energy India Pty. Limited (1st May 2012-30th April 2013)

Projects Handled:

1. Pilot CMM project of degassing target seams in Jamadoba, Jharia with TATA STEEL LIMITED
2. Satpura CBM Exploration Project

Special Skills: Lithological logging, Well log interpretation, Floor contouring, Seam Correlation, Drilling

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Research Interests
Adsorption, Porous media, Geomechanics, Flow in porous media

Publications:

- **T. Bakshi**, B.K. Prusty, K. Pathak, B.R. Nayak, D. Mani, S.K. Pal, 2017, Source rock characteristics and pore characterization of Indian shale. Journal of Natural Gas Science and Engineering, 45, 761-770
- **T. Bakshi**, B.K. Prusty, K. Pathak, S.K. Pal, 2018, Pore characteristics of Damodar valley shale and their effect on gas storage potential. Journal of Petroleum Science and Engineering, 162, 725-735.
- Sneha Rani, Eswaran Padmanabhan, **Tuli Bakshi**, Basanta K Prusty, Samir K. Pal, 2019, CO_2 sorption and rate characteristics in shales, Journal of Natural Gas Science and Engineering, 68, 102903
- **T. Bakshi**, V.Vishal, B.K. Prusty, K. Pathak, Carbon dioxide and methane sorption characteristics of Damodar Valley and Upper Assam shale, India, Energy and Climate Change, 2020, 100002.
- Y. Turlapati, B.K. Prusty. **T. Bakshi**, Detailed Pore Structure Study of Damodar Valley and Upper Assam Basin Shales Using Fractal Analysis. Energy Fuels 2020, 34, 11, 14001–14011
- [1]D. Chandra, [1]**T. Bakshi**, V. Vishal, Thermal effect on pore characteristics of shale under inert and oxic environments: Insights on pore evolution. Microporous mesoporous materials 2021, 314, 110969. ([1] equal contribution)

Book Chapter

T. Bakshi, V. Y. Turlapati ,V. Vishal, B.K. Prusty, K. Pathak., 2021, Analysis of pore characteristics of select Indian shale samples and assessment of pore connectivity by conformance correctionof mercury intrusion porosimetry results. Petroleum Geoscience, **Wiley Blackwell** (Edited by: S. Mukherjee)

Manuscripts under review

- **T. Bakshi,** V.Vishal, Organic matter in shale and how they influence the methane sorption behaviour : a review. (Energy and Fuels)
- **T. Bakshi**, V. Vishal, Effect of confining pressure on the methane and carbon dioxide permeability of shale (Environmental Geotechnics)

Manuscripts under preparation

- [1]**T. Bakshi**, [1]D. Chandra, V. Vishal, Pyrolysis and it's influence on the changing dynamics of kerogen pores.
- [1]**T. Bakshi**, V. Vishal, Effects of Brine and CO_2 saturation on the detailed pore characteristics of Gondwana shale
- **T. Bakshi**, B. Mahanta, V. Vishal, Effects of Brine and CO_2 on the mechanical and elastic properties of Dholpur sandstone

Talks Delivered in International Conferences/ Outreach:

- **T. Bakshi**, T. Chakraborty, B.K. Prusty, K. Pathak, An observation on transition elements of black shales in the Gondwana and Tertiary basins, India. Poster presented in "Goldschmidt Conference" 2017. Paris.Aug 13-18.
- **T. Bakshi**, B.K. Prusty, K. Pathak, Organic-inorganic composition of Indian shale and their effect on micro-pore characteristics and gas storage potential: A comparative analysis of Gondwana and Tertiary shale. Poster presented in "EGU" 2018. Vienna. April 8-14.
- **T. Bakshi**, B.K. Prusty, K. Pathak, Upper Assam Shale as a shale-gas reservoir; Their composition and pore characteristics. Abstract Accepted in "AGU Fall Meeting" 2018, Washington DC, December 10-14 (abstract accepted).
- **Why should we care about coal, shale and CO_2 sequestration? opportunities in higher studies for women scientists** Aligarh Muslim University, India Nov, 2020

Educational Qualification

Degree	Branch	Institute Name	Year of Graduation
PhD	Mining Engineering	IIT Kharagpur	2019
M.Tech	Petroleum Geoscience	IIT Bombay	2010
M.Sc	Applied Geology	IIT Bombay	2008
B.Sc	Geology	University of Calcutta	2006

Academic Achievements

- Best research work presentation at Research Scholar's day, Dept of Mining Engineering IIT Kharagpur, 2016
- Selected as a Research Assistant in Imperial College London-European Union and IIT Kharagpur "Greenhouse Gas" project 2013- 2015
- Recipient of British Gas fellowship 2008-2010
- Ranked 2nd in the All India GATE (Graduate Aptitude Test in Engineering), Year 2008
- Ranked 20th in All India JAM(Joint Admission Test), Year 2006

Mentoring Experiences

Ajay Singh Tomar (Dual B.Tech and M.Tech project 2014, 2015); Anurag Sarvannya (B.Tech Project 2015); Jai Prakash Meena (M.tech project 2015); T. Vinay (Dual B.Tech and M.Tech project 2016, 2017)

Lab Developments

Working with Dr. Vishal in developing the Geomechanics Laboratory of IIT Bombay by installing the Dynamic coloumn breakthrough instrument, Rock Triaxial with Permeability System and Gas hydrate machine

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Softwares handled: Avizo, Minex 6.0.1, Surpac, Geoframe 4.3, Corel Draw, AutoCAD

References

Dr. Vikram Vishal (Associate Professor, Department of Earth Sciences, IIT Bombay) drvikramvishal@gmail.com ; v.vishal@iitb.ac.in
Dr. B. K. Prusty (Associate Professor, Department of Mining Engineering, IIT Kharagpur): bkprusty@gmail.com ; bkprusty@mining.iitkgp.ac.in
Dr. K.Pathak (Professor, Department of Mining Engineering, IIT Kharagpur): khanindra.p@gmail.com ; khanindra@mining.iitkgp.ac.in

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Extracurriculars

- Writer at Indian Digital Media Giants like **The Wire, Youth ki Awaaz, The Quint, Countercurrents**, **Feminism in India**
  I have always been vocal about rights of gender and sexual minorities. My writings primarily focuses on the plight of women and people from LGBTQ community in modern India, the struggles they have to go through, the discrimination they face and their survival in 21st century, when rovers are being sent to mars.
- **Winner of** numerous awards and accolades in various Intra and Inter IIT Theater Events.
- Worked as a **social and cultural head (2017-2018)** in "Sister Nivedita Hall of Residence" and secured 1st position in social cultural General Championship among women halls of IIT Kharagpur
- **Active member and ex-Head of "Ambar"(2015-present)**

A gender equality group in IIT Kharagpur having a vision to have a campus devoid of discrimination against minorities on the basis of gender and sexuality. This includes existence of a safe space for people who are still coming to terms with themselves and their sexuality along with a commitment towards ending sexism and homophobia present both internal and external to the campus community.

- **Representative of "Women's Council" in IIT Kharagpur (2017-2018)**

The job is to bridge the gap between administration and students, especially female students. Addressing their problems and working for the solution.

- **Ex-Research scholar head (2014-2016)**

Department of Mining Engineering, IIT Kharagpur; My job was to identify the research related problems of the department and work for a solution.

- **Member of Breakthrough Science Society (2014-present)**

The job is to inculcate scientific thinking amongst the people around us and eradicating the superstitions in society, helping the people in distress. We organize popular science lectures, help people in relief camps, visit govt schools in remote places to discuss science with students.
