

SANTANU BHOWMIK

Mobile: +91-83359-34865,

E-mail : santanu789@gmail.com



HIGHLIGHTS

Experienced in laboratory testing of samples related to Geomechanics and Unconventional Reservoirs like Coalbed Methane, Shale gas with strong academic background supported by working experience in various facets of Mining Engineering/Earth Science.

ACADEMIC RECORDS

10th Standard/Madhyamik – 1995

Bengali, English, Math, Life Science, Physical Science, History, Geography, Physics (Addtnl.) from Barisha High School with 77.67%.

12th Standard/Higher Secondary – 1997

Bengali, English, Physics, Chemistry, Mathematics and Biological Sciences (Addtnl.) from Barisha High School with 80.5%.

Bachelor of Engineering - 2001

Mining Engineering from Indian Institute of Engineering, Science & Technology, Shibpur with 74.15%.

Master of Engineering - 2003

Mining Engineering from Indian Institute of Engineering, Science & Technology, Shibpur with 76.72%.

Thesis: *An investigation into the Shear Strength of Discontinuity Surfaces and its relevance to Mine Design.*

PhD in Engineering - 2012

Mining Engineering from Bengal Indian Institute of Engineering, Science & Technology, Shibpur.

Thesis: *Sorption properties of some Indian Coals for Coalbed Methane Recovery and Carbon Sequestration.*

Key research area: Methane and CO₂ single and binary gas sorption, preferential sorption and diffusion properties related to coal type and coal composition.

RESEARCH & WORK EXPERIENCE

June 2020 onwards: Assistant Professor, Gr. II in Department of Mining Engineering, National Institute of Technology, Rourkela. Teaching mining subjects like **Mineral Economics, Eco-friendly Mining, Coalbed Methane** to BTech/ BTech Dual Degree students.

January 2016-June 2020: Assistant Professor in Department of Petroleum Engineering & Earth Sciences, University of Petroleum & Energy Studies, Dehradun, India. Teaching *core-mining* subjects for B.Tech. Mining students like **Mine Development, Mine Surveying, Mine Ventilation, Underground Coal Mining and Mine Safety, Rock mechanics, Geotechnical Engineering for Coal.**

August 2015-January 2016: **Senior Research Associate** in the Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur, India.

Project Name – Coalbed methane reserves estimation for Indian Coalfield.

July 2015 – November 2015: Taught 1st semester post-graduate students **“Subsurface Rock Engineering and Tunneling”** in Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur. The topics covered were rock mass strength, tunneling methods, classification and associated problems; support and stability aspects, instrumentation & measurement of stress.

January 2015 – April 2015: Taught 6th semester undergraduate students **“Rock Mechanics Fundamentals”** in Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur. The topics covered were stress, strain, physico-mechanical properties of rock and laboratory measurements, rock discontinuities for their 6th semester Mining Engineering course.

February 2014 – June, 2015: **Senior Research Associate** in the Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur, India.

Project Name – Methane sorption characteristics on European shale samples.

December 2012 – December 2013: **Post Doctoral Fellow** in the Department of Geoscience, University of Calgary, Calgary, Canada.

Project Name - An investigation into the porosity, pore size distribution and permeability with rock composition for Nordegg Formation, Western Canada.

June 2008 – April 2012: **Senior Research Fellow** in the Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur, India.

Project Name – Gas sorption and diffusion properties of Indian coals Sponsored by Department of Science and Technology, Government of India.

January 2010 – May 2010: Taught 6th semester undergraduate students **“Rock Mechanics Applications”** in Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur. The topics covered were subsidence, slope stability, in-situ stress measurements and stresses around underground mining excavations for their 6th semester Mining Engineering course.

July 2007 - May 2008: **Project Fellow** in the Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur, India.

Project Name – Impact of Sorption and Diffusion Properties on the Deliverability of Coalbed Methane Sponsored by *British Petroleum (BP) International Limited, United Kingdom*.

August 2006 - April 2007: **Mining Engineer** in SRG Services & Consultancy (P) Ltd, Kolkata for preparation of the Mining Plan and effective time cycle analyses in various mines. **Khetri Copper Mine, HCL & Malangtoli Iron Ore Mine, MESCO.**

November 2005 – May 2006: **Junior Project Officer**, Department of Mining Engineering, Indian Institute of Technology, Kharagpur.

Project Name – Subsidence Monitoring & Control using high speed Remote Sensing & DGPS technology by wide area network in **Jhanjhra & Sanctoria Mines in Raniganj Coalfields Limited, ECL** for field subsidence data and Satellite images to calculate the rate and amount of subsidence.

June 2004– November 2005: **Project Assistant**, Central Institute of Mining and Fuel Research, Regional Centre, Nagpur, India.

Project Name – Flyrock prediction & control in opencast non-coal mines in India for modifying various blast designing parameters to reduce blast damages by trial runs conducted in surface metal mines.

August 2003 – June 2004: **Technical Assistant**, Department of Mining Engineering, Bengal Engineering & Science University, Shibpur, India for collecting field Air & Water Quality data for Environmental Impact Assessment.

CONSULTANCY WORK

June, 2011 – September, 2011: After submitting the PhD Thesis, worked as a Mining Engineer in the Department of Mining Engineering, Bengal Engineering & Science University, Shibpur, for MINOP Innovative Technologies Private Limited for Coal characterization, physico-mechanical properties of rock on 250 core samples.

MAJOR AREAS OF WORK

- ❖ Sorption, diffusion and permeability studies related to Shale gas, CBM/ECBM & Carbon Sequestration.
- ❖ Rock mechanics in Mining.

PUBLICATIONS

Journal papers:

1. Chatterjee, A., Bhowmik, S., Dutta, P. *Methane/CO₂ binary gas interaction on some moist, high-volatile bituminous Indian coals: 2. Pure-/mixed-gas adsorption modelling*. Journal of Petroleum Science and Engineering, 208, 109673, 11 pages, **2022**.
2. Dutta, P.; Chatterjee, A., Bhowmik, S. *Isotherm characteristics and impact of the governing factors on supercritical CO₂ adsorption properties of coal*. Journal of CO₂ Utilization, 39, 101150, 15 pages, **2020**.
3. Bhowmik, S.; Dutta, P. *A study on the effect of gas shale composition and pore structure on methane sorption*. Journal of Natural Gas Science and Engineering, 62, 144-156, **2019**.
4. Ghanizadeh, A.; Bhowmik, S.; Haeri-Ardakani, O.; Sanei, H.; Clarkson, C.R. *A comparison of shale permeability coefficients derived using multiple non-steady-state measurement techniques: Examples from the Duvernay Formation, Alberta (Canada)*. Fuel, 140, 371-387, **2015**.
5. Bhowmik, S.; Dutta, P. *Adsorption rate characteristics of methane and CO₂ in coal samples from Raniganj and Jharia coalfields of India*. International Journal of Coal Geology, 113, 50-59, **2013**.
6. Bhowmik, S.; Dutta, P. *An investigation into the methane displacement behavior by cyclic, pure CO₂ injection in coals*. Energy & Fuels, 25:6, 2730-2740, **2011**.
7. Dutta, P.; Bhowmik, S.; Das, S. *Methane and carbon dioxide sorption on a set of coals from India*. International Journal of Coal Geology, 85, 289-299, **2011**.
8. Raina A.K.; Choudhury P.B.; Ramulu M.; Srinivas P.; Bhowmik S.; Chakraborty A.K.; Bandopadhyay C. *Use of in-hole delays: A technique for control of flyrock and ground vibrations in blasting*, Mining Engineers' Journal, 7:1, 12-16, **2005**.
9. Dutta P.; Bhowmik S. *An Investigation into the Shear Strength of Rock Discontinuity*. Journal of the Institution of Engineers (India), 85, 11-16, **2004**.
10. Bhowmik S.; Raina A.K.; Chakraborty A.K.; Ramulu M.; Sahu P.B.; Haldar A.; Choudhury P.B.; Srinivas P.; Bandopadhyay C. *Flyrock Prediction and Control in Opencast Mines: A critical appraisal*, Mining Engineers' Journal, 6:5, 10-16, **2004**.

Conference papers:

1. Chatterjee, A.; Bhowmik, S.; Dutta, P. *Anomalous Adsorption Behavior of Supercritical CO₂ on Moisture-Equilibrated Coal Samples*. Presented in 14th Greenhouse Gas Control Technologies (GHGT-14) Conference, Melbourne, Australia, **2018**.
2. Dutta, P.; Bhowmik, S.; Das, S. *Coalbed methane reservoir characteristics – what is important for commercial production?* Presented at *Conference on Emerging Trends in Mining and Allied Industries*, Rourkela, India, **2008**.

Google Scholar Citations: <https://scholar.google.co.in/citations?hl=en&user=ih4yeUoAAAAJ>

PERSONAL

Date of birth: 18/12/1978, Male.

Permanent address: 16/3, Rabindranath Tagore Road, Nabapally, Kolkata – 700063, WB, India.

REFERENCES

1. **PRATIK DUTTA**, Professor, Department of Mining Engineering, Indian Institute of Engineering, Science & Technology, Shibpur, Howrah – 711103, India. dutta.pratik@gmail.com, Cell: +91-9830008863.
2. **BHAMIDIPATI SURYAN SASTRY**, Professor, Department of mining Engineering, Indian Institute of Technology, Kharagpur, Kharagpur – 721302, India. bssastry@mining.iitkgp.ernet.in, Phone No.: +91-3222-283720.
3. **QUENTIN FISHER**, Professor, Petroleum Engineering, School of Earth and Environment, University of Leeds, Leeds, UK. Q.J.Fisher@leeds.ac.uk, Phone No.: +44-(0)-113-343-1920.