PARTHA PRATIM MANDAL, PhD
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Career Profile:

Next-generation energy transition personnel with a dedication to the future development of techniques for net zero emission energy sources from concept, technology creation, and deployment adhering to climate resilience. Specialized in Geomechanical & Geophysical Engineering with 14 years of technical expertise, organization, and value-driven skillsets accumulated through holding multiple roles such as project execution, teaching, volunteering, stakeholder engagement, scientific communication, seismic processing and imaging, and project management. Attitude to learn and eagerness to diversify research skills to contribute to developing subsurface exploration and development technologies and deliver new research solutions for the organization.

Education

PhD | Petroleum Engineering *2018 - 2022*
WASM, Curtin University, WA

- Thesis on "Integrated Geomechanical Characterization of Anisotropic Gas Shales: Field Appraisal, Laboratory Testing, Viscoelastic Modelling, and Hydraulic Fracture Simulation"

M.Sc. Tech. | Applied Geophysics *2008 -2011*
Indian Institute of Technology (Indian School of Mines), Dhanbad, India

- First class with CGPA of 8.38/10
- Thesis on *"Fracture identification and its evaluation from borehole image logs"*

BSc Honours | Physics (honours) *2005 - 2008*
Presidency College, University of Calcutta, India

- First class degree with 65.5%

Key Skills and Strengths

- More than 7+ years' experience in delivering multiple **seismic processing**, **velocity model modelling, and depth imaging** projects for global energy companies and 6 + **years consulting, research and academic experience** in geomechanical modelling, petrophysical interpretation, energy transition and natural hydrogen exploration.
- Building workflow for storage identification and risk analysis of potential CCS projects through **seismic reservoir characterization** and integration with reservoir properties
- **Trained and experienced in** the measurement of **rock mechanical and ultrasonic** properties under in situ stress conditions with high-pressure Autonomous Triaxial cell at CSIRO's Geomechanics & Geophysics Laboratory
- Designed technology upgradation through Artificial intelligence-driven **machine learning** workflow with **Python** programming to address data gaps and reliable property estimation from existing databases like filling of **petrophysical logs, outlier identification,** and **TOC prediction**
- **Hands-on experience in high-level software suits** including Jewel Suite, Petrel, IP, CSMP, FSP, Abacus, Insite, etc.

- **Proficient in** product delivery, set priorities, meeting project deadlines, and quality control **with strong attention to continuous improvement initiative and planning led to** multiple direct project awards to PGS
- Highly **effective** written and verbal **communication** via project handling, proactive interaction, report writing, conference presentation, and direct reporting through email, presentation, stakeholder engagement, and volunteering
- Experience in preparing manuscripts, strong record of publications, and conference presentations to more than six conferences such as AEGC, ARMA, APPEA, EAGE, AGU, IPTC, IMAGE, SEAPEX
- **Organizing, communicating, and collaborating** with 300+ members as Secretary of ASEG WA branch and previously as Founder and President of EAGE-SEG club at Curtin University for effective implementation of chapter activities like technical talks, event organization, Webinar, sponsorship, social networking, and mentoring program
- **Numerous** student awards **from international organizations** for a proactive research project, high-quality research product delivery, and taking initiative on student welfare and technical skill development
- Strong ability to work with **multi-culturally diverse** groups and team building via collaborative research program, volunteering, mentoring, and university student discipline appeals board representative

Work Experience

Assistant Professor/ (Previously Remote Seasonal Lecture) *01/2022 – Current*

IIT (ISM), Department of Applied Geophysics | Dhanbad, India

- Basic teaching, practical tutorial, and workshop on well-logging techniques, formation evaluation, electro facies analysis and reservoir geomechanics units for UG and PG students
- Establish subsurface resource characterization group (sRCg) to innovate and advance technological development in petrophysics, geomechanics, rock-physics and seismic inversion
- Developed practical course material for three teaching units with current best practices and case study examples
- Prepare case studies, examination questions, model answer sheets, and conduct marking of exam papers
- Organize group case studies and practical assessments on industrial projects

Senior Consultant (Seismic quantitative interpretation) *11/2021 – 03/2023*

Qeye | Perth, Australia

Responsibilities:

Building R & D portfolio of geomechanical modelling, pore pressure analysis, wellbore stability, and CCUS monitoring with script-based Python programming language. Drive seismic inversion and rock physics inversion and reservoir characterization projects with support from team members.

Achievements:

- Development of maturity-dependent rock physics model for unconventional shale reservoirs
- Creating a CCS business portfolio page for the company and initiative for business development in India

Visiting scientist *04/2022 – Current*

CSIRO Energy | Perth, Australia

- Contribute to geomechanical modeling, laboratory geomechanical and petrophysical experiment, data interpretation, and numerical simulations for the strategic subsurface hydrogen storage and waste disposal site characterization project
- Apply knowledge of viscoelastic modelling to predict long-term creep deformation of salt formation for energy/waste disposal projects and contribute to scientific publications

Industry Internship *08/2021 – 10/2021*
Landgate | Perth, Australia

Responsibilities:
Prepare Landgate's data catalogue of the current state of data management on the four pillars "People, Process, Policy, and Technology". The project entails working with different parts of Landgate to interrogate, evaluate and assess different data sources. Through teamwork involved in diverse stakeholder engagement among all business groups within the organization.

Achievements:
- All engagement information guides the design framework of data strategy phases as planned within Landgate
- Data analysis and insights through PowerBI and a curated view of data discovery through the dashboard which help to drive cultural change in data governance, data sharing, and data stewardship
- Excellent demonstration of teamwork

Sessional Academic and Research Assistant *03/2018 – 12/2021*
Curtin University, CSIRO GGL Laboratory | Perth, Australia

Responsibilities:
Developed a multiscale geomechanical workflow of rock mechanical and elastic characterization starting from lab experiment to upscaling in boreholes dataset to field stimulation design program by including stress-strain, ultrasonic and petrophysical data, existing database, and finite element simulation of unconventional shale rock in the Canning Basin. Delivered tutorial lectures on formation evaluation, petroleum geomechanics, and field development planning and supervised final-year UG research projects.

Achievements:
- Viscoelastic stress relaxation model to understand long-term geomechanical impact of gas shales
- Non-contact laser ultrasonic to improve elastic and anisotropic properties of rocks
- Development of practical geomechanical workflow for UG students
- Multiple student awards from AIG, ASEG, AAPG, and PESA for exemplary research work

Summer Internship (Seismic quantitative interpretation) *11/2019 – 02/2020*
Qeye | Perth, Australia

Have generated software manual of web-based QeyeCloud platform which directly benefits the company to reach out to their customers about the product. Also built a quality control tool for optimum input data preparation to deploy seismic inversion.

Achievements:
- Software documentation of web-based QeyeCloud

- Development of QC tool for optimum input data preparation of seismic inversion.

Project Geophysicist (Seismic Processing, VMB, and imaging) *05/2011 – 03/2018*
PGS/DUG | Perth, Australia; Mumbai, India

Responsibilities:
Started my career as Junior Geophysicist and achieve several promotions to the project Geophysicist position. Over seven years, several successful seismic processing, velocity model building (VMB), and seismic imagining projects under minimal supervision were delivered. Liaise with various stakeholders within the organization to test, validate and support different internal geophysical application tools and software.

Achievements:
- Delivered high-resolution velocity model and seismic imaging project to help the client in **commercial gas discovery** at offshore Myanmar
- Create customer guideline presentation of **Full Waveform Inversion (FWI)**
- **Product champion** work of key technology to be production ready at PGS (**Q-VMB**)
- Improve customer feedback through continuous improvement process led to several large-scale direct project award
- Business up-sell (1 million dollars) and future work opportunities generated for PGS as a project team

Society Membership and Volunteering

Memberships: Society of Petroleum Geophysicist, SPWLA, SEG, SPE, ASEG.
Reviewers: Geophysics, AAPG Bulletin, Geophysical Prospecting, GGGG, GLS, Scientific Reports
Volunteering: Faculty Advisor of SPWLA Student chapter, VP and Secretary of ASEG WA Branch, Member of Toastmaster International Curtin Club, President and Founder of EAGE-SEG student chapter, Curtin University

Awards/Achievements

- 2022: **ASEG** WA Team member award
- 2021: Curtin University's Completion Scholarship and Publication Grant
- 2021: **ASEG** WA student award
- 2020: **AIG** student bursary award
- 2020: **AAPG** Grants-in-Aid recipient
- 2019-2021: Recipient of **HDR RTP Scholarship**
- 2020: Certificate of appreciation from EAGE Curtin University club to establish the chapter
- 2021-2018: Recipient of **PESA Federal Postgraduate Scholarship** award
- 2019: Received student support from **EAGE student fund**
- 2019: Certificate of Accomplishment Stanford University's online course "**Unconventional Reservoir Geomechanics**"
- 2018: Certificate of Accomplishment Stanford University's online course "**Reservoir Geomechanics**"
- 2018-2019: Certificate of Completion "**Machine Learning**" online course by Stanford University
- 2011-2008: Recipient of **Merit-cum-Means Scholarship** conferred by ISM, Dhanbad, India

Current ongoing research projects and funding

Funding Agency	Project	Amount	Duration
IIT(ISM) Dhanbad	Criticality of data in assessing subsurface CO2 storage prospects in Indian sedimentary basins	Rs. 16,00,000	11/23-11/26
TEXMiN under DST	Data-driven Mineral Prospectivity Mapping in Jharkhand and its Surroundings	Rs. 12,00,000	01/24-07/25
Gold Hydrogen Ltd, Australia	Petrophysical assessment and workflow creation of natural hydrogen reservoir	Rs. 10,00,000	11/23-12/24
Rezlytix	Development of petrophysics, rock-physics and geomechanics software for commercial application	Rs. 4,80,000	01/24-01/25

Appendix- Science communications and reporting

Book chapters

- Goswami, A., and **Mandal, P.P.** (2023). "Role of critical data for Geomechanical Modelling & Characterisation of future CO2 Storage Sites". Reservoir Characterization, Modelling and Quantitative Interpretation: Recent Workflows to Emerging Technologies edited by Dimri, V.P., and Ganguly S.S. Elsevier. https://doi.org/10.1007/s00603-023-03437-6

Publications

- Das, Shikha, Singha, D.K., **Mandal, P.P.** and Agrahari, S. (2024). Identification of Lithofacies from well log data in the upper Assam Basin using Machine Learning Techniques. Acta Geophysics. https://doi.org/10.1007/s11600-023-01229-8
- **Mandal, P.P.**, Sarout, J., and Rezaee, R. (2023). Triaxial deformation of the Goldwyer gas shale at in situ stress conditions – Part II: Viscoelastic Creep/Relaxation and Frictional Failure. Rock Mechanics and Rock Engineering journal. https://doi.org/10.1007/s00603-023-03437-6
- **Mandal, P.P.**, Sarout, J., and Rezaee, R. (2022). Triaxial deformation of the Goldwyer gas shale at in situ stress conditions – Part I: Anisotropy of Elastic and Mechanical Properties. Rock Mechanics and Rock Engineering journal. https://doi.org/10.1007/s00603-022-02936-2
- Singh, A., Jha, N., **Mandal, P. P.**, Esteban, L., and Desai, B. G. (2022). Pore throat characterization of bioturbated heterogeneous sandstone, Bhuj Formation, Kachchh, India: An integrated analysis using NMR and HPMI studies. Journal of Petroleum Science Engineering, Volume 211, https://doi.org/10.1016/j.petrol.2022.110221
- **Mandal, P.P.**, Sarout, J., and Rezaee, R. (2021). Specific surface area: A reliable predictor of creep and stress relaxation in gas shales. TLE. Vol 40, 11. https://doi.org/10.1190/tle40110815.1 , special edition
- **Mandal, P.P.**, Rezaee, R., and Emelyanova, J. (2021). Ensemble learning for predicting TOC from well-logs of the unconventional Goldwyer shale. Energies, *15*(1), 216; https://doi.org/10.3390/en15010216
- **Mandal, P.P.**, Sarout, J., and Rezaee, R. (2020). Geomechanical appraisal and prospectivity analysis of the Goldwyer shale accounting for stress and formation anisotropy. International Journal of Rock Mechanics and Mining Sciences 135: 104513. https://doi.org/10.1016/j.ijrmms.2020.104513
- Chatterjee, R., Gupta, S.D. and **Mandal, P.P.** (2017). Fracture and stress orientation from borehole image logs: A case study from Cambay basin, India. J Geol Soc India 89, 573–580. https://doi.org/10.1007/s12594-017-0646-3

Conference Proceedings and Presentations

- Kala, S., **Mandal, P.P**., Mirda, A., Khanna, P., and Chowdhury, A. (2023). Prospects of Natural Hydrogen in India: A Potential Alternative Energy Source. Conference proceedings at 14th Biennial Internation Conference and Exposition, SPG 2023 Kochi. https://spgindia.org/14th-biennial-international-conference-spg-2023
- **Mandal, P.P.**, Mirda, A., and Sahoo, S. (2023). Criticality of data for permanent CO2 storage in deep geological formations. Conference proceedings at 14th Biennial Internation Conference and Exposition, SPG 2023 Kochi. https://spgindia.org/14th-biennial-international-conference-spg-2023
- Ross, R., and **Mandal, P.P.** (2023). "Rock Physics Based Direct Probabilistic Inversion of Seismic Data for Kerogen Thermal Maturity." Paper presented at the Asia Pacific Unconventional Resources Symposium, Brisbane, Australia, November 2023. https://doi.org/10.2118/217309-MS
- **Mandal, P.P.**, Ross, R., Mictchell. B., Richards, B., Baruch-Jurado, E., and Vallee, M. (2023). Impact of kerogen thermal maturity on rock-physics modelling of Toolebuc formation. AEGC 2023: Short abstracts. (2023). *Preview*, *2023*(222), 77–156. https://doi.org/10.1080/14432471.2023.2175588
- Agrahari, P., **Mandal, P.P.**, Sari, M., and Sarout, J. (2023). Geomechanical simulation to model creep deformation of Salt formation. https://doi.org/10.1080/14432471.2023.2175588
- **Mandal, P.P.**, Ross, R., Kuppens, S., Jakobsen, A., and Sarout, J. (2022). Application of thermal maturity driven elastic rock-physics model for marine Ordovician Goldwyer formation, Canning Basin. Second International meeting for Applied Geoscience & Energy (IMAGE-22). Houston, Texas. https://doi.org/10.1190/image2022-3751390.1
- **Mandal, P.P.**, Sarout, J., Rezaee, R., and Finkbeiner, T. (2022). Viscoelastic stress relaxation for estimating S_{hmin} magnitude in deep sedimentary formations. 56th US Rock Mechanics /Geomechanics Symposium, Santa Fe, New Mexico. https://doi.org/10.56952/ARMA-2022-0172
- **Mandal, P.P.**, Sarout, J., and Rezaee, R. (2022). Can we predict primary creep and least principal stress S_{hmin} at depth either from specific surface area or weak phase of gas shales? IPTC, Riyadh, Saudi Arabia. https://doi.org/10.2523/IPTC-22212-MS
- **Mandal, P.P.**, Sarout, J., and Rezaee, R. (2021). Viscoelastic approach to capture varying least principal stress magnitude and the effect of observed stress layering on hydraulic fracturing- An example from shale formations of the Perth Basin. 55th US Rock Mechanics /Geomechanics Symposium, Houston, Texas. https://onepetro.org/ARMAUSRMS/proceedings-abstract/ARMA21/All-ARMA21/ARMA-2021-1202/467916
- Iqbal, M. A., **Mandal, P. P.**, Rezaee, R., Sarout, J., and Smith, G., (2021). Integration of mechanical stratigraphy with lithofacies in Goldwyer shale for selecting producible and hydraulic fracturing layers. 82nd EAGE Annual Conference and Exhibition, Amsterdam, Netherlands. https://www.earthdoc.org/content/papers/10.3997/2214-4609.202112730
- **Mandal, P.P.**, Rezaee, R., and Sarout, J. (2020). Impact of the stress state and the natural network of fractures/faults on the efficiency of hydraulic fracturing operations in the Goldwyer shale formation. The APPEA Journal 60, no.1: 163-83. https://doi.org/10.1071/AJ19025.
- **Mandal, P.P.**, Rezaee, R., and Sarout, J. (2020). Impact of stress regime on shale's brittleness: Implications for determining suitable hydraulic fracturing intervals. Conference Proceedings, EAGE 2020 Annual Conference & Exhibition Online, Dec 2020, Volume 2020, p.1 – 5. https://doi.org/10.3997/2214-4609.202010489
- **Mandal, P.P.**, Essa, I., Saha, S., and Rezaee, R. (2021). Multi-purpose utility of constructing 3D static Geomechanical model in the Ichthys field, Browse Basin. AEGC Technical Program Expanded Abstracts, Brisbane, Australia. 63-122 (69), 47. https://doi.org/10.5281/zenodo.7686644