

Curriculum Vitae

Hamid Roshan

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Summary: Dr Roshan is a Full Professor and Deputy Head of School (Education) at the School of Minerals and Energy Resources Engineering, UNSW Sydney. He earned his PhD in Energy Resources Engineering from UNSW in 2012. Prior to his doctoral studies, he spent several years in industry as a subsurface engineer, specialising in underground gas storage. He has been recognised as a Future Leader by the American Rock Mechanics Association, has served as an Associate Editor for Computers & Geosciences, and is a former Deputy Director of the CWI Research Centre. He currently leads the GeoEngineering Research Laboratory at UNSW, overseeing multidisciplinary research at the intersection of geomechanics, fluid flow, and energy systems. His research focuses on coupled Thermo–Hydro–Mechanical–Chemical (THMC) processes in porous and fractured media, with applications spanning resource extraction, CO₂ sequestration and mineralisation, and formation characterisation. His work integrates theory, laboratory experimentation, and numerical modelling to address complex minerals and energy challenges with real-world impact.

Education Background:

- PhD in Energy Resources Engineering, UNSW (2012)
Thesis title: *Development of 3D Non-Linear Anisotropic Thermo-Chemo-Poro-Elastoplastic Model for Chemically Active Formations*
- MSc in Petroleum Engineering, PUT (2006)
Thesis title: *Chemo-Mechanical Characterization of Well Cement Using CMC (Carboxy Methyl Cellulose Polymer)*
- BSc in Resources Exploration Engineering, SBUK (2004)
Thesis title: *A Novel Software for Statistical Analysis of Geomechanical Data*

Employment History:

- 12.2024 – present: Full Professor, School of Minerals and Energy Resources Engineering, UNSW, Australia
- 12.2021 – 12.2024: Associate Professor, School of Minerals and Energy Resources Engineering, UNSW, Australia
- 01.2017 – present: Director of GeoEngineering Research Laboratory, UNSW, Australia
- 01.2017 – 06.2025: Associate Editor for the Journal of Computers and Geosciences
- 01.2020 – 01.2022: Deputy Director, Connected Waters Initiative, UNSW, Australia
- 07.2018 – 12.2021: Senior Lecturer, School of Minerals and Energy Resources Engineering, UNSW, Australia
- 09.2015 – 06.2018: Lecturer, School of Petroleum Engineering, UNSW, Australia
- 06.2011 – 08.2015: Research Fellow, CWI Research Centre, UNSW, Australia
- 12.2005 – 08.2008: Subsurface Engineer, Underground Gas Storage Company

Professional Service and Memberships

- Member of American Rock Mechanics Association
- Member of International Association of Hydrogeologist
- Member of International Society of Rock Mechanics
- Member of Australian Geomechanics Society
- Member of Bowen Basin & Hunter Valley Open Cut Geotechnical Society
- Member of Bowen Basin Underground Geotechnical Society
- Member of NSW Underground Geotechnical Society
- Member of Bowen Basin Geologists Group

External Funding

- Australian Research Council Discovery Grant, **H. Roshan** et al, Bio-enhanced CO₂ mineralisation (2026-2028).
- Australian Research Council Linkage Grant, **H. Roshan** et al, Field-scale application of bio-enhanced CO₂ mineralisation (2026-2028).
- Industry Project. **H. Roshan**, In-situ stress modelling using iStress (2026-2027).
- Industry Project. **H. Roshan**, 2D in-situ stress modelling (2026-2027).
- ACARP, **H. Roshan**, DilaStress field trial (2025-2026).

- AEA Ignite, **H. Roshan**, H Alinejad, A Hashemi, iStress: An AI driven in-situ stress estimation software for the minerals and resources industry (2025-2026).
- Industry Project. **H. Roshan**, Mitigation of solid production in coal seam gas wells, Australia (2025-2026).
- Industry Project. **H. Roshan**, Controlling inturburden solid production, Australia (2025-2026).
- Industry Project. **H. Roshan**, 2D and 3D in-situ stress modelling (2024-2025).
- CINSW, F Hussain and **H. Roshan**, Assessment of CO₂ sequestration feasibility in Darling Basin, NSW, Australia (2023-2024).
- Australian Coal Industry Research Program Grant, **H. Roshan** and I Canbulat, Revolutionizing the in-situ stress measurement in mining industry: DilaStress (2023-2025).
- Australian Institute of Nuclear Science and Engineering, **H. Roshan**, Experimental requirements for multiple scattering free SANS and USANS measurements on strongly scattering geological samples at high pressures and temperatures (2022-2023).
- Australian Coal Industry Research Program Grant, **H. Roshan**, Review of time-lapse seismic analysis for seam and strata characterisation (2022-2023).
- Australian Research Council Discovery Grant, **H. Roshan** and K. Regenauer-Lieb, Quantification of Multiphysics phenomena of Gas flow in organic rich shale formations (2020-2023).
- Transport for NSW, **H. Roshan**, Effective stress coefficient of soft rocks (2019-2020).
- Australian Coal Industry Research Program Grant, **H. Roshan**, M. Hosseini, Development of a methodology for efficient design of the pattern of drainage holes based on stress variation and gas flow behaviour in coal seams (2020-2022).
- Industry Project, **H. Roshan**, New effective stress law for sorptive rocks: experimental, theoretical and numerical development (2020-2024)
- Coal Innovation NSW, **H. Roshan**, S. Walsh, Deployment of Silica Gels for Improved CO₂ Containment and Risk Mitigation (2019-2020).
- Australian Coal Industry Research Program Grant, M. Hosseini, **H. Roshan**, Parenting Geophysical Strata Rating (GSR) and numerical modelling for optimum characterisation of rock mass (2019-2021).
- Industry Project, **H. Roshan**, Biot coefficient measurements of sandstones (2020-2022)
- Australian Institute of Nuclear Science and Engineering, **H. Roshan**, The fate of hydraulic fracturing fluid in shale formations (2019-2020).
- CSIRO student scholarship, **H. Roshan**, Shale gas development challenges in Australia (2019-2022).
- Australian Coal Industry Research Program Grant, **H. Roshan**, M Hosseini, Advances in sonic logs to predict the stress re-distribution in geological strata as a result of degassing (2018-2019).
- Industry Project, **H. Roshan**, Sorption induced damage in sorptive rocks (2017).
- Industry Project, **H. Roshan**, Productivity optimization of tight formations by multi-technique approach (2017).
- Australian Research Council Discovery Grant, K. Regenauer-Lieb, and **H. Roshan**, Multiphysics instabilities during diagenesis of shale gas reservoirs (2016-2018).
- State Government (WA), Department of Water, D. Anderson, R. Jenkins, P. Rahman, **H. Roshan**, G. Smith, W. Timms and M. Whelan, Permeability Testing of Sediment Cores (using geo-centrifuge technique) (2014-2015).
- Australian Institute of Nuclear Science and Engineering, GC Rau, **H. Roshan**, MS Andersen, J Larsen, RI Acworth, Combining 222-Rn and Heat As Tracers To Quantify Uncertainty in Groundwater Flow (2013-2014).

Patents

- "iStress: In situ stress estimation software". Roshan H., UNSW Invention, 2024.
- "Application of colloidal silica in clay stabilisation". Roshan H., UNSW Invention, 2023.
- "DilaStress: In situ stress downhole tool and method". Roshan H., Patent number: 2022900512, 2022.
- "Quick-release triaxial cell". Roshan H., EASY IP, UNSW, Sydney, Australia, 2015.

Awards

- Nominated for VinFuture Award, 2023
- Excellence in Education Award, Global Forum for Education and Learning (GFEL), 2021
- American Rock Mechanics Association Future Leader, 2019
- Nominated for Young ENI Award, 2018
- Staff Excellence Award in Teaching, Faculty of Engineering, UNSW, 2016.
- SCOPE Award for Outstanding Research Student, UNSW, 2010

Reviewer/Assessor for funding agencies

- Australian Research Council
- US Department of Energy
- American Chemical Society
- Australian Nuclear Science and Technology Organisation
- Petronas Research Scheme
- Technical reviewer of more than 50 international journals.

Selected invited talks and conference organisation

- Organising Committee member, International Geomechanics Conference, Saudi Arabia, Nov 2025.
- Organising Committee member, International Geomechanics Conference, Kuala Lumpur, Nov 2024.
- Session chair on *Experimental Geomechanics*, ARMA, Golden Colorado, June 2024.
- Multiphysics modelling for HP-HT environment, Iranian Rock Mechanics Society, Aug 2023.
- Session Chair on *Geomechanics in Energy and Resource*, Australian Earth Sciences Convention, Tasmania, Australia, Feb 2021
- Geophysical data and numerical modelling for rock mass characterization, Bowen Basin and Hunter Valley Open Cut Geotechnical Society, 2020.
- Formation permeability estimation using downhole geophysical logs, International Association of Hydrogeologists, 2019
- Advances in sonic logs to predict the stress re-distribution in coal strata due to degassing, Bowen Basin Geologist Group, 2018.

Teaching Experience

- 2024 - current Formation Evaluation, School of Minerals and energy Resources Engineering, UNSW
- 2024 - current Unconventional Reservoir Engineering, School of Minerals and energy Resources Engineering, UNSW
- 2024 - current Geothermal Engineering, School of Minerals and energy Resources Engineering,
- 2017 - current Reservoir Geomechanics, School of Minerals and energy Resources Engineering, UNSW
- 2018 - 2024 Petrophysics, School of Minerals and Energy Resources Engineering, UNSW
- 2018 - 2022 Geological Modelling, School of Minerals and Energy Resources Engineering, UNSW
- 2015 - 2016 Design Practice, School of Civil and Environmental Engineering, UNSW
- 2014 - 2015 Solid Waste and Contaminant Transport, School of Civil and Environmental Engineering, UNSW
- 2012-2013 Water Resources Engineering, School of Civil and Environmental Engineering, UNSW

Supervision of postdocs and researchers

Current Postdocs and Research Associates

- 06.2021 – present Alex Hashemi, Postdoctoral researcher at UNSW (main supervisor). Research topic: *Assessment of CO2 geological storage in Darling basin*
- 06.2024 – present Umar Farooq, Research Fellow at UNSW (main supervisor). Research topic: *In-situ stress estimation techniques*

Past Postdocs and Research Associates

- 06.2024 – 10.2025 Lina Su, Research Fellow at UNSW (main supervisor). Research topic: *Mitigation of well solid production*
- 01.2023 – 10.2023 Asad Pirzada, Research associate at UNSW (main supervisor). Research topic: *Experimental caprock integrity analysis for CO2 storage*
- 06.2021 – 06.2023 Mohammad Siddiqui, Postdoctoral researcher at UNSW (main supervisor). Research topic: *Theoretical and numerical modelling of multiphysics geomechanics*
- 01.2020 – 12.2022 Ali Aghighi, Postdoctoral researcher at UNSW (main supervisor). Research topic: *Numerical modelling of multiphysics geomechanics*
- 06.2020 – 10.2021 Emad Sadeghinezhad, Postdoctoral researcher at UNSW (main supervisor). Research topic: *Shale gas flow analysis*
- 03.2021 – 0.5.2021 Nazanin Nourifard, Postdoctoral researcher at UNSW (main supervisor). Research topic: *Shale gas flow analysis*
- 06.2019 – 12.2019 Saad Irtza, Postdoctoral researcher at UNSW (co-supervisor). Research topic: *fracture detection from 3D CT images*

Current PhD Students

- *Fatemeh Shamsi*, In-situ CO2 mineralisation flow optimisation (main supervisor)
- *Haile Joes*, In-situ CO2 mineralisation using bacterial metabolites (main supervisor)
- *Abdulsalam Alasmari*, Ex-situ CO2 mineralisation using bacterial metabolites (main supervisor)

- *Putra Gani*, Geothermal battery energy storage (main supervisor)
- *Mohsen Alidaryan*, Computational modelling of wave propagation in fractured media (co-supervisor)
- *Amir Mohammadi*, Paste cementation modelling (co-supervisor)
- *Erfan Amini*, In-situ rock bolt assessment using ultrasonic guided waves (co-supervisor)
- *Mohammad Reza Aghajanzadeh*, Technoeconomic analysis of CO₂ mineralisation (co-supervisor)
- *Mahdi Ahmadi*, Geostatistical Modelling of mechanical properties (co-supervisor)

Past PhD Students

- 2026 Graduated PhD student: *Umar Farooq*, Quantification of Multiphysics phenomena of Gas flow in Organic rich Shale (main supervisor)
- 2025 Graduated PhD student: *Atefeh Dargahizarandi*, Field-scale stress estimation using finite element numerical modelling (co-supervisor)
- 2025 Graduated PhD student: *Vahid Azamipour*, Damage constitutive modelling (co-supervisor)
- 2024 Graduated PhD student: *Mobarakeh Mohammadpour*, Field-scale Geomechanical parametrisation using Artificial Intelligence (co-supervisor)
- 2024 Graduated PhD student: *Fatemeh Soleimani*, Development of an enhanced outburst propensity index using stochastic modelling (joint supervisor)
- 2024 Graduated PhD student: *Linan Su*, A new effective stress law for sorptive rocks (main supervisor)
- 2023 Graduated PhD student: *Yeping Ji*, Minimising multiple scattering and experimental artifacts for simulated in-situ conditions of (Ultra)-small angle Neutron scattering experiments (main supervisor)
- 2023 Graduated PhD student: *Asad Pirzada*, Evolution of joint contact area and its effect on joint frictional and fluid flow behaviour (main supervisor)
- 2022 Graduated PhD student: *Muath Algazlan*, Experimental Investigations and Theoretical Developments of a Coupled Gas Sorption Kinetics Dual-porosity Poromechanical Model for Australian Shales (main supervisor)
- 2022 Graduated PhD student, *Adelina Lv*, A fundamental investigation and ultrasonic characterisation of coal effective stress behaviour (main supervisor)
- 2021 Graduated PhD student, *Xiao Chen*, Mechanical compaction of highly porous carbonates: instabilities and permeability evolution (joint supervisor)
- 2021 Graduated PhD student, *Siddiqui MAQ*, Theoretical and Experimental Study of Water Loss in Shale Matrix: A Non-equilibrium Thermodynamics-based Two-Phase Flow, Damage Chemo-poroelastic Investigation (main supervisor)
- 2018 Graduated MSc Research student, *Adelina Lv*, An analytical and experimental study on the onset of sand production (main supervisor)
- 2016 Graduated PhD student, *Halloran LJS*, Heat tracing in the variably saturated shallow subsurface, UNSW, (co-supervisor)

Academics Services at UNSW

- Member of UNSW Faculty of Engineering Education Committee
- Chair of Teaching and Learning Committee of School of Minerals and Energy Resources Engineering
- Former Member of UNSW Faculty of Engineering Higher Degree Committee
- Former Postgraduate Coordinator (PG) and Advisor of School of Minerals and Energy Resources Engineering
- Former Chair of Assessment Committee of School of Minerals and Energy Resources Engineering
- Former Member of Faculty Assessment Committee
- Former Faculty of Engineering PG Admission Scheme Reviewer
- Former Member of Faculty of Engineering Quality Assurance Committee

Journal Publications

Hamid has published over 110 career journal papers and book chapters most of which sits in the top 10% highly cited papers in the field with a google scholar citation of over 5100 and a HI of 41. Since obtaining his PhD degree in 2012, he has significantly contributed to porous media multiphysics and formation mechanical and flow characterisation research areas publishing his works in high impact journals such as Earth Science Review (IF: 12.038), ACS Applied Materials and Interfaces (IF: 10.383), Applied Mechanics Review (IF: 11.345), and Journal of Colloid and Interface Science (IF: 9.965).

The list of his publication can be found in:

https://scholar.google.com.au/citations?hl=en&user=aBGN1ZIAAAAJ&view_op=list_works&sortby=pubdate