



Ali Salmachi (PhD. Petroleum Engineering)

Coal Seam Gas Reservoirs and Drilling Engineering

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Core competencies

Fluid flow modelling
Hydrology assessment
Project management
Coal degasification
Coal seam gas reservoirs
Big data analysis
Artificial intelligence
Program development
Drilling data analysis
Well completion design
Excellent report writing
Supervision
Optimization
Integrated modelling
3D printing

Education

PhD, Petroleum Engineering,
The University of Adelaide
(2010-2013)

Master of science, Petroleum
Well Engineering, Curtin
University of Technology

(2006-2009)

Bachelor of science, Drilling
Engineering

(2002-2006)

PROFESSIONAL EXPERIENCES

February 2013-present

Researcher/Lecturer
University of Adelaide

Established a successful research group conducting industry research contracts with particular emphasis on coal seam gas reservoir engineering. Provide solutions to complex engineering problems in coal seam gas industry including hydrology assessment and cross communication of fluids in coal mines and coal seam gas reservoirs, production data and rate transient analyses and well testing data analysis.

- ✓ Analysis of gas and water production data of coal seam gas wells of the Fairview Field, in Bowen Basin, Australia, to investigate permeability change during the life of the wells. Supported by GLNG group in Santos (\$ 118,350).
- ✓ Production data analysis of ultra-deep coal seams of the Cooper Basin, South Australia, to investigate production performance of unconventional deep coal resources. Supported by unconventional growth group in Santos and Institute for Mineral and Energy Resources (IMER) (\$71,000).
- ✓ **Hydrology assessment and groundwater modelling** to investigate the impact of **hydraulic connectivity** between aquifers and coal seam gas reservoirs on gas productivity and associated environmental implications. Joint research project with United States Geological Survey (USGS) and Australian School of Petroleum.
- ✓ The impact of **magmatic intrusion** on coal seam gas reservoir properties in the **Gunnedah Basin**, New South Wales. The integrated study of **borehole image log** and well test (**drill stem test**) data analysis in coal seam gas wells of the Gunnedah Basin.
- ✓ **Psyllium Husk** in water-based **drilling fluids**: The design of an environmentally friendly viscosity and filtration agent. Integrated chemical and petroleum engineering project.

Computer skills

Fluid flow modelling
software:
Eclipse and Computer
Modelling Group (CMG)

Matlab
Microsoft office
QGIS
@risk

PROFESSIONAL EXPERIENCES

- ✓ **Thermally enhanced gas production** from coal seam gas reservoirs using geothermal resources. A feasibility study to investigate thermal stimulation as an enhanced gas recovery technique in Australian coals (PhD dissertation).
- ✓ The impact of temperature on methane adsorption and diffusion in Australian coal samples. This **laboratory study** conducted at the **University of Queensland**, School of chemical engineering.
- ✓ Application of **artificial intelligence** in well placement optimization (simulation and intelligent algorithms). The integration of **reservoir simulator, economic models and Genetic Algorithm (GA)** in identifying best possible locations for infill wells in coal seam gas reservoirs.
- ✓ Application of **artificial intelligence** in drilling data analysis. Joint project with **Centre for Advanced Imaging**, University of Queensland (ongoing project).
- ✓ Investigation of stress/desorption dependent permeability in coal seam gas wells of the **Fairview Field** using **time-lapse pressure transient analysis**. Joint project with GLNG group, Santos (ongoing project).
- ✓ **Micro-CT scan imaging** of Australian coal samples (Fairview field, **Bandanna Coal Formation**). The high-resolution micro-CT scan images prepared at **Adelaide University Microscopy**.
- ✓ Supervision of a **research team** including a research assistant and a number of PhD and master students.
- ✓ Extensive knowledge in educational program development.

Professional activities

An active member of Society of Petroleum Engineers (SPE)

2009-present

Technical program committee member of Asia Pacific Oil and Gas Conference (APOGCE)

2016-present

Conference booth manager for Australian School of Petroleum

2016 and 2018

Selected publications in outstanding international journals

- ✓ **Salmachi, A.**, & Karacan, C. Ö. (2017). Cross-formational flow of water into coalbed methane reservoirs: controls on relative permeability curve shape and production profile. *Environmental Earth Sciences*, 76(5). doi:[10.1007/s12665-017-6505-0](https://doi.org/10.1007/s12665-017-6505-0)
- ✓ Yarmohammadtooski, Z., **Salmachi, A.**, White, A., & Rajabi, M. (2017). Fluid flow characteristics of Bandanna Coal Formation: a case study from the Fairview Field, eastern Australia. *Australian Journal of Earth Sciences*, 1-15. doi:[10.1080/08120099.2017.1292316](https://doi.org/10.1080/08120099.2017.1292316)
- ✓ Clarkson, C. R., & **Salmachi, A.** (2017). Rate-transient analysis of an undersaturated CBM reservoir in Australia: Accounting for effective permeability changes above and below desorption pressure. *Journal of Natural Gas Science and Engineering*, 40, 51-60. doi:[10.1016/j.jngse.2017.01.030](https://doi.org/10.1016/j.jngse.2017.01.030)
- ✓ **Salmachi, A.**, Rajabi, M., Reynolds, P., Yarmohammadtooski, Z., & Wainman, C. (2016). The effect of magmatic intrusions on coalbed methane reservoir characteristics: A case study from the Hoskissons coalbed, Gunnedah Basin, Australia. *International Journal of Coal Geology*, 165, 278-289. doi:[10.1016/j.coal.2016.08.025](https://doi.org/10.1016/j.coal.2016.08.025)
- ✓ **Salmachi, A.**, & Yarmohammadtooski, Z. (2015). Production data analysis of coalbed methane wells to estimate the time required to reach to peak of gas production. *International Journal of Coal Geology*, 141-142, 33-41. doi:[10.1016/j.coal.2015.02.006](https://doi.org/10.1016/j.coal.2015.02.006)
- ✓ **Salmachi, A.**, Sayyafzadeh, M., & Haghighi, M. (2013). Infill well placement optimization in coal bed methane reservoirs using genetic algorithm. *Fuel*, 111, 248-258. doi:[10.1016/j.fuel.2013.04.022](https://doi.org/10.1016/j.fuel.2013.04.022)
- ✓ **Salmachi, A.**, & Haghighi, M. (2012). Feasibility study of thermally enhanced gas recovery of coal seam gas reservoirs using geothermal resources. *Energy & Fuels*, 26(8), 5048-5059. doi:[10.1021/ef300598e](https://doi.org/10.1021/ef300598e)