



Tariq Laattoe B.Sc. Hons. PhD.

Senior Hydrogeologist / Groundwater Modeller

# **Overview**

Tariq is a hydrogeologist with 10 years' research and consulting experience specialising in groundwater modelling. His interest in cutting-edge groundwater modelling techniques, and exceptional numerical and computing skills have seen him work across a diverse range of modelling projects, including the simulation of groundwater flow, and solute, heat and reactive transport under saturated, variably saturated and variable density conditions.

Tariq has a particular interest in the application of the latest groundwater model calibration and uncertainty analysis methods, now widely recognised as critical in the effective application of groundwater models for decision-making. He also regularly uses statistical modelling techniques to better explain the uncertainty in outputs of models of natural systems. Using his specialized Python scripting skills, Tariq often develops customised tools to help clients and stakeholders use groundwater models more easily for optimization and decision-making.

Tariq has worked on projects to estimate impacts of climate change, floodplain environmental watering and seawater intrusion on groundwater resources. His excellent communication skills and an ability to work within tight timeframes ensure that the maximum benefit is achieved from his high quality technical work.

# Qualifications

2015	PhD.	Flinders University, South Australia.
		Thesis: Numerical modelling of flow, transport and reactions in hyporheic zones.
2010	B.Sc. Hons. (1 <sup>st</sup> Class)	Flinders University, South Australia.
		Thesis: Effects of coastal transgression in variable density seawater intrusion models.
2009	B.Sc.	Flinders University, South Australia

# **Employment History**

## November 2019 – Present

Senior Hydrogeologist / Groundwater Modeller

Innovative Groundwater Solutions Pty Ltd

## August 2019 – November 2019

Senior Hydrogeologist / Groundwater Modeller

EMM Consulting

## 2018 – 2019

Senior Groundwater Modeller

Water Technology

## 2014 – 2018

Independent Consultant

## 2015 – 2018

Postdoctoral Research Fellow

National Centre for Groundwater Research and Training, Flinders University

## 2010 - 2015

Lecturer, tutor and laboratory demonstrator, soil physics and hydrogeology

Flinders University

# **Major Projects**

#### West Angelas groundwater model to optimise spring fed GDE management Dec. 2019 – present, Rio Tinto

**Groundwater assessment for the Glendalough Irrigation Area** Nov. 2019 – present, North Queensland Water Infrastructure Authority

**Balranald Mineral Sands Project: Groundwater Modelling** August 2019 – November 2019, Iluka Resources.

#### EM1.3 Model Update

August 2019 – November 2019, Murray-Darling Basin Authority.

Linking Recharge Models to Existing Regional MODFLOW Models using Python. March 2019 – August 2019, Murray-Darling Basin Authority.

# Assessment of Impacts of Environmental Watering on Floodplain Freshwater Lenses

June. 2017 – Oct. 2017, South Australia Department for Environment and Water.

# Statistical Analysis of Global Climate Change Models to Identify Likelihood of Increased Extreme Rainfall Events

March 2016 – Aug 2016. South Australia Department for Environment and Water.

#### Development of Python Executables to Update the SA Government's Salinity Register Groundwater Models

July. 2015 – Dec. 2015, South Australia Department for Environment and Water.

#### **Review of River Murray Floodplain Salinity Risk Assessment Methods** July 2014 – Nov 2015, Goyder Institute

**Programming of Transient Boundary Conditions to Include Surface Inundation in the Simulation of Seawater Intrusion During Coastal Transgression** National Centre for Groundwater Research and Training

#### **International Peer-Reviewed Journals**

- 1. Laattoe, T, Post, VEA & AD, Werner 2017, A spatially periodic solute boundary for MT3DMS and PHT3D, *Groundwater* 55(3), pp. 419–427.
- 2. Laattoe, T, Werner, AD, Wood, J & I, Cartwright 2017, Terrestrial Freshwater Lenses: Unexplored subterranean oases, *Journal of Hydrology* 553, pp. 501–507.
- 3. Laattoe, T, Werner, AD & Post, VEA 2014, Spatial periodicity in bedform-scale solute transport models of the hyporheic zone, *Water Resources Research* 50(10), pp. 7886–7889.
- 4. **Laattoe, T**, Simmons, CT & Werner, AD 2013, Seawater intrusion under current sea-level rise: Processes accompanying coastline transgression, *Coastal Research Library* 7, pp. 271–294.
- 5. Laattoe, T, Post, VEA, & Werner, AD 2012, A spatially periodic boundary condition for MODFLOW, *Groundwater* 52(4), pp. 606–612.
- Heiss, JW, Post, VEA, Laattoe, T, Russoniello CJ & Michael, HJ 2017, Physical Controls on Biogeochemical Processes in Intertidal Zones of Beach Aquifers, *Water Resources Research* 53(11), pp. 9225–9244.
- Kim, KH, Heiss, JW, Michael, HA, Cai, WJ, Laattoe, T, Post, VEA, et al. 2017 Spatial Patterns of Groundwater Biogeochemical Reactivity in an Intertidal Beach Aquifer, *Journal of Geophysical Research* 122(10), pp. 2548-2562.
- 8. Werner, AD & Laattoe, T 2016, Terrestrial freshwater lenses in stable riverine settings: Occurrence and controlling factors, *Water Resources Research* 52(5), pp. 3654-3662.
- Werner, AD, Kawachi A, & Laattoe, T 2016 Plausibility of freshwater lenses adjacent to gaining rivers: Validation by laboratory experimentation *Water Resources Research* 52(11), pp. 8487-8499

#### **Refereed Conference Papers**

- Laattoe, T and Werner, AD 2016, Occurrence and controlling factors of terrestrial freshwater lenses, paper presented at SWIM-APCAMM Conference 2016, 4–8 July 2016, Cairns, Queensland.
- 11. Laattoe, T, Post, VEA & Werner, AD 2011, Mass balance errors associated with spatially periodic solute boundary conditions, paper presented at *National Groundwater Association Conference 2011, California, USA*.
- 12. Laattoe, T, Simmons, CT & Werner, AD 2009, Effects of sea-level rise induced coastal transgression on variable-density seawater intrusion models, paper presented at *Australian Water Association Conference 2009, Adelaide, Australia*

#### **Technical Reports**

13. Innovative Groundwater Solutions (2020). Draft Report Tasks 1-4: Groundwater Assessment for the Glendalough Alluvial Aquifers. A report prepared for North Queensland Water Infrastructure Authority, 4 March 2020. Commercial in Confidence.

 Woods J. (Ed.) (2015) Modelling salt dynamics on the River Murray floodplain in South Australia: Conceptual model, data review and salinity risk approaches. Goyder Institute for Water Research Technical Report Series No. 15/9-11, Adelaide, South Australia. ISSN: 1839-2725