

# New Zealand Geothermal Workshop 2024 Programme

## Tuesday 19 November

3:00 Registration Open

5:30

Welcome Reception | University of Auckland Engineering Building | Drinks and canapés sponsored by Utrex Ltd

7:00

## Wednesday 20 November

8:00 Registration Open

8:30 Mihi whakatau

8:40 Housekeeping: Sadiq J. Zarrouk

8:45 Welcome and Opening: Piaras Kelly, Head of Department, Department of Engineering Science and Biomedical Engineering, Sadiq J. Zarrouk and John O'Sullivan, Co-Directors, Geothermal

9:00 **WORKSHOP AWARDS**

9:15 **KEYNOTE TITLE: Geothermal development in Indonesia: Current and future directions.**

Keynote Speaker | Julfi Hadi, President Director, PT Pertamina Geothermal Energy Tbk, Indonesia

10:00 **Morning Tea**

**Session 1.2 - RESERVOIR MODELLING 1**

**Session 1.3 - DRILLING & WELL TESTING 1**

**SESSION CHAIR | Adrian Croucher**

**SESSION CHAIR | Ryan Tonkin**

**Lecture Theatre 405.460**

**Lecture Theatre 405.470**

10:30

75 | Numerical experiments with a model of a supercritical geothermal system - John O'Sullivan, Michael O'Sullivan

38 | Building resilience: Designing well testing equipment and procedures for powerful wells - Chris Horan

10:45

76 | Uncertainty quantification of reservoir models to assess the potential of Greenfields: A case study on inclusion of multiple conceptual models - Michael Gravatt

56 | Correcting for variations in borehole diameter in fluid velocity profiles - Flavia Purnomo

11:00

92 | Using T2well for simulating coupled wellbore-reservoir simulations - Rony Nugraha

85 | How to Design, Iterate and Continually Improve PDC Drill Bits for Geothermal Drilling - Ellie Krause

11:15

12 | Numerical reservoir modelling and resource assessment of the Nevado del Ruiz Volcano (NRV) geothermal field, Colombia - Andres Pinzon Mendez

19 | Pressure and temperature transient analysis of geothermal wells with low permeability - Jorge Alberto Rangel Arista

11:30

93 | Updates to the Salton Sea lithium extraction geothermal model - John O'Sullivan

30 | CO<sub>2</sub> injection well design in the geothermal industry - Colin Finnegan

11:45

94 | Towards a new framework for the systematic assessment of Indonesia's undeveloped geothermal resources - John O'Sullivan

36 | Accurate location of feed zones: Assessing obscuration by the liner in geothermal wells through analysis of fluid velocity profiles - Joel Trent

12:00	<b>Lunch and Poster Session</b>		
1:30	<b>MB CENTURY   INDUSTRY UPDATE   Robert Mandjes</b>		
1:45	<b>44   Reducing greenhouse gas emissions from NZ geothermal power stations - Katie McLean   NZGA</b>		
	<b>Session 2.1 - INDUSTRY UPDATES</b>	<b>Session 2.2 - PRODUCTION &amp; MANAGEMENT 1</b>	<b>Session 2.3 - DIRECT USE &amp; SOCIAL ENGAGEMENT / COMMUNITY ENGAGEMENT</b>
	<b>SESSION CHAIR   Farrell Seiga</b>	<b>SESSION CHAIR   Eylem Kaya</b>	<b>SESSION CHAIR   Ru Nicholson</b>
	<b>Lecture Theatre 401.401</b>	<b>Lecture Theatre 405.460</b>	<b>Lecture Theatre 405.470</b>
2:00	<b>MERCURY NEW ZEALAND   INDUSTRY UPDATE   Ben Pezaro</b>	<b>13   Operational experiences and asset management of geothermal pipelines at Wairakei - Robert Dudley</b>	<b>7   Investigating the geoheat potential of the Tauranga geothermal system - Yale Carden</b>
2:15	<b>EASTLAND GROUP   INDUSTRY UPDATE   Ben Gibson</b>	<b>53   Rotokawa Upgrade Project: Midlife geothermal power plant development and optimisation - Leigh McLellan</b>	<b>84   Interpretation of the first thermal response test in Central Asian countries - Hikari Fujii</b>
2:30	<b>CONTACT ENERGY   INDUSTRY UPDATE   Bridget Ayling</b>	<b>46   Lessons learned from the Rotokawa condensation-induced water hammer incident - Ivo Lemmens</b>	<b>18   Overview of the Rotokawa-Mokoia geothermal system, Bay of Plenty, Aotearoa New Zealand - science, monitoring and use - Mariana Zuquim</b>
2:45	<b>WESTERN ENERGY   INDUSTRY UPDATE   Marcus Prestney</b>		<b>28   Polaris renewable energy, Empowering communities - Jim Lawless</b>
3:00	<b>Afternoon Tea</b>		
	<b>Session 3.1 - INDUSTRY UPDATES</b>	<b>Session 3.2 - GEOTHERMAL GEOLOGY 1</b>	<b>Session 3.3 - SCALING &amp; CORROSION 1</b>
	<b>SESSION CHAIR   Ellie Krause</b>	<b>SESSION CHAIR   Bridget Lynne</b>	<b>SESSION CHAIR   Wei Guo</b>
	<b>Lecture Theatre 401.401</b>	<b>Lecture Theatre 405.460</b>	<b>Lecture Theatre 405.470</b>
3:30	<b>BAY OF PLENTY REGIONAL COUNCIL   INDUSTRY UPDATE   Penny Doorman</b>	<b>58   Geothermal The Next Generation - 5 years of findings to propose a new exploration phase for New Zealand - Isabelle Chambefort</b>	<b>17   Subsurface corrosion mitigation experience through acid fluid neutralization in the Tiwi geothermal field, Albay, Philippines - Jean Mary Libato-Avila</b>
3:45	<b>WAIKATO REGIONAL COUNCIL   INDUSTRY UPDATE   Katherine Luketina</b>	<b>90   Targeting faults with geothermal wells – why bother? - Phil White</b>	<b>3   Optimised chemical cleaning of geothermal wells: A laboratory study - Alan Ferguson</b>
4:00	<b>MITCHELL DAYSH   INDUSTRY UPDATE   Mason Jackson</b>	<b>67   Unveiling the Subsurface Dynamics: A multi-analytical approach for constructing geothermal model of Huangzui volcano, Taiwan - Ting Jui Song</b>	<b>64   Learnings from 50 chemical well cleaning and stimulations across various well types, formations and countries - Logan Muller</b>
4:15	<b>GEOTHERMAL INSTITUTE   INDUSTRY UPDATE   Sadiq J. Zarrouk, John O'Sullivan</b>	<b>39   Well-Scale Permeability Classification on the Indonesia Conventional Geothermal Reservoir - Muhammad Ikhwan</b>	
4:30	<b>JACOBS   INDUSTRY UPDATE   Darryn Wise</b>	<b>45   Conceptual model of the Roseau Valley geothermal system, Dominica, Lesser Antilles - Ryan Libbey</b>	
4:45	<b>JRG ENERGY   INDUSTRY UPDATE   Duncan Steven</b>	<b>9   Active fault delineation studies using soil gas survey in the North-Ghoubbet geothermal prospect - Youssouf Samod</b>	
<b>Thursday 21 November</b>			

8:45	Housekeeping		
9:00	<b>KEYNOTE TITLE: An overview of tools for the modelling of GHG storage, AGI and geothermal applications</b> Keynote Speaker   Professor Alfredo Battistelli, Geothermal Reservoir Engineer Consultant, Italy		
9:45	<b>TRIVENI TURBINES DMCC   INDUSTRY UPDATE   Siddarth Tomar</b>		
10:00	<b>Morning Tea</b>		
	<b>Session 4.1 - INDUSTRY UPDATES</b>	<b>Session 4.2 - GEOCHEMISTRY 1</b>	<b>Session 4.3 - RESERVOIR MODELLING 2</b>
	<b>SESSION CHAIR   Clare Baxter</b>	<b>SESSION CHAIR   Michael Rowe</b>	<b>SESSION CHAIR   John O'Sullivan</b>
	<b>Lecture Theatre 401.401</b>	<b>Lecture Theatre 405.460</b>	<b>Lecture Theatre 405.470</b>
10:30	<b>SOLENSIS   INDUSTRY UPDATE   Daniel Wilson</b>	63   <b>Development of a flow through multi Input chemical-water-gas-rock reactor for the purpose of geothermal non-condensable gas injection reaction testing</b> - Claire Newton	68   <b>Stored heat calculations – Time for Review</b> - Brian White
10:45	<b>AECOM NEW ZEALAND   INDUSTRY UPDATE   Shivam Naidu</b>	66   <b>Deciphering geochemical traits of metapelitic orogenic geothermal systems: Insights from the Lushan geothermal field in Taiwan</b> - Yi-Chia Lu	49   <b>Investigations of reservoir response to net-negative CO<sub>2</sub> reinjection using full-scale geothermal reservoir models</b> - Abigail Swanepoel
11:00	<b>CASIL TECHNOLOGIES   INDUSTRY UPDATE   Jim Johnston</b>	33   <b>Extracting geothermal potential areas in Ecuador using hydrogeochemical data and their principal component analysis</b> - Danilo Ibarra, Kotaro Yonezu	52   <b>Numerical assessment of carbon sequestration in a 3D rhyolite-hosted reservoir</b> - Dale Emet Altar
11:15	<b>SUPERIOR PERFORMANCE DESIGN GROUP (SPD)   INDUSTRY UPDATE   Colin Finnegan</b>	73   <b>Geochemical parameters for evaluating brine outfield injection impact at Salak, Indonesia</b> - Risa Prameswari Putri	31   <b>Reactive transport modelling of fluid-NCG reinjection in Ngā Tamariki geothermal field</b> - Yeftamikha Siahaan
11:30	<b>MARUBENI-TOCHU TUBULARS OCEANIA (MITO)   INDUSTRY UPDATE   Rafer Kong</b>	29   <b>The effect of CO<sub>2</sub> co-injection on silica scaling in acid-dosed subduction zone geothermal brines</b> - Akira Kamiya	24   <b>Reactive transport modelling of NCG-reinjection at Ngawha geothermal field</b> - Vaibhav Rajput
11:45	<b>ECOLAB   INDUSTRY UPDATE   David Rodman</b>	40   <b>Expanding the limits of experimental water-rock interaction: The supercritical laboratory at GNS Science</b> - Bruce Mountain	
12:00	<b>Lunch</b>		
1:00	<b>KEYNOTE TITLE: Hydrothermal monitoring of Yellowstone National Park (2005-2015) using night-thermal infrared remote sensing</b> Keynote Speaker   Dr Cheryl Jaworowski, Geologist Consultant, Wyoming, USA		
1:45	<b>Geothermal Institute website launch   Bettina Way</b>		
	<b>Session 5.1 - INDUSTRY UPDATES</b>	<b>Session 5.2 - DRILLING &amp; WELL TESTING 2   PRODUCTION &amp; MANAGEMENT 2</b>	<b>Session 5.3 - ENVIRONMENTAL ASPECTS</b>
	<b>SESSION CHAIR   Mason Jackson</b>	<b>SESSION CHAIR   Oliver Maclaren</b>	<b>SESSION CHAIR   Rony Nugraha</b>
	<b>Lecture Theatre 401.401</b>	<b>Lecture Theatre 405.460</b>	<b>Lecture Theatre 405.470</b>
2:00	<b>GNS SCIENCE   INDUSTRY UPDATE   Isabelle Chambefort</b>	54   <b>Real-time incident detection in geothermal drilling operations using machine learning solutions</b> - Aira Aspiras	42   <b>Ecology, history and management of geothermal vegetation and habitats in the Ngā Tamariki geothermal system, Waikato, Aotearoa New Zealand</b> - Chris Bycroft

2:15	MTL   INDUSTRY UPDATE   Richard Belcher	86   Post-drilling outer casing cement remediation and recommissioning of a Rotokawa well - Matt Kelley & Daniel Chaparro	25   Comparison of satellite-based InSAR methods for monitoring geothermal areas at Rotokawa: PS versus SBAS - Mark Harvey
2:30	GALLAGHER INSURANCE   INDUSTRY UPDATE   James Coldman	80   Over pressure protection in geothermal plants - Kevin Koorey	37   Unlocking our potential: a superhot geothermal future for Aotearoa New Zealand - Deborah Kissick
2:45	IXOM   INDUSTRY UPDATE   Noel Gerente		11   Understanding geothermal regulation in New Zealand. A day in the life of the regulator - Penny Doorman
3:00	Afternoon Tea		
	Session 6.1 - INDUSTRY UPDATES	Session 6.2 - SCALING & CORROSION 2	Session 6.3 - GEOCHEMISTRY 2 & GEOTHERMAL GEOLOGY 2
	SESSION CHAIR   Mike Allen	SESSION CHAIR   Jimmy Yang	SESSION CHAIR   Bei Nugoro
	Lecture Theatre 401.401	Lecture Theatre 405.460	Lecture Theatre 405.470
3:30	INDONESIA – AOTEAROA NEW ZEALAND GEOTHERMAL ENERGY PROGRAMME (PINZ)   INDUSTRY UPDATE   Greg Ussher, Evelyn Gunawan	71   Stress corrosion cracking failure of a geothermal steam piping rupture disc - Sigit Prabowo	21   A pioneer application of downhole tracer injection in geothermal production well - Fabian Hanik
3:45	NZTE - Indonesia   INDUSTRY UPDATE   Putri Wuningsari	48   Application of machine-learning for the prediction of formation rate of silica scale from geothermal water - Saefudin Juhri	95   Characterisation of tonalite and andesite prior to reaction with CO2-rich fluids - Bridget Lynne
4:00	NZTE - Philippines   INDUSTRY UPDATE   Maricon Popones-Lim	6   Case study of the CaSil technology at Dieng, Indonesia – Successfully eliminating silica scale - Thomas Borrmann	23   Comparative study of silica inhibitor versus pH modification in the geothermal system - Arsyian Sasoni
4:15	WING   INDUSTRY UPDATE   Clare Baxter, Michael Gravatt, Tessa Williams	79   Extending the life cycle of geothermal wells: Effective strategies for scale removal - Rochelle Longval	34   Conceptual model of slate formation: A case from the Lushan geothermal field, Taiwan - Sheng Rong Song
4:30		65   Iron sulfide deposition and inhibition and its impact on geothermal brine pumps - Fritz Monterozo	
4:45 - 5:30		Seequent   International Geothermal Association   industry announcement and panel discussion Jeremy O'Brien and Marit Brommer	
6:30 10:00	NZGW Conference Dinner - Lula Inn, 149 Quay St, Auckland CBD		
	<b>Friday 22 November</b>		
8:45	Housekeeping		
9:00	<b>KEYNOTE TITLE: Lessons learned from two successful EGS deployments in the United States</b> Keynote Speaker   Dr Jack Norbeck, Co-founder and Chief Technical Officer, Fervo Energy, USA		
9:45	<b>Geothermics: A New Zealand issue?</b>   Sadiq J. Zarrouk		
10:00	Morning Tea		
	Session 7.1 - INDUSTRY UPDATES	Session 7.2 - HINDSIGHT & FORESIGHT	Session 7.3 - SCALING & CORROSION 3

	SESSION CHAIR   Mike Allen	SESSION CHAIR   Michael Gravatt	SESSION CHAIR   Angus Yeh
	Lecture Theatre 401.401	Lecture Theatre 405.460	Lecture Theatre 405.470
10:30	NGĀWHĀ GENERATION   INDUSTRY UPDATE   Fabian Hanik	74   New Zealand annual geothermal review 2023 - Ted Montague, Sadiq Zarrouk	51   Deposition behaviour of elements composing of a silica scale formed from a geothermal water - Kotaro Yonezu
10:45	CONDOR ENERGY   INDUSTRY UPDATE   Josh Anderson	35   Superhot geothermal – A net zero window of opportunity for New Zealand? - Chris Bromley	43   Identifying formation scale in geothermal wells - Katie McLean
11:00	UPFLOW   INDUSTRY UPDATE   Andy Blair	87   The role of groundwater monitoring in the sustainable development of the Ngā Tamariki field - John Mering	15   Unlocking the full geothermal potential: How the CaSil technology can eliminate silica scaling and create new business opportunities - Michael Schweig
11:15	INTERGROUP   INDUSTRY UPDATE   Sam Clive	20   Reimagining geothermal power plants: Green Hydrogen, Lithium and CO2 removal from New Zealand's future geothermal stack - Karan Titus	22   Enhancing the viability of calcite inhibition systems via targeted dose rate reduction - Alan Ferguson
11:30	WORKSAFE NEW ZEALAND   INDUSTRY UPDATE   Nick Dawtry	62   Is the Australian geothermal industry "gathering steam"? - Rosalind Archer	60   Geophysical imaging of the Paeroa Fault: Insights from a dense nodal seismic array - Brook Keats
11:45		47   Prioritization of geothermal field development in Indonesia for energy transition: A multi-criteria decision analysis approach - Hadyan Perdana Putra	70   Refining geological models through 3D gravity modelling at Wairakei, Tauhara and Rotokawa geothermal fields - Jenny Barretto
12:00	Workshop close - Sadiq J. Zarrouk, John O'Sullivan		
12:15	Lunch		
1:00	WING: Walk & Talk, Auckland Domain		