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Hosted by



November 29th

to December 2nd

er 2022 Auckland New Zealand





TRANSPOWER



Future Architecture of the Network **TE-WHATUNGA HIKO-**



QuakeCoRE

NZ Centre for Earthquake Resilience *Te Hiranga Rū*







ENGINEERING DEPARTMENT OF ELECTRICAL, COMPUTER, AND SOFTWARE ENGINEERING

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IEEE is the world's largest technical professional organisation dedicated to advancing technology for the benefit of humanity. IEEE and its members inspire a global community to innovate for a better tomorrow through its more than 409,000 members in more than 160 countries, and its highly cited publications, conferences, technology standards, and professional and educational activities. IEEE is the trusted "voice" for engineering, computing, and technology information around the globe.

IEEE offers a number of ways to get involved with technical and local communities. These communities are active participants in research and authorship, conferences, and important conversations about today's most relevant technical topics locally and globally.

IEEE aims to drive global innovation through broad collaboration and the sharing of knowledge to enhance public understanding of engineering and technology and pursue standards for their practical application. Inspiring a worldwide audience by building communities that advance technical interests, inform public policy, and expand knowledge for the benefit of humanity.

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The 7th IEEE Workshop on the Electronic Grid (eGrid 2022) will be held on 29 November - 2 December 2022 in Auckland, New Zealand. This workshop is jointly sponsored by IEEE Power Electronics Society (PELS) and IEEE Power & Energy Society (PES). With the increasing applications of power electronics in the power grid, these two independent domains of power engineering are increasingly being integrated more closely from a systems viewpoint, ever than before. eGrid provides an international forum for academics and industry in the field of electronic grid to exchange information on their latest research ideas, progresses, developments, experiences, achievements, state-of-art technical trends, and applications.

The previous eGrid workshops have been held with great success in Hefei China (eT&D 2016), Aalborg Denmark (eT&D 2017), Charleston USA (eGrid 2018), Xiamen China (eGrid 2019), Aachen Germany (eGrid 2020), and USA (eGrid 2021). The conference papers will be indexed by EI and included in IEEE Xplorer.

eGrid 2022- Auckland includes the traditional 3-day themed panels, presentations and posters focusing on:

- Green Energy Technologies
- The future workforce to support deeper renewable
- electrification
- Innovations and start-ups to support AC/DC Hybrid Grid end-to-end operation
- Technical challenges for addressing planning
- Operation of and maintaining the Hybrid grid

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Kia ora All:

On behalf of the **7th IEEE Workshop on the Electronic Grid**, **eGrid 2022** Organizing Committee, it is our privilege and great pleasure to extend a warm Kiwi welcome to all delegates, invited keynotes/guests, sponsors and exhibitors. Attendees from 16 countries around the globe hail from different life-long learning stages like Student, Young Professional, Women in Engineering, Researchers, Professors, Innovators and Professionals. A special welcome to all the invited panel speakers who are power engineering thought leaders, experts, executives and professionals

It has been slightly more than 3 years since this journey began with the bid to host eGrid for 2021, by IEEE New Zealand North Section volunteers and in particular IEEE Power and Energy Society. The competition from various venues across the globe was so intense that year, that we were offered to host the 2022 eGrid instead of 2021. As part of the bidding process, we would like to take this opportunity to express our sincerest gratitude to the Auckland Convention Bureau, who helped prepare all the bid documents professionally which we strongly believe played a key part for winning amongst very stiff competition from other desirable locations across the globe. The electricity industry's IEEE PES members from across New Zealand and the 4 NZ tertiary institutions where Power Engineering teaching and research is active i.e. University of Canterbury, Victoria University of Wellington, Auckland University of Technology and University of Auckland have also been very supportive of these efforts and are delighted for the opportunity to host collectively this joint IEEE Power & Energy Society and IEEE Power Electronics strand of workshop for this global membership driven power engineering fraternity together here 'down-under'.

As part of the hosting process, we would particularly like to take this opportunity to express our sincerest gratitude to the Department of Electrical, Computer and Software Engineering at University of Auckland, who agreed to be the main host. The electricity industry's from across New Zealand and IEEE members from Electricity Utilities across NZ have been very supportive of these efforts and are delighted for the opportunity to host collectively, this joint IEEE PES and PELS facilitated event, in Auckland for the first time.

For a global industry workshop of this kind, this is the first time, where we have embedded co-located workshops and panels from NZ Power & Energy Collaboratory (NZPEC), QuakeCore (Seismic Centre of Research Excellence) and FAN (MBIE Funded Strategic Science Investment on Hybrid AC-DC Grid) to blend and engage alongside the main industry led 2 day intense panels delivered by professional stakeholders and other future low-carbon energy partners like transport, councils, innovators and policy makers. Technical presentations and poster sessions typical of PES/PELS are scheduled for the last day (Friday) to go along with Executive Round table and Industry presentation and panel sessions on all the 3 days of the program by international thought leaders and executives. This naturally meant that the traditional culture and practices of the eGrid workshop attendees need to be met along with a blended program that appears seamless and representative to the attendees who might be representing countries, institutions/ companies and as individuals. At the outset, we would like to acknowledge the patience and accommodation that each one of you extended before arriving here, as the organizing committee worked through the details and help establish a cohesive and integrated program that hopefully satisfies each one of your expectations and positive experiences during this conference.

At the time of sending this handbook to the e-printer we have about 120+ attendees from about 16 countries that are participating across various events during the 4 days. The pre-conference NZPEC event has an additional 30 attendees. During the actual meeting, we expect some more local participants to engage.

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In particular, we would like to thank **eGrid International Steering Committee** for their approval to host eGrid 2022 in Auckland and for their support and advice during the program preparation and sharing expectation of the industry-academia-research balance expected of eGrid brand.

At this stage, we would also like to say a big 'Nga mihi' (Thanks) to our supporters, members and volunteers of all categories - Industry Professionals, Electricity Utilities, Power industry organisations and Student Members for being part of the local program that will capture and showcase the electrical power systems challenges, opportunities, experiences and engagements from across Aotearoa, New Zealand. There is active participation across the various events from Kiwi engineers, leadership, researchers, affinity groups- 'Students, Women, Young professionals' electricity stakeholders across the board and engineering societies which represents the breadth of New Zealand power systems, whose history is about 135+ years.

The tag line for this conference is **"Future Electricity Architecture to Enable Zero-Carbon Economy**" and during the four days of the programming will have 3 industry relevant Tutorials, 1 site-visit, an Opening Panel on Innovation and Start Ups: connecting Entrepreneurs with Policy makers, 2 CEO Keynotes, 7 Executive Industry Panels, 3 cutting-edge AC-DC Hybrid grid Research Panels, 5 Technical Sessions on Friday, a Poster session, 2 Full day of workshops from NZPEC and QuakeCORE groups, 3 social networking functions, 1 Banquet and several opportunities to professionally interact with global innovators, experts, technical professionals, researchers gaining opportunities for recognition and peer-esteem. Details of the above are provided by our Industry and Technical Chairs later in this handbook.

We hope that the 4-day formal program of events including an integrated one-day NZPEC research workshop and various social networking activities will provide a roadmap for all attendees, to inspire new ideas for a collaborative leadership of sustainable energy issues for low-carbon transitions globally in coming decades. A special thanks to all the volunteers, sponsors and exhibitors for the preparation and help towards actual conduct of this event.

On behalf of the organizing committee we thank you for your participation and supporting eGrid 2022. We wish you all a great event full of new ideas, networking opportunities and showcasing the new technologies and strategies that will shape our sector in coming decades. For those of you who are here for the very first time, please take time to explore locally and nearby across our beautiful landscape and experience the friendly hospitality.

Nga Mihi,

Nohimer

Nirmal Nair General Chair

Kate M

Kate Murphy General Co-Chair

On behalf of Organizing Committee eGRID 2022



Nirmal Nair General Chair



Tek Tjing Lie **Technical Chair** Finance Chair



Kate Murphy General Co-Chair



Waqar Qureshi Industry Chair



Nyuk-Min Vong Industry Co-Chair



Ramesh Rayudu Technical Co-Chair



Andrew Lapthorn Yuan Liu Student Activities Chair Student Activities Co-Chair







Rizki Rahayani Social Activities Chair



Abhinav Rakesh Chopra Young Professional **Activities Chair**



Xin Liu **Creative Head** Social Activities Co-Chair



Lakshita Women in Engineering **Activities Chair**



Matt Sarten Site Visit Supervisor



Camille Virtusio EGRID Volunteer



Tran The Hoang **EGRID Volunteer**



Frederick Howard **EGRID Volunteer**



Thomas Patrick EGRID Volunteer



Aratrika Ghosh **EGRID Volunteer**



Eric Sauvage **EGRID Volunteer**



Tēnā koutou, tēnā koutou, tēnā koutou katoa

On behalf of the eGRID 2022 Industry Organizing Committee and long-standing IEEE PES members and supporters from the New Zealand industry, it is an honour and great pleasure to welcome all the conference participants from many countries representing Industry, Research, Academia and IEEE Power and Energy Society. eGRID 2022 theme "Future Electricity Architecture to Enable Zero-Carbon Economy" has been planned to provide strong industry participation from New Zealand and around the globe. The participation is from all levels of industry including CEOs, Executives, and Decision Makers. These industry attendees are participating as plenary session keynotes, panellists, and presenters on all four days of the conference as outlined in the conference program.

On 29th November, eGRID will offer a wonderful seismic resilience workshop led by researchers and specialised inter-disciplinary resilience research groups that will highlight machine learning expertise, a substation site visit, and a welcome 'Mihi Whakatau' being attended by the ACT party leader, David Seymour. This will be followed by the "Wonder Power Project Challenge" and Networking.

To set the tone of the eGRID, on 30th November, the conference opens with a keynote speech by the CEO of Transpower New Zealand, Alison Andrew, addressing the theme of the eGRID conference. After the opening keynote by Alison Andrew, an executive plenary session has been organised on the topic "Global Perspective on the Utility of the Future" which showcases varying views on the future of utilities. Following lunch, a second plenary session on the topic "Future Grid Digitisation and Optimisation" has been designed to offer technology options for the future grid. This panel will have industry experts from utility and technology partners actively developing digital solutions for the future grid. This panel session will nicely flow into "Future Workforce," an important panel session on the challenges the electricity industry is facing. The day will finish with concluding panels by Women in Power and Young Engineers where these groups share their experiences.

On 1st December, the CEO of the Vector Limited New Zealand, Simon Mackenzie, will open with his keynote speech highlighting challenges faced by the electricity sector and distribution sector in particular. He would share some thoughts on the role of the distribution sector and how some of those lessons can be applied to the developing technologies being adopted by other global participants.

After the keynote by Simon Mackenzie, an executive plenary session on the topic of "Energy Transition, Climate Action, Energy Policy & Modelling" has been organised which showcases the varying views on the energy transition and policy matters. Following lunch, the second plenary session on the topic of "Technical Challenges for Addressing Planning, Operation and Maintaining of the Grid" has been designed to offer technical challenges and options for grid operation and management. This panel will have industry experts from utility, developers and technology partners facing these challenges as they continue to emerge. This panel session will nicely flow into an important panel session on the topic of "Role of Grid Forming Inverters in the Future Power System" attended by experts from the US and New Zealand. The day will finish with networking opportunities and a banquet.

The conference will continue with the presentation of academic papers on the 2nd of December in hybrid mode.

We would like to make a special mention of industry program participation and sponsorships from Auckland Transport, Ara Ake, Connetics, Counties Energy, Electrix, Fraunhofer DE, GHD Australia, Lodestone Energy, MBIE, Northpower, Electrix, Future Architecture of the Network, NREL, the NZ Parliament, OMICRON, PowerCo, Quanta Technology, Sandia National Labs, QuakeCore, The University of Auckland, Transpower, Vector, VTS, Wellington Electricity, Western Power. We wish to thank all the attendees for supporting the industry programs and wish them a very exciting conference.

Nāku iti noa, nā Industry Chairs Waqar Qureshi and Nyuk-Min Vong On behalf of the IEEE eGRID 2022 Technical Organizing Committee, it is our great honour and pleasure to welcome you all to IEEE eGRID 2022. We would like to thank all the authors for considering IEEE eGRID 2022 as the forum for presenting your research. Without the submitted papers, we would not have an eventful, exciting, and productive global event!

IEEE eGRID 2022 has attracted many experts from industries, academia, research institutions, government agencies, and other institutions representing 16 countries. Many new emerging researchers who will be presenting their research works are also here among us today. The combinations of experts and new young researchers, of academia and industry, are a strength not just for the conference success, but also for contributing "Future Electricity Architecture to Enable Zero-Carbon Economy" in real life.

We have received 32 research papers. We have them reviewed by at least two reviewers to ensure that each accepted paper is up to the expected standard. All the papers are high quality papers and thus we made the toughest decision by only accepting about 75% submitted.

We contacted many experts to review the papers. The reviewers have volunteered their time to assess and critique the papers. Some of the reviewers are here with us today. Thank you very much for your significant help! We would also like to extend our gratitude to the reviewers who are not attending this conference. Without the help from all these reviewers, who are present or absent today, we would not have been able to meet the deadlines and finally to organize this conference.

Since the conference is hybrid, we are not able to group the papers based on the conference tagline "Future Electricity Architecture to Enable Zero-Carbon Economy". We have grouped the papers into several tracks based on the geographical time zones that suit the authors who will present their respective papers virtually. We made sure that the authors can present their papers in their reasonable time zone.

These peer-reviewed accepted papers, made available in the conference proceedings, will be presented in the technical session presentation format. There are 5 parallel technical sessions with around 5 papers in each session for a day. Overall, we will have 24 papers presented through 5 sessions.

We also would like to thank session chairs for your willingness to take the responsibility. With your help, we believe that the sessions will be well organized and productive.

Thank you very much for attending this conference. We wish that you all have a very exciting and

productive conference.

Nga Mihi,

Technical Chairs

Tek Tjing Lie and Ramesh Rayudu

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IEEE eGRID 2022 Technical Paper Reviewer List

NAME	COUNTRY
Frede Blaabjerg	Denmark
Surya Santoso	USA
Eduard Muljadi	USA
Quan Nguyen	USA
Arindam Ghosh	Australia
Don Mahinda Vilathgamuwa	Australia
Sumedha Rajakaruna	Australia
Farhad Shahnia	Australia
Hui Ma	Australia
Daming Zhang	Australia
Mohammed Haque	Australia
Joe Dong	Singapore
King Jet Tseng	Singapore
Yan Xu	Singapore
Veerasamy Veerapandiyan	Singapore
Guojie Lie	China
Jun Su	China
Sabrina Ding	China
Stein Erik-Fleten	Norway
Ramon Zamora	New Zealand
Kosala Gunawardane	New Zealand
Tran The Hoang	New Zealand
Lakshita	New Zealand
Zaid Al-Tameemi	New Zealand
Barkha Parkash	New Zealand
Shafiqur Rahman Tito	New Zealand
Dulsha Kularatna Abeywardana	New Zealand
Sheikh Tanzim Meraj	Bangladesh

Countries Represented:



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Institutions Represented:

- Auckland Transport
- Ara Ake
- Connetics
- Counties Energy
- Electrix
- Fraunhofer DE
- GHD Australia
- Lodestone
- MBIE
- Northpower
- NREL
- NZ Parliament
- OMICRON
- PowerCo
- Quanta
 - Technology
- Sandia National Labs
- Transpower
- Vector
- VTS
- Wellington Electricity
- Western Power

Day 1, 29th November 2022

The first day of EGRID 2022 will start with a substation visit, tutorial, and a welcome session.

Time (NZST)	Day 1, 29 th November 2022
Morning & Afternoon	Sponsored Workshop: Technology Megatrend on Machine Learning Application to Seismic Sciences (QuakeCore Harnessing Disruptive Technologies for Seismic Resilience Theme) Building 405 Room 422
13:00 – 16:00	Substation visit Building 401 Entrance Tutorial on Immittance and Frequency Response of Inverter-Based Resources Building 405 Room 430 Jian Sun, Professor at Rensselaer Polytechnic Institute (RPI)
16:00 - 18:00	Mihi Whakatau (traditional welcome) Poster Session Opening and Panel Session on 'Opening & Panel Innovation and Start Ups, Connecting Entrepreneurs with Policy Makers.' Building 405 Room 422 Professor Gerard Rowe, Dean of Engineering, University of Auckland, NZ Dr. Cristiano Marantes, Chief Executive, Ara Ake, NZ Hon. David Seymour, ACT Leader, NZ Kate Murphy, IEEE EGRID 2022 Co-Chair, Vector, NZ Nirmal Nair, IEEE EGRID 2022 Chair, University of Auckland, NZ
18:00 -20:00	Wonder Project Power Challenge Workshop and Networking
New Zealand Powe (Monday 28th J	er and Energy Collaboratory Annual Research and School Outreach Meeting

complimentary access to these events/

Day 2, 30th November 2022

The second day of EGRID 2022 will start with an opening from a keynote speaker followed by 4 panel sessions.

Time (NZST)	Day 2, 30 th November 2022
9:00 - 9:30	Coffee & Networking
09:30 - 10:15	Opening & Keynote Building 405 Room 460 Alison Andrew, CEO of Transpower
	Global Perspective on Utility of the Future Building 405 Room 460
10.15 10.00	Dr. Nikki Newham, Project Director at Grid Service Contracts, Transpower New Zealand Ltd
10:15 - 12:00	Dr. Alex Apostolov , PAC World Magazine and OMICRON electronics Charles Hanley, Sandia National Labs
	Richard Fioravanti, Director at Transportation Electrification, Quanta Technology
12:00 - 13:00	Lunch Building 405 Level 2
	Future Grid Digitization & Optimisation Building 405 Room 460
13:00 – 14:30	Patrick Cheffins, Head of Product in VTS
	Abhinav Chopra, Group Head of Architecture and Data, Counties Energy
14:30 - 14:45	Break
	Future Workforce Building 405 Room 460
14:45 - 16:30	Michael Whaley, Chief Engineer at PowerCo
	Johan H Enslin, Professor, Clemson University
16:30 - 18:15	Break
	Industry Experiences shared by Women in Engineering & Young Professional Engineers Building 405 Room 460
16:45 – 18:15	Emma Lloyd, Graduate Design Engineer, Connetics
	Amrita Sharma, Principal Infrastructure Lead in Auckland Transport
18:15 – 19:30	Welcome Cocktail and poster Session Building 405 Level 2

Day 3, 1st December 2022

The third day of EGRID 2022 will start with an opening from a keynote speaker followed by 3 panel sessions.

Time (NZST)	Day 3, 1st December 2022		
9:00 - 9:30	Coffee & Networking		
09:30 – 10:15	Opening & Keynote Building 405 Room 460 Simon Mackenzie, CEO of Vector		
	Energy Transition, Climate Action, Energy Policy & Modelling Building 405 Room 460 Nicole Kirkham, Senior Policy Advisor from the Ministry of Business,		
10:15 – 12:00	Innovation and Employment, NZ Dr. Dushan Boroyevich, IEEE PELS, Virginia Tech, USA Nirmal Nair, IEEE PES, University of Auckland, NZ		
12:00 - 13:00	Lunch Building 405 Level 2		
13:00 – 14:30	Technical Challenges for Addressing Planning, Operation and Maintaining of the Grid Building 405 Room 460Waqar Qureshi, Wellington Electricity Lekshmi Jaya Mohan, Team Lead at GHD AustraliaStephen Zhao, Senior Development Engineer from Lodestone		
14:30 - 14:45	Break		
14:45 – 16:30	Role of Grid Forming Inverters in the Future Power System Building 405 Room 460 Dr. Ben Kroposki, Director Power Systems Engineering Center, National Renewable Energy Lab, USA Dr. Jack Flicker, Principal Member from Sandia National Laboratories, USA Dr. Stuart Macdonald, Power System Dynamic Modelling, Transpower, NZ		
16:30 - 18:30	Networking alongside Trade-Exhibit and Poster Session of Previous Days Building 405 Level 2		
18:30 - 21:30	eGrid 2022 Banquet Fale Pasifika University of Auckland		

Day 4, 2nd December 2022

The final day of eGrid 2022 conference will consist of 3 sponsored panels in parallel with 25 technical sessions.

Time (NZST)	Day 4, 2nd December 2022			
08:30 - 10:00	Modelling the AC-DC Hybrid Grid Building 405 Room 460 Neville Watson, Professor of University of Canterbury Georgios Konstantinou, Senior Lecturer of The University of New South Wales Tobias Massier, Principal Scientist in the TUM CREATE		Technical Session 1 Building 405 Room 422	Technical Session 2 Building 405 Room 430
10:00 - 10:15	Break(15mins)			
10:15 – 12:00	Topologies and Protection for Hybrid AC-DC GridBuilding 405 Room 460Abhisek Ukil, Associate Professor at the University of AucklandAleksandra Lekić, Assistant Professor at TU DelftTran The Hoang, Research Fellow at the University of Auckland		Technical Session 3 Building 405 Room 422	Technical Session 4 Building 405 Room 430
12:00 - 13:00	Lunch			
13:00 - 14:30	Enabling Technologies for Hybrid AC-DC Grid Building 405 Room 460 Frede Blaabjerg, Professor at the Aalborg University Bernd Wunder, Institute for Integrated Systems and Device Technology (IISB) Tek Tjing LIE, Professor at the Auckland University of Technology		Technical Session 5 Building 405 Room 422	
14:30 - 15:00	Closing and Awards Building 405 Room 460			

Lists of the presenters in each technical session are detailed below.

Each presenter will have 8 minutes to present and 5 mins for Q&A after each presentation.

Time: 8:30 - 10:00 NZST	Technical Session 1 (TS-01) Chair: Tran The Hoang		
Time	Title, Paper ID and Presenter		
8:30-8:45	Paper ID 2258		
	Presenter Tran The Hoang		
	Comparison of Low-Voltage AC and DC Distribution Networks for EV Charging		
	Charging demand on the electricity grid		
8:45-9:00	Paper ID 1664		
	Presenter: Stanimir Valtchev (virtual)		
	Li-Ion Batteries Remaining Useful Life Maximization through Model Predictive Control		
	Based Optimal Charging		
9:15-9:30	Paper ID 7417		
	Presenter: Soren Subritzky		
	DC Suitability of AC Appliances		
9:30-9:45	Paper ID 7094		
	Presenter: Yilu Liu		
	Impact of High PV Penetration on Regional Power Grids		
9:45-10:00	Paper ID 659		
	Presenter: Tran The Hoang		
	Tripping Sequence Approach to Reduce Fault Current to be Interrupted in LVDC		
	Microgrids		

Time: 8:30 - 10:00 NZST	Technical Session 2 (TS-2) Chair: Johan Enslin/Jeremy Watson
Time	Title, Paper ID and Presenter
8:30-8:45	Paper ID 2399
	Presenter Johan Enslin
	Multi-terminal HVDC Grid Topology for large Scale Integration of Offshore Wind on the
	U.S Atlantic Coast
8:45-9:00	Paper ID 6411
	Presenter: Sameer Phadnis
	Platform for Querying CIM-based Models and Data of the
	Electrical Distribution Network
9:15-9:30	Paper ID 683
	Presenter Lydia Smith
9:30-9:45	Paper ID 6710
	Presenter Rizki Rahayani
	Solar Power Generation in Riau-Indonesia; Potential and its Challenge Due to Forest Fire
9:45-10:00	Paper ID 8629
-	Presenter: Xin Yi Teh
	Investigation of Geomagnetically Induced Currents (GICs) Susceptibility of Different
	Three-Phase Power Transformer Cores

Time: 10:15 - 12:00 NZST	Technical Session 3 (TS-03) Chair: Georgios Konstantinou
Time	Title, Paper ID and Presenter
10:15-10:30	Paper ID 9613 Presenter Georgios Konstantinou
	Base Failure Rate Calculation for Submodules in Modular Multilevel Converters for MVDC Applications
10:30-10:45	Paper ID 2820Presenter: Jiann Fuh ChenDesign and Implementation of Non-Isolated Switched-Capacitor SEPIC Converters UsingDuality Principle
10:45-11:00	Paper ID 7801 Presenter: Aratrika Ghosh Energy Management for Solar PV Generation with Contactless Power Transfer
11:15-11:30	Paper ID 8104 Presenter: Hailong Wang Enhanced Grid-tie Converter Control Under Unbalanced Conditions with no PLL
11:30-11:45	Paper ID 5624 Presenter: Neville Watson Accurate Harmonic Analysis of Distribution Systems

	Time: 10:15 - 12:00 NZST	Technical Session 4 (TS-04) Chair: Yilu Liu		
	Time	Title, Paper ID and Presenter		
	10:15-10:30	Paper ID 1907 Presenter Tek Tjing Lie Off-grid EV charging stations to reduce the impact of charging demand on the electricity grid		
	10:30-10:45	Paper ID 4870 Abhi Chopra (virtual) VA3: A Web 3.0 Based Power (VA) Transaction Platform		
•	10:45-11:00	Paper ID 4718 Presenter Andre Cuppen Hybrid MV AC/DC network topology options: applying multilayer networks framework		
	11:15-11:30	Paper ID 6466 Presenter: Don Gamage Load Frequency Control with Consensus Based Multi-Energy Storage System		
-	11:30-11:45	Paper ID 1396Presenter Jiasheng Zhang (virtual)A Bagging Long Short-term Memory Network for Financial Transmission RightsForecasting		

Time: 13:00 - 14:30 NZST	Technical Session 5 (TS-05) Chair: Lakshita/Rizki Rahavani
Time	Title, Paper ID and Presenter
13:00-13:15	Paper ID 1411 Presenter: Chenbei Lu (Virtual) Risk-Limiting Multi-Station EV Charging Scheduling with Imperfect Prediction
13:15-13:30	Paper ID 3801 Presenter: Chenye Wu (virtual) Economic Risk Analysis for the Power System: From a Quality-of-Service Perspective
13:30-13:45	Paper ID 8199 Presenter: Chenye Wu (virtual) Load Prediction under Accelerated Urbanization
13:45-14:00	Paper ID 5895 Presenter: Ahmed Haidar (virtual) Analysis of Grid-connected Solar PV System Operation based on Energy Router Concept

Streaming Details:

The sessions from 9:00 to 12:00 on Days 2 (Wednesday) and 3 (Thursday) can be streamed through this link:

https://www.linkedin.com/company/ieee-pes-new-zealand-north-chapter/posts/

Wifi details:

From 29th - 1st

For the 2nd December

- 1. Select the wireless network: UoA-Guest-WiFi
- 2. Enter the username: ieee2022@uoawifi.com
- 3. Enter the password: JHeJHByd
- 1. Select the wireless network: UoA-Guest-WiFi
- 2. Enter the username: ieee2022@uoawifi.com1
- 3. Enter the password: AQEbgJF8

Engineering Building - Level 2 - Refreshments





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Time (NZST)	Day 1, 29 th November 2022	
Morning & Afternoon	Sponsored Workshop: Technology Megatrend on Machine Learning Application to Seismic Sciences (QuakeCore Harnessing Disruptive Technologies for Seismic Resilience Theme) Building 405 Room 422	
13:00 – 16:00	Substation visit Building 401 Entrance Tutorial on Immittance and Frequency Response of Inverter-Based Resources Building 405 Room 430 Jian Sun, Professor at Rensselaer Polytechnic Institute (RPI)	
16:00 - 18:00	Mihi Whakatau (traditional welcome) Poster Session Opening and Panel Session on 'Opening & Panel Innovation and Start Ups, Connecting Entrepreneurs with Policy Makers.' Building 405 Room 422 Professor Gerard Rowe, Dean of Engineering, University of Auckland, NZ Dr. Cristiano Marantes, Chief Executive, Ara Ake, NZ	
	Kate Murphy, IEEE EGRID 2022 Co-Chair, Vector, NZ Nirmal Nair, IEEE EGRID 2022 Chair, University of Auckland, NZ	
18:00 - 20:00	Wonder Project Power Challenge Workshop and Networking	
New Zealand Power and Energy Collaboratory Annual Research and School Outreach Meeting (Monday 28th Nov from 10 am to 29th November noon, eGRID 2022 attendees will get complimentary access to these events/		

Substation Visits

Location: Jellicoe Street Car Park (37-55 Madden Street, Auckland CBD, Auckland).
Battery Energy Storage System - Vector Lights
Requirements: Full PPE, Vector WTC 2 holder
Vector personnel: Kate Murphy, Matthys Basson, Matt Sarten

Wonder Project Power Challenge Workshop and Networking

Charge up a brighter future for the electricity industry by signing up as a volunteer Ambassador for the Wonder Project Power Challenge in 2023

This free schools programme aims to inspire young Kiwis to consider a career in STEM, as they design and build their very own wind turbine to light up a mini town.

Wonder Project Ambassadors are role models for our future electricity industry workforce, uplifting students' aspirations and confidence as they learn how teamwork can keep the lights on, the schools open, and the hospitals running.

Facilitators:

- Alison Lawrie (Wonder Project Team Lead)
- Gay Watson
- Renee King

Tutorial on Immittance and Frequency Response of Converters in Power Systems

Jian Sun



Dr. Jian Sun joined the faculty at Rensselaer Polytechnic Institute (RPI) in 2002, where he is currently a Professor in the Department of Electrical, Computer and Systems Engineering. He is also Director of the Center for Future Energy Systems (CFES) funded by New York State government. His research interests are in the general area of power electronics and energy conversion, with an emphasis on modeling, control, and different applications including renewable energy and power systems.

Dr. Sun received his Dr.-Ing. Degree from the University of Paderborn in Germany. Prior to joining the faculty at RPI, he spent five years at Rockwell Collins working on power electronics for aircraft power systems, and was a Post-Doc Fellow at Georgia Tech from 1996 to 1997. As Director of CFES, he is responsible for the strategic directions and development of the Center's research, industry collaboration, education, and outreach programs. His professional services to the power electronics community included serving as Editor-in-Chief of IEEE Power Electronics Letters from 2008 to 2014, Treasurer of IEEE Power Electronics Society from 2013 to 2021, and Vice President of Conferences since 2021.

Dr. Sun received the IEEE PELS Modeling and Control Technical Achievements Award in 2013 and the R. David Middlebrook Outstanding Achievement Award in 2017. He is a Fellow of IEEE.

Welcome Session

Opening & Panel Innovation and Start Ups, connecting Entrepreneurs with Policy makers.

Theme: Enabling Decentralisation: Future Regulatory & standards

Christiano Marantes



Dr Cristiano Marantes is the Chief Executive of Ara Ake (New Zealand's Future Energy Centre), a role he started in September 2020. Having worked in different international markets, Cristiano is a highly experienced energy sector leader with an extensive engineering background and an informed worldview on the potential of technologies and business opportunities that will likely emerge in a low emissions energy future. He has a life-long passion for enabling this future, through strong leadership, innovation and knowledge of new low emissions energy solutions.

David Seymour



David grew up in Whangarei with two younger brothers, where his parents were a pharmacist and a draughtsman. As a teenager, he moved to Auckland for high school before graduating from the University of Auckland in electrical engineering and philosophy.

Before politics, David worked as an electrical engineer in New Zealand and for private

sector think tanks in Canada. He has served as ACT Leader and MP for Epsom since 2014. In Government, he was responsible for Regulatory Reform and charter schools. From opposition, he passed the End-of-Life Choice Act.

Fearless and principled, he is known for standing up for his constituents and, if necessary, to every other party. He has been named MP of the year twice, and 'the only one talking sense' too many times to count.

David knocked on 13,000 doors in the Epsom electorate suburbs of Epsom, Mt Eden, Parnell, and Remuera before being elected in 2014, and he hasn't stopped since. He regards being elected to Parliament by his neighbours as an enormous honour and privilege. Since then, his electorate office has assisted over 2,000 constituents on issues from ACC claims to hazardous trees on their properties. In cases such as that of Ana-Carolina Bircham, he has gone in to bat for as long as it takes, sometimes years. He has stood up for constituents on electorate-wide issues including proposed cycleways in Parnell, attacks on school children in Greenlane, and threats to Epsom's school zones

Dr. Gerard Rowe



Gerard completed a BE, ME and PhD at the University of Auckland in 1978, 1980 and 1984 respectively, where he is currently Dean of the Faculty of Engineering and a Professor (in the Department of Electrical, Computer, and Software Engineering). He is a member of the Department's Radio Systems Group and his (disciplinary) research interests lie in the areas of radio systems, electromagnetics and bioelectromagnetics. Over the last 37 years he has taught at all levels and has developed a particular interest in identifying correcting student conceptual and misunderstandings and in curriculum and course design. He has received numerous teaching awards from his institution. In 2004 was awarded a (National) Tertiary he Teaching Excellence Award in the Sustained Excellence in Teaching category and in 2005 he received the Australasian Association for Engineering Education award for excellence in Engineering Education in the Teaching and Learning category.

Time (NZST)	Day 2, 30 th November 2022
9:00 - 9:30	Coffee & Networking
09:30 – 10:15	Opening & Keynote Building 405 Room 460 Alison Andrew, CEO of Transpower
10:15 – 12:00	Global Perspective on Utility of the Future Building 405 Room 460 1Dr. Nikki Newham, Project Director at Grid Service Contracts, Transpower New Zealand Ltd Dr. Alex Apostolov , PAC World Magazine and OMICRON electronics Charles Hanley, Sandia National Labs Richard Fioravanti, Director at Transportation Electrification, Quanta Technology
12:00 - 13:00	Lunch Building 405 Level 2
13:00 – 14:30	Future Grid Digitization & Optimisation Building 405 Room 460Patrick Cheffins, Head of Product in VTSDr. Thahirah Jalal, Analytics Practice Manager of Transpower, NZ Abhinav Chopra, Group Head of Architecture and Data, Counties Energy
14:30 - 14:45	Break
14:45 – 16:30	Future Workforce Building 405 Room 460 Michael Whaley, Chief Engineer at PowerCo Matt Iorangi, Group Manager, Capability, Northpower Johan H Enslin, Professor, Clemson University
16:30 - 18:15	Break
16:45 – 18:15	Industry Experiences shared by Women in Engineering & Young Professional Engineers Building 405 Room 460 Emma Lloyd, Graduate Design Engineer, Connetics Chantelle Tomon, System Coordinator at Transpower, NZ Amrita Sharma, Principal Infrastructure Lead in Auckland Transport
18:15 – 19:30	Welcome Cocktail and poster Session Building 405 Level 2

Opening & Keynote

Alison Andrew



Alison joined Transpower in 2014 as Chief Executive. She has held a number of senior executive roles across various industry sectors, most recently as Global Head of Chemicals for Orica PLC. She is currently a Director of Ports of Tauranga, and has also been a Director of Genesis Energy.

Prior to these roles, she held a number of senior roles at Fonterra Cooperative Group and across the Fletcher Challenge Group in Energy, Forests and Paper. Alison has a MBA from Warwick University, and studied Engineering (Chemicals and Materials) at Auckland University

Global Perspective on Utility of the Future

Theme: Emerging Utility: Grid Planning, Control, Automation and Security Architectures Nikki Newham



Nikki has always enjoyed taking things apart and seeing if she can make them better, preferably with fewer pieces. Her interest in improving our lives has driven her 20-year career in the power industry. Nikki is a chartered professional engineer, specialising in power system planning and engineering management. Her career spans from technical analysis though to operations and strategic procurement. She is thrilled to see grid enhancements she studied now being delivered through new \$3bn long-term contracting partnerships. Nikki's strength in integrating strategic direction and operational realities made her a natural leader for the internal roll out of Transpower's Te Mauri Hiko strategic vision.

Nikki also leads the development of Transpower's drone programme, where she has unlocked step changes in condition assessment productivity and insight, in collaboration with nationwide service provider teams.

As the Chair of the Power Engineering Excellence Trust, Nikki is honoured to be the first scholar of the trust to serve on the Board. She is a strong advocate for developing partnerships between academia and industry with focus on the power industry's future challenges.

When she's not admiring transmission assets while driving to trail running locations, she is learning to fly her own drone, working hard to maintain her zero crash status.

Alexander Apostolov



Dr. Alexander Apostolov received MS degree in Electrical Engineering, MS in Applied Mathematics and Ph.D. from the Technical University in Sofia, Bulgaria. He has 49 years' experience in power systems protection, automation, control and communications.

He is presently Principal Engineer for OMICRON electronics in Los Angeles, CA. He is IEEE Life Fellow and Member of the IEEE PES Power Systems Relaying and Control (PSRC) Committee He is past Chairman of the Relay Communications Subcommittee and

Charles Hanley



Mr. Hanley is Senior Manager of the Grid Modernization and Energy Storage Group at Sandia National Laboratories. His group conducts research on enhancing the resilience of our critical energy infrastructures, including grid-scale optimization, controls, and microgrids; serves on many IEEE PES Working groups. He received the IEEE PES Distinguished Service Award in 2007.

He is member of IEC TC57 working groups 10, 17 and 19. He has been involved in the development of UCA 2.0 and IEC 61850 for more than 25 years

He is Convener of CIGRE WG B5.69 "Experience gained and Recommendations for Implementation of Process Bus in Protection, Automation and Control Systems (PACS)" and member of several other CIGRE B5 working groups. He received the 2007 CIGRE Technical Committee Award, the CIGRE 2014 Distinguished Member Award, the 2014 CIGRE USNC Attwood Associate Award, 2017 CIGRE Study Committee B5 Distinguished Service Award and the CIGRE USNC Dale Douglass Award for Technical Achievement.

He is Distinguished Member of CIGRE and IEEE Distinguished Lecturer.

He holds four patents and has authored and presented more than 600 technical papers.

He is Editor-in-Chief of PAC World and Chairman of the PAC World conference.

energy storage technologies; renewable energy integration; power electronics; cyber security; and advanced analytics for complex systems. He joined Sandia in 1988 and has been working in Sandia's renewable energy and electric grid programs since 1994. From 2005 through 2014, Charlie managed Sandia's Photovoltaics and Distributed Systems Integration Program. Prior to that, he managed Sandia's international renewable energy programs, through which he oversaw the implementation of more than 400 photovoltaic and wind energy systems in Latin America. He received his B.S. in Engineering Science from Trinity University in San Antonio, Texas, and his M.S. in Electrical Engineering from Rensselaer Polytechnic Institute, in Troy, New York.

Richard Fioravant



Mr. Fioravanti brings over 25 years of experience working with emerging energy technologies in both commercial and consulting roles. He has worked with major manufacturers, utilities, state/federal agencies, and developers to understand and deploy advanced energy systems. He currently focuses his efforts on electric transportation, EV infrastructure, and technology electrification - evaluating electricity grid impacts and linking the technologies to grid modernization, utility of the future initiatives. For electrification, he is currently leading efforts to examine load impacts for airport and seaport electrification.

Mr. Fioravanti also was a founding Board Member of New York BEST (Battery and Energy Storage Technology Consortium) and served on their Board for five years. In this role, he helped create the NY-BEST Energy Storage testing lab for the organization. He has authored several papers on advanced storage technologies and has been cited frequently as a leader in his field.

He received his M.B.A and a B.S. in Electrical Engineering from the University of Southern California.

Future Grid Digitization & Optimisation

Theme: Digitalisation: Smart Grid, Smart Village & Smart Cities

Patrick Cheffins



Patrick Cheffins is the Head of Product for Diverge, the energy data platform developed by Vector in strategic alliance with AWS. Patrick has a broad technology and enterprise management background, from origins as an electrical engineer to business strategy, IoT product development and digital transformation roles in NZ and in the UK.

Thahirah Jalal



Thahirah is currently the Analytics Practice Manager at Transpower. She is responsible for the development and delivery of the analytical capabilities and practices in Transpower. Her team delivers Intelligent Products (e.g. Automated analytics, Artificial Intelligence solutions) to various divisions in Transpower.

Abhinav Chopra



Abhinav heads the Future and Advanced Technology Security and Architecture portfolio working with Space Power Systems, Communication Systems, OT and ICS Systems, Smart Grid Architecture, Substation Automation Architecture, DERMS, ADMS, GIS, Asset Management, Big Data, Blockchain, Distributed Thahirah graduated with Honours in Engineering Science from Oxford University, United Kingdom. She then completed a PhD in Electrical Engineering from University of Canterbury. In 2019, she completed her MBA from Imperial College, London.

She has over 20 years of experience working in the electricity industry in New Zealand and Malaysia. She started her career as an academic in Malaysia. She then worked at Unison Networks, where she and her team developed and implemented novel data analytics solutions as part of Unison's Smart Grid and Digitalisation strategic initiatives. She also worked at ETEL Transformers on commercialising new technology solutions to progressive companies in Australasia and supporting their transition to a new energy future.

She actively participates in the Electricity Engineers' Association and the University of Canterbury Industrial Advisor Board.

Systems, Cloud, Cyber Security, ISA99, IEC 62443, IIoT, IoT, IED.

He has helped set standards (ISO/IEC/IEEE) and provides consulting services to critical

infrastructure sectors - ports, telecommunication, transport, energy, water, health. He has worked for council, insurance, healthcare, life sciences, critical infra, public policy, CERTNZ, NCSC and the higher education domain within Europe, the United States, Australia, and New Zealand to uplift their security Posture. Abhinav is CISSP, TOGAF, Prince 2, ITIL, Six Sigma certified. He holds advanced degree qualifications in Software, Power Systems, Electronics and Telecommunications Engineering and Business Management.

Future Workforce

Theme: Workforce Development: Diversity & Inclusion, Indigenous Knowledge

Michael Whaley



Michael is the Chief Engineer within Powerco's electricity division, where he leads the formation of the electricity network policies and standards. Michael has been at Powerco for 19 years in various engineering management roles and has over 30 years' experience in the electricity industry.

Michael is passionate about engineering, specialising in the electricity distribution sector where there seems to be no end of new situations and things to solve. He takes a special interest in training and development, and how infrastructure organisations organise themselves to fulfil their stated objectives.

He is a member of the Electricity Engineers Association executive committee and chairs the EEA's Professional Development Group, a committee that exists to provide leadership in technical capability development within the electricity supply industry.

Matt Iorangi



Ko Tainui tōku waka, Ko Kakepuku tōku Maunga, Ko Puniu tōku Awa, Ko Mangatoatoa tōku Marae, Ko Ngati Pare te kawa tōku Hapu, Ko Maniapoto tōku Iwi, Ko Matt Iorangi tōku Ingoa I have been in the Electricity supply industry for 26 years starting as an Apprentice Line mechanic and various other roles maintaining Electricity Supply networks across New Zealand.

As a Māori/Pasifika Apprentice I often struggled with the learning styles applied to teach me what I needed to know, I also struggled with career direction and development.

My greatest passion is to Develop and Grow our people by providing structured career & leadership pathways and partnering with key stakeholders to build our future workforce.

'He aha te mea nui o te ao? He tāngata, he tāngata, he tāngata'

Our greatest asset is 'People', by strengthening our people we create solid foundations to build upon.

Johan H Enslin



Dr. Johan H Enslin is the Director, Academic Programs, at the Zucker Family Graduate Education Center and the Duke Energy Endowed Chaired Professor in Smart Grid at Clemson University in North Charleston SC. He comes as Director for the Energy Production and Infrastructure Center (EPIC) and the Duke Energy Distinguished Chair in Power System at UNC Charlotte. Enslin has combined a 40-year career with leadership in industry and academia, in the US, Europe and South Africa. He served as an executive for private business operations and a professor in electrical engineering. Dr. Enslin initiated and led renewable energy teams, companies and executed multi-disciplinary power system projects. Over the course of his career Johan worked for more than 90 US, European, Asian, and African power utilities, governments, and industries. He authored and co-authored more than 350 technical journal and conference papers for IEEE and other organizations and has written several chapters in scientific books. Johan is a life-long leader in the IEEE and CIGRÉ working groups and committees. He holds more than 30 provisional and final patents. He received the 2014 Charlotte Business Journal Energy Leadership Award. He is a registered Professional Engineer in South Africa, Fellow of the SAIEE and Fellow of the IEEE.

Industry Experiences shared by Women in Engineering & Young Professional Engineers

Theme: Diverse perspectives, sharing experiences gained from working in the Engineering Sector

Emma Lloyd



Chantelle Tomon



Emma is currently a Graduate Design Engineer working in the Substations Design & Engineering team at Connetics in Christchurch. Emma has been working as a Graduate Engineer since late 2021 after finishing a Bachelor of Electrical and Electronic Engineering at the University of Canterbury.

During her time at Connetics Emma has been involved in a diverse range of projects including major distribution substation upgrades, work for private network customers, lightning design, and solar generation modelling and design.

Chantelle is currently a System Coordinator at Transpower's National Coordination Center since 2019. Her role includes delivering the real time operation of New Zealand's power system and electricity market. The real time role involves responding and managing power systems and market related events in real time.

She graduated from the University of Auckland in Electrical and Electronics Engineering in 2015 and is currently studying for her ME by Thesis at the Victoria University of Wellington.

Amrita is leading the high voltage specification required for electrical infrastructure to support the decarbonisation of Auckland's public transport bus and ferry fleets. She works closely with the local electrical lines network operator, Vector, to work on solutions to supply the required power to various bus depots, bus stations, and ferry terminals as the current fleet are transitioning from diesel to zero emission bus and low emission ferry fleet.

Amrita has an extended experience in the Power Systems industry where she worked as a design consultant involved with designs of zone substations and industrial power systems reticulations.

Amrita Sharma



Time (NZST)	Day 3, 1st December 2022				
9:00 - 9:30	Coffee & Networking				
09:30 – 10:15	Opening & Keynote Building 405 Room 460 Simon Mackenzie, CEO of Vector				
10:15 – 12:00	Energy Transition, Climate Action, Energy Policy & Modelling Building 405 Room 460 Nicole Kirkham, Senior Policy Advisor from the Ministry of Business, Innovation and Employment, NZ Dr. Dushan Boroyevich, IEEE PELS, Virginia Tech, USA Nirmal Nair, IEEE PES, University of Auckland, NZ				
12:00 - 13:00	Lunch Building 405 Level 2				
13:00 – 14:30	Technical Challenges for Addressing Planning, Operation and Maintaining of the Grid Building 405 Room 460Waqar Qureshi, Wellington ElectricityLekshmi Jaya Mohan, Team Lead at GHD AustraliaStephen Zhao, Senior Development Engineer from Lodestone				
14:30 - 14:45	Break				
14:45 – 16:30	Role of Grid Forming Inverters in the Future Power System Building 405 Room 460Dr. Ben Kroposki, Director Power Systems Engineering Center, National Renewable Energy Lab, USADr. Jack Flicker, Principal Member from Sandia National Laboratories, USA Dr. Stuart Macdonald, Power System Dynamic Modelling, Transpower, NZ				
16:30 - 18:30	Networking alongside Trade-Exhibit and Poster Session of Previous Days Building 405 Level 2				
18:30 - 21:30	eGrid 2022 Banquet Fale Pasifika University of Auckland				

Opening & Keynote

Simon Mackenzie



Simon Mackenzie is passionate about the power of technology to transform the energy industry, and consumers' lives. As Group Chief Executive Officer, Simon has expanded and driven Vector's portfolio of businesses to embrace innovative technologies and strategies to deliver efficient, sustainable energy solutions to consumers.

Simon was appointed Vector's Group Chief Executive Officer in 2008. His tertiary qualifications include engineering, finance and business studies, and the Advanced Management Programme at the Wharton School, University of Pennsylvania.

Energy Transition, Climate Action, Energy Policy & Modelling

Theme: Enabling Decentralisation: Future Regulatory & Standards Nicole Kirkham



Nicole is part of the Energy Markets Policy team at MBIE, advising on policy areas related to Aotearoa's energy transition and electricity system. Prior to this Nicole worked as a Principal Energy Analyst, also at MBIE, working in the Insights and Evidence branch on energy system modelling and analysis. Nicole started her career in the energy sector in the UK where she worked as an analyst and specialist energy consultant. Nicole holds a Bachelor of Science with Hons, PostGrad Diploma in Technology and has completed post-graduate studies in Environmental Economics, Applied Economics and Finance.

Dr Dushan Boroyevich



Dr Nirmal Nair



Nirmal received his BE in Electrical Engineering from Maharaja Sayajirao University (M.S.U), Baroda, India. He completed his ME in Electrical Engineering with specialization in High Voltage Engineering from Indian Institute of Science (IISc), Bangalore, India. After a decade of professional engineering and lecturing in India he moved to the United States where he completed his PhD in Electrical Engineering at Texas A&M University. Since 2004 he has been based in New Zealand.

He has held several professional, teaching and research positions in India, USA and in New Zealand. Presently, he is a tenured Associate Professor at Department of Electrical & Computer Engineering of Prof. Boroyevich is a member of the US National Academy of Engineering and is recipient of 4 honorary professorships in China and Taiwan, as well as numerous other awards, including the IEEE William E. Newell Power Electronics Technical Field Award and the European Power Electronics Association Outstanding Achievement Award. His research interests include electronic power distribution systems, multi-phase power conversion, power electronics systems modeling and control, and integrated design of power converters. Dushan was a mentor for around 50 Ph.D. dissertations and 50 M.S. theses.

University of Auckland. His expertise involves smart grids, power system analysis, protective relaying & optimisation in the context of electricity markets and integration of DG/renewable sources into electricity networks.

His research interests span power systems in the context of protective relaying, electricity markets, voltage security, blackouts and resilience. His current focus is towards integration of distributed/renewable energy sources to electricity system with emphasis on protection (IEC 61850, SPS, WAPS), energy markets (block-chain), innovations (Micro-grid, Storage, EV & PV integration, cyber-resilience, digital twins, machine learning and AI), low-carbon transitions and energy policy.

He serves in various capacities for IEEE New Zealand North Section, IEEE Power and Energy Society and is Secretary for CIGRE New Zealand National Committee. He is actively engaged towards University of Auckland's outreach with power system stakeholders, internationally and in New Zealand across all sectors (generators, distributors, retailers, metering, transmission system operator, regulatory bodies, consultancies, vendors, Electricity Engineering Association etc).

Technical Challenges for Addressing Planning, Operation and Maintaining of the Grid

Theme: Resilience: Seismic, Volcanic and High Impact Weather (wildfire, Hurricane, Heatwave, flooding etc. events)

Waqar Qureshi



Waqar Qureshi is the General Manager Asset Management for Wellington Electricity, the 4th largest New Zealand Electricity Utility Company in New Zealand supplying electricity to New Zealand's capital and the greater Wellington region. This involves managing 0.8 billion dollars in assets of the utility. He is an experienced leader who leads by example. He has a wealth of knowledge of the energy sector and is a subject matter expert when it comes to electricity markets, Infrastructure management, sustainability, decarbonization, climate risk on infrastructure, engineering and large program & portfolio management.

Waqar is the leading professional and executive in the New Zealand Energy Sector. Before this appointment, he served as General Manager Electricity Network for Horizon Networks and General Manager of Information Technology for Horizon Energy Group in New Zealand. He has held the role of Head of Asset Management and Innovation for Horizon Networks and Senior Transmission Advisor for the Electricity Generation and Retail sector for several years.

Waqar is an engineer by background with a doctorate qualification from the University of Auckland in 2013.

Waqar has a strong industry leadership footprint and is deeply involved in the New Zealand and global industries groups such as IEEE PES either as a member or through thought leadership and governance. He has been an IEEE Volunteer for 15 years and has held several office positions for IEEE PES local and regional chapters.

Lekshmi Jaya Mohan



Lekshmi has over 21 years of experience covering power system planning, grid connection studies, electricity network design, electricity network asset management and regulation.

Stephen Zhao

Lekshmi has recently joined GHD from Western Power, where she held multiple leadership roles in customer connection team, Transmission strategy, engineering design and economic regulation. Prior to working at Western Power, she held engineering roles in System Operations and grid development departments at Transpower NZ. Lekshmi commenced her career in the control room in India.

As the manager of power system capability and planning at GHD, Lekshmi leads the power system planning and analysis team within the Regulation and Assurance Business Group. Lekshmi is passionate about the diversity of the workforce and an active mentor for young women engineers.

Stephen has recently joined Lodestone Energy as a senior development engineer. He has 15 years of research, project development and technical experience in the energy sector throughout the Asia Pacific region.

Stephen has extensive experience in both renewable energy project development and power system studies. He has worked with many power clients and grid owners (Transpower, TransGrid, AusGrid and TenneT) on some of the biggest renewable projects at the time.

Stephen held multiple leadership roles in energy advisory and engineering design. Prior to working at Lodestone, he held Team Leader and engineering role in Jacob's Power Generation and Storage group, and Department Manager role for HT Solar Energy.

Role of Grid Forming Inverters in the Future Power System

Theme: eGRID Advances: Power Electronics in Transmission & Distribution

Dr Ben Kroposki



Dr. Ben Kroposki is the Director of the Power Systems Engineering Center at the National Renewable Energy Laboratory (NREL) where he leads NREL's strategic research in the design, planning and operations of electrical power systems. He has over 30 years of experience in the design, testing, and integration of renewable and distributed power systems. Dr. Kroposki received his BSEE and MSEE from Virginia Tech and Ph.D. from the Colorado School of Mines. Dr. Kroposki is the recipient of the IEEE Power & Energy Society (PES) Ramakumar Family Renewable Energy Excellence Award. Dr. Kroposki serves as the organizational director for the Universal interoperability for Grid-forming Inverters (UNIFI) consortium tackling the challenges with seamless integration of inverter-based resources and synchronous machines in all power systems.

Dr Jack Flicker



Jack Flicker, Sandia National Laboratories has B.S. degrees from Penn State University in Physics and Chemistry (2006) and a Ph.D. in Materials Science and Engineering from Georgia Tech (2011). After graduate school, Jack joined Sandia National Laboratories as a postdoctoral appointee focusing in power semiconductor reliability in photovoltaic applications, and is currently a Principal Member of the Technical Staff. His research focuses on all aspects of power electronics and power conversion systems that enable improvements in power system operation: from incorporation of new materials and devices in power conversion systems to utilizing new topologies and controls at the system level. Jack's research touches on all areas of the power electronics value chain ranging from usage of new devices (wideand ultra-wide bandgap semiconductors) to new topologies and controls to evaluation of system-level behavior. The nature of his work spans multiple TRL levels and incorporates everything from basic analysis to optimization and simulation to experiment and field-deployment.

Dr Stuart Macdonald



Stuart graduated BE (1991) & PhD (1995) from the Department of Electrical & Electronic Engineering, University of Canterbury, NZ. Between 1994 to 1998 he worked in the UK at GEC Alsthom on HVDC / SVC systems; then until 2004 in the USA at Westinghouse (later to become Siemens) on FACTS projects.

Since 2004 he has worked at Transpower NZ in various engineering and senior management roles including: Grid planning, Asset Management, and Information management. His present responsibilities include power system dynamic modelling to support the stable long term power system operation and the development of power system analysis capability.

He has co-authored several IEEE Transaction and conference publications and is a member of Engineering NZ.

Time (NZST)	Day 4, 2nd December 2022				
08:30 – 10:00	Modelling the AC-DC Hybrid Grid Building 405 Room 460 Neville Watson, Professor of University of Canterbury Georgios Konstantinou, Senior Lecturer of The University of New South Wales Tobias Massier, Principal Scientist in the TUM CREATE	Technical Session 1 Building 405 Room 422	Technical Session 2 Building 405 Room 430		
10:00 - 10:15	Break(15mins)				
10:15 – 12:00	Topologies and Protection for Hybrid AC-DC Grid Building 405 Room 460Abhisek Ukil, Associate Professor at the University of AucklandAleksandra Lekić, Assistant Professor at TU DelftTran The Hoang, Research Fellow at the University of Auckland	Technical Session 3 Building 405 Room 422	Technical Session 4 Building 405 Room 430		
12:00 - 13:00	Lunch				
13:00 - 14:30	Enabling Technologies for Hybrid AC-DC Grid Building 405 Room 460 Frede Blaabjerg, Professor at the Aalborg University Bernd Wunder, Institute for Integrated Systems and Device Technology (IISB) Tek Tjing LIE, Professor at the Auckland University of Technology	Technica Building 4	al Session 5 05 Room 422		
14:30 - 15:00	Closing and Awards Building 405 Room 460				

Modelling the AC-DC Hybrid Grid

Theme: EGrid Advances: Power Electronics in Transmission and Distribution

Neville Watson



Neville Watson received his B.E. (Hons) and Ph.D. degrees from the University of Canterbury, where he is now a Professor. He was appointed to the academic staff at the University of Canterbury where he has been teaching and performing research into various aspects of power systems and power electronics. His main research areas have been; computer modelling of electrical power systems, power quality, HVDC transmission, harmonics and electromagnetic transients. He has coauthored eight books, four chapters of books and more than 320 technical papers. Prof. Watson is a senior member of IEEE, member of EngineeringNZ, IET (UK), CIGRE Australian Panel C4, and joint Australia/New Zealand standards committee (EL034). He is also a Chartered Professional Engineer in N.Z. and on the International Professional Engineers register, Int.PE(NZ).

Georgios Konstantinou



Dr. Georgios Konstantinou is currently a Senior Lecturer at the School of Electrical Engineering and Telecommunications, UNSW Sydney (The University of New South Wales) where he leads the Real-time Digital Simulations Group (RTS@UNSW). His research interests are in the area of Power Electronics and their integration to electricity grids, renewable and distributed energy systems, energy storage, and DC systems.

Tobias Massier



Tobias Massier received his Diploma (M.Sc.) and Dr.-Ing. (Ph.D.) degree in Electrical Engineering and Information Technology from the Technical University of Munich (TUM) in 2002 and 2010 respectively.

From 2010 to 2012, he served as programme manager at TUM setting up and managing a new international Master Programme in Power Engineering.

Since 2013, he has been working as a

principal scientist and head of the Energy and Power Systems Group at TUMCREATE Ltd., Singapore.

He has been involved in numerous research and industry projects dealing with - recommendations for governmental agencies on electrifying Singapore's road transport system,

- concepts for operating single and networked micro-grids with high share of intermittent sources of energy and flexible loads,

exploring and utilising Singapore's geothermal potential.

Since October 2022, he is also serving as the coordinator of a new TUMCREATE project on Singapore's pathway to carbon neutrality which deals with providing solutions for Singapore's future low-carbon energy supply. His research interests include integration of electric vehicles and renewable energies into the grid, future energy supply options, energy systems and energy system modelling, and life cycle assessment.

Topologies and Protection for Hybrid AC-DC Grid

Theme: eGRID Advances: Power Electronics in Transmission and Distribution

Abhisek Ukil



Abhisek received the B. Eng (First Class Honours) degree in electrical engineering from the Jadavpur University, Kolkata, India, in 2000 and the M.Sc. (dual) degree in electronic systems and engineering management from the Univ. of Bolton, Bolton, UK and Southwestphalia Univ. of Applied Sciences, Germany in 2003. He received the Ph.D. degree from the Pretoria (Tshwane) University of Technology, Pretoria, South Africa in 2006, working on automated disturbance analysis in power systems with South African national utility.

From 2006-2013, he was Principal Scientist at the ABB (Asea Brown Boveri) Corporate

Aleksandra Lekić



Aleksandra Lekić (M'18-SM'22) received the B.Sc., M.Sc., and Ph.D. degrees in electrical engineering from the University of Belgrade, Serbia, in 2012, 2013, and 2017, respectively. Research, Baden-Daettwil, Switzerland where he led several projects on smart grid, protection (medium & low-voltage), distribution automation, control, condition monitoring (motor, circuit-breaker). From 2013-2017, he was Assistant Professor in the School of Electrical and Electronic Engineering (EEE) Nanyang Technological University (NTU), Singapore where he led a group of 20 researchers including 7 PhD students, attracting competitive funding over 5 Million SG\$, with several industry collaborations. From 2000-2002, he was Software Engineer at InterralT, India He is inventor of 12 Patents, and author of more than 200 refereed Papers 2 Monographs: 'Fault Analysis and Protection System Design for DC Grids' 'Intelligent Systems & Signal Processing in Power Engineering' 2 Book chapters. His research interests include Renewable Energy & Grid Integration, Hybrid AC/DC Microgrid, HVDC: Protection & Control, Energy Storage & EV, Energy Efficiency, Power Systems/Electronics, Condition Monitoring, Asset Management. He is a Senior Member of IEEE, USA, Registered Chartered Engineer (CEng), UK, and Member of IET, UK. He is Associate Editor of the journals IEEE Transactions on Industrial Informatics, and Springer-Electrical Engineering.

Between 2012 and 2019, she worked at the University of Belgrade, Serbia. In 2019 she was a Postdoctoral Researcher at the Department of Electrical Engineering (ESAT), KU Leuven, and at the Institute EnergyVille, Genk, Belgium.

Currently, Aleksandra is an Assistant Professor at TU Delft, Faculty of Electrical Engineering, Mathematics and Computer Science in the Intelligent Electrical Power Grids group. Aleksandra is leading the HVDC/AC research team that develops control and protection solutions for HVDC/AC power systems and offline and online (real-time) experimental studies. She is also a technical director of the Power System Protection Centre

Tran The Hoang



Tran T. Hoang received his B.Sc and M.Sc degrees in Electrical Engineering in 2010 and 2012, respectively, from Tomsk Polytechnic University, Russia, and his Ph.D. degree from

Enabling Technologies for Hybrid AC DC Grid

G2Elab, Grenoble Institute of Technology, France, in 2020. From 2020 to 07/2022, he was with the National Institute of Solar Energy, French Alternative Energies and Atomic Energy Commission, France. Since 08/2022, Tran has been working as a Research Fellow at the Department of Electrical, Computer, and Software Engineering at the University of Auckland, New Zealand for the Future Architecture of the Network (FAN) project or Te Whatunga Hiko. His research interests include adaptive protection, fault location, real-time simulation and its stability, and recently protection of hybrid AC/DC networks. He has been serving as a reviewer for IEEE and Elsevier Journals, and a Guest Editor for a Frontier in Energy Research Journal

Theme: EGrid Advances: Power Electronics in Transmission and Distribution

Frede Blaabjerg



Frede Blaabjerg (S'86-M'88-SM'97-F'03) was with ABB-Scandia, Randers, Denmark, from 1987 to 1988. From 1988 to 1992, he got the PhD degree in Electrical Engineering at Aalborg University in 1995. He became an Assistant Professor in 1992, an Associate Professor in 1996, and a Full Professor of power electronics and drives in 1998 at AAU Energy. From 2017 he became a Villum Investigator. He is honoris causa at University Politehnica Timisoara (UPT), Romania in 2017 and Tallinn Technical University (TTU), Estonia in 2018.

His current research interests include power electronics and its applications such as in

wind turbines, PV systems, reliability, harmonics and adjustable speed drives. He has published more than 600 journal papers in the fields of power electronics and its applications. He is the co-author of four monographs and editor of ten books in power electronics and its applications.

He has received 38 IEEE Prize Paper Awards, the IEEE PELS Distinguished Service Award in 2009. the EPE-PEMC Council Award in 2010. the IEEE William E. Newell Power Electronics Award 2014, the Villum Kann Rasmussen Research Award 2014, the Global Energy Prize in 2019 and the 2020 IEEE Edison Medal. He was the Editor-in-Chief of the IEEE TRANSACTIONS ON POWER ELECTRONICS from 2006 to 2012. He has been Distinguished Lecturer for the IEEE Power Electronics Society from 2005 to 2007 and for the IEEE Industry Applications Society from 2010 to 2011 as well as 2017 to 2018. In 2019-2020 he served as a President of IEEE Power Electronics Society. He has been Vice-President of the Danish Academy of Technical Sciences.

He was nominated in 2014-2021 by Thomson Reuters to be between the most 250 cited researchers in Engineering in the world.

Bernd Wunder



Bernd Wunder received a degree in Electrical Engineering from Friedrich- Alexander University Erlangen-Nuremberg in 2010. From 2010 until 2013 he was employed as scientific assistant at the Chair for Electronic Components and developed several power electronic systems for EVs. In 2013 he founded the group for DC microgrids at the Institute for Integrated Systems and Device Technology (IISB) to design new destructive infrastructure for regenerative and sustainable energy usage. As well-known DC entrepreneur he was honoured and strongly supported the IEEE ICDCM2015 and organized the IEEE ICDCM 2017 conference in Nürnberg as leader of the technical program. He is also active in IEC where he represents Germany as national delegate in the IEC SyC LVDC committee.

Tek Tjing Lie



Professor Tek Tjing LIE received his bachelor's degree in electrical engineering from Oklahoma State University, USA in 1986. He also received his Master of Science and Ph. D. degrees in Electrical Engineering from Michigan State University, USA in 1988 and 1992 respectively.

Professor Lie is the Deputy Head of School of Engineering, Computer and Mathematical Sciences, Auckland University of Technology, New Zealand. His research interests include power system control and operation, AI application to power systems, deregulated power systems, smart grids and renewable energy systems. He has authored/co-authored more than 270 journal and international conference papers. Prof Lie has served as Guest Editor of Energies and Electric Power Systems Research Journals. He also serves as Associate Editor of Modern Power System and Clean Energy and Energies journals respectively. He is the Chair of the IEEE New Zealand North Section and serves as organising committee member of several international conferences.

Two sets of awards will be given out. IEEE PES NZ North Volunteer Awards will be awarded on Day 3 at the banquet, and EGRID 2022 Awards will be awarded on Day 4 during the closing ceremony.

IEEE NZ North Awards:

IEEE PES Outstanding Engineer Award (2021 for IEEE PES NZ North)

To be given by Tek Tjing Lie (IEEE NZ North Section Chair)

IEEE PES Outstanding Volunteer Award (2022 for IEEE PES NZ North)

To be given by Nirmal Nair (IEEE PES Long-Range Planning Member)

IEEE PES Outstanding Engineer Award (2022 for IEEE PES NZ North)

To be given by Kate Murphy (IEEE PES NZ North Chapter Chair)

Details about the Outstanding Engineer Award can be found <u>here</u>, and about the Outstanding Volunteer award can be found <u>here</u>.

eGRID 2022 Event Awards:

Technical Paper Session:

Best Technical Paper Award, Presented by Kate Murphy

Best Technical Paper Runner-up, Presented by Kate Murphy

Poster Session:

Best Poster Paper Award, Presented by Nyuk-Min Vong

Nyuk-Min Vong



Nyuk-Min has over 25 years' experience in the power industry. After graduating from University of Brighton with a PhD in Power System Engineering, he worked with Sarawak Electricity Supply Corporation (SESCo) in Malaysia for 10 years. His main roles included

Ramesh Rayudu



Ramesh Rayudu (Senior Member, IEEE) received the B.E. (First Class Distinction) degree from Osmania University, Hyderabad, India, in 1993, the M.E. degree from the University of Canterbury, Christchurch, New Zealand, 1993, and the Ph.D. degree in Al and power systems engineering from Lincoln University, Lincoln, New Zealand, in 2001. He

Kate Murphy



Kate's interest in new energy technologies took off when she started working at "MaREI", Marine and Renewable Energy Ireland, after studying Engineering at load flow and dynamic studies, generator testing, dynamic model validation, grid planning and power system operation. He joined Transpower New Zealand Ltd. in December 2006 providing specialist analytical support to power system operations and asset compliance. He is currently leading a team to work on the Future Security and Resilience (FSR) programme to ensure the electricity system in New Zealand remains secure and resilient while transitioning towards 100% renewables and high penetration of Inverter-based Resources. This is a multi-year programme of studies to identify challenges and create opportunities to enable a successful transition

has more than 15 years of industrial work experience both in India and New Zealand. He is also involved in consultation work for several international firms in New Zealand, Australia, Singapore, Malaysia, India, EU, and the USA. He is currently an Associate Professor with the Victoria University of Wellington, Wellington, New Zealand. He has co-authored over 180 publications and holds six patents. His current research interests include power systems engineering, renewable energy systems, artificial intelligence (AI) applications, health monitoring, and energy harvesting. He was the recipient of the seven Best Paper and four Best Presentation Awards. He is an Associate Editor of three international journals. He was co-awarded the prestigious IPENZ (ENZ) 1999 Fulton Downer Silver Medal for his work.

University College Cork. Kate has gained experience with new energy technologies from both sides of the world, and since joining Vector in 2016 and has worked in both the unregulated and regulated side business. Her experience ranges from customer facing grid-scale Solar PV & Battery, network trials of Smart Fault Indicators, Distribution Transformer Monitoring and Smart Meter Data applications. Her current role is in Vector's control room, where she manages the transformation of Electricity Operations Planned Work across the Auckland & Northern network Region. She is also currently Chapter Chair of IEEE PES New Zealand North.





ENGINEERING DEPARTMENT OF ELECTRICAL, COMPUTER, AND SOFTWARE ENGINEERING

Kia Ora, Thank you

Day 0, 28th November 2022

The day before the first day of EGRID 2022 features the New Zealand Power and Energy Collaboratory Annual Research and School Outreach Meeting. EGRID 2022 attendees will get complimentary access to these events.

Schedule:

S.						Start	End	
No.	Project	Affiliation	First Name	Last Name	Mode	Time	Time	Title
		NZPEC,				10:00	10:0	
		UC	Andrew	Lapthorn		AM	5 AM	Opening Remarks
								Future Challenged in the
1					2.			Transmission Network:
	Keynote	Transpowe				10:05	10:3	Optionality, Complexity &
	1	r	Nikki	Newham		AM	0 AM	Technology
		TUM-Creat	1					
	Keynote	e,	1.			10:30	10:5	Singapore's Pathways to
	2	Singapore	lobias	Massier		AM	5 AM	Carbon Neutrality
		NZPEC,	_ \.		1	10:55	11:10	NZ Power and Energy
	1	VUW	Ramesh	Rayudu		AM	AM	Collaboratory
						44.40		Closing Remarks &
		NZPEC,	A I	1 41		11:10	11:15	Opening of 2022 NZPEC
		UC	Andrew	Laptnorn				Research workshop
		K	1		\sim	1		Strategies to support
	and the second s	12			135-	11.15	11.22	power system resilience
1	DhD		Lakshita	l akehita	In Person			against night impact
-			Lakshila	Laksinta				An intelligent forecasting
				2	$ \rangle$		-2.	method for hierarchical
				~~~		11.22	11.29	load structure in a
2	PhD	AUT	Barkha	Parkash	Remote	AM	AM	residential market
	Final	S. A.				11:29	11:36	Control of a Pico Hydro
3	Year	UC	Lydia	Smith	In-Person	AM	AM	Generator
		1.1.	The second s		/	$\sim$	· · · · · · · · · · · · · · · · · · ·	Current Measurement for
						11:36	11:43	High-Impedance Fault
4	ME	VUW	Minyu	Zhang	Remote	AM	AM	Detection by Toroidal CTs
				X			1	Topologies for Effective
	Final						$\langle \cdot \rangle$	use of Locally Generated
	Year-FA				1	11:43	11:50	Energy in Remote New
5	N	VUW	Meg	Gleadow	Remote	AM	AM	Zealand.
	and the second division of the second divisio			/	1			Identifying Distribution
		and the second sec	1.			11:50	11:57	Networks Topology Using
6	PhD	UC	Ali	Othman	Remote	AM	AM	Smart Meter Data.
						11:57	1:00	
					Lunch	AM	PM	
			_ \	and the second sec	L \	1:00	1:07	GaN HEMT cryogenically
7	PhD	UC	Reece	Cateley	Remote	PM	PM	cooled inverter
	/				X	4		Resilience to natural
	PLD			0.000	In David	1:07		nazards in the
Ø	PnD	UOA	Eric	Sauvage	In-Person	PM	PM	relecommunications sector

								-
								Dynamic Active Response
								Management System part
						1:14	1:21	of the transition state
9	PhD	UoA	Abhinav	Chopra	In-Person	PM	PM	architecture
								Development of
	· · · · ·							Hierarchical Control
						1.21	1.28	Strategies for DC
10	PhD	AUT	Zaid	Al-Tameemi	In-Person	PM	PM	Microarids Clusters
								Control Strategies and
1			Charles - Charles			1.28	1.35	Stabilization Techniques
11	FAN	АШТ	Aphrodis	Nduwamungu	In-Person	PM	PM	for Converters
	Final			littaawamanga		1 101	1 101	Construction of a DC test
	Voor FA					1.35	1.12	for household wiring
12	N		Griffin	Almond	Pomoto	DM		
12		000	Grimin	Aimanu	Tremote		L IAI	Detential of Low Valtage
			Mirzo			1.40	1.10	Direct Current in Now
10			NIIZa	Abread	Domoto		1:49	
13	IN	VUV/-	Sumair	Anmed	Remote	PIVI	PIN	
	No		1			1		Assessing
-				~ \ ·	1			Complementarity for Wind
		VUW/Iran		_ >>~		1:49	1:56	and Solar Energy in New
14	ME	spower	Chantelle	Tomon	Remote	PM	PM	Zealand
			24					Managing volcanic
	-		V			1:56	2:03	hazards in power systems
15	PhD	UC	Hugh	Mace	Remote	PM	PM	in 2022
		1			1			The effect of dust on the
-		1		\	X	2:03	2:10	performance of
16	PhD	AUT	Hussam	Almukhtar	In-Person	PM	PM	photovoltaic panels
						2:10	2:30	
					Break	PM	PM	
and the second sec								AHP-GIS analysis for solar
	State of the local division of the local div	1			N	2:30	2:37	site location based on
17	PhD	UoA	Rizki	Rahayani	In-Person	PM	PM	disaster risk assessment
		1				2:37	2:44	Characterising GaN
18	PhD	UC	Jeoff	Antony	Remote 🦯	PM	PM	HEMTs in LN2
	/				/	1		Platform for Querying
	/	\		1 -		- N		Models and Data of the
		UoA/Uniso		-1	/	2:44	2:51	Electrical Distribution
19	ME	n	Sameer	Phadnis	Remote	PM	PM	Network
		1					1	Developing
						and the second division of the second divisio	- \	decarbonisation
a survey and the survey of				/	1		~_^	opportunities for New
	Contraction in the local division in the loc			1	1	2.51	2.58	Zealand's low-temperature
20	PhD	VUW	Rohit	Duqual	Remote	PM	PM	process heat industries
20				Duggu			1	Anlaysing the impact of
			n-			1	£	dases present in the
			1.			/		geothermal fluid on
				No. of Concession, Name of Street, or other		2.50	3.05	different components of a
21	DhD	N/L INA/	Anu	Choudhan	Pomoto	2.30	0.00 DM	deothermal system
21		1000			Tremote	2.05	2.40	Bortiol Coro industano and
22	DhD		lohn	Morrie	Bometa	3:05	3:12	
22	טחיין		Joun	IVIOITIS	Remote		PIM	mansionmers

								Systematic Literature
		UoA/Powe				3:12	3:19	Review on Hybrid MV
23	PhD	rCo	Andre	Cuppen	Remote	PM	PM	AC/DC networks
								Investigation of
								Geomagnetically Induced
								Currents (GICs)
								Susceptibility of Different
						3:19	3:26	Three Phase Power
24	PhD	UC	Cecilia	Teh	In-Person	PM	PM	Transformer Cores
1								Multi physics Transformer
						3:26	3:33	Modelling for GIC
25	PhD	UC	Soren	Subritzky	In-Person	PM	PM	Mitigation
		NZPEC,				3:33	3:37	Closing 2022 NZPEC
		UC	Andrew	Lapthorn		PM	PM	Research Workshop

#### **Opening Remarks**



#### Dr. Andrew Lapthorn NZPEC Chair, University of Auckland

#### Keynotes



Future Challenges in the Transmission Network Dr. Nikki Newham Project Director - Grid Service Contracts, Transpower New Zealand Ltd



Singapore's Pathway to Carbon Neutrality Tobias Massier Principal Scientist TUMCREATE Singapore

### NZ Power and Energy Collaboratory



Dr. Ramesh Rayudu NZPEC Secretary, Victoria University of Wellington

Closing Remarks & Opening of 2022 NZPEC Research Workshop



Dr. Andrew Lapthorn NZPEC Chair, University of Auckland

# Day 1, 29th November 2022

The first day of EGRID 2022 also features a sponsored workshop: Technology Megatrend on Machine Learning Application to Seismic Sciences. EGRID 2022 attendees will get complimentary access to this event.

# Schedule:

		Overview of IP4 – Dr Garry McDonald and Assoc. Prof. Nirmal Nair
		Quick fire introductions for attendees (name, organisation, and interest areas)
10:00 -	In person,	Update of IP4's Year 1 activities, progress and updates
10:30	online	Funded activity update by Dr Kristin Stock, Dr Raj Prasanna, Assoc. Prof. Nirmal Nair and
		Dr Garry McDonald
		Newly funded PhD's
		Machine Learning Applications to Seismic Science Workshop. Chaired by Dr Kevin Wang.
		Aim is to gather everyone's opinions about how to move forward to connect with and
10:30 -	In person,	contribute to the QuakeCoRE community
12:00	online	A few QuakeCORE2 representatives will present 5-7 minutes on their research
		Brainstorming session on:
		- How we envisage machine learning contributing towards QuakeCORE related research
		- What kind of future events should we organise?
12:00 -	In nerson	Lunch and Breakout of the funded project groups of IP4
13:00	in person	
		Plans for 2023 and meeting schedule
		External funding discussions (MBIE Endeavours and Smart Ideas, Marsden, etc)
13:00 -	Innorson	Ideating new IP4 projections for the 2023 RfP round
5:00		Strategy for attracting applications for 2023 IP4 Masters and PhD applicants
		Industry engagement for IP4 projects (2023-24)
		Inviting new researchers to IP4 from and upgrading to AI

#### Overview of QuakeCore IP4



Dr Garry McDonald QuakeCore IP4 Director



Nirmal Nair IEEE EGRID 2022 Chair University of Auckland

#### IP4's Year 1 Updates & Progress



Dr. Kristin Stock Massey University



Dr. Raj Prasanna Massey University



Dr. Garry McDonald QuakeCore IP4 Director IEEE EGRID 2022 Chair



Nirmal Nair University of Auckland

#### Machine Learning Application to Seismic Science Workshop



Dr Kevin Wang Chair



Dr Chin-Long Lee University of Canterbury



Dr Minh Kieu University of Auckland



Kitty Li University of Auckland



Dr. Raj Prasanna **Massey University**