Program: International Symposium on Green Transformation of Carbon Dioxide (ISGTCO2)

Wednesday 29th November – Friday 01 December 2023, Hotel Grand Chancellor, Brisbane, Australia

Timeslot: presentation + Q&A	Plenary (40 mins)	Keynote (20 mins)	Invited (20 mins)	Submitted (20 mins)	Student (10 mins)
Day 0 - Tuesday 28th November 2023					
4:30-6:00pm	Registration				
5:00-6:00pm	Welcome Reception - Courtyard Hotel Grand Chancellor				
Day 1: Wednesday 29th November 2023					
8:00 onwards	Registration				
	Chair: Rachel Caruso **Opening Ceremony**				
8:30-8:40	**Dr Mark Jacobs,** Deputy Director-General - Science Division, Queensland Government Department of Environment and Science **Opening speech**				
8:40-9:10	**P1 Welcome: Xiwang Zhang/Robin Batterham** Introducing ARC Centre of Excellence GETCO2				
9:10-9:50	P2 Sandra Kentish Carbon Dioxide Capture – the Challenges Ahead				
9:50-10:30	P3 Debra Bernhardt Contributions of Simulation to Green Transformation of Carbon Dioxide				
10:30-11:00am	**Morning tea – Level 1 (30 mins)**				
	Roma Room	**Terrace Room**	**Wickham Room**		
	Session 1 Electrolysis System **Chair: Tom Rufford**	**Session 2 Catalyst** **Chair: Yuan Chen**	**Session 3 Advanced Characterisation & Simulation** **Chair: Karen Wilson**		
11:00	1.1 Brian Seger An overall analysis of CO2 and CO electrolysis devices	2.1 Yijiao Jiang Heterogeneous Molecular Catalysis for Electrochemical CO2 Reduction	3.1 David Winkler Artificial Intelligence for Materials Sciences, Quo Vadis?		
11:20	1.2 Muxina Konarova Enabling Hydrogen Storage and Transport: Unleashing Cost-Effective Potential through Liquid Organic Hydrogen Carriers	2.2 Dae-Hyun Nam Metallurgical Alloy Electrocatalysts for Selective CO2-to-Ethylene/Ethanol Conversion	3.2 Benjamin Muir Introducing CSIROs robotic and automated capabilities that enable rapid, materials synthesis, formulation, screening and optimisation		
11:40	1.3 Mengran (Aaron) Li Designing inherently stable PGM-free CO2 electrolysis	2.3 Chen Jia Ordered Hierarchical Porous Single-Atom Catalyst with Enhanced Mass Transfer for CO2 Electroreduction	3.3 Tu Le Machine Learning for Materials, a Journey from Artificial Intelligence to Intelligent Materials		
12:00	1.4 Yong Zhao Integrated CO2 capture and electrolysis for CO production	2.4 Haoming Yu Biomass-derived carbon-based catalysts for electrocatalytic CO2 reduction	3.4 Ravichandar Babarao Accelerating the Discovery of Novel Materials for CO2 Capture: Integrating High Throughput Simulation and Machine Learning		
12:10		2.5 Aloka Kumar Sahu Photo- and Electrocatalytic CO2 Reduction based on Ga-doped NiTiO3 Perovskite Nanoparticles			
12:20-13:20	**Lunch – Courtyard (1 hour)**				

Day 1 continued	Roma Room	Terrace Room	Wickham Room
	Session 4 Electrolysis System **Chair: Simon Smart**	**Session 5 CO2 Capture** **Chair: Fengwang Li**	**Session 6 Catalyst** **Chair: Jie Zhang**
13:20	4.1 Tom Rufford Shockingly large volumes of materials may be required for large scale CO2 electrolysis to make a dent in carbon emissions	5.1 Kevin Gang Li In-situ vapor promoted direct air CO2 capture	6.1 Sankar Bhattacharya CO2 conversion to methane – current status and the way forward
13:40	4.2 Lei Ge Microtubular membrane electrodes for CO2 electrochemical conversion	5.2 Kristina Konstas Direct Air Capture with Advanced Porous Materials	6.2 Adam lee Multimetallic catalysts for CO2 methanation
14:00	4.3 Hesamoddin Rabiee Microtubular Gas-diffusion electrode for electrochemical CO2 reduction reaction	5.3 Kaige Sun Capacitive deionization: From ion separation to CO2 capture	6.3 Penghui Yan Influence of supports and metal particle size on CO2 methanation
14:10		5.4 Ibrahim Orhan Accelerating prediction of CO2 capture at low partial pressures in metal-organic frameworks using new machine learning descriptors	
14:20	4.4 Qi Gao Integration of CO2 Capture and Electrochemical Conversion	5.5 TBC	6.4 Ahmad Zhafran Md Azmi Bimetallic Synergies of Ni and Fe on Al2O3 Catalysts in a Hybrid Thermal-Plasma Catalytic System for CO2 Methanation
14:30	4.5 Xiaohe Tian Bipolar Membrane Electrode Assembly for High-performance CO2 Electrolysis		6.5 Zeno Rizqi Ramadhan Stacking Fault in 3D Branched Ni Nanoparticles for Improved Catalytic Activity
14:40-15:20	**Afternoon tea – Level 1 (40 mins)**		
	Roma Room	**Terrace Room**	**Wickham Room**
	Session 7 CO2 Capture **Chair: Ruth Knibbe**	**Session 8 Publishing for impact** **Chair: Saleem Ali**	**Session 9 Membranes** **Chair: Jingwei Hou**
15:20	7.1 Lian Zhang High-Temperature Reactions of CO2 and Steam with Calcium Chloride	Panel session with Senior Editors: • Yaoqing Zhang Senior Editor, Nature Sustainability • Adam Lee Editor-in-Chief, Materials Today Chemistry • Zaiping Guo Board Member, Energy Storage Materials & Green Energy & Environment	9.1 Michael Guiver MOFs and microporous polymer frameworks for gas separation membranes
15:40	7.2 Zhijian Wan A Scalable Material for the Deployment of Direct Air Capture		9.2 Gloria Monsalve Bravo Gas sorption isotherms in glassy polymer membranes: are mixture predictions sensitive to parameter uncertainty?
16:00	7.3 Jun-Seok Bae Carbon composites in a honeycomb monolithic structure for CO2 capture		9.3 Shuwen Yu Thin film composite membranes with enhanced microporosity for gas separation
16:20	Close		
17:15	**Bus departs Hotel Grand Chancellor to Customs House,** 399 Queen St. Brisbane		
18:00-21:30	**Gala Dinner at Customs House, Chair: Simon Smart**		

Day 2: Thursday 30th November 2023			
8:30 onwards	Registration		
	Chair: Ruth Knibbe **Welcome to Day 2 Plenary session**		
9:00-9:40	P4 Shizhang Qiao Electrocatalytic Refinery for Production of Fuels and Chemicals		
9:40-10:20	P5 Sir Anthony Cheetham Hybrid Perovskite Formates: From Multiferroics to Carbon Capture		
10:20-10:40	P6 Jennifer Wilcox The Role of Carbon Capture in Meeting Net-Zero Carbon Goals		
10:40-11:20am	**Morning tea – Level 1 (40 mins)**		
	Roma Room	**Terrace Room**	**Wickham Room**
	Session 10 Advanced Characterisation **Chair: Adam Lee**	**Session 11 Simulation** **Chair: Karen Wilson**	**Session 12 Membranes** **Chair: Andrew Whittaker**
11:20	10.1 See Wee Chee Operando Electron Microscopy of Electrocatalysts Transformations under CO2 Electro-reduction Conditions	11.1 Aijun Du Computational Design of new Catalysts for the Reduction of Carbon Oxide into Multi-carbon Product	12.1 Ingo Pinnau Materials Design for Membrane-Based CO2 Separations
11:40	10.2 Fengtao Fan Spatiotemporal imaging of charge transfer in photocatalyst particles	11.2 Aoni Xu Theories for electrolyte effects in CO2 electro-reduction	12.2 Rijia Lin Glassy Metal-Organic Frameworks: New Opportunities in Membrane Gas Separation and Devices
12:00	10.3 Neil Robinson Low-field time domain NMR of porous systems	11.3 Quang Kim Loi Reaction dynamics and molecular transport of CO2 hydrogenation on N-doped graphene using ReaxFF simulations	12.3 Christian Zuluaga-Bedoya Transport of light gases across single-crystal zeolite (MOF) nanomembranes: effect of size, flexibility, and polymer coating
12:10			12.4 Ruiqi Chen Ion Incorporation in ZIF-62 Glasses: Melting Behavior, Interaction Dynamics, and Enhanced Gas Separation Performance
12:20	10.4 Jeffrey Harmer Studying Catalytic Reactions using Electron Paramagnetic Resonance Spectroscopy	11.4 Steffen Jeschke Challenges and Methods for Molecular Modelling of Electrode-Electrolyte Interfaces	12.5 Francis McCallum Enhancing the Durability of Polymeric Materials via Sequential Infiltration Synthesis
12:30			12.6 Matthew Kratzer Species-dependant diffusion in flue gas separation through carbon nanotube arrays
12:40-13:40	**Lunch - Courtyard**		
13:00-14:30	**CSIRO - GETCO2 round table (invitation only)**	**Leichhardt Room, Level 1**	

Day 2 continued	Roma Room	Terrace Room	Wickham Room
	Session 13 Catalyst **Chair: Christian Doonan**	**Session 14 CO2 Reduction Technology Landscape** **Chair: Darren Martin**	**Session 15 Catalyst** **Chair: Yuan Chen**
13:40	13.1 Aaron Marshall Fancy electrocatalysts vs well-designed electrocatalytic systems	14.1 Liu Ye Towards Net-zero Emissions in Urban Water Industry	15.1 Qin Li Biomass to Catalytic Quantum Materials: Enriching the Pathways for CO2 Conversion
14:00	13.2 Haoxin Mai Catalysts Synthesis and Development: What we can do for Electrochemical CO2 Reduction	14.2 Zongping Shao Development of functional oxide electrocatalysts for low-to-intermediate temperature CO2 electrolysis	15.2 Zhiliang Wang Dipole Moment Tuning in Semiconductor Photoelectrodes
14:20	13.3 Anoja Kawsihan Production of C2+ products through the electrochemical reduction of CO2 by single atom Fe decorated Cu nano-dendrites	14.3 Rana Afzal Investigating the impact of various treatments on the lignocellulosic biomass and its derived carbon features	15.3 Thi Kieu Oanh Le Heterojunction photocatalysts for aqueous phase CO2 reduction
14:30	13.4 Qian Sun Enhanced C2+ Production from CO Electroreduction by Using Molecular Doping	14.4 Liang Sun High Entropy Alloy Enables Efficient CO2 Redox Reactions	15.4 Daksh Shah TiO2/CoAl-LDH nanocomposites for CO2 photoreduction
14:40	13.5 Calvin Yuen Leong Chow Realising Catholyte–Free CO2 Electrolysis Under Acidic Condition	14.5 TBC	15.5 Wengang Huang Intermarrying MOF glass and nanoconfined perovskite for photo-enzyme coupled CO2 reduction
14:50-15:30	**Afternoon tea – Level 1 (40 mins)**		
	Session 16 Catalyst **Chair: Chuan Zhao**	**Session 17 Advanced Characterisation & Simulation** **Chair: Rachel Caruso**	**Session 18 Catalyst** **Chair: John Zhu**
	Roma Room	**Terrace Room**	**Wickham Room**
15:30	16.1 Jun Chen Defective carbon-based materials for electrocatalysis	17.1 Bernt Johannessen Advanced Materials meets X-ray Absorption Spectroscopy: a Strong and Growing Partnership	18.1 Yuan Chen Tailoring heterogeneous molecular Co–N–C catalysts
15:50	16.2 Porun Liu Single Atom Catalyst for Efficient Hydrogen Evolution and Oxygen Reduction Reactions	17.2 Timothy Duignan Calculating activities with equivariant neural networks potentials	18.2 Akshat Tanksale Aqueous Phase Conversion of Carbon Dioxide into Acetic Acid
16:10	16.3 Venkata Dasireddy Development of Ru-based catalysts for the CO2 reduction: Power to Gas process	17.3 Zhe Liu Liquid state nanoionics: high-performance computing for novel physics and cross-scale models for engineering	18.3 Juan Bai Anion-Modulated Generation of Defective Molybdenum Sites as Synergistic Active Centers for Durable Oxygen Evolution
16:30	16.4 Yu Yang Ligand-tuning copper in stable coordination polymer catalysts for selective C-C coupling	17.4 Qingbing Xia Probing Electronic-Scale Charge Storage Mechanisms via Electron Paramagnetic Resonance	18.4 Fangzhou Liu Understanding the Degradation Mechanism of Iron Phthalocyanine- for Acidic Oxygen Reduction Reaction

Day 2 continued			
16:40	16.5 Mohamed Nazmi Catalyst layer ink formulation matters for CO2 electrolysis		18.5 Leo Lai Structural Evolution of MOF-derived Carbon Catalysts Synthesized by Ultrafast Joule Heating
16:50	16.6 Zixun Yu Interfacial engineering of heterogeneous molecular electrocatalysts using ionic liquids		
17:00	Close		
17:00-19:00	**Networking drinks & canapes with Gecko's wildlife Courtyard, Hotel Grand Chancellor**		

Day 3: Friday 1st December 2023			
8:30am onwards	Registration		
	Chair: Fengwang Li Welcome to Day 3 Plenary session		
9:00-9:40	P7 Alexis Bell Electrochemical Reduction of CO2: Challenges for Materials and System Design		
9:40-10:20	P8 Feng Jiao CO2 Electrolysis Systems for Chemical and Food Production		
10:20-11:00	P9 Graeme Henkelman Correlating structure and function for nanoparticle catalysts		
11:00-11:40am	**Morning tea – Level 1 (40mins)**		
	Roma Room	**Terrace Room**	**Wickham Room**
	Session 19 Advanced Characterisation & Simulation Chair: Adam Lee	**Session 20 CO2 Capture Chair: Jie Zhang**	**Session 21 CO2 Reduction Technology Landscape Chair: Zaiping Guo**
11:40	19.1 Rosalie Hocking In designing catalysts for clean energy- is the nature of the active site always the right question to ask?	20.1 Hai Yu Integrated carbon capture and utilization for sustainable carbon mining	21.1 Geoff Wang Development of Technologies Approaching to Low Emission and Carbon Neutrality for Steel Industry
12:00	19.2 Hao Li The Cat-Universe: A "Data-Theory-Methodology-Experiment" Framework to Realize Catalyst Design	20.2 Huazhen Chang 2D materials used for CO2 adsorption	21.2 Colin Scholes Carbon dioxide hydrogenation to methanol through CuO/ZrO2-polymer composite membrane reactor
12:20	19.3 Adrian Sheppard Directions in 3D and 4D Imaging for Characterising Materials and Processes	20.3 Graeme Puxty Aromatic amines for CO2 capture applications	21.3 Yuting Zhuo Optimising the flow behaviours in flow channels via CFD modelling to accelerate electrolyser performance
12:40	19.4 Cameron Bentley Nanoscale Structure–Activity Mapping of Electrocatalysts	20.4 Ngoc Nguyen Unconventional CO2 Capture Based on Gas Hydrates	21.4 Jinshuo Zou Size Effects of Ru Nanoparticles in Li-CO2 Batteries
13:00-13:40pm	**Lunch – Courtyard (40 mins)**		

Day 3 continued	**Chair: Yuan Chen** **Closing Plenary Session**
13:40-14:20	P10 Huijun Zhao Green Electrochemical Transformation of Carbon Dioxide: Challenges and Solutions
14:20-15:00	P11 Chuan Zhao Single-atom catalysts for electroreduction of CO2
15:00-15:30	**Chair: Xiwang Zhang** Presentation of Awards
15:30-15:35	**Xiwang Zhang** Thanks & final words
15:35	**ISGTCO2 Close**