# Program


ENGINEERS
AUSTRALIA
National
Committee
on Water
Engineering
Hydrology & Water
Resources Symposium
Living with extremes
13-15 November | Sydney
Register now
engineersaustralia.org.au/hwrs2023

Hydrology & Water Resources Symposium

ENGINEERS AUSTRALIA

# FINAL PROGRAM

**As of 8 November 2023**

**Hydrology and Water Resources Symposium 2023**

**13-15 November 2023**

**Hilton Sydney**

## Monday, 13 November 2023

| | | |
|---|---|---|
| **0730 - 1700** | **REGISTRATION OPEN** | **0730 - 1700** |
| | **Grand Ballroom A** | |
| **0845 - 0855** | **Official Opening** | **0845 - 0855** |
| **0855 - 0915** | **Welcome to Country and Presentation "Flood impacts on Aboriginal communities – the lessons learnt from Northern Rivers flood events 2022" by Warren Martin** | **0855 - 0915** |
| **0915 - 0920** | Hydrologic Games Annoucements | **0915 - 0920** |
| **0920 - 1005** | **High level panel - living with extremes?**<br>Panel Members:<br>Maree Abood - Executive Director, Risk Reduction and Adaptation - NSW Reconstruction Authority<br>Prof Katherine Daniell - Professor - 3A Institute, School of Cybernetics & Fenner School of Environment and Society, College of Science, ANU<br>Leanne Pearce- Principal Hydrologist – Dams Engineering, Water Corporation<br>Dr William Glamore- Professor- EcoEng Research Leader UNSW Water Research Lab | **0920 - 1005** |
| **1005-1100** | **KEYNOTE PRESENTATION 1**<br>**Richard Kingsford "The environmental costs and benefits of engineering our rivers"** | **1005-1100** |
| **1100-1130** | **MORNING TEA & EXHIBITION BREAK** | **1100-1130** |

**Concurrent Session 1**

| Room | Grand Ballroom A (Level 3) | Grand Ballroom B (Level 3) | Room 4 (Level 4) | Room 5 (Level 4) | Room |
|---|---|---|---|---|---|
| **1130 - 1230** | **Hydrology 1** | **Hydrology 2** | **Flood Forecasting** | **Ecosystem Responses** | **1130 - 1230** |
| **Session Chair** | **Chris Thomas** | **Brendan Berghout** | **James Ball** | **Rhys Thomson** | **Session Chair** |
| **1130 - 1150** | Does ARR2019 ensemble temporal pattern method represent various storm types in NSW?<br>**Jayden Fraser - WMAwater** (#157) | Benchmarking the differences between modelled flood peaks when using Monte Carlo and Ensemble approaches<br>**Matt Scorah - HARC** (#29) | Flood Forecasting to Prepare Communities for Flood Events<br>**Josh Terry - Royal HaskoningDHV** (#134) | Challenges and Opportunities in Environmental Water Management: What's working and what can we do better?<br>**Dr Geoff Vietz - Streamology** (#159) | **1130 - 1150** |
| **1150 - 1210** | Combination of SCS-CN and Rational Function Models to Estimate Daily River Flow<br>**Dr Hossein SamadiBoroujeni - Premise Australia** (#37) | Probably some practical advice when using FFA utilities<br>**Lindsay Millard - WRM Water & Environment** (#100) | How useful are global streamflow forecasts for Australian catchments?<br>**A/Prof Fiona Johnson - UNSW** (#77) | An ecohydrological approach for modelling and optimisation of vegetation health and ecosystem services in wetlands<br>**A/Prof Jose Rodriguez - University of Newcastle** (#167) | **1150 - 1210** |
| **1210 - 1230** | Storage-based routing of floods through river channels: improving parameterisation with hydraulic models<br>**Dr Richard Sharpe - Sunwater** (#11) | Lake Torrens (South Australia) arid catchment initial loss and continuing loss observations<br>**Anya Jones-Gill - EMM Consulting** (#107) | Radar-Based Ensembles Forecasts to Enhance Flood Forecasts and Warnings in Australia<br>**Dr Carlos Velasco Forero - Bureau of Meteorology** (#121) | Ecogeomorphological modelling of a mangrove wetland in Pacific Islands.<br>**Eliana Jorquera - University of Newcastle** (#168) | **1210 - 1230** |
| **1230 - 1320** | **LUNCH & EXHIBITION BREAK** | | | | **1230 - 1320** |

| Concurrent Session 2 | | | | | |
|---|---|---|---|---|---|
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1320 - 1500** | **Hydrology** | **Integrated Water Resources Planning and Management** | **Workshop 1: Bridge Hydraulics in 2D Models** | **Ecosystem Responses** | **1320 - 1500** |
| **Session Chair** | **Leanne Pearce** | **Katherine Daniell** | **Monique Retallick** | **Ian Rowbottom** | **Session Chair** |
| **1320 - 1340** | Extreme event dam hydrology calibration using ARR2019 with a limited data collection sample<br>**Lee Williams - Aurecon** (#78) | Apprehending cybernetic water system dynamics and futures? A review of games and immersive environments for education and foresighting<br>**Amy Wardrop - The Australian National University** (#181) | Effect of Dual Bridge Piers - Learnings from CFD, ducks and 2D modelling<br>**David Cox - SMEC** (#52) | Downstream fish passage on dam spillways: truths, myths, and realities during prototype operation<br>**Prof Hubert Chanson - The University of Queensland** (#10) | **1320 - 1340** |
| **1340 - 1400** | Defining Catchment Delay and Non-Linearity Using Flow Data<br>**Tim Rhodes - SMEC** (#85) | Why is accurate low flow modelling important in long-term planning: A Greater Sydney Case Study for Warragamba Dam<br>**Dr Marlene van der Sterren - WaterNSW** (#20) | Case study - Estimation of bridge pier and deck form loss coefficients using 3D modelling<br>**Thomas Ramsay - GHD**<br>**David Cox - SMEC** (#54) | Advantages of Indirect Screening for Removal of Gross Pollutants from Waterways<br>**Krey Price - Surface Water Solutions** (#153) | **1340 - 1400** |
| **1400 - 1420** | Water quantity and quality modelling for the Great Barrier Reef catchments and development of an operational-ready system<br>**Dr Urooj Khan - The Bureau of Meteorology** (#86) | Catchment water balance modelling with timestep independence<br>**Jarrah Muller - EMM Consulting** (#108) | Modelling of Nature-based Solutions (NbS) for Bridge Pier Scour Protection<br>**Dr Muhammad Zain Bin Riaz - AECOM** (#139) | Reynolds Stresses and Secondary Motion in Box Culvert Barrel: Implications in terms of Upstream Fish Passage at road crossings<br>**Hui Ling Wong - University of Queensland** (#6) | **1400 - 1420** |
| **1420 - 1440** | Robust hydrological model calibration for extreme events<br>**Caleb Dykman - UNSW** (#130) | A new approach to integrated environmental modelling<br>**Dr Michael Barry - TUFLOW** (#48) | Application of Bradley's Dual Bridges Theory in TUFLOW Layered Flow Constrictions: a clarification<br>**Jacob Thorne - Jacobs** (#53) | Fish passage considerations in closed conduit systems<br>**Reilly Cox - UNSW** (#142) | **1420 - 1440** |
| **1440 - 1500** | Enhancing resilience in a community roof harvesting rainwater system based on Monte Carlo analysis<br>**Lynn Seo - CSIRO** (#102) | A schematic modelling approach for estimating water quantity and quality in water supply systems in Greater Sydney<br>**Dr Shengyang (Chris) Chen - WaterNSW** (#15) | **Discussion on modelling for floods** | A review of artificial destratification and selective withdrawal techniques to mitigate the impacts of reservoir stratification and cold water pollution<br>**Fred Chaaya - UNSW Water Research Laboratory** (#56) | **1440 - 1500** |
| **1500 - 1530** | **AFTERNOON TEA & EXHIBITION BREAK** | | | | **1500 - 1530** |
| **Concurrent Session 3** | | | | | |
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1530 - 1710** | **Invited session on Advanced Numerical Techniques** | **Floods - risk assessment, planning and management** | **Hydrology** | **Responding to climate change** | **1530 - 1710** |
| **Session Chair** | **Behzad Jamali** | **Scott Button** | **Brett Phillips** | **Marlene Van der sterren** | **Session Chair** |
| **1530 - 1610** | **Invited Speaker**<br>**Prof Holger Maier**<br>Data, Models and Advanced numerical techniques | Post extreme event modelling to assess catchment changes in order to inform restoration prioritisation: A case study of Poatina catchment flooding<br>**Aaron Smith - Hydro Tasmanina** (#31) | Extreme Flooding in the Kimberley and the Loss of WA's Fitzroy River Bridge<br>**Krey Price - Surface Water Solutions** (#152) | Lessons from an assessment of water supply system yield in South East Queensland – climate change is already happening<br>**Ian Varley - WREMA** (#34) | **1530 - 1550** |
| **1550 - 1610** | | Spatially optimising natural flood management approaches across catchments<br>**A/Prof Fiona Johnson - UNSW** (#22) | Disaggregation of daily rainfall data to estimate at-site intensity-frequency-duration curves at sub-hourly timescales<br>**Dr Md Atiqul Islam - STANTEC** (#49) | Challenges in incorporating climate change impact to Greater Sydney water supply security<br>**Selvaratnam Maheswaran - Consultant** (#28) | **1550 - 1610** |
| **1610 - 1630** | Quantifying the benefits of using machine learning for the Smart Design and Control of Stormwater Storages<br>**A/Prof Mark Thyer - University of Adelaide** (#150) | Establishing floodplain connectivity using time series satellite data<br>**Dr Sanjeewani (Sanji) Somarathana - WaterNSW** (#120) | Taking a downpour of data and turning it into a flood of knowledge - applications of radar rainfall in hydrology<br>**Bronte Board - Department of Transport and Main Roads** (#21) | Projections of initial and continuing loss under climate change and the impacts on design flood estimation<br>**Dr Conrad Wasko - University of Melbourne** (#112) | **1610 - 1630** |
| **1630 - 1650** | Calibrating hydrological models for high flow estimation using data science resampling methods<br>**Maryam Zeinolabedini Rezaabad - UNSW Water Research Centre** (#13) | Development of Hydraulic Models using Remote Sensing techniques<br>**Gurmeet Singh - WaterNSW** (#122) | Urban Water Risk, Water Law and Insurance<br>**Prof Peter Coombes - Australian National University & Urban Water Cycle Solutions** | Impact of Climatic Factors on Groundwater Piezometry Dynamics over a Long-Term Observation<br>**Dr Adnan Mohammed - University of Newcastle** (#145) | **1630 - 1650** |
| **1650 - 1710** | Assessment of Catchment Imperviousness Derived from Artificial Intelligence Models Using Information Entropy Methods<br>**Siming Gong - University of Technology Sydney & STANTEC** (#67) | A methodology for assessing the impact of cumulative development on flooding in Australian floodplains<br>**Chris Thomas - Advisian (Worley Group)** | Regional rainfall frequency analysis for Tasmania's West Coast<br>**Benjamin James - Entura** (#26) | From resistance to resilience – adapting to the dichotomy of urban flood response induced by a changing climate.<br>**Dr Suresh Hettiarachchi - UNSW & Alluvium** (#184) | **1650 - 1710** |
| **1710 - 1800** | **Welcome Drinks** | | | | **1710 - 1800** |

| | | | | | |
|---|---|---|---|---|---|
| 1800 - 1830 | Hall of Fame<br>Allan Goyen and Geoff O'Loughlin | | | | 1800 - 1830 |
| 1830 - 1930 | Munro Oration - Francis Chiew | | | | 1830 - 1930 |
| | | | | | |
| | Tuesday, 14 November 2023 | | | | |
| 0800 - 1700 | REGISTRATION OPEN | | | | 0800 - 1700 |
| | Grand Ballroom A | | | | |
| 08.45 - 08.50 | Welcome & Day Briefing - Day 2<br>Hydrologic Games Update | | | | 08.45 - 08.50 |
| 08.50 - 09.40 | KEYNOTE PRESENTATION 2<br>Duncan Mcluckie<br>"Strategic management of flood risk for communities" | | | | 08.50 - 09.40 |
| | Concurrent Session 4 | | | | |
| Room | Grand Ballroom A (Level 3) | Grand Ballroom B (Level 3) | Room 4 (Level 4) | Room 5 (Level 4) | Room |
| 0940 - 1040 | Hydrology | A Changing Climate | Flood Frequency Analysis | Integrated Water Resources Planning and Management | 0940 - 1040 |
| Session Chair | Michael Leonard | Hubert Chanson | George Kuczera | Natalie Lockhart | Session Chair |
| 0940 - 1000 | Estimating Rainfall Loss Values for Flood Modelling Using Catchment Characteristics<br>**Matthew Tiller - Queensland University of Technology** (#137) | Intensification of sub-hourly heavy rainfall<br>**Dr Hooman Ayat - University of Melbourne** (#14) | Adopting Regularised Linear Model within Peaks-over-threshold Framework for Regional Flood Frequency Analysis: A case study for south-east Australia<br>**Xiao Pan - Western Sydney University** (#17) | Future water supply scenarios for Tasmanian municipalities: A data scaling approach<br>**Dr Michael Wright - WMAwater** (#98) | 0940 - 1000 |
| 1000 - 1020 | The need for a national test dataset<br>**Mark Babister - WMAwater** (#177) | Are CMIP3 projections still plausible to 2030 for Tasmanian catchments?<br>**Kirsten Adams - Natural Resources and Environment Tasmania** (#83) | Updating the Quantile Regression Technique Regional Flood Frequency in Queensland<br>**Calvin Oppy, Luke Gericke**<br>**Queensland Department of Transport and Main Roads** (#36) | The impact of errors in hydrological predictions on water supply system performance<br>**A/Prof Mark Thyer - University of Adelaide** (#135) | 1000 - 1020 |
| 1020 - 1040 | Spatial and Temporal Patterns of rainfall changes at decadal time period in south-east Australia<br>**Prof Ataur Rahman - Western Sydney University** (#18) | Projecting rainfall and flood frequency curves under climate change<br>**Dr Conrad Wasko - University of Melbourne** (#104) | Rainfall and flow monitoring in an arid catchment – Analysing 30 years of rainfall and flow data in Arcoona Creek in the Gammon Ranges<br>**Dr David Kemp - University of South Australia** (#24) | Benchmarking MUSIC and GLM Models in Two Window Lakes in South East Queensland<br>**Dr Brett Phillips - STANTEC** (#62) | 1020 - 1040 |
| 1040 - 1110 | MORNING TEA & EXHIBITION BREAK | | | | 1040 - 1110 |

| Concurrent Session 5 | | | | | |
|---|---|---|---|---|---|
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1110 - 1230** | **Infrastructure** | **Hydrology** | **Floods - risk assessment, planning and management** | **Ecosystem responses** | **1110 - 1230** |
| **Session Chair** | **Anthony Gaffney** | **James Charalambous** | **Greg Collecutt** | **Mardi Medwell-Squier** | **Session Chair** |
| **1110 - 1130** | Enhancing infrastructure upgrade projects in Melbourne area: Overcoming challenges and seizing opportunities for achieving zero afflux in flood modelling<br>**Farshad Lotfiazad - Wallbridge Gilbert Aztec (WGA)** (#117) | Continuous simulation of catchment hydrology using a coupled direct rainfall surface / groundwater hydraulic model: Oxley Creek catchment calibration<br>**Dr Shuang Gao - TUFLOW** (#55) | Spatio-temporal patterns of channel morphology: a case study of Dry Creek, Northern Adelaide<br>**Tesfa Gebrie Andualem - University of South Australia** (#16) | Water and CO2 fluxes in a perennial pasture<br>**Dr Marcela Silva - Monash University** (#173) | **1110 - 1130** |
| **1130 - 1150** | When zero does not equal zero - The need to transition from flood hazard management to a comprehensive flood risk mitigation approach<br>**Lucy Goss - Jacobs Group** (#88) | Estimation of flood magnitudes affected by combined outflows from a large dam and side-creek using long term continuous simulation<br>**Martin Jacobs - pitt&sherry** (#12) | Assessing the reliability, efficiency and limitations of the TUFLOW 1D Model: A case study on the 2021 extreme river event calibration<br>**Dr Yucen Lu, Jasmine Lee**<br>**Aurecon** (#66) | Predicting Event Response in Coupled Catchment-Reservoir Models<br>**Dr Peter Yeates - Hydronumerics**<br>**Dr Amanda Newman - WaterNSW** (#75) | **1130 - 1150** |
| **1150 - 1210** | Solar farm flood hydraulics<br>**Jarrah Muller - EMM Consulting** (#109) | New IFDs for Brisbane Region<br>**Sarah Blundy - WMAwater** (#169) | Applying computer vision approaches to stream gauging<br>**Daniel Wagenaar - Xylem Wayer Solutions** (#19) | PLANNING and design for seasonal herbaceous wetlands in future growth areas**Greta Porras, Ian Pham, Katy Marriott**<br>**Melbourne Water** (#39) | **1150 - 1210** |
| **1210 - 1230** | Eliminating Flood Risk on Stadium Construction Projects<br>**Siobhan Maxwell - John Holland** (#97) | Towards Resilient Water Supply Management: Innovative Forecasting Techniques for Medium to Long-Term Rainfall Anomalies<br>**Dr Ze Jiang - UNSW** (#38) | Consideration of life safety risk equity principles in the assignment of design flood probability<br>**Chris Nielsen - Department of Regional Development Manufacturing and Water** (#60) | Understanding Hydrodynamic Drivers of Algal Bloom in the Berowra Creek Estuary<br>**Calvin Li - Arup & Sydney Water** (#72) | **1210 - 1230** |
| **1230 - 1330** | **LUNCH & EXHIBITION BREAK** | | | | **1230 - 1330** |
| **Concurrent Session 6** | | | | | |
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1330 - 1520** | **Workshop 2: Panel Session on infrastructure and acceptable impacts**<br>**Workshop 3: ARR update** | **Hydrology** | **Urban water management** | **Integrated Water Resources Planning and Management** | **1330 - 1520** |
| **Session Chair** | | **Conrad Wasko** | **Peter Coombes** | **Fiona Ling** | **Session Chair** |
| **1330 - 1350** | **Panel Session**<br>Infrastructure and acceptable impacts - discussion with people from range of industries<br>Presentation: Mark Babister (WMAwater) and Martin Giles (WEP)<br>Panel: Chris Thomas (Advisian), Chris Russell (QLD TMR), | Multivariate time series-based streamflow forecasting<br>**Sandhya Eswara - Federation of University Australia** (#70) | Experimental investigation of the effectiveness of macro-roughness in erosion protection<br>**Dr Laura Montano - UNSW Water Research Laboratory** (#106) | The Development of Integrated Water End Use and Climate Responsive Demand Modelling for Urban Water Resources System Models in Darwin and Canberra<br>**Russell Beatty - HARC** (#124) | **1330 - 1350** |
| **1350 - 1410** | | A Development of Long-Term Daily High-Resolution Grid Meteorological Data for South Korea based on Deep Learning<br>**Yookyung Jeong - Incheon National University** (#73) | Integrating ESG with sustainable water management approach in urban areas to respond to climate change<br>**Dr Hamed Esfahani - STANTEC** (#154) | Integrated water system modelling for the Resilient Water Futures strategy-<br>**Dr Leon van der Linden - SA Water** (#144) | **1350 - 1410** |
| **1410 - 1430** | | Software Application for Spatiotemporal Variability of Design Rainfall for use in Hydrological Modeling in Qatar<br>**Hassan Qasem - Ministry of Municipality** (#43) | Not Again! A case study of heavy and recurring rainfall during a construction project<br>**Dr Rodney Ronalds - Friends Civil Engineering** (#89) | Water balances in pit lakes: integrating hydrogeology, surface water balances, and climate change.<br>**Yubely Andrea Garcia Forero - WSP** (#129) | **1410 - 1430** |

| | | | | | |
|---|---|---|---|---|---|
| **1430 - 1450** | **ARR Update**<br>A/Prof Michael Leonaerd and Monique Retallick (National Committee on Water Engineering) | Extrapolating to extremes: A perennial stream comparison of Advective and Diffusive flood hydrograph models with embedded baseflow algorithm.<br>**Dr William Meynink - Mine Water Specialists Int** (#44) | Water quantity calibration and validation of storages in Greater Sydney drinking water catchments<br>**Dr Rizwana Rumman - WaterNSW** (#68) | Assessing Conditions of Bioretention Basins; Investigating Influential Factors on Asset Performance and Longevity<br>**Dr Emad Kavehei, Bishal Chudal**<br>**Moreton Bay Regional Council** (#95) | **1430 - 1450** |
| **1450 - 1510** | | Extrapolating to extremes: An arid zone catchments comparison of Advective and Diffusive flood hydrograph models and storm loss algorithms.<br>**Alexander Rogan - PSM** (#41) | Oyster beds as stormwater champions: Nature's solution for offsetting stormwater impacts and achieving water quality targets<br>**Dr Courtney Henderson, Andre Foersch**<br>**AECOM** (#92) | Calibration and validation of water quality parameters in the Greater Sydney drinking water catchments<br>**Asha Kelly - WaterNSW** (#35) | **1450 - 1510** |
| **1510 - 1540** | **AFTERNOON TEA & EXHIBITION BREAK** | | | | **1510 - 1540** |
| **Concurrent Session 7** | | | | | |
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1540 - 1720** | **Integrated Water Resources Planning and Management** | **Hydrology** | **Floods - risk assessment, planning and management** | **Workshop 4: Improving rating curves in 2d hydraulic Models** | **1540 - 1720** |
| **Session Chair** | **Francis Chiew** | **Bree Bennett** | **Laura Montano** | **Mark Babister** | **Session Chair** |
| **1540 - 1600** | Can the yield approach to urban water supply planning be trusted in a non-stationary climate?<br>**Prof George Kuczera - University of Newcastle** (#9) | Blending of radar, satellite and gauge rainfall data for hydrological application<br>**Dr Jayaram Pudashine - Bureau of Meteorology** (#126) | "City on Alert", a digital tool to anticipate and control flood risk<br>**Remy Baudot - Egis** (#71) | Improving rating curves in 2d hydraulic Models Presentation by Dr Carlos Gonzalez and Mark Babister | **1540 - 1600** |
| **1600 - 1620** | Engaging water sector stakeholders to identify impactful compound events and climate extremes<br>**Steven Thomas - Bureau of Meteorology** (#123) | Hydrological Seasonal Forecasting at the Bureau of Meteorology<br>**Dr Christopher Pickett-Heaps - Bureau of Meteorology** (#127) | The building blocks of a business case to manage flood risk in the Gawler River region<br>**Katharine Ward - Department for Environment and Water**<br>**Ed Henty - Dryside Engineering** (#63) | Opportunity to contribute to the NCWE paper on Improving rating curves in 2d hydraulic Models | **1600 - 1620** |
| **1620 - 1640** | A line of sight – how roadmaps support the water resources sector by linking strategy to technical scoping and delivery.<br>**Dr Stephanie Kermode - Jacobs**<br>**Mr Kaushal Kumandur - Syndey Water** (#149) | The AR&R2019 design flood estimation procedure – A need for review<br>**Ted Rigby - Rienco Consulting** (#166) | Dynamic CA-ffé: a hybrid 1D/2D fast flood evaluation model for urban floods<br>**Dr Maziar GholamiKorzani - Queensland University of Technology** (#80) | Achieving accuracy, stability, and parallelism in a new 1D hydraulic scheme for TUFLOW HPC<br>**Dr Greg Collecutt - TUFLOW** (#33) | **1620 - 1640** |
| **1700 - 1720** | The Bradfield Scheme: a contemporary analysis.<br>**Dr Cuan Petheram - CSIRO** (#155) | Exploring memory of catchment represented by conceptual rainfall-runoff models.<br>**Thien Nguyen - University of Adelaide** (#69) | Upstream impact assessment of reservoir operation during floods: a case study of Narracan<br>**Yanni Wang - HARC** (#79) | Hydraulics and Energy Dissipation on a Steep Stepped Spillway: Physical Modelling in a Large-size Facility<br>**Prof Hubert Chanson - University of Queensland** (#5) | **1700 - 1720** |
| **Grand Ballroom (Level 3)** | | | | | |
| **1900 - 2300** | **CONFERENCE DINNER** | | | | **1900 - 2300** |

| Wednesday, 15 November 2023 | | | | | |
|---|---|---|---|---|---|
| **0800 - 1600** | **REGISTRATION OPEN** | | | | **0800 - 1600** |
| **Concurrent Session 8** | | | | | |
| **Room** | **Grand Ballroom A (Level 3)** | | | | **Room** |
| **0900 - 1020** | **Workshop 5: Climate Science for Hydrology**<br>0900-0905 Introduction by Chair - Dr Ben Henley, Uni of Wollongong<br>0905-0912 Climate change needs for flood modelling- Prof Rory Nathan, Uni of Melbourne<br>0912-0920 Climate change needs for water supply planning - Dr Natalie Lockart, Hunter Water<br>0920-0940 State of the science on heavy rainfall - Dr Acacia Pepler, Bureau of Meteorology<br>0940-1000 State of the science on drought - Dr Anna Ukkola, UNSW<br>1000-1020 Q and A | | | | **0900 - 1020** |
| **1020 - 1050** | **MORNING TEA & EXHIBITION BREAK** | | | | **1020 - 1050** |
| **Grand Ballroom A** | | | | | |
| **10.50 - 11.40** | **KEYNOTE PRESENTATION 3**<br>**Rebecca Nelson**<br>**"Water and cumulative impacts: Global policy issues and approaches"** | | | | **10.50 - 11.40** |
| **Concurrent Session 9** | | | | | |
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1140 - 1240** | **Hydrology 1** | **Hydrology 2** | **Floods - risk assessment, planning and management** | **Urban water management** | **1140 - 1240** |
| **Session Chair** | **Lindsay Millard** | **Fiona Johnson** | **Sabina Lohani** | **Pandora Sullivan** | **Session Chair** |
| **1140 - 1200** | Selecting representative evacuation events from large Monte Carlo data sets<br>**Wiebke Coenen - WMAwater** (#180) | Improving the rigour of catchment-wide hydrodynamic modelling of the rainfall-runoff process<br>**Dan Williams - Torrent Consulting** (#147) | A Structured Flood Mitigation Approach – A case Study: Road Level Crossing Removal Project<br>**Gus Naghib - SMEC** (#140) | Digital Twins to Establish Rain Gauge Site Exposure to Wind and Measurement Errors in an Arid Qatari Environment<br>**Niels Erik Joergensen - NJ Data ApS** (#46) | **1140 - 1200** |
| **1200 - 1220** | Application of space-time rainfall patterns derived from atmospheric reanalysis data to define the joint probability of riverine catchment and local stormwater flooding<br>**Dr Phillip Jordan - HARC** (#125) | Estimates of design wet season rainfall depths across northern Australia<br>**Michael Batchelor - WRM Water & Environment** (#103) | An attempt to generalise the flood mitigation provided by potential future dams in northern Australia<br>**Matt Scorah - HARC** (#161) | Advancing Environmental Management through Digital Twin Technology: A Demonstration and Future Outlook for Land and Water Resource Development in Australia<br>**Dominic Branchaud - CSIRO** (#156) | **1200 - 1220** |
| **1220 - 1240** | Application of joint probability to respond to climate change and avoid extreme assumptions in hydrology<br>**Prof Peter Coombes - Australian National University & Urban Water Cycle Solutions** (#136) | PNG Highland Storm Rainfall Response<br>**Alexander Rogan - PSM** (#30) | Update to Regional flood frequency estimation for Australia<br>**Monique Retallick - WMAwater** (#182) | A Digital Twin for Optimising Cooling and Water Efficiency in Parks<br>**Ben Cressall - HARC** (#164) | **1220 - 1240** |
| **1240 - 1340** | **LUNCH & EXHIBITION BREAK** | | | | **1240 - 1340** |

| Concurrent Session 10 | | | | | |
|---|---|---|---|---|---|
| **Room** | **Grand Ballroom A (Level 3)** | **Grand Ballroom B (Level 3)** | **Room 4 (Level 4)** | **Room 5 (Level 4)** | **Room** |
| **1340 - 1500** | **Hydrology 1** | **Hydrology 2** | **Water Resources Planning and management** | **Machine Learning in Water Engineering** | **1340 - 1500** |
| **Session Chair** | **Ashish Sharma** | **Mark Jempson** | **Edoardo Daly** | **Mark Thyer** | **Session Chair** |
| **1340 - 1400** | Inconsistency between Rainfall Depths and Temporal Patterns for GSDM PMP<br>**Dr Eric Lam - Aurecon** (#61) | Developing a guideline for modelling the interaction of catchment and coastal flooding for Victoria - why do need one and what does it cover<br>**Dr Christine Lauchlan Arrowsmith - Streamology** (#160) | Enhancing Floodplain Harvesting Estimates in the Barwon-Darling Valley through the NSW Healthy Floodplains Project<br>**Siv Teh - Marina Sivkova - Department of Planning and Environment** (#185) | Investigating machine learning methods for predicting soil carbon and nitrogen of bioretention systems; stormwater asset management<br>**Dr Emad Kavehei - Moreton Bay Regional Council**<br>**Dr Abdul Karim - Faethm AI** (#171) | **1340 - 1400** |
| **1400 - 1420** | On the frequency of flooding of the Barwon River at Geelong<br>**Dr Anthony Ladson - Moroka** (#91) | Investigating routing discrepancies between hydrological and hydraulic models<br>**Dr Richard Gale - Venant Solutions** (#146) | Surface Water Extent Mapping of Macquarie Marshes Through Satellite Data Fusion and Random Forest Analysis<br>**Saba Zehra - University of Sydney** (#93) | Benchmarking of a surrogate model optimisation to an event based hydrological model against traditional metaheuristic optimisation algorithms<br>**Shilin Chen - John Myers - Jacobs** (#131) | **1400 - 1420** |
| **1420 - 1440** | HyFS a Hydrological Forecasting System for a Continent<br>**Justin Robinson - Bureau of Meteorology** (#165) | GUGU-BADHUN Dam on Burdekin River<br>**John Kell - Hycast Metals** (#7) | Creek rehabilitation in Sydney – addressing multi-disciplinary challenges to enhance the liveability of urban catchments<br>**Rob Leslie, Joel Sercombe**<br>**WSP** (#47) | Artificial Intelligence based long-term Streamflow Forecasting of Goulburn River using different input predictors<br>**A/Prof Shamotra Oad - Swinburne University of Technology** (#32) | **1420 - 1440** |
| **1440 - 1500** | Fast flood simulation parametrised by 2D hydraulic models<br>**Dr Behzad Jamali - WMAwater** (#174) | Enhancing Rating Curve Development using 2D Hydraulic Models: A Case Study<br>**Priyam Awotar - AECOM** (#133) | Characterising stormwater gross pollutants captured in catch basin inserts<br>**Craig Rothleitner - ARI Water Solutions** (#187) | Prediction of Seasonal Rainfall Using the Hybrid Model Combining Wavelet Transform and Machine Learning Algorithms<br>**Rashid Farooq - Swinburne University of Technology** (#4) | **1440 - 1500** |
| **1500 - 1530** | **AFTERNOON TEA & EXHIBITION BREAK** | | | | **1500 - 1530** |
| **Room** | **Grand Ballroom A (Level 3)** | | | | **Room** |
| **1530 - 1630** | **Workshop 6: Climate change guidence update to ARR**<br>DCCEEW and the team looking at updating ARR climate change guidence - panel session and presentation of the draft guidence and opportunities for feedback.<br>Panel:<br>Leanne Wilkinson, DCCEEW<br>Dr Conrad Wasko, Uni of Melbourne<br>Prof Rory Nathan, Uni of Melbourne<br>Dr Acacia Pepler | | | | **1530 - 1630** |
| **1630 - 1700** | **CONFERENCE CLOSE** | | | | **1630 - 1700** |

| Thursday, 16 November 2023 | | |
|---|---|---|
| 8.30-1.30 | **NSW Flood Risk Management Workshop**<br>Speakers: Duncan McLuckie<br>with Angela Toniato, Phillip Buchanan, Ainslie Frazer, Mikayla Ward<br>**Separate rego required**<br><br>8:30-9:00 am: Registration opens with tea and coffee served<br>9.00-9.15 am: Outline of manual and toolkit<br>9.15-9.45 am: Understanding managing risk guide<br>9.45-10.15 am: Flood risk management measures<br>10.15-10.45 am: Morning tea served and networking<br>10.45-11.05 am: Demonstration using flood damages tool<br>11.05-11.25 am: Flood function and hazard<br>11.25-11.45 am: Considerations for emergency management<br>11.45 am - 12.05 pm: NSW Flood Data Portal<br>12.05-12.30 pm: Q&A<br>12.30-1.30 pm: Lunch served and networking | 8.30-1.30 |