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Programme

Tuesday, September 4, 2018

4:00 PM - 5:00 PM	Registration Desk Open
5:00 PM - 6:00 PM	Welcome Reception
6:00 PM - 7:30 PM	WELCOME & DISTINGUISHED LECTURER: Lucy Jones
7:30 PM - 8:30 PM	Welcome Dinner
8:30 PM - 10:00 PM	POSTER SESSION - *Posters need to be hung prior to 6pm*

Wednesday, September 5, 2018

8:00 AM - 8:30 AM	Registration Desk Open
8:30 AM - 9:30 AM	WELCOME SESSION: State of QuakeCoRE
9:30 AM - 11:00 AM	PLENARY SESSION 1 Future Great Earthquakes in NZ and their Impacts on Structures
11:00 AM - 11:30 AM	Morning Tea
11:30 AM - 1:00 PM	PLENARY SESSION 2 Multi-disciplinary approaches to simulation of infrastructure network resilience
1:00 PM - 2:00 PM	Lunch
2:00 PM - 3:30 PM	LIGHTNING TALKS
3:30 PM - 4:00 PM	Afternoon Tea

4:00 PM - 5:00 PM	POSTER SESSION
5:30 PM - 6:30 PM	Pre-dinner Reception
6:30 PM - 8:30 PM	QuakeCoRE Dinner
8:30 PM - 10:00 PM	POSTER SESSION

Thursday, September 6, 2018

8:30 AM - 9:00 AM	Registration Desk Open
9:00 AM - 9:45 AM	KEYNOTE PRESENTATION: Roger Sutton Disaster Recovery Lessons from Canterbury Earthquakes
9:45 AM - 10:15 AM	Morning Tea
10:15 AM - 11:45 AM	PLENARY SESSION 3 Using hazard scenarios for developing improved social resilience
11:45 AM - 12:45 PM	Lunch
12:45 PM - 2:15 PM	PLENARY SESSION 4 How do we achieve better performing buildings and communities?
2:15 PM - 2:30 PM 2:30 PM - 3:00 PM	CONCLUDING REMARKS: Looking forward WHAKAKAPAI

This programme was correct as at 13 August. There may have been minor programme changes.
The current programme is available online via the Annual Meeting App.

About Us

QuakeCoRE is transforming the earthquake resilience of communities and societies, through innovative world-class research, human capability development and deep national and international collaborations. As a Centre of Research Excellence (CoRE) funded by the New Zealand Tertiary Education Commission (TEC), QuakeCoRE is a national network of leading New Zealand earthquake resilience researchers. QuakeCoRE is hosted by the University of Canterbury and has seven formal partners.

We enhance earthquake resilience across the country and internationally, by working collaboratively on integrated, multi-disciplinary programmes of world-leading research. Our research supports the development of an earthquake-resilient New Zealand.

Our Vision

We will create an earthquake-resilient New Zealand where thriving communities have the capacity to recover rapidly after major earthquakes through mitigation and pre-disaster preparation informed by research excellence.

Our Outcomes

1

Improved Earthquake Resilience

We will contribute to a step-change improvement in the earthquake resilience of the nation's infrastructure from research-informed national and local policies, implementation standards and disaster planning.

2

Improved Economic and Commercial Outcomes

We will support New Zealand's long-term economic benefit through significantly improved seismic performance of New Zealand infrastructure, rapid business recovery after future earthquakes and the growth of engineering resilience innovation and business in the New Zealand construction sector driving international competitiveness.

3

Improved Societal Outcomes

We will enable communities to recover rapidly after major earthquakes through mitigation and pre-disaster preparation, informed by research and public outreach.

4

Highly Skilled and Diverse Workforce

Our graduates will be sought after for their knowledge of earthquake resilience and work-ready professional skills. They are taught in the very best national and international multi-disciplinary environment, combining research and industry elements. Through our graduates, we will seek a growth in under-represented groups (Māori and Pasifika) and gender equality in engineering disciplines.

5

International Recognition

We will be a focal point for international earthquake resilience, attracting the best talent and business alongside national and international research collaborations.

6

Growing Mātauranga Māori

We will contribute by building close engagement with Māori leaders who have responsibility for earthquake planning and resilience and developing opportunities for Māori capability building. The distinctive contribution of Māori indigenous knowledge of earthquake resilience will enhance social, economic and environmental outcomes for New Zealand.

Distinguished Lecture

Life Safety in the City: There is more to life than not being crushed

Lucy Jones

Biography:

Dr. Lucy Jones is the founder and chief scientist of the Dr. Lucy Jones Center for Science and Society, with a mission to foster the understanding and application of scientific information in the creation of more resilient communities, and a Research Associate at the Seismological Laboratory of Caltech. With a BA in Chinese Language and Literature from Brown University and a Ph.D. in Geophysics from MIT, she has furthered earthquake risk reduction through seismological research and integrated disaster scenarios, including 33 years with the US Geological Survey. Her work at the USGS included leading the creation of a national science strategy for natural hazards research, creating the first American major earthquake drill, the Great ShakeOut, that has expanded to now encompass 53 million participants around the world in 2017 and writing over 100 published papers on statistical seismology and integrated disaster scenarios. Her pioneering science was recognized with the 2015 Samuel J. Heyman Service to America Medal, the Ambassador Award from the American Geophysical Union, the William Rodgers Distinguished Alumni Award from Brown University, the 2017 Distinguished Lecture Award of the Earthquake Engineering Research Institute, and most recently, the Frank Press Public Service Award from the Seismological Society of America.

Abstract:

Since their inception, building codes have been based on a principle that safety is the only valid concern of government. If an owner chooses to build a building that is a total financial loss, that is his prerogative but he cannot kill someone in the process. A key factor is that building codes consider buildings in isolation with impacts only on their owners and tenants but the reality of a major earthquake is that the failure of a building impacts the whole community through economic disruption, population decreases, and cascading failures of engineered and social systems.

My work with the City of Los Angeles to create the Resilience by Design program adopted by Los Angeles in 2014 to address earthquake vulnerabilities brought together the earth science, earthquake engineering and public policy and worked with hundreds of community organizations to get approval for sweeping seismic resilience legislation. The process elucidated the disconnect between what well-informed members of the community and local governments understand about the earthquake risk and the goals and objectives of mitigation measures like building codes and what has been implemented in most communities.

The Dr. Lucy Jones Center for Science and Society was formed to continue working to bridge the gap between the technical and policy communities. One consequence of this ongoing collaboration is that in 2018, the California State Legislature is considering a bill (AB 1857) to create a new standard for building codes, a "functional recovery" standard. The goal of a functional recovery standard is that the function of the building can be recovered quickly after the design earthquake. The fate of the bill will be known by the time of the QuakeCoRE meeting.

NOTES:

Keynote

Disaster recovery lessons from Canterbury earth-quakes

Roger Sutton

Biography:

Roger graduated from the University of Canterbury in 1986 with a degree in Mechanical Engineering. Over 15 years at Orion NZ (formerly Southpower), including 8 years as CEO, Roger had a significant influence on the energy distribution sector, most notably in the aftermath of the 2010-2011 Canterbury earthquakes. In May 2011, Roger was announced as the CEO of the newly-established Canterbury Earthquake Recovery Authority (CERA), a position he held for three and a half years.

Abstract:

It's been over 7 years since the Canterbury Quakes first hit. At the time of the September 2010 quake I was Chief Executive of Orion, the local Electricity Lines Company. While Orion had invested extensively in resilience initiatives, power was still lost to many parts of the city.

It took a week before power was fully restored to the region. We felt like we had survived the "Big One" even wearing T shirts with "Tested to 7.1"

The February 22nd quake hit 5 months later, right underneath us, devastating the city. I was appointed Chief Executive of the Canterbury Earthquake Recovery Authority, a job that I did until early 2015.

In the 3 years since I finished at CERA, I have spent time reflecting on the important lessons from the Canterbury recovery.

What has gone well, what hasn't gone well and what we would do differently. What are the lessons for Governments, Utilities, businesses and community organisations we can take from Canterbury so that when the next big one strikes we are truly prepared to ensure recovery happens more quickly and more effectively and communities can rebuild themselves.

NOTES:

Sessions

Duration of earthquake ground motion: Influence on structural collapse risk and integration in design practice

Reagan Chandramohan

Biography:

Reagan Chandramohan is a Lecturer in the Department of Civil and Natural Resources Engineering at the University of Canterbury. He obtained his Bachelor's degree in Civil Engineering from the Birla Institute of Technology and Science in Pilani, India. Following a brief period of employment as a Field Engineer for Schlumberger Oilfield Services in the remote wilderness of Colombia, he obtained his Master's and PhD degrees in Structural Engineering from Stanford University in the US. Over the course of his graduate career, he has secured the Gerard J. Lieberman fellowship: Stanford University's premier doctoral fellowship award, and won the 2015 EERI US National Graduate Student Paper Competition.

His current research seeks to advance the state-of-the-art in structural risk and reliability assessment using modern high-performance computing tools and statistically rigorous structural analysis techniques. He employs large-scale numerical simulations to answer fundamental questions relating the characteristics of earthquake ground motion to the nonlinear dynamic behaviour and collapse response of structures.

Abstract:

The MW6.2 2011 Christchurch and MW7.8 2016 Kaikōura earthquakes shook buildings and infrastructure in New Zealand's major population centres for about 10 and 30 seconds respectively. Strong ground motion produced by the larger MW9.0 2011 Tohoku earthquake in Japan, on the other hand, lasted about 80 seconds on average, exceeding two minutes in some cases. A large Hikurangi subduction zone earthquake is thought to be capable of producing strong ground motion of duration comparable to the Tohoku earthquake in and around Wellington. Structural engineers have always intuitively acknowledged that longer duration earthquake ground motions are capable of inflicting greater structural damage. The larger number of deformation cycles they induce are expected to cause greater cyclic degradation of structural strength and stiffness, and an increased likelihood of sidesway collapse by ratcheting. This effect of duration is frequently echoed by earthquake reconnaissance teams when they state that a structure would probably have collapsed if the ground motion had lasted just a little longer. Yet, a number of early research studies employing deficient structural models incapable of simulating cyclic degradation, found little to no effect of duration on structural response. Consequently, current design and assessment standards do not mandate explicit consideration of the durations of ground motions a structure may experience over its life; they consider only their intensities and frequency content using response spectra. Recent studies employing large-scale numerical simulations of realistic, deteriorating structural models and rigorous statistical analyses have been able to successfully capture and quantify the influence of ground motion duration on structural collapse risk. These studies have provided the required evidence to warrant the explicit consideration of duration in structural design and assessment practice. Strategies proposed to incorporate the effect of duration in seismic design and assessment standards will ensure that buildings located at sites susceptible to long duration ground motions possess margins of safety against collapse comparable to those at sites likely to experience only short duration ground motions.

NOTES:

Sessions

Hazard posed by the Hikurangi subduction zone: New Zealand's largest and most active fault

Laura Wallace

Biography:

Dr. Wallace is a geodetic scientist whose primary interests lie in the interpretation of GPS, seismological and geological data to gain new insights into processes occurring at complex plate boundary zones. She has undertaken research throughout much of the western Pacific, with an emphasis on convergent margins in New Zealand, Papua New Guinea, Japan, and the Solomon Islands. Much of her recent research is focused on earthquake and slow slip event behavior of the Hikurangi megathrust plate boundary, and resolving the physical processes that control the diverse spectrum of slip behavior observed there. She has also been co-leading international efforts to undertake scientific drilling (IODP) at the offshore Hikurangi subduction zone, as well as seafloor instrument development and deployment to investigate slow slip events and earthquakes on the offshore Hikurangi margin. She is currently leading an MBIE Endeavour fund project to better understand the earthquake and tsunami hazard posed to New Zealand by the Hikurangi subduction zone.

Abstract:

The Hikurangi subduction zone is New Zealand's largest, and fastest slipping plate boundary fault. It has the potential to produce Great (Mw >8.0) or Giant (Mw >9.0) earthquakes and tsunami, that could impact much of New Zealand. Although GPS geodetic data suggest that large portions of the plate boundary are locked, and building stress to be relieved in future earthquakes, our knowledge of the earthquake and tsunami hazard posed by the Hikurangi subduction zone is severely limited. Moreover, the last 15 years have revealed that slow slip events lasting weeks to years, and involving slip on the plate boundary equivalent to Mw ~7.0 earthquakes, occur frequently at the Hikurangi subduction zone. The relationship of these slow slip events to shorter term seismicity rates, and seismic hazard is also unknown. This became a particularly important issue to understand following the Kaikoura earthquake when unprecedented widespread triggering of large slow slip events occurred over much of the Hikurangi subduction zone.

In the last few years, many unique characteristics of the Hikurangi subduction zone have attracted the attention of scientists around the world, making it a focal point for subduction zone studies globally. As a result, several large experiments including scientific ocean drilling, seismic imaging, and seafloor instrument deployments have taken place. These experiments involve international investment of over $50 million NZD, and are helping to transform our understanding of the Hikurangi subduction zone and the physical processes that control earthquakes and slow slip events here. A GNS-led MBIE Endeavour fund project is leveraging off of this investment to improve our record of past earthquakes on the subduction zone, develop new capability to investigate the modern-day offshore deformation and seismicity on the plate boundary, and to combine these data with seismic imaging and drilling studies to resolve the physical controls on subduction earthquake occurrence. I will overview our latest understanding of the Hikurangi subduction zone and its earthquake potential, and the implications for seismic and tsunami hazards in New Zealand.

NOTES:

Sessions

Building better resilience investment cases using end-to-end modelling: Key challenges, opportunities and fit with decision-making

Garry McDonald

Biography:

Dr Garry McDonald is a founding Director of ME Research, one of NZ's largest economics consultancies, where he has been responsible with fellow directors for delivery of 1,600+ projects (>$65m). He is also a successful Ecological Economics researcher, with science leadership roles in 13 Targeted Research/ Endeavour programmes, and >60 peer-reviewed publications. He currently leads the Economics Toolbox within the Resilience National Science Challenge. The breadth of his research track record reflects his interest in delivering transdisciplinary science focused on complex real-world challenges through mixed (multi-) methods, integrated assessment, and cutting-edge policy and decision-support systems. This includes co-design, development and implementation of the spatially explicit and fully dynamic Measuring the Economics of Resilient Infrastructure Tool (MERIT). Finally, he also has a natural ability to build capability in emerging researchers and teams, foster positive forward-looking collaborative public and private sector networks, and an entrepreneurial bent which often culminates in self-funding workstreams.

Abstract:

Infrastructure managers face an increasingly complex investment decision making space that requires them to consider not only the infrastructure they may have direct responsibility or control over, but those that are co-located or have high levels of connectivity. This is particularly the case when investing for 'resilience-building'. Creating resilience requires that we consider not only risk-based assessment, acknowledging that probabilistic assessment of hazard or infrastructure performance, is only partially adequate when planning for an uncertain future. We must also consider emerging societal and environmental challenges, view infrastructure as a 'system of systems', and apply novel evaluation methods to help us create value cases for resilience building. Our current evaluation toolkits are woefully inadequate in addressing these issues. In this talk, I will use Alpine Fault, Wellington Fault and the recent Kaikoura earthquake case studies to showcase how hazard, risk and impact modelling can be brought together to provide more holistic resilience business cases that trace impacts across space, through time for multiple stakeholders. From a modelling perspective, I also reflect on key challenges, opportunities and 'fit' with decision-making processes.

NOTES:

Sessions

Technical resilience of distributed infrastructure networks followingnatural hazard events: Developments in end-to-end quantitative simulation

Liam Wotherspoon

Biography:

Liam Wotherspoon is a Senior Lecturer in the Department of Civil and Environmental Engineering at the University of Auckland. He completed both his BE and PhD at the University of Auckland, with part of his PhD spend at Iowa State University through the EQC-Fulbright Award in Natural Disaster Research. His current research focuses on geotechnical site characterisation and site response, performance of infrastructure components under seismic and tsunami loading and infrastructure network resilience. He sits on the leadership team of QuakeCoRE and heads Technology Platform 2: Field Testing and Monitoring. He is the programme lead of the Infrastructure Toolbox of the Resilience to Nature's Challenges, and has used this platform to develop an active national collaborative group of infrastructure resilience researchers across a range of funding areas. He is a Fellow of the New Zealand Society for Earthquake Engineering, and sits on their Management Committee.

Abstract:

This presentation will outline the development of an end-to-end framework for quantifying the technical resilience of distributed infrastructure networks following natural hazard events. To be able to assess improvements in resilience from investment in network infrastructure before an event and approaches to management of networks after events, a quantitative framework is needed that can account for the complex interconnected nature of infrastructure networks.

The dependencies between networks is a key aspect, as the nature and magnitude of these dependencies are currently not well understood, and can often lead to unforeseen consequences. This necessitates the adoption of a system-of-systems modelling methodology that requires strong multi-disciplinary collaboration to capture the salient features of each network, and the dependencies between networks.

Developments in the simulation of the physical, functional and interdependent aspects of infrastructure network resilience will be presented, making use of examples of recent collaborative research across NZ, focussed around the efforts of QuakeCoRE and the Resilience to Natures Challenges National Science Challenge. This research is built around strong ties between research and industry in NZ, enabling application of frameworks on real network data and typologies, with real world scale and associated complexity.

NOTES:

Lightning Talks

Anastasiia Plotnikova
Robin Xie
Eyitayo Opabola
Lauren Vinnell
Marion Tan
James Dismuke
Chris de la Torre
Sara Harrison
Francisco Gálvez

Abstract:
The QuakeCoRE Lightning Talk Competition provides emerging researchers with an opportunity to develop their presentation and communications skills. Participants have five minutes and five slides to showcase their research in the field of earthquake resilience.

NOTES:

Sessions

Using earthquake hazard Scenarios for developing improved social resilience in New Zealand

David Johnston

Biography:

David Johnston is a Principal Scientist at GNS Science and Director of the Joint Centre for Disaster Research in the School of Psychology at Massey University, Wellington, New Zealand. His research has developed as part of multi-disciplinary theoretical and applied research programme, involving the collaboration of physical and social scientists from several organisations and countries. His research focuses on human responses to volcano, tsunami, earthquake and weather warnings, crisis decision-making and the role of public education and participation in building community resilience and recovery.

Abstract:

Scenarios are a useful and powerful tool in earthquake risk management. They provide a way of considering a range of events that are possible but have not yet occurred. They attempt to set up a logical sequence of events, from a given starting point and allow a range of possibilities to be considered. Erickson (1975) defines two types of scenarios: exploratory and normative. Exploratory scenarios focus on the processes of change in a system whereas normative scenarios have a pre-determined outcome and explore alternative paths used to reach this outcome. This talk will outline the evolution of the use of earthquake scenarios since the 1990s, in research, policy development, emergency management exercises, community engagement and education/outreach. Future directions and opportunities for new innovative approaches will be explored.

NOTES:

Sessions

The HayWired Earthquake Scenario: Connections to Improve Social Resilience

Anne Wein

Biography:

Dr. Anne Wein pursues the uses of scientific information to reduce societal risks and enhance societal resilience to natural hazards. She is a principal investigator at the United States Geological Survey (USGS), Menlo Park, California for the USGS scenarios (ShakeOut earthquake, ARkStorm winter storm, SAFRR Tsunami, and currently the HayWired earthquake sequence). She coordinates and conducts collaborative research activities to transform natural hazard information and data into potential societal consequences. Also, she investigated the communication of aftershock forecast information during the 2010-present Canterbury earthquake sequence with scientists at GNS Science, New Zealand. She works at the interfaces of disciplines, between theory and practice, using quantitative and qualitative methods.

In 2010, she received a Success Story award for advancing the goals of the USGS Science Strategy through the development and execution of the 2008 ShakeOut Scenario and Exercises. She represented Societal Impacts in the 2013 USGS Hazards Science Strategy Plan. Her foundation has been a PhD in Decision Science from the Graduate School of Business, Stanford University, in 1988.

Abstract:

The HayWired scenario, led by the United States Geological Survey, anticipates the impacts of a hypothetical magnitude 7.0 earthquake on the Hayward Fault, and its aftershocks The fault along the east-bay side of San Francisco Bay is among the most active and dangerous in the United States because it runs through a densely urbanized and interconnected region. Wired refers to various types of connections including physical, technological, economic, and social that affect the outcomes of a large earthquake. HayWired scenario goals are to facilitate improved understanding of earthquake hazards; earthquake risk reduction and response capabilities; and community capacity to recover.

Social resilience has been defined as the ability for communities to cope with, adapt to, and transform after disasters. The collaborative processes to construct and communicate the HayWired scenario aim to improve social resilience through building relationships and sharing knowledge/information in social networks. With partners, we construct what could happen using Interdisciplinary analyses of cascading hazards, physical damages, and societal consequences. With a coalition of organizations, the scenario is communicated in various events and media. The effort transcends community scales of household, organization, neighborhood, city, county, region, and state.

I will describe how the HayWired scenario construction and communication processes relate to improving social resilience. Scientific, engineering, business, utility, and civic communities have cooperated around topics of ground failure hazards; an aftershock sequence; building code performance; ShakeAlert; impacts to information and communication technology, utility and transportation infrastructure interactions; communities at risk; disruptions between work and home, and economic consequences.

NOTES:

Sessions

Implementation of low-damage design: How far have we come?

Richard Henry

Biography:

Rick is a senior lecturer in the Department of Civil and Environmental Engineering at the University of Auckland and a QuakeCoRE Associate Investigate. He is currently leading research into the seismic design of reinforced concrete walls, precast concrete structures, and low-damage systems. He is the PI for a joint QuakeCoRE-ILEE research project that involves shake-table testing of a two-storey low-damage concrete building at Tongji University. Rick is the deputy leader of QuakeCoRE Flagship 4 (Next-generation Infrastructure: Low-damage and Repairable Solutions), leader of QuakeCoRE Technology Platform 1 (Large-scale Laboratory Facilities), a council member of Concrete New Zealand – Learned society, and a member of the technical committee of the New Zealand Concrete Structures Standard (NZS 3101).

Abstract:

Lessons from past earthquakes and the increased focus on improving the resilience of our communities have led to the development of the low-damage design philosophy for structures. There has been a rapid increase in the implementation of low-damage buildings in New Zealand and plenty of lessons learned along the way. Examples of low-damage technologies used in buildings will be discussed and the success of their implementation examined.

Key questions explored include: How far have we progressed from the development of low-damage systems to the implementation of low-damage buildings? Will these buildings achieve the desired performance? What happens when innovation goes wrong?

NOTES:

Sessions

Integrating Low Damage Design into Community Resilience Models

Keri Ryan

Biography:

Keri Ryan is an Associate Professor of Civil Engineering and a member of the Center for Civil Engineering Earthquake Research at the University of Nevada, Reno. She specializes in earthquake engineering and protective systems for high seismic performance, with application to buildings and bridges. She was the PI of the U.S. National Science Foundation funded "Tools for Isolation and Protective Systems" (or TIPS) project to examine impediments to the wider application of seismic isolation systems. As part of this project, she led an international collaborative test program between the U.S. and Japan with large scale shake table testing that led to several new findings about the earthquake response of base-isolated buildings. Her recent research has expanded to take a broader view of "better performing buildings", touching on the seismic performance of reduced damage concrete walls, tall timber buildings with CLT rocking walls, and nonstructural walls with modified detailing. She has authored more than 50 publications on topics related to seismic isolation, high seismic performance, and life cycle analysis of structures.

Abstract:

A variety of technologies are now available for achieving low damage structural performance and enhanced reparability. In the nonstructural world, significant performance gains can be achieved by attention to detailing, and many detailing innovations are being explored. These offer the potential to identify the best solution for the given application considering seismic hazard, architectural requirements, cost constraints, and performance objectives. The community is moving toward advanced tools to evaluate performance, but some challenges remain. In addition, the means by which communities make progress toward seismic resilience vary regionally and nationally; and are affected by regional seismicity (earthquake frequency), cultural influences, organization of the construction industry, governmental influences. Many lessons can be learned by examining these differences and identifying the models that lead to more aggressive action toward resilience and hence adoption of technologies for better performing buildings on a broad scale.

NOTES:

Posters

Flagship 1: Ground Motion Simulation and Validation – Posters 01-13

1	Modeling Nonlinear Site Effects in Physics-Based Ground Motion Simulation **Chris de la Torre,** Brendon Bradley
2	Ground motion simulation of Upper North Island earthquakes **David Dempsey**, Jennifer Eccles, Liam Wotherspoon, Brendon Bradley
3	Natural disaster system, a multi-hazard impact assessment methodology **Alexandre Dunant**, Tim Davies, Mark Bebbington, JC Gaillard
4	What caused the spatial variability of strong ground motions near the epicentre of 2016 M7.8 Kaikōura earthquake? The role of the local geological condition **Seohko Jeong**, Kevin Foster, Christopher de la Torre, Liam Wotherspoon, Brendon Bradley
5	Strong Ground Motions Simulations for Dunedin: First step using the SCEC Broadband Simulation Platform **Anna Kowal**, Mark Stirling, Catherine Sangster, Andrew Gorman
6	Hybrid Broadband Ground Motion Simulation Validation of New Zealand Earthquakes **Robin Lee**, Brendon Bradley
7	Seismic response of complex structural systems using code-compatible as-recorded and simulated ground motions **Vahid Loghman**, Karim Tarbali, Brendon Bradley, Reagan Chandramohan, Chris McGann, Didier Pettinga
8	On the Relationship Between Geospatial Liquefaction-Model Performance and Quality of Geospatial Data: A Case Study of the 2010-2016 Canterbury Earthquakes **Brett Maurer**, Alex Baird, Mertcan Geyin
9	Getting ready to rock Dunedin: 3D velocity model for Dunedin ground motion simulations. **Catherine Sangster**, Andrew Gorman, Mark Stirling, Liam Wotherspoon
10	Rupture model of a Hikurangi megathrust earthquake **Paul Somerville**, Jeff Bayless, Andreas Skarlatoudis
11	Cybershake NZ v18.6: New Zealand Simulation-Based Probabilistic Seismic Hazard Analysis **Karim Tarbali**, Brendon Bradley, Jonney Huang, Daniel Lagrava, Viktor Polak, Jason Motha, Sung Bae
12	Physics-based ground motion simulations of Hope Fault earthquakes and comparison with the shaking from the 14 November 2016 Kaikoura earthquake. **Ethan Thomson**, Brendon Bradley, Robin Lee
13	Simplified-physics high frequency ground-motion simulations using site-specific parameters **Jagdish Vyas**, Brendon Bradley, Hoby Razafindrakoto, Ethan Thomson, Robin Lee

Flagship 2: Liquefaction Impacts on Land and Infrastructure – Posters 14 -22

14	Validating Numerical Simulation of SSI for Buildings on Liquefiable Deposits **Ananth Balachandra**, Sara Chalian, Connor Hayden, Chris McGann, Liam Wotherspoon
15	Cyclic Undrained DSS Testing of Christchurch Sands **Claudio Cappellaro**, Misko Cubrinovski, Jonathan Bray, Gabriele Chiaro, Michael Riemer, Mark Stringer
16	Experimental and numerical investigations of the Takanodai landslide caused by the 2016 Kumamoto Earthquakes, Japan **Gabriele Chiaro**, Takashi Kiyota, Muhammad Umar, Christopher Massey, Kewin Chew, Joon Su Kim
17	CPT-Based Site Characterization and Liquefaction Assessment of the Reclaimed Soils in CentrePort, Wellington for the 2016 Kaikoura Earthquake **Riwaj Dhakal**, Misko Cubrinovski, Jonathan Bray, Christopher de la Torre
18	Accounting for Ground Motion Duration in Evaluating Liquefaction Triggering **Russell Green**, Samuel Lasley, Adrian Rodriguez-Marek, Kristin Ulmer
19	Soil-Foundation-Structure Interaction Analysis of an Instrumented Building in Wellington, NZ **Christopher McGann**, Reagan Chandramohan, Liam Wotherspoon, Connor Hayden, Didier Pettinga, Seokho Jeong
20	Post-liquefaction behaviour of undisturbed and reconstituted natural pumiceous sands **Rolando Orense**, Baqer Asadi, Sadeq Asadi, Michael Pender
21	Maximum shear modulus of crushable natural pumiceous soil and hard-grained sand: A comparison **Michael Pender**, Baqer Asadi, Sadeq Asadi, Rolando Orense
22	Cyclic testing on undisturbed samples of pumice-rich soils from the North Island **Mark Stringer**, Dr Rolando Orense, Baqer Asadi, Sadeq Asadi

Flagship 3: Addressing Earthquake-vulnerable Buildings – A Multidisciplinary Approach – Posters 23-34

23	Toolkit of Alternative Policies and Incentives for Resilience and Sustainable Reuse of Heritage Buildings **Temitope Egbelakin**, Ruan Malan
24	Creating GIS-ready building inventory dataset for seismic risk assessment and management **Ken Elwood**, Olga Filippova, Jacob Pastor, Ilan Noy
25	Discrete Element Modelling of Unreinforced Masonry Buildings and Parts **Francisco Galvez**, Jason Ingham, Dmytro Dizhur, Marta Giaretton
26	Regulating for Resilience in an Earthquake-Vulnerable City: The Wellington Case Study (Stage 1) **John Hopkins**, Toni Collins
27	Drivers of Injuries from Recent New Zealand Earthquakes **Nick Horspool**, Ken Elwood, David Johnston, Michael Ardagh
28	Measuring the Impact of Insurance on Urban Recovery with Light: The 2010 -2011 New Zealand Earthquakes **Cuong Nguyen**, Ilan Noy
29	Red Zoning in Christchurch: What were the Consequences? **Ilan Noy**, Cuong Nguyen
30	Rebuilding Christchurch: Amended Building codes and their impact in New Zealand **Amarachukwu Nwadike**, Suzanne Wilkinson, Alice Chang-Richards
31	Accounting for Inherent Uncertainty in Failure Mode and Deformation Capacity in Seismic Assessment of Reinforced Concrete Structures **Eyitayo Opabola**, Ken Elwood
32	Wellington Cordon Project **Caroline Orchiston**, Shakti Shrestha
33	Development of a Seismic Damage Prediction Model Using Data Science Techniques **Samuel Roeslin**, Quincy Ma, Ken Elwood
34	An overview of economic impact of resilient seismic technologies on earthquake insurance in New Zealand **Shermineh Zarinkamar**

Flagship 4: Next-generation Infrastructure – Low-damage and Repairable Solutions – Posters 35-46

35	Characterising the effect of ground motion duration on deteriorating structural models **Vishvendra Bhanu**, Reagan Chandramohan, Timothy Sullivan
36	Resilience by Design: Improving Hospital Functionality Following Earthquake **Megan Boston**
37	Modelling of Bridge Pile-Column Dynamic Field Tests **Pavan Chigullapally,** Liam Wotherspoon, Lucas Hogan, Michael Pender
38	The Lateral Seismic Performance of Multi-storey Heavy Timber Buildings with BRBs **Wenchen Dong**
39	Using loss assessment to provide a value case for implementation of seismic isolation of light-framed timber houses in New Zealand. **Tom Francis**, Andre Filiatrault, Timothy Sullivan
40	Effect of ground motion duration and response spectral shape on seismic performance of steel moment resisting frame buildings **Srijana Gurung Shrestha**, Reagan Chandramohan, Rajesh Dhakal
41	An analysis and design procedure for seismic resilient buildings using Resilient Slip Friction Joint (RSFJ) technology **Ashkan Hashemi**, Pouyan Zarnani, Pierre Quenneville
42	Developing procedures for the prediction of floor response spectra **Kieran Haymes**
43	Shaking table tests of full-scale rocking selective pallet racks **James Maguir**, Zhenghao Tang, Charles Clifton, Lip Teh, James Lim
44	Simplified Performance Based Design/Assessment: Towards an improved SAC-FEMA Approach **Amirhossein Orumiyehei**, Tim Sullivan, Ken Elwood
45	Planning shake-table testing of a three-storey low-damage steel frame building **Kiran Rangwani**, Gregory MacRae, Charles Clifton, Rajesh Dhakal, Hamed Bagheri, Graeme Beattie, Ken Elwood, Ashkan Hashemi, Pierre Quenneville, Shahab Ramhormozian, Mohammad Rashid, Geoff Rodgers, Tim Sullivan, Zhenduo Yan, Pouyan Zarnani
46	Effect of Loading Rate on the Response of Reinforced Concrete Prisms **Qi Wang**, Rick Henry, Lucas Hogan, Allan Scott

Flagship 5: Pathways to Improved Resilience – Posters 47-60

47	Nonprofit-business collaboration: Exploring the effects on nonprofit resilience **Ann Brown**, Bernard Walker, Sussie Morrish, Lucie Ozanne
48	Disaster Resilience Framework for Hotels: An integrative approach **Nancy Brown**, Caroline Orchiston, Jane Rovins, Shirley Feldmann-Jensen, David Johnston
49	Mapping New Zealand 2025 – responding to the Kaikoura earthquakes **Anna de Raadt**, Graeme Blick
50	Community Resilience Capital Framework: An action-research approach to Earthquake Community Resilience in Aotearoa New Zealand. **Martin Garcia**
51	Prepared for the Big One? An exploratory study with emergency managers, planners and responders in Aotearoa New Zealand **Lesley Gray**
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53	Alternative Data Sources for Impact Warnings and Impact Modelling **Sara Harrison**
54	Resilience of Business Models of Small and Medium Enterprises **Rabia Ijaz**
55	The science behind citizen science: how citizens could be engaged in disaster risk management research projects in Aotearoa New Zealand. **Lisa McLaren**
56	Developing a Build Back Better tool for Post-Disaster Recovery and Reconstruction **Shankar Neeraj**
57	Reviewing issues with anchor projects in Christchurch following 2010-2011 earthquakes: Christchurch Justice and Emergency Services Precinct **Niransha Rodrigo**
58	Disaster apps: usability factors affecting continued intention to use **Marion Tan**, Raj Prasanna, Kristin Stock, Emma Hudson-Doyle, Graham Leonard, David Johnston
59	An Example of How Community Participation can be Successfully Incorporated into the Disaster Risk Assessment Process, Aotearoa-New Zealand **Kristie-Lee Thomas**, Thomas Wilson, Kate Crowley, Matthew Hughes, Tim Davies, Helen Jack, Darren King, Emily Lane, David Johnston, Graham Leonar
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62	Data and decision making in the transport sector following the Kaikōura earthquake **Daniel Blake**, Liam Wotherspoon, Maggie Trotter, Joanne Stevenson, Vivienne Ivory
63	New Zealand Stopbank networks: Understanding Resiliency Challenges **Kaley Crawford-Flett**, Daniel Blake, Eduardo Pascoal, Matthew Wilson
64	Probabilistic framework for modeling spatially distributed infrastructure **Rachel Davidson**
65	The Resiliency of Communication infrastructure during Alpine fault 8 (AF8) Earthquake scenarios in Westcoast, New Zealand **Farrukh Latif**, Andrew Austin, Nirmal Nair, Liam Wotherspoon, Rob Ruiter
66	Historic performance and seismic hazard exposure of national infrastructure networks **Amelia Lin**, Moustafa Al-Ani, Pavan Chigullapally, Lucas Hogan, Shong Wai Lew, John Reynolds, Vinod Sadashiva, John Wood, Liam Wotherspoon, Daniel Blake
67	Electricity Distribution Resilience Framework through West Coast Alpine Fault Scenario **Leo Liu**, Andrew Austin, Farrukh Latif, Yang Liu, Duncan Maina, Ebad Rehman, Samad Shirzadi, Nirmal Nair
68	Islanded grid operation and restoration in distribution electricity networks following large-scale natural hazards **Duncan Maina**, Cosmin Cosma, Samad Shirzadi, Stuart Wilson, Rodger Griffiths, Nirmal Nair
69	Critical infrastructure impacts in small towns following the Kaikōura earthquake, and pre- and post- event adaptations to manage these impact **Damon McKibbin**, Daniel Blake, Thomas Wilson, Liam Wotherspoon, Matthew Hughes
70	Infrastructure Failures and Recovery from an Alpine Fault Earthquake Scenario **Nirmal Nair**, Alistair Davies, Raghav Pant, Tom Robinson, Scott Thacker, Conrad Zorn
71	Performance of underground electricity cables during the 2010-2011 Canterbury Earthquake Sequence: Insights for assessing criticality and resilience **Ebad Rehman**, Peter Elliot, Matthew Hughes, Liam Wotherspoon, Nirmal Nair
72	An integrated simulation framework to model Critical Infrastructure interdependencies **Yasir Imtiaz Syed,** S R Uma, Raj Prasanna, Kristin Stock, Denise Blake
73	Tsunami Vulnerability – Developing Tools for Infrastructure Impact Assessment **James Williams**, Colin Whittaker, Thomas Wilson, Matthew Hughes, Nick Horspool, Emily Lane, Liam Wotherspoon

74	Quantification of infrastructure downtime in earthquake reconstruction **Sam Wilson**, Alice Chang-Richards
75	Resilience of Telecommunications Networks and Services: Practical improvements in the data collection in a post-disaster scenario **Liam Wotherspoon**, Silvia Bertelli, Sonia Giovinazzi, Susanna Lopez-Querol, Tiziana Rossetto, Rob Ruiter

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