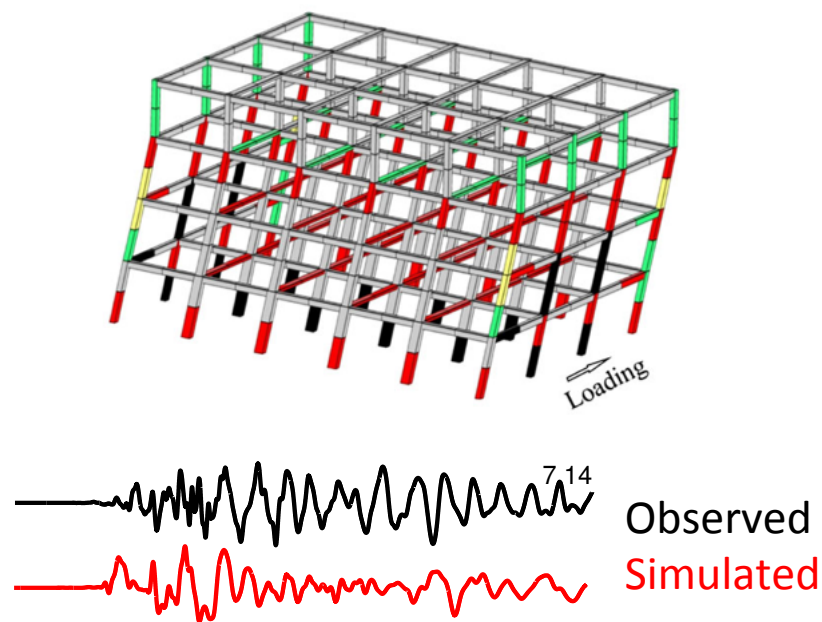
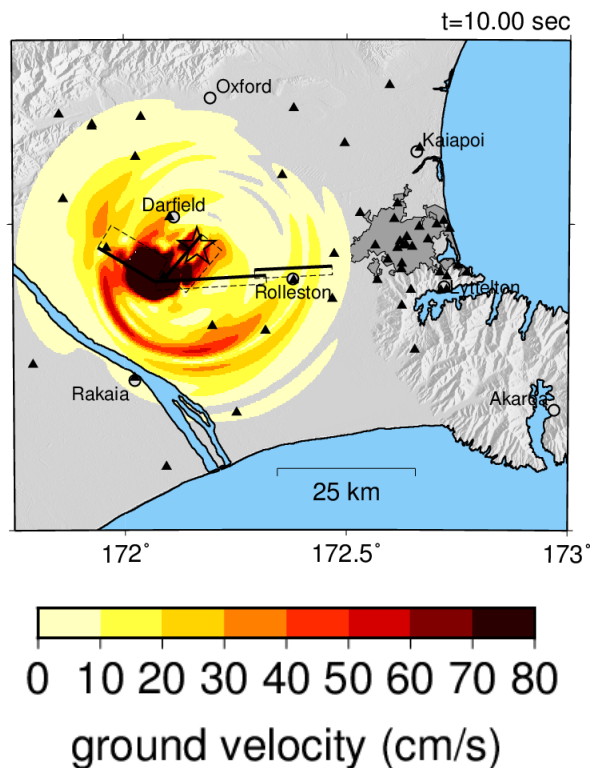


Flagship Project 1: Ground motion simulation & validation



Brendon Bradley,

Flagship Project Leader & Deputy
Director, QuakeCoRE

QuakeCoRE Flagship Projects

Technology Platforms

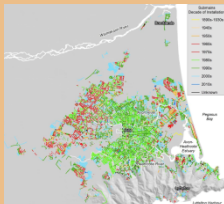
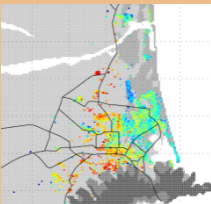
1. Large-scale Laboratory Facilities



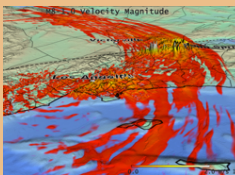
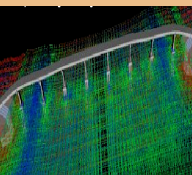
2. Field Testing & Monitoring Equipment



3. Multi-disciplinary Community Datasets



4. Simulation & Data Visualization



Research Themes

THEME 1
Seismic demands
and consequent
geohazards

THEME 2
Infrastructure
component
modelling

THEME 3
Infrastructure network
interactions and
interdependencies

THEME 4
Novel technologies,
design philosophies,
and decision-support
tools

Flagship Projects

1. Ground motion
simulation & validation
(Bradley)

2. Liquefaction
impacts on
infrastructure
(Cubrinovski)

3. Heritage, Safety
and Economics:
Addressing EPBs
(Ingham)

4. Repairable
infrastructure
(Elwood/Pampanin)

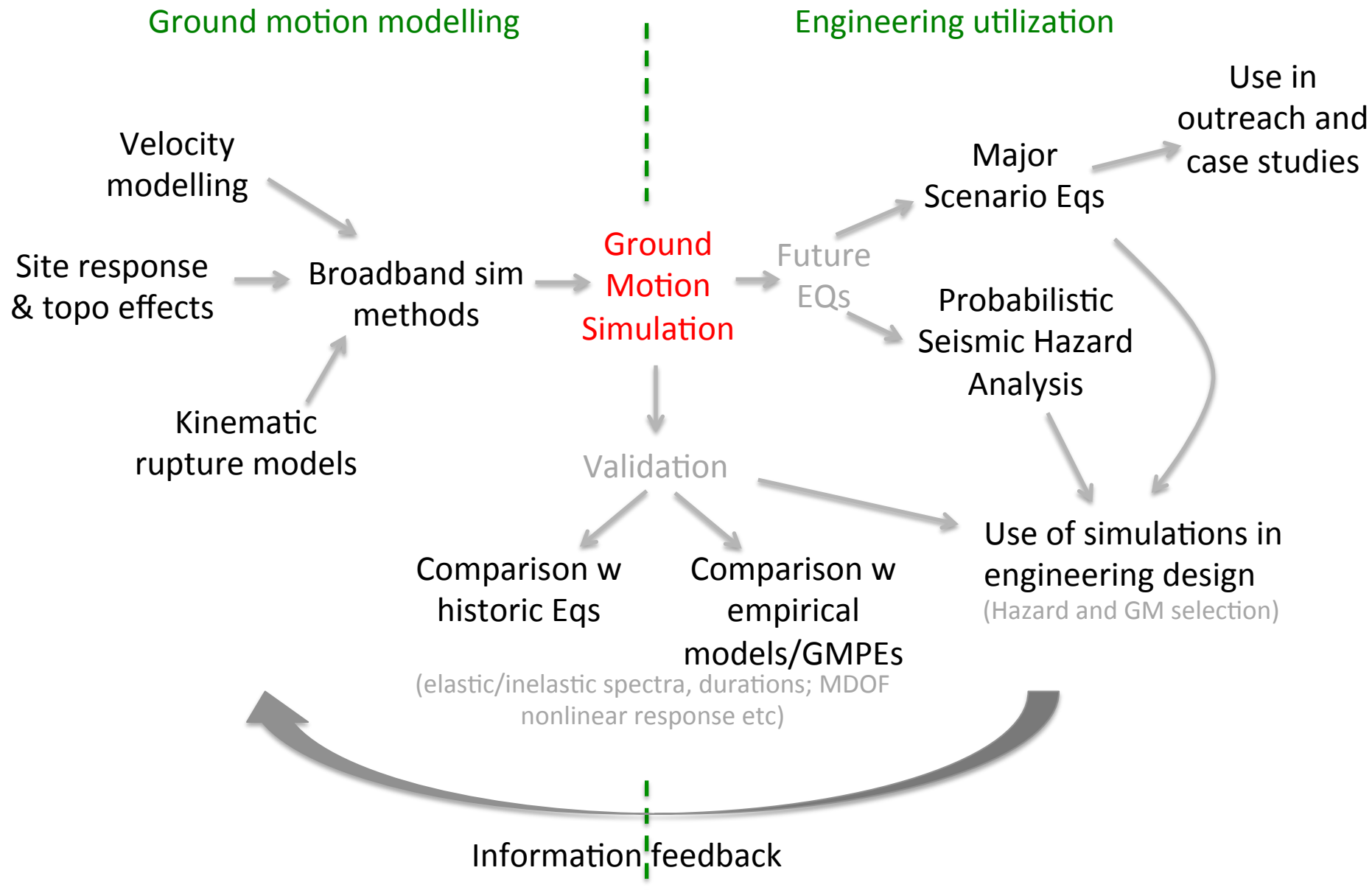
5. Pathways to
improved resilience
(Seville)

6. National critical
infrastructure
(with RNC-NSC)
(Wotherspoon)

Key Attributes of Flagship Projects

1. Research excellence
2. High-impact (high relevance/need) research
3. Leveraged funding (proven high quality research; co-funded by Marsden, EQC, MBIE, NHRP etc, or international sources)
4. International collaborations, regulatory engagement and substantial links to industry and stakeholders
5. Large transformational projects that involve multi-disciplinary and multi-institutional collaborations

Spectrum of research



Thrust Areas (with strategic impacts)

- 1. Simulation methods:** Development/refinement of ground motion simulation methods that enable the generation of acceleration time series for the seismic response analysis of infrastructure (including kinematic 'rupture generators').
- 2. Velocity model development:** Development of 'velocity models' of the earth's crust in new regions of NZ, or improve those in existing regions; such models should provide resolution at the length scales necessary for broadband ground motion simulations
- 3. Nonlinear site and topographic response:** Develop, validate, and apply models for nonlinear near-surface site and topographic response for use in conjunction with GM simulation methods.
- 4. Application for major NZ EQ scenarios:** Utilize ground motion simulations to forecast the severity of ground shaking over spatially-distributed regions in future major NZ earthquakes.
- 5. Uncertainties and PSHA:** Examination of modelling uncertainties in ground motion simulation methods and utilization for probabilistic seismic hazard analysis
- 6. Use of simulations in earthquake engineering analyses:** Explore the role of simulated ground motions for use in seismic response analysis of engineering infrastructure, including comparisons with as-recorded ground motions and development of procedures for simulated ground motions in infrastructure seismic design guidelines.