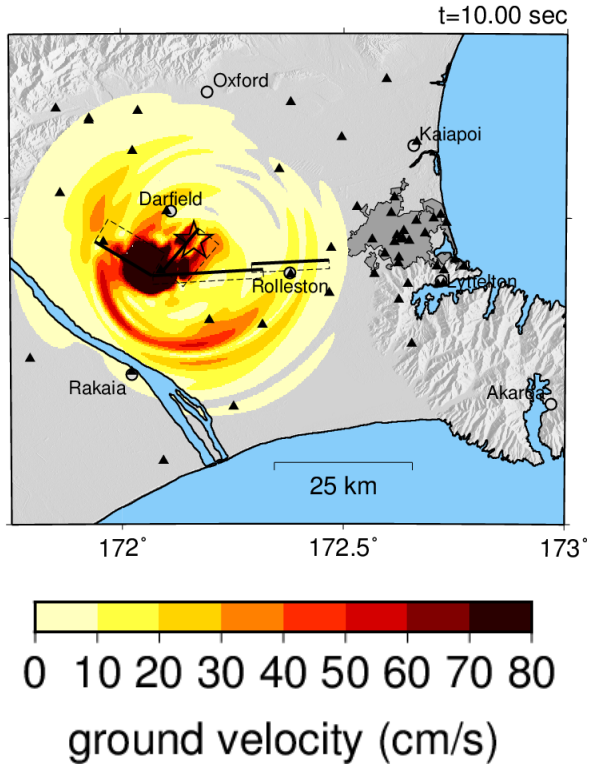
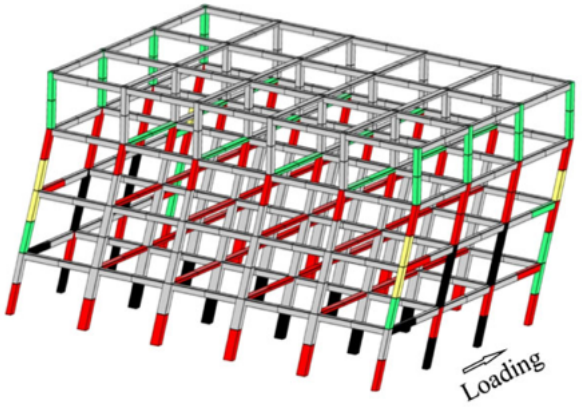
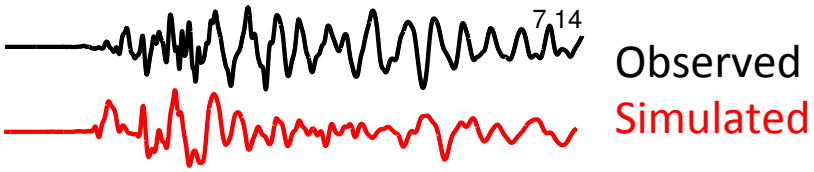
Flagship Project 1:
Ground motion simulation & validation



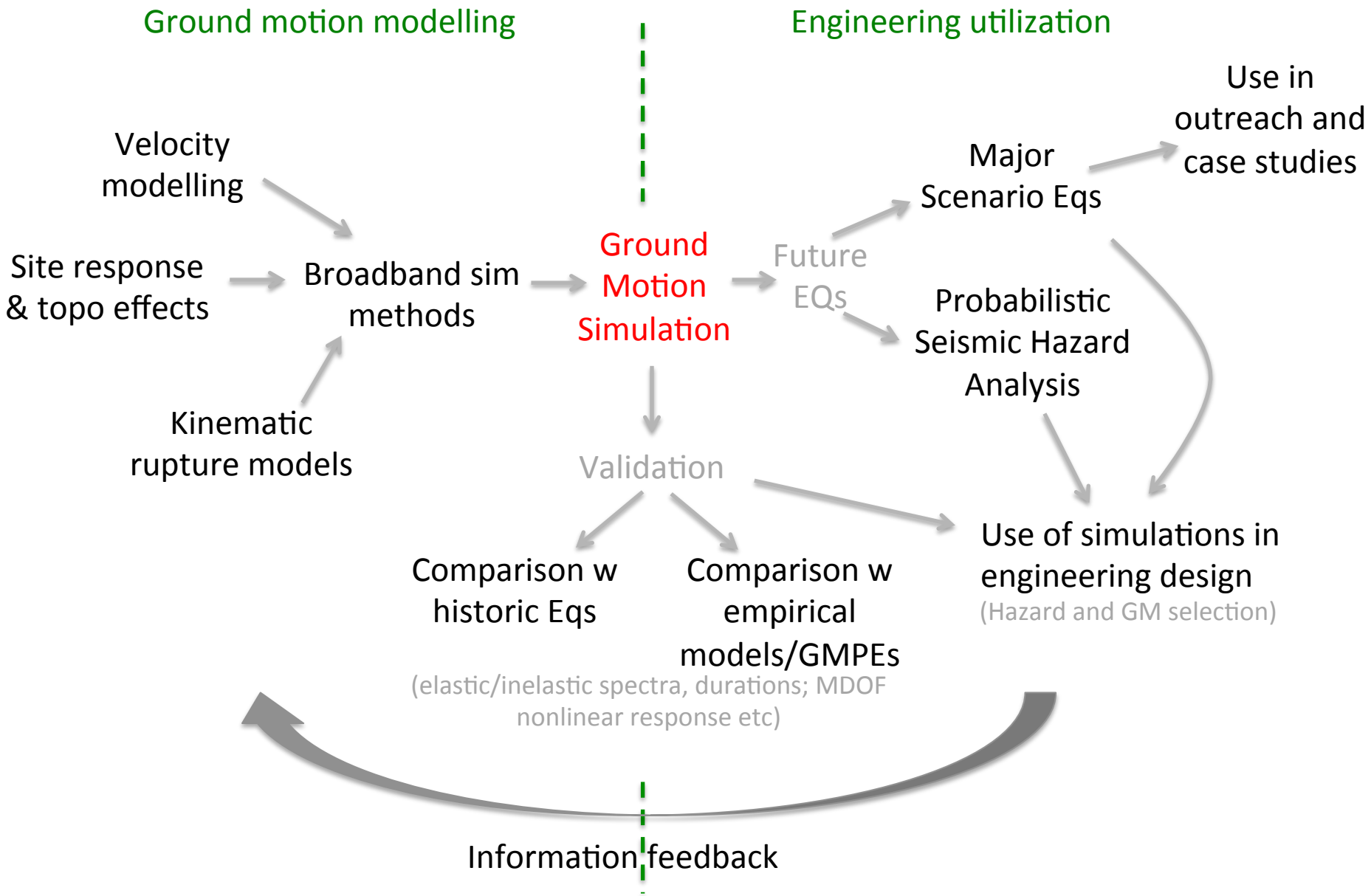




Brendon Bradley,

Flagship Project Leader & Deputy Director, QuakeCoRE

Spectrum of research



Thrust Areas and 2016 funded projects

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').

#16002(Somerville) Sim Validation of two historical NZ Subduction Eqs

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

#16027(Wotherspoon) Site Characterization Nelson/Tasman Region

#16030(Bradley/Lee) 3D Tomography to improve Canterbury Vel Model

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.

#16030(Bradley/Jeong) Topographic simulation Port Hills, Christchurch

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.

#FP1Postdoc(Nazer) Sim Porters Pass fault rupture

5. **Uncertainties and PSHA:** Examination of modelling uncertainties in ground motion simulation methods and utilization for probabilistic seismic hazard analysis

#16006(Stirling) Sim Validation Clyde fault using Fragile Geologic Features

#16030(Bradley/Razafindrakoto) Non-ergodic analysis Canterbury simulations

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.

#16035(Pettinga) Guidelines for utilizations of GM sim in eng practice

#16057(Luco) Coordination of QuakeCoRE and SCEC GMSV efforts

Time	Speaker	Topic
12:45-1:15	**Lunch available**	
1:15	**Welcome and workshop aims**	
1:20	**Validation (10min talks)**	
	Christine Goulet	SCEC efforts in ground motion simulation validation
	Ricardo Taborda	Validation of physics-based ground motion simulations of past earthquakes
	Hoby Razafindrakoto	Validation of ground motion simulations in the Canterbury, NZ, region
	Paul Somerville / Andreas Skarlatoudis	Validation of strong ground motion simulations of two historical NZ subduction zone earthquakes on the SCEC BBP
	John Anderson	The composite source model: Calibrations and validation for the SCEC BBP and precariously balanced rocks
	Sanaz Rezaeian	Implementation of GMSV TAG validation gauntlets on the SCEC BBP for engineering applications
	Brendon Bradley	Explicit validation of uncertainties in ground motion simulation
2:40	*Open Discussion: Advancing simulation validation*	
3:00	*Coffee break*	
3:20	**Advances in GM Sim: High frequencies and shallow soil response (10min talks)**	
	Ricardo Taborda	Current efforts and future challenges in high frequency ground motion simulation
	Seokho Jeong	Improvements in ground motion prediction via explicit simulation of near-surface site response at Heathcote Valley during the Canterbury earthquakes
	Liam Wotherspoon	Near surface site characterization
4:00	*Open Discussion: Advancing modeled physics in simulations*	
4:20	**Utilization of simulated ground motions (10min talks)**	
	Didier Pettinga / Brendon Bradley	Guidelines for the utilization of ground motion simulations in engineering practice
	Christine Goulet / Sanaz Rezaeian	Utilization of simulated ground motions in the US hazard and design maps
4:40	*Open Discussion: Utilization of simulations*	
5:00	**Workshop close**	