

Regional-Scale Simulations of Earthquake Ground Motions and Infrastructure Response for Performance Based Earthquake Engineering



PEER International Pacific Rim Forum, June 16 - 17, 2021

Online Workshop

Day 1: Wednesday, June 16, 2021

Zoom info:

Time	Session & Topic	Presentation Title	Speakers
7:00 am - 7:30 am PDT 4:00 pm - 4:30 pm CEST 11:00 pm - 11:30 pm JST	Opening Remarks	Welcome and Context / Purpose of the Pacific Rim Forum	McCallen/Mosalam
7:30 am - 9:10 am PDT 4:30 pm - 6:10 pm CEST 11:30 pm - 1:10 am JST (+1)	Core Elements – Current Status and Knowledge/Capability Gaps 1: Earthquake Source Representation (Moderator: Pitarka)	Quantifying Earthquake Rupture Complexity from Theory and Observations	Mai
		Physics-Based Constraints on Kinematic Rupture Models Used in Broadband Ground Motion Simulations	Pitarka
		Kinematic Simulation of Near Fault Ground Motions for the 2019 M7.1 Ridgecrest, CA Earthquake	Graves
		Earthquake Source Characterization for Broadband Ground Motion Simulation	Miyake
		Discussion	ALL
9:10 am - 9:20 am PDT	Break		
9:20 am -11:00 am PDT 6:20 pm - 8:00 pm CEST 1:20 am - 3:00 am JST (JST: Thu, June 17)	Core Elements – Current Status and Knowledge/Capability Gaps 2: Nonlinear Structural Response / Soil Response (Moderator: McCallen)	Progress Towards Engineering Applications of Physics-Based Numerical Simulations of Earthquake Ground Motions	Paolucci
		Numerical Simulation of The Impact of Regional Geology on The Structural Response	Lopez-Caballero
		Seismically-induced Slope Deformations: Pile Supported Wharfs and Bridges	Elgamal
		Nonlinear Site Response: A Seismology Perspective	Bonilla
		Discussion	ALL
11:00 am - 11:10 am PDT	Break		
11:10 am - 12:50 pm PDT 8:10 pm - 9:50 pm CEST 3:10 am - 4:50 am JST (JST: Thu, June 17)	Core Elements – Current Status and Knowledge/Capability Gaps 3: Geologic models to support high frequency simulations (stochastic geology, tomography, FWI geologic updates) (Moderator: Pitarka)	Modern Approaches to Characterizing Seismic Hazard for Engineering Applications: Investigating Earthquake Source Behavior and Modelling Broadband Ground Motions	Withers
		New Velocity Relations for SF Bay Quaternary Sediments and Simulation of Long Duration Shaking in the East Bay Plain	Hirakawa
		Pushing the Simulation of Earthquake Ground Motion in the Grenoble Valley to Higher Frequencies. Part I: Integrating Geotechnical, Geological and Geophysical Near-Surface Properties into a 3D Model.	Cornou
		Pushing the Simulation of Earthquake Ground Motion in the Grenoble Valley to Higher Frequencies. Part II: Verification and Validation Aspects.	Chaljub
			Discussion
12:50 pm - 3:00 pm PDT 9:50 pm - 12:00 am CEST 4:50 am - 7:00 am JST (JST: Thu, June 17)	Break		
3:00 pm - 4:40 pm PDT 12:00 am - 1:40 am CEST 7:00 am - 8:40 am JST (CEST, JST: Thu, June 17)	Core Elements – Current Status and Knowledge/Capability Gaps 4: Near-Surface Geotechnical Layers (Linear and Nonlinear) (Moderator: Seylabi)	The Importance of Near-Surface Geotechnical Response on Earthquake Ground Motions in the San Francisco Bay Area	Bray
		Towards Modeling Three-Dimensional Shallow Crust Nonlinearity in Broadband Deterministic Earthquake Simulations	Seylabi
		A Sediment Velocity Model for The Simulation of Basin Amplification Effects in Southern California	Asimaki
		A New Approach for Broadband Site Amplification Prediction Based on The Mapping Function from Theory to Observation	Kawase
			Discussion
4:40 pm - 4:50 pm PDT	Break		
4:50 pm - 6:30 pm PDT 1:50 am - 3:30 am CEST 8:50 am - 10:30 am JST (CEST, JST: Thu, June 17)	Core Elements – Current Status and Knowledge/Capability Gaps 5: Geophysics / Engineering Model Coupling (Moderator: Seylabi)	Rupture-to-Rafters: Scenario-Based Seismic Risk Assessment of Critical Infrastructure through Regional Earthquake Simulations	Tacioglu
		Integration of 3D Large-Scale Earthquake Simulations into The Assessment of The Seismic Risk of Bogota, Colombia	Restrepo
		Coupling Regional Scale Ground Motion Simulation and Material Point Method for Large Deformation Analyses of Coseismic Landslides	Wang
		Utilization of Synthetic Ground Motion Time-Series for Bridge Response Assessment	Zareian
		Discussion	ALL
6:30 pm - 6:40 pm PDT	Break		
6:40 pm - 8:20 pm PDT 3:40 am - 5:20 am CEST 10:40 am - 12:20 pm JST (CEST, JST: Thu, June 17)	Core Elements – Current Status and Knowledge/Capability Gaps 6: Computational Considerations - Integrated Simulations Workflow, Performance and Computational Demands (Moderator: Abrahamson)	Integration of Earth Science, Earthquake Engineering and Social Science Simulations for Earthquake Hazard, Disaster and Response Estimation	Hori
		A Fast Scalable Implicit Solver for Nonlinear Wave Simulation on Low-Ordered Unstructured Finite Elements to Enhance Comprehensive Earthquake Simulation	Ichimura
		The US DOE EQSIM Exascale Application Development for Fault-to-Structure Regional-Scale Simulations	McCallen
		Physics-Driven City-Scale Disaster Simulation Methods and Applications	Lu
		Discussion	ALL
8:20 pm - 8:30 pm (PDT)	Closing Remarks		McCallen/Mosalam

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Online Workshop

Day 2: Thursday, June 17, 2021

Zoom info:

Time	Session Name	Presentation Title	Speakers
7:00 am - 7:30 am PDT 4:00 pm - 4:30 pm CEST 11:00 pm - 11:30 pm JST	Day 2 Opening Remarks	Recap of Day 1 & Objectives of Day 2	McCallen/Mosalam
7:30 am - 9:10 am PDT 4:30 pm - 6:10 pm CEST 11:30 pm - 1:10 am JST (+1)	Building Confidence in Regional-Scale Simulation Methods and Computational Tools 1: Metrics and Acceptance Criteria for the Use of Simulations in PBEE (Moderator: Petrone)	Guidelines on Utilization of Simulated Ground Motions for Engineering Building Response Applications	Lin
		A Multi-Level Framework for Region-Specific Engineering Validation of Simulated Ground Motions	Galasso
		A 4-Step Methodology for the Validation of Not-Historical Large-Event Ground-Motion Simulations: the San Francisco Bay Area Case Study	Petrone
		Significance and Validation of the Inter-Period Correlation of Simulations	Bayless
		Discussion	ALL
9:10 am - 9:20 am PDT	Break		
9:20 am - 11:00 am PDT 6:20 pm - 8:00 pm CEST 1:20 am - 3:00 am JST (JST: Fri, June 18)	Building Confidence in Regional-Scale Simulation Methods and Computational Tools 2: Characterization and Propagation of Uncertainties (Moderator: Petrone)	Incorporation of Uncertainties in Seismic Hazard Characterization Using Numerical Simulation Models	Abrahamson
		Computational Workflows for Propagating Uncertainties in Regional Simulations of Earthquake Performance of Buildings and Infrastructure	Deierlein
		Grand Challenges for Uncertainty Quantification in Inverse Problems	Marzouk
		Spatial and Statistical Characterization of P- and S-wave Velocities of Soils from Geophysical Measurements	Sett
		Discussion	ALL
11:00 am - 3:00 pm PDT 8:00 pm - 12:00 am CEST 3:00 am - 7:00 am JST (JST: Fri, June 18)	Break		
3:00 pm - 4:40 pm PDT 12:00 am - 1:40 am CEST 7:00 am - 8:40 am JST (CEST, JST: Fri, June 18)	Building Confidence in Regional-Scale Simulation Methods and Computational Tools 3: Verification and Validation of Simulation Results (Moderator: Pitarka)	Verification and Validation of Earthquake Ground Motion Simulation in the San Francisco Bay Area with SW4	Rodgers
		Spatial Correlations in CyberShake Ground Motion Simulations: Validation and Estimation of Non-stationarities	Baker
		Verification and Validation of Regional-Scale Ground Motion Models and Simulations	Taborda
		Validation of Ground Motion Simulations using Large Datasets in New Zealand	Bradley
		Discussion	ALL
4:40 pm - 4:50 pm PDT	Break		
4:50 pm - 6:30 pm PDT 1:50 am - 3:30 am CEST 8:50 am - 10:30 am JST (CEST, JST: Fri, June 18)	Transitioning to Practice for Performance Based Earthquake Engineering: A Strategy for Transition to Practice – An Appropriate Roadmap (Moderator: McCallen)	A Phased Strategy for Transition of Synthetic Ground Motions Into Seismic Hazard Practice	Abrahamson
		Implementation of 3D Ground Motion Simulations in USGS Seismic Hazard Models	Moschetti
		Developing a Community Accessible Database of Synthetic Ground Motion Records	Mosalam
		Discussion	ALL
6:30 pm - 6:40 pm PDT	Break		
6:40 pm - 8:30 pm PDT 3:40 am - 5:30 am CEST 10:40 am - 12:30 pm JST (CEST, JST: Fri, June 18)	Operational Models for Broadening Community Access – From R&D to Community Application	Moderated Panel Discussion on Operational Model Options for Community Access to Simulated Ground Motions	CGS Bohlen
			PEER Abrahamson PG&E Bachhuber USGS Moschetti LBNL McCallen
	Closing Remarks and Open Discussion		McCallen/Mosalam

