



Hybrid Simulation Workshop & Multi-Hazard Symposium

11-12-13 - September 2019
Eucentre Foundation, Pavia - Italy



The EUCENTRE Foundation, the University of Pavia and MTS Systems Corporation organize a threeday exploration of the latest technologies and methods available for studying and mitigating the risks posed to civil infrastructure by combined hazards, including earthquake, tsunami/wave, hurricane/wind, fire and blast.

WEDNESDAY, 11.09.19

Hybrid Simulation Workshop

MTS experts will conduct a Hybrid Simulation primer, introducing proven pseudo-dynamic and real-time tools and techniques for a wide range of engineering applications, including civil structural, seismic, multi-hazard, automotive, aerospace and more.

Master of Ceremony: **Francesco Franzese**

09:00 Welcome / Opening Remarks

Garth Su, MTS Systems

Alberto Pavese, Eucentre Foundation

09:15 Mechanical Hybrid Simulation: Overview & Implementation Frameworks

Brian Kornis, MTS Systems

10:00 Pseudo-dynamic Hybrid Simulation: Techniques & Case Studies

Shawn You, MTS Systems

10:45 *Break / Networking*

11:15 Real-time Hybrid Simulation Techniques: Techniques & Case Studies

Shawn Gao, MTS Systems

12:00 *Lunch*

13:00 Achieving Optimal Test System Control

Brian Kornis, MTS Systems

13:30 Advanced Testing Tools & Techniques

Shawn Gao, MTS Systems

14:15 *Break / Networking*

14:45 New Hybrid Simulation Tools for Automotive, Aerospace and Wind Energy Applications

Shawn You, MTS Systems

15:30 Introduction to Multi-Hazard Testing

Alberto Pavese, Eucentre Foundation

16:15 Panel Discussion

Alberto Pavese, Eucentre Foundation

Shawn You, MTS Systems

Shawn Gao, MTS Systems

Brian Kornis, MTS Systems

Moderators

Francesco Franzese, MTS Systems

Remi Crenon, MTS Systems

17:00 Workshop Conclusion

THURSDAY, 12.09.19

Multi-Hazard Symposium

Leading researchers from EUCENTRE and around the globe will share real-world Multi-Hazard Testing experiences, providing insight into a variety of methodological frameworks and approaches.

Master of Ceremony: **Alberto Pavese, Julio Ramirez**

09:00 Welcome / Opening Remarks

Prof. Riccardo Pietrabissa, President of the EUCENTRE Foundation

- 09:15 Real-time hybrid simulation for fluid-structure interaction with coastal structures
Barbara Simpson, Oregon State University
- 09:45 Real time hybrid simulation for multi-hazards (wind and EQ), in particular 3-D complex structures subjected to multi-directional loading while experiencing nonlinear response
James Ricles, Lehigh University
- 10:15 Hybrid Simulation Applied to Biomechanics
Tomaso Villa, Politecnico of Milano
- 10:45 *Break / Networking*
- 11:00 Hybrid simulation of a braced steel frame subjected to seismic-induced fire
Patrick Covi, University of Trento
- 11:30 Hybrid simulation in marine technology: applications and method
Thomas Sauder, SINTEF Ocean
- 12:00 Enabling RTHS with Non-Linear Systems
Shirley Dyke, Purdue University
- 12:30 *Lunch*
- 13:30 Sendai Framework for Disaster Risk Reduction
Marc Gordon, United Nations Office for Disaster Risk Reduction
- 14:00 Hybrid Simulation of Base-isolated Structures
Alberto Pavese, University of Pavia, Eucentre Foundation
- 14:30 Latest Research and Applications of Hybrid Simulation
Dean Bin Wu, Wuhan University of Technology
- 15:00 Leveraging the Feedback from Experimental Data to Magnify the Impact of Hybrid Testing
Gian Andrea Rassati, University of Cincinnati
- 15:30 Hybrid simulation of a coupled tank-piping system for seismic fragility analysis
Oreste Bursi, University of Trento
- 16:00 *Break / Networking*
- 16:30 On-site Simulation of Isolated Building
Gian Michele Calvi, IUSS Pavia, Eucentre Foundation
- 17:00 Advances in quasi-static simulation for multi-axial simulation of large-scale structural systems
Arturo E. Schultz, University of Minnesota
- 17:30 Vibration and Vision-based Evaluation of a Large-scale RC Frame Structure through Shake Table Test
Jiazeng Shan, Tongji University
- 18:00 Characterizing the seismic behavior of a URM building via shaking table tests on several substructures
Francesco Graziotti, Eucentre Foundation
- 18:30 Conclusion

FRIDAY, 13.09.19

EUCENTRE Laboratory Demonstrations

- 09:30 Presentation of experimental test
Alberto Pavese, University of Pavia, Eucentre Foundation
- 10:00 Presentation of the Hybrid Testing Solution implemented at EUCENTRE
Igor Lanese, Eucentre Foundation
- 10:30 Hybrid simulation on two case studies in the seismic isolation field
- 11:30 Presentation of Results
- 11:45 Comments & Questions
Alberto Pavese, University of Pavia, Eucentre Foundation
- 12:00 Conclusion

ORGANIZERS

MTS Systems Corporation

Since 1966, MTS Systems Corporation has worked side-by-side with engineers in a wide range of industries to solve complex challenges. Today, its high-performance testing and sensing solutions are deployed around the world, enabling precise control of forces and motions as well as real-time feedback that optimizes performance.

European Centre for Training and Research in Earthquake Engineering (Eucentre)

The Eucentre Foundation, based in Pavia (Italy), is a non-profit organisation that supports and sustains training and research in the field of earthquake engineering and, more generally, of risk engineering. Eucentre has an important asset of experimental labs consisting of shaking tables able to reproduce any seismic event for testing both structural and non-structural elements and for the qualification of anti-seismic devices.

Department of Civil Engineering and Architecture (DICAr), University of Pavia

DICAr originates on March 1st 2012 from the fusion of three departments, namely: "Building and Territory Engineering", "Hydraulic and Environmental Engineering" and "Structural Mechanics", that now constitute the three Sections of "Architecture and Territory", "Hydraulics, Environment and Energetic" and "Structures and Materials".

Meeting Location

EUCENTRE Foundation, Multimedia Room – Via Adolfo Ferrata, 1 - 27100 Pavia, Italy

Registration

To register, please complete and submit the form on <http://www.mts.com/events/eucentre19/index.html>



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EUCENTRE Foundation

Via Adolfo Ferrata, 1 - 27100 Pavia, Italy
Phone (+39) 0382.5169811 - Fax (+39) 0382.529131
E-mail: info@eucentre.it - Website: www.eucentre.it