17WCEE Special Discussion Session: Future Direction of Earthquake Engineering

June 9, 2020

Special Discussion Session: Future Direction of Earthquake Engineering

- This special session aims to trigger a community-wide debate about our future:
  - What is new in Earthquake Engineering?
  - In what interest should we invest our international effort?
  - What are the challenges for the next generation?
- Speakers consisting of young researchers, senior keynote speakers, and distinguished coordinators will facilitate constructive discussions to derive resolutions.
- The 100-minute sessions will take place during the four days of the 17WCEE period and each session will deal with a different theme.
- The coordinators will report the resolutions at the closing ceremony of 17WCEE.
- In coordination with the **Masters' Series**, four legendary figures will be invited to mentor the sessions.
- The WCEE organizing committee and IAEE are joining forces to prepare and manage this memorable event.

Information about events and sessions hosted by IAEE

- IAEE invites legendary figures in earthquake engineering in the following three sessions:
  - Read the Masters: Publication of monographs (approx. 150 pages)
  - Greet the Masters: Memorial lectures
  - Meet the Masters: Luncheon or tea session with young researchers
- Masters at the 17WCEE
  - Dr. Tsuneo Katayama (Japan)
  - Dr. Luis Esteva Maraboto (Mexico)
  - Dr. Theodosios P. Tassios (Greece)
  - Dr. James O. Jirsa (USA)
- The above masters will mentor the Future Direction Sessions.

Special Discussion Sessions in 17WCEE program

- One session (approx. 100 minutes) per day for a total of 4 sessions each with a different theme
  - 17WCEE steering committee (hereafter, WCEE) will host 2 sessions (2 themes) and IAEE will host 2 sessions (2 themes).
  - The sessions will be held from 9:00 to 11:00 on Day 2 through Day 5 (autumn in 2021).
- All participants of 17WCEE will be welcomed to attend the sessions.

Four Themes

Sessions hosted by WCEE steering committee

- ***Emerging Vulnerability***
- ***Super Advanced Exploration, Simulation, and Monitoring***

Sessions hosted by IAEE

- ***Towards "Earthquake-Proof" Structures***
- ***Societal Resilience to Earthquakes and Tsunamis***

Members of “Emerging Vulnerability” Session



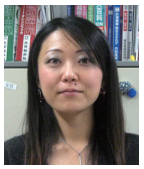

Coordinators

- Masayuki Kohiyama (Prof., Keio Univ.)
- Taichiro Okazaki (Prof., Hokkaido Univ.)

Keynote Speakers

- Tsuyoshi Takada (Prof., Univ. of Tokyo)
- Alessandro Palermo (Prof., Univ. of Canterbury)

Panelists


- Masashi Inoue (Eight-Japan Engineering Consultants Inc.)
- Noriko Takiyama (Assoc. Prof., Tokyo Metropolitan Univ.)
- Shuichi Fujikura (Assoc. Prof., Utsunomiya Univ.)
- Ramesh Guragain (Deputy Executive Director, National Society for Earthquake Technology-Nepal (NSET))
- Gian Paolo Cimellaro (Director of the Disaster Resilience Simulation Laboratory (DRSIL) Associate Professor, Politecnico di Torino)

Emerging Vulnerability

What are the lessons we learned about “engineering assumptions” after experiences such as the 2016 New Zealand earthquakes that caused widespread soil liquefaction and the 2011 Great East Japan Earthquake that caused massive casualties and damage by tsunami and a nuclear disaster? We were reminded that earthquakes never fail to expose weak points that are overlooked or left behind. What are the weak points that remain unrecognized? Is the rapid transition to a super-smart society creating new weak points? Considering the roles and responsibilities we are entrusted with, we should think proactively how to implement research to advance our societies.

Members of “Super Advanced Exploration, Simulation, and Monitoring” Session

Coordinators
- Mitsuyoshi Akiyama (Waseda Univ.)
- Tsuyoshi Ichimura (University of Tokyo)

Keynote Speakers
- Muneo Hori (JAMSTEC)
- Zifa Wang (China Earthquake Administration)

Panelists
- Barbara Simpson (Oregon State University)
- Masahiro Kurata (Kyoto Univ.)
- Saki Yotsui (Ritsumeikan University)
- Takeshi Koyama (Univ. of Tokyo)
- Quincy Ma (University of Auckland)

Super advanced exploration, simulation, and monitoring

In the future, by combining big data of cities and disasters with IoT and AI, we should be able to simulate and predict everything from tectonic plate movement to fault destruction to recovery and reconstruction of our cities. In our industrialized world, machines freed humans from physical burdens and simple labor, but rapid computerization caused significant changes in every aspect of the society. We should think how earthquake engineering might free humans from the mental burden and pain caused by disasters.

Towards “Earthquake-Proof” Structures

- So far, the focus of seismic design and seismic codes was on Collapse Prevention/Life Safety through ductility and hysteretic energy dissipation in the structure. However, ductility means damage, which, in advanced economies, is becoming unacceptable. Society demands a change in paradigm to focus on avoiding or, at least, minimizing damage.
- This session will examine means to control/minimize damage and produce more resilient structures. The scope includes earthquake protection systems (structures with energy dissipation devices, base isolation), structures designed for unconventional seismic response (rocking, sliding, use of the foundation soil to seismically-isolate the superstructure) and real-life applications.
- The session will feature two keynote presentations and remarks by up to two to three additional panelists (depending on response to invitation), with ample time for discussion and questions from the audience.
- Coordinator: Michael Fardis (Greece)
- Keynote Speakers: Michele Calvi (Italy) and George Gazetas (Greece)
- Panelists: David Mar (USA) and Masahiko Higashino (Japan)

“Societal Resilience to Earthquakes and Tsunamis”

- The devastating effects of past earthquakes and tsunamis offer important lessons for the seismic risk and steps that can be taken to minimize the threat through land use and urban planning, seismic design and retrofit of buildings and infrastructure, and preparations for response and recovery.
- This session will examine lessons from the 2011 Tohoku and other recent earthquakes, including challenges in research and implementation of innovative ways to improve community resilience. The session will feature four keynote presentations with ample time for discussion and questions from the audience.
- Coordinator: Gregory Deierlein (USA)
- Keynote Speakers (those confirmed): Haruo Hayashi (Japan) and Laurie Johnson (USA)
- (Two more panelists)