Opening Ceremony

Monday, September 16th, 08:30 - 09:00 **Convention Hall on 2nd floor**

Keynote Speech

Monday, September 16th, 09:00 - 09:30 **Convention Hall on 2nd floor**

Chair: Hongey Chen

SCEC and the Science of Earthquake Forecasts

John E. Vidale
Former Director, Southern California Earthquake Center,
University of Southern California, USA

This talk reviews new ideas about earthquakes that we've learned at the Southern California Earthquake Center (SCEC), and where we're headed next.

The danger and cost of earthquakes has focused public fear and research effort in California since long before the devastating 1906 San Francisco and 1933 Long Beach events. Precise earthquake prediction, heralded as imminent in the 1970s, has faltered, maybe permanently, but nevertheless there is progress.

Hosted at USC, with 16 core institutions and more than 60 affiliated organizations, SCEC involves more than 1000 quake cognoscenti. Funding comes from the National Science Foundation, the United States Geological Survey, and special projects with foundation and corporate partners. We are uncloaking the mysteries in plate tectonics, the San Andreas fault system, and how the ground is driven to shake. SCEC investigates all aspects of earthquakes from theoretical models through detailed observations to hazard maps. We foster collaboration among the fields of science and engineering research, computer science, communication and outreach to develop integrated research products used by various stakeholders.

The central point of this intense research, and the result that most directly benefits those living in California, is the improvement of maps of earthquake danger. We find the tectonic fault lines, gauge their geological rates of motion, and model their patterns of rupture and reloading in order to resolve the earthquakes we are likely to face. By simulating, in the nation's largest computers, the trembling for millions of those earthquakes through high-fidelity models of the rocks just under our feet, we are step-by-step wringing the uncertainty out of the nation's earthquake hazard maps.

We are on the verge of making the hazard estimation process entirely physics-based - built on models with realistic patterns of fault slip on realistic fault surfaces, accurate models of geological structure, and with the latest models of earthquake cycles on fault systems. Some aspects of the old hazard maps are confirmed. Other aspects, particularly the strength of the reverberations in the soft Los Angeles basin and its basin brothers across the state, may have been underestimated. A few places are now assessed as safer than before, but answers are not yet final.

SCEC is allowing more apt emergency preparations and building and retrofitting laws, and in the process giving us a deeper understanding of the physics of earthquakes and the geological evolution of the Southern California natural laboratory.

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AM0

Keynote Speech

Monday, September 16th, 09:30 - 10:00 **Convention Hall on 2nd floor**

Chair: Hongey Chen

Progresses and challenges of social scientific research on disaster risk reduction for the last two decades in Taiwan and Japan	
Haruo Hayashi President, National Research Institute for Earth Science and Disaster Resilience, Japan	

Keynote Speech

Monday, September 16th, 10:00 - 10:30 **Convention Hall on 2nd floor**

Chair: Hongey Chen

Remain to be determined	
Kathleen Tierney Former Board Member and Vice-President, Earthquake Engineering Research Institute, USA	

Monday, September 16th, 10:50 - 12:20 **Conference Hall**

Session Title: SS1 - 1999 Mw7.6 Chi-Chi Earthquake: 20 years of scientific study Earthquake

Chair: Ya-Ju Hsu, Wen-Tzong Liang

10:50 - 11:10 SS1-007 (Invited Talk)	THE 1960 CHILE EARTHQUAKE -- IMPLICATION FOR SLIP PARTITIONING AT A CONVERGENT BOUNDARY Speaker: Hiroo Kanamori
11:10 - 11:30 SS1-001 (Invited Talk)	WHAT HAVE WE LEARNED FROM THE 1999 M_S7.6 CHI-CHI, TAIWAN, EARTHQUAKE FOR RESOLVING THE BASIC PROBLEMS IN EARTHQUAKE PHYSICS? Speaker: Jeen-Hwa Wang
11:30 - 11:50 SS1-012 (Invited Talk)	PROBING FAULT FRICTION AND CRUSTAL RHEOLOGY FROM CO-SEISMIC AND POSTSEISMIC OBSERVATIONS Speaker: Jean-Philippe Avouac
11:50 - 12:10 SS1-002 (Invited Talk)	WHAT WE LEARN FROM THE TAIWAN CHELUNPGU FAULT DRILLING PROJECT Speaker: Li-Wei Kuo
12:10 - 12:25 SS1-013	STATUS OF THE ISC BULLETIN AND ASSOCIATED DATASETS IN THE AREA OF 1999 CHI-CHI EARTHQUAKE Speaker: Dmitry Storchak

Monday, September 16th, 10:50 - 12:20 **Room 101**

Session Title: A4 - Earthquake triggered geohazards
B4 - Remote sensing and crustal deformation

Chair: Yu-Ting Kuo, James Hollingsworth

10:50 - 11:10 B4-002 (Invited Talk)	OPTICAL IMAGE CORRELATION AND THE CHARACTERIZATION OF NEAR-FIELD GROUND DEFORMATION IN SURFACE RUPTURING EARTHQUAKES Speaker: James Hollingsworth
11:10 - 11:25 B4-011	THE 2018 MW6.4 HUALIEN EARTHQUAKE IN EASTERN TAIWAN: INSIGHTS FROM SYNTHETIC APERTURE RADAR INTERFEROMETRY (INSAR) AND RELOCATED SEISMICITY Speaker: Sin-Mei Ng
11:25 - 11:40 B4-013	DIGITALLY IMAGING SURFACE DEFORMATION: CASE STUDIES OF 1999 CHI-CHI, 2008 WENCHUAN AND 2018 HUALIEN EARTHQUAKES Speaker: Yu-Ting Kuo
11:40 - 11:55 A4-012	ANALYSIS OF PALSAR-2 IMAGES TO EXTRACT GEOLOGICAL EFFECTS CAUSED BY THE 2018 HOKKAIDO-EASTERN-IBURI EARTHQUAKE Speaker: Yoshihisa Maruyama

Monday Sep. 16 AM1

Monday, September 16th, 10:50 - 12:20 **Room 103**

Session Title: B1 - Mountain Building Processes
B2 - Subduction zone earthquakes, structure & geodynamics

Chair: Donald M Fisher, Chih-Tung Chen

10:50 - 11:10 B1-001 (Invited Talk)	MOUNTAIN BUILDING AND DEFORMATION PARTITIONING Speaker: Jacques Malavieille
11:10 - 11:30 B1-002 (Invited Talk)	MOUNTAIN BELT DYNAMICS, ROCK STRENGTH AND TOPOGRAPHY IN TAIWAN Speaker: Donald M Fisher
11:30 - 11:45 B2-011	SUBDUCTION OF TRANSITIONAL CRUST IN MANILA TRENCH CAUSING DEEP PLATE-BENDING NORMAL FAULT EARTHQUAKES Speaker: Eh Tan
11:45 - 12:00 B0-011	DEFORMATION CHARACTERISTICS IN THE TAIWAN ACTIVE COLLISION ZONE AND THEIR GRODYNAMIC MECHANISMS: INSIGHT FROM FEM Speaker: Shoubiao Zhu
12:00 - 12:15 B1-012	THE TULUNGWAN-CHAOCHOU FAULT COMPLEX: AN ACTIVE, CRUSTAL-SCALE FAULT IN AN ACR-CONTINENT COLLISION Speaker: Timothy Byrne
12:15 - 12:30 B1-011	EARTHQUAKE GEOLOGY OF THE ACTIVE SHANCHIAO FAULT, TAIPEI METROPOLIS, AND IMPLICATIONS ON POST-OROGENIC PROCESSES IN NORTHERNMOST TAIWAN Speaker: Chih-Tung Chen

Monday, September 16th, 10:50 - 12:20 **Room 201**

Session Title: SE5 - Revisiting probability seismic hazard assessment within 20 years after chichi earthquake (Joint session with Taiwan earthquake model, TEM)

Chair: Hiroyuki Fujiwara, Bor-Shouh Huang

10:50 - 11:10 SE5-001 (Invited Talk)	DEVELOPMENT OF THE TAIWAN SEISMOGENIC SORUCE MOEDEL FOR SEISMIC HAZARD USING SSHAC LEVEL 3 METHODOLOGY Speaker: Bor-Shouh Huang
11:10 - 11:30 SE5-006 (Invited Talk)	THE SEISMOLOGENIC STRUCTURE SOURCE MODEL OF TEM: ACHIEVEMENTS AND FUTURE CHALLENGES Speaker: J. Bruce H. Shyu
11:30 - 11:45 SE5-016	TAIWAN OFFSHORE SEISMOGENIC FAULTS Speaker: Kuan Yu Chen
11:45 - 12:05 SE5-002 (Invited Talk)	METHODOLOGY OF DEVELOPING A GROUND MOTION LOGIC TREE FOR SITE-SPECIFIC PROBABILISTIC SEISMIC HAZARD ANALYSIS IN TAIWAN Speaker: Kuo-Liang Wen
12:05 - 12:25 SE5-003 (Invited Talk)	AN INTEGRATED SYSTEM FOR SHARING INFORMATION ON NATIONAL SEISMIC HAZARD MAPS FOR JAPAN AND ITS APPLICATION TO SEISMIC RISK ASSESSMENT Speaker: Hiroyuki Fujiwara

Monday, September 16th, 10:50 - 12:20 **Room 202**

Session Title: SE6 - Advanced Simulation, Artificial Intelligence, Data Science and Internet of Things for Earthquake Engineering

Chair: Khalid Mosalam, Chuin-Shan Chen

10:50 - 11:10 SE6-001 (Invited Talk)	STRUCTURAL HEALTH MONITORING USING MACHINE LEARNING Speaker: Khalid Mosalam
11:10 - 11:25 SE6-011	USE OF MACHINE LEARNING TECHNIQUES TO DETECT THE LOCATIONS OF EARTHQUAKE-INDUCED SLOPE FAILURES Speaker: Yoshihisa Maruyama
11:25 - 11:40 SE6-018	A REAL TIME SEISMIC CAPABILITY EVALUATION OF SCHOOL BUILDINGS USING MACHINE LEARNING Speaker: Nai-Wen Chi
11:40 - 11:55 SE6-015	ONLINE MODEL UPDATING FOR THE ADVANCED HYBRID SIMULATIONS OF A STEEL PANEL DAMPER SUBSTRUCTURE Speaker: Ming-Chieh Chuang
11:55 - 12:10 SE6-016	METHODOLOGY FOR EARTHQUAKE-FIRE COUPLED HYBRID SIMULATION Speaker: Zhimeng Yu

Monday, September 16th, 10:50 - 12:20 **Room 203**

Session Title: SE3 - Seismic performance of steel and composite columns
SE7 - Development of steel structures for seismic urban regions

Chair: Chia-Ming Uang, Chung-Che Chou

10:50 - 11:10 SE3-001 (Invited Talk)	COMPACTNESS REQUIREMENT FOR SEISMIC DESI GN OF WIDE-FLANGE DEEP COLUMNS Speaker: Chia-Ming Uang
11:10 - 11:30 SE3-012 (Invited Talk)	SEISMIC BEHAVIOR OF HSS COLUMNS UNDER LATERAL LOADING Speaker: Jason McCormick
11:30 - 11:50 SE7-001 (Invited Talk)	JSCE SPECIFICATIONS ON EVALUATION OF DUCTILE CRACK INITIATION DUE TO ELCF IN STEEL BRIDGE STRUCTURES Speaker: Hanbin Ge
11:50 - 12:05 SE3-014	A SEVEN-STORY STEEL BRACED FRAME UNDER FAR-FIELD AND NEAR-FAULT EARTHQUAKES: LOADING PROTOCOL AND SEISMIC TEST OF HIGH-STRENGTH STEEL H-SHAPED COLUMNS Speaker: Te-Hung Lin
12:05 - 12:20 SE3-019	US-TAIWAN COLLABORATIVE RESEARCH ON STEEL COLUMNS: CYCLIC TESTING OF TWO-STORY SUBASSEMBLAGES Speaker: Chung-Che Chou

Monday, September 16th, 10:50 - 12:20 **Room 204**

Session Title: 5ICUDR

10:50 - 12:20	**5th INTERNATIONAL CONFERENCE ON URBAN DISASTER REDUCTION -** DECADES REVIEW ON RECOVERY: LEARNING FROM BEST PRACTICES

Monday Sep. 16 AM1

Keynote Speech

Monday, September 16th, 13:30 - 14:00 **Conference Hall**

Chair: J. Bruce H. Shyu

Geology of Earthquakes Against Extreme Hazards

Koji Okumura
Professor, Graduate School of Letters, Hiroshima University, Japan

A lot of people around the world have suffered from a number of extreme hazards from earthquakes and tsunamis in past a few decades. 2004 Indian Ocean tsunamis and 2010 Heiti earthquake caused the extreme number of fatalities. Extremely high tsunamis ever occurred in Japan account for the severe damage from 2011 Tohoku Earthquake and tsunamis. As well, extremely intense ground shaking during 1995 Kobe and 2016 Kumamoto earthquakes raised the number of fatalities and casualties drastically. One of the important tasks of earthquake geology is to know the nature of such extreme hazards and to help the society prepare for them. In order to better perform the tasks, it is necessary to examine what we knew and did not know, and what we learned from unexpected extreme events.

Before 2004 Indian Ocean earthquake, there was no record of M 9 earthquake, which generate very extensive tsunami hazards that are not comparable with previously known M 7 to M 8 earthquakes. 2011 M 9 Tohoku earthquake and tsunamis occurred after we learned a lot from 2004 Indian Ocean earthquake. Before 2011 also, earthquake geology had revealed 1700 Cascadia earthquake and tsunamis, 17 century southern Kuril (eastern Hokkaido) tsunamis, and 869 Jogan tsunamis in Tohoku area. The 2011 Tohoku disasters might have been mitigated with lessons from these findings and experience in 2004. If the information of 869 tsunamis based on tsunami deposits were applied for tsunami awareness and preparedness in Sendai-Ishinomaki areas, thousands of lives could have been saved.

The extremely intense ground shaking of Japan Meteorology Agency intensity 7 was first observed and established during 1995 Kobe earthquake. ~1000 gal PGA and 100 to 170 cm/s PGV that killed 6600 people was due to the blind reverse faulting under Kobe city. The partial rupture of known surface active faults and geologic structure of active sedimentary basin rim caused this shaking and damage. After 1995 Kobe earthquake, five JMA I=7 earthquakes occurred. Four of them including 2018 Hokkaido earthquake were from blind faults with minor surface ruptures. The April 16 2017 is the only I = 7 event with clear surface ruptures. We have learned a lot about faulting and ground shaking in past 30 years, but more efforts are necessary to forecast and mitigate damage from strong ground motion from active faults.

In order to reduce future damage from extreme earthquake and tsunami, it is important to locate such hazards and help the society to prepare for them.

Monday, September 16th,14:20 - 15:50 **Conference Hall**

Session Title: SS1 - 1999 Mw7.6 Chi-Chi Earthquake: 20 years of scientific study Earthquake
B3 - Seismotectonics

Chair: Yuan-His Lee, Ya-Ju Hsu

14:20 - 14:40 SS1-005 (Invited Talk)	DEVELOPMENTS OF THE SEISMIC MONITORING IN TAIWAN AFTER THE 1999 CHI-CHI EARTHQUAKE Speaker: Nai-Chi Hsiao
14:40 - 15:00 SS1-003 (Invited Talk)	CGS'S INVESTIGATIONS ON ACTIVE FAULT IN TAIWAN SINCE 1997 Speaker: Shih-Ting Lu
15:00 - 15:20 SS1-006 (Invited Talk)	SEISMOGENIC STRUCTURES IN WESTERN TAIWAN Speaker: Yuan-His Lee
15:20 - 15:35 B3-011	CO-AND POST-SEISMIC RESPONSES IN AMBIENT SEISMIC VELOCITY TO THE 1999 M_W 7.6 CHI-CHI EARTHQUAKE IN CENTRAL TAIWAN Speaker: Mong-Han Huang
15:35 - 15:50 B3-016	THE STRUCTURE CHANGES OF THE 1999 CHI-CHI EARTHQUAKE FROM 4D TOMOGRAPHY Speaker: Shunping Pei

Monday Sep. 16 PM1

Monday, September 16th, 14:20 - 15:50 **Room 101**

Session Title: C1 - Source modeling and ground motion simulations
C3 - Earthquake precursors and forecasting

Chair: Yin-Tung Yen, Yi-Wun Liao

14:20 - 14:35 C1-011	DYNAMIC MODELING ON STRESS MODEL OF THE 1999 CHI-CHI, TAIWAN, EARTHQUAKE Speaker: Chi-Jen Chen
14:35 - 14:50 C1-013	SOURCE PARAMETER STUDY AND GROUND MOTION SIMULATION OF 1604 QUANZHOU EARTHQUAKE Speaker: Yi-Wun Liao
14:50 - 15:05 C1-014	SIMULATION OF PGV OF 1920 HUALIEN EARTHQUAKE WITH 3DEC: COMPARISON WITH HISTORICAL SEISMIC INTENSITY Speaker: Chih-Cheng Chung
15:05 - 15:20 C1-015	RUPTURE DYNAMICS OF THE 2012 NICOYA MW 7.6 EARTHQUAKE AND ITS APPLICATION IN PHYSICS-BASED GROUND VELOCITY PREDICTIONS Speaker: Suli Yao
15:20 - 15:35 C1-016	INFLUENCE OF LOW-VELOCITY LAYERS IN THE PHILIPPINE SEA PLATE REGION ON LONG-PERIOD GROUND MOTION IN THE TOKYO METROPOLITAN AREA Speaker: Tomohiro Oguchi
15:35 - 15:50 C3-015	TECTONIC IMPLICATIONS OF SOIL-GAS MONITORING FOR EARTHQUAKE SURVEILLANCE IN TAIWAN Speaker: Vivek Walia

Monday, September 16th, 14:20 - 15:50 **Room 103**

Session Title: B6 - The nature of aseismic slip: observations and simulations
Chair: Aitaro Kato, Kate Huihsuan Chen

14:20 - 14:40 B6-002 (Invited Talk)	CHARACTERISTICS AND INTERPRETATION OF BROADBAND SLOW EARTHQUAKES Speaker: Satoshi Ide
14:40 - 15:00 B6-001 (Invited Talk)	RELATIONSHIPS BETWEEN SLOW SLIP, TREMOR AND LFES: EFFECT OF ALONG-DIP POSITION Speaker: Heidi Houston
15:00 - 15:15 B6-012	TIDAL MODULATION AND TECTONIC IMPLICATIONS OF TREMORS IN TAIWAN Speaker: Kate Huihsuan Chen
15:15 - 15:35 B6-003 (Invited Talk)	THE EVOLUTION OF FAULT SLIP RATE BEFORE EARTHQUAKE: THE INTERPLAY OF SLOW AND FAST SLIP Speaker: Aitaro Kato
15:35 - 15:50 B6-011	THE NATURE OF ASEISMIC SLIP IN SOUTHERN TAIWAN: THE MUD DIAPIR/VOLCANO Speaker: Kuo-En Ching

Monday Sep. 16 PM1

Monday, September 16th, 14:20 - 15:50 **Room 201**

Session Title: SE5 –Revisiting probability seismic hazard assessment within 20 years after chichi earthquake (joint session with Taiwan earthquake model, TEM)
Chair: Brian Chiou, Yu-Wen Chang

14:20 - 14:40 SE5-007 (Invited Talk)	GROUND MOITON PREDICTION EQUATIONS FOR CRUSTAL EARTHQUAKES IN TAIWAN Speaker: Brian Chiou
14:40 - 14:55 SE5-015	THE STUDY OF LOCAL SOURCE MODEL SETTING TO CONSIDER THE POSSIBLE GEOLOGIC STRUCTURE IN THE OFFSHORE LOCATION Speaker: Yu-Wen Chang
14:55 - 15:15 SE5-004 (Invited Talk)	TOWARD IMPROVEMENT OF SEISMIC HAZARD ASSESSMENT IN TAIWAN AND RYUKYU ISLANDS Speaker: Ken Xiansheng Hao
15:15 - 15:35 SE5-005 (Invited Talk)	PROBABILISTIC SEISMIC HAZARD ASSESSMENT FOR TAIWAN: TEM PSHA2019 Speaker: Chung-Han Chan
15:35 - 15:55 SE5-008 (Invited Talk)	THE PROJECT SAM: DEVELOPMENT OF PROBABILISTIC SEISMIC GROUND MOTION HAZARD MAP FOR THE ENTIRE PHILIPPINES Speaker: Adam Abinales

Monday, September 16th, 14:20 - 15:50 **Room 202**

Session Title: SE12 - Seismic performance design, evaluation and retrofit for non-structural components

Chair: George C. Yao, Eun-Rim Baek

14:20 - 14:35 SE12-011	A STUDY ON SEISMIC RETROFIT OF SUSPENDED TRANSPORTATION SYSTEMS AND AUTOMATED STORAGE SYSTEMS IN A HIGH-TECH FABRICATION PLANT Speaker: Min-Chi Ko
14:35 - 14:50 SE12-029	SEISMIC PERFORMANCE OF SUSPENDED CEILINGS Speaker: Geoffrey Davidson
14:50 - 15:05 SE12-023	REVIEW ON THE SEISMIC DESIGN METHOD FOR WATER SUPPLY TANKS INSTALLED ON VARIOUS LEVELS OF BUILDINGS Speaker: Eun-Rim Baek
15:05 - 15:20 SE12-015	DESIGN OF SHAKING TABLE TEST FOR NEAR-FAULT EFFECT ON SLOSHING MODE OF WATER STORAGE TANK Speaker: Wei-Hung Hsu
15:20 - 15:35 SE12-020	NUMERICAL ANALYSIS ON SEISMIC SHELTER AND EARTHQUAKE-PROOF FURNITURE Speaker: Chia-Chen Lin
15:35 - 15:50 SE12-019	EXPERIMENTAL STUDY ON SEISMIC SHELTER AND EARTHQUAKE-PROOF FURNITURE Speaker: Chia-Chen Lin

Monday, September 16th,14:20 - 15:50 **Room 203**

Session Title: SE7 - Development of steel structures for seismic urban regions

Chair: Hanbin Ge, Hsieh-Lung Hsu

14:20 - 14:35 SE7-012	CYCLIC PERFORMANCE OF CONCRETE–FILLED LOW-YIELD STEEL PLATE COMPOSITE WALLS SUBJECTED TO IN-PLANE SHEAR AND AXIAL LOADS Speaker: Chin-Tung Cheng
14:35 - 14:50 SE7-013	PERFORMANCE OF FRAMED STRUCTURES WITH STEEL RIM DAMPERS Speaker: Hsieh-Lung Hsu
14:50 - 15:05 SE7-014	AN EXPERIMENTAL INVESTIGATION OF NATURALLY BUCKLING BRACES Speaker: Po-Chien Hsiao
15:05 - 15:20 SE7-016	CYCLIC BEHAVIOR OF SQUARE HSS STEEL BRACES WITH WIDE-FLANGE SPLICED MID-SEGMENT Speaker: Chui-Hsin Chen
15:20 - 15:35 SE7-017	PLASTIC DUCTILITY PERFORMANCE OF GRID-PURLIN SYSTEM CONNECTED TO WIDE FLANGE BEAM Speaker: Ryota Matsui
15:35 - 15:50 SE7-021	EVALUATION OF SEISMIC PERFORMANCE FOR EXISTING STEEL MOMENT CONNECTIONS AND THE UPGRADING Speaker: Heui-Yung Chang

Monday, September 16th, 14:20 - 15:50	**Room 204**
Session Title:	5ICUDR
14:20 - 15:50	**5th INTERNATIONAL CONFERENCE ON URBAN DISASTER REDUCTION -** DECADES REVIEW ON RECOVERY: LEARNING FROM BEST PRACTICES

Monday
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Monday, September 16th, 16:10 - 17:40 **Conference Hall**

Session Title: SS1 - 1999 Mw7.6 Chi-Chi Earthquake: 20 years of scientific study Earthquake
A4 - Earthquake triggered geohazards
B6 - The nature of aseismic slip: observations and simulations
B7 - General seismology

Chair: Wei-An Chao, Kate Chen

16:10 - 16:30 A4-001 (Invited Talk)	THE FORMATION AND FAILURE OF LANDSLIDE DAM IN CHICHI EARTHQUAKE 1999 AND TYPHOON MORAKOT 2009 Speaker: Su-Chin Chen
16:30 - 16:45 A4-011	CAN WE UNDERSTAND LANDSLIDE FROM COSEISMIC LANDSLIDE SEISMIC SIGNALS? Speaker: Wei-An Chao
16:45 - 17:00 SS1-011	LOWER-CRUSTAL RHEOLOGY IN THE TAIWAN OROGEN REVEALED BY THE POSTSEISMIC TRANSIENTS FOLLOWING THE 1999 CHI-CHI EARTHQUAKE Speaker: Chi-Hsien Tang
17:00 - 17:15 B7-012	TEMPORAL VELOCITY CHANGES IN THE CRUST OVER 2005–2015 NEAR THE SUMATRA EXAMINED USING REPEATING AFTERSHOCKS SUBDUTION ZONE Speaker: Wen-Che Yu
17:15 - 17:30 B7-014	EVALUATING THE ASSOCIATION BETWEEN TECTONIC TREMORS AND EARTHQUAKES IN TAIWAN FROM SEVEN YEARS CATALOGS Speaker: Wei Peng
17:30 - 17:45 B7-013	SCATTERING AND INTRINSIC ATTENUATION OF S-WAVES IN SOUTHERN AEGEAN DERIVED USING MULTIPLE LAPSE TIME WINDOW ANALYSIS Speaker: P. Ranjan
17:45 - 18:00 B6-013	SINGLE-STATION CLASSIFICATION OF TECTONIC TREMOR USING FISHER'S CLASS SEPARABILITY CRITERION-BASED FEATURE SELECTION Speaker: Ting-Chen Yeh

Monday, September 16th, 16:10 - 17:40 **Room 101**

Session Title: SS1 - 1999 Mw7.6 Chi-Chi Earthquake: 20 years of scientific study Earthquake
C3 - Earthquake precursors and forecasting

Chair: Shih-Jung Wang, Ching-Chou Fu

16:10 - 16:30 SS1-004 (Invited Talk)	SEISMO-IONOSPHERIC PRECURSORS OF THE TOTAL ELECTRON CONTENT (TEC) ASSOCIATED WITH THE 21 SEPTEMBER 1999 CHI-CHI EARTHQUAKE Speaker: Jann-Yenq Liu
16:30 - 16:50 C3-001 (Invited Talk)	EVALUATION OF SEISMO-MAGNETIC PRECURSORY PHENOMENA IN KANTO, JAPAN BY USING STATISTICAL ANALYSIS Speaker: Katsumi Hattori
16:50 - 17:05 C3-013	INVESTIGATING PERMEABILITY ENHANCEMENT BY USING GROUNDWATER LEVEL ANOMALIES IN 2016 KAOHSIUNG MEINONG EARTHQUAKE, TAIWAN Speaker: Shih-Jung Wang
17:05 - 17:20 C3-014	THE IMPORTANCE OF STATIONARY PRE-EARTHQUAKE ANOMALIES OBSERVED FROM TOTAL ELECTRON CONTENT BASED ON GLOBAL IONOSPHERE MAPS Speaker: Hau-Kun Jhuang
17:20 - 17:35 C3-011	GROUND Rn CONCENTRATION AND LOCAL SEISMICITY AROUND ASAHI STATION, BOSO, JAPAN Speaker: Haruna Kojima
17:35 - 17:50 C3-012	GAS GEOCHEMISTRY APPLIED TO EARTHQUAKE PRECURSOR IN TAIWAN: RECENT STATUS AND FUTURE SCENARIOS Speaker: Ching-Chou Fu

Monday Sep. 16 PM2

Monday, September 16th, 16:10 - 17:40 **Room 103**

Session Title: C3 - Earthquake precursors and forecasting
C4 - Ground motion observations and characteristics from small to large events

Chair: Chu-Hsiang Kuo, En-Jui Lee

16:10 - 16:30 C4-001 (Invited Talk)	NIED OBSERVATION NETWORK FOR EARTHQUAKE, TSUNAMI AND VOLCANO: MOWLAS Speaker: Shin Aoi
16:30 - 16:50 C4-002 (Invited Talk)	DEVELOPMENT OF THE LOW COST EARTHQUAKE EARLY WARNING AND SHAKEMAP SYSTEMS IN TAIWAN Speaker: Yih-Min Wu
16:50 - 17:05 C4-012	STRONG MOTION OBSERVATIONS AND CHARACTERISTICS IN MEINONG AND HUALIEN, TAIWAN EARTHQUAKES Speaker: Chun-Hsiang Kuo
17:05 - 17:20 C4-011	GROUND MOTION CHARACTERISTICS IN HUALIEN, TAIWAN BASED ON MICROTREMOR OBSERVATIONS Speaker: Junji Kiyono
17:20 - 17:35 C4-013	A GRAPHICS PROCESSING UNIT (GPU) BASED MICROSEISMIC MONITORING PLATFORM Speaker: En-Jui Lee
17:35 - 17:50 C3-016	RADON MONITORING IN TATUN VOLCANIC GROUP, MAI-TAO-SAN AREAS AND WAN-DAN AREAS OF TAIWAN FOR SEISMIC AND VOLCANIC STUDY Speaker: Arvind Kumar

Monday, September 16th, 16:10 - 17:40 **Room 201**

Session Title: SE9 - Liquefaction potential map and application
F4 - Seismic design of foundations and geotechnical structures
F5 - Geotechnical engineering innovations

Chair: Tzou-Shin Ueng, Jin-Hung Hwang

16:10 - 16:30 SE9-001 (Invited Talk)	CURRENT STATUS OF, AND PROBLEMS WITH, HAZARD MAPS FOR SOIL LIQUEFACTION Speaker: Susumu Yasuda
16:30 - 16:50 F4-013 (Invited Talk)	EFFECT OF GROUND IMPROVEMENT THROUGH DYNAMIC COMPACTION ON LIQUEFACTION OF RECLAIMED LAND Speaker: Charng-Hsein Juang
16:50 - 17:05 F5-012	A FEW EXAMPLES OF LIQUEFACTION ASSESSMENT OF GROUND DURING EARTHQUAKE USING PIEZO DRIVE CONE IN TAIWAN Speaker: Shun-Ichi Sawada
17:05 - 17:20 SE9-013	A NEW SIMPLIFIED METHOD FOR ASSESSING LIQUEFACTION POTENTIAL OF SOILS: TWENTY YEARS DEVELOPMENT OF HBF METHOD Speaker: Jin-Hung Hwang
17:20 - 17:35 SE9-011	VS BASED APPROACH TO REFINE LIQUEFACTION HAZARD MAP Speaker: Chi-Chin Tsai
17:35 - 17:50 SE9-012	FACTORS CONSIDERED IN PRODUCING A REFINED SOIL LIQUEFACTION POTENTIAL MAP: A CASE STUDY OF TAIPEI BASIN Speaker: Chih-Chieh Lu

Monday Sep. 16 PM2

Monday, September 16th, 16:10 - 17:40 **Room 202**

Session Title: SE12 - Seismic performance design, evaluation and retrofit for non-structural components
E2 - Lifelines and infrastructure

Chair: Hyoung-Suk Choi, Fan-Ru Lin

16:10 - 16:25 SE12-017	FAILURE ESTIMATION OF PRESSURIZED STEEL PIPE FITTINGS UNDER IN-PLANE CYCLIC LOADING: ELBOW AND TEE CASES Speaker: Jae-Bong Kim
16:25 - 16:40 SE12-014	EXPERIMENTAL STUDY ON THE MECHANICAL PROPERTIES OF PIPES JOINTS UNDER AXIAL LOAD Speaker: Li Wenliang
16:40 – 16:55 SE12-026	NUMERICAL ANALYSIS OF FIRE SPRINKLER PIPING ACCORDING TO THE RESTRAINT METHOD OF BRANCH LNES Speaker: Hyoung-Suk Choi
16:55 - 17:10 SE12-030	SEISMIC EVALUATION AND STRENGTHENING METHOD FOR FIRE PROTECTION SPRINKLER-PIPING SYSTEM IN BUILDING Speaker: Yung An Tsai
17:10 - 17:25 E2-011	STEEL PIPELINE NONLINEARITY EFFECT ON THE FORCE-DISPLACEMENT ANALYSIS OF BURIED PIPELINES CROSSING STRIKE-SLIP FAULT Speaker: Farzad Talebi

Monday Sep. 16 PM2

Monday, September 16th,16:10 - 17:40 **Room 203**

Session Title: G0 - Seismic design, evaluation and retrofit

Chair: Rildolva, Yuan-Tao Weng

16:10 - 16:30 G0-001 (Invited Talk)	M6.4, M7.0, M6.9 LOMBOK ISLAND EARTHQUAKES, NUSA TENGGARA BARAT, INDONESIA ON JULY 29 – AUGUST 19, 2018 Speaker: Rildolva
16:30 - 16:45 G0-011	A MINIMALLY DISRUPTIVE RETROFITTING STRATEGY FOR EARTHQUAKE DAMAGED REINFORCED CONCRETE SHEAR WALLS Speaker: Joshua Woods
16:45 - 17:00 G0-012	SEISMIC RETROFIT OF A HISTORIC BUILDING IN SAN FRANCISCO USING ROTATIONAL FRICTION DAMPERS Speaker: Insung Kim
17:00 - 17:15 G0-013	A STUDY ON THE DAMMING EFFECT OF A WATER BORNE DEBRIS TO THE REINFORCED CONCRETE BUILDINGS Speaker: Toshikazu Kabeyasawa
17:15 - 17:30 G0-018	EFFECTIVE WIDTH OF SLAB AT A SPAN END IN REINFORCED CONCRETE FRAMES Speaker: Ziling Xiao

Monday, September 16th, 16:10 - 17:40	**Room 204**
Session Title:	5ICUDR
16:10 - 17:40	**5th INTERNATIONAL CONFERENCE ON URBAN DISASTER REDUCTION -** DECADES REVIEW ON RECOVERY: LEARNING FROM BEST PRACTICES

Monday
Sep. 16
PM2

Keynote Speech

Tuesday, September 17th, 09:00 - 09:30 **Conference Hall**

Chair: Shyh-Jiann Hwang

Damaging Features of Near-fault Ground Motions

Norman Abrahamson
Adjunct Professor, University of California, Berkeley, USA

Near-fault ground motions that contain velocity pulses have been associated with more severe damage than ground motions that do not contain a velocity pulse. The main concept behind the velocity pulse is that a large amount of energy arrives at the site over a short time interval, leading to greater demands on the structure. Initially, the identification of velocity pulses in recorded ground motions was subjective based on visual inspection of the velocity time series, but more recently, quantitative methods for identifying pulses using wavelet decomposition have been developed (e.g. Shahi and Baker, 2014). While the wavelet decomposition is an objective and repeatable approach, the application requires three parameters to be considered: presence of a pulse, pulse period, and pulse amplitude. The wavelet decomposition method also tends to classify more records as having pulses than just those with a large amount of energy arrives at the site over a short time interval. Alternative measures of the damaging features of near-fault ground motions that are based on the rate of energy input into the structure rather than the current velocity pulse definition are reviewed. The instantaneous power (IP), defined by Zengin and Abrahamson (2019a) as the energy per second in the quarter-cycle of the band-pass filtered velocity time series at the time of the peak velocity, captures key damaging features of near-fault ground motions better than the velocity pulse classification approach. The velocity time series is band-pass filtered around the fundamental period of the structure. This allows the IP to represent the power of the near-fault ground motions that is relevant to the response of the structure. The IP replaces the need to classify near-fault ground motions in terms of presence of a velocity pulse and the pulse period. It is also a much simpler parameter to use than velocity pulse parameters in that it combines the effects of presence of a velocity pulse, the pulse period, and the amplitude of the pulse into a single continuous parameter. A conditional ground-motion model (GMM) for IP, conditioned on the elastic spectral acceleration, in addition to the earthquake magnitude and distance was developed by Zengin and Abrahamson (2019b). An example of how to use the IP GMM with results from standard seismic hazard analyses to select appropriate near-fault time histories for use in dynamic analyses of structures is shown.

Tuesday Sep. 17 AM0

Keynote Speech

Tuesday, September 17th, 09:30 - 10:00 **Conference Hall**

Chair: Shyh-Jiann Hwang

Vibration-control Systems for Super-tall Buildings in Areas of Strong Seismicity

Kazuhiko Kasai

Specially Appointed Professor, Institute of Innovative Research,
Tokyo Institute of Technology, Japan

Much higher level of seismic performance is needed for super-tall buildings due to increased demands for their functional continuities and recognized needs for becoming havens in metropolitan areas. The conventional structural systems can no longer meet the demands, and the vibration control systems using dampers are most commonly used for super-tall buildings in Japan. As the building is taller, however, the dampers are known to deform less, and become less effective at upper stories. This is because the shear drift that produces damper deformation and energy dissipation decreases due to the increased bending (chord) drift at upper stories. The presentation explains this trend, and proposes a simple and reasonably accurate method to predict the shear drift, chord drift, as well as effectiveness of dampers. The method is based on the eigenvalue analysis and static elastic analysis of the frame, typically performed during design stage.

The method is extended also to formulation of a simplified shear-flexure beam model that accurately simulate the global dynamic behavior of the original model. In addition, local mode of deformations of members surrounding the damper can reduce the damper deformation/effectiveness. Another method, therefore, is proposed to account for this trend. Time-history analyses are conducted to show the accuracy of these methods.

Keynote Speech

Tuesday, September 17th, 10:00 - 10:30 **Conference Hall**

Chair: Shyh-Jiann Hwang

Tzu Chi's Disaster Prevention and Recovery Strategy towards Sustainable Development	
Powen Yen CEO, Tzu Chi Foundation, Taiwan	

Tuesday, September 17th,10:50 - 12:20 **Conference Hall**

Session Title: SE2 - Seismic assessment, retrofit and repairability for existing RC buildings

Chair: John Wallace, Fu-Pei Hsiao

10:50 - 11:10 SE2-001 (Invited Talk)	AXIAL COLLAPSE MODELS FOR RC STRUCTURAL WALLS AND WALL PIERS Speaker: John Wallace
11:10 - 11:25 SE2-021	SEISMIC ASSESSMENT METHODOLOGY FOR CORRODED REINFORCED CONCRETE BUILDINGS Speaker: Sunil Nataraj
11:25 - 11:40 SE2-022	SEISMIC EVALUATION AND FRAGILITY CURVES OF A TYPICAL SCHOOL BUILDING IN TAIWAN Speaker: Te-Kuang Chow
11:40 - 11:55 SE2-026	STUDY ON SEISMIC RETROFITTING FOR EXISTING BUILDINGS WITH EXTERIOR REINFORCED CONCRETE FRAMES Speaker: Fu-Pei Hsiao
11:55 - 12:10 SE2-014	AUTOMATIC HINGE GENERATION SYSTEM FOR NONLINEAR ANALYSIS WITH HINGES CONSIDERING P-M INTERACTION Speaker: Chi-Hang Li
12:10 - 12:25 SE2-016	DATA SYSTEM AND DATA ANALYSIS OF SCHOOL BUILDING RETROFITTING IN TAIWAN Speaker: Yuan-Sen Yang

Tuesday, September 17th, 10:50 - 12:20 **Room 101**

Session Title: SE4 - Seismic design, evaluation and retrofit of bridge structure

Chair: Kunitomo Sugiura, Patria Kusumaningrum

10:50 - 11:10 SE4-003 (Invited Talk)	ANTI-CATASTROPHE PERFORMANCE IMPROVEMENT OF MULTI-PIPE INTEGRATED BRIDGE PIER WITH HIGH PERFORMANCE SHEAR PANEL DAMPERS Speaker: Kunitomo Sugiura
11:10 - 11:30 SE4-002 (Invited Talk)	PARAMETRIC STUDIES OF STEEL FIBER REACTIVE POWDER CONCRETE BRIDGE PIER SUBJECTED TO LATERAL MONOTONIC LOADING Speaker: Patria Kusumaningrum
11:30 - 11:45 SE4-016	MITIGATION OF RESIDUAL DISPLACEMENTS OF RC BRIDGE COLUMNS BY PARTIALLY UNBONDED HIGH-STRENGTH STEEL STRANDS Speaker: Yu-Chen Ou
11:45 - 12:00 SE4-013	COMPARISON BETWEEN THE SEISMIC PERFORMANCE OF FULLY JOINTLESS SEMI-INTEGRAL AND JOINTED BRIDGES Speaker: Yong-Chun Ma
12:00 - 12:15 SE4-011	STUDY ON GFRP AND STEEL HYBRID TEMPORARY RESCUE BRIDGE FOR EMERGENCY DISASTER RELIEF Speaker: Fang-Yao Yeh

Tuesday Sep. 17 AM1

Tuesday, September 17th,10:50 - 12:20 **Room 103**

Session Title: SE11 - Recent developments in high-performance structural systems and devices for earthquake resilient infrastructure

Chair: Yi-Lung Mo, Huanjun Jiang

10:50 - 11:10 SE11-001 (Invited Talk)	SEISMIC PERFORMANCE OF PERIODIC METAMATERIAL BARRIES Speaker: Yi-Lung Mo
11:10 - 11:25 SE11-021	EXPERIMENTAL INVESTIGATION OF THE HYSTERETIC PERFORMANCE OF SELF-CENTERING BUCKLING-RESTRAINED BRACES WITH FRICTION FUSES Speaker: Qin Xie
11:25 - 11:40 SE11-022	CYCLIC BEHAVIOR OF SLENDER RC STRUCTURAL WALLS WITH HIGH STRENGTH STEEL REINFORCEMENT Speaker: Yu-Chen Chou
11:40 - 11:55 SE11-024	STRUCTURAL PERFORMANCE OF REINFORCED CONCRETE MEMBERS WITH NON-STRUCTURAL WALLS WITHOUT ANCHORAGE OF WALL REINFORCEMENT Speaker: Yo Hibino

Tuesday, September 17th,10:50 - 12:20 **Room 201**

Session Title: A4 - Earthquake triggered geohazards
B2 - Subduction zone earthquakes, structure & geodynamics
B5 - Lesson learnt from recent lrage earthquakes

Chair: Tai-Lin Tseng, Chun-Te Chen

10:50 - 11:10 B5-001 (Invited Talk)	SEISMIC HAZARD MODELLING IN NEW ZEALAND: LESSONS FROM RECENT EARTHQUAKES Speaker: Mark Stirling
11:10 - 11:30 B5-002 (Invited Talk)	APPLICATION AND UPTAKE OF TIME-DEPENDENT HAZARD ASSESSMENT IN NEW ZEALAND Speaker: Matthew Gerstenberger
11:30 - 11:50 B2-001 (Invited Talk)	ACCELERATING FORESHOCKS OF CRUSTAL EARTHQUAKES CONTROLLED BY FRICTIONAL HETEROGENEITIES Speaker: Yoshihiro Kaneko
11:50 - 12:10 A4-002 (Invited Talk)	EFFECT OF SEISMIC RECORD IN NEWMARK ANALYSIS FOR EARTHQUAKE-INDUCED LARGE-SCALE LANDSLIDE Speaker: Che-Ming Yang
12:10 - 12:25 B5-011	LESSONS LEARNED FROM RECENT EARTHQUAKES: 2016 MEINONG, TAIWAN, 2017 PUEBLA, MEXICO, AND 2017 POHANG, SOUTH KOREA Speaker: Insung Kim

Tuesday, September 17th, 10:50 - 12:20 **Room 202**

Session Title: A3 - Fault properties and rock mechanics
Chair: Li-Wei Kuo, En-Chao Yeh

10:50 - 11:10 A3-002 (Invited Talk)	A PRELIMINARY RESULT OF TEMPERATURE DEPTH PROFILE IN A DRILLING BOREHOLE PENETRATED THE FUTAGAWA FAULT RUPTURED DURING THE 2016 KUMAMOTO M_W7.1 EARTHQUAKE Speaker: Weiren Lin
11:10 - 11:25 A3-011	STRESS STATE HETETOGENEITY OBSERVED ALONG THE TCDP EWLLS AND ITS RELATION TO LITHOLOGICAL VARIATIONS Speaker: Mayukh Talukdar
11:25 - 11:45 A3-003 (Invited Talk)	CO-SEISMIC FOCAL MECHANISM OF CHICHI EARTHQUAKE (1999, M_W 7.6) DEDUCED FROM GOUGE MAGNETIC FABRIC Speaker: Yu-Min Chou
11:45 - 12:00 A3-012	DEFORMATION STYLES WITHIN SHALLOW CREEPING FAULT ZONE OF THE CHIHSHANG FAULT, TAIWAN Speaker: Wen-Jie Wu
12:00 - 12:20 A3-001 (Invited Talk)	RELATING POTENTIAL SIGNATURES OF FAULT HEALING AND DISTRIBUTED DEFORMATION IN FAULT DAMAGE ZONES Speaker: Hiroki Sone
12:20 - 12:35 A3-013	CURVED SLICKENLINES PRESERVE DIRECTION OF RUPTURE PROPAGATION Speaker: Yoshihiro Kaneko

Tuesday Sep. 17 AM1

Tuesday, September 17th,10:50 - 12:20	**Room 203**
Session Title:	H0 - Seismic loss and risk assessment H3 - Earthquake loss estimation
Chair:	Bing-Ru Wu, Chin-Hsun Yeh

10:50 - 11:05 H0-014	EVALUATION OF SEISMIC RESISTANT CAPACITY OF EXPOSURES BY MESH-BASED SCENARIO SIMULATION FOR DISASTER REDUCTION PLANNING Speaker: Bing-Ru Wu
11:05 - 11:20 H0-011	TIME-DEPENDENT COMPUTATION OF MULTISCALE INTERDEPENDENCIES BETWEEN LIFELINE SYSTEMS SUBJECTED TO SEISMIC EVENTS Speaker: Szu-Yun Lin
11:20 - 11:35 H0-012	AN METHOD FOR SEISMIC IMPACT EVALUATION OF LIFELINES FACILITIES CONSIDERS CASCADING EFFECTS Speaker: Chih-Hao Hsu
11:35 - 11:50 H3-012	DEVELOPMENT AND APPLICATIONS OF SEISMIC DISASTER SIMULATION TECHNOLOGY Speaker: Chin-Hsun Yeh
11:50 - 12:05 H0-015	SEISMIC PERFORMANCE OF WATER SUPPLY SYSTEMS — FROM EARTHQUAKE EXPERIENCES TO RECENT RISK ASSESSMENT WORK IN TAIWAN Speaker: Gee-Yu Liu
12:05 - 12:20 H0-018	DAMAGING DATA SPECTRUM FRAGILITY CURVES DEVELOPMENT AND SCENARIO BASED LOSS ESTIMATION Speaker: Ming-Kai Hsu

Tuesday, September 17th, 10:50 - 12:20	**Room 204**
Session Title:	5ICUDR

10:50 - 12:20	**5th INTERNATIONAL CONFERENCE ON URBAN DISASTER REDUCTION -** DECADES REVIEW ON RECOVERY: LEARNING FROM BEST PRACTICES

Keynote Speech

Tuesday, September 17th, 13:30 - 14:00 **Conference Hall**

Chair: J. Bruce H. Shyu

What We've Learned about Tsunamis in Aceh from Corals, Sands, Bats, Sherds and Gravestones

Kerry Sieh

Professor, Earth Observatory of Singapore,
Nanyang Technology University, Singapore

Destructive large earthquakes usually generate a flurry of scientific activity – witness the rapid growth of modern earthquake science in Taiwan in the aftermath of the 1999 Chi Chi earthquake. The giant 2004 Indian Ocean earthquake and its tsunami also provoked a rapid growth in regional knowledge of seismic and tsunami hazards. Discovery of a sequence of sand layers in a cave along the western coast of Aceh yielded a tsunami record that extends 7,600 years into the past. Sand layers in swales behind beach ridges and uplifted corals implied that the penultimate large earthquakes and tsunamis occurred about six centuries prior to 2004, in about 1394 and 1450 CE.

The effects of these two penultimate tsunamis on coastal settlements and trade patterns were significant, because Aceh had become an important link in Chinese and Indian-Ocean maritime trade by medieval times. Archeological evidence demonstrates that the 1394 tsunami devastated nine distinct communities along a 40-km section of the northern coast of Sumatra. Our evidence is the spatial and temporal distribution of tens of thousands of ancient Chinese, Thai, and Burmese ceramic sherds and over 5,000 carved gravestones, collected and recorded during a systematic landscape archaeology survey near the modern city of Banda Aceh. Only the trading settlement of Lamri, perched on a headland above the reach of the tsunami, survived into and through the subsequent 15th century. It is of historical and political interest that by the 16th century, however, Lamri was abandoned, while low-lying coastal sites destroyed by the 1394 tsunami were resettled as the population center of the new economically and politically ascendant Aceh sultanate. Our evidence implies that the 1394 tsunami was large enough to impact severely many of the areas inundated by the 2004 tsunami and to provoke a significant reconfiguration of the region's political and economic landscape that shaped the history of the region in subsequent centuries.

Tuesday, September 17th, 14:20 - 15:50 **Conference Hall**

Session Title: SE4 - Seismic design, evaluation and retrofit of bridge structure
Chair: W. Phillip Yen, Yu-Chen Ou

14:20 - 14:40 SE4-001 (Invited Talk)	BRIDGE SEISMIC PERFORMACNE FROM RECENT EARTHQUAKE RECONNAISSANCE Speaker: W. Phillip Yen
14:40 - 14:55 SE4-014	AN OVERVIEW OF EARTHQUAKE ENGINEERING RESEARCHES ON BRIDGE STRUCTURES IN NCREE AFTER THE 1999 CHI-CHI EARTHQUAKE Speaker: Yu-Chen Ou
14:55 - 15:10 SE4-012	INTRODUCTION OF THE TAIWAN FREEWAY BRIDGE SEISMIC RETROFIT PROGRAM Speaker: Kang-Yu Peng
15:10 - 15:25 SE4-015	RESPONSE OF BRIDGES WITH FOUNDATION EXPOSURE UNDER NEAR-FAULT GROUND MOTION Speaker: Shin-Tai Song
15:25 - 15:40 SE4-017	PARAMETRIC STUDY ON THE SEISMIC RESPONSES OF SIMPLY-SUPPORTED BRIDGES CROSSING FAULT-RUPTURE ZONES Speaker: Hsiao-Hui Hung

Tuesday Sep. 17 PM1

Tuesday, September 17th, 14:20 - 15:50 **Room 101**

Session Title: SE2 - Seismic assessment, retrofit and repairability for existing RC buildings
Chair: Sutat Leelataviwat, Lyan-Ywan Lu

14:20 - 14:40 SE2-002 (Invited Talk)	COMPARISON OF SEISMIC STRENGTHENING METHODS FOR SOFT-STORY RC FRAMES USING BUCKLING-RESTRAINED BRACES AND CONCRETE JACKETING Speaker: Sutat Leelataviwat
14:40 - 14:55 SE2-023	SEISMIC RESPONSE OF A HALF-SCALE SEVEN-STORY REINFORCED CONCRETE STRUCTURE WITH TORSIONAL AND DAMAGE IRREGULARITIES Speaker: Tomomi Suzuki
14:55 - 15:10 SE2-029	A PRACTICAL PROCEDURE FOR COLLAPSE RISK ASSESSMENT OF MID-TO-HIGH RISE BUILDINGS Speaker: Lyan-Ywan Lu
15:10 - 15:25 SE2-033	SEISMIC REPAIRING AND STRENGTHENING OF POST-TENSIONED FLAT PLATE USING POST-INSTALLED SHEAR REINFORCEMENT Speaker: Jamaluddin ChalermThai
15:25 - 15:45 SE2-004 (Invited Talk)	STEEL FIBER REINFORCED CONCRETE COUPLING BEAMS WITH SIMPLIFIED REINFORCEMENT DETAILING: FROM RESEARCH TO PRACTICE Speaker: Gustavo J. Parra-Montesinos

Tuesday, September 17th, 14:20 - 15:50 **Room 103**

Session Title: SE11 - Recent developments in high-performance structural systems and devices for earthquake resilient infrastructure
G7 - Seismic isolation, energy dissipation and vibration control of structures

Chair: Arturo Tena-Colunga, Chung-Han Yu

14:20 - 14:35 SE11-025	RESEARCH OF HIGH-STRENGTH REINFORCED CONCRETE STRUCTURAL SYSTEM IN TAIWAN Speaker: Kai-Ning Chi
14:35 - 14:50 SE11-027	RESILIENT CODE-ORIENTED SEISMIC DESIGN FOR DUCTILE REINFORCED CONCRETE FRAMES WITH HYSTERETIC FUSES Speaker: Arturo Tena-Colunga
14:50 - 15:05 G7-011	STUDY ON THE ACTUAL RESPONSES OF SEISMIC ISOLATED STRUCTURE IN THE HUALIEN TZUCHI MEDICAL CENTER Speaker: Chung-Han Yu
15:05 - 15:20 SE12-034	EFFECTS OF MASS IRREGULARITIES ON SEISMIC RESPONSES OF RC FRAMED STRUCTURES Speaker: Hyung-Joon Kim
15:20 - 15:35 SE11-014	SHEAR BEHAVIOR OF STEEL REINFORCED ULTRA HIGH PERFORMANCE FIBER REINFORCED CONCRETE MEMBERS WITH HYBRID FIBERS Speaker: Manuel Bermudez

Tuesday Sep. 17 PM1

Tuesday, September 17th, 14:20 - 15:50 **Room 201**

Session Title: B2 - Subduction zone earthquakes, structure & geodynamics
B5 - Lesson learnt from recent lrage earthquakes
B6 - The nature of aseismic slip: observations and simulations
B7 - General seismology

Chair: Tai-Lin Tseng, Chun-Te Chen

14:20 - 14:40 B6-004 (Invited Talk)	MILLIHERTZ GROUND MOTION ON OCEAN BOTTOM PRESSURE DATA EXCITED BY LARGE REGIONAL EARTHQUAKES Speaker: Yoshihiro Ito
14:40 - 14:55 B2-012	THE 2018 Mw6.4 HUALIEN EARTHQUAKE: DYNAMIC SLIP PARTITIONING REVEALS THE SPATIAL TRANSITION FROM MOUNTAIN BUILDING TO SUBDUCTION Speaker: Yi-Ching Lo
14:55 - 15:10 B7-015	COULOMB STRESS CHANGES TRIGGERING SURFACE UPLIFT IN 2016 M_W 6.4 MEINONG EARTHQUAKE AND THEIR IMPLICATIONS FOR EARTHQUAKE-INDUCED MUD DIAPIRING Speaker: Hue Anh Mai
15:10 - 15:25 B5-013	LESSONS LEARNED FROM THE 2018 HUALIEN EARTHQUAKE: I. CHARACTERISTICS OF STRONG GROUND MOTIONS AND ITS CORRESPONDENCE TO DAMAGES FROM QUESTIONNAIRE SURVEY FOR HIGHRISE RESIDENTIAL BUILDINGS Speaker: Xin Wang
15:25 - 15:40 B5-015	LESSONS LEARNED FROM THE 2018 HUALIEN EARTHQUAKE: II. NONLINEAR RESPONSE ANALYSIS OF HIGH-RISE REINFORCED-CONCRETE BUILDINGS TO PULSE-LIKE GROUND MOTIONS Speaker: Tetsushi Watanabe
15:40 - 15:55 B5-014	LESSONS LEARNED FROM THE 2018 HUALIEN EARTHQUAKE: III. GENERATION OF LONG-PERIOD PULSE-LIKE GROUND MOTIONS Speaker: Xin Wang

Tuesday, September 17th, 14:20 - 15:50 **Room 202**

Session Title: A0 - Earthquake geology and active faults
C2 - Fault-zone dynamics and modeling

Chair: Ming Chun Ke, Hung-Yu Wu

14:20 - 14:35 A0-013	ROLE OF SURFACE PROCESSES ON THE LOCATION OF LARGE SEISMOGENIC FAULTS IN TAIWAN Speaker: Jacques Malavieille
14:35 - 14:50 A0-012	APPLICATION OF THE NEW MORPHOLOGICAL ACTIVE FAULT DATABASE ON SEISMIC SCENARIO Speaker: Ming-Chun Ke
14:50 - 15:05 A0-015	QUASI-REGULAR BEHAVIER OF AN INTRAPLATE REVERSE FAULT INFERRED FROM THE FLIGHT OF DISPLACED TERRACES: AN EXAMPLE FROM THE KAMISHIRO FAULT, CENTRAL JAPAN Speaker: Naoya Takahashi
15:05 - 15:20 C2-012	OBSERVATIONS AND MODELING OF CO-SEISMIC STRESS CHANGES IN THE M7.6 CHI-CHI EARTHQUAKE TAIWAN – APPARENT EVIDENCE FOR COMPLETE STRESS DROP ON A SMALL FAULT PATCH Speaker: Hung-Yu Wu
15:20 - 15:35 A0-014	THE NEW REVEAL OF CHIHSHANG FAULTING AT TAPO, EASTERN TAIWAN Speaker: Mohammad Tri Fitrianto

Tuesday Sep. 17 PM1

Tuesday, September 17th,14:20 - 15:50 **Room 203**

Session Title: A1 - Paleoseismology and tectonic geomorphology
A2 - Thrust tectonics

Chair: Maryline Le Béon, J. Bruce H. Shyu

14:20 - 14:35 A2-011	ACTIVE TECTONICS AND STRUCTURAL ARCHITECTURE AT THE PIEDMONT OF SOUTHWESTERN TAIWAN IN RELATION TO RECENT SEISMICITY AND OROGENY Speaker: Maryline Le Béon
14:35 - 14:50 A1-015	LANDFORM DEVELOPMENT PROCESSES OF THE WESTERN HENGCHUN TABLELAND IN SOUTHERN TAIWAN BASED ON UPLIFTED COASTAL FEATURES Speaker: Sze-Chieh Liu
14:50 - 15:05 A1-011	INTERACTION BETWEEN SLIP EVENTS, EROSION AND SEDIMENTATION ALONG ACTIVE STRIKE-SLIP FAULTS: INSIGHTS FROM GEOMORPHIC EXPERIMENTS Speaker: Jacques Malavieille
15:05 - 15:20 A1-013	PALEOSEISMIC STUDY OF THE MILUN FAULT ACTIVATED DURING THE 2018 MW 6.4 HUALIEN EARTHQUAKE RUPTURE IN EASTERN TAIWAN Speaker: Ya-Chu Tseng
15:20 - 15:35 A1-012	A PROPOSED METHOLOGY FOR STUDING EARTHQUAKE DAMAGE ORIENTATION Speaker: Fidel Martin-Gonzalez

Tuesday, September 17th, 14:20 - 15:50 **Room 204**

Session Title: 5ICUDR
L - Lessons learned from post-disaster response and recovery
M- Policy and implementation for reducing risk

14:20 - 14:35 L-016	STUDY ON ECOLOGICAL MOBILITY AND COMMUNITY FOOT-PATH MOVEMENT FOR RECOVERY AFTER THE 2016 KUMAMOTO EARTHQUAKE Speaker: Hitomi Murakami
14:35 - 14:50 L-011	RESEARCH ON EARTHQUAKE RESCUE AND EMERGENCY MANAGEMENT Speaker: Yun-Ming Tang
14:50 - 15:05 L-012	RESEARCH ON THE INSPIRATION OF CHINESE TRADITIONAL ARCHITECTURE DESIGN CONCEPTS AND SPIRITS IN THE MODERN ARCHITECTURE Speaker: Francis Lin
15:05 - 15:20 M-011	APPLYING COMPASSION INTO RESEARCH AND DE VELOPMENT AND PRACTICE TAKING THE GLOBAL DI SASTER ASSISTANCE OF TZU CHI FOUNDATIO N AS AN EXAMPLE Speaker: Yu-Chi Huang
15:20 - 15:35 L-014	HELPING DISASTER VICTIMS AVOIDING FROM POST-TRAUMATIC STRESS DISORDER THE SOONER THE BETTER Speaker: Fang-Tsuang Lu
15:35 - 15:50 L-018	DISASTER RECOVERY AND REBUILDING: THE TZU CHI EXPERIENCE Speaker: Fang-Tsuang Lu

Tuesday, September 17th, 16:10 - 17:40 **Conference Hall**

Session Title: SE8 - Past, present and future of seismic passive control technology
G7 - Seismic isolation, energy dissipation and vibration control of structures

Chair: Herlien D. Setio, Chung-Che Chou

16:10 - 16:30 G7-001 (Invited Talk)	TOWARDS IMPLEMENTATION OF ACTIVE CONTROL SYSTEM USING ARTIFICIAL INTELLIGENT FOR FLEXIBLE STRUCTURES UNDER EARTHQUAKE EXCITATIONS Speaker: Herlien D. Setio
16:30 - 16:45 SE8-012	DEVELOPMENT AND VALIDATION OF SEISMIC-RESISTING DAMPERS: BUCKLING-RESTRAINED BRACE, SELF-CENTERING BRACE AND LEVER VISCOELASTIC WALL DEVICE Speaker: Chung-Che Chou
16:45 - 17:00 SE8-013	PERFORMANCE OF FRICTION-PENDULUM BEARING SYSTEMS SUBJECTED TO NEAR-FAULT GROUND MOTIONS Speaker: Ya-Heng Yang
17:00 - 17:15 SE8-016	BUILDING MASS DAMPER DESIGN BASED ON OPTIMUM DYNAMIC CHARACTERISTIC CONTROL APPROACH Speaker: Bo-Han Lee
17:15 - 17:30 G7-013	PERFORMANCE IDENTIFICATION OF BI-AXIAL DYNAMIC TESTING SYSTEM Speaker: Wang-Chuen Lin

Tuesday Sep. 17 PM2

Tuesday, September 17th, 16:10 - 17:40 **Room 101**

Session Title: SE7 - Development of steel structures for seismic urban regions

Chair: Dyah Kusumastuti, Haeyong Park

16:10 - 16:30 SE7-003 (Invited Talk)	STUDY ON THE PERFORMANCE OF REPLACEABLE LINK ON SEISMIC RESISTANT STEEL STRUCTURES Speaker: Dyah Kusumastuti
16:30 - 16:45 SE7-011	SEISMIC PERFORMANCE OF DAMPED-OUTRIGGER SYSTEM INCORPORATING BUCKLING-RESTRAINED BRACES Speaker: Pao-Chun Lin
16:45 - 17:00 SE7-018	STRUCTURAL PERFORMANCE OF STEEL BEAM SYSTEM WITH T-STUB CONNECTION TYPE SEISMIC STEEL DAMPER Speaker: Haeyong Park
17:00 - 17:15 SE7-020	DESIGN AND APPLICATION OF SBRB FRAMES FOR STEEL TALL BUILDINGS IN TAIWAN: BRACE ORIENTATION AND CONNECTION Speaker: Jia-Hau Liu
17:15 - 17:30 SE7-023	THE SEISMIC PERFORMANCE OF DEVELOPED HCE STRUCTURES FOR PREFABRICATED SHEAR WALLS Speaker: Limeng Zhu

Tuesday, September 17th, 16:10 - 17:40 **Room 103**

Session Title: SE1 - Blind analysis contest on a 7-story reinforced concrete building model under near-fault earthquakes

Chair: Shyh-Jiann Hwang, Yuan-Tao Weng

16:10 - 16:25 SE1-012	EXPERIMENTAL PLANNING AND STRUCTURAL COLLAPSE BEHAVIOR OF 7-STORY REINFORCED CONCRETE BUILDING MODEL UNDER NEAR-FAULT EARTHQUAKES Speaker: Fu-Pei Hsiao
16:25 - 16:40 SE1-013	2018 THREE-DIMENSIONAL SHAKING TABLE TEST OF A 7-STORY REINFORCED CONCRETE BUILDING UNDER NEAR-FAULT EARTHQUAKES ON THE NCREE TAINAN LAB. – OVERVIEW OF THE BLIND ANALYSIS CONTEST Speaker: Yuan-Tao Weng
16:40 - 16:45	SPECIAL CEREMONY Speaker: Shyh-Jiann Hwang
16:45 - 17:00 SE1-001	BLIND ANALYSIS OF A 7 STORY REINFORCED CONCRETE BUILDING USING DETAILED FINITE ELEMENT MODELING Speaker: Yasunori Mizushima
17:00 - 17:15 SE1-002	INSTRUCTIONS FOR BLIND ANALYSIS CONTEST ON A 7-STORY REINFORCED CONCRETE BUILDING MODEL UNDER NEAR-FAULT EARTHQUAKES Speaker: Riku Sakamoto
17:15 - 17:30 SE1-003	INSTRUCTIONS FOR BLIND ANALYSIS CONTEST ON A 7-STORY REINFORCED CONCRETE BUILDING MODEL UNDER NEAR-FAULT EARTHQUAKES Speaker: Xinlei Jin
17:30 - 17:45 SE1-011	ANALYTICAL MODELING OF A HALF-SCALE SEVEN-STORY REINFORCED CONCRETE BUILDING SHAKEN TO NEAR-FAULT EARTHQUAKE MOTIONS Speaker: Yu-Fang Liu

Tuesday Sep. 17 PM2

Tuesday, September 17th, 16:10 - 17:40 **Room 201**

Session Title: C2 - Fault-zone dynamics and modeling
Chair: David D. Oglesby, Yen-Yu Lin

16:10 - 16:30 C2-002 (Invited Talk)	EARTHQUAKE DYNAMIC ON GEOMETRICALLY COMPLEX FAULTS: LESSON LEARNED FROM THE 1999 CHI-CHI (TAIWAN) EARTHQUAKE Speaker: Luis A. Dalguer
16:30 - 16:50 C2-001 (Invited Talk)	WHAT CAN SURFACE SLIP DISTRIBUTIONS TELL US ABOUT FAULT CONNECTIVITY AT DEPTH? Speaker: David D. Oglesby
16:50 - 17:05 C2-014	A DYNAMIC RUPTURE MODEL OF THE 1999 CHI-CHI, TAIWAN, EARTHQUAKE Speaker: Jolan Liao
17:05 - 17:20 C2-016	EXAMINATION OF FAULT-TO-FAULT RUPTURE TRANSFER DURING THE 2016 KUMAMOTO EARTHQUAKE IN JAPAN USING A DYNAMIC SOURCE MODEL Speaker: Hiroki Karatsu
17:20 - 17:35 C2-011	MICROSEISMICITY SIMULATED ON ASPERITY-LIKE FAULT PATCHES: ON SCALING OF SEISMIC MOMENT WITH DURATION AND SEISMOLOGICAL ESTIMATES OF STRESS DROPS Speaker: Yen-Yu Lin

Tuesday, September 17th, 16:10 - 17:40 **Room 202**

Session Title: B3 - Seismotectonics
Chair: Hsin-Hua Huang, Strong Wen

16:10 - 16:30 B3-001 (Invited Talk)	A SYSTEMATIC PREFERENCE OF LARGE (M6+) EARTHQUAKES ALONG TOMOGRAPHIC EDGE ZONES IN TAIWAN Speaker: Honn Kao
16:30 - 16:45 B3-013	INTRAPLATE SEQUENCES AND SWARMS: STATISTICAL ANALYSIS OF TRIACASTELA REGION (GALICIAN, NW IBERIAN PENINSULA) Speaker: Fidel Martin-Gonzalez
16:45 - 17:00 B3-012	GPS HORIZONTAL DISPLACEMENTS AND SURFACE DEFORMATION DURING EARTHQUAKE CYCLE IN THE NORTHERNMOST LONGITUDINAL VALLEY, EASTERN TAIWAN Speaker: Jian-Cheng Lee
17:00 - 17:15 B3-017	THE SEISMOGENIC STRUCTURES BENEATH THE NORTHERN LONGITUDINAL VALLEY, TAIWAN: APPLICATION IN 2018 HUALIEN EARTHQUAKE Speaker: Strong Wen
17:15 - 17:30 B3-015	RUPTURE CHARACTERISTIC AND SEISMOGENIC STRUCTURE OF 2018 ML HUALIEN EARTHQUAKE SEQUENCE Speaker: Hsin-Hua Huang
17:30 - 17:45 B3-014	DISCUSSION ON ANOMALOUS CRUSTAL STRUCTURES ALONG THE CONVERGENT ZONE IN EASTERN TAIWAN: INSIGHTS FROM THE NEW AIRBORNE MAGNETIC SURVEY AND UPDATED SEISMIC TOMOGRAPHIC MODELS Speaker: Chi-Hsuan Chen

Tuesday Sep. 17 PM2

Tuesday, September 17th, 16:10 - 17:40 **Room 203**

Session Title: SE5 - Revisiting probability seismic hazard assessment within 20 years after chichi earthquake (Joint session with Taiwan earthquake model, TEM)
D0 - Engineering seismology

Chair: Kuo-Liang Wen, Chun-Hsiang Kuo

16:10 - 16:25 D0-013	STRONG GROUND MOTION APPLICATION IN NCREE AFTER CHI-CHI, TAIWAN EARTHQUAKE Speaker: Kuo-Liang Wen
16:25 - 16:40 SE5-017	ANALYSIS OF SEISMIC HAZARD POTENTIAL IN TAIPEI AREA RELATIVE TO SITE EFFECT Speaker: Kun-Sung Liu
16:40 - 16:55 SE5-013	THE INFLUENCE OF FAULT SLIP RATE UNCERTAINTY ON EARTHQUAKE PROBABILITY ESTIMATION – A CASE STUDY IN NORTHERN TAIWAN Speaker: Yi-Jui Lee
16:55 - 17:10 SE5-014	A SITE DATABASE FOR TAIWAN STRONG MOTION NETWORK Speaker: Chun-Hsiang Kuo
17:10 - 17:25 SE5-011	OBSERVED PULSE-LIKED GROUND MOTION AND RUPTURE DIRECTIVITY EFFECT IN TAIWAN GROUND MOTION DATASET Speaker: Shu-Hsien Chao
17:25 - 17:40 SE5-012	APPLYING H/V FOURIER SPECTRAL RATIOS FOR PREDICTING THE SITE EFFECT OF GROUND MOTION Speaker: Shu-Hsien Chao

Tuesday, September 17th, 16:10 - 17:40 **Room 204**

Session Title: 5ICUDR
L - Lessons learned from post-disaster response and recovery
N - Public-private-partnership for risk management

16:10 - 16:25 L-015	STUDY ON STRENGTHENING AND COGNITION OF EARTHQUAKE RESISTANT FOR OLD BUILDINGS: A CASE OF YUTIAN COMMUNITY IN YUJING DIST Speaker: Shu-Ting Lin
16:25 - 16:40 N-012	THE IMPORTANCE OF THE PARTNERSHIP BETWEEN THE PUBLIC AND PRIVATE SECTIONS FOR DISASTER RELIEF AND RISK MANAGEMENT. ~ THE EXPERIENCE OF TZU CHI'S GLOBAL EMERGENCY RESPONSE AND RECOVERY PROGRAMS Speaker: Yun-Ching Wang
16:40 - 17:40	**5th INTERNATIONAL CONFERENCE ON URBAN DISASTER REDUCTION -** DECADES REVIEW ON RECOVERY: LEARNING FROM BEST PRACTICES

Keynote Speech

Wednesday, September 18th, 09:00 - 09:30 **Conference Hall**

Chair: Ruey-Juin Rau

From Earthquake Observation and Modelling to Forecasting

Jean-Philippe Avouac
Professor, California Institute of Technology, Pasadena, USA

A major goal of seismotectonic studies is to improve methods to assess the probability of occurrence, possible location, magnitude and expected ground motion of the most extreme earthquake. In this presentation, I will discuss the progress that we have made toward that goal since the Chichi earthquake happened in 1999. I will start with summarizing what we have learned from the Chichi earthquake itself and from a number of more recent large events, in particular the 2015 Gorkha earthquake which occurred in a similar tectonic setting. I will discuss how these observations have impacted our understanding of the 'seismic cycle' and the success and limitations dynamic modeling in simulating these observations. I will finally discuss the major challenges that need to be addressed to improve earthquake hazard assessment and forecasting.

Wednesday Sep. 18 AM0

Keynote Speech

Wednesday, September 18th, 09:30 - 10:00 **Conference Hall**

Chair: Ruey-Juin Rau

A Review of 1999 Chi-Chi, Taiwan, Earthquake from Modeling to Drilling for the Understanding of Fault Zone Dynamics and Ground Motions

Kuo-Fong Ma

Director, Earthquake –Disaster & Risk Evaluation and Management (E-DREaM) Center, National Central University, Taiwan

Professor, Department of Earth Sciences, National Central University, Taiwan

Joint appointment research fellow, Institute of Earth Sciences, Academia Sinica, Taiwan

The high quality dense strong motion station deployed priori to the occurrence of the destructive 1999 Chi-Chi earthquake provided the most comprehensive studies on the mechanism of a damaging event. The general consistent feature in spatial slip distribution of the fault as a large slip of ~12m at the northern portion of the fault from fault models and geological observation suggest the importance in the understanding of physics of faulting with large slip, and the long period ground motion. The success of Taiwan Chelungpu-fault Drilling project (TCDP) shed the light on the understanding of the earthquake energy partition by revealing the very fine grain (~nm) fault gouge with slip thickness in a scale of mm for a single event. The dynamic parameters inverted from the kinematic slip inversion suggest a heterogeneous of shear stress distribution, and complexity in stress-time history, and, thus, also slip-weakening curves over the fault. The combined study from surface energy estimated from slip zone identified from fault gouge to the fracture energy estimated from dynamic parameters modeling of strong motion data gives the direct estimation on energy partition of a single earthquake from geological and seismological observations. The low frictional coefficient from temperature measurement after drilling provoked the rapid response drilling after a large earthquake (e.g. 2008 Wencuan, and 2011 Tohoku earthquakes) for frictional heating measurement. With the success of the TCDP drilling with identified slip zone associated with the 1999 Chi-Chi earthquake, an in-situ borehole seismometers as TCDPBHS was installed to monitor the fault zone behavior after a large slip. This cross the fault vertical seismic array helps us to understand the fault zone hydrological structure, its association to fault zone recovery in anisotropy, earthquake nucleation and triggering. From the lesson learnt through the 1999 Chi-Chi earthquake, the earthquake kinematics and dynamics from recent two moderate but damaging 20160206 Mw6.4 Meinong, and 20180206 Mw6.3 Hualian earthquakes, which both generating long period ground velocity, were examined. The dense low-cost seismometers, P-alert, which developed and installed after the 1999 Chi-Chi earthquake for earthquake early warning (EEW) brought in not just the useful information for EEW, but, also good coverage to the earthquakes as seismic array with high quality waveforms. The array-like analysis to the simulation on the generation of the long period velocity ground motion suggested the important contribution of the near asperity effect from buried fault, rather than near-fault motion from fling effect. These dense strong motion array captured the most direct features on ground motions from earthquake faulting, and important message to the application in hazard mitigation.

Keynote Speech

Wednesday, September 18th, 10:00 - 10:30 **Conference Hall**

Chair: Ruey-Juin Rau

Seismic Design Verification Using Nonlinear Response History Analysis

Jack Moehle

Ed & Diane Wilson Professor of Structural Engineering
University of California, Berkeley, USA

We live in a time when social, environmental, and economic factors in the Western United States favor the development of urban centers populated by high-rise buildings. The design of this new generation of high-rise buildings has benefited from the advancement of performance-based design methods in which structural engineers characterize expected performance for hypothesized earthquake shaking using computer simulation. The design approach has evolved rapidly - whereas a decade ago each project had its own, project-specific basis, today the designs are guided by a set of consensus standards, including a new appendix for ACI 318-19 Concrete Building Code on Seismic Design Verification Using Nonlinear Response History Analysis. Though developed with high-rise buildings in mind, the approach is generally applicable for performance-based designs of buildings of any height or performance category. The presentation will describe the performance-based design approach and will illustrate it through the example of a tall building design in San Francisco.

Wednesday, September 18th,10:50 - 12:20 **Conference Hall**

Session Title: SS3 - Frontiers of Earthquake and Fault-Zone Dynamics (Invited lectures)

Chair: Kuo-Fong Ma, Ya-Ju Hsu

10:50 - 11:20 SS3-001 (Invited Lecture)	LEARNING ABOUT LARGE EARTHQUAKE RUPTURES USING FAULT ZONE DRILLING FROM TCDP TO JFAST Speaker: James Mori
11:20 - 11:50 SS3-002 (Invited Lecture)	VARIABILITY AND TIME-DEPENDENCIES OF EARTHQUAKES PROPERTIES: LESSONS LEARNED FROM LARGE GROUND-MOTION DATASETS ANALYSIS Speaker: Fabrice Cotton
11:50 - 12:20 SS3-003 (Invited Lecture)	SLIP BEHAVIOR OF THE SHALLOW SUBDUCTION INTERFACE ALONG THE JAPAN TRENCH Speaker: Ryota Hino

Wednesday Sep. 18 AM1

Wednesday, September 18th, 10:50 - 12:20 **Room 101**

Session Title: F1 - Soil dynamic and ground response
F4 - Seismic design of foundations and geotechnical structures
F5 - Geotechnical engineering innovations

Chair: Cheng-Hsing Chen, Chi-Chin Tsai

10:50 - 11:05 F1-011	DEPTH-DEPENDENT AMPLIFICATION BEHAVIOR OBSERVED FROM DOWNHOLE ARRAYS IN THE TAIPEI BASIN Speaker: Chi-Chin Tsai
11:05 - 11:20 F1-012	NUMERICAL STUDY OF GROUND RESPONSE FOR SITES WITH INCLINED LAYERS Speaker: On-Lei Annie Kwok
11:20 - 11:35 F1-014	SOIL DYNAMIC RESPONSE FOR SEISMIC MICROZONATION PURPOSES: RANCAGUA-MACHALÍ AND RENGO CITIES, CHILE Speaker: Laura Piñero-Feliciangeli
11:35 - 11:50 F4-011	SEISMIC PERFORMANCE ASSESSMENT FOR GRAVITY WHARVES – A CASE STUDY OF 2018 HUALIEN EARTHQUAKE Speaker: Yung-Yen Ko
11:50 - 12:05 F1-018	COMPARISON OF DEEPSOIL AND LS-DYNA METHODS IN SITE RESPONSE ANALYSIS FOR NUCLEAR POWER PLANT Speaker: Hsuan-Chih Yang
12:05 - 12:20 F5-013	STUDY ON THE INFLUENCE OF DIFFERENCE OF PENETRAION DEVICE OF PIEZO DRIVE CONE ON INVESTIGATION RESULTS Speaker: Noriyuki Fujii

Wednesday Sep. 18 AM1

Wednesday, September 18th,10:50 - 12:20 **Room 103**

Session Title: SE10 - Smart Monitoring technology for bridge
Chair: Tzu-Kang Lin, Yung-Bin Lin

10:50 - 11:05 SE10-015	SOUR STABILITY EVALUATION OF BRIDGE PIER CONSIDERING FLUID-SOLID INTERACTION Speaker: Tzu-Kang Lin
11:05 - 11:20 SE10-011	TWO-YEAR MONITORING PROJECT ON A REPAIRED EARTHQUAKE DAMAGED BRIDGE USING OPTIC FIBER DIFFERENTIAL SETTLEMENT SENSORS Speaker: Zheng-Kuan Lee
11:20 - 11:35 SE10-012	EMPLOYMENT OF VIBRATION-BASED SCOUR DETECTION TECHNOLOGY IN A FIELD APPLICATION Speaker: Xiao-Qin Liu
11:35 - 11:50 SE10-013	A FIELD MONITORING SYSTEM FOR MAINTENACE AND MANAGEMENT OF EXTRADOSED BRIDGES Speaker: Chun-Chung Chen
11:50 - 12:05 SE10-014	MONITORING BRIDGE SCOUR USING MACHINE LEARNING Speaker: Yi-Hsiang Chen

Wednesday, September 18th, 10:50 - 12:20 **Room 201**

Session Title: D2 - Ground motion prediction equations and engineering applications of ground motion simulation
Chair: Mukatlal Sharma, Jyun-Yan Huang

10:50 - 11:05 D2-014	EMPIRICAL RELATION OF CUMULATIVE ABSOLUTE VELOCITY FOR WESTERN HIMALAYA Speaker: Mukatlal sharma
11:05 - 11:20 D2-012	VERTICAL GROUND MOTION PREDICTION EQUATION FOR VERTICAL TO HORIZONTAL (V/H) RATIOS OF GROUND MOTION IN TAIWAN Speaker: Van-BANG Phung
11:20 - 11:35 D2-013	SITE-DEPENDENT UNIFORM HAZARD RESPONSE SPECTRA FOR A MAJOR RESERVOIR PROJECT IN TAIWAN Speaker: Jia Cian Gao
11:35 - 11:50 D2-012	RAPID SITE EFFECT EVALUATION FOR RECENT DISASTER EARTHQUAKES IN TAIWAN FROM DENSE MICROTREMOR H/V MEASUREMENTS Speaker: Jyun-Yan Huang

Wednesday, September 18th, 10:50 - 12:20 **Room 202**

Session Title: G0 - Seismic design, evaluation and retrofit
G3 - Advances in earthquake engineering research

Chair: Jui-Liang Lin, Ching-Yi Tsai

10:50 - 11:05 G0-020	A STUDY ON COMPARISON OF MODAL RESPONSE COMBINATIONS IN SEISMIC RESPONSE ANALYSIS Speaker: Jia-Sheng Chiou
11:05 - 11:20 G0-014	SIMPLIFIED SEISMIC ANALYSIS OF BUILDINGS WITH SETBACKS Speaker: Jui-Liang Lin
11:20 - 11:35 G0-021	RETROFITTING METHOD WITH COMPRESSION BRACE WITH SELF-JOINTING DEVICE FOR RC STRUCTURE Speaker: Ren-Jie Tsai
11:35 - 11:50 G0-023	ANALYSIS MODEL OF LATERAL LOAD-DISPLACEMENT CURVE OF RC WALL WITH OPENINGS UNDER SHEAR FAILURE Speaker: Ren-Jie Tsai
11:50 - 12:05 G3-012	FRACTURE ASSESSMENT OF ELECTRO-SLAG WELDING CONNECTION IN STEEL BEAM-TO-BOX COLUMN JOINTS Speaker: Ching-Yi Tsai

Wednesday, September 18th, 10:50 - 12:20 **Room 203**

Session Title: SE12 - Seismic performance design, evaluation and retrofit for non-structural components

Chair: Takuya Nagae, Dong-Hyeon Shin

10:50 - 11:05 SE12-024	ASSESSMENT OF A CURTAIN WALL SYSTEM USED IN HIGH-RISE BUILDINGS AND DEVELOPMENT OF A MONITORING METHOD Speaker: Takuya Nagae
11:05 - 11:20 SE12-021	ANALYSIS AND VERIFICATION OF SEISMIC REINFORCEMENT PERFORMANCE OF MASONRY WALLS USING PREFABRICATED STEEL BAND AND URES RETROFITTING METHOD Speaker: Han-Gil Kim
11:20 - 11:35 SE12-022	SHAKE TABLE TEST FOR SEISMIC PERFORMANCE INVESTIGATION OF CLADDING SYSTEM INSTALLED AT THE STEEL FRAME Speaker: Jae-Han Park
11:35 - 11:50 SE12-033	EVALUATION OF EQUIVALENT STATIC AND DYNAMIC ANALYSIS METHOD FOR SIESMIC DESIGN OF NON-STRUCTURAL ELEMENTS Speaker: Su-Chan Jun
11:50 - 12:05 SE12-018	DYNAMIC BEHAVIOR OF ANCHORED NONSTRUCTURAL COMPONENT CONNECTED VIA YIELDING ELEMENTS Speaker: Tal Feinsein
12:05 - 12:20 SE12-036	EXPERIMENTAL INVESTIGATION ON CYCLIC BEHAVIOR OF HYBRID SPRING SUPPORT APPLIED FOR ELECTRIC SWITCHBOARDS Speaker: Dong-Hyeon Shin

Wednesday Sep. 18 AM1

Wednesday, September 18th, 10:50 - 12:20 **Room 204**

Session Title: SE6 - Advanced Simulation, Artificial Intelligence, Data Science and Internet of Things for Earthquake Engineering
H5 - Emergency management and planning

Chair: Maki Koyama, Yuan-Sen Yang

Wednesday Sep. 18 AM1

10:50 - 11:05 SE6-012	AN IMAGE ANALYSIS SOFTWARE FRAMEWORK FOR PROTOTYPING IMAGE BASED STRUCTURAL DEFORMATION MONITORING Speaker: Yuan-Sen Yang
11:05 - 11:20 SE6-013	A SOFTWARE FRAMEWORK FOR GPU BASED FINITE ELEMENT PARALLELIZATION ON OPENSEES FRAMEWORK Speaker: Yuan-Sen Yang
11:20 - 11:35 SE6-014	PARTICLE-BASED METHODS AND THEIR POTENTIALS FOR EARTHQUAKE ENGINEERING Speaker: Wei-Tze Chang
11:35 - 11:50 H5-012	RESCUE OPERATIONS AT COLLAPSED HOUSES BY POLICE RESCUE TEAMS IN THE KUMAMOTO EARTHQUAKES Speaker: Maki Koyama
11:50 - 12:05 H5-011	APPLICATION OF MONITORING INFORMATION IN SCIENCE PARKS TO EARTHQUAKE DISASTER MANAGEMENT Speaker: Min-Cheng Teng

Wednesday, September 18th, 14:00 - 15:00 **Conference Hall**

Session Title: SE2 - Seismic assessment, retrofit and repairability for existing RC buildings

Chair: Wen-I Liao, Tsung-Chih Chiou

14:00 - 14:15 SE2-017	SEISMIC PERFORMANCE OF NON-DUCTILE RC FRAME RETROFITTED USING POST-INSTALLED RC WALLS Speaker: Wen-I Liao
14:15 - 14:30 SE2-032	SEISMIC UPGRADING OF SCHOOL BUILDINGS SINCE 1999 CHI-CHI EARTHQUAKE Speaker: Lap-Loi Chung
14:30 - 14:45 SE2-030	SEISMIC RETROFIT IN STAGES FOR RESIDENTIAL BUILDINGS WITH SOFT AND WEAK BOTTOM STORY Speaker: Tsung-Chih Chiou

Wednesday, September 18th, 13:30 - 15:00 **Room 101**

Wednesday Sep. 18 PM1

Session Title: F2 - Soil liquefaction and ground failure

Chair: Jin-Hung Hwang, On-Lei Annie Kwok

13:30 - 13:50 F2-001 (Invited Talk)	LIQUEFACTION ANALYSIS ADOPTING EFFECTIVE STRESS METHOD FOR PETOBO SITE POST M_W 7.4 PALU EARTHQUAKE Speaker: Wayan Sengara
13:50 - 14:05 F2-012	THE INFLUENCE OF DATA RESOLUTION OF CPTU TO SOIL LIQUEFACTION ANALYSIS AND COMPARISON WITH SPT-BASED EVALUATION- A CASE STUDY IN TAIPEI BASIN Speaker: Jiun- Shiang Wang
14:05 - 14:20 F2-015	LIQUEFACTION RESISTANCE OF PENGHU CALCAREOUS SAND Speaker: On-Lei Annie Kwok
14:20 - 14:35 F2-013	PARAMETRIC STUDY OF FACTORS AFFECTING TUNNEL UPLIFT INDUCED BY SOIL LIQUEFACTION Speaker: Jui-Ching Chou
14:35 - 14:50 F2-011	A DISCUSSION ON THE DAMAGE MECHANISMS OF HUALIEN HARBOR IN 20180206 HUALIEN EARTHQUAKE Speaker: Yuan-Chang Deng
14:50 - 15:05 F2-014	A PRELIMINARY STUDY OF THE LIQUEFACTION POTENTIAL OF GRAVELLY SOILS USING SHAKING TABLE TEST Speaker: Kuan-Yu Chen
15:05 - 15:20 F2-019	LIQUEFACTION POTENTIAL EVALUATION BASED ON SPT, CPT AND PDC IN-SITU TESTS AND THEIR CORRELATIONS FOR KAOHSIUNG SOILS Speaker: Wen-Chih Liu

Wednesday, September 18th, 13:30 - 15:00 **Room 103**

Session Title: J0 - Advanced method for simulation
J1 - Advanced techniques for simulations in earthquake engineering

Chair: Sung-Yong Kim, Pei-Ching Chen

13:30 - 13:45 J0-013	DEVELOPMENT OF ASYMMETRIC BOUC-WEN MODEL WITH LINEAR STRENGTH-DEGRADATION FUNCTIONS Speaker: Sung-Yong Kim
13:45 - 14:00 J0-012	PARAMETRIC ANALYSIS OF A NONLINEAR TUNED MASS DAMPER ON A BRIDGE USING INCREMENTAL HARMONIC BALANCE METHOD Speaker: Chiu Jen Ku
14:00 - 14:15 J1-012	ARTIFICIAL TRACTION BOUNDARIES FOR SOIL-STRUCTURE INTERACTION ANALYSES USING THE FINITE ELEMENT METHOD Speaker: Wen-Chia Yang
14:15 - 14:30 J1-014	BRIEF INTRODUCTION OF SHAKING TABLE TEST OF 1/25 SCALE MODEL OF OFFSHORE WIND TURBINE WITH JACKET FOUNDATION Speaker: Bai-Yi Huang
14:30 - 14:45 J0-011	A VERSATILE SMALL-SCALE STRUCTURAL LABORATORY FOR DEVELOPING ADVANCED EXPERIMENTAL METHODS Speaker: Pei-Ching Chen
14:45 - 15:00 J1-011	SEISMIC CONTROL PERFORMANCE EVALUATION OF A SMART BASE-ISOLATED RAISED FLOOR SYSTEM USING REAL-TIME HYBRID SIMULATION Speaker: Pei-Ching Chen

Wednesday Sep. 18 PM1

Wednesday, September 18th, 14:20 - 15:50 **Room 201**

Session Title: D3 - Velocity structures and site effect
E0 - Near fault ground motion
E1 - Characteristic of near fault ground motions

Chair: Yu-Chih Huang, Chun-Te Chen

13:30 - 13:45 D3-012	JOINT MODELING OF RECEIVER FUNCTION AND HORIZONTAL-TO-VERTICAL SPECTRAL RATIO FOR SHALLOW SHEAR-WAVE VELOCITY STRUCTURE Speaker: Che-Min Lin
13:45 - 14:00 D3-013	SHALLOW SHEAR WAVE VELOCITY STRUCTURE IN TAIWAN INFERRED FROM MICROTREMOR ANALYSIS Speaker: Chun-Te Chen
14:00 - 14:15 D3-014	BUILDING 3-D SHALLOW S-WAVE VELOCITY MODEL BY SPATIAL INTERPOLATION IN THE TAIPEI BASIN Speaker: Xue-Min Lu
14:15 - 14:30 D3-011	SHALLOW CRUSTAL VELOCITY STRUCTURES BENEATH WESTERN FOOTHILLS OF TAIWAN REVEALED BY AMBIENT SEISMIC NOISE Speaker: Yu-Chih Huang
14:30 - 14:45 E0-011	SCALING RELATIONSHIP OF THE PULSE-LIKE VELOCITY GROUND MOTIONS OF THE DISASTROUS EARTHQUAKES Speaker: Ming-Hsuan Yen
14:45 - 15:00 E1-011	NEAR-FIELD VELOCITY PULSE-LIKE GROUND MOTIONS ON FEBRUARY 6, 2018 MW6.4 HUALIEN, TAIWAN EARTHQUAKE AND STRUCTURE DAMAGE IMPLICATIONS Speaker: Kun Ji

Wednesday, September 18th, 13:30 - 15:00 **Room 203**

Session Title: H0 - Seismic loss and risk assessment
H2 - Seismic hazards and vulnerabilities
H3 - Earthquake loss estimation

Chair: Lessandro Estelito Garciano, Cheng-Tao Yang

13:30 - 13:50 H0-001 (Invited Talk)	RED-ACT: REAL-TIME EARTHQUAKE DAMAGE ASSESSMENT USING CITY-SCALE NONLINEAR TIME HISTORYANALYSIS Speaker: Qing-Le Cheng
13:50 - 14:05 H2-017	TIME DEPENDNENT PROB ABILISTIC SEISMIC HAZARD ASSESMENT FOR HIMALA YAN REGION Speaker: Shweta Bajaj
14:05 - 14:20 H0-013	DEVELOPMENT OF SEISMIC IMPACT ASSESSMENT OF TAIWAN'S ROAD NETWORK Speaker: Cheng-Tao Yang
14:20 - 14:35 H0-017	STUDY ON THE SEISMIC FRAGILITY OF ECCENTRIC NON-STRUCTURES IN HOSPITA Speaker: Liang-Sheng Su
14:35 - 14:50 H3-011	QUANTIFYING THE SEISMIC RESILIENCE OF COMMUNITIES: A DISTRIBUTED COMPUTING FRAMEWORK Speaker: Omar Sediek
14:50 - 15:05 H0-020	QUANTIFYING A RESILIENCE INDEX OF A WATER DISTRIBUTION NETWORK (WDN) UNDER SEISMIC HAZARD Speaker: Lessandro Estelito Garciano

Wednesday Sep. 18 PM1

Wednesday, September 18th, 15:20 - 16:50 **Conference Hall**

Session Title: SE2 - Seismic assessment, retrofit and repairability for existing RC buildings

Chair: Kenneth J. Elwood, Shyh-Jiann Hwang

15:20 - 15:40 SE2-003 (Invited Talk)	DEVELOPMENT OF A BRIEF CODE-BASED SEISMIC DIAGNOSTIC TOOL FOR EXISTING RC BUILDINGS CONSIDERING VERTICAL IRREGULARITIES Speaker: Andres Winston Oreta
15:40 - 15:55 SE2-020	SHEAR BEHAVIOR PREDICTION OF NON-DUCTILE REINFORCED CONCRETE MEMBERS UNDER EARTHQUAK LOADING Speaker: Shyh-Jiann Hwang
15:55 - 16:10 SE2-019	CYCLIC BEHAVIOUR OF LARGE-SCALE LIGHTLY REINFORCED CONCRETE COLUMNS Speaker: Pham Phu Anh Huy
16:10 - 16:25 SE2-035	AXIAL COMPRESSION BEHAVIOR OF PRE-DAMAGED CONCRETE PRISMS CONFINED WITH BFRP Speaker: Gao Ma
16:25 - 16:40 SE2-036	MODELING METHOD OF EARTHQUAKE-DAMAGED RC COLUMNS RETROFITTED WITH FRP Speaker: Gao Ma
16:40 - 17:00 SE2-005 (Invited Talk)	REPAIR AND RESIDUAL CAPACITY OF REINFORCED CONCRETE PLASTIC HINGES Speaker: Kenneth J. Elwood

Wednesday Sep. 18 PM2

Wednesday, September 18th, 15:20 - 16:50 **Room 103**

Session Title: SE3 - Seismic performance of steel and composite columns

Chair: Jason McCormick, Chung-Sheng Lee

15:20 - 15:40 SE3-002 (Invited Talk)	SEISMIC CAPACITY OF DEEP STEEL COLUMNS AND THEIR INFLUENCE ON THE COLLAPSE RESPONSE OF STEEL SPECIAL MOMENT FRAMES Speaker: Jason McCormick
15:40 - 15:55 SE3-015	MECHANICAL RESPONSE OF CONCRETE-FILLED FRP-WRAPPED STEEL CORRUGATED TUBE COLUMNS Speaker: Chung-Sheng Lee
15:55 - 16:10 SE3-016	PERFORMANCE EVALUATION OF A NOVEL BOX SECTION COLUMN BASE WITH SELF-CENTERING ABILITY Speaker: Yu-Lin Chung
16:10 - 16:25 SE3-018	SEISMIC TEST AND ANALYSIS OF WIND-TURBINE HOLLOW STEEL ROUND COLUMNS WITH A LARGE DIAMETER-TO-THICKNESS RATIO Speaker: Chung-Che Chou
16:25 - 16:40 SE3-017	SEISMIC PERFORMANCE OF CONCRETE FILLED STEEL TUBULAR (CFST) COLUMNS WITH VARIED AXIAL LOADS Speaker: Hao-Dinh Phan

Wednesday, September 18th, 15:20 - 16:50 **Room 201**

Session Title: SE8 - Past, present and future of seismic passive control technology
D4 - Earthquake early warning system
I1 - Structural health monitoring and early warning system

Chair: Shiang-Jung Wang, Chang-Ching Chang

15:20 - 15:35 D4-011	TOWARD A 10-SECOND EARTHQUAKE EARLY WARNING SYSTEM IN TAIWAN Speaker: Da-Yi Chen
15:35 - 15:50 SE8-014	HORIZONTAL DISPLACEMENT RESPONSES AND PARAMETRIC STUDY OF SLOPED ROLLING-TYPE SEISMIC ISOLATORS Speaker: Shiang-Jung Wang
15:50 - 16:05 SE8-015	BEYOND DESIGN PERFORMANCE OF VISCOELASTIC DAMPERS Speaker: Shiang-Jung Wang
16:05 - 16:20 I1-012	STRUCTURAL HEALTH MONITORING FOR CONTROLLED BUILDINGS WITH ACTIVE MASS DAMPERS Speaker: Chang-Ching Chang
16:20 - 16:35 I1-013	REVIEW ON PRESTRESS LOSS EVALUATION IN CONCRETE Speaker: Marco Bonopera

Wednesday Sep. 18 PM2

Wednesday, September 18th, 15:20 - 16:50 **Room 202**

Session Title: G2 - Design for control of seismic damage
G3 - Advances in earthquake engineering research

Chair: Tomofusa Akita, Yuan-Tao Weng

15:20 - 15:35 G2-012	TIME HISTORY RESPONSE ANALYSIS OF RC SCHOOL BUILDING USING SUPER-AND-SUB STRUCTURE MODEL Speaker: Tomofusa Akita
15:35 - 15:50 G2-014	A STUDY ON THE RESPONSE OF CES STRUCTURE WITH DIFFERENT SHEAR STRENGTH OF BEAM-COLUMN JOINTS Speaker: Kazuki Takahashi
15:50 - 16:05 G2-011	SEISMIC BEHAVIOR FOR STEEL-PLATE-EMBEDDED HIGH-STRENGTH REINFORCED CONCRETE COUPLING BEAMS OF SHEAR WALLS Speaker: Min-Lang Lin
16:05 - 16:20 G3-013	SHEAR BEHAVIOR OF ULTRA-HIGH PERFORMANCE FIBER REINFORCED CONCRETE BEAMS WITHOUT STIRRUP Speaker: Kuo-Chia Wei
16:20 - 16:35 G3-011	NUMERICAL STUDY ON THE CORRELATION BETWEEN FUNDAMENTAL FREQUENCIES AND LAYOUTS OF COLUMNS FOR SELECTED BUILDING MODELS Speaker: Hung-Yu Liu
16:35 - 16:50 G2-015	A STUDY ON THE INFLUENCE OF SEISMIC ZONING FACTORS ON THE STRUCTURE COST AND THE REPAIR COST OF THE RC SCHOOL BUILDING Speaker: Daisuke Matsubara

Wednesday, September 18th, 15:20 - 16:50 **Room 203**

Session Title: H0 - Seismic loss and risk assessment
H4 - Disaster risk assessment for earthquakes

Chair: Saki Yotsui, Tung-Yu Wu

15:20 - 15:35 H4-014	INFLUENCE OF ENVIRONMENT SURROUNDING HUMAN SOCIETY ON LANDSLIDE CASUALTY: A CASE STUDY FROM THE 2018 HOKKAIDO EASTERN IBURI EARTHQUAKE Speaker: Saki Yotsui
15:35 - 15:50 H4-011	THREE DIMENSIONAL BUILDING MODEL WITH SEISMIC RESISTANCE ATTRIBUTES AND ITS APPLICATION ON DISASTER MITIGATION Speaker: Bing-Ru Wu
15:50 - 16:05 H4-012	INFLUENCE OF SEISMIC DESIGN CODE EVOLUTION ON THE SEISMIC LOSSES AND RESILIENCE OF STEEL BUILDINGS Speaker: Tung-Yu Wu
16:05 - 16:20 H4-013	SEISMIC RISK ASSESSMENT BY USE OF THE COMPREHENSIVE DATABASE OF EARTHQUAKE OCCURRENCE MODEL IN AND AROUND JAPAN Speaker: Nobuoto Nojima
16:20 - 16:35 H0-019	THE PERFORMANCE OF SEISMIC DISASTER PREVENTION IN TAIWAN Speaker: Lee-Hui Huang