ZJU-UIUC Institute

Zhejiang University / University of Illinois at Urbana-Champaign Institute

Workshop
Sustainable Development of Civil Engineering

ABSTRACT

Sustainable development, especially since the 1992 United Nations Conference on Environment & Development at Rio de Janeiro, has become an increasingly important theme in local, national and world politics, and increasingly a central theme for the engineering professions around the world. The sustainable development concept requires of all of us (as engineers and citizens) to consider much more widely than before the impact of our own lives and of the infrastructure and products we produce, both geographically and temporally.

The American Society of Civil Engineers (ASCE) defines sustainability as a set of economic, environmental and social conditions (aka "The Triple Bottom Line") in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or the availability of economic, environmental and social resources. Sustainable development is the application of these resources to enhance the safety, welfare, and quality of life for all of society.

This workshop investigates different possibilities and opportunities for the sustainable development of Civil Engineering. Civil engineers have a leading role in planning, designing, building, and ensuring a sustainable future by providing the bridge between science and society. In this role, engineers must actively promote and participate in multidisciplinary teams with other professionals, such as ecologists, economists, and sociologists, and work with the communities served and affected to effectively address the issues and challenges of sustainable development.

MAIN ORGANIZER

Yan Xiao, Cristoforo Demartino and BinBin Li.

COLLABORATORS

Shengwei Qi, Longyan Xie, Sicheng Zhou, Chenyi Mo, Anke Ye and Marilena Minardi.

DATE

20 December, 2019

VENUE

Faculty Club
Zhejiang University - University of Illinois at Urbana Champaign Institute,
Zhejiang University, 718 East Haizhou Road,
Haining, 314400 Zhejiang,
P.R. China

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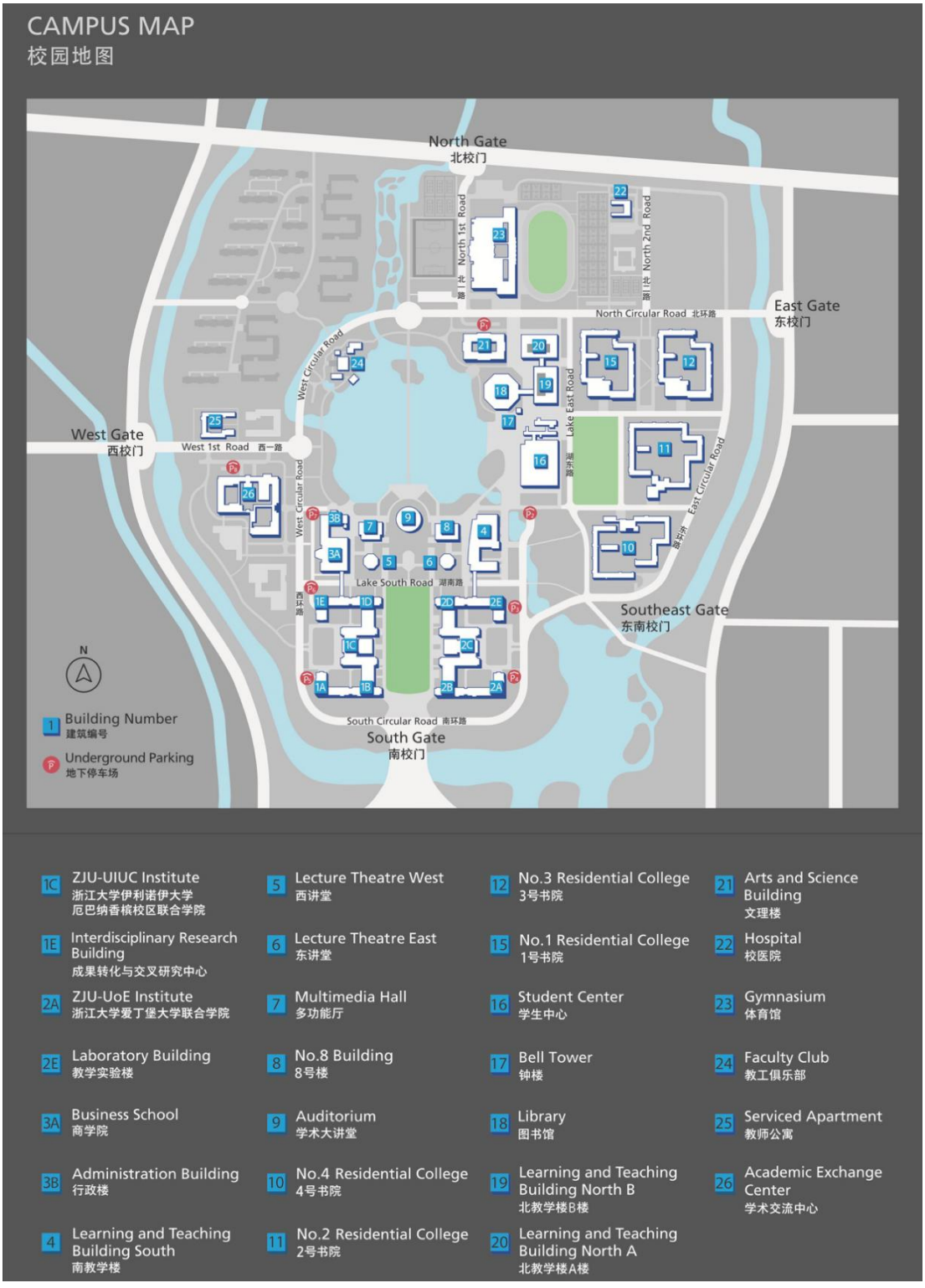
MAP OF THE CAMPUS



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INVITED SPEAKERS

Flavio Stochino
(University of Cagliari)

Giuseppe Quaranta
(University Sapienza of Rome)

Sashi Kunnath
(University of California, Davis)

Chen Xiong
(Shenzhen University)

Fabrizio Mollaioli
(University Sapienza of Rome)

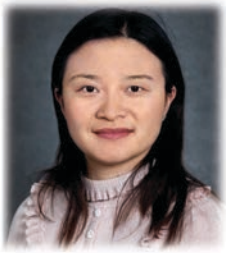
Bruno Briseghella
(Fuzhou Univesity)

Zhen Sun
(JSTI group)

Giorgio Monti
(University Sapienza of Rome)

Marco Cimillo
(Xi'an Jiaotong-Liverpool University)

Junfeng Jia
(Beijing University of Technology)



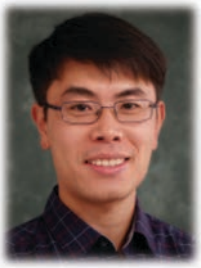
Shuqin Chen
(Zhejiang University)

Zhongdong Duan
(Harbin Institute of Technology)

INTERNAL SPEAKERS

Yan Xiao
(ZJU-UIUC Institute)

Cristoforo Demartino
(ZJU-UIUC Institute)



BinBin Li
(ZJU-UIUC Institute)

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PROGRAM

Time	Activity	Speaker
09:00–09:20	**Welcome**	
09:20–09:40	**Seminar**: On the importance of energy-based parameters for earthquake resilient structures	Fabrizio Mollaioli
09:40–10:00	**Seminar**: An advanced seismic resilient bridge system, from research to practice	Junfeng Jia
10:00-10:20	**Seminar**: Seismic response of integral abutment bridges	Bruno Briseghella
10:20-10:40	**Break**	
10:40-11:00	**Seminar**: Developing collapse fragility functions for resilient seismic design of buildings	Sashi Kunnath
11:00-11:20	**Seminar**: Update of my research on seismic and impact testing methods and engineered bamboo	Yan Xiao
11:20-11:40	**Seminar**: Simplified models for reinforced concrete structures under blast and impact loads	Flavio Stochino
11:40-12:00	**Seminar**: Integration of SHM with maintenance in long span bridges: A problem-oriented perspective	Zhen Sun
12:00–13:00	**Lunch break & group photo**	
13:00-13:20	**Seminar**: Energy modelling and retrofit of the residential building stock of Jiangsu Province	Marco Cimillo
13:20-13:40	**Seminar**: Regional energy planning: methodology, database and case studies	Shuqin Chen
13:40-14:00	**Seminar**: Structural monitoring of civil constructions: dynamic identification and smart technologies	Giuseppe Quaranta
14:00-14:20	**Seminar**: Bayesian operational modal analysis for long-span cable-stayed bridges	Binbin Li
14:20-14:40	**Break**	
14:40–15:00	**Seminar**: Modelling of typhoons in the Western North Pacific basin under warming climate	Zhongdong Duan
15:00–15:20	**Seminar**: Aeroelastic behaviour of bridge cables: modelling, instability and uncertainties	Cristoforo Demartino
15:20-15:40	**Seminar**: Improve the near real-time seismic loss assessment using UAV and machine learning	Chen Xiong
15:40-16:00	**Seminar**: Seismic response of masonry building clusters	Giorgio Monti
16:00-17:00	**Discussion time**	
17:00-17:30	**Campus Tour**	
17:30-19:00	**Dinner at Yuan Zheng Hotel**	

SHORT RESUMES AND ABSTRACTS

Fabrizio Mollaioli
(University Sapienza of Rome)

Fabrizio Mollaioli was schooled at the Sapienza University of Rome in Structural Engineering. From 1990 to 1999 he was a researcher of the Italian National Group for Earthquake Loss Reduction (GNDT) of the National Research Council (CNR). During that period, he obtained his Ph.D. in Structural Engineering (1996). Then he moved to the School of Architecture of the Sapienza University of Rome as Assistant Professor in Structural Engineering (2000-2006). He is now Associate Professor (since 2007) at the Sapienza University of Rome and now teacher of Final Laboratory of Structural Design and Rehabilitation.

Presentation: On the importance of energy-based parameters for earthquake resilient structures

Abstract: The potential for an earthquake ground motion to damage a specific structure is closely associate with the energy input to that structure and its energy dissipative capacities. The development of an energy-based framework for Performance-Based Seismic Engineering (PBEE) requires, among other steps, the characterization of the relationships between IMs and with suitable engineering demand parameters (EDPs) for the design and assessment of resilient structures. Although many parameters are used to establish design earthquakes, most of them are not reliable for assessing the damage potential of earthquake ground motions. A promising parameter for assessing the damage potential of these motions is the input energy that takes into account the contribution of amplitude, frequency content and duration of ground motion. Moreover, the effects of inelasticity and ground motion duration that are overlooked by the more conventional spectral parameters are instead implicitly captured by input energy, that is directly related to the number and amplitudes of the cycles of oscillator response: hence, it conveys information on the ground motion duration, reflecting cumulative effects by virtue of the integration over time that is involved in their computation. In this presentation, by using energy-based parameters, I intend to highlight the contribution of energy IMs in describing several effects of seismic action in simple and more complex structural systems.

Junfeng Jia
(Beijing University of Technology)

Dr. Jia is an associate professor of the Beijing University of Technology, China, specializing in the earthquake engineering and bridge engineering sub-discipline. He graduated from Harbin Institute of Technology and got a doctorate in 2011. The overarching theme of his research is development of engineering concepts and techniques for improved seismic performance, with primary applications in bridges. Much of his work has focused on seismic isolation and mitigation of bridges, and accelerated bridge construction (ABC) for high seismicity areas. Recently, Dr. Jia is focusing on seismic analysis and design of precast bridge substructures for ABC and seismic resiliency of bridges. He is also investigating UHPC, SMA, FRP and other advanced materials and structures for seismic-resistant promotion of bridges.

Presentation: An advanced seismic resilient bridge system, from research to practice

Abstract: Typhoon wind hazard analysis methods have been built upon the statistical modeling of typhoon activities using historical observation records. Limited by the availability of records both in time and space, this approach may not be able to produce reliable estimates of wind hazard, especially when extreme wind hazard with long period of recurrence is concerned. On the other hand, as global warming becomes obvious, how to incorporate its effect on the future typhoon wind hazard is a major challenge. Researchers have become more believed that global warming is affecting typhoon

activities, and how to cope with climate change with the future infrastructure is getting more attentions. We developed a full track cyclone synthesis model for typhoon wind hazard analysis. This model is more physically sound by incorporating atmospheric dynamics, climate change and statistics, and enables typhoon wind hazard analysis under future warming climate. This talk reports our full track cyclone synthesis model with a statistical determination approach, and a quantitative projection of typhoon wind hazard at the end of this century (2071-2100) in the east Asia under the worst scenario of RCP8.5 by using this model.

Bruno Briseghella
(Fuzhou Univesity)

Dr. Bruno Briseghella is Distinguished professor and Dean of the College of Civil Engineering of Fuzhou University (Fuzhou, China), Founding Director of the "Sustainable and Innovative Engineering Research Center" and Co-Director of the RM3-FZU Sino-Italian Center. He graduated with a Bachelor's and Master's Degree from Padova University (Padova, Italy) and a PhD from Trento University (Trento, Italy). His main research activities have been focused on bridge and structural design, integral abutment bridges, earthquake engineering, seismic isolation, durability, monitoring and retrofit of bridges, and steel and steel-concrete structures, both from the theoretical and experimental point of view.

Presentation: Seismic Response of Integral Abutment Bridges

Abstract: Integral abutment bridges (IABs) are becoming rather common due to the durability problems of bearings and expansion joints. Monolithic connections between the deck and sub-structure allow, on one side, to increase the structure redundancy and reduce the maintenance costs. However, from the other side, soil-structure effects are also introduced due to the interactions between the abutment and the backfill and between the pile and soil induced by thermal variations, long-term effects (creep and shrinkage) and dynamic loads, such as earthquakes. Several authors have investigated the soil-structure interaction for IABs both theoretically and experimentally, but there is still a lack of common guidelines and codes. To develop know-how on the seismic behavior of IABs, experiments were conducted in the EQUALS Laboratory at the University of Bristol as part of the Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe (SERA) Horizon 2020 project. The tests were carried out using the 3m x 3m 6DOF shaking table and the 5m long shear stack, focusing on soil-structure interaction effects between an integral bridge model with frame abutments on piles and the backfill soil. The experiments were aimed at investigating the influence and potential benefits of (i) addition of compressible inclusions between IAB and backfill and (ii) different types of connection between the IAB and the pile foundation. The compressible inclusion reduces the accelerations on the bridge and the settlements in the backfills, while disconnecting on of piles from the cap decreases significantly the moments on the abutments and at the piles head showing that both measures can be valuable for the design of these structures against seismic loads action.

Sashi Kunnath
(University of California, Davis)

Sashi K. Kunnath is Distinguished Professor, Department of Civil and Environmental Engineering, University of California, Davis, CA 2004 – 2018: Professor, Department of Civil and Environmental Engineering, University of California, Davis, CA. 2009 – 2015: Department Chair, Department of Civil and Environmental Engineering, University of California, Davis, CA. His research interest is on Structural dynamics and earthquake engineering, multiple hazards and extreme loading (blast, impact, fire), inelastic modeling of structural systems.

Presentation: Developing collapse fragility functions for resilient seismic design of buildings

Abstract: The development of fragility functions that express the probability of collapse of a building as a function of some ground motion intensity measure is an effective tool to assess seismic vulnerability of structures. One of the issues that emerges from past research on collapse assessment is that a number of factors influence the prediction of collapse and the quantification of collapse probability. These factors range from ground motion selection to modeling considerations at the component and material level. A systematic investigation was carried out to examine the effects of modeling considerations and the choice of ground motion IMs in establishing collapse fragility functions of typical RC buildings. The primary system considered in this study is a 6-story RC moment frame building though additional simulations are carried out on a 20-story building to better assess the effects of certain parameters that may be influenced by higher modes of response. Both concentrated and distributed plasticity beam-column elements were used to model the building frame and several options were considered in constitutive modeling for both options. Incremental Dynamic Analyses (IDA) were carried out on both mid-rise and high-rise RC building frames to evaluate the variability of the intensity measures to induce collapse and to eventually develop collapse fragility curves. Findings from the study highlight the importance of both modeling considerations as well as the selection of intensity measures in the development of seismic collapse fragility functions.

Yan Xiao
(ZJU-UIUC Institute)

Prof. Yan Xiao is currently the program director for Energy, Environment, and Infrastructure Sciences and a professor of ZJU-UIUC Institute. Prof Xiao Yan received his PhD degree in Structural Engineering in 1989, from Kyushu University, Fukuoka, Japan. He is currently a Changjiang Scholar and serving as the Dean in the College of Civil Engineering, Nanjing Tech University, China. Prior to this appointment, he served as a Changjiang Scholar Professor and the Dean of College of Civil Engineering at the Hunan University, from 2011 till May 2015, he joined the Astani Department of Civil and Environmental Engineering, University of Southern California from since 1994, where he had been a tenured full professor till 2011.

Presentation: Update of my research on seismic and impact testing methods and engineered bamboo

Abstract: In this short presentation, ideas and progress on experimental methods of muti-usage structural testing (MUST) to simulate seismic effects on structural components, as well as impact testing will be updated. Two new equipment currently in manufacturing stage will be reported. In addition, research efforts are continuously made for bio-based materials and structures, in particularly engineered bamboo. Progress of research project on new structural system, i.e., cross laminated bamboo and timber (CLBT or CLTB) will be discussed.

Flavio Stochino
(University of Cagliari)

Flavio Stochino is Assistant Professor of Theory and Design of Structures at University of Cagliari (Italy), Department of Civil Environmental Engineering and Architecture. He obtained the Ph.D. in Structural Engineering at University of Cagliari in 2013. Then he moved to University of Sassari (Italy) working on computational mechanics problems as Post Doc researcher till 2016. In that year he became Dresden Junior Fellow at TU Dresden (Germany) where he worked on some advanced computational techniques for fracture mechanics. In 2017 he won the PhD ITalents call, funded by CRUI and Confindustria.

Presentation: Simplified Models for Reinforced Concrete Structures Under Blast and Impact Loads

Abstract: The public perception of risk regarding critical infrastructure has changed significantly over the last twenty years. The tragic news of the terrorist attacks of recent years raise important, urgent questions regarding the real safety and reliability of our buildings. Extreme loads such as impacts, explosions, etc., can occur in everyday life with unexpectedly high frequency. After a general overview of my research work, this talk will present simplified semi-analytical models for the flexural failure of reinforced concrete structures under blast loads. In the first case, RC beams are modelled by means of Euler–Bernoulli's theory and their elastic–plastic behaviour is expressed through a nonlinear relationship between bending moment and curvature. The second model represents the beam as a Single Degree Of Freedom (SDOF) spring-mass oscillator. Furthermore, in the third approach another SDOF model is developed enforcing the law of energy balance and assuming that the deformed shape of the beam is represented by its first vibration mode. The effects of strain rate are of paramount relevance in blast problems. They are taken into consideration by introducing time-variable coefficients into the equations of motion considered for the models. The accuracy of the numerical results is assessed comparing them with some experimental findings available in literature and with the solution obtained from a commercial finite element software. With the aim of identifying the key parameters in the structural response, a sensitivity analysis is also developed by means of the SDOF models. Finally, the presented models will be used to represent the behaviour a RC tower structure subjected to blast load in a stochastic framework. Indeed, a reliability analysis will be developed in order to obtain the fragility curves representing the probability of collapse under a given load intensity measure.

Zhen Sun
(JSTI group)

Mr. Zhen Sun is a research engineer in State Key Laboratory of Safety and Health for In-Service Long Span Bridges, JSTI Group. He is a member of several international and Chinese academic associations, such as ISHMII and IABSE. He is also the recipient of several research awards and projects in China.
He has more than 10 journal publications in the area of structural health monitoring, structural condition assessment, dynamics and control, etc. He serves as a reviewer for several international journals, such as Journal of Bridge Engineering ASCE, Structure and Infrastructure Engineering, Engineering Computations, Shock and Vibration, Engineering Structures, etc. He also published 3 patents and 2 software copyrights in China.

Presentation: Integration of SHM with maintenance in long span bridges: A problem-oriented perspective

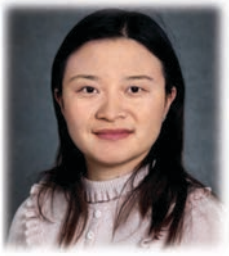
Abstract: Structural health monitoring (SHM) of bridges has gained rapid development in the past few years. This presentation describes application of SHM on long-span bridges in China, with the aim to illustrate its practical value. Two case studies are presented on utilization of SHM data in engineering practice. In the first case study, damage of expansion joints in a suspension bridge is assessed with SHM measurements and field test. In the second case study, the performance of tuned mass dampers is evaluated with wind and vibration measurements during a typhoon event. Through explanation of these case studies, the presentation tries to illustrate how to distill useful insights from SHM data, which could be instructive for further research in this field.

Marco Cimillo
(Xi'an Jiaotong-Liverpool University)

Marco Cimillo, Lecturer and Programme Director of the BEng Architecture at Xi'an Jiaotong-Liverpool University, was awarded his Master's Degree in Architecture and his PhD in Environmental Design by Sapienza University of Rome. He is also a fully registered architect, a LEED Green Associate and a member of IBPSA (International Performance Simulation Association) and SITdA (Italian Society of Technology of Architecture).
Before joining XJTLU in August 2016, he carried out research and teaching activities at Northumbria University in Newcastle, at Sapienza University and the Italian National Institute of Architecture in Rome and at University of Camerino in Ascoli Piceno. Furthermore, he was a visiting lecturer at Polis University in Tirana and worked with several architecture firms in Italy as a designer and as a consultant.

Presentation: Energy modelling and retrofit of the residential building stock of Jiangsu Province

Abstract: The presentation discusses the energy use and characteristics of the residential building stock in Jiangsu Province, with a focus on the potential of large-scale energy retrofit to mitigate environmental impact and running costs of its most inefficient vintages, while improving occupant comfort and reducing the need for demolition and reconstruction in the upgrading of the stock.
The study is part of a research conducted mainly by means of bottom-up energy modelling and simulation. The methodology involves the identification of representative typologies that can be modelled in detail and be assigned a statistical weight to typify the behaviour of the entire stock. Different sets of simulations can then predict the performance of the entire stock in in different scenarios. Preliminary results indicate a significant potential of relatively simple retrofit interventions to reduce energy use and, more in general, the environmental impact of the construction and demolition industry in the province.



Shuqin Chen
(Zhejiang University)

Shuqin Chen is currently an associate professor in the department of architecture, college of civil engineering and architecture, Zhejiang University. She is also the Qiushi Young scholar of Zhejiang University. She was a postdoctoral fellow at Lawrence Berkeley National laboratory, U.S.A. Her research interest is energy efficiency of buildings and district, which covers occupant-oriented building energy efficient design and optimal operation, load prediction of building blocks, the optimal design of energy systems in buildings and district. She has published more than 50 journal papers in Chinese and English as the first author or corresponding author, and compiled 3 industry guidelines, and co-authored 4 English and Chinese books.

Presentation: Regional energy planning: methodology, database and case studies

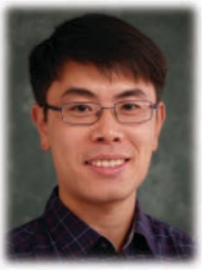
Abstract: Regional energy planning is an important part of eco-community construction nowadays in the world. The prediction of space heating and cooling loads for district buildings and the optimal design of energy system are the two fundamental topics from the demand side and supply side respectively. In this presentation, firstly, a prediction method of space heating and cooling loads for district buildings based on the architecture typology theory and a simplified method of district load prediction that considered stochastic behavior were developed respectively. Based on the load prediction, a method of multi-objective optimization design of energy systems for the district buildings was developed. Secondly, the methods were applied in the case studies of a university campus and a residential community. Finally, large database is on construction right now so as to collect the basic data for the research.

Giuseppe Quaranta
(University Sapienza of Rome)

Giuseppe Quaranta is Associate Professor in Structural Engineering at Sapienza University of Rome (Italy), where he obtained his Ph.D. in 2011. Before joining Sapienza University of Rome as Assistant Professor in 2012, he also served as Postdoctoral Scholar at University of California, Davis (USA) from 2011 to 2012. His research interests include structural monitoring (specifically, sensing systems for structural monitoring, dynamic identification, diagnostic of civil structures and infrastructures), vibrations mitigation and structural concrete. Within these research fields, he authored or co-authored more than 40 journal papers on referred international scientific journals and about the same number of contributions to qualified national and international conferences.

Presentation: Structural monitoring of civil constructions: dynamic identification and smart technologies

Abstract: The use of sensor networks for the dynamic monitoring of single civil structures and infrastructures is becoming ever more frequent, since recorded data might be elaborated conveniently for parametric or nonparametric identification, models updating, damage detection and reliability evaluation. In this perspective, current advances in sensing and wireless data transmission systems can facilitate the large-scale and permanent implementation of sensor networks for structural monitoring applications, thus allowing assessment and intelligent management of a portfolio of civil constructions throughout their lifetime. On the other hand, the massive diffusion of sensor networks also poses new challenges, e.g. the use of alternative ways to power electronic devices as well as the need of implementing highly energy-efficient technological solutions. Handling with these issues effectively is the key premise for ubiquitous monitoring in the near future.
Starting from a discussion about a few recent dynamic identification monitoring projects, the present talk will illustrate some results related to ongoing studies about numerical modeling and experimental characterization of smart piezoelectric electromechanical devices for energy harvesting and sensing.



BinBin Li
(ZJU-UIUC Institute)

Dr. Binbin Li is an assistant professor in the Zhejiang University/University of Illinois at Urbana-Champaign Institute at the Zhejiang University, International Campus. He obtained his Bachelor and Master degrees from the Dalian University of Technology, China and Ph.D. from the University of California-Berkeley, USA, all in Civil Engineering. Before joining ZJU, he worked as a research associate at the University of Liverpool for two years.
Prof. Li's research focuses on developing innovative statistical methods to address safety, sustainability and resilience issues of the built civil infrastructure systems including bridges, buildings, and road/rail networks. His specific interests include Bayesian system identification, operational modal analysis, infrastructural network modeling and field test, for structure and infrastructure health management and resilience assessment. The ultimate goal of Prof. Li's work is to equip the civil infrastructure systems with a smart brain so that they can sense, process and react properly to the external excitations, e.g., earthquakes, windstorms.

Presentation: Bayesian operational modal analysis for long-span cable-stayed bridges

Abstract: It is becoming a routine process to conduct the vibration test to identify the modal properties (e.g., natural frequencies, damping ratios and mode shapes) and to monitor the long-term variation for the purpose of early-damage alert of bridges. Cable-stayed bridges have attracted considerable attention in recent years as an increasing number of projects have been constructed worldwide. They are usually in long-span and flexible enough to have extremely low natural frequencies. It challenges the experimental capability (e.g., instrumentation, budgeting) and modal identification techniques (e.g., low and closely-spaced modes). In this study, a generalized Bayesian FFT modal identification method incorporating expectation-maximization (EM) algorithm is developed for modal identification of cable-stayed bridges, in which the modal parameters and associated identification uncertainties are both addressed. The physical model, statistical model and the computation strategies are introduced in detail. A laboratory test of the 1:50 model of Sutong Bridge and a field test of the Jintang Bridge (spanning 218+620+218 meters) are applied to illustrate its performance. The results show that the

proposed algorithm has a high efficiency (usually seconds for a mode) and precision (low identification uncertainties), and can be directly applicable for real projects.

Zhongdong Duan
(Harbin Institute of Technology)

Dr. Zhongdong Duan is a professor of civil engineering in the School of Civil and Environmental Engineering of Harbin Institute of Technology (HIT), Shenzhen. He severed as a professor of engineering mechanics in the School of Civil Engineering of HIT at Harbin before moved to Shenzhen in 2010. His research areas are: simulation of natural hazards and risk analysis, structural health monitoring, wind and ocean engineering. He won numerous awards on the national and provincial level, and received several honors, including the Excellent Researcher of the New Century from the Ministry of Education of China in 2004. The typhoon simulation model developed by his team is solicited by ChinaRe to develop China's typhoon catastrophe model. He has published more than 150 journal papers, and advised more than 20 Ph.D. students and 100 graduate students.

Presentation: Modeling of Typhoons in the Western North Pacific Basin under Warming Climate

Abstract: Typhoon wind hazard analysis methods have been built upon the statistical modeling of typhoon activities using historical observation records. Limited by the availability of records both in time and space, this approach may not be able to produce reliable estimates of wind hazard, especially when extreme wind hazard with long period of recurrence is concerned. On the other hand, as global warming becomes obvious, how to incorporate its effect on the future typhoon wind hazard is a major challenge. Researchers have become more believed that global warming is affecting typhoon activities, and how to cope with climate change with the future infrastructure is getting more attentions. We developed a full track cyclone synthesis model for typhoon wind hazard analysis. This model is more physically sound by incorporating atmospheric dynamics, climate change and statistics, and enables typhoon wind hazard analysis under future warming climate. This talk reports our full track cyclone synthesis model based on statistical dynamics, and a quantitative projection of typhoon wind hazard at the end of this century (2071-2100) in the east Asia under the worst scenario of RCP8.5 by using this model.

Cristoforo Demartino
(ZJU-UIUC Institute)

Cristoforo Demartino is an Assistant Professor (2019-) in the Zhejiang University/University of Illinois at Urbana-Champaign (ZJU-UIUC) Institute at the Zhejiang University, International Campus.
B.Sc. (2008) and M.Sc. (2010) full marks with honors in Civil Engineering at Mediterranea University of Reggio Calabria. 2nd level University Master degree at University of Rome "La Sapienza" with a thesis on "Evaluation of the seismic economic losses of precast concrete industrial buildings" in 2012. Ph.D. in Structural Engineering at the University of Naples "Federico II" with a thesis on "Aerodynamics and aeroelastic behavior of ice-accreted bridge cables" in 2014. Dr. Demartino is the author of more than 70 publications mainly on the topics of Structural Engineering, Wind Engineering, Earthquake Engineering, and Structural Dynamics.

Presentation: Aeroelastic behavior of bridge cables: modelling, instability and uncertainties

Abstract: The risk of large amplitude vibrations of bridge cables due to aeroelastic instabilities has posed a challenge to the engineering and research community. A number of aeroelastic models have been developed to predict the unstable behavior and to design counteracting measures, e.g., shape modifications and structural damping addition. Moreover, meteorological conditions such as icing can lead to a variation of the original nominal circular cross-section shape leading to enhanced cable vibrations. At this talk, a general discussion on the aeroelastic instabilities occurring on bridge cables will be reported based on the experience of the speaker in this field. In particular, it will be discussed the effects of the ice accretion and the effect of the superficial irregularities on the aeroelastic behavior of bridge cables. Moreover, it will be

shown the problem of the deterministic and probabilistic assessment of the minimum structural damping required to prevent galloping of dry bridge cables.

Chen Xiong
(Shenzhen University)

Chen Xiong is an assistant professor and associate dean of the Department of Civil Engineering of Shenzhen University, Shenzhen, China.
Dr. Xiong's major research interests cover earthquake engineering and computer-aided disaster prevention. He earned his Ph.D. in Civil Engineering at Tsinghua University in 2016. He has published more than twenty articles on Computer-Aided Civil and Infrastructure Engineering, Automation in Construction, Engineering Structures, Bulletin of Earthquake Engineering etc. He is the principle investigator of six research projects received from National Science Foundation of China, Natural Science Foundation of Guangdong Province, Intellectual Innovation Program of Shenzhen Science and Technology Innovation Committee etc. His work has been integrated into some important simulation platforms, such as US-NSF NHERI SimCenter.

Presentation: Improve the Near Real-Time Seismic Loss Assessment Using UAV and Machine Learning

Abstract: A rapid assessment of the seismic loss to buildings can facilitate improved emergency response and timely relief in earthquake-prone areas. In this study, an automated building seismic loss assessment method using unmanned aerial vehicles (UAV) and machine learning is introduced. First, a 3D building model, aerial images, and camera data are used for the following simulation. Next, a building image segmentation method is proposed using the 3D building model as georeference, through which multi-view segmented building images can be obtained. Subsequently, a CNN model based on VGGNet is adopted to assess the collapse situation of each building. The CNN model is fine-tuned based on manually tagged building images obtained from the Internet. Finally, a series of THA is performed for the target regional buildings, thereby generating a number of simulation results. Those simulation results that bear strong similarities to the identified collapse scene are identified as the optimal solutions, which will be used to estimate the seismic loss. The simulation results of the case studies signify that the use of the identified building collapse scene leads to much closer estimations to actual economic losses.

Giorgio Monti
(University Sapienza of Rome)

Giorgio Monti was born in Roma, Italy, in 1961. He has graduated in Civil Engineering in 1986 at the University of Roma La Sapienza, then he has obtained a Master of Science at the University of California at Berkeley in 1993, and a PhD at the University of Roma La Sapienza in 1994 in Structural Engineering. Since 2001 he has been Full Professor at the Sapienza University of Roma, where he is Director of the Master Course on Advanced Structural Design according to Eurocodes.

Presentation: Seismic response of masonry building clusters

Abstract: Still nowadays masonry structures represent most of the global built environment in seismic regions. Despite their diffusion and long age, their dynamic behavior under earthquake loads is still extremely hard to predict, since it depends on several site-dependent factors, such as local empirical expertise, that are difficult to generalize. Furthermore, considerable and often economically disproportionate efforts are usually required to achieve a sufficient knowledge level for characterizing the basic variables affecting their response. The problem is challenging and the recent earthquakes have highlighted the extreme urgency to provide structural engineers with reliable yet simple procedures to seismically assess such buildings.

ABOUT

Zhejiang University (ZJU)

Zhejiang University (ZJU) is one of China's leading higher education institutions, as well as one of its oldest; its roots can be traced back to 1897 and the founding of the Qiushi Academy. Located in Hangzhou – one of China's most picturesque cities – the university is organized across seven faculties and 36 schools. It is home to 3,500 full-time academic members of staff and around 45,000 students undergraduates, of which around 60 per cent opt to pursue further studies. Zhejiang University has strategic partnerships in place with 140 overseas institutions from more than 30 countries worldwide. Included among them are such leading institutions as Imperial College London, Princeton University and University of Illinois at Urbana-Champaign. With a cohort of 6,000 international students, and around 8,000 teachers and students who participate annually in its various overseas exchange programs, ZJU prides itself on the strength of its global outlook. In collaboration with the Universities of Edinburgh and Illinois it has also established the ZJU-UoE and ZJU-UIUC Institutes on the international Haining Campus, and boasts an overseas presence at Imperial College London, with future plans to establish a China-US Business School with the University of Pennsylvania. Chief among Zhejiang's aims is the aspiration to become a world-class university, one that simultaneously retains a distinctively Chinese character, where tradition and modernity are successfully combined.

International campus of Zhejiang University

With the aim of exploring new models of higher education that combined the best practices of the east and west, learn from world's most advanced educational experiences, and cultivate talents with innovative minds and international vision, Zhejiang University began to build its International Campus in February 2013,and was granted approval from the Ministry of Education in October 2015. Zhejiang University will cooperate with several world's top 20 universities (or top 5 at individual discipline level) and respectively build joint institutes with each of them. So far, ZJU-Imperial Joint Lab for Applied Data Science has opened. Institute of China Studies, ZJU-UoE Institute and ZJU-UIUC Institute have been formally established, and the Campus received its first batch of freshmen in September, 2016. International Campus is located at Haining, covering a land area of approximately 80 hectares and has a total floor area of 399,300 square meters.

Zhejiang University/University of Illinois at Urbana-Champaign Institute (ZJU-UIUC Institute)

The Zhejiang University/University of Illinois at Urbana-Champaign Institute (the ZJU-UIUC Institute) is a new cooperatively-run engineering college on the new Zhejiang University (ZJU) International Campus in Haining, China. By introducing top engineering curricula and resources from UIUC, complemented with contributions from counterpart colleges and departments from ZJU, ZJU-UIUC Institute will provide a world-class engineering education. The institute is officially approved by the Ministry of Education, China on February 2016. ZJU and UIUC cooperatively cultivate undergraduates and graduate students. Currently, ZJUI has 329 undergraduates, 31 PhD candidates. Faculty of ZJUI is composed of talent recruited from top-tier international universities and outstanding professors from ZJU and UIUC.

Center for Research On Sustainable Systems (CROSS)

The Center for Research On Sustainable Systems (CROSS) is an international and interdisciplinary research platform currently under development by a group of faculty members of the ZJUI. The faculty members are engaged in English based teaching and research in ZJUI, and meanwhile are also affiliated with the College of Civil Engineering and Architecture at the main campus of the Zhejiang, as doctoral advisers in the first-level discipline of Civil Engineering of Zhejiang University.

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