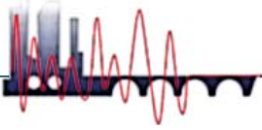


# The 8<sup>th</sup> International Conference on Experimental Vibration Analysis for Civil Engineering Structures (EVACES 2019)





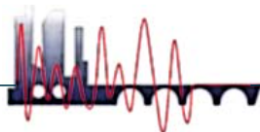
## Welcome Message

Research, development, and applications in experimental vibration analysis of civil engineering structures are being fed by the continuous progress in the fields of sensor and testing technologies, instrumentation, data acquisition systems, computer technology, and computational modeling and simulation of large and complex civil infrastructure systems. The objectives and challenges are to understand the behavior and state of health of structural, geo-structural, and soil-foundation-structural systems as well as predicting their remaining useful life using vibration data collected from these systems when subjected to operation and extreme loads. Advanced data analysis (e.g., system and damage identification) methods are required to extract the needed information from the data and to gain from the information the knowledge required to support decision making related to maintenance and inspection, retrofit, upgrade, and rehabilitation of these systems as well as in case of emergency response.

EVACES, the International Conference on Experimental Vibration Analysis for Civil Engineering Structures is a premier venue where recent progress in the field are presented and discussed by experts from all over the world. After the first seven successful editions of EVACES which took place in Bordeaux, France (2005), Porto, Portugal (2007), Wroclaw, Poland (2009), Varenna, Italy (2011), Ouro Preto, Brazil (2013), Dübendorf, Switzerland (2015), and San Diego, United State of America (2017), EVACES 2019 will be organized by Southeast University, Nanjing, and held on the main campus of Southeast University during 5th to 8th September, 2019. The topics of EVACES 2019 include but are not limited to: (1) damage identification and structural health monitoring, (2) testing, sensing and modeling, (3) vibration isolation and control, (4) system and model identification, (5) coupled dynamical systems (including human-structure, vehicle structure, and soil-structure interaction), (6) application of big data and Artificial Intelligence techniques.

Southeast University (SEU) is one of the national key universities administered directly under the Central Government and the Ministry of Education of China. It is also one of the universities of Project 211 and Program 985 financed by the Central Government as a world-class university. In September 2017, SEU is listed as a Level-A University of "first-class universities," and its 11 disciplines are selected as "first-class disciplines." We express our sincere gratitude to the members of the Organizing Committee, the members of the Scientific Committee, and in particular all the authors and participants for their essential and valuable contributions.

Nanjing, September, 2019  
ZS Wu, J Zhang, A. E Aktan, J. Brownjohn



# CONTECTS

## Conference Committee

### Pre-Conference Short Course

### Conference Schedule by Dates

Registration Schedule  
Conference Schedule Day One  
CONCURRENT SESSION 1  
Conference Schedule Day Two  
CONCURRENT SESSION 2  
Conference Schedule Day Three

### Keynote Speakers

### General Information

### Technical Visit

## Conference Committee

### Conference Chairs

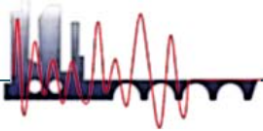
*Zhishen Wu*, Southeast University, China  
*Jian Zhang*, Southeast University, China  
*A. Emin Aktan*, Drexel University, USA  
*James Brownjohn*, University of Exeter, UK

### International Scientific Committee

<i>A. Emin Aktan</i>	<i>Jinping Ou</i>
<i>Rodrigo Astroza</i>	<i>Aleksandar Pavic</i>
<i>Flavio Barbosa</i>	<i>Patrick Paultre</i>
<i>Elsa Caetano</i>	<i>Jan Bien</i>
<i>Joel P. Conte</i>	<i>Alvaro Cunha</i>
<i>Christian Cremona</i>	<i>Alain Fournol</i>
<i>Alexandre A. Cury</i>	<i>Raid Karoumi</i>
<i>Guido De Roeck</i>	<i>Antonino Morassi</i>
<i>Glauco Feltrin</i>	<i>Luis F. Ramos</i>
<i>Yozo Fujino</i>	<i>Zhishen Wu</i>
<i>Carmelo Gentile</i>	<i>Yeong-Bin Yang</i>
<i>Paweł Hawryszkó</i>	<i>Jian Zhang</i>
<i>Mieszko Kuźawa</i>	<i>Xingchong Chen</i>
<i>Hui Li</i>	
<i>Qiusheng Li</i>	

### Organizing Committee

<i>Gang Wu</i> (Chair)	<i>Maosen Cao</i>
<i>Jingquan Wang</i> (Chair)	<i>Bo Chen</i>
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<i>Yuanfeng Duan</i>	<i>Yu Zhou</i>
<i>Xugang Hua</i>	<i>Weihua Hu</i>
<i>Songye Zhu</i>	<i>Zhigang Yang</i>
<i>Zheng Liu</i>	<i>Emma Liao</i>
<i>Yong Li</i>	<i>Lusong Yu</i>
<i>Yufeng Zhang</i>	<i>Jack Zhao</i>
<i>Longhe Xu</i>	<i>Fay Shan</i>
<i>Mohammad Noori</i>	<i>Yekai Chen</i>
<i>Zhishui Liang</i>	



## Pre-Conference Short Course

### Topic:

Advances in Machine Vision, Point-Cloud Modeling, and Artificial Intelligence for Structural Health Monitoring and Nondestructive Evaluation

### Organizer:

*Dr. Zhiqiang Chen*, Associate Professor, University of Missouri-Kansas City

**Thursday – 5<sup>th</sup> September, 2019 (8:30-18:00)**

Pre-Conference Short-Course: Xinhua Hall of Liuyuan Hotel

9:00-10:30      **Topic: Surface and Subsurface Imaging Using Computer Vision Techniques**  
Dr. Andrew (Hae-bum) Yun, University of Central Florida

10:30-12:00      **Topic: Introduction to Point Cloud Processing and Applications**  
Dr. Mike Olsen, Oregon State University

13:30-15:00      **Topic: Augmented Reality for Structural Inspections**  
Dr. Fernando Moreu, PE, University of New Mexico

15:00-16:30      **Topic: Introduction of Video-based Motion Tracking, Digital Image Correlation, and Structural Damage Detection**  
Dr. Zhiqiang Chen, University of Missouri-Kansas City

16:30-18:00      **Topic: Introduction to Deep Learning for Image-based Condition Assessment and UAV Applications**  
Dr. Ji Dang, Saitama University

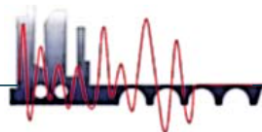
## Conference Schedule by Dates

### Registration Schedule:

Wednesday – 4<sup>th</sup> September, 2019 (14:00 – 18:00)

Thursday – 5<sup>th</sup> September, 2019 (8:00-20:00)

Friday – 6<sup>th</sup> September, 2019 (8:00-11:00)



## Conference Schedule Day One – Friday, 6<sup>th</sup> September, 2019

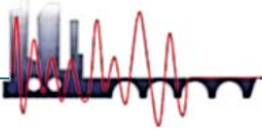
<b>Opening Ceremony and Plenary Keynote Session 1</b> Xinhua Hall of Liuyuan Hotel Chair: Zhishen WU			
8:30–8:40      Opening Ceremony			
8:40–9:10	ATMD Systems, Design Approaches and In-field Testing Inspection for Wind-Induced Structural Vibration Control	Jinping OU	Harbin Institute of Technology
9:10–9:40	The Civil Engineer: From Artist to Technician to Scientist	A. Emin Aktan	Drexel University
9:40–10:10	Updating of Nonlinear Finite Element Models of Civil Structures using Bayesian Inference	Joel P. Conte	University of California San Diego
10:10–10:30      Coffee Break and Group Photo			
<b>Keynote Session 2</b> Xinhua Hall of Liuyuan Hotel Chair: Satish Nagarajah			
10:30–11:00	Vehicle Scanning Method for Bridge using the Contact Point Response	Yeong-Bin YANG	Chongqing University
11:00–11:30	Ocean Energy Harvesting	Quan WANG	Shantou University
11:30–12:00	Vibration Serviceability Assessment of Building Floors: the (Hi) Story of Response Factor and Vibration Dose Value	Aleksandar Pavic	University of Exeter
12:00–13:30      Lunch (Liuyuan Hotel)			
<b>Keynote Session 3</b> Xinhua Hall of Liuyuan Hotel Chair: Maosen CAO			
14:00–14:30	The Data Paradigm for Civil Engineering	Hui LI	Harbin Institute of Technology
14:30–15:00	Multi-scale Modeling Method of Rectangular Section Component based on Multi-point Constraints	Jun TENG	Harbin Institute of Technology, Shenzhen
15:00–15:30	System Identification of Structures Using Non-stationary Data: Challenges and New Solutions	Ertugrul Taciroglu	University of California, Los Angeles
15:30–15:50      Coffee Break			
15:50–18:05      Concurrent Session 1 (See below)			
18:30–20:30      Banquet (Liuyuan Hotel)			



**CONCURRENT SESSION 1, FRIDAY, 6<sup>th</sup> SEPTEMBER, 15:50-18:50**

	1	2	3	4
	<p><b>Xinhua Hall of Liuyuan Hotel</b> Chair: Ertugrul Taciroglu and Pennung Warnitchai</p>	<p><b>Middle Hall</b> 1<sup>st</sup> floor of Liuyuan Hotel Chair: Mohammad Noori</p>	<p><b>East Hall</b> 2<sup>nd</sup> floor of Liuyuan Hotel Chair: Yongfeng Du and Yuanfeng Duan</p>	<p><b>Conference Room I</b> 1<sup>st</sup> Floor of Yifu Science and Technology Museum Chair: Jun Li and Xiaowei Ye</p>
<b>15:50</b>	<p><b>Seismic Base Isolation Tall Buildings with RC Walls</b> Pennung Warnitchai (Asian Institute of Technology)</p>	<p><b>New Platform for Automated detection of Pipeline defects in closed-circuit television images using deep learning techniques</b> Wael A. Altabay, (Southeast University)</p>	<p><b>Non-Contact Video-based Identification for Dynamic Behaviors of Beam Structures</b> Yu Cheng, (Southeast University)</p>	<p><b>Stochastic Characterization of Wind Field Characteristics nearby an Arch Bridge based on Long-term Monitoring Data</b> Xiaowei Ye, (Zhejiang University)</p>
<b>16:05</b>	<p><b>Validation of Proposed SHM Model based on Inverse Dynamic Approach with Limited Noisy Dynamic Responses by Experimental Study</b> Debashish Bandyopadhyay (Jadavpur University)</p>	<p><b>A Wavelet-Based Damage-Sensitive Feature Extraction</b> Ahmed Silik, (Southeast University)</p>	<p><b>Influence of Space Height on the Internal Explosion Response of Single-layer Spherical Reticulated Shell</b> Xuanneng Gao, (Huaqiao University)</p>	<p><b>Displacement Estimation by Multi-Rate Data Fusion of Strain and Acceleration Data</b> Shun Weng, (Huazhong University of Science and Technology)</p>
<b>16:20</b>	<p><b>A Review of Experimental and Analytical Work on Laboratory Grandstands</b> Mohammad Almutairi (University of Leeds)</p>	<p><b>Identification of Cracks in an Euler-Bernoulli Beam Based on Analytical Solution of Vibration Modes Using Bayesian Inference</b> Tianyu Wang, (Southeast University)</p>	<p><b>Dynamic Displacement Estimation of Supertall Structures using Multi-Rate Data Fusion of Strain and Acceleration Data</b> Ke Gao, (Huazhong University of Science and Technology)</p>	<p><b>Bridge Damage Localization using Moving Embedded Principal Component Analysis via a Single Sensor</b> Zhenhua Nie, (Jinan University)</p>
<b>16:35</b>	<p><b>Estimation of Repeated Slip Surface in Cut Slope Stability Analysis</b> Zulkifl Ahmed (Northeastern University)</p>	<p><b>Uncertainty Handling in Structural Damage Detection using A Non-Probabilistic Meta-Model</b> Ramin Ghiasi (University of Sistan and Baluchestan)</p>	<p><b>EME Sensors for Stress Monitoring of Steel Cables: Research, Application and Standard</b> Yuanfeng Duan, (Zhejiang University)</p>	<p><b>Damage Detection of Bridges based on Comprehensive Information of Influence Lines</b> Zhiwei Chen, (Xiamen University)</p>
<b>16:50</b>	<p><b>A Full Version of Vision-based Structural Identification</b> Chuanzhi Dong (University of Central Florida)</p>	<p><b>A non-parametric approach toward structural health monitoring for processing big data collected from the sensor network</b> Ramin Ghiasi (University of Sistan and Baluchestan)</p>	<p><b>Pseudo Damage Training for Seismic Fracture Detection Machine</b> Luyao Wang, (Saitama University)</p>	<p><b>Performance Analysis of Shear Connectors in Demountable Composite Bridge Deck with Steel Sheets</b> Jing Zhang (Hefei University of Technology)</p>

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	<b>Xinhua Hall of Liuyuan Hotel</b> Chair: Ertugrul Taciroglu and Pennung Warnitchai	<b>Middle Hall</b> 1 <sup>st</sup> floor of Liuyuan Hotel Chair: Mohammad Noori	<b>East Hall</b> 2 <sup>nd</sup> floor of Liuyuan Hotel Chair: Yongfeng Du and Yuanfeng Duan	<b>Conference Room I</b> 1st Floor of Yifu Science and Technology Museum Chair: Jun Li and Xiaowei Ye
<b>17:05</b>	<b>Bridge Foundation Integrity Assessment by Dynamic Testing and Structural Identification</b> Xiangang Lai, (Drexel University)	<b>An Optimized Test Combining Dynamic Actuators and Shake Table</b> Farhad Behnamfar (Isfahan University of Technology)	<b>Piezoelectric Admittance based Detection via Data Compression and Reconstruction</b> Hedong Li, (Huazhong University of Science and Technology)	<b>Application of a 3D based Isolation and Overturn Resistance Device on the Large Height-width Ratio Structure</b> Xueyuan Yan, (Fuzhou University)
<b>17:20</b>	<b>Frequency-domain Fast Maximum Likelihood Estimation of Complex Modes</b> Binbin Li, (Zhejiang University)	<b>Serviceability Design Spectral Acceleration for Structures Subjected to Passing Underground Trains</b> Farhad Behnamfar (Isfahan University of Technology)	<b>Distributed Detection of Grouting Defects in Pre-stressed Ducts using Brillouin Fiber Optic Sensors</b> Shilin Gong (Dalian University of Technology)	<b>Influence of Joint Reinforcement Anchorage Detailing on the Seismic Performance of Double-Column Bridge Piers</b> Liyuan Wang, (Fuzhou University)
<b>17:35</b>	<b>Simulation Analysis of a Bridge with a Nonlinear Tuned Mass Damper Using Incremental Harmonic Balance Method</b> Feng Gu, (Shantou University)	<b>An investigation into the active vibration control of three coupled oscillators using the twin rotor dampers</b> Richard Terrill (Hamburg University of Technology)	<b>Several Damage Indices based on Transmissibility for Application in Structural Damage Detection</b> Jianping Han (Lanzhou University of Technology)	<b>Modal Shape Estimation based on a Parked Vehicle Induced Frequency Variation</b> Wenyu He (Hefei University of Technology)
<b>17:50</b>	<b>The Analysis of the Temperature Effect on Frequencies of a Footbridge</b> Dehui Tang (Harbin Institute of Technology)		<b>Numerical Simulation of Precast Concrete Structure with Cast-in-situ Monolithic Joint</b> Yongfeng Du (Lanzhou University of Technology)	<b>Classification and Characteristicization of Bridge cracks based on deep learning and image processing</b> Qi Zhu, (Zhejiang University)
<b>18:05</b>				<b>Multiple tuned mass dampers for multi-mode control of a cable-supported roof under wind-induced vibration</b> X.C. Wang, (Zhejiang University)



Conference Schedule Day Two – Saturday, 7<sup>th</sup> September, 2019

<b>Keynote Session 4</b> Xinhua Hall of Liuyuan Hotel Chair: You-Lin XU			
8:30–9:00	Smart Strain Sensing Skin for 2D-Strain Mapping using Laser-Induced Fluorescence from Single Walled Nanotubes	Satish Nagarajaiah	Rice University
9:00-9:30	Monitoring of Structural Dynamic Characteristics and Vibrations of Skyscrapers during Super Typhoon Mangkhut	Qiusheng LI	Hong Kong City University
9:30– 10:00	Novel Techniques to Control Vortex-induced Vibration of Offshore Structures	Hong HAO	Curtin University
10:00-10:15 Coffee Break			
10:15-12:00 Concurrent Session 2 (See below)			
12:00-13:30 Lunch (Liuyuan Hotel)			
<b>Keynote Session 5</b> Xinhua Hall of Liuyuan Hotel Chair: Joel P. Conte			
14:00–14:30	Vehicle-Induced Fatigue Damage Assessment of Orthotropic Steel Decks of a Cable-Stayed Bridge	You-Lin XU	The Hong Kong Polytechnic University
14:30–15:00	Identification Cracks: Issues with Reduced Stiffness Method & Development of an Explicit Approach	Yong LU	The University of Edinburgh
15:00–15:30	Developing Smart Building Structures Through Integrated Structural Health Monitoring and Vibration Control	Ying LEI	Xiamen University
15:30-15:50 Coffee Break			
15:50–16:20	Model- and Non-model-based Damage Detection Methods Using Vibration Data	Weidong ZHU	University of Maryland
16:20–16:50	Macro-strains modal analysis and its roles in damage detection and monitoring	Zhishen WU	Southeast University
16:50–17:10 Closing Ceremony/Summary			
18:00–20:00 Dinner (Liuyuan Hotel)			

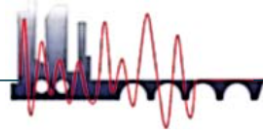


**CONCURRENT SESSION 2, SATURDAY, 7<sup>th</sup> SEPTEMBER, 10:15-12:00**

	①	②	③	④
	<p><b>Xinhua Hall of Liuyuan Hotel</b> Chair: Zhiqiang Chen and Jun Chen</p>	<p><b>Middle Hall</b> 1<sup>st</sup> Floor of Liuyuan Hote Chair: Rodrigo Astroza</p>	<p><b>East Hall</b> 2<sup>nd</sup> Floor of Liuyuan Hotel Chair: Ji Dang and Lin Chen</p>	<p><b>Conference Room I</b> 1<sup>st</sup> Floor of Yifu Science and Technology Museum Chair: Shun Weng</p>
<b>10:15</b>	<p><i>Time-frequency features of continuous metro bridge under various excitations</i> Jing Yang, (Central South University)</p>	<p><i>Automated Generation of FE Model for Digital Twin of Concrete Structures from Point Cloud</i> Jiangpeng Shu (Zhejiang University)</p>	<p><i>Non-Probabilistic Damage Detection using Classic and Modal Interval Analysis</i> Sheng'en Fang (Fuzhou University)</p>	<p><i>Using Artificial Intelligence Techniques for Structural Health Monitoring and Damage Quantification</i> Jun Li (Curtin University)</p>
<b>10:30</b>	<p><i>Finite element model updating of psc box-girder bridge based on multi-output support vector machine</i> Zheheng Chen,(Hohai University)</p>	<p><i>Identification of Moving forces in the Case of Unknown Bridge Structural Parameters using Truncated Generalized Singular Value Decomposition Algorithm</i> Zhuhong Ouyang (Shantou University)</p>	<p><i>A Three-Dimensional Isolation Device with Vertical Variable Stiffness for Long-Span Spatial Structures</i> Yundong Shi, (Tianjin University)</p>	<p><i>Deep Learning based Crack Detection for Concrete Structures</i> Xiaowei Ye (Zhejiang University)</p>
<b>10:45</b>	<p><i>Development and experimental verification of iot sensing based structural seismic monitoring system</i> Rongzhi Zuo, (Saitama University)</p>	<p><i>Hybrid Dic-meshless Method for Evaluating Strain Field around the Crack</i> Zihui Zhu (Central South University)</p>	<p><i>A Novel Experience-based Learning Algorithm for Structural Damage Identification: Simulation and Experimental Verification</i> Weili Luo (Guangzhou University)</p>	<p><i>Physics-Informed Structural Identification using Video Data</i> Zhilu Lai (ETH-Zurich, Switzerland)</p>

CONCURRENT SESSION 2, SATURDAY, 7<sup>th</sup> SEPTEMBER, 10:15-12:00

	①	②	③	④
	<p><b>Xinhua Hall of Liuyuan Hotel</b> Chair: Mohammad Noori</p>	<p><b>Middle Hall</b> 1st Floor of Liuyuan Hote Chair: Rodrigo Astroza</p>	<p><b>East Hall</b> 2nd Floor of Liuyuan Hotel Chair: Ji Dang and Lin Chen</p>	<p><b>Conference Room I</b> 1st Floor of Yifu Science and Technology Museum Chair: Shun Weng</p>
11:00	<p><i>Pseudo damage training for seismic fracture detection machine</i> Luyao Wang, (Saitama University)</p>	<p><i>Substructuring-based Damage Assessment of a Steel Railway Bridge using Operational Modal Data</i> Leqia He, (Fuzhou University)</p>	<p><i>Seismic Protection of Cultural Relics using Three-Dimensional based Isolation System</i> Wen Bai (Institute of Engineering Mechanics)</p>	<p><i>Grouting Compactness Assessment in Post-tensioning Tendon Ducts using Piezoceramic Transducers and Wavelet Packet Analysis</i> Dan Li(Hefei University of Technology)</p>
11:15	<p><i>Bridge damage classification and detection using fully convolutional neural network on images from uavs</i> Jiyuan Shi,(Saitama University)</p>	<p><i>Highway Bridge Weigh-in-motion via Moving Load Identification</i> Xiangang Lai, (Drexel University)</p>	<p><i>Performance Comparison of Viscoelastic Dampers for Cable Vibration Control based on Field Tests</i> Lin Chen, (Tongji University)</p>	<p><i>Output-only Structural Damage Detection under Multiple Unknown White Noise Excitations</i> Pinghe Ni (Beijing University of Technology)</p>
11:30	<p><i>Quarter car parameter estimation with application to road profile evaluation using a smartphone</i> Kai Xue, (The University of Tokyo)</p>	<p><i>Experimental System and Damage Identification of Small-scale Wind Turbine Blades</i> Rodrigo Astroza (Universidad de los Andes, Chile)</p>	<p><i>Pedestrian Induced Vibration of Plate</i> Yan'an Gao (Huaiyin Institute of Technology)</p>	<p><i>Bridge Damage Detection under Moving Loads based on Multi-sensor Recurrence Plots</i> Dong Yang (Hefei University of Technology)</p>
11:45	<p><i>A substructure approach to calculating structural response and response sensitivity for model updating based damage identification</i> Jiajing Li (Huazhong University of Science and Technology)</p>	<p><i>On the Performance of Unscented Kalman Filters in Parameter Estimation of Nonlinear Finite Element Models</i> Rodrigo Astroza (Universidad de los Andes, Chile)</p>	<p><i>Analysis on the Internal Explosion Effects of Single-Layer Spherical Reticulated Shell</i> Shiqi Fu (Huaqiao University)</p>	<p><i>EKF-based Nonlinear Identification with Unknown Loading and Limited Observations</i> Jia He (Hunan University)</p>



### Conference Schedule Day Three – Sunday, 8<sup>th</sup> September, 2019

8:30	To Assemble at the Lobby of Liuyuan Hotel
9:00–11:30	Technical Visit: 1. State Key Laboratory of Safety and Health for In-service Long Span Bridges 2. The 3rd Yangtze River Highway Bridge
12:00–13:00	Lunch (Liuyuan Hotel)
13:00	The End of EVACES 2019

