

Preface

The aim of Global Conference on Civil, Structural and Environmental Engineering is to create a venue where researchers from around the world can reflect on progress made in the scientific study in civil and environment field. The first conference was taken place in Yichang, China, in 2012. The combined conference is organized by China Three Gorges University, Geoenvironmental Engineering Branch of Chinese Society for Rock Mechanics and Engineering, The Ground Rock Engineering Committee of Chinese Society for Rock mechanics and Engineering, The Fluid Mechanics Committee of the Chinese Society of Mechanics, and Hubei Society for Rock Mechanics & Engineering. The second GCCSEE was successfully held in Shenzhen, China, September, 2013. Following the success of the previous two conferences, the third conference (GCCSEE 2014) was successfully held in Chengdu, China, October 21-22, 2014. This conference proceeds to bring together leaders from industry and academia to exchange and share their experiences, present research results, explore collaborations and to spark new ideas, with the aim of developing new projects and exploiting new technology in this field.

We are grateful to all the authors, referees and organizations that have made these volumes possible and hope that it becomes an invaluable reference both for the civil and environmental engineering profession.

The editors

**2014 3rd Global Conference on
Civil, Structural and Environmental Engineering
Conference Organization**

Chairman

Prof. Yong Huang, Guizhou University, China

Scientific and Technical Committee

Prof. J. H. Bungey, University of Liverpool, Liverpool, UK

Prof. K. J. Bathe, Massachusetts Institute of Technology, USA

Prof. Lawrence C. Bank, University of Wisconsin-Madison, USA

Prof. Longsheng Bao, Shenyang Jianzhu University, China

Prof. Xiangdong Zhang, Liaoning Technical University, China

Prof. Chaohe Chen, South China University of Technology, China

Prof. Xianglin Gu, Tongji University, China

Prof. Xiating Feng, Institute of Rock and Soil Mechanics, Chinese Academy of Science

Prof. Hongnan Li, Dalian University of Technology, China

Prof. Zhihua Chen, Tianjin University, China

Prof. Jian-Fei Chen, the University of Edinburgh, UK

Prof. Shucai Li, Shandong University, China

Prof. Lai Wang, Shandong University of Science and Technology

Prof. Xin'gang Zhou, Yantai University, China

Prof. Xuejun Zhou, Shandong Jianzhu University, China

Prof. Feng Fan, Harbin Institute of Technology, China

Prof. Luciano Feo, University of Salerno, Italy

Prof. Han-Bin Ge, Meiji University, Japan

Prof. Haiyan Guo, Ocean University of China

Prof. Zong Woo Geem, iGlobal University, USA

Prof. Linhai Han, Tsinghua University, China

Prof. Yong Huang, Guizhou University, China

Prof. Jiping Hao, Xi'an University of Architecture and Technology, China

Prof. I. E. Harik, University of Kentucky, USA

Prof. David Hui, University of New Orleans, USA

Prof. Tan Kiang Hwee, National University of Singapore

Prof. Tim Ibell, University of Bath, UK

Dr. Tianjian Ji, The University of Manchester, UK

Prof. A. Kaveh, Iran University of Science & Technology, Iran

Prof. Guoqiang Li, Tongji University, China

Prof. Lijuan Li, Guangdong University of Technology, China

Prof. Shucai Li, Shandong University, China

Prof. Zhongxian Li, Tianjin University, China

Prof. Qiusheng Li, Hong Kong City University, Hong Kong

Prof. Kang Seok Lee, Chonnam National University, South Korea

Prof. Marcus M.K. Lee, the University of Southampton, UK

Prof. Zhengliang Li, Chongqing University, China

Prof. Zhengnong Li, Hunan University, China

Prof. Guangfan Li, Hainan University, China

Prof. Xiliang Liu, Tianjin University, China

Prof. Yew-Chaye Loo, Griffith University, Australia

Prof. Yaozhi Luo, Zhejiang University, China

Prof. Ayman Mosallam, Univ of California Irvine, USA

Prof. Aftab Mufti, University of Manitoba, Canada

Prof. Antoine E. Naaman, University of Michigan, USA

Prof. Hamid Ronagh, The University of Queensland, Australia

Prof. R. Sri Ravindra rajah, University of Technology, Australia

Prof. Yongjiu Shi, Tsinghua University, China

Prof. Xingping Shu, Hunan University, China

Prof. Ramiro Sofronie, University of Bucharest, Romania

Prof. M. N. Soutsos, University of Liverpool, Liverpool, UK

Dr. Scott T. SMITH, Hong Kong University, Hong Kong

Prof. J-G Teng, Hong Kong Polytechnic University, Hong Kong

Prof. Yan Xiao, Hunan University, China
Prof. Zhixin Yan, Lanzhou University, China
Prof. Yanzhen Yu, Jinan University, China
Prof. Qilin Zhang, Tongji University, China
Prof. Xin Zhang, Shandong Jianzhu University, China
Prof. Yigang Zhang, Beijing University of Technology, China
Prof. Jincheng Zhao, Shanghai Jiaotong University, China
Prof. Xin'gang Zhou, Yantai University, China
Prof. Xuejun Zhou, Shandong Jianzhu University
Prof. Yanpeng Zhu, Lanzhou University of Technology, China
Prof. Chaoying Zou, Harbin Institute of Technology, China
Prof. Jiru Zhang, Wuhan University of Technology, China
Prof. Chuangbin Zhou, Wuhan University, China

Local Organizing Committee

Prof. Tai Bao, Guizhou University, China
Prof. Tao Xie, Guizhou University, China
Prof. Xianzhong Guo, Guizhou University, China