The 2021 International Conference on Crowd Science and Engineering
(ICCSE 2021)

16-18 October 2021
Jinan, China
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Welcome Message (ICCSE 2021)

Dear ICCSE 2021 delegates,

On behalf of the ICCSE 2018 organizing committee, we warmly welcome you to the 2021 International Conference on Crowd Science and Engineering.

ICCSE 2021 offers a wonderful opportunity for academics, industry practitioners, and policymakers to gather and explore the transformative potential of crowd science research, intending to find ways to engineer efficient systems that can combine the strengths of both humans and machines for new innovative possibilities.

ICCSE 2021 also provides a global forum for scientists, engineers, and educators to present and discuss the latest Crowd Science and Engineering research, emerging technologies, and their future applications. The ICCSE 2021 program includes the 2021 China-Singapore Higher Education Forum; 5 keynote speeches given by world-renowned speakers including Dacheng Tao, Cyril Leung, Sinno Jialin Pan, Guang-Bin Huang, and Yuan Miao; 6 technical sessions on emerging research areas and several Workshop, Poster and Demo sessions.

ICCSE 2021 is held in the beautiful spring city of Jinan, China. Jinan is famous as spring city, autumn is the best season in Jinan. It will offer ample opportunities for delegates to interact and connect with each other. ICCSE 2021 wishes to thank our International Advisory Committee and Organizing Committee members for their great contributions to ensure the success of the conference. ICCSE 2021 also thanks Shandong University for providing the conference venue. This year is also the 120th anniversary of Shandong University. We sincerely hope that Shandong University will become better and better and achieve more fruitful results in the future. Besides attending the conference, ICCSE 2021 delegates will find a whole lot to see and do in Shandong.

We hope that ICCSE 2021 will be a memorable event for all delegates. We welcome you to explore and enjoy the Jinan and wish you a wonderful stay in Shandong.

Yueting Chai, Tsinghua University, China
Lizhen Cui, Shandong University, China
Bo An, Nanyang Technological University, Singapore
ICCSE 2021 General Chairs
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- Victor Lesser, University of Massachusetts Amherst, USA
- Cyril Leung, The University of British Columbia, Canada
- Chunyan Miao, Nanyang Technological University, Singapore
- Chengqi Zhang, University of Technology Sydney, Australia
- Baowen Sun, Central University of Finance and Economics, China
- Yongqing Zheng, Shandong University, China

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Minting Huang, Nanyang Technological University
Qiang Yang, Hong Kong University of Science and Technology
Qingming Huang, University of Chinese Academy of Science
Qingzhong Li, Shandong University
Qiong Wu, Nanyang Technological University
Quan Bai, Auckland University of Technology
Rabab Ward, The University of British Columbia
Roger Jiao, Georgia Institute of Technology
Shijun Liu, Shandong University
Siyuan Liu, Swansea University
Takayuki Ito, Nagoya Institute of Technology
Tom Calvert, Simon Fraser University
Victor Lesser, University of Massachusetts Amherst
Weigui Zhou, Nanyang Technological University
Wei Guo, Shandong University
Wei-Tek Tsai, Arizona State University
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Yuan Miao, Victoria University
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Zhen Hai, Institute for Infocomm Research, A*Star
Zhiqi Shen, Nanyang Technological University
Zhongmin Yan, Shandong University
Zhongke Wu, Beijing Normal University
## Program at a Glance

### Day 1: Saturday, October 16, 2021, Room Lu, Level 1, Sheraton Jinan Hotel

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>08:00 - 09:00</td>
<td>Registration (Sheraton Jinan Hotel 1st floor, Lobby)</td>
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<tr>
<td>09:00 - 12:00</td>
<td><strong>2021 China-Singapore Higher Education Forum</strong> (Room Lu 鲁厅)</td>
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<tr>
<td><strong>Lunch:</strong></td>
<td>12:00 - 13:30</td>
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<tr>
<td>13:00 - 14:00</td>
<td>Registration (Sheraton Jinan Hotel 1st floor, outside Room Lu 鲁厅)</td>
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<tr>
<td>14:00 - 14:30</td>
<td>Welcome Speeches</td>
</tr>
<tr>
<td>14:30 - 15:10</td>
<td><strong>ICCSE Keynotes #1 Prof Dacheng Tao</strong> (Room Lu 鲁厅)</td>
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<tr>
<td></td>
<td>Title: Foundations of Deep Learning</td>
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<tr>
<td>15:10 - 15:30</td>
<td>Group Photo / Tea Break</td>
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<tr>
<td>15:30 - 16:00</td>
<td><strong>ICCSE Keynotes #2 Prof Cyril Leung</strong> (Room Lu 鲁厅)</td>
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<tr>
<td></td>
<td>Title: AI for 3H</td>
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<tr>
<td>16:00 - 16:30</td>
<td><strong>ICCSE Keynotes #3 Prof Sinno Jialin Pan</strong> (Room Lu 鲁厅)</td>
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<tr>
<td></td>
<td>Title: Sensor-Based Activity Recognition via Kernel-embedding Neural</td>
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<td>Networks</td>
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<td>16:30 - 17:00</td>
<td><strong>ICCSE Keynotes #4 Prof Guang-Bin Huang</strong> (Room Lu 鲁厅)</td>
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<tr>
<td></td>
<td>Title: Artificial Intelligence and Brief History of Human Life</td>
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<td>17:00 - 17:30</td>
<td><strong>ICCSE Keynotes #5 Prof Yuan Miao</strong> (Room Lu 鲁厅)</td>
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<td></td>
<td>Title: NLP &amp; Commonsense Knowledge</td>
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<td>Banquet: 18:00 - 20:00</td>
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### Day 2: Sunday, October 17, 2021, Level 1, Sheraton Jinan Hotel

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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>09:00 - 17:00</td>
<td>Registration (Sheraton Jinan Hotel 1st floor, outside Room Qi 齐厅)</td>
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<tr>
<td>09:00 - 11:30</td>
<td>ICCSE-Session #1 &amp; #2 (Room Wei 魏厅)</td>
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<td>Tencent HealthCare-Workshop (Room Qi 齐厅)</td>
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<td></td>
<td>ACE Internal Meeting (Room Zhao 赵厅)</td>
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<tr>
<td><strong>Lunch:</strong></td>
<td>12:00 - 13:45</td>
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<tr>
<td>14:00 - 17:00</td>
<td>ICCSE-Session #3 &amp; #4 (Room Wei 魏厅)</td>
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<td>ICCSE-Session #5 &amp; #6 (Room Qi 齐厅)</td>
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<td>ICCSE Steering committee meeting (Room Zhao 赵厅)</td>
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### Day 3: Monday, October 18, 2021

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<thead>
<tr>
<th>Time</th>
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<td></td>
<td>Self-Networking Session</td>
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Keynote #1

Dacheng Tao
Fellow, Australian Academy of Science and IEEE, ACM, AAAS
President, the JD Explore Academy and SVP, JD.com
Professor of Computer Science, University of Sydney, Australia

Title: Foundations of Deep Learning

Venue: Room Lu 鲁厅
Time: Saturday, October 16, 2021 14:30 - 15:10

Abstract:
Deep learning has achieved impressive performance across a wide variety of domains in the past decade due to its ability to learn very complex functions by adding more layers and more neurons within a layer. Despite of their great success in practice, a clear understanding of the fundamentals of deep learning is still lacking. Prior work has shown that deep neural networks have enough capacity to memorize training data with random labels. But why deep neural networks generalize well to new data, even when the number of parameters is significantly larger than the amount of training data, still remains unclear. To explain the generalization in deep learning, many complexity measures have been proposed to capture the capacity of neural networks such as VC-dimension, norm and sharpness. However these measures usually depend on the networks size and would become vacuous for very large networks. For a better understanding of the latest advancements in AI, it is critical to understand why deep learning is capable and has the capacity to raise the third wave of AI. In this talk, we will present our investigations, initiatives and insights to the interpretation of the successful deep learning.

Biography:
Prof Dacheng Tao is the President of the JD Explore Academy and a Senior Vice President of JD.com. He is also an advisor and chief scientist of the digital science institute in the University of Sydney. He mainly applies statistics and mathematics to artificial intelligence and data science, and his research is detailed in one monograph and over 200 publications in prestigious journals and proceedings at leading conferences. He received the 2015 Australian Scopus-Eureka Prize, the 2018 IEEE ICDM Research Contributions Award, and the 2021 IEEE Computer Society McCluskey Technical Achievement Award. He is a fellow of the Australian Academy of Science, AAAS, ACM and IEEE.
Keynote #2

Cyril Leung
Fellow, The Engineering Institute of Canada
Professor, University of British Columbia, Canada
Co-Director, Joint NTU-UBC Research Centre of Excellence in Active Living for the Elderly (LILY), NTU

Title: AI for 3H

Venue: Room Lu 鲁厅
Time: Saturday, October 16, 2021 15:30 - 16:00

Biography:
Cyril Leung is a Professor in the Department of Electrical and Computer Engineering at UBC. He received a BSc (first-class honours) degree from Imperial College, London and his MS and PhD degrees in Electrical Engineering from Stanford University in California. He has been an Assistant Professor in the Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology and the Department of Systems Engineering and Computing Science, Carleton University. He served as Associate Dean, Research and Graduate Studies in the Faculty of Applied Science from 2008 to 2011. His current research interests are in wireless communications systems, data security and technologies to support active independent living for the elderly.
Keynote #3

Sinno Jialin Pan
Provost’s Chair Associate Professor, School of Computer Science and Engineering, Nanyang Technological University (NTU), Singapore

Title: Sensor-Based Activity Recognition via Kernel-embedding Neural Networks

Venue: Room Lu 鲁厅
Time: Saturday, October 16, 2021 16:00 - 16:30

Abstract:
Feature-engineering-based machine learning models and deep learning models have been explored for wearable-sensor-based human activity recognition. For both types of methods, one crucial research issue is how to extract proper features from the partitioned segments of multivariate sensor readings. Existing methods have different drawbacks: 1) feature-engineering-based methods are able to extract meaningful features, such as statistical or structural information underlying the segments, but usually require manual designs of features for different applications, which is time consuming, and 2) deep learning models are able to learn temporal and/or spatial features from the sensor data automatically, but fail to capture statistical information. In this talk, I will introduce our recently developed kernel-embedding neural architecture that is able to automatically learn meaningful features including statistical features, temporal features and spatial correlation features for activity recognition. I will also discuss some advanced issues in sensor-based activity recognition.

Biography:
Sinno Jialin Pan is a Provost’s Chair Associate Professor with the School of Computer Science and Engineering at Nanyang Technological University (NTU), Singapore. He received his Ph.D. degree in computer science from the Hong Kong University of Science and Technology (HKUST) in 2011. Prior to joining NTU, he was a scientist and Lab Head of text analytics with the Data Analytics Department at Institute for Infocomm Research, Singapore. He joined NTU as a Nanyang Assistant Professor in 2014. He was named to the list of “AI 10 to Watch” by the IEEE Intelligent Systems magazine in 2018. His research interests include transfer learning and its real-world applications.
Keynote #4

Guang-Bin Huang  
Founder of Mind PointEye  
Full Professor in the School of Electrical and Electronic Engineering,  
Nanyang Technological University, Singapore

Title: Artificial Intelligence and Brief History of Human Life

Venue: Room Lu 鲁厅  
Time: Saturday, October 16, 2021 16:30 - 17:00

Biography:  
Guang-Bin Huang is the Founder of Mind PointEye, Singapore, was a Full Professor in the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. He was a Nominee of Singapore President Science Award (2016, 2017, 2018 and 2019), was awarded by Thomson Reuters “Highly Cited Researcher” (in two fields: Engineering and Computer Science) and listed in Thomson Reuters’s “The World's Most Influential Scientific Minds” in the past several years since 2014. He received the best paper award from IEEE Transactions on Neural Networks and Learning Systems (2013). His two works on Extreme Learning Machines (ELM) have been listed by Google Scholar in 2017 as Top 2 and Top 7, respectively in its “Classic Papers: Articles That Have Stood The Test of Time” - Top 10 in Artificial Intelligence.

He is Principal Investigator of BMW-NTU Joint Future Mobility Lab on Human Machine Interface and Assisted Driving, Principal Investigator (data and video analytics) of Delta – NTU Joint Lab, Principal Investigator (Scene Understanding) of ST Engineering – NTU Corporate Lab, and Principal Investigator (Marine Data Analysis and Prediction for Autonomous Vessels) of Rolls Royce – NTU Corporate Lab. He has led/implemented several key industrial projects (e.g., Chief architect/designer and technical leader of Singapore Changi Airport Cargo Terminal 5 Inventory Control System (T5 ICS) Upgrading Project, etc).
Abstract:
Natural Language Processing (NLP) involving human knowledge will be the focus of contemporary artificial intelligence. It facilitates knowledge and related information transition from one person to another and from one generation to the next. This talk discusses why NLP is more challenging than other areas and its close association with human cognition and knowledge. The robustness of NLP models is far from satisfactory as compared to image processing or computer vision. Applying commonsense knowledge like synonyms to modify datasets (e.g. SQuAD 2.0) presents no challenges to human readers, but NLP models like BERT and ELECTRA can fail on them badly.

Biography:
Professor Yuan Miao received his PhD from Tsinghua University 1996. He is currently the Head of IT Discipline at the College of Engineering and Science, Victoria University, leading the Innovative Intelligent Technology Lab research. His research interests are in human knowledge modeling (fuzzy cognitive map, knowledge graph), natural language comprehension, decision support and their application in smart cities, health care, active aging, cyber security, and digital transformation in the construction industry. He has led the research towards the discovery of the sufficient and necessary condition for a complex cognitive map to be decomposable, a transformation of major cognitive map models, an adversary dataset that fails top models BERT and ELECTRA. His research received support from the industry, including Oracle, Amazon, Microsoft, and national competitive grant support from government funding bodies such as Australia Research Council and National Research Foundation Singapore.
Conference Program
Morning, 17th October 2021

ICCSE-Session 1: Crowd Intelligence and Learning
Session Chair: Prof. Xu Yonghui
Venue: Room Wei

Title: A glance at people's engagement behavior with fully pay transparency: From the perspective of a crowd collaboration system
Author: Tongda Zhang, Jun Qian, Xiao Sun, Ye Yuan and Minyu Chen

Title: Collaboration interaction prediction in crowdsourcing via temporal network
Author: Yiqin Luo, Tongda Zhang, Xiao Sun and Minyu Chen

Title: Classification Model based on Intelligence for Crowdsourced Data Labeling: Intelligence Elicitation by Information Interaction Mechanism
Author: Joonhyup Lee, Ziyang Wang, Yi Liu, Yueting Chai and Anting Zhang

Title: From Crowdsourced Software Development to Crowdtesting
Author: Wei-Tek Tsai, Li Zhang and Shufeng Hu

Title: Investigating Influencing Factors for Public Service Capacities of Digital Government
Author: Jiayan Guo, Yanlin Ma and Jian Tang

ICCSE-Session 2: Crowd Economy
Session Chair: Prof. Liang Zou
Venue: Room Wei

Title: Deep transfer learning based on LSTM model in stock price forecasting
Author: Haoran Xu, Bo Xu, Jie He and Jingrui Bi

Title: Credit Default Prediction via Explainable Ensemble Learning
Author: Ronghua Xu, Hefeng Meng, Zhiqiang Lin, Yonghui Xu and Lizhen Cui

Title: A Creditworthy Resources Sharing Platform Based on Microservice
Author: Shuaiyu Wang and Yinsheng Li

Title: Practices of Using Blockchain Technology in e-Learning
Author: Jun Lin
Title: Research on blockchain application maturity assessment method for digital government public service projects
Author: Yutao Yang, Yuxuan Shi and Tianmei Wang

**Afternoon, 17th October 2021**

**ICCSE-Session 3: Crowd Behavior**
Session Chair: Prof. Lingguo Bu
Venue: Room Wei
Session Time: 14:00 – 15:00

Title: ECG Prediction based on Bidirectional Time Series Chain Discovery Algorithm
Author: Xiangwei Zheng, Xiunan Zou, Xiuxiu Ren, Cun Ji and Mingzhe Zhang

Title: A Serious Mobile Game for Neurodegenerative Diseases Evaluation
Author: Huiguo Zhang, Yonghui Xu, Jun Lin, Weiming Li and Zhiqi Shen

Title: A Survey of Smart Healthcare for the Elderly based on User Requirements and Supply Accessibility
Author: Ching Hung Lee and Zehao Zhang

Title: Music Rhythm Matching Based on Dynamic Step Frequency
Author: Youyang Du, Chi Zhang, Escoffier Wang, Yunsen Tang, Yonghui Xu and Lizhen Cui

Title: Exploring the use of Virtual Reality for evaluating activities of daily living: a usability study
Author: Siyuan Liu, Benny Tan, Huiguo Zhang, Chunyan Miao

Title: A Survey on Knowledge Enhanced EHR Data Mining
Author: Jiancheng Zhang, Xiao Yang, Hefeng Meng, Zhiqiang Lin, Yonghui Xu and Lizhen Cui

**ICCSE-Session 4: Crowd E-Commerce**
Session Chair: Prof. Lingguo Bu
Venue: Room Wei
Session Time: 15:30 – 17:00

Title: Diversity-Promoting Deep Reinforcement Learning for Interactive Recommendation
Author: Yong Liu, Zhiqi Shen, Yinan Zhang and Lizhen Cui

Title: The Live Streaming Shopping: A New Industrial Ecology in China
Author: Tongda Zhang, Jun Qian, Xiao Sun, Ding Ma and Ye Yuan
Title: The Evolution and value chain decomposition of Live Streaming Shopping
Author: Tongda Zhang, Jun Qian, Xiao Sun, Ding Ma and Ye Yuan

Title: Live streaming shopping in China: an interpretation from the perspective of major market participants
Author: Tongda Zhang, Jun Qian, Xiao Sun, Ding Ma and Ye Yuan

Title: The Boosting Effect of Online Retailing on Household Consumption During Covid-19
Author: Hang Liu, Peng Yang, Baowen Sun and Yaxian Gong

ICCSE-Session 5: Crowd Optimization
Session Chair: Prof. Jun Wang
Venue: Room Qi
Venues: Room Qi
Session Time: 14:00 – 15:00

Title: Self-Learning Optimal Control with Performance Analysis using Event-Triggered Adaptive Dynamic Programming
Author: Ziyang Wang, Joonhyup Lee, Xiao Sun, Yi Liu and Yueting Chai

Title: The Method of Real-time Calculation and Scheduling Optimization of Power Data Based on Improved HEFT and Bayesian network
Author: Songhui Zhang, Tao Liu, Xinguang Xu, Tong Cao, Yu Xing and Xianguang Dong

Title: The Order Batching Strategies in Parts-to-picker System
Author: Ruochen Zhang and Yongjie Dang

Title: Internet and Cognition-Based Decision Making: A Survey
Author: Yiqiang Feng, Leiju Qiu and Baowen Sun

Title: Knowledge Distillation in Medical Data Mining: A Survey
Author: Hefeng Meng, Zhiqiang Lin, Fan Yang, Yonghui Xu and Lizhen Cui

ICCSE-Session 6: Crowd Agriculture
Session Chair: Prof. Jun Wang
Venue: Room Qi
Session Time: 15:30 – 17:00

Title: Traceability Analysis of Cold Chain Food under COVID-19 Based on Block Chain Technology
Author: Yang Hongzhi, Li Na and Huang Yadong
**Title:** Voice spoofing detection with raw waveform based on Dual Path Res2net  
**Author:** Xin Fang, Haijia Du, Tian Gao, Liang Zou and Zhenhua Ling

**Title:** Research on Security Protection Warning Model Based on Multiple Data Monitoring  
**Author:** Songhui Zhang, Liang Guo, Zhelong Wang and Tao Liu

**Title:** Boosting Ideation in Open Innovation Community: The Role of Feedback and User’s Past Successes  
**Author:** Zhengfa Yang, Qian Liu and Yang Zhao
Getting to Conference Venue

This year’s Designated Conference Hotel is Sheraton Jinan Hotel, Jinan, Shandong, China.

The various conference sessions will be held at the 1st floor, Sheraton Jinan Hotel.

Sheraton Jinan Hotel is situated in downtown Jinan’s new Central Business District, close to attractions like the Olympic Sports Center. (No. 8 Long Ao North Road, Lixia District, Jinan 250098 China)

Taxi from Jinan West Railway Station to Sheraton Jinan Hotel:
Taxi from Jinan Yaoqiang International Airport to Sheraton Jinan Hotel:
Top-Rated Tourist Attractions in Jinan City

1. Daming Lake

Daming Lake (Chinese: 大明湖; pinyin: Dà Míng Hú; Wade – Giles: Ta4 Ming2 Hu2; literally: ‘Lake of the Great Splendour’) is the largest lake in the city of Jinan, Shandong, China and one of city’s main natural and cultural landmarks. Located to the north of the historical city center, the lake is fed by the artesian karst springs of the area and hence retains a fairly constant water level through the entire year.

Daming Lake is located to the north of Minghu Road and to the south of the old city moat. Taking bus No. 6, 11, 31, 33, 36, 37, 41, k54, 游 66 to visit.
2. Baotu Spring

Jinan is known as the “City of Springs” because of the large number of natural artesian springs. The majority of the springs, many of which have been historically listed under the “72 Famous Springs” (七十二名泉) are concentrated in the downtown district and flow north to converge in Daming Lake.[6] The Baotu Spring Park is the most popular of the springs in the City of Jinan proper. Besides the Baotu Spring, the park contains several other springs that are listed among the “72 Famous Springs.” “Bàotū” (趵突) means “jumping and leaping” in Chinese. The water in the spring pool can be seen foaming and gushing, looking like a pot of boiling water. The spring was visited by the Qianlong Emperor (1711–1799) of the Qing dynasty who declared it “the best spring under the heaven” (Chinese: 天下第一泉; pinyin: tiān xià dì yī quán). A tablet with the Emperor’s handwriting “Baotu Spring” has since been erected beside the spring pool.

The Baotu Spring is located right to the southwest of the city center of Jinan, on the outer side of the old city moat and near the west end of Quancheng Road. Taking bus No. 5, 41, 49, k54, k96, 游 66, 85, 102, 103, 104 to visit.
3. Thousand Buddha Mountain

The Thousand Buddha Mountain (Chinese: 千佛山; pinyin: Qiān Fó Shān) is a hill located southeast of the city of Jinan, China. It is renowned for its numerous Buddha images which have been carved out of the hill’s rock faces or free-standing structures erect since the times of the Sui Dynasty (581-618) and its Xingguochan Temple.

The Thousand Buddha Mountain is a small hill located about 2.5 kilometres southeast from the center of the city of Jinan. Taking bus No. 2, 31, 48, k51, k56, 游 66, 游 68 to visit.
See you on beautiful Jinan!
Organized by:

- SHANDONG UNIVERSITY
- NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE
- Joint NTU-UBC Research Centre of Excellence in Active Living for the Elderly
- THE UNIVERSITY OF BRITISH COLUMBIA
- Tsinghua University
- Association for Crowd Science and Engineering (ACE)
- CCIE China Center for Internet Economy Research
- Nagoya Institute of Technology
- DAREWAY
- PEKING UNIVERSITY
- ICT
- University of Chinese Academy of Sciences
- University of Technology Sydney
- Victoria University Melbourne Australia
- THE UNIVERSITY OF SYDNEY
- Fudan University

In Collaboration with:

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- Dr Wei Guo  guowei@sdu.edu.cn

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