HASE 2019

The 19*th* IEEE International Symposium
on High Assurance Systems Engineering

CONFERENCE PROGRAM

January 3-5, 2019

Hangzhou, CHINA

HASE 2019 Program at a Glance
3 to 5 January 2019
Venue: Science Museum (Next to Hangzhou Shujiang Hotel)
Hangzhou Dianzi University (Xiasha campus), Hangzhou

Regular paper: 20min (including QA)		
Short paper: 15min (including QA)		
2, January 2019 (Wednesday)		
Time	**Event**	**Venue**
1330-1730	Registration & Reception	Hangzhou Shujiang Hotel

3, January 2019 (Thursday)		
Time	**Event**	**Venue**
0900-1700	Registration & Reception	Science Museum
0930-1030	Tutorial - Part 1	Lecture Hall, 2nd floor of Science Museum
1030-1050	Coffee Break	
1050-1150	Tutorial - Part 2	
1200-1330	Lunch	Hangzhou Shujiang Hotel, 2nd floor
1330-1430	Tutorial - Part 3	Lecture Hall, 2nd floor of Science Museum
1430-1500	Coffee Break	
1500-1700	Workshop on Security issues in Cyber-Physical System (SecCPS)	
1730-1930	Dinner	Hangzhou Shujiang Hotel, 2nd floor

4, January 2019 (Friday)		
Time	**Event**	**Venue**
0815-1700	Registration & Reception	Science Museum
0840-0900	Welcome Address & Photo Taking	Lecture Hall, 2nd floor of Science Museum
0900-1000	Keynote One	
1000-1020	Coffee Break	
1020-1210	Session 1: Data Analytics for High Assurance Systems Engineering	
1210-1330	Lunch	Hangzhou Shujiang Hotel, 2nd floor
1330-1520	Session 2: Development and Understanding	Lecture Hall, 2nd floor of Science Museum
1520-1540	Coffee Break	
1540-1730	Session 3: Platforms, Architectures and Design	
1800-2000	Banquet	Xianghe Hall, Hangzhou Shujiang Hotel, 2nd floor

5, January 2019 (Saturday)		
Time	**Event**	**Venue**
0830-1700	Registration & Reception	Science Museum
0900-1000	Keynote Two	Lecture Hall, 2nd floor of Science Museum
1000-1030	Coffee Break	
1030-1200	Session 4: System Operation and Behavior	
1200-1330	Lunch	Hangzhou Shujiang Hotel, 2nd Floor
1330-1450	Session 5: Security and Privacy	Lecture Hall, 2nd floor of Science Museum
1450-1510	Coffee Break	
1510-1710	Session 6: Emerging Systems of High Assurance	
1730-1930	Dinner	Hangzhou Shujiang Hotel, 2nd floor

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Message from the Chairs

It is our great honor to welcome you to Hangzhou, China for the 19th IEEE International Symposium on High Assurance Systems Engineering (HASE 2019). Hangzhou is one of the top tourist attractions in China with the world-renowned West lake – a UNESCO World Heritage site and the headquarters of the ecommerce giant Alibaba.

With this year's theme "High Assurance Systems Engineering via Data Analytics", HASE 2019 focuses on addressing the challenges and proposing methods, techniques, best practices, and tools to support data elicitation, visualization, sharing, and integration across engineering disciplines in effective and efficient data analytics for high assurance systems engineering. The conference consists of a few fantastic events, including two keynotes from two remarkable scholars, the main technical program, one workshop, and one tutorial. Professor Tao Xie from the University of Illinois at Urbana-Champaign, IEEE Fellow, will deliver the keynote entitled "Intelligent Software Engineering: Synergy between AI and Software Engineering". Professor Xie will also give the tutorial on "Research Methodology on Pursuing Impact-Driven Research". Professor Yang Yu from the LAMDA Group, School of Artificial Intelligence at Nanjing University will deliver the keynote entitled "On Landing Reinforcement Learning in Real-World Applications". Professor Yu's research focuses on machine learning and reinforcement learning. He is chosen by IEEE Intelligent Systems as AI's 10 to Watch in 2018.

Following the rigorous review process with at least three reviews per paper, the program committee accepted 30 papers (including 25 regular papers and 5 short papers) for the technical program. The papers cover many different topics including platforms, architectures and design, development and understanding of systems, data analytics for high assurance systems engineering, and emerging systems of high assurance. In addition, five papers were accepted for the Workshop on Security issues in Cyber- Physical System (SecCPS).

It has been a team effort to make this event possible. We express our sincere thanks to the authors of all papers who were interested in the conference and submitted the papers for consideration. We thank the PC members and reviewers for contributing their time and expertise to provide constructive comments during the review process.

Our special thanks go to the keynote speakers, Professor Tao Xie and Professor Yang Yu, for their generosity to share their wisdoms and visions on the synergy between AI and high assurance systems engineering.

Finally, we would like to acknowledge the willingness and approval of Hangzhou Dianzi University, Hangzhou Normal University, and Zhejiang University of Science and Technology for providing work environments and professional services. Special thanks also go to the HASE 2019 team members from the Institute of Big Data, Hangzhou Dianzi University for their hard work and dedication to organize this event successfully. We would like to express our appreciation for the continuous support from the Steering Committee members of HASE conferences.

We look forward to meeting you in this magnificent city of Hangzhou. We hope that you will find this conference rewarding.

LiGuo Huang, *Southern Methodist University, USA*
Hua Hu, *Hangzhou Normal University, China*
Qing Wu, *Hangzhou Dianzi University, China*
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Dongjin Yu, *Hangzhou Dianzi University, China*
Vu Nguyen, *University of Science, VNU-HCMC, Vietnam*
Congfeng Jiang, *Hangzhou Dianzi University, China*
HASE 2019 Program Chairs

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Norman Ahmed, AFRL, USA
Dongjing Wang, Hangzhou Dianzi University, China
Xin Chen, Hangzhou Dianzi University, China

Keynote Talks

Keynote I

On Landing Reinforcement Learning in Real-World Applications

Yang Yu,

Nanjing University, China

Abstract

Reinforcement learning achieved significant successes include being part of the AlphaGo system and playing Atari games. However, it is also criticized for applicability only in virtual worlds due to the requirement of huge amount of interaction data. In this talk, we will report our recent experience towards real-world reinforcement learning, including virtualizing real-world environments and reusing virtual-world policies in the real world.

Speaker's Biography

Yang Yu is an associate professor of computer science in Nanjing University, China. He joined the LAMDA Group as a faculty since he got his Ph.D. degree in 2011. His research interest is in machine learning, a sub-field of artificial intelligence. Currently, He is working on reinforcement learning in various aspects, including optimization, representation, transfer, etc. He was recommended as AI's 10 to Watch by IEEE Intelligent Systems in 2018, invited to have an Early Career Spotlight talk in IJCAI'18 on reinforcement learning, and received the Early Career Award of PAKDD in 2018. His homepage is at http://lamda.nju.edu.cn/yuy/.

Keynote II

Intelligent Software Engineering:Synergy between AI and Software Engineering
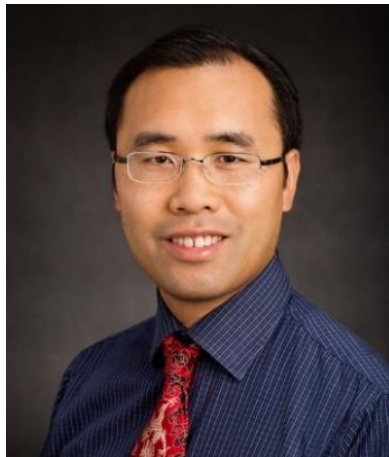
Tao Xie,

University of Illinois at Urbana-Champaign, USA

Abstract

As an example of exploiting the synergy between AI and software engineering, the field of intelligent software engineering has emerged with various advances in recent years. Such field broadly addresses issues on intelligent [software engineering] and [intelligence software] engineering. The former, intelligent [software engineering], focuses on instilling intelligence in approaches developed to address various software engineering tasks to accomplish high effectiveness and efficiency. The latter, [intelligence software] engineering, focuses on addressing various software engineering tasks for intelligence software, e.g., AI software. This talk will discuss recent research and future directions in the field of intelligent software engineering.

Speaker's Biography

Tao Xie is a Professor and Willett Faculty Scholar in the Department of Computer Science at the University of Illinois at Urbana-Champaign, USA. He worked as a visiting researcher at Microsoft Research. His research interests are in software engineering, with focus on software testing, software analytics, software security, and intelligent software engineering. He received an NSFCAREER Award, a Microsoft Research Outstanding Collaborators Award, Microsoft Research Software Engineering Innovation Foundation (SEIF) Award, a Google Faculty Research Award, an IBM Jazz Innovation Award, and three-time IBM Faculty Awards. He served as the ISSTA 2015 Conference Program Chair and the Tapia 2017/2018 Conference Program/General Chair, and will serve as an ICSE 2021 Program Co-Chair. He has been an Associate Editor of the IEEE Transactions on Software Engineering (TSE) and the ACM

Transactions on Internet Technology (TOIT), along with an Editorial Board Member of Communications of ACM (CACM). He is an ACM Distinguished Speaker and was an IEEE Computer Society Distinguished Visitor. He was named an ACM Distinguished Scientist in 2015 and an IEEE Fellow in 2018. His homepage is at http://taoxie.cs.illinois.edu.

Tutorial

Research Methodology on Pursuing Impact-Driven Research

Tao Xie,

University of Illinois at Urbana-Champaign, USA

Abstract

Conducting research to produce impact has been an important, yet challenging task for the research community. This technical debriefing presents experience sharing of research methodology on pursuing impact-driven research, such as how to select research problems to work on, how to map out a research agenda, and how to write research papers. General advice materials on research methodology can be found on the presenter's advice portal: http://taoxie.cs.illinois.edu/advice/

Speaker's Biography

Tao Xie is a Professor and Willett Faculty Scholar in the Department of Computer Science at the University of Illinois at Urbana-Champaign, USA. He worked as a visiting researcher at Microsoft Research. His research interests are in software engineering, with focus on software testing, software analytics, software security, and intelligent software engineering. He received an NSFCAREER Award, a Microsoft Research Outstanding Collaborators Award, Microsoft Research Software Engineering Innovation Foundation (SEIF) Award, a Google Faculty Research Award, an IBM Jazz Innovation Award, and three-time IBM Faculty Awards. He served as the ISSTA 2015 Conference Program Chair and the Tapia 2017/2018 Conference Program/General Chair, and will serve as an ICSE 2021 Program Co-Chair. He has been an Associate Editor of the IEEE Transactions on Software Engineering (TSE) and the ACM

Transactions on Internet Technology (TOIT), along with an Editorial Board Member of Communications of ACM (CACM). He is an ACM Distinguished Speaker and was an IEEE Computer Society Distinguished Visitor. He was named an ACM Distinguished Scientist in 2015 and an IEEE Fellow in 2018. His homepage is at http://taoxie.cs.illinois.edu.

Workshop

The International Workshop on Security issues in Cyber-Physical System(SecCPS)

Cyber Physical Systems (CPS), are embedded systems composed of computing elements as well as physical processes. In the past, CPS were proprietary and not connected to the cyber space. With the advent of networked control systems to enable better operations and monitoring of the physical processes, these systems are increasingly becoming part of cyberspace. Connection to the cyber space enables effective management of public infrastructures such as public transportation, smart grid and water treatment facilities. However, these advantages come with new security challenges. Attacks on CPS may lead to performance degradation to complete shutdown, or even equipment damage depending on the knowledge, goals and resources of the attacker. Most work in area of CPS security focuses on the cyber part and attempts to ensure secure exchange of information across controllers, sensors, and actuators. The nature of security threats and attacks in a CPS, is different from those found in pure cyberspace. Threat models have evolved significantly and the fact that any successful attack could be fatal as it's more than a computer being hacked and disturbs the physical process may result in dangerous scenarios. It is not only about the consequences of attacks but the fact that besides cyber attacks, attacks on physical devices are also possible. Hence understanding the physical part, and how it could be compromised, is essential to ensure CPS security. An adversary may add, remove or replace some physical components which may result in severe consequences. Thus focus ought to be on both physical and cyber domains. SecCPS 2019 seeks novel submissions describing practical and theoretical solutions to securing CPS. Submissions may represent any application area for CPS. Hence, papers that are pertinent to the security of embedded systems, Internet of Things, SCADA Systems, Water Systems, Smart-Grid Systems, Critical Infrastructure Networks, Transportation Systems, Medical Devices are welcome.

Workshop Co-Chairs
  Mauro Conti, *University of Padua, Italy*
  Alexander Pretschner, *TU Munich, Germany*
  Qi Li, *Tsinghua University, China*
Publicity Chair
  Tooska Dargahi, *Uni Roma, Italy*
Organizing Co-Chairs
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Jingqiang Lin, Institute of Information Engineering (IIE), China

Sahra Sedigh Sarvestani, Missouri University of Science and Technology, USA

Raheem Beyah, Georgia Institute of Technology, USA

Eyasu Getahun, Singapore University of Technology and Design

HASE 2019 Detailed Program

3 to 5 January 2019
Venue: Science Museum (Next to Hangzhou Shujiang Hotel), Hangzhou Dianzi University (Xiasha campus), Hangzhou
Regular paper: 20min (including QA)
Short paper: 15min (including QA)

2, January 2019 (Wednesday)		
Time	**Event**	**Venue**
1330-1730	Registration & Reception	Hangzhou Shujiang Hotel

3, January 2019 (Thursday)		
Time	**Event**	**Venue**
0900-1700	Registration & Reception	Science Museum
0930-1030	<u>Tutorial</u>: Research Methodology on Pursuing Impact-Driven Research – Part 1 Speaker: Prof. Tao Xie, *University of Illinois at Urbana-Champaign, USA*	Lecture Hall, 2nd floor of Science Museum
1030-1050	Coffee Break	
1050-1150	<u>Tutorial</u>: Research Methodology on Pursuing Impact-Driven Research – Part 2 Speaker: Prof. Tao Xie, *University of Illinois at Urbana-Champaign, USA*	
1200-1330	Lunch	Hangzhou Shujiang Hotel, 2nd floor
1330-1430	<u>Tutorial</u>: Research Methodology on Pursuing Impact-Driven Research – Part 3 Speaker: Prof. Tao Xie, *University of Illinois at Urbana-Champaign, USA*	Lecture Hall, 2nd floor of Science Museum
1430-1500	Coffee Break	
1500-1700	<u>Workshop</u> on Security issues in Cyber-Physical System(SecCPS) Chair: Congfeng Jiang, *Hangzhou Dianzi University, China* ➢ **Designing Safe and Secure Mixed Traffic Systems** Giedre Sabaliauskaite, Lin Shen Liew, Fengjun Zhou and Jin Cui	

	➤ **Modelica-Supported Attack Impact Evaluation in Cyber Physical Energy System** Kaikai Pan, Digvijay Gusain and Peter Palensky ➤ **Asymmetric key-based secure ECU replacement without PKI** Ryo Kurachi ➤ **Vulnerability Analysis of an Automotive Infotainment System's WIFI Capability** Edwin Franco Myloth Josephlal and Sridhar Adepu ➤ **Attack Defense Trees with Sequential Conjunction** Jeremy W. Bryans, Hoang Nga Nguyen and Siraj A. Shaikh	
1730-1930	Dinner	Hangzhou Shujiang Hotel, 2nd floor

4, January 2019 (Friday)		
Time	**Event**	**Venue**
0815-1700	Registration & Reception	Science Museum
0840-0900	<u>Welcome Address & Photo Taking</u> <u>Session Chair: Wanzeng Kong, Hangzhou Dianzi University, China</u> ➤ Welcome speech from local organizer，Prof. Qing Wu，Vice President of Hangzhou Dianzi University ➤ Welcome speech from HASE2019 general chair，Prof. Liguo Huang, Southern Methodist University ➤ Message from program committee, Prof. Dongjin Yu, Hangzhou Dianzi University ➤ Group photo taking	Lecture Hall, 2nd floor of Science Museum
0900-1000	<u>Keynote One</u>: On Landing Reinforcement Learning in Real-World Applications Speaker: Dr. Yang Yu, *Nanjing University, China* Chair: Haiyang Hu, *Hangzhou Dianzi University, China*	
1000-1020	Coffee Break	
1020-1210	<u>Session 1: Data Analytics for High Assurance Systems Engineering</u> <u>Session Chair: Mingyue Jiang, *Zhejiang Sci-Tech University*</u> ➤ **A Lightweight Framework for Regex Verification** Xiao Liu, Yufei Jiang and Dinghao Wu	

	➢ **Towards an Efficient Cyber-Physical System for First-mile Taxi Transit in Urban Complex** Junjie Wang, Peng Xu, Jinyang Li, Xiaoshan Sun, Wenchong Tian, Jie Ling, Wei Zheng and Hengchang Liu ➢ **Quantitative Validation of Formal Domain Models** Alexei Iliasov, Alexander Romanovsky and Linas Laibinis ➢ **Mining Accompanying Passing-Vehicles to Discover Suspected Gangs (Short)** Zhihao Wei, Jianyuan Li and Wanqing Li ➢ **Real-time anomaly detection method for space imager streaming data based on HTM algorithm (Short)** Lei Song, Haoran Liang and Taisheng Zheng ➢ **The Rotate Stress of Steam Turbine Prediction Method based on Stacking Ensemble Learning (Short)** Haoran Liang, Lei Song and Xuzhi Li	
1210-1330	Lunch	Hangzhou Shujiang Hotel, 2nd floor
1330-1520	<u>Session 2: Development and Understanding</u> <u>Session Chair: Elena Troubitsyna, KTH - Royal Institute of Technology</u> ➢ **Air-Ground System Wide Information Management to Achieve Safe Flight Operation** Xiaodong Lu, Kazuyuki Morioka, Tadashi Koga and Yasuto Sumiya ➢ **Parallel Verification of Software Architecture Design** Nacha Chondamrongkul, Jing Sun, Bingyang Wei and Ian Warren ➢ **Multi-Layered Safety Architecture of Autonomous Systems: Formalising Coordination Perspective** Inna Vistbakka, Elena Troubitsyna and Amin Majd ➢ **Isochronous Execution Models for High-Assurance Real-Time Systems** Bader Alahmad and Sathish Gopalakrishnan ➢ **Engineering Functional Safety Requirements for Automotive Systems: A Cyber-Physical-Social Approach**	Lecture Hall, 2nd floor of Science Museum

Time	Event	Venue
	Mohamad Gharib, Paolo Lollini, Andrea Ceccarelli and Andrea Bondavalli	
1520-1540	Coffee Break	
1540-1730	Session 3: Platforms, Architectures and Design Session Chair: Farokh B. Bastani, *The University of Texas at Dallas* ➤ **A Framework for Model-based Dependability Analysis of Cyber-Physical Systems** Morayo Adedjouma and Nataliya Yakymets ➤ **A refinement based method for developing distributed protocols** Paulius Stankaitis, Alexei Iliasov, Yamine Ait-Ameur, Tsutomu Kobayashi, Fuyuki Ishikawa, and Alexander Romanovsky ➤ **Identification of multi-core interference** Frédéric Boniol, Claire Pagetti and Nathanaël Sensfelder ➤ **Formalizing Cyber–Physical System Model Transformation via Abstract Interpretation** Natasha Jarus, Sahra Sedigh Sarvestani and Ali Hurson ➤ **Semantically Enhanced Time Series Databases in IoT-Edge-Cloud Infrastructure** Shuai Zhang, Wenxi Zeng, I-Ling Yen and Farokh B. Bastani	
1800-2000	Banquet	Xianghe Hall, Hangzhou Shujiang Hotel, 2nd floor

| 5, January 2019 (Saturday)		
Time	**Event**	**Venue**
0830-1700	Registration & Reception	Science Museum
0900-1000	Keynote Two: Intelligent Software Engineering: Synergy between AI and Software Engineering Speaker: Prof. Tao Xie, *University of Illinois at Urbana-Champaign, USA* Chair: Liguo Huang, *Southern Methodist University, USA*	Lecture Hall, 2nd floor of Science Museum
1000-1030	Coffee Break	
1030-1200	Session 4: System Operation and Behavior Session Chair: Liming Nie, *Zhejiang Sci-Tech*	

	University ➢ **Facilitating Failure Analysis with Software Instrumentation** Brad J. Ziegler, Sahra Sedigh Sarvestani and Ali R. Hurson ➢ **A Framework for Preprocessing Multivariate, Topology-Aware Time Series and Event Data in a Multi-System Environment** Andreas Schörgenhumer, Mario Kahlhofer, Peter Chalupar, Paul Grünbacher and Hanspeter Mössenböck ➢ **Timing Modeling and Analysis for AUTOSAR OS Schedule Tables** Rongkun Yan and Jian Guo ➢ **Interface Injection with AspectC++ in Embedded Systems** Ulrich Thomas Gabor, Christoph-Cordt von Egidy and Olaf Spinczyk	
1200-1330	Lunch	Hangzhou Shujiang Hotel, 2ⁿᵈ floor
1330-1450	Session 5: Security and Privacy Session Chair: Dongjing Wang, *Hangzhou Dianzi University* ➢ **Study of Trust at Device Level of the Internet of Things Architecture** Tunde Akeem Yekini, Fehmi Jaafar and Pavol Zavarsky ➢ **Private Blockchain Network for IoT Device Firmware Integrity Verification and Update** Samip Dhakal, Fehmi Jaafar and Pavol Zavarsky ➢ **MidSecThings: Assurance Solution for SecuritySmart Homes in IoT** Richardson Andrade and Nelson Rosa ➢ **Research on Cloud Performance Testing Model (Short)** XiuRu Li, HongHui Li, Huan Wang, Jie Zhang and ZhouXian Jiang	Lecture Hall, 2ⁿᵈ floor of Science Museum
1450-1510	Coffee Break	
1510-1710	Session 6: Emerging Systems of High Assurance Session Chair: Junjun Zheng, *Ritsumeikan University* ➢ **Modeling and Verifying Storm Using CSP** Hongyan Zhao, Huibiao Zhu, Yucheng Fang and Lili Xiao	

	➢ **Development of a Generic Model for Large-Scale Healthcare Organizations** Faisal Alkhaldi and Ali Alouani ➢ **Modeling and Verifying Spark on YARN Using Process Algebra** Jiaqi Yin, Huibiao Zhu, Yuan Fei and Yucheng Fang ➢ **Security Evaluation of a VM-Based Intrusion-Tolerant System with Pull-Type Patch Management** Junjun Zheng, Hiroyuki Okamura and Tadashi Dohi ➢ **Simulation on grounding fault location of distribution network based on regional parameters (Short)** Bo Zhang, Haoming Liu, Jia-Jia Song and Jinbo Zhang ➢ **RangeLocker: Adaptive Range-Sensitive Lockset Analysis for Precise Dynamic Race Detection** Yoshitaka Arahori	
1730-1930	Dinner	Hangzhou Shujiang Hotel, 2nd floor

Banquet

4, January 2019 (Friday), 1800-2000

Hangzhou Shujiang Hotel, Hangzhou
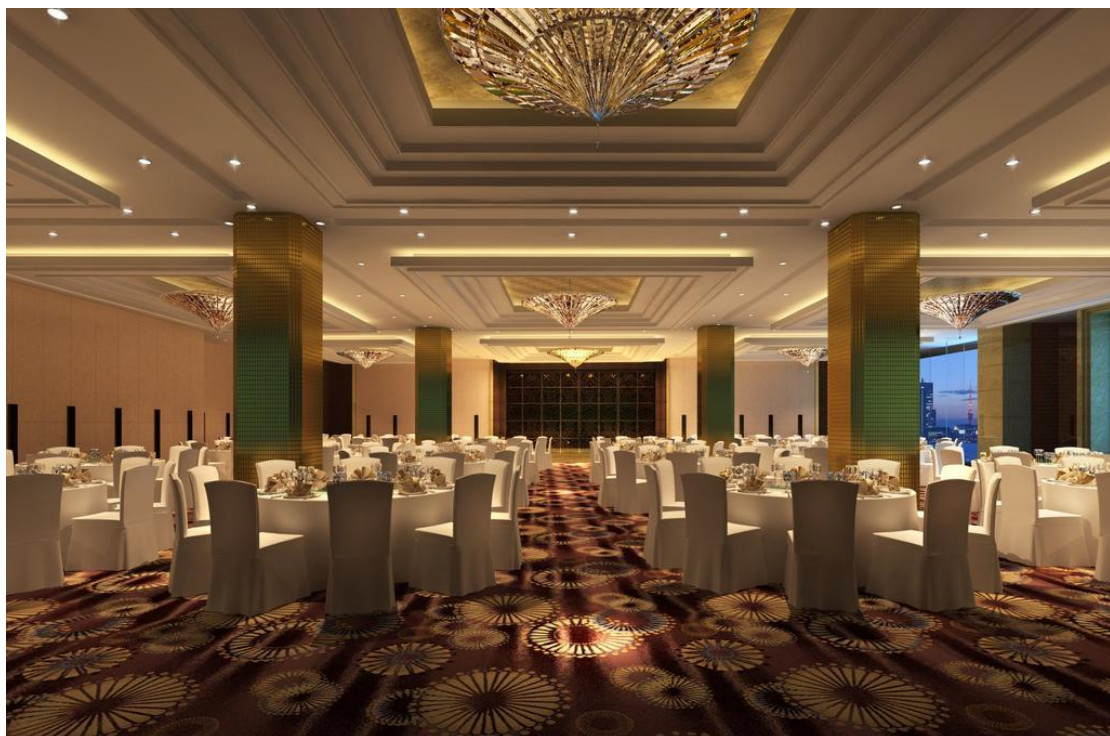
Transportation to Hangzhou

By Air

Xiaoshan International Airport (HGH) is the urban airport of Hangzhou. Domestic air lines are operated between Hangzhou and almost all major cities in China. Alternatively, the participants can transfer to the Hangzhou airport via Beijing or Hong Kong International airports. Possible flight routes are listed as below:

- Any Other Cities -> Hangzhou Xiaoshan International Airport (HGH)
- Any Other Cities -> Beijing Capital International Airport (PEK) -> Hangzhou Xiaoshan International Airport (HGH)
- Any Other Cities -> Hong Kong International Airport (HKG) -> Hangzhou Xiaoshan International Airport (HGH)

For your convenience, we display several international flight routes to Hangzhou:

- Direct Flight: San Francisco (USA) -> Hangzhou (or transfer via Hongkong / Beijing)
- Direct Flight: Los Angeles (USA) -> Hangzhou (or transfer via Hongkong / Beijing)
- Direct Flight: Tokyo (Japan) -> Hangzhou
- Direct Flight: Singapore -> Hangzhou
- Direct Flight: Seoul (South Korea) -> Hangzhou
- New York City (USA) -> San Francisco / Beijing / Guangzhou -> Hangzhou
- Vancouver (Canada) -> Beijing / Xiamen / Hongkong -> Hangzhou
- Paris (France) -> Hongkong / Beijing -> Hangzhou
- Amsterdam (Denmark) -> Hongkong / Beijing / Guangzhou -> Hangzhou
- Sydney (Australia) -> Hongkong / Beijing -> Hangzhou
- Melbourne (Australia) -> Guangzhou / Hongkong -> Hangzhou

By Train

The high-speed railway is the most efficient means of transportation between Hangzhou and Shanghai. It takes only 50 minutes from Shanghai Hongqiao Railway Station (which locates within the same transportation complex with Shanghai Hongqiao Airport) to Hangzhou East Railway Station, and the train departs for approximately every 15 minutes.

By Shuttle Bus / By Car

If landing on Shanghai Pudong Airport (PVG), the participants can also choose to take the shuttle bus or rent a vehicle at the airport. It takes about 3 hours from PVG airport to the central part of Hangzhou urban area by bus or car.

HASE 2019 Program Venue

Venue: Science Museum (Next to Hangzhou Shujiang Hotel)

Transportation to Venue

Transportations

1. Hangzhou Xiaoshan International Airport → Science Museum in Hangzhou Dianzi University

By Airport bus (★Recommended)

Route: Airport bus Xiasha Line

Get on the Airport bus in Airport → Get off the Airport bus in Grand New Century Hotel → Walk 1km north along Wenze Road to Science Museum in Hangzhou Dianzi University

Fare: 20 RMB

By Taxi

Route: Drive along airport expressway & Shanghai Kunming expressway & No. 21 Street & No. 6 Street.

Distance: About 21.4 km **Time**: About 40 minutes **Fare**: About 120 RMB

2. Hangzhou Railway Station (Chengzhan Railway Station) → Science Museum in Hangzhou Dianzi University

By Metro (★Recommended)

Metro Entrance Location:

When you arrive at Hangzhou Railway Station, go straight from the exit to the ground floor, then you will see the subway station entrance.

Route: Metro Line 1

Get on the Metro Line 1 (Xianghu → Xiasha Jiangbin) in Chengzhan Station → Get off the Subway in Wenze Road → Walk 500m to Science Museum in Hangzhou Dianzi University (Please note that Metro Line 1 has two directions: one is bound for Xiasha Jiangbin direction and the other one is bound for Linping direction. You need to take the Xiasha Jiangbin direction).

Fare: 6 RMB

By Taxi

Route: Drive along Viaduct of Zhonghe & Viaduct of Shang Tong & Desheng Expressway.

Distance: About 27 km **Time**: About 45 minutes **Fare**: About 150 RMB

3. Hangzhou East Railway Station → Science Museum in Hangzhou Dianzi University

By Metro (★Recommended)

Metro Entrance Location:

Go out the Exit on the ground floor of the terminal, take the staircase and get to the second floor of the underground, then you can see the Metro Entrance.

Route:
Metro Line 1 Get on the Metro Line 1 (Xiasha Jiangbin direction) in East Railway Station → Get off the Metro in Wenze Road → Walk 500m to Science Museum in Hangzhou Dianzi University
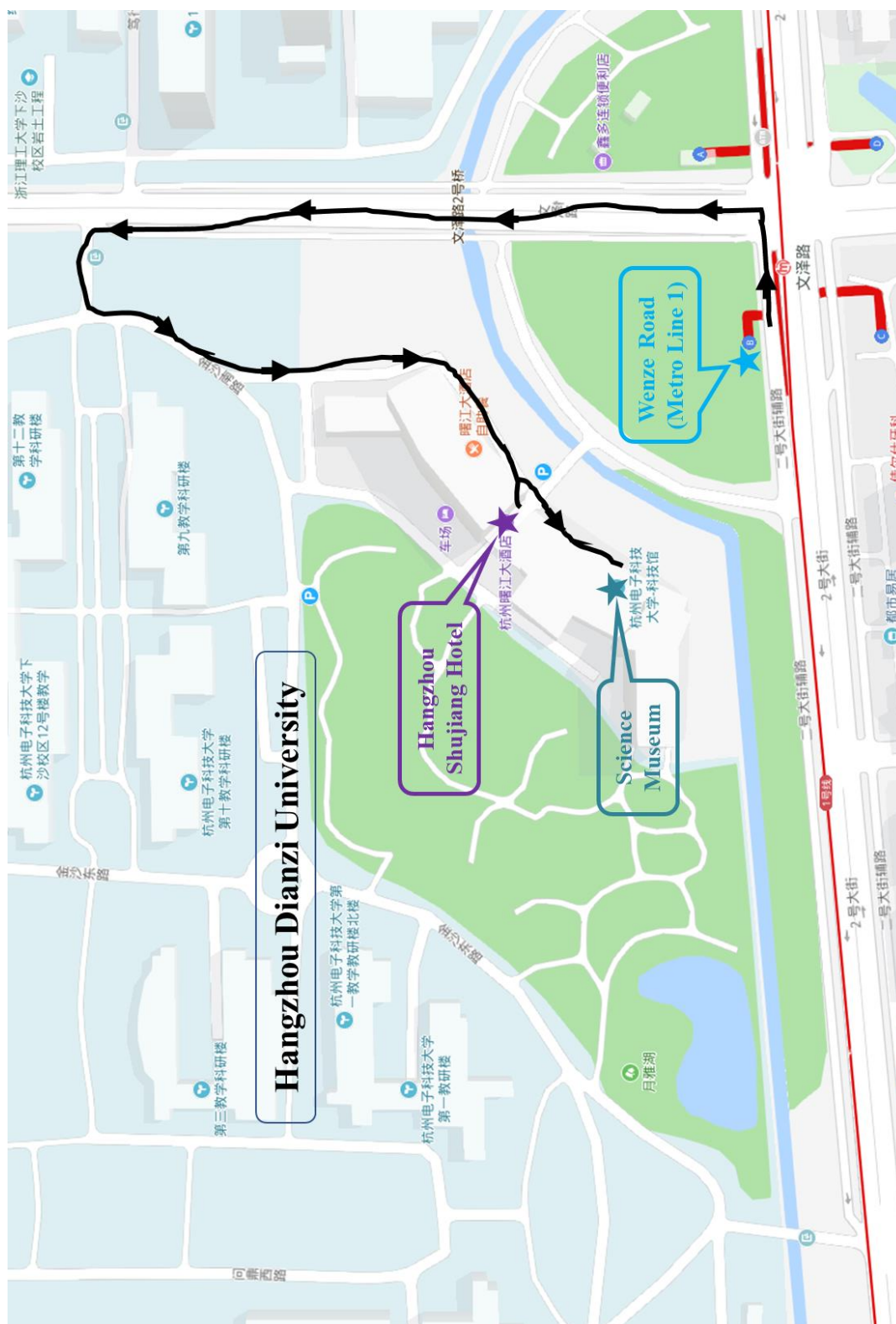
Fare: 5 RMB

By Taxi

Route: Drive along Tiancheng Road & Ring Station East Road & Desheng Expressway & Wenze Road.
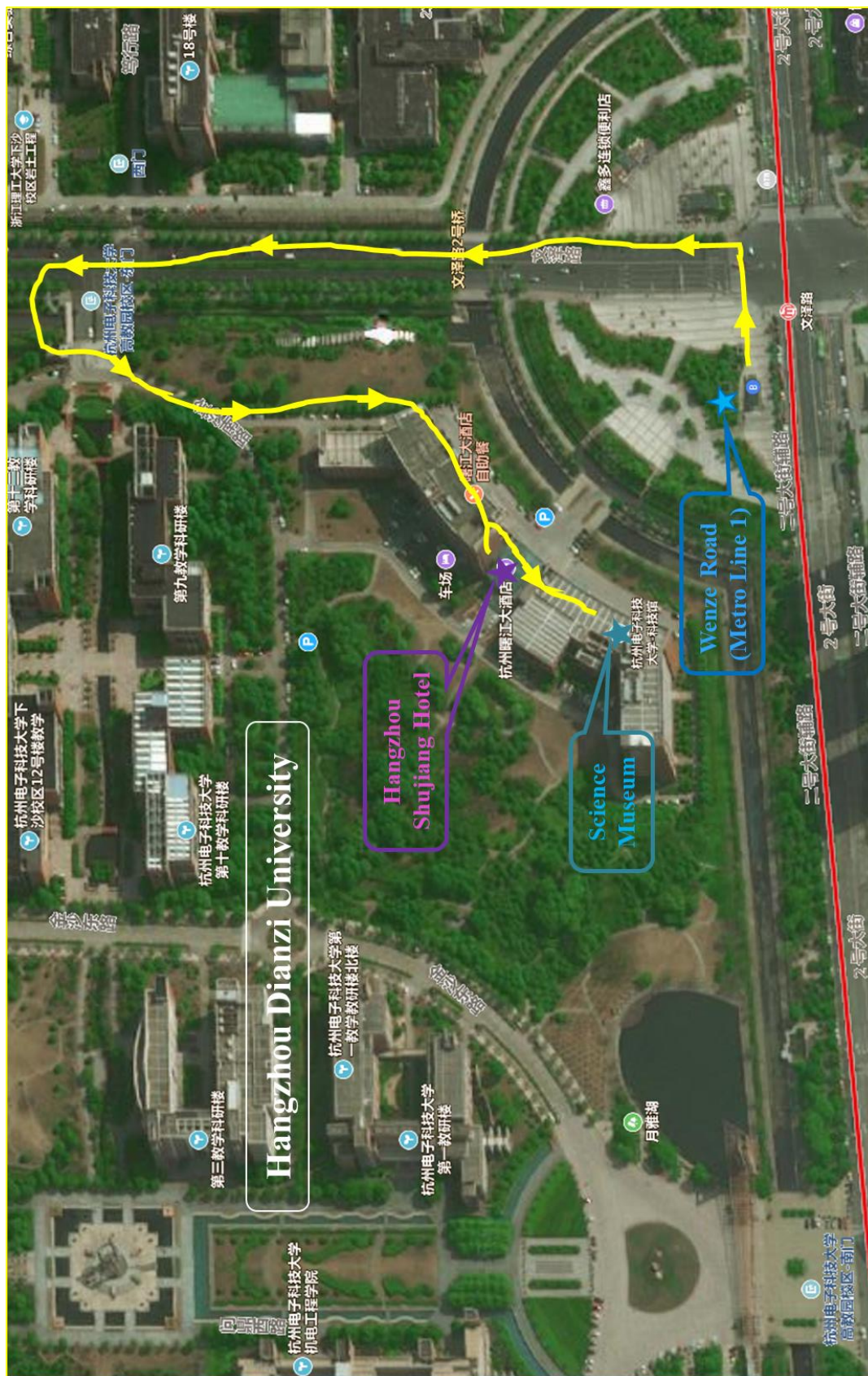
**Distance:** About 17km **Time:** About 30 minutes **Fare:** About 80 RMB.

Note: Take the Metro Line 1 (Xiasha Jiangbin direction)

Note: If you take the subway to get off at Wenze Road station (**Exit B**), please go to the Science Museum in Hangzhou Dianzi University according to the route shown above (**black line**).
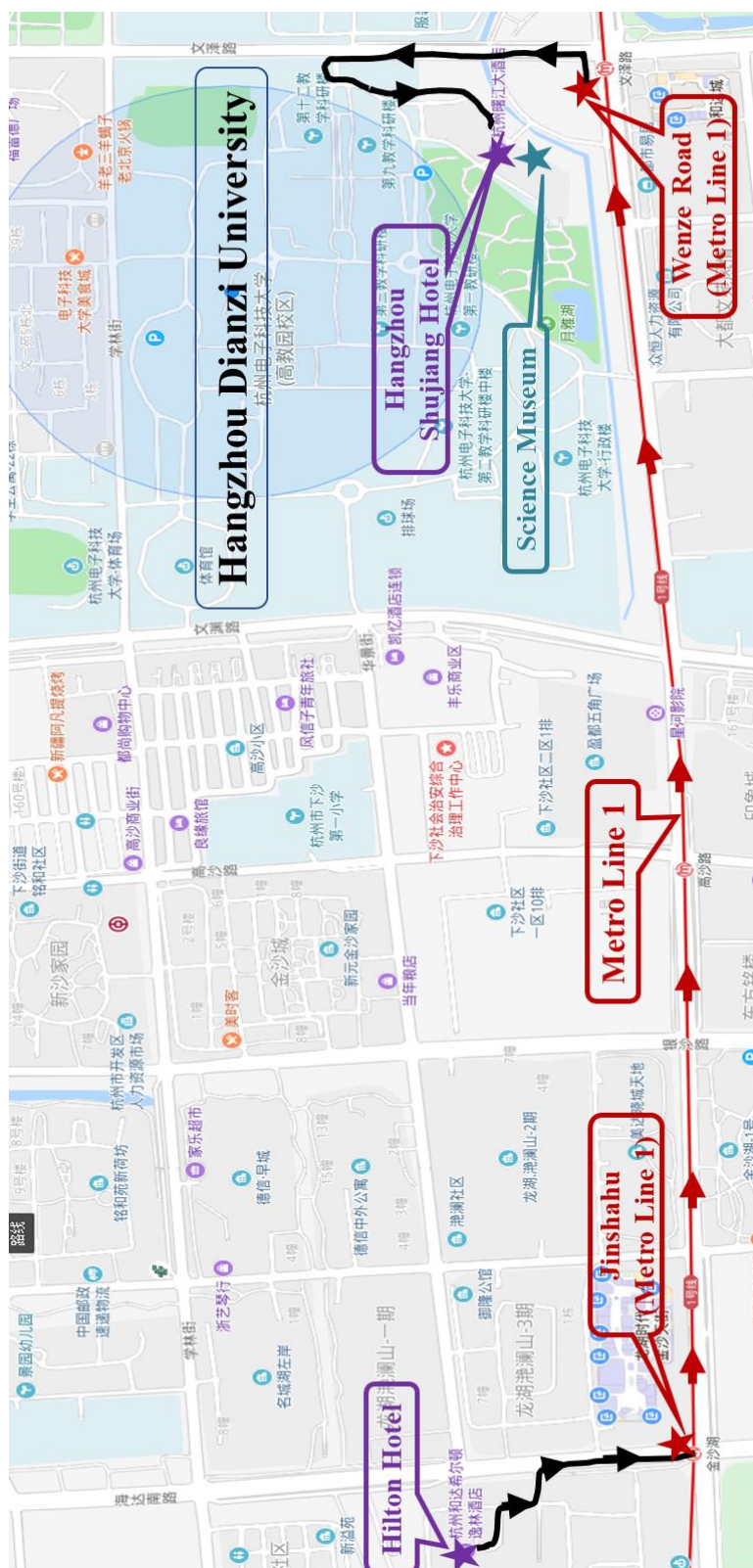
Note: If you take the subway to get off at **Wenze Road station** (**Exit B**), please go to the Science Museum in Hangzhou Dianzi University according to the route shown above (<mark>yellow line</mark>).
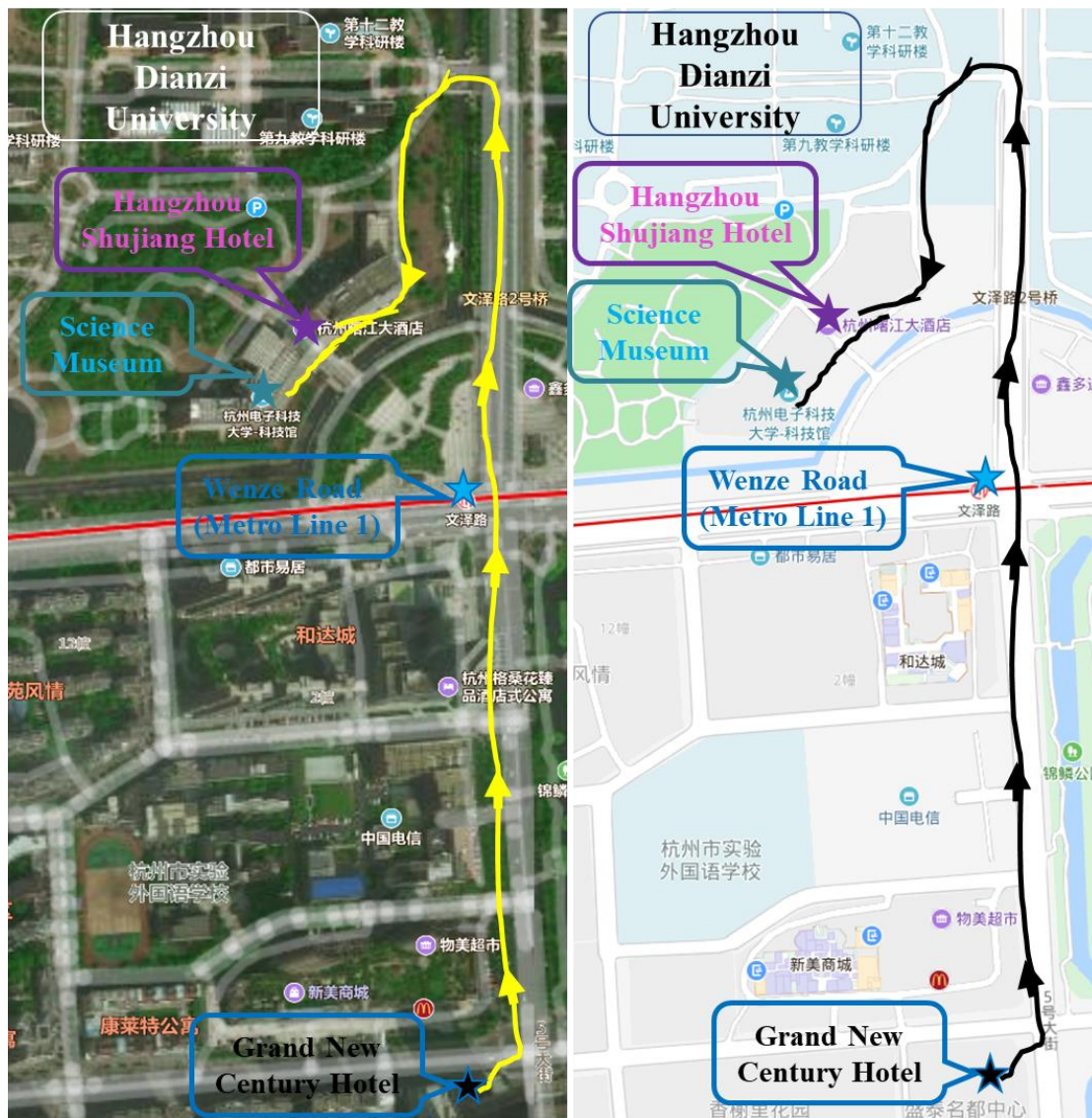
Note: If you take the airport bus to get off at the **Grand New Century Hotel**, Hangzhou, please go to the Science Museum in Hangzhou Dianzi University according to the route shown above.

Hilton hotel → Hangzhou Shujiang Hotel/Science Museum by Metro
Route: Walk 5 min to Jinshahu (Metro Line 1) → Get on Metro Line 1 (Xiasha Jiangbin direction) → Get off the Subway in Wenze Road (**Exit B**) → Walk to Hangzhou Shujiang Hotel/Science Museum according to the route shown above.

Phrasebook

Could you please take me to Hangzhou Shujiang Hotel (Conference Hotel)?
请载我到杭州曙江大酒店（杭州江干区下沙经济技术开发区 2 号大街 1 号）

Could you please take me to Hangzhou Grand New Century Hotel?
请载我到杭州盛泰开元名都大酒店（杭州江干区下沙经济开发区 5 号大街 297 号）

Could you please take me to DoubleTree by Hilton Hotel Hangzhou East?
请载我到杭州和达希尔顿逸林酒店（杭州，江干区，金沙大道 600 号）

Can I pay it using credit card?
我能使用国际信用卡支付吗？

Can I have the receipt?
请给我发票

Could you tell me where am I now?
请告诉我，我现在在哪里（靠近什么路和什么路交叉口）？

Any help for police, please call 110

Attractions

Landmarks

- Lingyin Temple

Lingyin Temple is in a long, narrow valley between Fei Lai Feng and North Peak to the northwest of West Lake. The temple is without doubt a premier showpiece in the West Lake environs and is notable as one of the 10 most famous Buddhist temples of China.

- Six Harmonies Pagoda

Six Harmonies Pagoda is located at the foot of Yuelun Shan (Yuelun Hill) overlooking the Qiantang River. The pagoda was reputedly built as a navigational aid and as a way of calming the waters of the Qiantang River. The shape was modified during the Ming and Qing Dynasties.

- He Fang Street

Located in Wushan Square, He Fang Street is an old, well-designed pedestrian street that is the epitome of ancient Hangzhou. Shops selling arts and crafts, souvenirs, and silk; tea houses; and restaurants line both sides of the street.

- Hu Qing Yu Tang

Located at the foot of Wushan Hill is an ancient and magnificent architectural complex—the Hu Qing Yu Tang drugstore. The whole drugstore, featuring the garden-inspired architecture of southern China, was designed and finally completed in 1874 by Hu Xueyan.

Museums

- China National Tea Museum

The China National Tea Museum focuses on tea and its culture, and is clustered around the tea plantations. Inside the museum, the flower corridors, fake hills, ponds, and waterside pavilions are well integrated, creating a clean atmosphere where visitors can feel close to nature.

- China National Silk Museum

The China National Silk Museum is the first state-level professional silk museum in China, as well as the largest silk museum in the world. People can also choose their favorite silk goods from the museum shop and relax in the tea house.

- Zhejiang Art Museum

The Zhejiang Art Museum is set in a geomantic, treasured site, with West Lake

in front and Mt. Jade Emperor (Mt. Yuhuang) to the rear. Designed by one of China's master architects, Mr. Cheng Taining, the museum has the style of a local ethnic building with sloping ceilings in black and white.

Shows and Performances

- Impression West Lake

Performances of "Impression West Lake," a unique metropolitan outdoor show on the most natural stage in the world, are set on the wavy, mellow, and ever-changing West Lake, ensuring that the performance appears vivid and natural.

- The Romance of the Song Dynasty

"The Romance of the Song Dynasty" is based on the historic stories and legends of the city of Hangzhou and is one of the "World's Top Three Famous Shows."

Scenes of West Lake

Each view in West Lake has its own feature, when combining together, they also can be on behalf of the essence of the beauty of ancient West Lake. Ten Views of the West Lake were formed in the Southern Song Dynasty, and basically are distributed around the West Lake, some are located on the lake, they are:

- Autumn Moon over the Peaceful Lake - Chinese: 平湖秋月

Autumn Moon over the Calm Lake is one of the top ten views of the West Lake in Hangzhou. It is located in the western end of Baiti Causeway, near to the Isolated Hill. It is closed to the outer West Lake. At the edge of the lake, overlooking the Moon on high site can make you acquire the sense of quiet in the West Lake, washing irritable mood. It covers an area of over 6000 square meters.

Why Autumn Moon over the Calm Lake is famous

There is a scientific reason for why Autumn Moon over the Calm Lake is famous. Hangzhou is located in the subtropical area. According to the earth and the sun operating laws, four seasons in this city is distinct clearly; according to the relation of the earth and the moon, chord circle hook does have a pattern. in autumn, the moon from is closer to the northern hemisphere in earth. Because of Hangzhou's geographical location, the angle between the moon and the earth does not exceed 60 degrees. What's more, the weather is mainly sunny in autumn evening in Hangzhou and the temperature is about 20 degrees Celsius. The relative humidity is 80%, wind speed three meters to four meters per second. There are little particulates in the air. The pleasant climate at this time makes the moon seem to be particularly large, bright and especially round.

- Evening Bell at Nanping Hill - Chinese: 南屏晚钟

Located on the south side of West Lake, Evening Bell at Nanping Hill is one of top ten views of the west lake with the longest history. It is a mixture of cultural and natural views. It refers to the evening bells in Jingci Temple at Nanping Hill in Hangzhou. Due to the caves at Nanping Hill, when the sun is down and the bell rings, the sound of the bell will echoes in the valley for a long time. This is why this place is so famous. In recent years, when the New Year comes, foreign guests, overseas Chinese and native residents in Hangzhou gather at the bell towel in Jingci Temple to strike the huge bell for New Year blessings.

The Scene of Evening Bell Ringing at the Nanping Hill is mainly consisted of two parts: Nanping Hill Scenic Area and Jingci Temple. The two portions are specially and vividly characterized of its beautiful of natural scene and religion culture.

- Curved Yard and Lotus Pool in Summer - Chinese: 曲院风荷

Located in the west side of West Lake, Curved Yard and Lotus Pool in Summer (Qufeng Heyuan) is famous for the beautiful scenery in summer. It ranks second among top ten views of the West Lake in Hangzhou. The total area of this place is 126,500 square meters, including a construction area of 2.68 billion square meters. This place mainly includes two parts: the lotus lake and the crooked courtyard. The crooked courtyard is located in site where Jinsha Stream (largest natural water source in West Lake) flows into West Lake, near to the Hongchun Bridge in Hongyin Road. It used to be a wine shop in South Song Dynasty. Near the banks of West Lake grows lotus. When summer comes, the flavor of the lotus and the perfume of the wine together can be smelled everywhere.

- Melting Snow at Broken Bridge- Chinese: 断桥残雪

It is famous for the looming view of the bridge seen from the distance when there is winter snow. The broken bridge is located in the eastern end of Baidi in the West Lake in Hangzhou, backed Baoshi Mountain, facing the city of Hangzhou. It is the watershed point of outer West Lake and and inner West Lake.

With a high location and broader vision, Melting Snow at Broken Bridge is the best place to appreciate the snow scenery in winter. When it snows, standing on the hill south and overlooking southwards, the West Lake is Clad in silvery white. The stone arch bridge without shelter reveals it mottled face when ice and snow melt in the sun. However, both ends of the bridge are still under snow cover. The bridge is vaguely seen and snow in the culverts is light, which is contrasted to the gray bridge. that seems to break the non-breaking, it is so called broken bridge.

- Orioles Singing in the Willows - Chinese: 柳浪闻莺

Orioles Singing in the Willows ranks fifth among the top ten views of the West

Lake. It is located in the eastern side of West Lake in Hangzhou Covering an area of over 20 square meters, it is near the city by the lake, being a large integrated garden with ornamental and entertainment functions. The attraction, Orioles Singing in the willows, is divided into Friendship, Wen Ying, Ju Jing, South Park four parts. The willows grow together with purple nanmu, cedar, magnolia, plum and other different trees and flowers. In Southern Song Dynasty, it is the largest imperial garden, called Ju Jing Garden. At that time there was a Huifang Hall and three houses and nine pavilions, and Liu Lang Bridge and Bachelor Bridge. It was named Orioles Singing in the Willows for oriole flying and crowing in the willows. When the spring comes, thousands of willows waving in the breeze like a waves in the sea; in shade depths, from time to time come the sound of orioles.

- Spring Dawn at Su Causeway - Chinese: 苏提春晓

Spring Dawn at Su Causeway ranks first among ten views of the West Lake in Hangzhou. It is a north-south tree-lined embankment running through the West Lake scenic area. The embankment is south to the foothills of Nanping Mount and north to the Xixia Ridge. The embankment is 300 kilometers long and 36 meters wide. It is built by Su Dongpo, who is a writer and calligrapher in Northern Song Dynasty. In 1089, Su used the mud of the West Lake to build the embankment when he was dredging the lake. There are six stone arch bridges along the embankment, from south to north are the Central Wave Bridge (Yangbo Bridge), Suo Lan Bridge, Wang Shan Bridge, Ya Ti bridge, Dongpu Bridge, Kua Hong Bridge. Su Causeway is named in honor of Su Dongpo, also known as Su Gong Causeway. In the south end of the causeway lies a Su Dongpo Memorial, which shows the life of Su Dongpo and his poems.

Su Causeway provides visitors with changing touring lines which can take a leisure stroll with impressing view. Walking in the embankment or bridge, scenic view expands like a picture with kinds of style and fancy taste.

- Viewing Fish at Flower Harbor - Chinese: 花港观鱼

Located in the southwest of the West Lake, Viewing Fish at Flower Harbor features flowers, harbor and fishes. There are thousands of red carps in the fishpond here. And feeding red carp is a pleasure for native residents. Flower Harbor covers an area of twenty hectares and the whole garden is divided into five parts: red carps pond, peony garden, flower harbor, large lawn and jungle. Red carp pond is located in south central park it is the center of the tour area in the whole garden. The shore of the pond is naturally tortuous. There are small

bridges above the water for visitors to have close look at the red carps. When the visitors stand on the bridge, thousands of red carp will swim towards to the visitors, gaming and dancing. Peony garden is in the center of Viewing Fish at Flower Harbor. Here grows a large number of peonies, which make it a traditional public leisure venue in Hangzhou.

- Leifeng Pagoda in the Sunset - Chinese: 雷峰夕照

This scene is known for the sunset glowing shining on Leifeng Pagoda, which looks like Buddha's light shining.

- Two Peaks Piercing the Clouds - Chinese: 双峰插云

The two peaks are South High Peak and North High Peak. This scene is to describe the beautiful landscape reaching high into the air in a far.

Shopping

- Wushan Night Market

The Wushan Night Market is located on Wushan Road, starting at the junction of Huixin and Renhe Roads. The market offers a variety of items and gifts for young and old. Since the late 1990s, it has gradually become known for selling all kinds of major commodities.

- Hangzhou Tower

Located in the commercial core block, Wulin Square includes shopping, dining, entertainment, and convention and exhibition facilities. In addition to the world-class luxury brands, Hangzhou Tower also features a financial centre, fine dining, and other sophisticated lifestyle attractions.

- Hangzhou MIXC

Hangzhou MIXC is a large-scale mixed-use development located in the city's central business district and represents a sophisticated lifestyle. With multiple functions, including retail, leisure, food and beverage, entertainment, and office facilities, it has brought together a number of international luxury brands, as well as the first IMAX theatre in Hangzhou.

- Hangzhou Intime

This group of merchandise stores includes three Intime in Hangzhou stores, namely Wu Lin Intime, West Lake Intime, and Qing Chun Intime, which feature department stores and leisure and food facilities in one comprehensive retail complex.

雷峰夕照

Introduction to Hangzhou Dianzi University

Located in the historical and cultural city of Hangzhou, China, Hangzhou Dianzi University is an institution of higher learning that offers multiple disciplines, including engineering, science, economics, management, literature, law and education. While highlighting electronics and information science, the university is also fairly strong in the disciplines of business management. The predecessor of the university is Hangzhou Aviation Finance and Economics School which was founded in 1956. In 1980, ratified by the State Council, Hangzhou Institute of Electronic Engineering was set up, which was later renamed Hangzhou Dianzi University in 2004. Throughout decades the university was successively affiliated to the No.4 Ministry of Mechanical Industry, the Ministry of Electronics Industry and later the Ministry of Information Industry. The university has been under ministerial and provincial joint leadership with the Provincial Government playing the major role in management since 2000. So far, HDU has developed into a teaching and research-oriented university with the great support from authorities of Zhejiang Province for further development. It consists of four campuses, Xiasha Campus, Wenyi Campus, Dongyue Campus, and Xiasha East Campus which cover more than 2,000 mu in size, with a building area of 670,000 square meters. The university has a current enrollment of more than 26,000 full-time undergraduates and postgraduates and a staff of 2,200.

Since its foundation, the talent fostering system continues to improve and the university has come to offer programs at a variety of levels, such as undergraduate, graduate and continuing education and vocational education. The university is also entitled to enroll overseas students as well as students from Hong Kong, Macao and Taiwan. The university is composed of several schools, including School of Mechanical Engineering, School of Automation, School of Finance & Economics, School of Management, School of Computer Science, School of Software, School of Electronics & Information, School of Communication Engineering, School of Sciences, School of Foreign Languages, School of Humanities & Arts, School of Publishing and Press Industry, School of Continuing Education, The National Demonstrative Vocational School of Software Technology, and School of Information Engineering (Independent School) which is affiliated to the university. The university has 45 undergraduate specialties, which fall into 7 major disciplines, namely, engineering, management, economics, science, literature, law and education. Six specialties like Electronics and Information Engineering are designated as state priority management. In 2003, with approval from the Ministry of Education, the university launched its doctoral program and set up one post-doctoral research station and one joint-doctoral station with Zhejiang University, also HDU has 2 Joint Doctoral Programs with Dublin City University, Ireland and Queen's University, Belfast, UK; 3 disciplines are qualified to Doctor's (Ph.D) Degrees, another 6 specialties like Software Engineering are key disciplines of Zhejiang Province. Furthermore, 6 primary disciplines and 31 secondary disciplines are qualified to confer Master's Degrees. Meanwhile, the university is also authorized to grant Master's Degrees to on-the-job candidates and confer Master of Engineering (ME) in 9 academic fields. Moreover, there are 2 key-in-key provincial disciplines, 7 provincial key disciplines, 7 ministerial key disciplines in the university.

The university takes the lead among its peers in terms of teaching and research facilities. 7 provincial and ministerial key laboratories are available for researches in following subjects: Large-Scale Integration Circuit Design, System Integration Circuit Design, E-Business and Computer-Based Accounting, Special Materials Processing, Computer Science and Technology, Signal and Information Processing and Electronic Materials and Instruments. The university also boasts a ministerial educational project research center of Instrument Detection and Automatic System Integration Technology, a provincial and ministerial laboratory for Radio-Frequency Circuit and System, 2 national experiment teaching demonstration centers for Electronics Engineering and Computer Science, and 3 Provincial experiment teaching demonstration centers, 2 provincial public platforms for technological innovation in fields of Integrated Circuit Design and Software, a well-equipped project center to cultivate talents for advanced network-based manufacturing technology. The machines and equipments for teaching and research total nearly 200 million RMB yuan; the total library collection amounts to 1.67million items. The good conditions of teaching and research have laid solid foundations for the continual improvement in education quality of the university.

In the course of its long-time running, the university keeps adhering to the right educational orientations. A balanced development is pursued by coordinating such factors as quality, scale, structure and efficiency. Quality talents are cultivated with creative spirits and practical skills in a comprehensive way for all round development of morality, intelligence and physical strength. A host of graduates have become prominent leaders in domestic and international IT industries and high-level managers in business administration. The university's premium educational quality is rewarded by extensive support and acclamation

the society. Moreover, students from HDU are awarded in a row in domestic and international discipline competitions such as "Challenge Cup", "Mathematical Modeling" and "Electronics Design", exhibiting a good command of fundamental theories, practical skills, creation and overall quality. With these solid theories and skills in practice, graduates from the university are highly acclaimed and well received by employers and various sectors of society. The university is also one of top universities in terms of first-time employment rate and first-time admission rate to master programs.

The university attaches great importance to the discipline development and academic researches. It has an outstanding research faculty comprising leading experts with outstanding achievements and profound knowledge, and young and middle-aged professors and doctorate holders. The university has completed a host of high-tech research projects and Province or Ministry sponsored research projects under the national 6th, 7th, 8th, 9th, 10th Five-Year Plans, under the military science funding and Program 973 and 863. Many of these projects were awarded the national first and second prize for science and technology progress Prize, the third prize for National Invention, and the second prize for National Pedagogical Achievement. The annual research funding has amounted to 100 million RMB yuan. At present, the university has established solid relationship for technological cooperation with hundreds of enterprises and companies, with the overall performance in technological researches atop among its national peers and province-owned universities and colleges. The university becomes an important base in Zhejiang Province for cultivating top-grade talents and turning scientific research achievements into

productivity. HDU has obtained fruitful financial and social returns, which in turn has effectively supported the academic development and talent fostering.

The university has extensive international academic exchange and cooperation with foreign prestigious universities, multinational enterprises and research institutes in many countries, such as America, Canada, Britain, Ireland, Germany, Spain, Denmark, Finland, Sweden, Belarus, Japan, Australia and New Zealand, etc. Foreign professors and experts are invited to assume teachings and research in the university. Teachers are selected for further study in foreign countries and international academic exchanges every year. Collaborations are carried out for intensive academic researches and talent fostering. Some excellent students are annually selected to study and exchange in America, UK, Canada, Germany, Ireland, Sweden, Denmark, Spain and Japan.etc. The university is gradually characterized by globalization.

So far, the university has come to its prime phase of development. All teachers and students will conserve good academic traditions of the university and forge ahead under the guidance of the university's spirit for the establishment of a domestically renowned university with its distinctive features in teaching and research orientation.

Introduction to School of Computer Science and Technology, Hangzhou Dianzi University

The School of Computer Science and Technology was developed from the Department of Electronic Engineering and Computer, which was established in August 1980. The first group of undergraduate students were enrolled the same year, majoring in Electronic Computer, while the postgraduate program of Computer Application Technology was started in 1981. In May 1984, the department was renamed as the Department of Electronics and Computer Science, which was renamed again as the Department of Computer Science two years later. In December 1994, it was changed to the Department of Computer Science and Technology. In June 1995, the university determined to establish the School of Information Engineering, which was combined with the Department of Computer Science and Technology, the Department of Electronic Engineering and the Department of Information Communication. In July 2000, the School of Computer Science and Technology was established based on Department of Computer Science and Technology.

The school has a well-structured faculty team with high academic standard and research capabilities. There are more than 180 faculty members currently, 144 of whom are full-time academic members, including 22 Ph.D. advisers, 32 Professors, 52 Associate Professors; 117 have PhD degree and other 22 have Master degree. There are many faculty members having distinguished titles and

awards, including an Academician of the Chinese Academy of Engineering, two with the "Thousand People Plan" run by the Central Organization Department, two with the "New Century Excellent Talents Scheme" run by the Ministry of Education, one with "Excellent Young Scientists Fund" run by National Natural Science Foundation of China, three with "Qianjiang Senior Talent" (Distinguished Professors), three with the "Thousand People Plan" of Zhejiang Province, one with the "Middle and Young Aged Experts with Outstanding Contributions" of Zhejiang Province, four with key or first level "151 Talents Project" of Zhejiang Province, seven Middle and Young Academic Leaders of Zhejiang Province, one Famous Teacher of Zhejiang Province, and one Outstanding Educator of Zhejiang Province. There are also a national-level teaching teams and three provincial key technical innovation teams of our discipline. There are more than 2400 undergraduates and over 400 postgraduates including PhD candidates in the school.

The school owns a National Computer Experimental Teaching Demonstration Center and a National Software Engineering Experimental Teaching Demonstration Center, which has been an experiment capability and engineering innovation capability training center with solid discipline foundation, advanced experiment education system, and first-class environment.

The school also owns distinguish education, research and innovation platforms such as National-level International Science and Technology Cooperation Base (National International Joint Research Center) called "The International Joint Research Center Of Brain Technology And Collaborative Intelligence", the Key Laboratory of "Complex System Modeling and Simulation" awarded by Education Ministry, Zhejiang Provincial "Human-Machine Interface and Internet of Things Technology" international collaboration base, Computer Application Technology Key Laboratory of Ministry of Information Industry, the Key Laboratory of Embedded Technology Associates of Zhejiang Province, Zhejiang Provincial Network Media Cloud Processing and Analyze Engineering Technology Research Center, Zhejiang Provincial Software Industrial Technology Innovation Service Platform, Data Storage Transmission and Application Technology Research Key Laboratory. The school also constructs joint laboratories or research centers with famous international research institutes such as German Fraunhofer, Google, Savaje, etc.

The discipline of computer started from the undergraduate program of Electronic Computer, which was one of the earliest 74 undergraduate programs of computer all around the nation. In December 2017, the results of the National Fourth Round of Subject Evaluation showed that our Discipline of Computer Science and Technology was ranked B+ (top 10% - 20%), which won the place among Zhejiang Province managed universities and colleges. In 2017, the latest ranking of the disciplines from Research Center for China Science Evaluation showed that our discipline was ranked 24, which was top 10% national wide.

After 38 years of construction, the discipline of Computer Science and Technology is always guided by the major strategic requirements of the state and the reality of Zhejiang's economic construction, actively carries out theoretical research and application work on the areas of brain science, intelligent manufacturing and industrial internet, media computer and artificial intelligence, cloud computing and big data, military software, software engineering theory and mechanism, and software architecture, and forms research groups on cooperative intelligent technology of brain machine, industrial internet, media intelligence, cloud computing and software and intelligence engineering.

Sponsors & Supporters