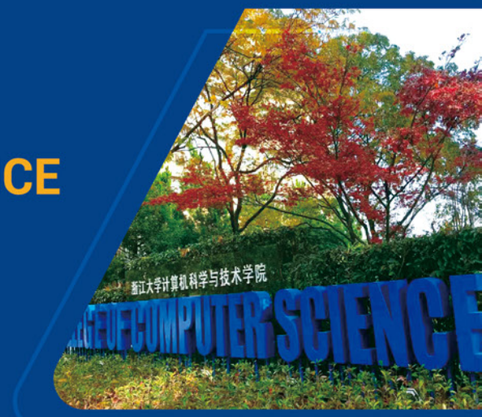
浙江大學
ZHEJIANG UNIVERSITY

COLLEGE OF COMPUTER SCIENCE AND TECHNOLOGY
ZHEJIANG UNIVERSITY



Humanism,
Harmony,
Change.

COLLEGE OF COMPUTER SCIENCE AND TECHNOLOGY
38 ZHEDA ROAD, HANGZHOU, P.R. CHINA, 310027

WWW.EN.CS.ZJU.EDU.CN

學而創新
與時俱進
潘雲鶴

Learning with innovation
Advancing with the times
——Pan Yunhe

CONTENTS

WELCOME TO ZJU CCST

Chen Gang
Dean

The College of Computer Science and Technology (CCST), Zhejiang University (ZJU), neighbors West Lake and Laohe Mountain. Since its inception in 1978, it has become a harbor where groups of young students start their dream and a place where generations of scholars endeavor. Nowadays, the school has gone through journey of 40 years.

The school is committed to cultivating top-notch, multidisciplinary talents in scientific research and engineering, and fostering leading figures with cross-disciplinary innovation capabilities and global perspective.

As computer science is one of the most important engines for societal growth today, our school endeavors to create a dynamic environment for educating the future leaders and addressing global challenges. The latest ESI statistics show that the school is ranked top 24th worldwide, with two disciplines proudly selected into China's 'Double First-Class' initiative.

During forty years of journey, the College of Computer Science and Technology is devoted to pursuing innovation and constantly forges ahead, all while remaining faithful to its initial vision. Nowadays, it stands at the new beginning of the 'double first-class' development, and will once again set off and continue its unceasing strive for excellence.

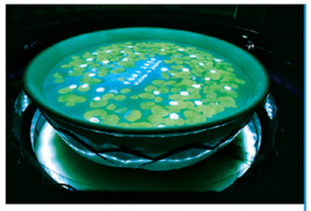
A HISTORY OF SEEKING EXCELLENCE

1960s

ZJU researchers invented the first vacuum tubes computer ZD-I.

1970s

The Department of Computer Science was established under the advocacy of Professor He Zhijun.



1980s

The *Artistic Picture Design Expert System* by Professor Pan Yunhe was exhibited in the World Technology Exposition in Japan.

1990s

The **State Key Lab of Computer-Aided Design & Computer Graphics** of CCST was rated as top 10 most influential key labs in China by Science magazine.

2000s

The Department of Computer Science was promoted to the College of Computer Science and Technology (CCST).

2010s

CCST makes a leap in international and national ranking, with Computer Science and Technology and Software Engineering disciplines selected into China's 'Double First-class' Initiative.

CCST IN A NUTSHELL

3

CAE / CAS Academicians

3

Turing Laureates engaged as honorary professors

TOP 11th

Ranked the 11th Best Global Universities for Computer Science

US NEWS & WORLD REPORT, 2020

2

MOE Double First-class Disciplines

11

National Top-tier Experts

10

National Awards of Teaching Excellence

¥ 380 MILLION

Research Funding (2020)

2

National Key Lab/ National Engineering Technology Research Center

8

National Awards of Research Achievement

A LEADER RISES TO THE CHALLENGE

The excellent research platform and unique teaching programs of CCST have enabled the college to train thousands of high-level undergraduates, masters and doctors in computer science in the past 40 years, fostering talents qualified for scientific research, entrepreneurship and industry. Among our graduates in academia, there are three academicians of the Chinese Academy of Engineering, including Pan Yunhe, Chen Zuoning and Chen Chun, as well as one academician of the Chinese Academy of Sciences, Wu Zhaohui.

The college has also trained a number of innovative entrepreneurial figures in the industry, such as Shi Lie, the chairman of Insigma, and Huang Zheng, the founder of Pinduoduo. These enterprises have become the main driving force in China's information industry.

EDUCATION

Curricula:
Theories of Computer Science
Computer Architecture
Computer Software Technology
Information Security

Turing Class
- Honor class designed for cultivating top-notch talents
- Comprehensive research training and theorical knowledge
- Mentorships from distinguished scholars, including Turing laureate and CAE/CAS academicians
- Fully-funded access to study-abroad programs

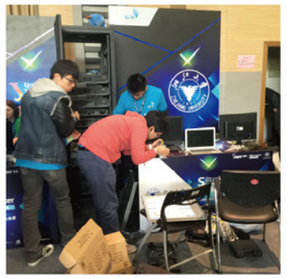
- Extensive practice components and guaranteed internships
- Application-oriented curriculum and collaboration with enterprises

• Excellent Engineer Training Program
• National cultivation program for distinguished engineering talents
• System design and analysis + Engineering technology and management
• 'Computer + X' interdisciplinary talents

5
Bachelor Programs

1,221
Undergraduate Students

4
Graduate Programs



1,447
Graduate Students

223
Faculty Members

10
National Awards of Teaching Excellence

3
National Strategic Talent Training Bases

80
Student Research Training Projects (SRTP)

90+
Top-tier International Competition Awards Won by Students

98%
Initial Employment Rate

AN INTERNATIONAL CURRICULUM

Each year, the school offers 10+ English-instructed courses in various modules taught by our faculty and guest professors. A list of English-instructed courses offered in the past two years includes:

Software Module	Computing Module
Fundamentals of C Programming	Fundamentals of Data Structures
Software Quality Assurance & Test	Advanced Algorithm Design and Analysis
Software Integration and Engineering	Principles of Data Structure
Software Engineering	**Design Module**
Hardware Module	Cultural Formation and Product Innovation Design
Computer Architecture	User Experience and Product Innovation Design
Computer Hardware System Based Comprehensive Practice	Integration and Innovation Design
Operating System	Service and Innovation Design
Introduction to Computer Science with Robotic Laboratory	History, Theory and Culture, Contemporary Design between Technology, Science and Culture

"The school also invites distinguished foreign scholars to campus each year to enrich our international curriculum."

2015 Turing Laureate Whitfield Diffie joined CCST as a full-time professor and delivered a course on Introduction to Cryptology in 2018

Dr. Yale Patt, member of US National Academy of Engineering had delivered a course on Introduction to Computer System since 2014

SUMMER OPPORTUNITIES FOR INTERNATIONAL STUDENTS

The **International Summer School on Visual Analytics** is a two-week program held at Zhejiang University. It is designed for undergraduate/graduate students and working professionals to delve into cutting-edge techniques for data visualization and visual analytics. Through a series of talks, visits and group assignments, attendees are inspired to master crucial concepts and tools of visual analytics.

INVITED SPEAKERS

Prof. Benjamin Renoust
Osaka University, Japan

Prof. Dennis Thom
University of Stuttgart, Germany

Prof. Issei Fujishiro
Keio University, Japan

Prof. Jaegul Choo
Korea University, South Korea

Prof. Kwan-Liu Ma
UC Davis, USA

Prof. Rüdiger Westermann
Technical University of Munich, Germany

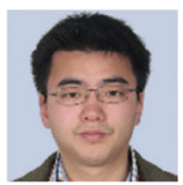
Prof. Stefan Bruckner
University of Bergen, Norway

Prof. Tobias Schreck
Graz University of Technology, Austria

Prof. Wei Chen
Zhejiang University, China

Prof. Xiaoyang Mao
University of Yamanashi, Japan

Prof. Yingcai Wu
Zhejiang University, China



Prof. Yunhai Wang
Shandong University, China

CAMPUS Asia (Collective Action of Mobility Program of University Students in Asia) is a program jointly developed by Zhejiang University, Japan Chiba University and South Korea Yonsei University, with the purpose of uniting the innovation and creativity of young students in China, Japan and South Korea, and exploring the ways to solve common social problems. In this program, three workshops are hosted each year with focus on innovation and technology-empowered design.

ENGLISH-TAUGHT DEGREE PROGRAM

ZJU-SFU Dual Degree Program

CCST offers an unique, award-winning Dual Degree Program (DDP) with Simon Fraser University (SFU). The DDP program admits a mixed cohort of 30 students from ZJU and SFU each year and offers two degrees — a Bachelor of Science (BSc) from SFU, and a Bachelor of Engineering from ZJU. The program was awarded as Outstanding International Education Program by Canadian Bureau for International Education.

CUTTING-EDGE RESEARCH

LEADING THE REVOLUTION IN COMPUTER SCIENCE

From artificial and hybrid intelligence to service computing and mixed reality, the research effort of CCST is devoted to expanding human insights into the frontier of computer science, as well as generating solutions to the pressing issues faced by the world today.

National Key Laboratory of **CAD&CG**

Research Institutes

Institute of **Artificial Intelligence**

Institute of **Modern Industrial Design**

Institute of **Computer System Architecture and Network Security**

Institute of **Computer Software**

Year 2020

¥380 Million Research funding (2020)	**1** 2nd National Prize of Nature Science	**20** Enterprise-cooperated labs with funding over ¥10 million
116 Patents of invention	**60+** Faculty members serving on editorial board of leading CS Journals	**164** SCI paper publications as first authors
2 National key R&D projects	**8** International joint labs /centers	**1** Publication on Nature Machine Intelligence

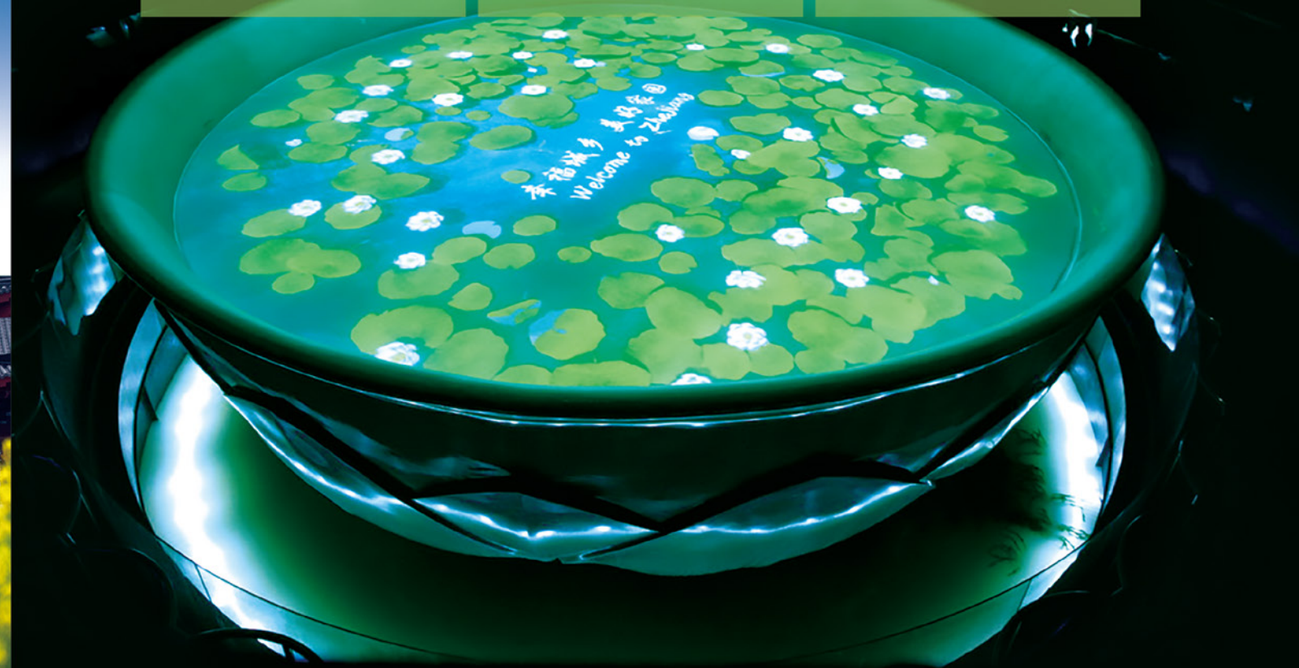
INTERNATIONAL AWARDS
include but not limited to:

Automating Just-In-Time Comment Updating

ACM SIGSOFT Distinguished Paper Awards, 2020

Scalable Byzantine Consensus via Hardware-Assisted Secret Sharing

IEEE Transactions on Computers Best Paper Awards, 2019



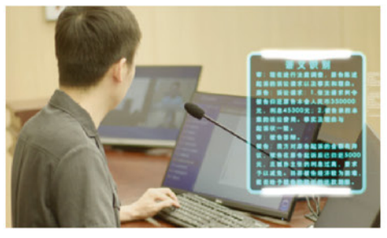
FEATURED RESEARCH

AREA 01

Artificial Intelligence

Heading towards AI 2.0 with ZJU wisdom

ZJU is devoted to promoting talent cultivation and cross-disciplinary research in artificial intelligence. From 1978 to date, researchers of ZJU CCST endeavors to advance the frontiers of AI research, from big data intelligence to intelligent automatic systems. Through tripartite university-government-industry cooperation, their research strives to promote AI-empowered technology applications to address real world challenges.

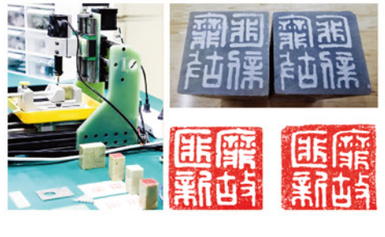


AI + Judicature

In collaboration with ZJU College of Law, Alibaba DAMO Academy and Zhejiang Provincial Court, research team at ZJU CCST developed an intelligent trial platform Xiaozhi. Through voice-image-text cross-media analysis, Xiaozhi can achieve real-time trial results prediction and judgement documents generation without presence of defendant and plaintiff at court. In September 2019, Xiaozhi was first employed in Hangzhou municipal court and closed its first case of financial loan disputes in just 30 minutes.

AI + Business

ZJU research team developed an intelligent supply chain cooperation platform which bolsters data-driven business cooperation and lean production amid supply chains, firstly adopted in Deqing, Hangzhou. Moreover, together with Alibaba DAMO Academy, ZJU CCST team invents and refines a data-driven and knowledge-led economic knowledge computing platform, which integrates AI technology with economic analysis, making AI-enhanced economic behavior understanding from multifaceted perspectives possible.



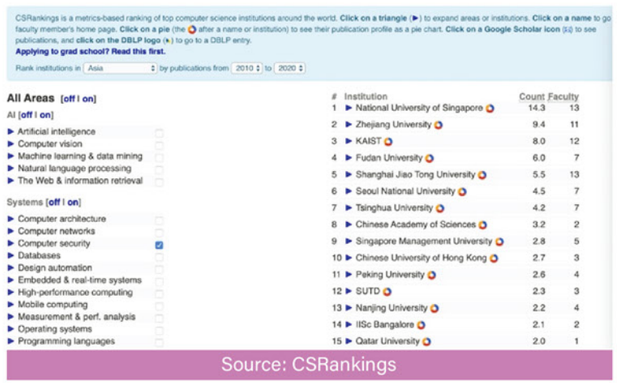
AI + Design

To support traditional seal-cutting art with AI technology, the research team of Prof. Kejun Zhang invented an intelligent seal-cutting machine that enables customized and automatic seal cutting. It revolutionizes design as simple operations with embedded algorithms, and restores the texture of traditional seal cutting with hardware innovations.

AREA 02

Computer Security

Safeguarding cyberspace security with world-leading research


CSRankings is a metrics-based ranking of top computer science institutions around the world. Click on a triangle (▶) to expand areas or institutions. Click on a name to go faculty member's home page. Click on a pie (the ◔ after a name or institution) to see their publication profile as a pie chart. Click on a Google Scholar icon (🎓) to see publications, and click on the DBLP logo (✎) to go to a DBLP entry.
Applying to grad school? Read this first.
Rank institutions in Asia by publications from 2010 to 2020

All Areas [off | on]
AI [off | on]
▶ Artificial intelligence
▶ Computer vision
▶ Machine learning & data mining
▶ Natural language processing
▶ The Web & information retrieval
Systems [off | on]
▶ Computer architecture
▶ Computer networks
▶ Computer security
▶ Databases
▶ Design automation
▶ Embedded & real-time systems
▶ High-performance computing
▶ Mobile computing
▶ Measurement & perf. analysis
▶ Operating systems
▶ Programming languages

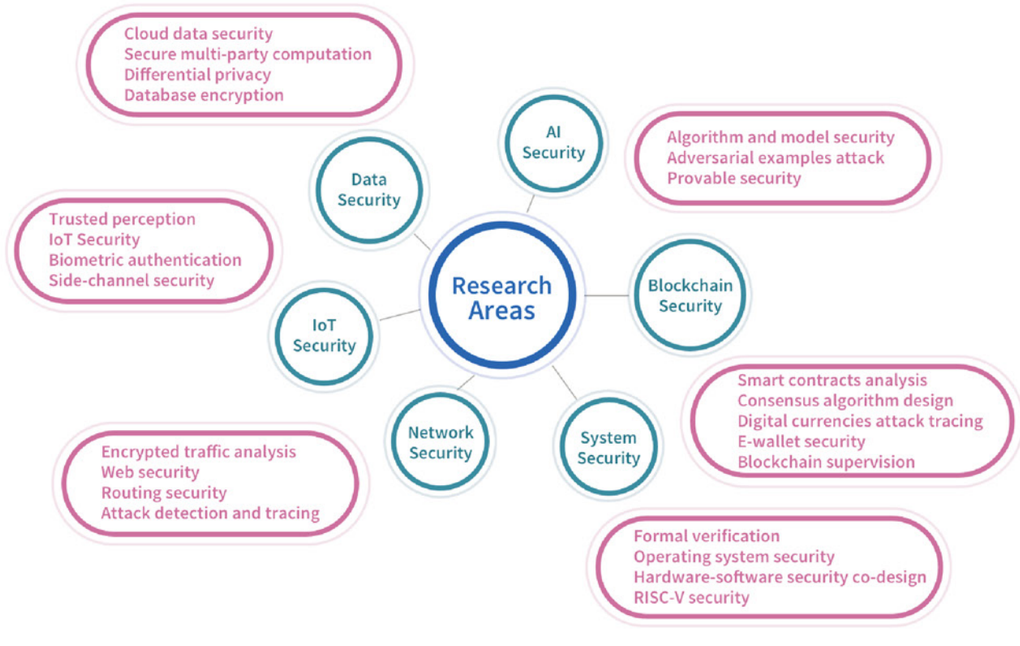
#	Institution	Count	Faculty
1	▶ National University of Singapore	14.3	13
2	▶ Zhejiang University	9.4	11
3	▶ KAIST	8.0	12
4	▶ Fudan University	6.0	7
5	▶ Shanghai Jiao Tong University	5.5	13
6	▶ Seoul National University	4.5	7
7	▶ Tsinghua University	4.2	7
8	▶ Chinese Academy of Sciences	3.2	2
9	▶ Singapore Management University	2.8	5
10	▶ Chinese University of Hong Kong	2.7	3
11	▶ Peking University	2.6	4
12	▶ SUTD	2.3	3
13	▶ Nanjing University	2.2	4
14	▶ IISc Bangalore	2.1	2
15	▶ Qatar University	2.0	1

Source: CSRankings

In Computer Security, ZJU is ranked top 2 in Asia, top 1 in China by CSRankings from 2010-2020

ZJU Institute of Cyberspace Research (ICSR) is a newly founded research institute, focusing on computer security research. Since its foundation in 2017, ZJU ICSR now has around 20 faculty members, 6 main research areas, more than 150 PhD and master students, receiving 5 million USD research funding each year.

Research Areas



Research Recognition

2020 IEEE INFOCOM Test of Time Paper Award

ICDCS 2020 Best Paper

MobiSys 2020 Best Paper

WWW 2020 Best Paper

IEEE INFOCOM 2019 Best Paper

IEEE Transactions on Computers 2019 Best Paper

IEEE Euro S&P 2019 Best Paper

IEEE GLOBECOM 2019 Best Paper

1st in iDash Contest

AREA 03

Computer Aided-Design and Computer Graphics

Empowering interdisciplinary applications through CAD&CG technologies

#	Institution	Count	Faculty
1	Zhejiang University	15.3	22
2	University College London	12.5	7
3	University of Toronto	12.4	13
4	New York University	12.2	8
4	Stanford University	12.2	10
6	University of Maryland - College Park	11.3	12
7	University of Utah	9.4	12
8	KAUST	9.2	5
9	University of British Columbia	8.8	11
10	Max Planck Society	8.2	6
11	University of Washington	8.1	13
12	Ohio State University	7.9	6
13	ETH Zurich	7.3	4
13	Tsinghua University	7.3	10
15	Georgia Institute of Technology	7.2	12
15	Massachusetts Institute of Technology	7.2	14
17	TU Munich	6.5	5
18	Peking University	6.3	6
19	Texas A&M University	6.1	7
20	HKUST	6.0	11
20	University of California - Davis	6.0	4

Computer Graphics and Visualization

#	Institution	Count	Faculty
1	Carnegie Mellon University	103.5	28
2	Chinese Academy of Sciences	95.0	27
3	University of Adelaide	75.9	10
4	Stanford University	56.5	15
5	Max Planck Society	55.5	7
6	Peking University	52.7	42
7	Massachusetts Institute of Technology	48.5	22
25	Imperial College London	31.7	10
26	University of Tokyo	31.4	10
27	Tsinghua University	30.8	34
28	Technion	30.5	14
29	Zhejiang University	30.1	31
30	HKUST	29.9	15
31	University of Southern California	29.7	9
32	Ecole Normale Superieure	29.4	5
32	Graz University of Technology	29.4	5
34	NWPU	29.3	12
35	Australian National University	29.1	7

Computer Vision

Source: CSRankings

In Computer Graphics & Visualization, ZJU is ranked top 1 in the world by CSRankings from 2010-2020

The State Key Lab of CAD&CG is dedicated to original research and innovations, engaging a wide breadth of research areas ranging from computer-aided design, computer graphics, virtual reality, visual analytics of big data and human-computer interaction. Through 20 years of endeavor, it has yielded ample impactful achievements in theoretical research and system integrations, and continues to exert academic impact globally.

Computer Graphics and Visualization

Intelligent Sensing Technology of 3D Graphic Objects

The research team led by Prof. Kun Zhou and Prof. Hongzhi Wu proposed a high-efficiency, high-precision geometry and material joint acquisition framework that can perform end-to-end joint optimization of the intelligent sensing hardware and software systems for 3D graphics objects. Their research will help the Palace Museum and the National Museum of China to better protect and promote digital cultural heritage.

Virtual Reality

Virtual Training and Testing Platform for Autonomous Vehicles

A large number of recent experiments show that the design of autonomous driving cannot solely rely on road testing. Researchers led by Prof. Bao Hujun and Prof. Wei Hua developed a virtual training platform that helps to achieve high-efficiency autonomous driving algorithms training.
By developing a self-synchronizing communication protocol and high-performance simulation server, the platform achieves time and space consistency in a distributed simulation environment and realizes large-scale parallel testing.

VR driving simulator

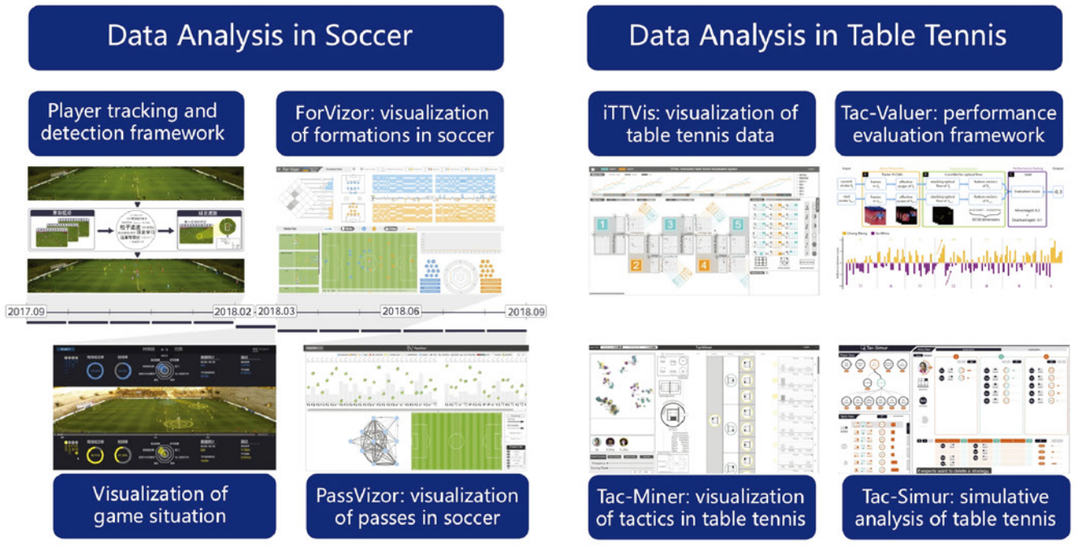
Complex traffic flow simulation

Vehicle-mounted lidar simulation in complex scenes

Media Computing and Visual Analysis

Sports Big Data Visual Analytics Platform

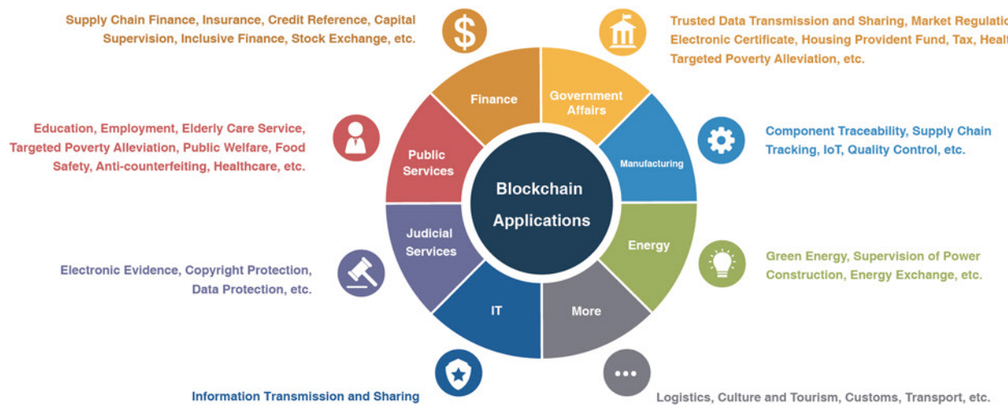
Revolving around the idea of big-data driven intelligent sports analytics, Prof. Yincai Wu is leading a research project to develop an intelligent sports analysis framework that combines visual analytics and human-computer interaction concepts using computer vision and deep learning algorithms. The platform was used by Chinese National Table Tennis Team to prepare for the 2019 World Table Tennis Championships en route to winning 5 gold medals, and is also an important foundational platform in preparation for the Tokyo Olympics.



AREA 04

Blockchain Technology

Upgrading services industry with secure and controllable solutions



Blockchain Research

Established in June 2018, ZJU Blockchain Research Center is now a leading research institution in the field of blockchain theory & technology in China. The research team is led by Prof. Chun Chen, academician of the Chinese Academy of Engineering, and brings together many leading global experts from interdisciplinary disciplines. The Center focuses research on frontier blockchain theory & technology covering the following topics:

- Blockchain architecture
- Consensus algorithm
- Data storage for blockchain
- Cryptography in blockchain
- Security & privacy
- Theory and technology for inter-chain
- New programming system for blockchain
- Smart contracts and distributed applications
- Blockchain testing and supervision
- Networking and collaboration technology for blockchain

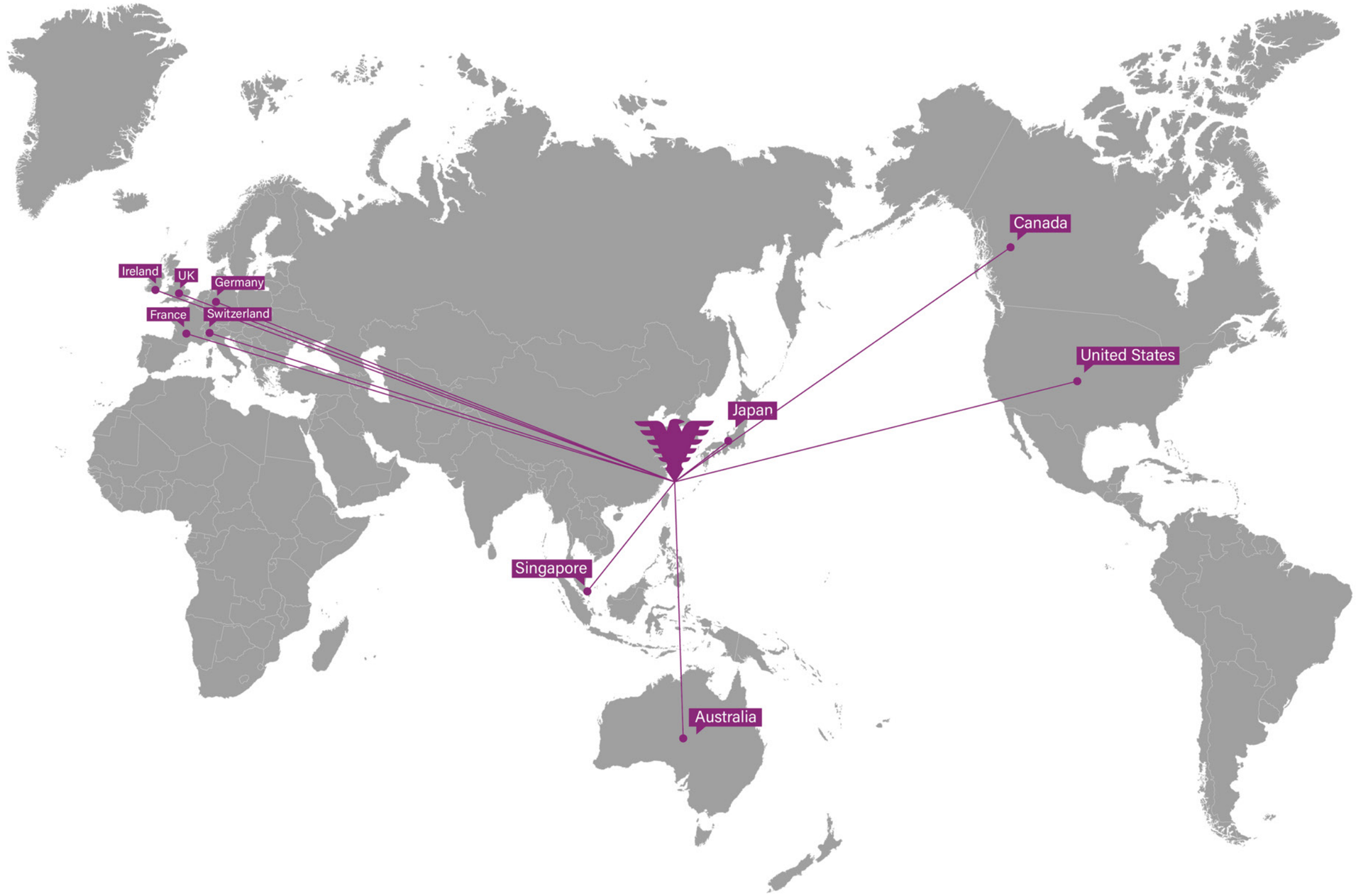
Employ Technology to Benefit Industry Applications

The research center has backed the first unicorn in China's blockchain industry, Hangzhou Qulian Technology Co., Ltd. Qulian developed an international leading consortium blockchain platform, which ranks the first in the evaluation of multiple authoritative institutions including the China Electronics Standardization Institute (CESI) and China Academy of Information and Communications Technology (CAICT) of MIIT.

Qulian provides dedicated blockchain solutions for business, public management, industrial internet, and more. For business applications, Qulian has launched the first blockchain accounts receivable platform, which activates the accounts receivable of hundreds of billion RMB for thousands of enterprise users. For government applications, Qulian has launched the first data sharing platform of housing provident fund based on blockchain technologies, which connects nearly 500 urban housing provident fund systems and provides support for tens of millions of data records stored in the blockchain every day.

ENGAGING THE WORLD

To increase student mobility and facilitate research collaboration, CCST has developed extensive partnerships with global universities.



Europe

Imperial College London
Oxford University
ETH Zurich
Technical University of Munich
ParisTech
National University of Ireland, Maynooth

North America

Harvard University
Massachusetts Institute of Technology
Princeton University
Stanford University
Carnegie Mellon University
University of Pennsylvania
University of Illinois, Urbana-Champaign
McGill University

Asia

University of Tokyo
National University of Singapore
Nanyang Technological University

Oceania

University of New South Wales
University of Queensland
University of Western Australia

INTERNATIONAL JOURNALS

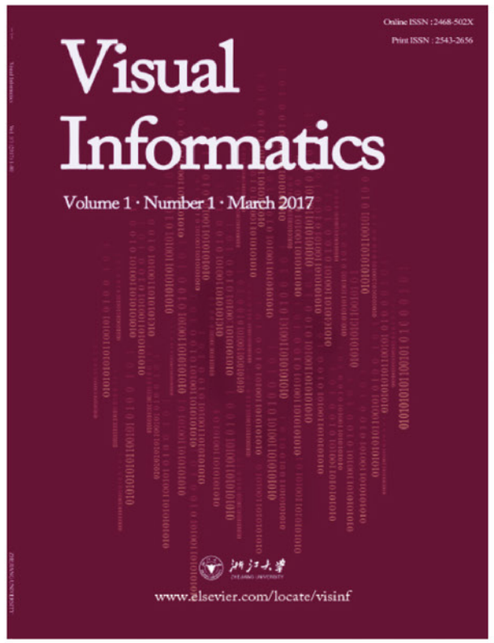
Visual Informatics

Visual Informatics is an EI & ESCI-indexed peer-reviewed online journal published on the platform of Elsevier. It is dedicated to the development and application of theories, algorithms and technologies associated with visual data acquisition, analysis, synthesis, perception, enhancement and applications. The journal has drawn wide attention from global researchers (with over 116 thousand paper downloads in 2020). Its latest CiteScore is 5.4.

Editor-in-chief

Prof. Zhou Kun
Zhejiang University

Prof. Hans-Peter Seidel
Max Planck Institute



Big Data Research

Launched in 2014, the journal *Big Data Research* aims to promote and communicate advances in big data research by providing a fast and high quality forum for researchers, practitioners and policy makers from different communities working on this topic.

Editor-in-Chief

Prof. Huajun Chen
Zhejiang University

Prof. Themis Palpanas
Paris Descartes University

INTERNATIONAL CONFERENCE

The 16th International Conference on Service Oriented Computing, 2018

International Conference on Service Oriented Computing (ICSOC) is the top international forum in this field. ICSOC 2018 gathered over 200 attendees worldwide, including experts from Australia, United States, Germany, France, Canada, Korea etc. The conference featured research, industry presentations, forward-looking keynote presentations and workshops that share groundbreaking research work in service-oriented computing.

The 8th IEEE Pacific Visualization Symposium, 2015

IEEE Pacific Visualization is one of the world's highest-level conferences in the field of visualization and visual analysis. At the conference, more than 60 international scholars and industry experts delivered speeches, and over 60 papers and posters were exchanged.

The 40th International Conference on Very Large Data Bases (VLDB), 2014

The VLDB conference is world's most influential conference in the field of big data founded by VLDB Endowment. During VLDB 2014, more than 800 scholars, including 650 international researchers and industry experts, discussed the latest research progress and industry applications in the field.

JOINT RESEARCH CENTERS

ZJU - SFU Collaborative Research Center on Big Data

ZJU - NUS Joint Research Center on Sensor Enhanced Social Media Data Research

ZJU - State Street Technology Center

ZJU - Cisco Technology Center

ZJU - Intel Technology Center

ZJU - HKPU Center for International Design

MOE-Microsoft Key Lab of Visual Perception

Joint Research Center of Service-Economics-Management-Computing

ZJU-Tencent Joint Lab of Intelligent Graphics Innovation Technology

ZJU-Huawei Collaborative Research Center on Systems and Data Security

ZJU-Huawei Collaborative Research Center on Advanced Media

PARTNER INSTITUTIONS

SFU SIMON FRASER UNIVERSITY ENGAGING THE WORLD

NUS National University of Singapore | School of Computing

The Hong Kong Polytechnic University 香港理工大學

STATE STREET.

cisco

Microsoft

阿里巴巴 Alibaba.com

intel

Tencent

HUAWEI

In collaboration with University of Zurich and Alibaba, ZJU launched **Joint Research Center of Service-Economics-Management-Computing** to explore multidisciplinary research in those fields, which engages international scholars as advisory board members, including Professor Alvin Roth from Stanford University and Professor David Parker from Harvard University.

Launched in 2001, the **ZJU – State Street Technology Center** is dedicated to large-scale international financial software development and financial data analytics, which has developed over 20 financial systems that are widely used in North America, Europe and Asia, and supports transaction of thousand trillion of US Dollars.

HANGZHOU: A CITY OF INNOVATION

"It is without a doubt the finest and most splendid city in the world."
—— **Macro Polo**, Italian merchant, explorer and writer(1254—1324)

Hangzhou, "the City of Heavens", was Marco Polo's favorite city in China. His words still ring true even today. Hangzhou has been consistently ranked among the top three most attractive Chinese cities for foreigners. A city of a long history and a hub for innovation, Hangzhou has something for everyone!

QUICK FACTS

Hangzhou is listed as one of the Seven Ancient Capitals of China. Today it is the capital of Zhejiang province.

With a population of 9.5 million people, Hangzhou has joined the club of China's new first-tier cities.

Powered more by services and advanced industry, the city shows a possible model for China's new economy.

ATTRACTIONS OF ANTIQUITY

The city retains many of its historical and cultural heritage. It boasts three UNESCO world heritage sites - the West Lake, the Beijing-Hangzhou Grand Canal, and the ancient Liangzhu Archaeological Site.

A HUB OF INNOVATION

Hangzhou is the base for the e-commerce giant Alibaba. It is also home to venture capital funds, big data firms, and hundreds of technology-linked companies.

PROUD HOSTS

Hangzhou was the host of the 2016 G20 Summit, the first ever G20 summit in China. The city will also host various events including West Lake Expo, China International Cartoon and Animation Festival, and Hangzhou International Marathon.