CONNECTION

The Official Newsletter of Zhejiang University

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Seeking Truth
Pursuing Innovation

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MESSAGE FROM THE EDITOR-IN-CHIEF

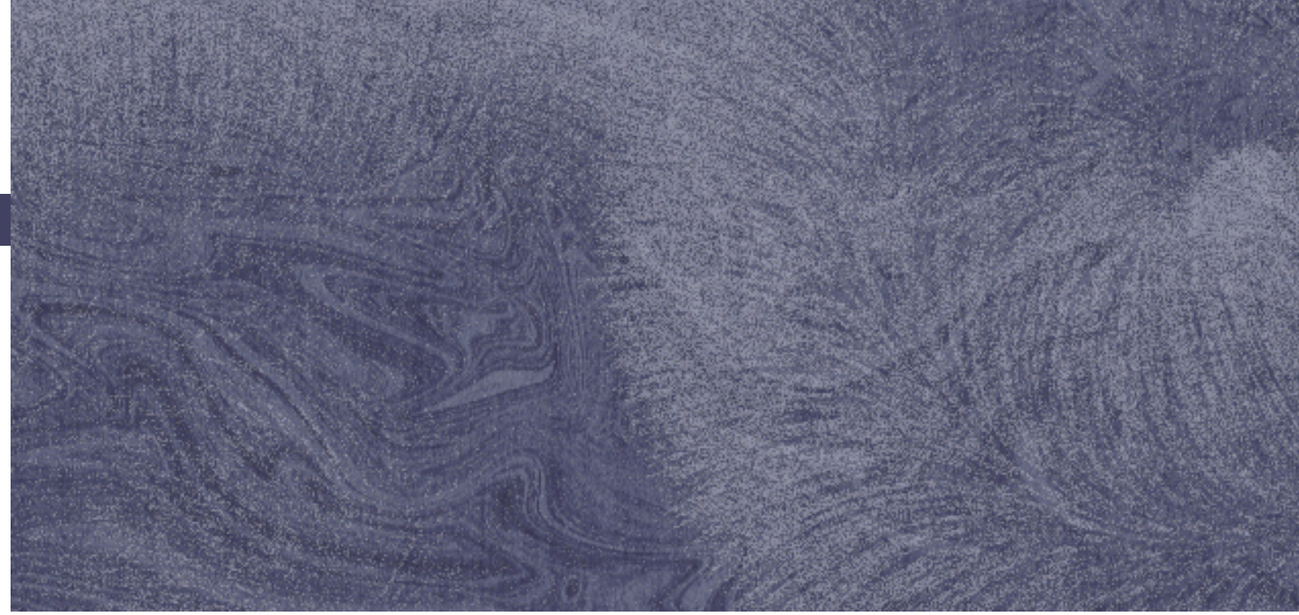
As one of the most international Chinese universities, ZJU is always on its way to pursuing a higher level of cooperative education with our oversea partners. In recent months, ZJU signed with Ghent University, Belgium a double PhD agreement, held a presidential-level remote meeting with UChicago, and our Vice president met with the Consul General of Uruguay in Shanghai.

ZJU is also continuously assuming its social responsibility. A new pediatric medicine hospital together with a research center was launched, and our efforts in restoring and rejuvenating the traditional Chinese paintings were shown at the National Museum of China, entitled "Compilation of Classics in the Flourishing Age—The Series of Ancient Chinese Paintings".

In the field of research, ZJU scientists discovered how machine learning helps to understand the neurobiological and nosological bases of mental illness, developed a cotton whole-genome design breeding platform and Zhejiang's first sustainable roadmap to achieve carbon neutrality, realized topological time crystal using digital quantum simulation, etc.

As always, we truthfully invite you to share with us your thoughts. Also, taking this opportunity, we'd like to extend our warmest gratitude for your support and wish you all the best.

LI Min, Editor-in-Chief
Director, Office of Global Engagement



ZJU NEWSROOM

International

Zhejiang University and Ghent University sign double PhD agreement

Prof. WU Zhaohui, president of Zhejiang University, and Prof. Rik Van de Walle, rector of Ghent University, signed a university-level double PhD agreement virtually on September 28th.

WU Zhaohui stated that "this double PhD agreement will mark a new chapter for the partnership in training PhD students and deepening research cooperation in many fields including philosophy, photonics, environment and so on", introduced the latest development and major strategic plans of Zhejiang University, and expressed the confidence in the future cooperation with Ghent. Rik Van de Walle stressed that Zhejiang University is a very valuable partner of Ghent University and that the collaboration between the two universities is rich and diverse. He also expressed his hope to continue to play a vital role in ZJU 's international strategy.

Ghent University & Zhejiang University double PhD agreement signing ceremony

ZJU president meets with UChicago president remotely

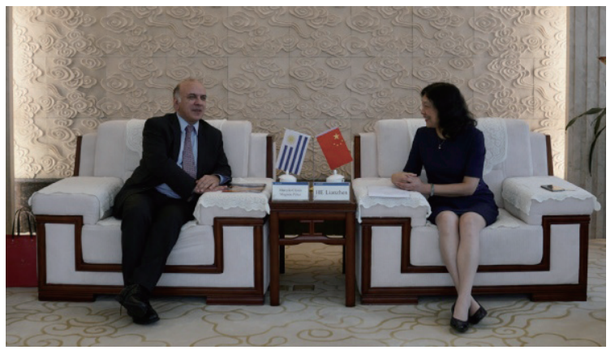
On October 14, Prof. WU Zhaohui, president of Zhejiang University had a virtual meeting with Prof. Paul Alivisatos, president of the University of Chicago. Katie Hrinyak, assistant vice president for Global Initiatives and Strategy at the University of Chicago, and LI Min, director of the Office of Global Engagement at Zhejiang University, were also present at the meeting.

WU extended his congratulations to Paul on Douglas Diamond's winning of the 2022 Nobel Prize for Economics. He looked back on cooperation between the two universities over the years and expressed expectation for further cooperation: "In the face of the changing times and pressing global challenges, Zhejiang University will continue to promote Global ZJU 2.0 and Z4G to address common issues together with partners worldwide."

Paul was highly supportive of long-term cooperation between the two universities, expressing the hope to further cooperation, particularly in the area of climate change. Katie and LI offered new updates on cooperation between the two universities and exchanged ideas on future work.

ZJU president meets with UChicago president remotely

ZJU Vice President He LianZhen meets with Consul General of Uruguay in Shanghai



Speech by Vice President HE Lianzhen

At the beginning of September, Vice president HE LianZhen including 3 associate professors of ZJU met with the Consul General of Uruguay, Marcelo Clovis Magnou Pérez in Shanghai, who paid a visit to Zhejiang University on September 2. After a warm welcome, Vice president HE LianZhen introduced to the Consul General ZJU's academic characteristics and its plan for international cooperation. She mentioned that Zhejiang University attaches great importance to cooperation with universities and institutions all over the globe and that they are willing to strengthen friendly ties with Uruguay while the associate professors also expressed their willingness to enhance exchanges and expand the scope of cooperation with Uruguayan universities. Marcelo Magnou expressed his delight in visiting ZJU and praised the achievements ZJU has made. He looked forward to establishing partnership with top Chinese universities so that more Uruguayan youth can grow into outstanding talents and contribute to the development of Uruguay.

Public Engagement

Sir Run Run Shaw International Children's Medical Center and Sir Run Run Shaw Pediatric Research Building officially launched

On September 21, 2022, the second phase of Binjiang Campus of the Children's Hospital, Zhejiang University School of Medicine (ZCH) was officially opened, including a medical center and a research building, under the support of the Shaw Foundation in Hong Kong.

SHEN Zhicheng (middle) and his students

WU Zhaohui, president of Zhejiang University, other school and government leaders, the hospital staff, and the Shaw Foundation's chairman participated in the opening ceremony.

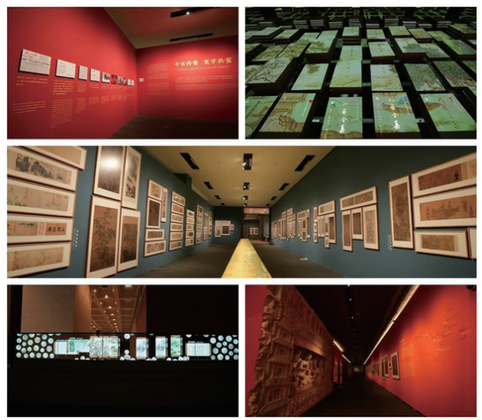
With the medical center, the total inpatient beds of ZCH reach 2,000, which could better meet the increasing patient needs. Meanwhile, the new scientific research building with multiple research centers and laboratories can support the development of pediatric medicine, and help improve the level of pediatric diagnosis and treatment.

WU Zhaohui and other leaders pointed out the importance of and Zhejiang Province's efforts paid in pediatric medicine, ZCH's leading position in this field, and the opportunities brought by the new hospital in their speeches.

A "masterpiece" created with craftsmanship in 17 years at ZJU

On September 29, 2022, the National Museum of China in Beijing unveiled an exhibition titled "Compilation of Classics in the Flourishing Age—The Series of Ancient Chinese Paintings".

The Series is compiled and co-published by Zhejiang University and the Cultural Heritage Bureau of Zhejiang Province, containing 12,405 ancient Chinese paintings. Comprising 226 books in 60 volumes, it is by far the most comprehensive archive of ancient Chinese paintings with the most authentic images and refined printing quality.



The ZJU team was photographing in the Kurokawa Institute of Ancient Cultures.

The exhibition features more than 1,700 publication copies of ancient Chinese paintings. Meanwhile, 10 pieces or sets of niche statues in Chinese cave temples, reproduced with 3D high-fidelity measurement and reconstruction technology, are also showcased.

Zhejiang University boasts superb inter-disciplinary resources, and has made significant contributions to the digital preservation, reproduction and virtual experience of ancient art relics and cultural heritage, thereby promoting the creative and innovative development of traditional Chinese culture.

RESEARCH

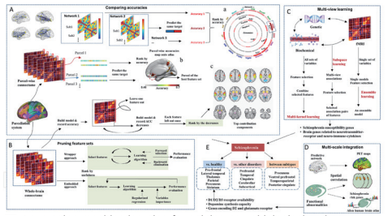
How machine learning helps to understand the neurobiological and nosological bases of mental illness?

The research team led by Assist. Prof. CHEN Ji at the Zhejiang University Department of Psychology and Behavioral Sciences summarized several new directions based on prior psychiatric machine learning studies and highlighted the essential role of machine learning in providing neurobiological and nosological insights into mental disorders. Their findings were published in the journal *Biological Psychiatry*.

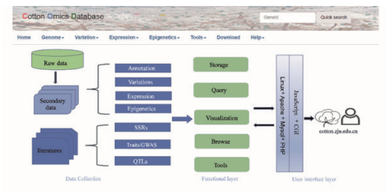
By reviewing the latest trends in the field of machine learning for mental disorders, views were presented, including "the classification accuracy rate of machine learning models can be used as a dependent variable to identify the biological features intimately linked to the pathophysiological processes of mental disorders."

To address these methodological perspectives and application strategies, the researchers proposed common pitfalls associated with input data or analytic procedures at the technical level.

This study provides a new perspective for screening biomarkers of mental disorders and for resolving diagnostic heterogeneity and co-morbidity issues in psychiatric research.



Leveraging machine learning for gaining neurobiological and nosological insights in psychiatric research



Cotton Omics Database

ZJU scientists develop cotton whole-genome design breeding platform

In the past decade, the team at the Zhejiang University College of Agriculture and Biotechnology led by Prof. HU Yan, Assoc. Prof. FANG Lei, Dr. SI Zhanfeng and Prof. ZHANG Tianzhen has been committed to cotton precision breeding.

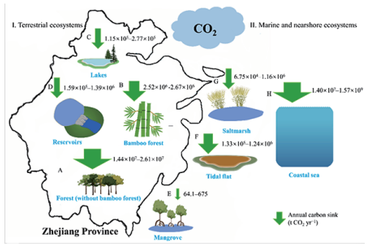
On the basis of the released high-quality data, the team worked in collaboration with MolBreeding Biotechnology Co. Ltd. and developed a liquid single nucleotide polymorphism (SNP) chip named "ZJU Cotton SNP40K". Experiments revealed that this chip could be successfully applied to the construction of the genetic map, QTL mapping and so on.

The team also constructed a comprehensive cotton multi-omics database—COTTONOMICS. It is an easily accessible web database that integrates 32.5 TB of omics data, and allows users to employ various search scenarios and retrieve different types of information. Its user-friendly web interface enables its users to carry out population genetics research more conveniently and efficiently.

ZJU scholars develop Zhejiang's first sustainable roadmap to achieving carbon neutrality

Led by FU Weiqi, the research team at Ocean College, Zhejiang University offers a clear picture of the current situation and key pathways of "carbon neutrality" in Zhejiang Province. Their findings are published on the *Journal of Marine Science and Engineering*.

Their thesis analyzes the pathways of improving carbon sink and reducing carbon emissions and puts forward the challenges and solutions.

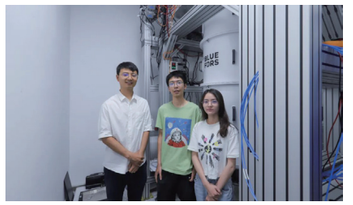


Sustainable approaches to realize carbon neutrality in China: A case study of Zhejiang Province

On the strength of the reality in Zhejiang Province, the research team proposes an ecological approach to increasing the carbon sink. As coastal region, it has great potential for the growth of carbon sinks in both near-shore and offshore locations. Additionally, the team's calculations show that lowering carbon emissions is crucial for attaining carbon neutrality through the development of low-carbon eco-friendly energy and the capture, separation, utilization, and storage of carbon dioxide. A more technologically advanced industrial and ecological is also necessary to reach carbon neutrality in the future.

RESEARCH HIGHLIGHTS

Scientists realize topological time crystal using digital quantum simulation



Prof. WANG Zhen (left) and doctoral students ZHANG Xu and DENG Jinfeng (right) in the lab

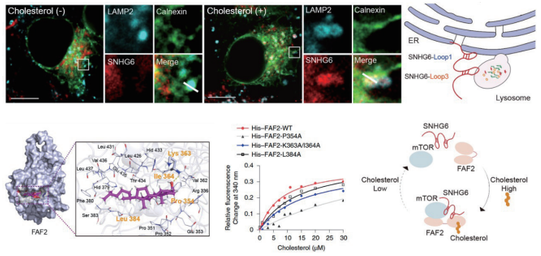
In collaboration with Prof. DENG Dongling from Tsinghua University, Prof. WANG Zhen and Prof. WANG Haohua from the Zhejiang University School of Physics and other scientists demonstrated a distinct state of matter—topological time crystal—via digital quantum simulation with an array of programmable superconducting qubits. This is a new non-equilibrium state of matter. The researchers observed its discrete time crystalline behavior—Floquet symmetry-protected topological phases.

Their research findings are published in a research article entitled "Digital quantum simulation of Floquet symmetry-protected topological phases" in the journal *Nature*.

After evaluating the idea proposed by Prof. DENG Dongling's team, the Zhejiang University research team implemented the "digital quantum simulation" scheme. They used quantum circuits of depth exceeding 240 with 26 programmable superconducting qubits. This was a more universal experimental solution than analog quantum simulation. Superconducting quantum computing is marked by more programming flexibility, greater quantum gate accuracy, and a wider variety of quantum algorithms.

The successful simulation of topological time crystal is a testament to the feasibility of using digital quantum simulation on superconducting quantum processor. It will inspire people to explore more new substances and novel phenomena on the superconducting quantum computing platform.

Scientists uncover the molecular mechanism of RNA-mediated organelle contact sites and the regulation mechanism of cholesterol metabolism



Cholesterol regulates SNHG6–FAF2–mTOR complex formation

The long non-coding RNA (lncRNA) plays a vital role in modulating signaling, cellular metabolism and tumorigenesis. On August 22, the research team led by Prof. LIN Aifu from the Zhejiang University College of Life Sciences published an article entitled "Long non-coding RNA SNHG6 couples cholesterol sensing with mTORC1 activation in hepatocellular carcinoma" in the journal *Nature Metabolism*. This study reveals that lncRNA SNHG6 as an important player in the progression from non-alcoholic fatty liver disease (NAFLD) to hepatocellular carcinoma (HCC) by linking cholesterol sensing with mTORC1 signaling.

On the strength of previous studies, LIN Aifu et al. uncovered that lncRNA SNHG6 is distributed to ER-lysosome contact sites to accelerate NAFLD-HCC progression. The results demonstrated that SNHG6 accelerates NAFLD–HCC progression via positive feedback with cholesterol.

To further determine the regulatory role of SNHG6 in the NAFLD–HCC progression, LIN Aifu et al. constructed cholesterol-induced NAFLD–HCC mouse models. They found that SNHG6 overexpression in mice livers promotes cholesterol-induced mTORC1 activation and exacerbates NAFLD-HCC progression. Moreover, it was suggested that SNHG6 can serve as a potential target for liver cancer treatment.

Together, these findings open up new avenues for tumor treatment at the subcellular level.

Prof. ZHANG Dan (the fourth from the right on the front line) and her team

ZJU scientists discover new pathologic mechanism of primary ovarian insufficiency

On October 5, 2022, a research paper revealed the mechanism of POI and was published online in *Nature Communications* by the research group of Prof. ZHANG Dan from the Key Laboratory of Reproductive Genetics in Zhejiang University. Primary ovarian insufficiency (POI) is a clinical syndrome defined as premature exhaustion of the resting pool of primordial follicles before the age of 40 years.

The research group identified a Basonuclin 1 (*BNC1*) mutation and found that mice with targeted *Bnc1* mutation exhibited symptoms of POI. However, the underlying mechanism remained unknown.

In the progress of searching the mechanism, the team found that BNC1 played key roles in ovarian reserve and maintaining lipid metabolism and redox homeostasis in oocytes during follicle development. They found that the deficiency of BNC1 cause premature follicular activation and excessive follicular atresia and uncovered a pathologic mechanism of POI based on BNC1 deficiency, which suggested YAP and ferroptosis inhibitors as potential therapeutic targets for POI. This discovery can provide a reference for the treatment of primary ovarian insufficiency.

SPOTLIGHT ON

Students

Spotlight on Shaoxing Opera Club: setting the trend with classics

Shaoxing opera, ranked as the second national opera after Beijing Opera, has been enlisted into the national intangible cultural heritage since 2006. As the crown of Shaoxing opera, Butterfly Lovers is a carrier of traditional vernacular culture. In 2018, the story was performed by the student Club of Shaoxing Opera in Zhejiang University, which arose a fashion of traditional arts at that time. Despite the thought that the show won't be popular, the performance still managed to hit big in the university. Every member knew that the success was hard-earned, and it is just the love for opera and the arduous efforts that ensure the vivid revival of the Butterfly Lovers on stage. "Leading the trend with the classics," that's the commitment of the Shaoxing Opera Club. They launches a Shaoxing opera series by re-staging these classics in many sites of the city, in this way they pay a tribute to the traditional arts.

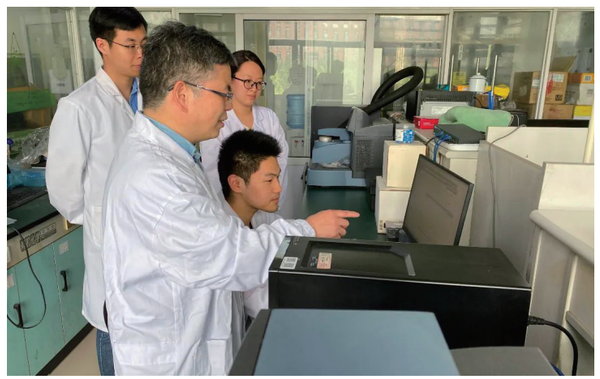
Shaoxing Opera Club members' performance

Faculty

Prof. FANG Wenjun: Education should always be a top priority for teachers

FANG Wenjun is a true "frontline teacher" who has been dedicated to teaching for over 30 years. He is a doctoral supervisor and has completed many national research tasks, but he has given of his time and expertise to teach the most fundamental general education and experiment courses to undergraduates.

In his opinion, teaching is as much a discipline as research. Inside class, he does a lot of serious thinking about how to deliver his lecture to freshmen from different majors, while outside class FANG Wenjun spends much of his time solving puzzles for his students, via a variety of communication channels, for example e-mail. He also has been arranging 4-hour question and answer sessions every week over the years.



FANG Wenjun and his students

"Love" is the motivation behind his ongoing commitment to teaching. He loves his career and love his students even more. He said, "Education should always be a top priority for teachers."

Prof. WU Fei: Synergy of teaching and research

WU Fei is currently Director of the Institute of Artificial Intelligence at Zhejiang University. During his 20-year career, he has participated in and witnessed many milestone and transformative strategic plans in the field of artificial intelligence in China. He has developed an innovative talent cultivation model featured by science-education integration and industry-education integration through the establishment of a new-generation AI scientific and educational platform—Zhihai. In April 2021, WU Fei, together with other computer science teachers, launched the "AI + X" program with Huawei, Baidu, and SenseTime. This program aims to teach non-computer science students the basic knowledge system in artificial intelligence. Textbook writing is another major focus in WU Fei's work. He believes that textbooks should reflect the thoughts, ideas and contents of educators. All that WU Fei has done stems from his longing to share cutting-edge science and technology with the general public.

WU Fei and his students