

CONNECTION

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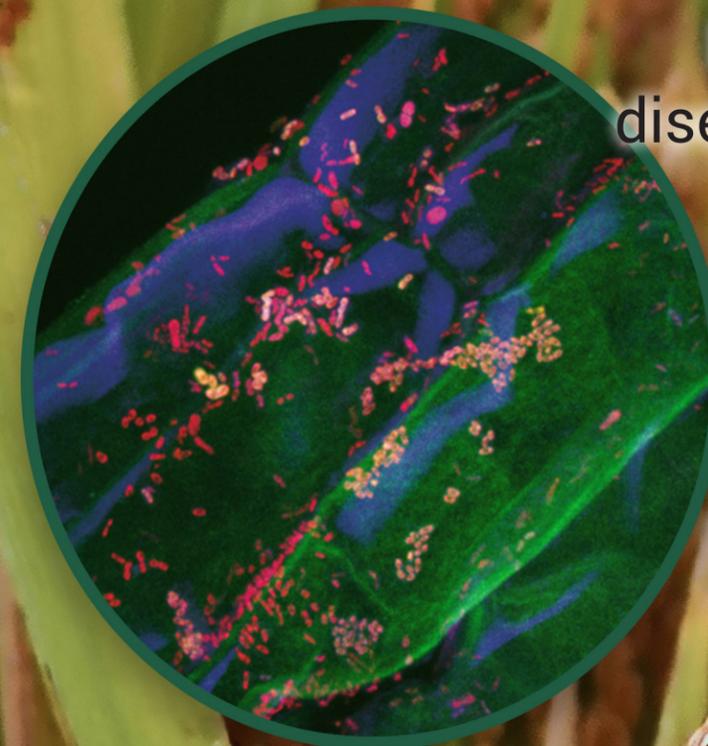
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Seeking Truth
Pursuing Innovation



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Editorial office :

Global Communications
Office of Global Engagement, Zhejiang University
866 Yuhangtang Road, Hangzhou, P.R. China 310058
Phone: +86 571 88981259
Fax: +86 571 87951315
Email: newsletter@zju.edu.cn

Edited by :

CHEN Weiyang, YE Ying, JIANG Li, JI Yuhuan

Designed by :

BAO Jiyuan

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MESSAGE FROM THE EDITOR-IN-CHIEF

Spring is a season full of hope, a time for making a plan and drawing a big picture. Here in the 21st issue, I am pleased to share with you our progress in the fields of arts, science and social engagement.

The University newly set up Institute of Asian Civilizations in January, whose goal is to build a first-class platform for cultural exchange and research on Asian civilizations.

ZJU scientists have been actively engaged in serving the local and global community. A new round of research findings in diversity of animal chromosomes, single-cell deep-immune atlas of COVID-19 and preventive protection of cultural relics demonstrate our commitment to addressing the challenges of the time.

With the project "Smart Rice-fish Culture", our student team clinched gold medal in the 6th China College Students' Internet Plus Innovation and Entrepreneurship Competition. The project is a good practice to promote the sustainable development of the ecological environment.

As always, we wish you pleasant reading and hope you follow us in the social media and leave your comments!



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



Education

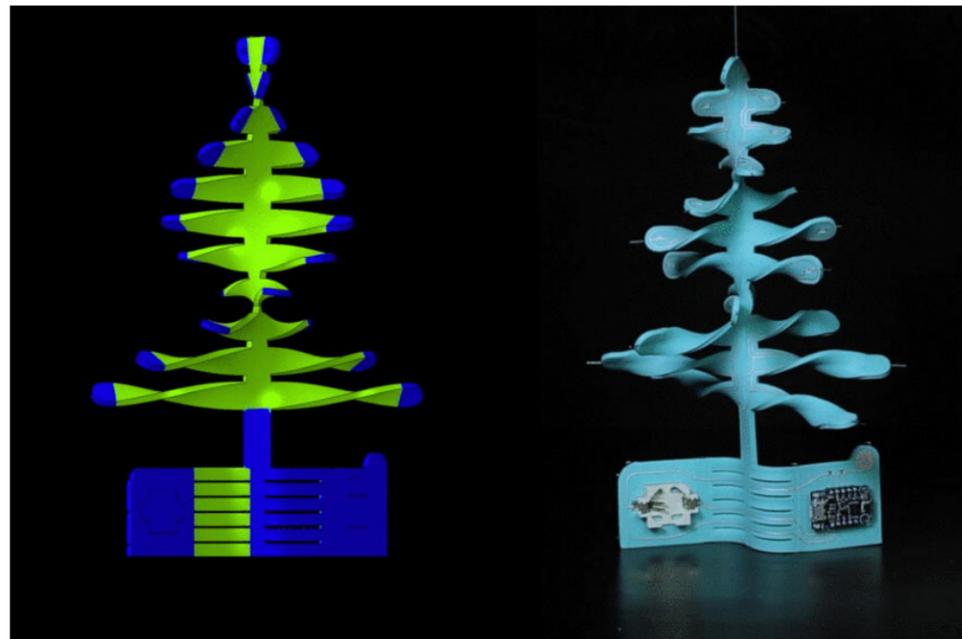
Zhejiang University sets up Institute of Asian Civilizations

On January 9, Forum for Asian Civilizations and the inauguration ceremony for Zhejiang University Institute of Asian Civilizations were held on Zijingang Campus. Scholars from home and abroad attended the forum online and offline, sharing their insights on the construction of key theories and the tackling of pressing challenges concerning Asian civilizations.

With the goal of building "a new outlook on Asian civilizations", the Institute will be committed to developing a disciplinary system with six dimensions: cognition and variations of languages, transformation and preservation of cultural relics and historical sites, circulation and regeneration of literature and ancient records, understanding and dialogues of literary arts, inheritance and innovation of cultural concepts, and fusion and symbiosis of civilizations and thoughts.

"Exchanges and mutual learning among civilizations is the passport for human beings to promote mutual trust and head towards the future. Top universities play a vital role in promoting dialogues among civilizations. We expect to gather more wisdom through a series of forums and build the Institute into a first-class cultural platform, thus making positive contributions to the brilliant future of human civilization," said Dr. REN Shaobo, Chairman of Zhejiang University Council.

Research



Scientists “bake” a robot in the oven

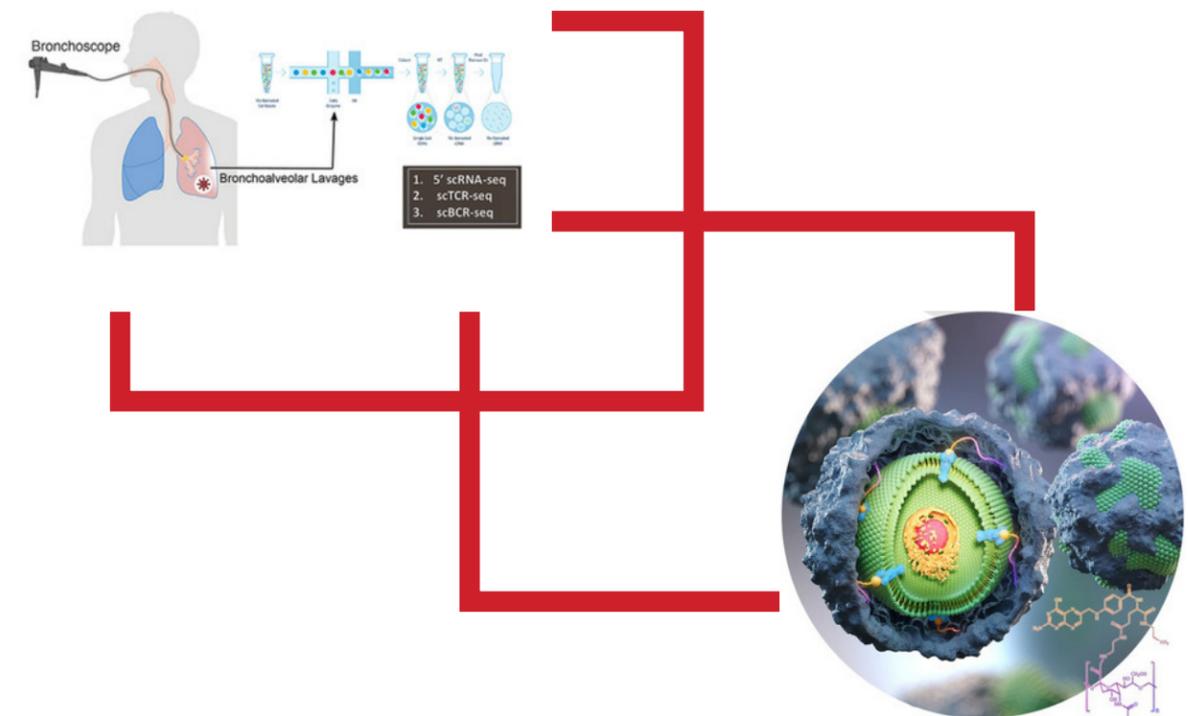
The research team led by Dr. WANG Guanyun from College of Computer Science and Technology and Dr. YAO Lining from Carnegie Mellon University co-developed MorphingCircuit—an integrated design, simulation, and fabrication workflow which combines electronic functions with forms through 4D printing. Their research was published in *The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT / UbiComp)*, a premier journal series for research relevant to the post-PC era.

The research team is currently focusing on the deformation of thermoplastic materials and using changes in temperature to control the deformation of objects. In addition, the team is also exploring other deformable materials. For example, they are able to print “breathable clothes” using harmless bacteria and the deformation is determined by “humidity” rather than “temperature”.

Scientists create single-cell deep-immune atlas of COVID-19 and discover its immunopathology

Recently, QIAN Junbin, a researcher from Women’s Hospital affiliated with the Zhejiang University School of Medicine, teamed up with Prof. Diether Lambrechts from the VIB Center for Cancer Biology and KU Leuven in Belgium to engage in research into the distinction between mild and critical COVID-19. Their research findings were published in the journal *Cell Research*.

In this study, by using scRNA-seq data derived from BAL, the researchers performed deep-immune profiling of the adaptive and innate immune cell landscape within the main locale of COVID-19 pathology. It is the first time that researchers have made a systematic comparison between mild and critical disease groups in lung-localized pathology and revealed the dynamic immunological mechanism for the progression from mild to severe COVID-19 at single-cell resolution. These findings bear crucial therapeutic relevance.



ZJU scientists develop macromolecular drug for cancer therapy via extracellular calcification

Inspired by biomineralization in nature, two research teams conducted collaborative research into cancer therapy. They are led respectively by WANG Ben, an associate professor from the Institute of Translational Medicine and Prof. TANG Ruikang from the Department of Chemistry. They developed a new polysaccharide based conjugate combining folate and polysialic acid (polySia), which can provide several carboxylate groups to enrich calcium from blood and induce cancer cell calcification spontaneously and selectively. The application of folate polySia can induce spontaneous and pathological calcification inside tumors, leading to successful tumor inhibition by affecting the aerobic glycolysis of cancer cells. Their research findings are published as a cover feature in the journal *Angew. Chem. Int. Ed.*

Public Engagement

ZJU4H “Mobile Digital Hospital” ushers in an era of “zero distance” mobile health

On January 23, the 5G “Mobile Digital Hospital” built by the Fourth Affiliated Hospital of the School of Medicine (ZJU4H) was officially launched. It is the first “mobile hospital” to provide medical services in the whole process in Zhejiang Province. Based on a mobile CT car and the 5G Internet technology, it offers a full spectrum of medical services and functions, including micro consultation rooms, CT/ B ultrasound/ ECG/ blood tests, remote consultation, mobile nursing and pharmaceutical guidance, online reservation, follow-up visits and drone logistics support.



RESEARCH HIGHLIGHTS



From IoT to cloud computing: Dunhuang murals can “live” for another millennium

The Mogao Grottoes boast a brilliant history of several millennia. Since 2006, associate professor DONG Yabo, Deputy Director of the Institute of Artificial Intelligence at School of Computer Science and Technology, has become one of its guardians. He has installed an environmental monitoring system to chronicle the “warm and cold signs” of artworks, which enables experts in heritage conservation to “prescribe a better cure”.

DONG Yabo uses the newly-emerging Internet of Things technology to transmit signals via the wireless sensing network. With more in-depth research, his research team monitors not only the environment inside caves, but also relics in tilting or cracking. The team also works with cloud technology experts from Alibaba in collaboration to resolve the problems regarding storage and management of massive data. Today, they are expanding their research and application in the hope of training more and smarter electronic “watchdogs” for other cultural heritage institutions.

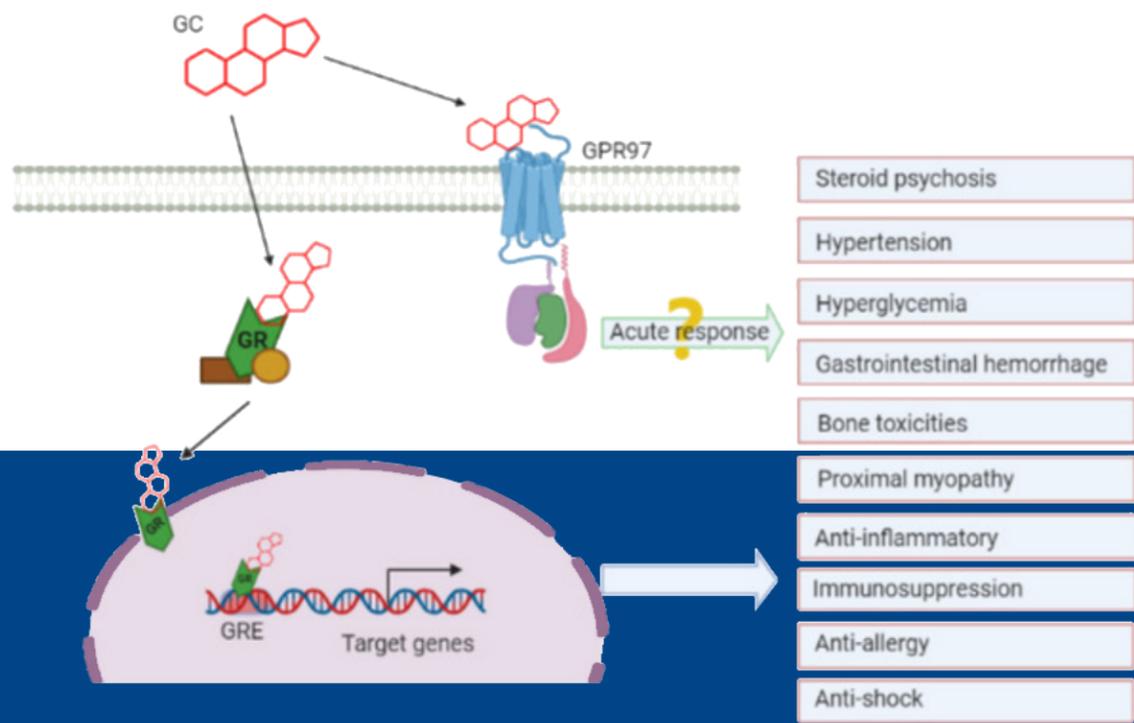
Researchers uncover seed microbiome-mediated disease resistance in rice

Recently, the role of bacterial seed endophytes in disease resistance in rice was unveiled by the research team led by Dr. WANG Mengcen from Zhejiang University and the team led by Dr. Tomislav Cernava from Graz University of Technology, and these findings were published as a featured cover article in *Nature Plants*.

Researchers observed that rice plants of the same cultivar can be differentiated into disease-resistant and disease-susceptible phenotypes under the same pathogen pressure. The disease-resistant phenotype was

characterized by the predominantly occurring *Sphingomonas* members in the seed endosphere. In the follow-up analyses, it was observed that *Sphingomonas melonis*, accumulated and transmitted across generations in disease-resistant rice plants, confers resistance to disease-susceptible phenotypes by producing anthranilic acid. Without affecting cell growth, anthranilic acid interferes with the sigma factor RpoS of the seed-borne pathogen *Burkholderia plantarii*, probably leading to the impairment of upstream cascades that are required for virulence factor biosynthesis.





Scientists identify the structure of adhesion GPCR–G complexes

Recently, the research teams led by ZHANG Yan from the School of Medicine and Zhejiang Laboratory for Systems & Precision Medicine, SUN Jinpeng from Peking University and Shandong University, and H. Eric Xu from the CAS Shanghai Institute of Materia Medica co-published an article entitled “Structures of glucocorticoid-bound adhesion receptor GPR97–Go complex” in *Nature*. It is the first time that the structure of adhesion

GPCR–G complexes has been identified and analyzed. This work provides experimental evidence that endogenous steroid hormone glucocorticoids are high-affinity agonists for GPR97, an aGPCR, and presents the structures of GPR97–Go in complex with two glucocorticoids. It thus lays a structural basis for ligand binding to the seven-transmembrane domain of an adhesion GPCR and subsequent G protein coupling.

ZHOU Qi’s research team publishes 3 papers regarding diversity of animal chromosomes

The research team led by ZHOU Qi from the Life Sciences Institute published 3 different papers regarding the genome configuration and sex chromosome evolution about the platypus, the Australian emu, and the Peking duck in *Nature*, *Genome Research* and *GigaScience*. The work about platypus, published in *Nature*, was an international collaboration with colleagues from the University of Adelaide and the University of Copenhagen, and the other two projects were independently completed by ZHOU Qi’s research team. These three studies systematically delineate the dazzling diversity of animal sex chromosomes and provide new insights into the origin and evolution of sex chromosomes at three-dimensional genomic levels using Hi-C technology. Comparative genomic analyses unraveled marked differences between monotremes and therians in haptoglobin genes, lactation genes and chemosensory receptor genes for smell and taste that underlie the ecological adaptation of monotremes.

SPOTLIGHT ON: STUDENTS



The “Smart Rice-fish Culture” team

The “Smart Rice-fish Culture” team from the College of Life Sciences clinched two gold medals in the 6th China College Students’ Internet Plus Innovation and Entrepreneurship Competition and in the 12th “Challenge Cup” National College Student Business Plan Competition.

The research found that in the rice-fish farming system, about 30% of the nutrients needed for the growth of rice derive from the metabolic waste of free-ranging aquatic organisms, which not only reduces the environmental pollution caused by the metabolic waste of the fish, but also brings down the cost of fertilizers from farmers. Fish can also feed on rice flowers. In hot summers, the rice canopy provides shade for fish. Therefore, rice and fish are mutually beneficial, which is of much help to the sustainable development of the ecological environment.



FACULTY

GU Zhen awarded the Felix Franks Biotechnology Medal



On January 15th, the Royal Society of Chemistry (RSC) awarded the Felix Franks Biotechnology Medal to GU Zhen, Qishi Chair Professor of Zhejiang University and Dean of College of Pharmaceutical Sciences, for his fundamental and technological innovations in the drug delivery field for the treatment of diabetes and cancers. Authorized by the RSC Felix Franks Biotechnology Medal Committee, the award ceremony was held at the University and Prof. ZHOU Tianhua, Vice President, granted the award to GU Zhen.

ZJU professors named ACM Fellows



On January 13th, the Association for Computing Machinery (ACM) announced its 2020 Fellows, which include two professors from the Zhejiang University College of Computer Science and Technology (CCST): Prof. REN Kui and Prof. ZHOU Kun.

Prof. REN Kui was elected for his contributions to wireless system security and cloud data security. He has published over 300 papers in peer-reviewed journals and conferences in areas of cloud and outsourcing security, wireless and wearable system security, and artificial intelligence security, with total citations over 34,000 times and an H-index of 75. Prof. ZHOU Kun was elected for his contributions to computer graphics. He conducts a wide range of research on shape modeling, real-time rendering, GPGPU computing, digital avatars and 3D printing, which has led to over 60 publications in ACM SIGGRAPH/TOG and more than 50 granted patents.

