

# CONNECTION

The Official Newsletter of Zhejiang University

Issue 18

Sept. 15, 2020



*Seeking Truth  
Pursuing Innovation*



[www.zju.edu.cn/english](http://www.zju.edu.cn/english)

ZJU Medical Center  
officially set up  
**P. 03**

Summer experiences in a  
pandemic  
**P. 04**

Particle physicists  
move closer toward  
understanding the matter  
asymmetry in the universe  
**P. 10**



# CONTENTS

**ZJU NEWSROOM** 03

**RESEARCH HIGHLIGHTS** 08

REGULATORY MECHANISMS IN THE BRAIN

HYBRID NANOMEDICINE FOR LIVER CANCER

MATTER ASYMMETRY IN THE UNIVERSE

**SPOTLIGHT ON** 11

## MESSAGE FROM THE EDITOR-IN-CHIEF

As the lotus flowers still blossom in Qizhen Lake, we embrace a unique summer. In response to the transnational mobility restriction, ZJU has worked with its global partners, creating 110 online global learning programs. In the middle of August, we greeted a cohort of Chinese students from UIUC, who will study at the ZJU International Campus as exchange students due to the pandemic.

It's inspiring to see new advances ZJU scientists continue to achieve in the fields of physics, medicine, engineering, environmental sciences, biotechnology, pharmaceutical science, and etc. I'm also proud to share with you ZJU's leap in the ARWU and the awards recognizing the remarkable achievements made by the ZJU faculty. The Medical Center was officially launched, aiming to be an innovative leader in customized diagnosis and an incubator for the health industry.

As always, we wish you pleasant reading and hope you are able to share your thoughts with us!



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



**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, TIAN Minjie, LI Yufei, WU Bojin

Material from *Connection* may be reproduced accompanied with appropriate acknowledgement.



# ZJU NEWSROOM

## Education

### ZJU Medical Center officially set up

Zhejiang Laboratory for Systems & Precision Medicine was set up on July 17, marking the official launch of Zhejiang University Medical Center. As a new multi-disciplinary research and development institution, the medical center will focus on the construction of an innovative medical ecosystem in the new era. High on the agenda are whole-chain R&D supporting facilities, the Future Medical Innovation Fund, professional services in medical translation, incubators and industrial parks.



The medical center aims to serve as a center for diagnosis and treatment of complicated diseases, a cradle of innovation for customized diagnosis and treatment technology, and an incubator for the health industry.





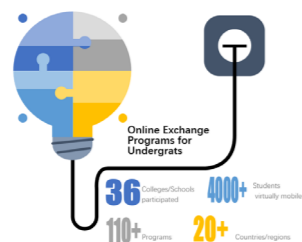
Screenshot of the online crash course Egyptology

### Summer experiences in a pandemic

The summer break is a time for ZJU students to hone their skills and broaden their horizons through diverse global exchange programs. In response to COVID-19, digital technologies are utilized to create more personalized and adaptive learning and connections for students.

This summer over 4000 undergraduate students have overcome the difficulty of time difference to take part in more than 110 online exchange programs. ZJU has

also worked with its global partners to replace the research internships with remote options. For example, ZJU students analyzed sample data or built demo devices from their home in China under the instructions of professors from UC Davis, Princeton University and National University of Singapore.



### ZJU and Tencent launch a joint lab for innovation technology

Recently, ZJU-Tencent Joint Lab for Game and Intelligent Graphics Innovation Technology (hereinafter referred to as the Joint Lab) was officially set up.

The Joint Lab will make the most of the elite talent pool and the world-class academic assets, such as the State Key Lab of CAD & CG, to strengthen disciplinary construction and talent cultivation in the domains of computer game science and animation, fill the gap in

China's games technology education and promote the sound development of the game industry. The Joint Lab will engage in research into scene modeling, motion control, real-time rendering, AR/VR, computer vision and artificial intelligence.



## International

### A special cohort of students set foot on ZJU's International Campus

On August 21, the International Campus welcomed a special cohort of incoming Chinese students matriculating at the University of Illinois at Urbana-Champaign (UIUC) for enrollment in the fall of 2020. They are unable to pursue their studies in the United States for the time being due to the COVID-19 pandemic. In the fall semester, they will study at ZJU as exchange students.

In response to the pandemic challenge, Zhejiang University has collaborated with its partner universities to develop innovative models and reinvent the international exchange programs. With access to local facilities and services, this group of exchange students will enroll in ZJU's in-person courses while working on their home university's online courses. ZJU Teachers and teaching assistants will also be available for in-person discussions so as to ensure the quality of teaching.



### ARWU puts ZJU among top universities in the world

Zhejiang University has leaped forward 12 places to the ranking of 58<sup>th</sup> within the world's top 100 universities in the latest Academic Ranking of World Universities (ARWU). Six Chinese Universities were listed in the top 100 league table of this year. Following Tsinghua University (29<sup>th</sup>) and Peking University (49<sup>th</sup>), Zhejiang University was ranked 3<sup>rd</sup> in China.

The University's research output and outstanding individual academic performance are major factors in achieving higher global ranking. Highly cited researchers, especially in publications such as Nature and Science, have made important contributions to such a ranking result.

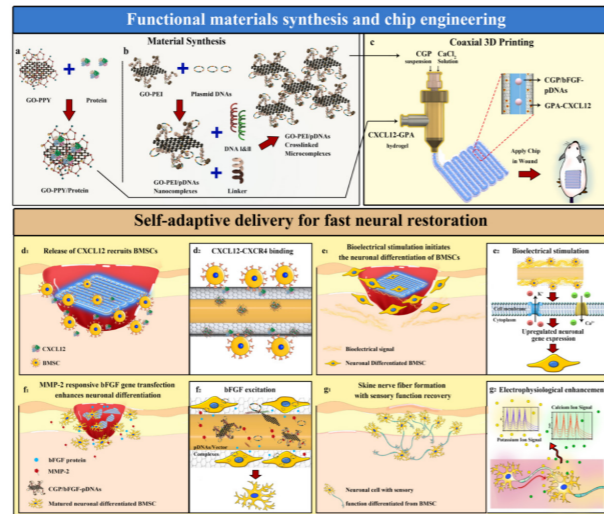




# Research

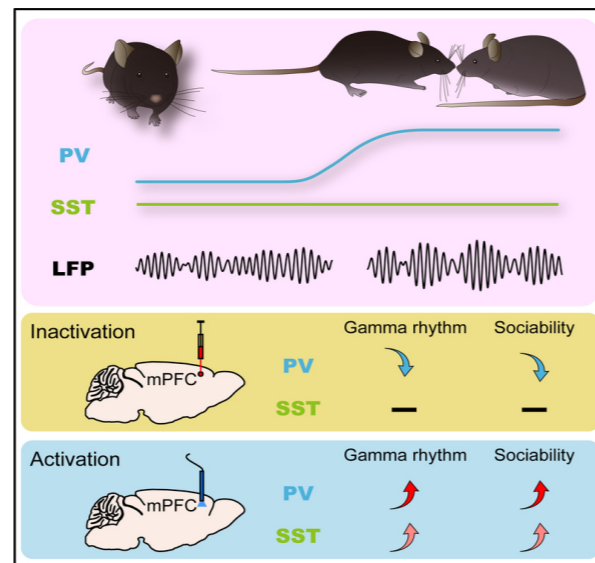
## A self-adaptive all-in-one delivery chip for skin wound healing

A multi-disciplinary team of ZJU designed a novel self-adaptive all-in-one delivery chip (G:P:AI-Chip) to assemble hybrid polymeric materials and multiple therapeutics within a single microchannel chip to achieve programmed skin nerve restoration based on endogenous stem cell recruitment. Successful *in vitro* and *in vivo* applications of this chip demonstrate the promise of utilizing feedback-controlled release systems to facilitate adaptive delivery of therapeutics. This project is led by Assoc. Prof. PENG Lihua and Prof. GAO Jianqing from College of Pharmaceutical Sciences. The study was published in the journal of *Advanced Functional Materials*.



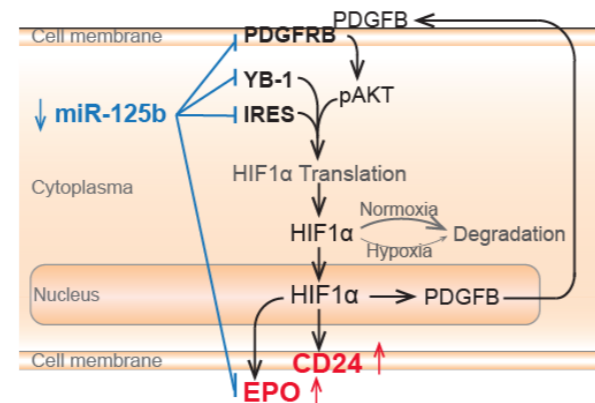
## Scientists discover the "Golden Baton" for regulating social interaction

The research team led by Prof. XU Han from School of Medicine has been committed to fundamental research into the neurological mechanism for social behaviors and social dysfunctions. They discover the cell type-differential modulation of prefrontal cortical GABAergic interneurons on low gamma rhythm and social interaction. This not only deepens the understanding of social interaction but also opens the door to treating such neuropsychiatric disorders as autism. Their findings were published in the journal of *Science Advances* on July 22.



## Key miRNA related to TACE therapy identified for HCC patients

The research team led by Prof. JI Junfang from Life Sciences Institute published a research article titled "MiR-125b Loss Activated HIF1α/pAKT Loop, Leading to Trans-Arterial Chemoembolization Resistance in Hepatocellular Carcinoma" in *Hepatology* on July 1. This article elaborates on the regulatory role of miRNA-125b-activated hypoxia signaling pathways in contributing to trans-arterial chemoembolization (TACE) resistance, thus providing prospective molecular signatures for TACE therapy.

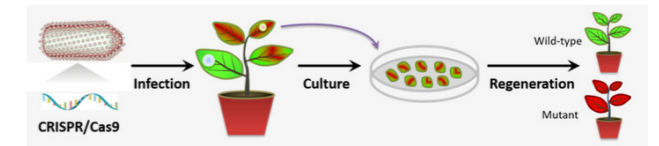


Poor cell sensitivity to TACE in hepatocellular carcinoma

## A novel approach to realize DNA-free gene editing in plants

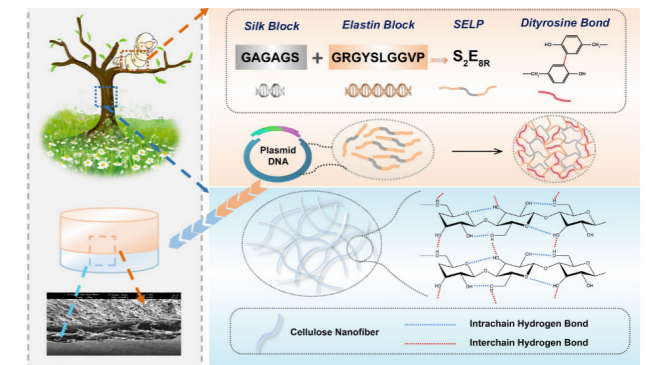
The research team, headed by Prof. LI Zhenghe from College of Agriculture and Biotechnology, reported the engineering of a plant negative-strand RNA virus-based vector for DNA-free in plant delivery of the entire CRISPR-Cas9 cassette to achieve single, multiplex mutagenesis and chromosome deletions at high frequency in a model allotetraploid tobacco host. Their research findings were published in the journal of *Nature Plants* on June 29.

This study provides a convenient, highly efficient and cost-effective avenue for CRISPR-Cas9 gene editing in plants through virus infection, thereby opening the door to DNA-free plant genome editing.



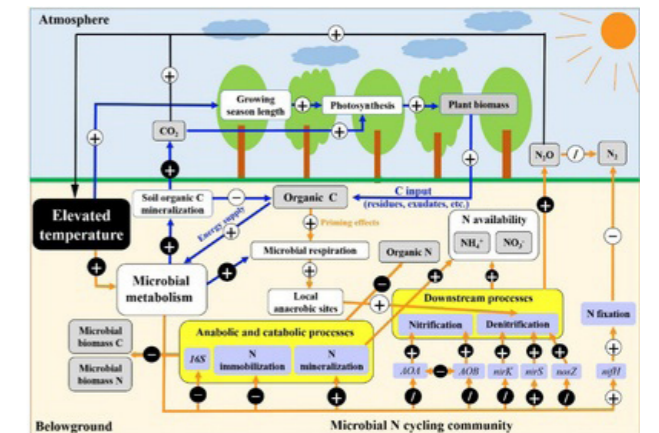
## A novel smart bionic actuator deformed upon the stimuli

The research team led by Dr. HUANG Wenwen from the ZJU-UoE Institute developed a bionic actuator system entirely out of biocompatible and biodegradable materials. This design is inspired from the hydration-dependent actuation of ice plant seed capsules. Stimuli-responsive genetically engineered silk-elastin-like proteins (SELPs) and cellulose nanofibers (CNFs) are combined to fabricate an actuator system that can respond effectively to physical and chemical stimuli. The SELP/CNF actuator can achieve programmable and reversible deformations in response to the stimuli. The study was published in the *PNAS*.

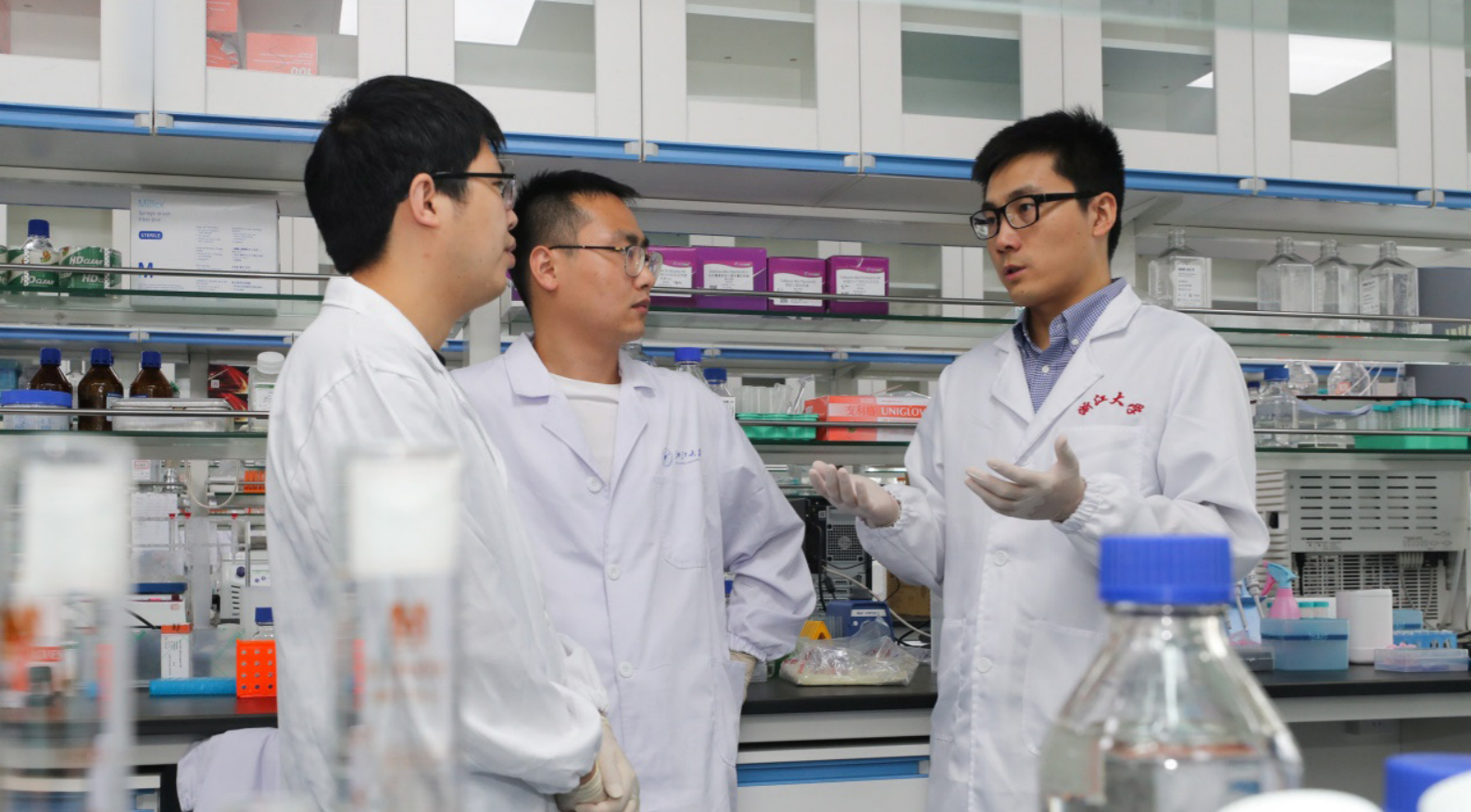


## Elevated temperatures influence soil N cycling in the global scale

The research team led by Prof. XU Jianming from College of Environmental and Resource Sciences published an article in the *Global Change Biology* on July 2, 2020. The team reported that elevated temperatures significantly decreased soil microbial biomass N in terrestrial ecosystems, increased the rates of soil N mineralization, nitrification and denitrification, and promoted the emission of N<sub>2</sub>O. This study reveals that elevated temperatures produce a dramatic impact on global N cycling processes with implications of a positive feedback to global climate and emphasizes the close link between soil microbial C and N cycling.







# RESEARCH HIGHLIGHTS

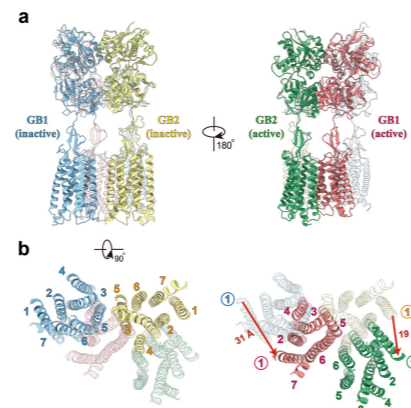
## Scientists open the door to the regulatory mechanisms in the brain

Scientists successfully presented, for the first time, the precise cryogenic electron microscopy (cryo-EM) structure of the full-length human heterodimeric Metabotropic  $\gamma$ -amino butyric acid (GABAB) receptor and a novel activation mechanism for the G protein-coupled receptor (GPCR).

Carried out by the team led by Prof. ZHANG Yan from Zhejiang University School of Medicine and the team led by Prof. LIU Jianfeng from Huazhong University of Science and Technology and published in the June issue of *Cell Research*, the research identified the high-resolution structure of the GABAB receptor in both inactive and active states via cryo-EM. GABAB is located

in the central nervous system, mediating slow and prolonged inhibitory activity. Researchers discovered that the GABAB receptor has two subunits. They also revealed a novel activation mechanism for the GPCR which is involved in virtually any physiological and pathological process.

COVID-19 is currently rampant all over the world, jeopardizing human life and health. "Structural pharmacology holds immense promise," said ZHANG Yan. "Identifying the full-length structure of the important protein of the virus is of appreciable significance to fabricating effective drugs with minimal side effects in a precise way."



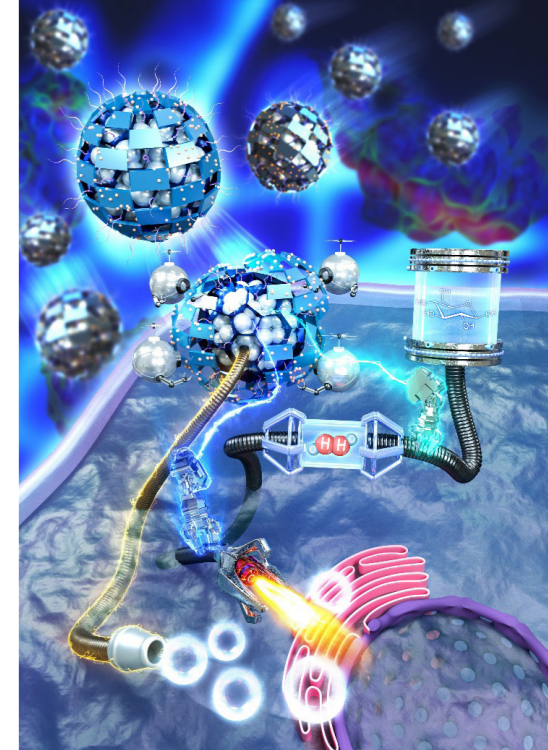
## Scientists fabricate a hybrid nanomedicine for liver cancer

Liver cancer is the seventh most common cancer. In recent years, there have emerged a variety of novel therapies, among which chemodynamic therapy (CDT) is one of the most promising. CDT can catalytically convert intracellular hydrogen dioxide (H<sub>2</sub>O<sub>2</sub>) into highly toxic reactive oxygen species (ROS) through therapeutic reactions, especially Fenton like reactions. It is characterized by its non-toxicity and exceptional targeting ability. Nevertheless, insufficient endogenous H<sub>2</sub>O<sub>2</sub> in the tumor issue inhibits the efficacy of CDT considerably.

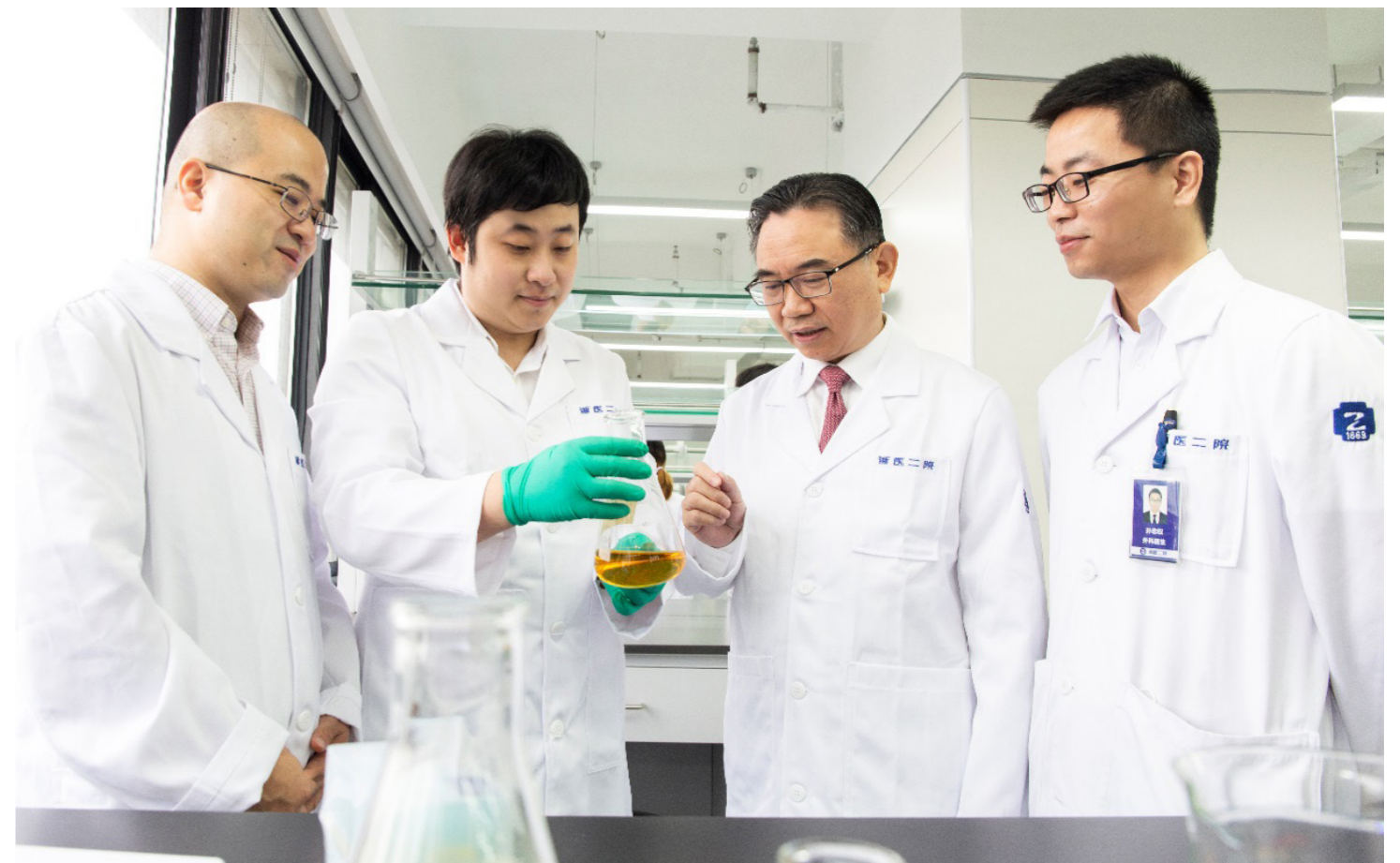
The research team led by Prof. WANG Weilin from Zhejiang University Second Affiliated Hospital and the team led by Prof. MAO Zhengwei from Zhe-

jiang University Department of Polymer Science and Engineering engaged in pioneering research into the possibility of fabricating a hybrid nanomedicine (Au/FeMOF@CPT NPs) using metal-organic framework (MOF) nanoparticles and gold nanoparticles (Au NPs) as building blocks for cancer chemo/chemodynamic therapy. Their research findings were published in an open access form in the *Advanced Science*.

In addition to systemic chemotherapy, this medicine can also play a vital role in intervention therapy and surgery. It can remove some early liver tumors with multiple metastases through local injection. Furthermore, the application of this drug together with the



surgical removal of some tiny and hidden lesions that can only be spotted during surgery can maximize the cure of liver cancer and minimize the possibility of recurrence.







# SPOTLIGHT ON



## Particle physicists move closer toward understanding the matter asymmetry in the universe

CMS collaboration recently reported the first measurement of the top-Higgs CP structure. Dr. XIAO Meng, PI in the Department of Physics, made significant contribution to the research effort and was selected as one of two editors for this article published in *Physical Review Letters*.

The Big Bang should produce the same amount of matter and antimatter, yet there is far more matter in the universe than antimatter. Theorists suggest that some interactions lead to this, and that one of their characteristics is Charge-Parity odd, also known as Charge-Parity Violation (CPV).

Based on the LHC Run2 dataset, the collaboration employed machine-learning algorithms to disentangle the relative fractions of the CP-even and CP-odd components of top-Higgs interactions. ttH production was observed at significance of  $6.6\sigma$ , and their results excluded a pure CP-odd structure of the top-Higgs Yukawa coupling at  $3.2\sigma$ . The ratio of the measured ttH production rate to the predicted production rate was found to be 1.38 with an uncertainty of about 25%. These results improved our understanding of the Higgs boson's properties, which also demonstrates the robustness of the Standard Model.

## Students

### DMT clinches championship at 2020 iQIYI iCartoonFace Challenge

Three ZJU students, HE Shuting, ZHANG Miao and ZENG Zhaoyang, formed the team DMT and won the championship at the 2020 iQIYI iCartoon-Face Challenge, an integral part of IJCAI PRICAI 2020. The Challenge attracted about 500 teams in China this year, such as Shanghai Jiao Tong University, the Chinese Academy of Sciences, the University of Science and Technology of China, and Tencent.

The DMT team is under the guidance of ZJU's Dr. LUO Hao, Prof. JIANG Wei and Prof. LIU Xinggao as well as researchers from Alibaba DAMO Academy. It has participated in several competitions in the field of com-

puter vision and achieved excellent records.

For instance, in the AI City Challenge 2020 the team innovatively integrated multi-domain learning and identity mining into the vehicle re-identification questions and was the third-place winner in the leaderboard of this track.

This January the team also participated in the 1<sup>st</sup> National Artificial Intelligence Challenge, co-hosted by Shenzhen Municipal Government and Tencent, and won the third place in person re-identification track with a handsome sum of prize money (500,000 yuan).

## Faculty

### Dr. Imran Haider Shamsi honored with the title of "My Favorite Foreign Teacher"

Dr. Imran Haider Shamsi, an associate professor from College of Agriculture and Biotechnology, clinched the title of "My Favorite Foreign Teacher" at the national competition and secured the position in top ten.

Dr. Imran became a ZJU's faculty member in 2012 after he got his Ph.D. degree from ZJU. With his dedication to teaching, he has won many awards, among which are ZJU Teaching Excellence Award, the grand prize of the 9<sup>th</sup> Young Teachers' Teaching Skills Competition in Zhejiang Province and the first prize of the 3<sup>rd</sup> National Teach-

ing Competition for Young College Teachers. He's also the recipient of the West Lake Friendship Award, which is the highest award established by Zhejiang Provincial Government in recognition of outstanding contributions made by foreign experts in terms of the economic and social development.

"It's a great feel to be part of one of the best universities," said Dr. Imran. "The hard work is the only choice which can give me the satisfaction and real happiness as I strongly believe I am made in, made by and made for Zhejiang University."