

CONNECTION

The Official Newsletter of Zhejiang University

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"Eye" on the far side of the moon

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Three collections of *The Series of Ancient Chinese Paintings* debut

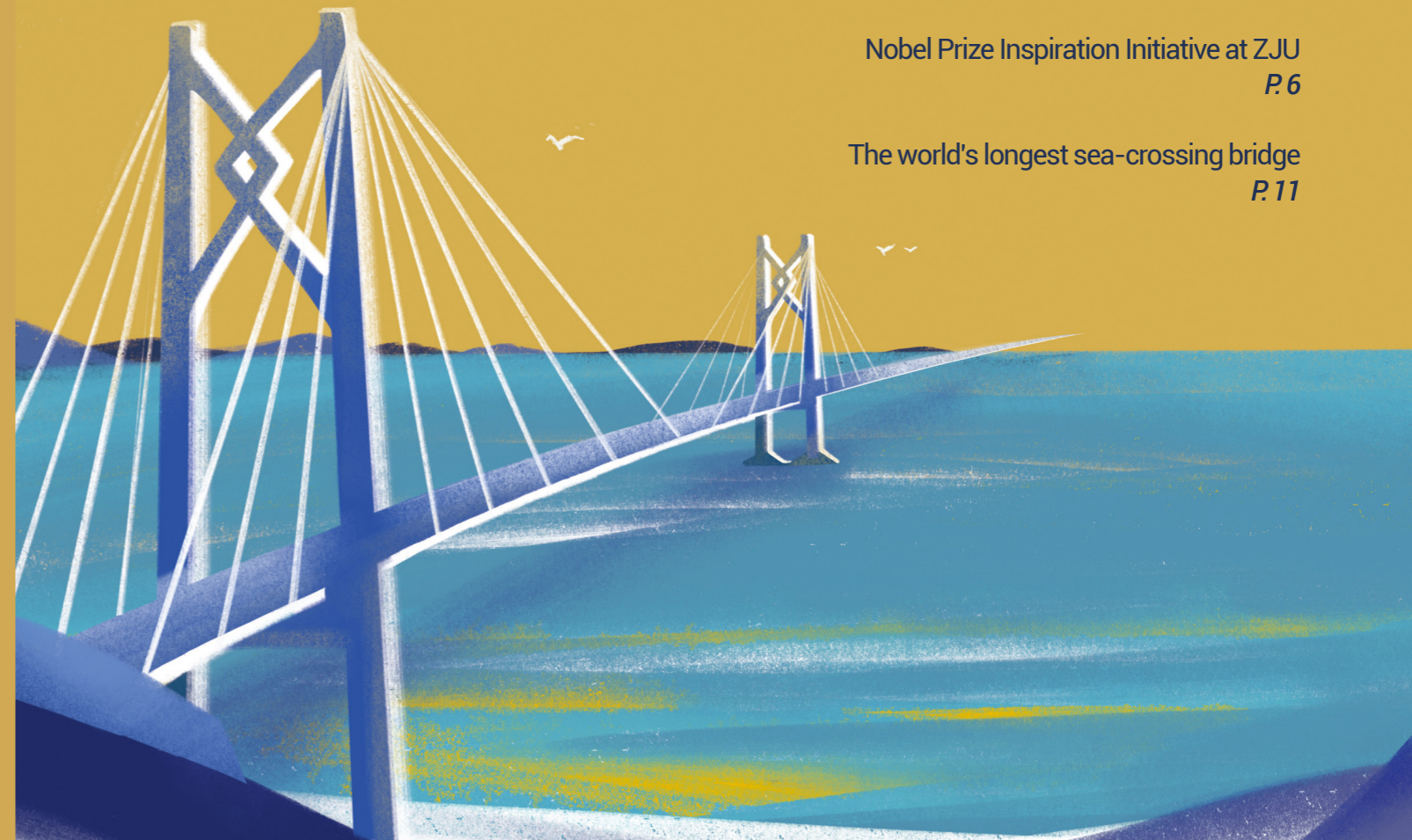
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*Seeking Truth
Pursuing Innovation*

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MESSAGE FROM THE EDITOR-IN-CHIEF

As Hangzhou embraces its beautiful snow this winter, I would like to invite you to take a closer look at ZJU's colorful events and fruitful researches during the past few months.

ZJU scientists and engineers have been actively engaged in serving the local and global community. We are proud to share with you their great contributions to the world's longest sea-crossing bridge — The Hong Kong–Zhuhai–Macao Bridge and the first probe that lands on the far side of the moon — Chang'e 4. A new round of research findings in the fields of neuroscience, biology, physics and engineering, and our efforts to boost scientific collaboration with our international partners also demonstrate our commitment to facing the challenges of the time.

I am happy to inform you that you will be able to read an issue of *Connection* every month in the days to come. As we enter 2019 with greater enthusiasm and dedication, the Global Communications of ZJU sincerely wishes you a very happy new year!



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ZJU NEWSROOM

INTERNATIONAL

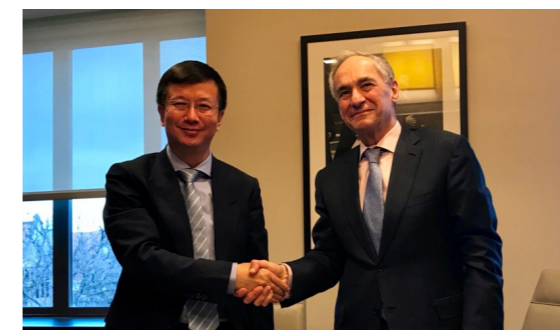
What's happening

- Over 70 representatives from around 30 Chinese and Pakistani universities attended the 2nd Exchange Mechanism Conference of China–Pakistan Economic Corridor Consortium of China–Pakistan Universities on Nov. 1.
- ZJU inked the cooperation agreement on World Leisure Center of Excellence (WLCE) with World Leisure Organization, becoming the first in Asia to hold the membership of WLCE.
- The ZJU delegation visited the University of Tokyo, the University of Chicago and Northwestern University to promote academic exchanges and global cooperation during Nov. 12–18.

- On Dec. 11, the ZJU delegation attended the Conference of ZJU–SUTD cooperation Administrative Committee for further partnership at Singapore University of Technology and Design.
- As the 3rd among Chinese institutions, ZJU had 17 scientists listed in the annual Highly Cited Researchers 2018 List by Clarivate Analytics.

The 18th Biennial IEEE Conference Electromagnetic Field Computation kicks off in Hangzhou

The 18th Biennial IEEE Conference on Electromagnetic Field Computation (CEFC 2018) kicked off in Hangzhou on Oct. 29, 2018. As an important scientific platform for academic exchanges in computational electromagnetics, it's the first time that CEFC has been held in China. Hosted by Zhejiang University this year, the conference attracted more than 500 scholars and engineers from more than 30 countries and regions.



Overseas study programs at your doorstep: 2018 ZJU Study Abroad Fair

To help students explore programs that offer international opportunities, ZJU's Office of Global Engagement held the first ZJU Study Abroad Fair on Nov. 1. More than 40 exhibitors of ZJU's international partner institutions joined the event to interact face-to-face with students.

"International collaboration has always been among the top priorities of our agenda," said Prof. LI Min, director of the Office of Global Engagement. "Last year, around 4000 ZJU students had a certain period of time of international experiences, which made a real difference in their lives."

Joint symposium highlights biotech collaboration with Cambridge

Aiming at maximizing the impact of ongoing research collaborations and translating them into concrete actions to take up new challenges for the future, the Cambridge-ZJU Biotechnology Symposium was held at Clare Hall on Dec. 11. More than 50 participants from the University of Cambridge and ZJU attended the symposium to exchange views on collaborative research during three sessions — biomimetics, biomedical materials, and biomedical engineering.

PUBLIC ENGAGEMENT

ZJU's Cultural Heritage Institute participates in restoration of Taleju Temple in Nepal

In 2016, Chinese and Nepali governments signed an agreement concerning restoration of Taleju Temple at Kathmandu Durbar Square. A team of engineers from ZJU's Cultural Heritage Institute engages actively in chronicling digital data regarding Taleju Temple. The restoration project is primarily focused on photographing and scanning typical components and resorted parts as well as surveying and drawing hidden parts.



Three collections of *The Series of Ancient Chinese Paintings* debut in Beijing

Three collections of *The Series of Ancient Chinese Paintings* — *A Collection of Paintings from the Warring States Period to the Tang Dynasty*, *A Collection of Ming Dynasty Paintings* and *A Collection of Qing Dynasty Paintings* — made their debut on Dec. 12 in Beijing. Experts hailed *The Series* as high-fidelity with the maximum replay of the charm of ancient Chinese paintings and as an "encyclopedia" of Chinese arts and history.



Your eyes tell you are interested

How can the brain achieve a real-time regulation of attention states? By monitoring cortical attention states via a computer-based visual device, scientists find that your eye movements may tell if you are interested when listening to a speech.

The research team headed by Prof. DING Nai at the College of Biomedical Engineering and Instrument Sciences published their findings in an article entitled "Eye Activity Tracks Task-Relevant Structures during Speech and Auditory Sequence Perception" in the December 18 issue of *Nature Communications*.

Drosophila's dietary preference sheds light on "gut feeling"

Can fruit flies taste amino acids? The research team led by Prof. WANG Liming from ZJU's Life Sciences Institute started their research from this intriguing question.

YANG Zhe *et al.* finds that fruit flies could also taste gourmet food via their "taste buds" in their gastrointestinal tract. The study, published in *Cell Research* entitled "A post-ingestive amino acid sensor promotes food consumption in *Drosophila*", is a catalyst for deepening the human understanding of gustation.

A new three-dimensional super-resolution imaging technique for live cells

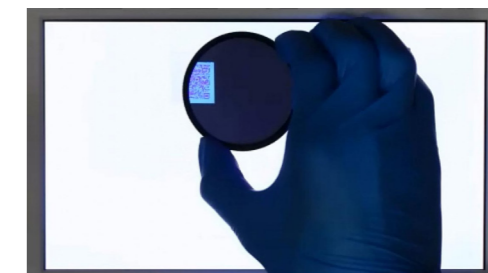
Recently, the research team led by Prof. LIU Xu and Prof. KUANG Cuifang from ZJU's College of Optical Science and Engineering put forward a novel method of performing 3D multi-color live-cell super-resolution volume imaging, which is termed as multi-angle interference microscopy (MAIM). The findings are published in the November 16 issue of *Nature Communications*.

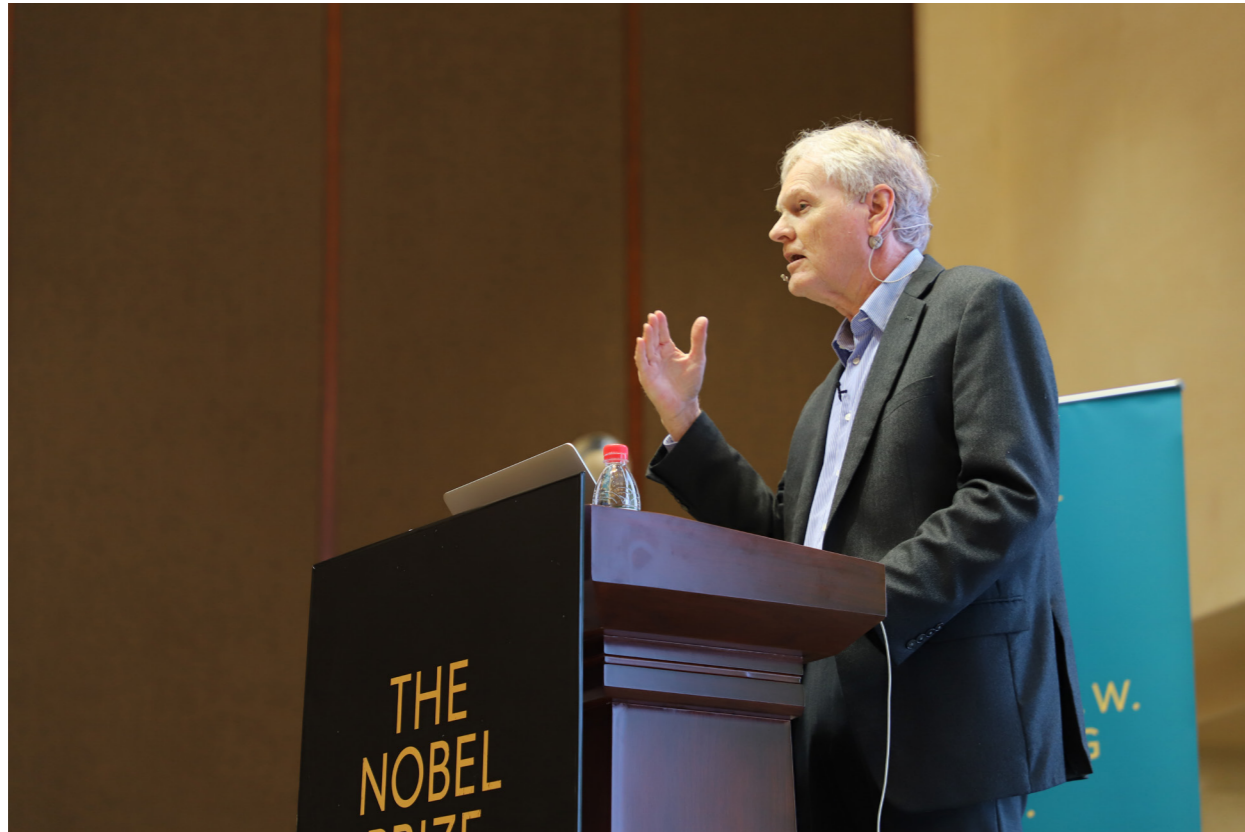
In the future, MAIM can be applied to tracking the subcellular dynamics of mitochondria and microtubule architectures, thus boosting the efficiency of various studies spectacularly.

Programmable plastics: Encoding the "color" of the colorless

Scientists invented a kind of programmable plastics in which a precise "invisible" pattern can be inserted via digitalized modulation of internal stresses.

"We haven't added any pigment to materials or altered the micro structure of their surface. It is due to stress that the patterns are created," said ZHANG Guogao, a member of the research team led by Prof. XIE Tao from College of Chemical and Biological Engineering.





Nobel Prize Inspiration Initiative kicks off at ZJU with Michael Young

Michael W. Young, 2017 Nobel Laureate in Physiology or Medicine, visited Zhejiang University on Dec. 4, as part of the Nobel Prize Inspiration Initiative (NPII) 2018 in China.

During his visit, Prof. Young gave a lecture entitled "Genes that control sleep and circadian rhythms" at Qiushi Great Hall, which attracted more than 400 students and scholars.

Prior to the lecture, Prof. Young engaged with ZJU's students and young researchers in two round-table talks, sharing insights on science, life and career. "Consider carefully what interests you most and be patient. Take the steps necessary to begin to do research in your own small way," said Prof. Young.

ZJU establishes International Business School

On Nov. 15, the International Business School was inaugurated on Haining International Campus, along with the convocation of the Asia Pacific FinTech Landscape Symposium.

"I hope that International Business School will be committed to promoting the joint development of emerging finance, technologies and industries and make considerable contributions to regional development," said ZJU President WU Zhaohui. "We should highlight more outstanding disciplinary qualities in line with the strategic demands of new business studies, embrace a more inclusive spirit in the age of globalization and serve as a more typical yardstick for education which caters to the strategic needs of industrialization."

Marked by cross-border education, International Business School will construct a multi-level ecological system incorporating a network of world-renowned universities and institutions.



International Alliance of "Belt & Road" Engineering Education established in Hangzhou

At the 2018 Symposium on Engineering Talent Cultivation in the context of "Belt & Road" on Nov. 9-11, the International Alliance of "Belt & Road" Engineering Education was inaugurated in Hangzhou. Headed by Zhejiang University, this alliance was co-launched by over 10 institutions and enterprises

"With the massive construction of infrastructure along the Belt & Road, it's a primary mission for first-class universities to provide intellectual support and cultivate talents. The Symposium will create a new chapter of cultivating top engineers for the Belt & Road Initiative and building a global community of engineering education," remarked ZOU Xiaodong, chairman of the University Council.



■ Xi's visit to Portugal: Innovation center boosts science collaboration

Science and technology collaboration has been a key part of cooperation between China and Portugal. One of their projects is the Portugal–China Joint Innovation Centre for Advanced Materials. CGTN's Wu Lei visited the center at Zhejiang University in east China and found out more.

Doctors often use metal stents to treat heart disease. But there's a disadvantage: The traditional cardiovascular stent gets left in the heart forever. Researchers from Portugal and China are now developing an advanced bio-degradable stent to change that.

JI JIAN, DIRECTOR PORTUGAL–CHINA JOINT INNOVATION CENTRE FOR ADVANCED MATERIALS “What the innovations for ours is that we make it bio-degradable, we made a coating which is like a sponge, then we can deliver many drugs and biomolecules, growth factors, which can induce the healing of blood vessel.”

Since the joint innovation center was built by the governments of Portugal and China in 2013, over 20 Portuguese experts have come to do research. In addition to studying advanced materials, they also work with 20 domestic companies to turn research into real products. (CGTN)

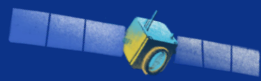
■ NEXT Summit calls for multilateral cooperation

Attendees of the second NEXT Summit (Hangzhou 2018) called for multilateral cooperation and against protectionism in Hangzhou on Thursday.

Peter Goodfellow, president of the New Zealand National Party and the Oceania Silk Road Network's honorary chairman, pointed out that China and New Zealand need to work harder to promote international cooperation and reduce trade barriers, praising China for becoming a leader in supporting and promoting free trade in the past few years as well as China's determination to adhere to reform and opening up.

The second NEXT Summit kicked off in Hangzhou, Zhejiang province, on Nov. 22, with a focus on optimal practices among some 400 delegates from New Zealand, China and around the world to seek a new pathway for global cooperation, and is jointly hosted by China Economic Information Service, the Oceania Silk Road Network (OSRN), and Zhejiang University.

The summit held five parallel subforums on five industry areas: public service, energy and infrastructure; robotics, artificial intelligence and blockchain; food, health and husbandry; education, tourism and cultural creativity; innovation and transformation of scientific & technological research. (China.org.cn)



RESEARCH HIGHLIGHTS

“Eye” on the far side of the moon

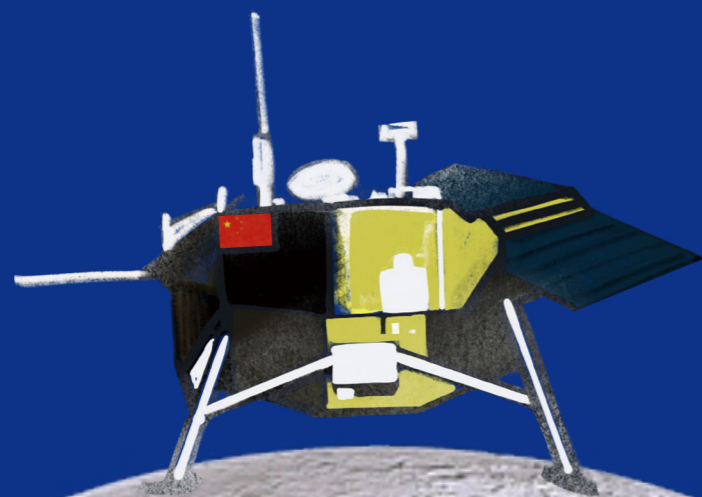
At 10:26 am Beijing time on Jan. 3, 2019, China’s Chang’e 4 probe made history in outer space exploration as it became the first to land on the far side of the moon.

“It is when the landing image of Chang’e 4 probe was successfully transmitted to us that my heart calmed down from pounding,” said Prof. XU Zhihai in ZJU’s College of Optical Science and Engineering.

A close-up image of the landing was captured by the Landing Camera (LCAM) deployed on the lander, which was developed by a research team headed by Prof. XU Zhihai.

“This small ‘eye’ plays a crucial role for Chang’e 4 to land on the ‘perilous’ lunar surface. The lens of the small ‘eye’ is made of radiation-proof glass to block a myriad of radiations in the space. Its body tube is made of titanium alloys so that it can take high-resolution photos even in extreme environments,” explained XU Zhihai.

Besides LCAM, the research team developed the optical camera system for Queqiao relay satellite, which provided telecommunications support for Chang’e 4 lander. This camera also took the first picture of the earth and the moon from Lagrange L2 point.



ZJU's contribution to the world's longest sea-crossing bridge

The Hong Kong–Zhuhai–Macao Bridge, the world’s longest sea-crossing bridge, was open to traffic on Oct. 23. The bridge spans the waters of the Pearl River Estuary and cuts the travel time between Hong Kong, Zhuhai and Macao from three hours to 30 minutes.

The ZJU team headed by WANG Jinfeng from Institute of Transportation Engineering undertook key work in the construction of the Bridge. They resolved many technological problems by applying the numerical simulation technology to generating key parameters of the final design of the project, and provided massive technological support such as flood prevention in the Pearl River Estuary and white dolphin reservation. The team also claimed responsibility for a series of construction work, which helped ensure the smooth and successful construction of the Bridge.

“Upon completion of the bridge, we participate in a series of work in regard to summarizing technologies and compiling norms and standards so as to facilitate sea-crossing development in China and serve the construction of the Belt & Road Initiative,” remarked WANG.



Dr. WANG Jinfeng at the construction site



Wall-climbing robot for rust removal put into use

The team led by Prof. ZHU Shiqiang from ZJU's Ocean College develops a wall-climbing robot for automatic ship rust removal, which has been put into use recently.

With a weight of 72 kilograms and a carrying capacity of over 100 kilograms, the robot removes rust and paint using an ultra-high water jet of 200 MPa and vacuums wastewater into a collecting device from the deck simultaneously, thereby avoiding pollution caused by wastewater.

This robot can also be applied to the maintenance of petrochemical storage tanks. The team looks forward to bringing this robot into full play in Zhoushan, one of the major shipyards and oil storage centers in China.

A sample robot with a greater carrying capacity and higher working efficiency is currently being assembled, and an amphibious robot will be developed soon.

Evidence for Weyl fermions in a heavy fermion system found

The research team led by Prof. YUAN Huiqiu from ZJU's Center for Correlated Matter and Department of Physics reported evidence for Weyl fermions in the heavy-fermion semimetal YbPtBi in *Nature Communications* on Nov. 5, 2018. Their work provides a new platform for studying the interplay of topology and electron correlations, as well as topological quantum phase transitions.

At high temperatures, electronic structure calculations, ARPES, and magnetotransport measurements show consistently that Weyl nodes formed from the conduction bands, while the f electrons are well localized. At lower temperatures, the strong band renormalization due to Kondo coupling enhances the effective quasiparticle mass, which modifies the dispersion of the bands in the vicinity of the topologically protected Weyl points. This leads to the disappearance of the chiral anomaly in resistivity measurements, but the very large entropy associated with the heavy charge carriers means that the linear band dispersion near the Weyl nodes can be probed by specific heat measurements. Here evidence for Weyl fermions at low temperatures is found from a quadratic temperature dependence of the specific heat coefficient. Meanwhile the topological nature of the electronic state is revealed to persist at very low temperatures, from a significant contribution of the band topology to the Hall effect.



A novel type of battery developed to store energy using porous carbon from mold

The research team headed by XIA Xinhui in ZJU's School of Materials Science & Engineering develops a novel type of high-energy lithium-sulfur (Li/S) battery using porous carbon from a filamentous fungus. Their findings are published in the journal of *Advanced Materials*.

Fermented from waste fruits and vegetables, porous carbon is introduced into the energy field as an energy storage material to produce higher-energy Li/S batteries. With a capacity of three times higher than that of best batteries in the market, the battery, competitive in cost and service life, may help resolve the endurance problem of electric cars in the future.

"The Li/S battery is considered to be a promising energy-storage technology, notably for its high capacity and achievable energy of sulfur. Its hypothetical capacity far surpasses that of lithium-ion batteries," XIA Xinhui says.

SPOTLIGHT ON: STUDENTS

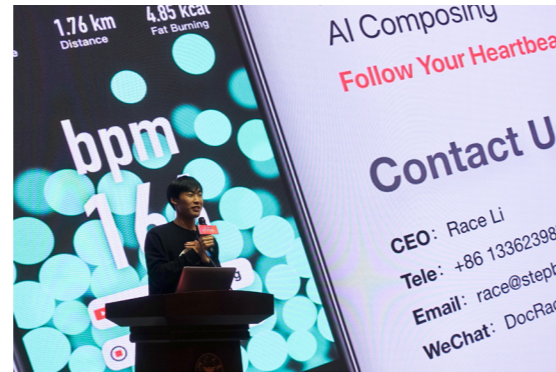
Ideas to reality: International College Students' Entrepreneurship Invitational Competition 2018

"At first it all began with a simple idea: make running more fun," said LI Chenxiao, CEO of *StepBeats* and a sophomore from ZJU's College of Media and International Culture. "One day I heard someone complaining beats in his music doesn't match his running steps, and it came to my mind that it would be great to have music produced in real time in sync with the runner's stride."

StepBeats, an app enabling its users to improvise music by AI composing while running, just won the Gold Award in the Final Pitch of the International College Students' Entrepreneurship Invitational Competition 2018 on Oct. 19.

Similarly, a team from NUS has been working on transforming their ideas into useful products. Seeing the flaws of certificate verification in Singapore and China, they developed *Blockcert-blockchain*, a certificate verification platform for institutions, companies and individuals.

More than 100 teams from around the globe submitted their ideas to the Competition. Only eight teams made it to the Final Pitch. Besides *StepBeats*, *Transparent Display* from MIT and *Intelligent Traffic Control* from Ben Gurion University also won a Gold Award.



ZJU clinches gold at the 2018 iGEM competition

On Oct. 29, Team ZJU-China's "A Detector" won the gold medal at the 2018 International Genetically Engineered Machine (iGEM) competition. It is the sixth time ZJU has won the gold medal.

"A Detector" employs protein logic gates to detect biomarkers and ultimately aid in diagnosis. It links three pairs of isopeptide bonds to form logic gates which are fixed onto electrodes via the curl matrix. The output signal could be applied to diagnosis of traumatic brain injuries and hematogenic shock.



ZJU students thrive at the 1st China College Computing Contest — Artificial Intelligence Innovation Contest

In the first China College Computing Contest — Artificial Intelligence Innovation Contest, teams from the College of Computer Science and Technology have won a grand prize, a first prize and a second prize.

More than 1,000 teams from 369 universities at home and abroad signed up for the competition. A total of six teams from ZJU participated in the contest. HU Sihao, YUAN Jiaqi and WU Zetian's "Intelligent Financial Risk Control Model for Mobile Phone Rental Business" won a grand prize. "You Speak I Paint" by ZHANG Shengyu, JIANG Yinjie and LIAO Binbing won the first prize, and "Intelligent Recognition and Auxiliary Diagnosis System for Thyroid Nodule Images" by SHAO Ping, KONG Ming, ZHAO Tianqi won a second prize.