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CHINA'S SPACE DAY 2019

ACADEMICIAN LIU YONGTAN WON CHINA'S TOP SCIENCE AWARD AND HIT WON 4 NATIONAL SCIENCE AND TECHNOLOGY AWARDS

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AWARDS & HONORS

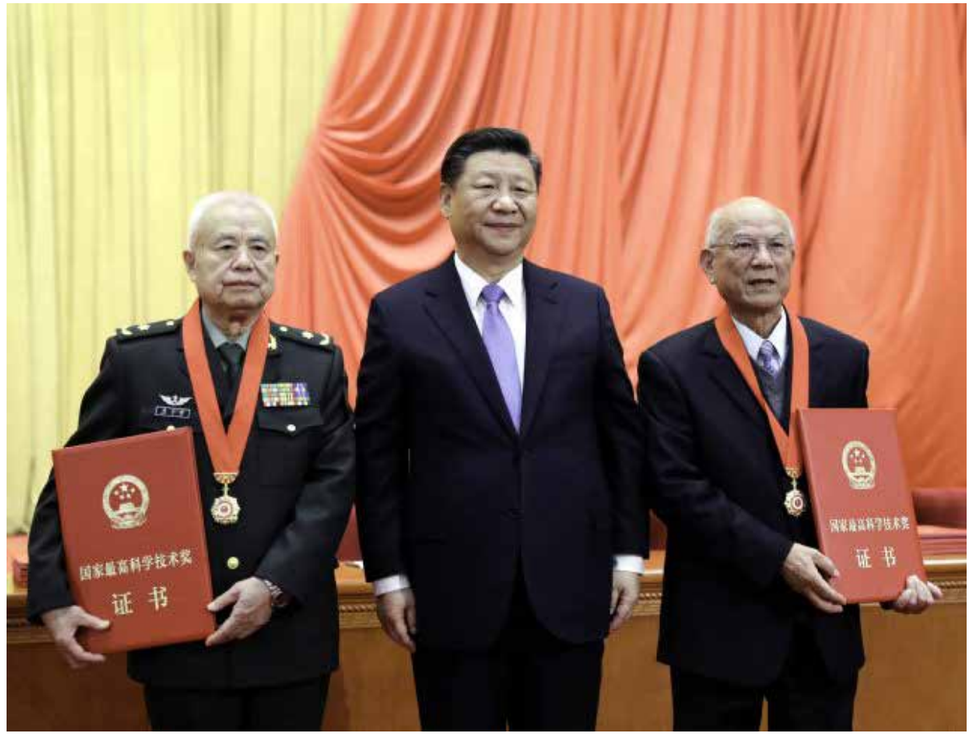
ACADEMICIAN LIU YONGTAN WON CHINA'S TOP SCIENCE AWARD AND HIT WON 4 NATIONAL SCIENCE AND TECHNOLOGY AWARDS

On January 8th, the ceremony of the National Science and Technology Award was held at the Great Hall of the People in Beijing. President Xi Jinping, also general secretary of the Communist Party of China (CPC) Central Committee and chairman of the Central Military Commission, granted an award and medal and certificate to China's top science award winner Liu Yongtan, who is an academician of the Chinese Academy of Sciences and the Chinese Academy of Engineering (CAE) from Harbin Institute of Technology.

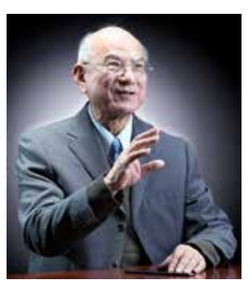
During the ceremony, 278 projects won the National Science and Technology Awards, including 38 National Natural Science Awards, 67 National Technological Invention Awards, and 173 National Scientific and Technological Progress Awards.

Harbin Institute of Technology won 4 of these awards including 3 National Technological Invention Awards and 1 National Scientific and Technological Progress Award. In addition, 4 collaborative projects won 2nd prizes.

A project led by Professor Leng Jinsong, a project led by Professor Wang Changhong and a project led by Professor Tan Yiqiu won 2nd prizes of the National Technological Invention Awards. The project "Key Technology of Data Mining and Safety Assessment for Structural Health Monitoring of Large Bridges" led by Professor Li Hui won the 2nd prize of the National Scientific and Technological Progress Award. ■



ACADEMICIAN LIU YONGTAN WON CHINA'S TOP SCIENCE AWARD



On January 8th, 2019, the National Science and Technology Awards Conference was held by the Central Committee of the Communist Party of China and the State Council in Beijing. President Xi Jinping, also general secretary of the CPC Central Committee and chairman of the Central Military Commission, presented the State Preeminent Science and Technology Award medal and certificate to Academician Liu Yongtan.

The State Preeminent Science and Technology Award was established in 2000 by the State Council of the People's Republic of China, under the responsibility of the National Science and Technology Awards Committee. The award is the highest level of the five national science and technology awards in China. It is awarded to the scientists and technicians who have made major breakthroughs in frontier technology or have made outstanding contributions in scientific and technological innovation and application of scientific and technological achievements in high-tech industry. The State Preeminent Science and Technology Awards are selected once a year, with no more than two awards given each time. Until now, only 31 outstanding scientists have received this award.

Liu Yongtan was born in December 1936 in Nanjing, Jiangsu Province. From 1953 to 1958, he studied in the Department of Electrical Engineering of Harbin Institute of Technology and the Radio Department of Tsinghua University. He joined Harbin Institute of Technology as a faculty member in 1958. Currently, he is a professor and doctoral tutor at Harbin Institute of Technology. In 1991, he was elected as an academician of the Chinese Academy of Sciences. In 1994, he was elected as an academician of the Chinese Academy of Engineering.

Academician Liu Yongtan is a well-known expert in radar and signal processing technology in China. He is the founder of the sea surface target detection theory of a new radar type in China and a leader in the development of remote detection technology.

In the early 1980s, facing the major needs of the national coastal defense strategy, Liu Yongtan initiated the research field of China's new radar type detection technology. In the past 40 years, he led the team to focus on the research of sea surface remote detection technology and has successfully realized comprehensive and independent innovation in the theory, technology and engineering application of the new radar system type.

Due to the particularity of the frequency band, conventional theory cannot support the research of the new radar type. Academician Liu Yongtan led the team to break through the basic theories of the generation of strong sea surface propagation, sea clutter background target detection, long-range detection signals and system model design, and created a complete and systematic new type detection theory. Based on this, a series of key technologies were overcome and China's first experimental new radar type was successfully developed. For the first time, China realized long-distance detection experiments of a sea surface target. This was a major breakthrough in China's sea detection technology, and for this, Liu Yongtan won the first prize of the National Scientific and Technological Progress Award in 1991.

In order to solve the urgent need for remote detection of the national sea defense, it is necessary to develop radar with stable and long-distance detection capability. However, from principle to engineering, it involves technical problems such as a complex electromagnetic environment and various strong clutter interferences. Facing the technical bottlenecks that are difficult to overcome in the world, from the late 1990s to the beginning of this century, Liu Yongtan led the team, after thousands of experiments and many major improvements, to form a set of innovative technologies and methods. In 2011, a new radar system with full-time, all-weather and long-distance detection capabilities was successfully developed. Compared with the most advanced radars in the world, it has a smaller system scale, but longer detection distance and higher accuracy. The overall performance has reached the international advanced level, and the core technology is in the leading position in the world. This was another major breakthrough in China's long-distance detection technology. In 2015, Professor Liu once more won the first prize of the National Scientific and Technological Progress Award.

Facing the country's future long-sea strategic needs, Academician Liu Yongtan has also planned to implement a systematic study on remote sea surface detection and he has gradually carried out independent innovations such as distributed and miniaturized detection technologies. These are forward-looking technologies for the construction of a monitoring system for detection of the vast sea area.

PROFESSOR WANG CHANGHONG WON THE 2ND PRIZE OF THE NATIONAL TECHNOLOGICAL INVENTION AWARD

Professor Wang Changhong is the Director of the Space Control and Inertial Technology Research Center from the School of Aeronautics at HIT. His project "High-Precision Physical Simulation System and Test Technology for Large Spacecraft" won the 2nd prize of the National Technological Invention Award.

This project has proposed a solution of verification, validation and accreditation of the condition of spacecrafts. The obtained results have been applied to various space missions, such as the "Feng Yun" series satellite.

In the past decade, Professor Wang and his team have been dedicated to the studies of simulation and testing for spacecrafts, and have developed a series of systematic methods for system performance evaluation and assessment. Other innovative results include a large bearing air bearing, a high precision detection device and measuring technique, a spherical error separation technique, a high rigidity instrument platform, modeling and simulation techniques, etc.

Professor Wang has been granted over 50 patents. He has also authored or coauthored over 100 papers published in journals such as IEEE Transactions on Automatic Control, Automatica, Control and Decision, and so on.

PROFESSOR TAN YIQIU WON THE 2ND PRIZE OF THE NATIONAL TECHNOLOGICAL INVENTION AWARD

Due to her outstanding contribution to the anti-ice and anti-slip functional asphalt pavement in cold regions, Professor Tan Yiqiu, a Chang Jiang Scholar from the School of Transportation Science and Engineering, won the 2nd prize of the National Technological Invention Award. The project also won the 1st prize of the Scientific and Technological Award of China Highway & Transportation Society, the 1st prize of the Technological Invention Award in Heilongjiang Province and the Excellence Award of China Patent Award.

In order to provide new technologies and new ways to solve the problem of winter road safety, the project independently invented

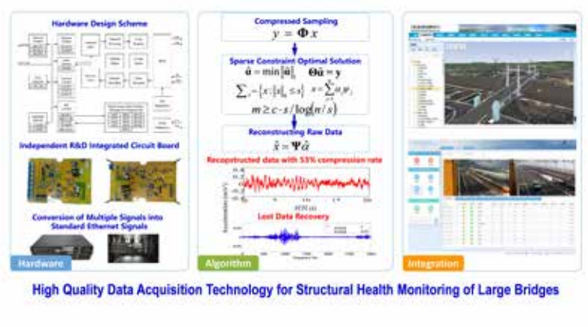
a wide temperature domain, slow release type of low freezing point filler, which solved the problem of the "high freezing point and short release period" of halogen materials and overcame the problem of poor durability of frozen pavement. In addition, the team invented a method and device for evaluating the anti-icing and anti-sliding function of the road surface in a tire-ice-road three-phase system and realized the rapid-in-situ-lossless-quantitative evaluation of the road surface function.

The research results have been successfully promoted in more than 80 projects in 19 provinces, such as the Beijing Winter Olympic Stadium Road and the Beijing's New Airport Expressway. The road service capacity has been significantly improved, ensuring the safety of winter snow and ice roads, and bringing significant social and economic benefits.

PROFESSOR LI HUI WON THE 2ND PRIZE OF THE NATIONAL SCIENCE AND TECHNOLOGY PROGRESS AWARD

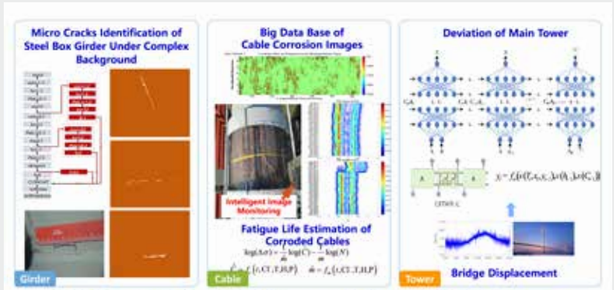
On January 8th 2019, the project "Key Technology of Data Mining and Safety Assessment for Structural Health Monitoring of Large Bridges" led by Professor Li Hui won the 2nd prize of the National Science and Technology Progress Awards, which is the first big data analysis and application project in the transportation industry.

China has the largest number of large bridges in the world, each of which cost billions to tens of billions of RMB and carried tens of millions of vehicles per year. In the past 15 years, 165 bridges collapsed due to the damage and disease, resulting in enormous economic losses. Aiming at the safety requirements of large bridges in China, Professor Li's team developed an intelligent acquisition technology of high-quality data monitoring in severe environments, proposed a big data driven and model driven safety assessment approach system, and put forward a novel monitoring data analysis and condition assessment technology in the event of disasters and emergencies.

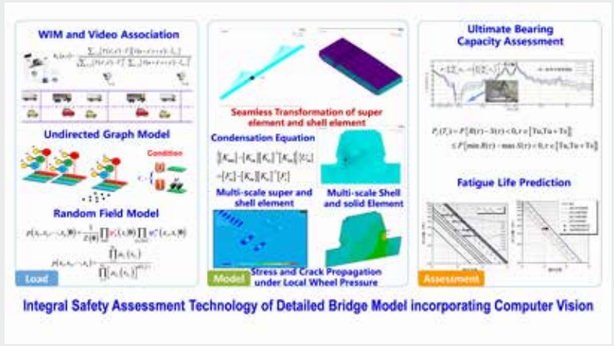


High Quality Data Acquisition Technology for Structural Health Monitoring of Large Bridges

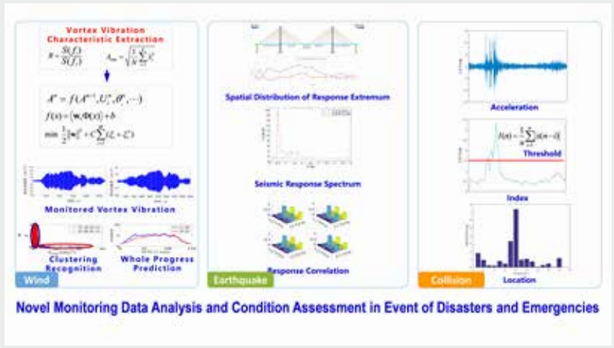
Professor Li's team pioneered and led the research of structural health monitoring data science and engineering in the world and promoted the development of the new field of "smart bridges." CCCC Highway Consultants Co., Ltd, a partner of her team, designated and built a stable and reliable monitoring system for more than 50 super-large bridges in China, such as Hong Kong-Zhuhai-Macao Bridge and Hangzhou Bay Bridge, using the aforementioned key technologies, which reduced the bridge traffic control time by 50%, achieved direct and indirect economic benefits for 1.08 billion and more than 10 billion RMB respectively. They formulated the first technical regulations for structural safety monitoring system of highway bridges in the transportation industry, published 40 SCI papers and gave 32 keynote lectures at important conferences at home and abroad. She published a monograph "Structural Health Monitoring Data Science and Engineering" and authorized 10 patents and software copyrights. In light of her innovative and outstanding contribution in data science and engineering, Professor Li Hui was the first Chinese person elected as the chairman of the International Association for Structural Control and Monitoring and was the first mainland Chinese person awarded as Person of Year for the International Structural Health Monitoring.■



Health Feature Extraction and Rapid Assessment Technology of Critical Components



Integral Safety Assessment Technology of Detailed Bridge Model incorporating Computer Vision



Novel Monitoring Data Analysis and Condition Assessment in Event of Disasters and Emergencies

PROFESSOR ZHOU YU ELECTED AS APAM ACADEMICIAN

On June 27th, a board meeting of the Asian Pacific Academy of Materials (APAM) was held at Nanyang Technological University in Singapore.

In 2019, 32 APAM academicians were elected, including one Nobel Laureate and 10 academicians from the Chinese Academy of Engineering. 12 associate academicians were also elected. During last 27 years, more than 400 APAM academicians have been elected. Professor Zhou Yu from Harbin Institute of Technology (HIT) was elected as one of APAM academicians.

Professor Zhou Yu is an academician of the Chinese Academy of Engineering and an academician of the World Academy of Ceramics. He is also the President of HIT and HIT Shenzhen. He is mainly engaged in the research of ceramic phase transformation and toughening, thermal shock resistance and ablation resistance of ceramic composites, and the application of spacecraft thermal protection components. Professor Zhou won one 2nd prize of the National Technological Invention Award, ten provincial and ministerial science and technology awards, and more than 60 China invention patents. He has published more than 400 SCI and EI papers with more than 4000 citations. He has more than 80 graduates with Master's degrees and Doctoral degrees.

PROFESSOR CHEN HONGREN WON CHINA'S LIFETIME ACHIEVEMENT AWARD FOR TRAFFIC ENGINEERING

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Recently, the 40th anniversary of the founding of China's traffic engineering discipline was held. Professor Chen Hongren from the School of Transportation Science and Engineering at HIT was awarded China's Lifetime Achievement Award for Traffic Engineering at the symposium.

The symposium, with the theme of "Sharing Dreams and Creating the Future through Science", was co-hosted by the Traffic Engineering and Information Branch of the China Highway and Transportation Society and the College of Metropolitan Transportation from Beijing University of Technology. It aimed to discuss emerging issues and future development plans of the traffic engineering discipline in China and to present the lifetime achievement awards to the founders and pioneers who have contributed their whole lives to the development of the discipline. The China Lifetime Achievement Award for Traffic Engineering went to six professors, namely Professor Chen Hongren from Harbin Institute of Technology, Professor Ren Futian from Beijing University of Technology, Professor Xu Jiqian from Southeast University, Professor Yan Baojie from Chang'an University, Professor Yang Peikun from Tongji University, and Professor Feng Guiyan from Hunan University.

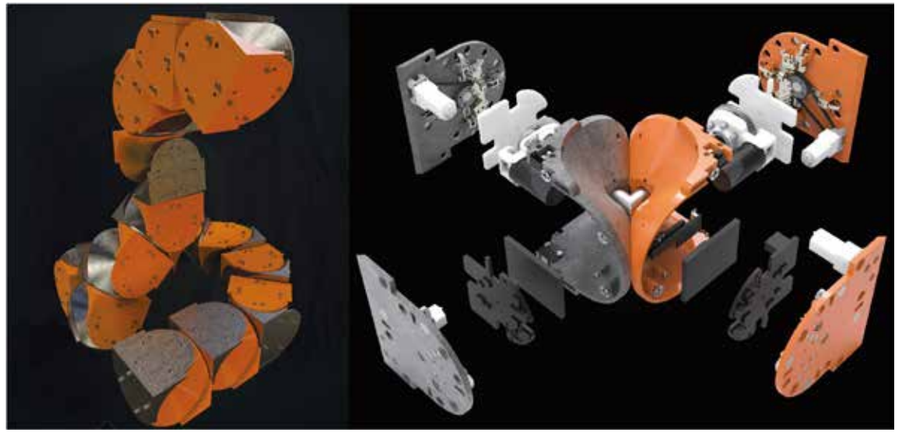
As one of the founders of the traffic engineering discipline in Harbin Institute of Technology and one of the pioneer experts of doing research and practice in the traffic field in China, Professor Chen Hongren has rich experience in teaching, scientific research, and the practice of traffic engineering. Over the years, he has engaged in the teaching and research of road survey and design, traffic planning, and traffic management and control. He has published four books and more than 30 papers and has cultivated more than 20 graduate students. Moreover, he won the second prize of the National Science and Technology Progress Award and a number of scientific and technological awards at the provincial and ministerial levels. Also, he served as the Director of the China Traffic Engineering Society, a member of the China Urban Traffic Planning Committee, a member of the National Traffic Engineering Professional Education and Instruction Commission, a member of the Expert Consultant Committee of Harbin, and as the General Engineer Consultant of the Shenzhen Municipal Design and Research Institute, etc.

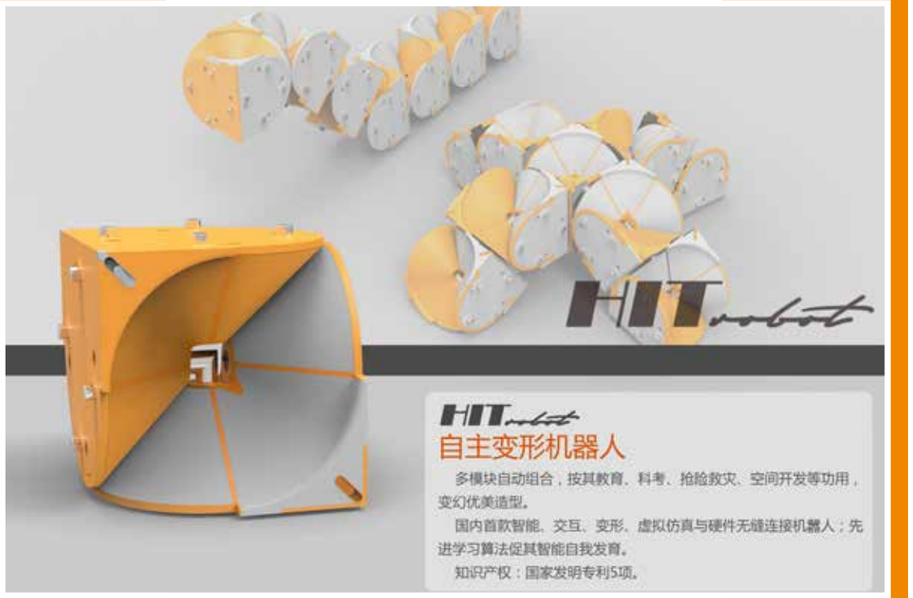
HIT WON GOLD AWARD OF CHINA EXCELLENT INDUSTRIAL DESIGN

Recently, the award ceremony for the China Excellent Industrial Design Award was held in Wuhan. The modular autonomic deformation robot designed by the HIT Robotics and Industrial Design Team won the gold award. It was the only gold award won by a university.

In 2012, the China Excellent Industrial Design Award was established to promote the development of the industrial design industry and improve the innovation ability of industrial design. Launched by the Ministry of Industry and Information Technology of the People's Republic of China, it was the first national government award in the field of industrial design approved by the China Central Committee. In 2018, there were 10 gold awards that emerged from the fields of consumer goods, electronic information products, transportation tools, machinery equipment, etc.

The team led by Professor Zhao Jie and Professor Zhu Yanhe from the State Key Laboratory of Robotics & Systems at HIT designed the modular autonomic deformation robot. It is composed of a large number of standard modular units. The modules can be freely configured, dynamically combined, autonomously deformed, and can realize configuration remodelling, functional regeneration and combine multiple functions. It can be applied in a complex environment and varied tasks, and has broad application prospects in many fields, such as military, disaster relief, aerospace, education, etc. With its unique innovative concept, this work fully reflects the development trend of integrating technology, engineering, intelligence, data and industrial design.





A PHOTO OF THE MOON'S FAR SIDE WITH THE EARTH BEYOND TAKEN BY HIT

On February 15th, "News in Brief" in the journal Science published a photo of the moon's far side with the earth beyond. The photo was taken by a miniature CMOS camera built by students from Harbin Institute of Technology, which is on board the Chinese DSLWP-B/Longjiang-2 satellite.

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The Longjiang-2 satellite, independently developed by the microsatellite team from HIT, was launched with the Queqiao relay satellite last year and then successfully deployed a lander on the moon's far side. It was the world's first microsatellite which was able to complete the earth-moon transfer, braking when approaching the moon and lunar flight. HIT became the first university in the world to place a spacecraft in the moon's orbit. The Longjiang-2 satellite carries the VHF/UHF communication module developed by HIT LilacSat team to conduct radio astronomy. The UV communication module has a built-in miniature CMOS camera for space photography.

HIT has been committed to international exchange and cooperation in the field of aerospace, and the Longjiang-2 has also received worldwide attention. The image was transmitted with the cooperation of radio amateurs in the Netherlands and Germany.

RESEARCH & ACADEMIA

CERAMIC AEROGEL RESEARCH FROM PROFESSOR LI HUI'S GROUP PUBLISHED IN SCIENCE

Recently, Professor Li Hui's group from the School of Civil Engineering published a research paper titled "Double-Negative-Index Ceramic Aerogels for Thermal Superinsulation" in Science (IF=41.058). Associate Professor Xu Xiang was the first author. Professor Li Hui, Professor Huang Yu and Professor Duan Xiangfeng (UCLA) were co-corresponding authors. HIT was the co-corresponding affiliation.

A new mechanically strong, double-pane ceramic aerogel made from hexagonal boron nitride that is resistant to high temperatures could be used in aerospace and industrial applications. The material, which boasts both a negative Poisson's ratio and a negative thermal expansion coefficient, is very different to typical ceramic aerogels that are brittle and structurally degrade under thermal shocks. Aerogels are exceptionally lightweight composite materials containing more than 99% air. They can withstand high temperatures and are resistant to many chemicals. Most aerogels studied so far, however, are made from ceramic materials, such as silica, alumina and silicon carbide, and are thus very brittle. Researchers recently

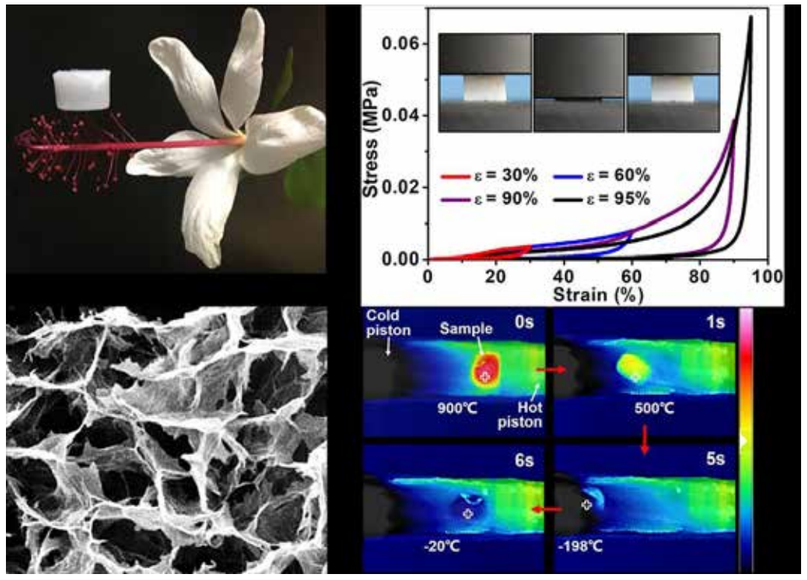


Diagram of ceramic aerogels for their ultralight weight, superelasticity, structure and thermal stability

made aerogels from graphene (a sheet of carbon just one atom thick). Here, the nanosheets of carbon stack up against each other, which makes the material incredibly strong. The nanosheets also divide the aerogel into nanosized cells through which air cannot pass. This means that the material has a thermal conductivity that is lower than that of air.

The resulting material has a density as low as 0.1 mg/cm^3 thanks to its highly porous structure with atomically thin cell walls (made of highly crystalline hBN), is superelastic (it can be compressed to 5% of its original length without breaking and fully recovers), and has an ultralow thermal conductivity (of around 2.4 mW/m·K in vacuum and 20 mW/m·K in air). It can also withstand sharp temperature shocks in that it can be heated to 900°C and then rapidly cooled to -198°C at a rate of 275°C per second over several hundred cycles while hardly losing any of its strength.■

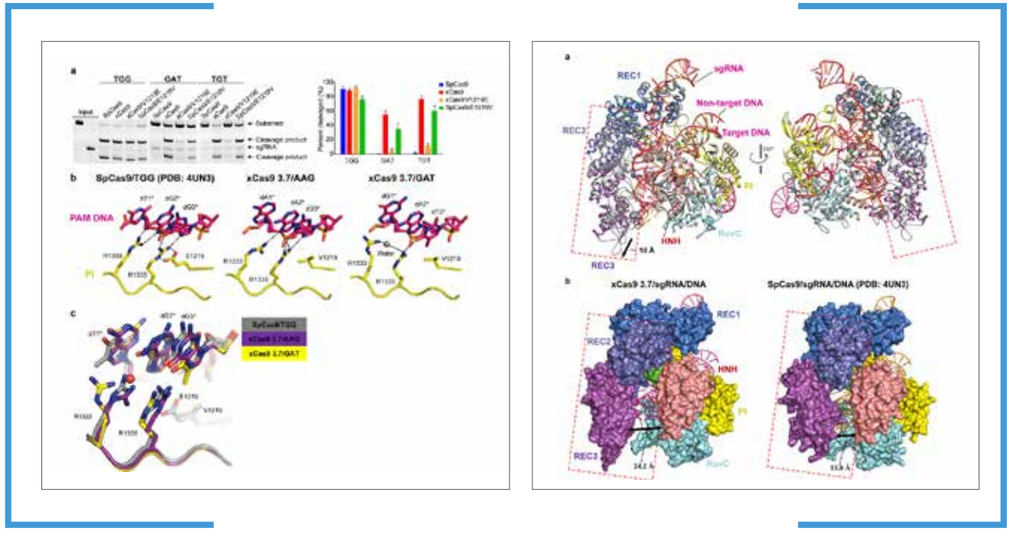
REFERENCE

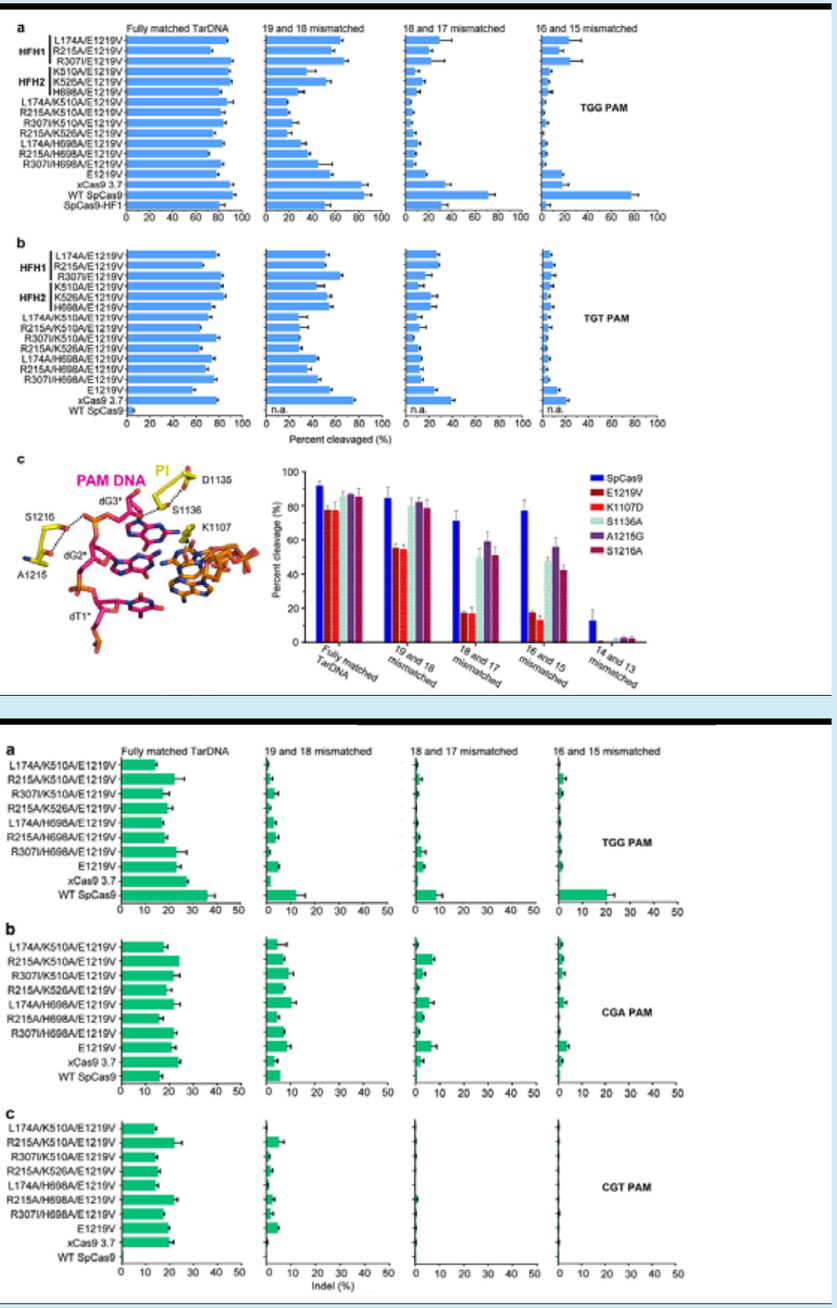
Xiang Xu, Qiangqiang Zhang, Menglong Hao, Yuan Hu, et al. Double-negative-index ceramic aerogels for thermal superinsulation. Science, 2019, 363, 6428, 723-727

STRUCTURAL INSIGHTS INTO A HIGH FIDELITY VARIANT OF SpCas9

On January 27, 2019, a group led by Professor Huang Zhiwei from the School of Life Science at HIT revealed the structural mechanisms underlying the broadened PAM compatibility and high DNA fidelity of xCas9 3.7 (carrying 7 point mutations, A262T, R324L, S409I, E480K, E543D, M694I and E1219V, compared with wild-type (WT) SpCas9). The research paper titled "Structural Insights into a High Fidelity Variant of SpCas9" was published in Cell Research.

Many bacteria encode CRISPR-Cas adaptive immune systems to defend themselves from phage invasion. The RNA-guided endonucleases of the CRISPR-Cas9 system, including the most widely used Cas9 from Streptococcus pyogenes (SpCas9), are becoming a robust genome editing tool in model organisms and hold immense promise for therapeutic applications. Many strategies have been employed to overcome the limitations caused by SpCas9's off-target effects and its stringent requirement for the protospacer adjacent motif (PAM) sequence. However, the structural mechanisms underlying these

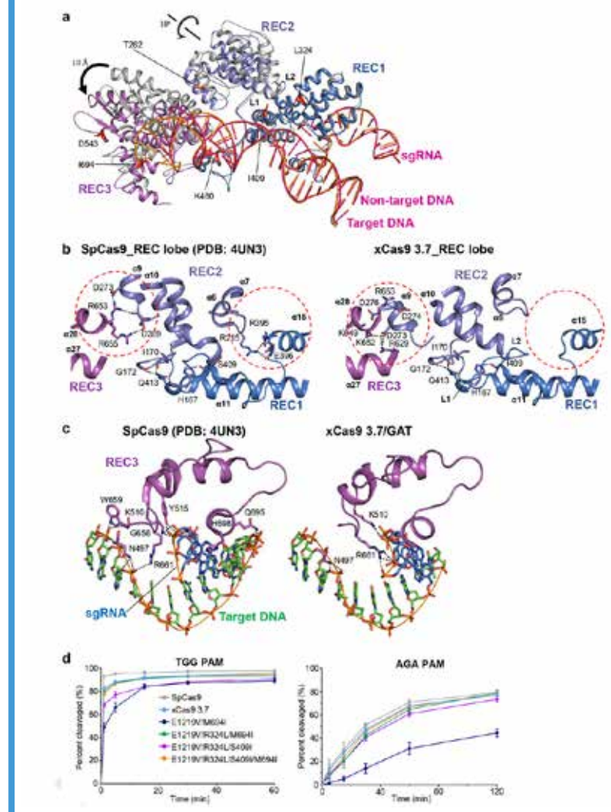




strategies remain undefined.

To reveal the molecular mechanisms of the broadened PAM recognition and improved DNA specificity of xCas9 3.7, we determined the crystal structures of xCas93.7 in complex with a 100-nucleotides (nt) sgRNA, a 28-nt target DNA strand and an 11-nt non-target DNA strand containing either 5'-GAT-3' PAM or 5'-AAG-3' PAM sequence, at 2.7 and 3.0 Å resolutions, respectively. Structural comparison revealed that salt bridge-stabilized R1335 is critical for the stringent selection of PAM sequence by SpCas9. Mutation of E1219 to Val disrupts salt bridges with R1335, and unrestricted rotamerization of this residue by the E1219V mutation in xCas9 3.7 lessens the stringency for PAM recognition and allows SpCas9 to recognize multiple PAM sequences. Compared to those in wild-type (WT) SpCas9, REC2 and REC3 domains in xCas9 3.7 undergo striking conformational changes, leading to reduced contact with DNA substrate. SpCas9 mutants engineered to display less interaction with DNA and have conformationally more flexible REC2 and REC3 domains display enhanced specificity for DNA substrates in both biochemical and cellular assays.

This study not only reveals the molecular mechanism of the high-fidelity Cas9 gene editing system for the first time, but also has value to guide the reform of a novel gene editing system. Professor Huang Zhiwei is the correspondent author of the paper. His Ph.D. students Guo Minghui, Ren Kuan and Postdocter Zhu Yuwei are the co-first authors of the paper. This research was financially supported by the National Natural Science Foundation of China.



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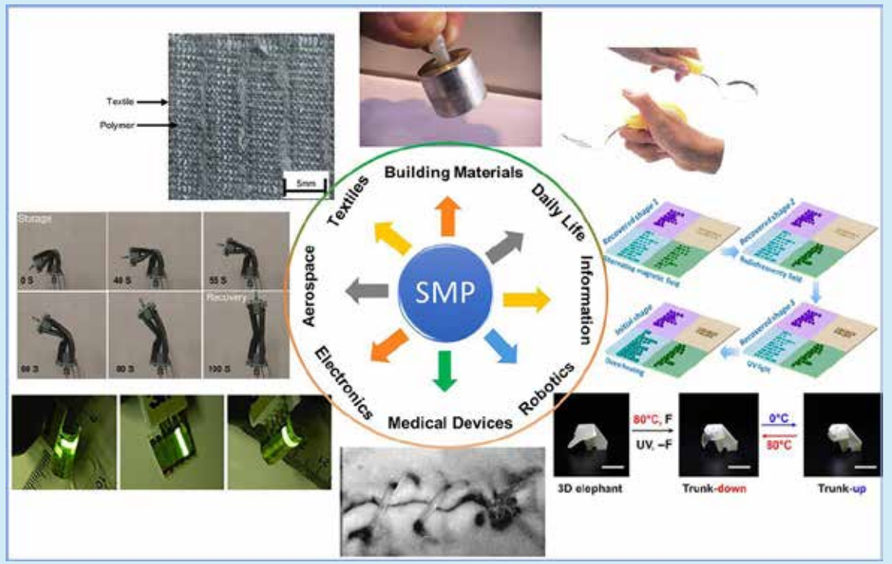
Minghui Guo, Kuan Ren, Yuwei Zhu, et al. Structural insights into a high fidelity variant of SpCas9. Cell Research, 2019, 29, pages183–192

A CRITICAL REVIEW OF SHAPE MEMORY POLYMER-BASED FLEXIBLE ELECTRONICS



Recently, a team led by Professor Leng Jinsong from the Centre for Composite Materials and Structure at Harbin Institute of Technology published an important review article titled "The Research Status and Challenges of Shape Memory Polymer-Based Flexible Electronics" in Materials Horizons to summarize the research status and challenges of shape memory polymer-based flexible electronics.

Shape memory polymers (SMPs), with the advantages of programmable shape change, tunable modulus, large deformation, light weight and low cost, have been widely investigated and developed in the past decades. More and more attention has been paid to the applications of SMPs in the areas of medical devices, aerospace, electronics, robotics, textiles, building materials, daily life and information. The novel features of SMPs have opened a new field of SMP flexible electronics, and more functions have been endowed with the SMP flexible electronic devices (SMPFEDs). Moreover, 4D printing technology provides the feasibility to fabricate SMPFEDs with complicated structures.

Professor Leng's group has developed several kinds of thermosetting SMPs, including styrene-based, epoxy-based, bismaleimide-based, cyanate ester-based, and polyimide-based SMPs, as well as shape memory filaments for 4D printing. In this review, they focused on some issues in the application of SMPs in flexible electronics, including materials, fabrication technologies and actuation methods. Firstly, advances in the SMPFEDs, like SMP light-emitting diodes, SMP thin film transistors and optical devices were introduced. Secondly, some available fabrication techniques for SMPFEDs, especially 4D printing, were discussed. Then the potential actuation methods of SMPFEDs are also summarized. Finally, the challenges and further developments of SMP-based flexible electronics are described.

This paper was financially supported by the National Natural Science Foundation of China.

REFERENCE

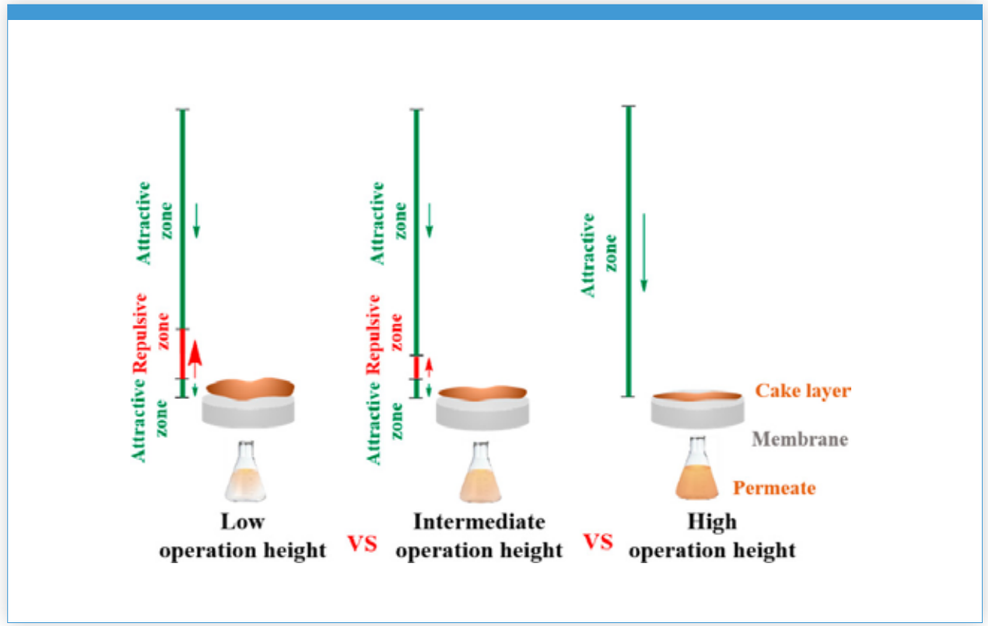
Hui Gao, Jinrong Li, Fenghua Zhang, Yanju Liu, Jinsong Leng. The research status and challenges of shape memory polymer-based flexible electronics. Materials Horizons, 2019, 6: 931-944

A PAPER PUBLISHED BY PROFESSOR MA JUN'S TEAM SELECTED AS HIGHLIGHT IN ENVIRONMENTAL SCIENCE & TECHNOLOGY

Professor Ma Jun from the School of Environment published a paper titled "Interaction Analysis between Gravity-Driven Ceramic Membrane and Smaller Organic Matter: Implications for Retention and Fouling Mechanism in Ultralow Pressure-Driven Filtration System," which was identified as a highlight in the leading environmental journal Environmental Science & Technology.

The gravity-driven membrane has attracted much attention due to its excellent properties, such as low energy consumption, stable operation and simple maintenance. The gravity-driven membrane has been applied in many fields, such as sewage water treatment, oil-water separation, rainwater circulation, household drinking water treatment and seawater pretreatment. In-depth analysis of the retention and fouling mechanism of the gravity-driven membrane plays a crucial role in optimizing its filtration performance.

This study pointed out that physicochemical interactions and hydrodynamic interaction mutually influenced the retention and fouling behaviors of gravity-driven ceramic membrane filtration. Specifically, the change of operation height largely influenced the function exertion of electrostatic interaction (EL) between membrane and foulant in an ultra-low pressure driven system. Additionally, EL interaction played a significant role on retention and fouling performance among EL, van der Waals (LW) and acid-base (AB) interactions in gravity-driven ceramic membrane filtration. Therefore, advancing EL property of a ceramic membrane would likely work efficiently under an ultra-low pressure-driven system (e.g., achieving higher removal efficiency when filtrating a like-charged foulant by applying an electrically advanced membrane), yet its function would mitigate with the increase of driven pressure. This study would provide enlightening insight on membrane selection/preparation/modification and performance control of ultra-low pressure-driven filtration.



The first author of this paper is Ph.D. candidate Zhao Yumeng. The research work was completed under the joint guidance of Professor Ma Jun and Professor Lu Dongwei, and was funded by the National Key Research and Development Program.

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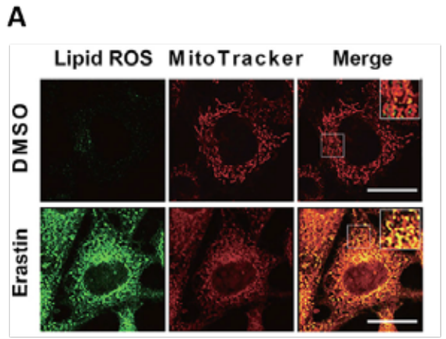
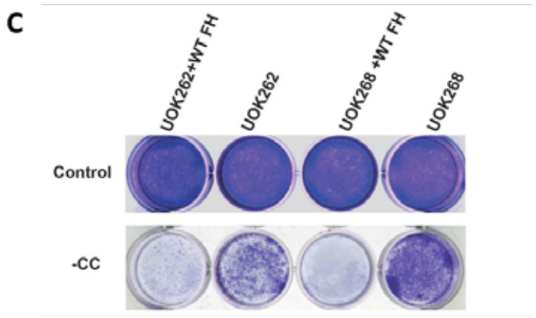
Zhao, Y., Lu, D., Cao, Y., Luo, S., Zhao, Q., Yang, M., Xu, C., Ma, J. Interaction analysis between gravity-driven ceramic membrane and smaller organic matter: Implications for retention and fouling mechanism in ultra-low pressure-driven filtration system. Environmental Science & Technology, 2018, 52 (23), 13718-13727

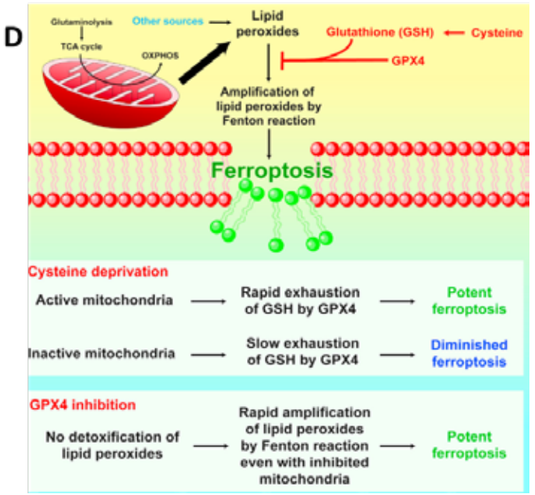
ROLE OF MITOCHONDRIA IN FERROPTOSIS

In 2019, a group led by Professor Gao Minghui from the Center for Life Sciences and the School of Life Sciences and Technology at HIT published a paper titled "Role of Mitochondria in Ferroptosis" in the journal Molecular Cell (IF: 14.248). They made significant progress in the field of ferroptosis.

Ferroptosis is a recently identified iron-dependent programmed cell death process. It has been established that ferroptosis is involved in many human diseases, such as cancer, neurodegeneration disease and ischemia-induced organ damage. However, the molecular mechanism of ferroptosis is still largely unknown. In this study, Professor Gao's group found mitochondria play a crucial role in cysteine deprivation induced ferroptosis. They found the metabolic activity of mitochondria, including both mitochondrial tricarboxylic acid cycle and mitochondrial electron transport chain activity, are required for the generation of sufficient lipid ROS to initiate cell death in cysteine starvation induced ferroptosis.







They further found kidney cancer cells, which have loss-of function mutation of mitochondrial tumor suppressor fumarate hydratase (FH) are resistant to cysteine deprivation-induced ferroptosis. This result supports the notion that ferroptosis might be a physiologically relevant tumor suppressive mechanism, and provides insights into potential ferroptosis-inducing cancer therapeutic approaches.■

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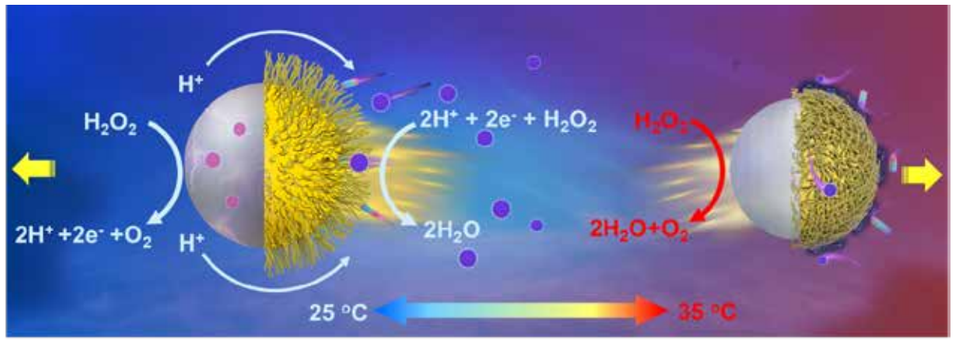
MICROMOTOR COULD SELF-SENSE THE LOCAL TEMPERATURE CHANGE

Professor He Qiang's group from the Key Laboratory of Microsystems and Microstructure Manufacturing has made important progress in the precise control of the motion of micro-/nanomotors. The research paper titled "Thermoresponsive Polymer Brush Modulation on the Direction of Motion of Phoretically Driven Janus Micromotors" was published in the leading chemistry journal, Angewandte Chemie International Edition.



Chemically driven micro-/nanomotors have possible applications, including targeted drug delivery, environmental monitoring and remediation, and biosensing. However, the use of an external magnetic field to control their motion can be difficult in some of these applications. Building micro-/nanomotors that can sense changes in their local environment could be a better strategy to steer their movement. To address this issue, he and his colleagues employed a thermoresponsive poly-N-isopropylacrylamide (PNIPAM) brush to functionalize the half gold-covered gold-platinum bimetallic Janus micromotor. The PNIPAM@Au-Pt Jansu micromotor moved along the Au–Pt direction (pictured) with a speed of 8.5 μm/s in 1.5 % H_2O_2 at 25 °C. The micromotor changed the direction of motion (i.e., along the Pt-Au direction) and the speed decreased to 2.3 μm/s at 35 °C. This change is caused by a phase transition of the PNIPAM brush at around 32 °C, which causes the polymer chains to collapse and hinder the chemical reaction on the Au surface once the temperature is beyond 32 °C. These micromotors could autonomously sense the local ambient temperature change and thus perform the change of direction of motion toward or away from the targeted source. Such a functionalization of micromotors with an environmentally-responded polymer brushes provides a new strategy for modulating the motion behavior of micro-/nanomotors.

This work was financially supported by the National Natural Science Foundation of China.

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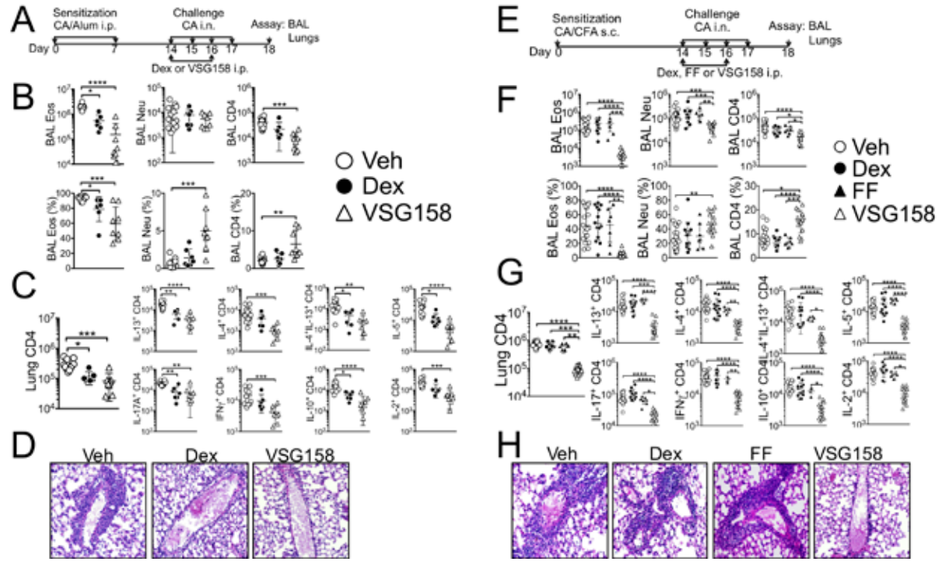
NEW PROGRESS IN DEVELOPING NOVEL COMPOUNDS FOR STEROID-RESISTANT SEVERE ASTHMA

Recently, Dr. He Yuanzheng's group from the Center for Life Science (HCLS) at HIT has made significant progress in developing a novel solution for steroid-resistant asthma. This result was recently published in Proceedings of the National Academy of Sciences of the United States of America (PNAS).

Asthma is common chronic inflammatory lung disease that affects 8-12% of human beings worldwide. Generally, asthma symptoms can be well controlled through inhaled glucocorticoids. However, patients with severe asthma respond poorly to inhaled glucocorticoids (steroid-resistance). Although steroid-resistant asthma is only a small portion of all asthma patients, however, it causes most of the disability and mortality among all asthma patients. Currently, there is almost no effective treatment to control the symptoms of severe asthma; therefore, there is a great need to develop novel compounds that can reverse the steroid-resistance in severe asthma patients.

Through structural study of glucocorticoid receptor, Dr. He has revealed the key mechanism for designing and developing novel highly potent glucocorticoids. Utilizing this insight, Dr He, in collaboration with Dr. Eric Xu in Shanghai Institute of Materia Medica (SIMM) of the Chinese Academy of Sciences and Booki Min of the Cleveland Clinic Foundation, has developed a series of novel highly potent glucocorticoids. Particularly, one of those compounds, VSG158, exhibits a maximal repression of lung inflammation and is 10 times more potent than the currently most potent clinical GC, Fluticasone Furoate (FF) in a murine model of asthma. More importantly, VSG158 displays a unique property to reduce lung inflammation in a steroid-resistant airway inflammation model, which is refractory to clinically available GCs.

Until the present time, this is the first and the only small molecule compound that can reverse steroid-resistant asthma in a mouse model. This discovery not only has potential in developing novel treatment for severe asthma patients, but also provides clues for fighting this high mortality disease.



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He Y, Shi J, Nguyen QT, You E, Liu H, Ren X, Wu Z, Li J, Qiu W, Khoo SK, Yang T, Yi W, Sun F, Xi Z, Huang X, Melcher K, Min B, Xu HE. Development of highly potent glucocorticoids for steroid-resistant severe asthma. Proc Natl Acad Sci U S A., 2019, 116 (14):6932-6937

NOVEL HUMAN-MACHINE INTERFACE: ELECTROOCULOGRAPHIC SIGNAL CONTROLLED BIOMIMETIC SOFT LENS

Human-machine interface (HMI) has been extensively investigated in order to realize the collaboration and interaction between human beings and machines or robots. The developed HMIs have not only enabled the disabled to restore their mobility and dexterity, but also have enhanced the capability of healthy people. However, in most of the previous work, HMIs were constructed between human beings and conventional hard machines. In recent years, a variety of soft robots and soft machines have been designed and constructed and many advantageous features have been explored and demonstrated, such as great deformability, excellent biocompatibility and a high tolerance of defects. To enable versatile interactions between humans and those soft robots or soft machines, corresponding HMIs are imperative. In a recent paper published in Advanced Functional Materials titled "A Biomimetic Soft Lens Controlled by Electrooculographic Signal", Professor Cai Shengqiang's group at the University of California, San Diego and Professor Leng Jinsong's group from Centre for Composite Materials and Structure at Harbin Institute of Technology demonstrated the first proof-of-concept design of using electrooculographic (EOG) signals to control soft machines.

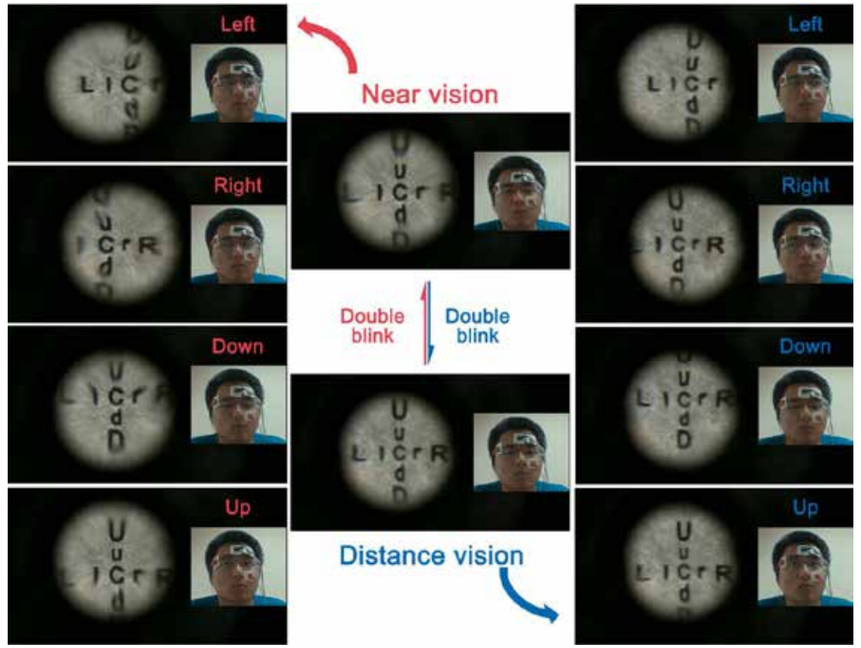

Image changes when the soft lens was controlled by different eye movements

In this work, a biomimetic soft lens was designed and fabricated based on dielectric elastomers, a typical soft active material. The motions, including planar movements and rotations and focal length change of the soft lens were achieved by the actuation of different areas of dielectric elastomer films, mimicking the working mechanisms of the eyes of humans and most mammals. The monitoring electrodes were placed in a conventional five-electrode configuration around two eyes to acquire the EOG signals generated by the eye movements. After signal processing, the motion of the eyes towards four directions and a double blink were recognized and used to control different functions of the soft lens. Triggered by a double blink, the lens can be switched between near vision mode and distance vision mode due to the focal length change. Within each vision mode, the lens can move following the direction of the eye motions.■

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AcrVA5 DEACTIVATES TYPE V Cas12a BY ACETYLATING PAM RECOGNITION SITE

Recently, a new type mechanism of anti-CRISPRs was discovered by the research group of Professor Huang Zhiwei. A paper titled “An Anti-CRISPR Protein Disables Type V Cas12a by Acetylation” was published online by Nature Structural & Molecular Biology, and was reported by News & Views in Nature as a research highlight at the same time. This study reveals an unprecedented mechanism of CRISPR-Cas inhibition and suggests an evolutionary arms race mechanism between phage and bacteria.

CRISPR-Cas adaptive immune systems provide bacteria or archaea with a nucleic acid sequence specific defense mechanism against phages or plasmids invaders. On the other hand, phages deploy diverse anti-CRISPR proteins to thwart this attack and shut down CRISPR-associated defense from bacteria or archaea for survival. Many anti-CRISPR proteins were discovered

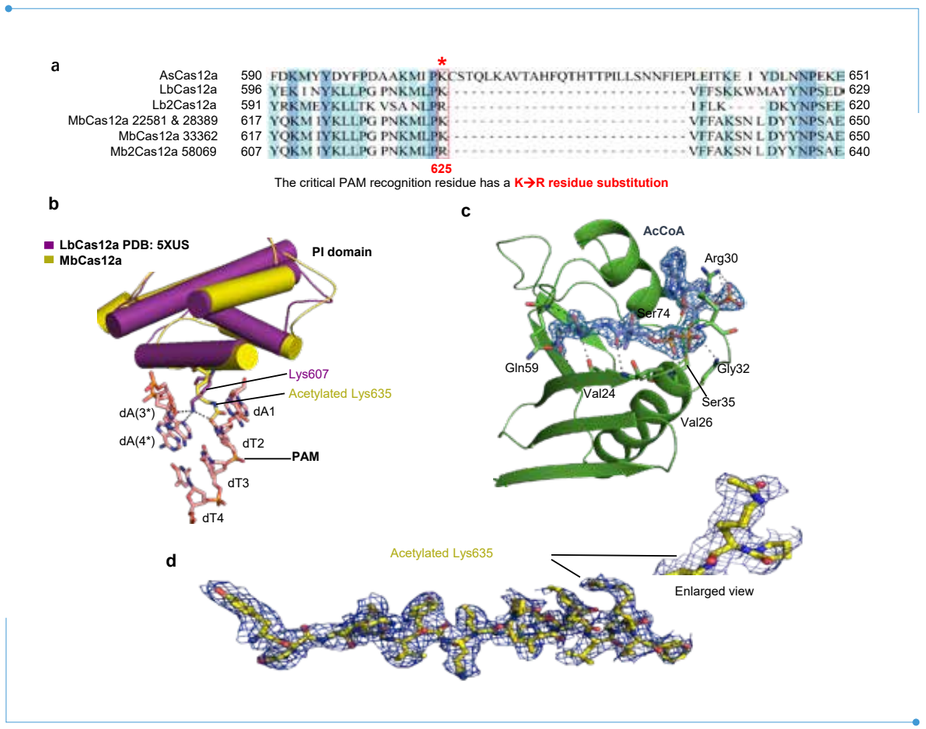
in inhibiting typeI, II and VCRISPR-cas systems and utilized various mechanism to prevent the CRISPR-Cas system in different stages, such as interfering with crRNA loading or interacting with the effector proteins to block the DNA binding or cleavage.

Notably, the type II CRISPR-Cas9 and type V CRISPR-Cas12a systems have been harnessed as the widely used tools for genome editing and various biotechnological applications. Although anti-CRISPR proteins against Cas9 have been reported in detail, the recently discovered mechanisms of the Acr proteins directed against Cas12a were almost unclear.

In this research, the authors provide the first characterization of AcrVA5 to reveal how it functions to switch off the CRISPR-Cas system in Moraxella bovoculi (Mb) and discover a new type of distinct mechanism, as before that it permanently inactivates the Cas12a via enzyme catalysis reaction for the first time.

To identify inhibitors of the type V-A CRISPR-Cas system, the authors analyzed all available completely sequenced bacterial genomes from NCBI RefSeq database using the CRISPRminer pipeline, and found that 31 (~25%) out of the 122 unique spacers potentially target the prophage regions by comprehensive analysis of the spacers from the Mb V-A CRISPR arrays.

50 anti-CRISPR candidates encoding fewer than 300 amino acids from the second prophage region in Mb 22581 were tested and analyzed activity of inhibiting MbCas12a using in vitro and in vivo assays. Finally two candidates were discovered with inhibitory effect and based on the nomenclature of these studies, we



hereafter refer #49 and #50 to as AcrVA4 and AcrVA5, respectively.

Inhibition assays in vitro showed that the proteins of AcrVA4 and AcrVA5 potently inhibited dsDNA cleavage by MbCas12a, and found that AcrVA4 could bind to the MbCas12a-crRNA binary complex while AcrVA5 could not. This unusual phenomenon suggests a distinct mechanism that functions to inhibit MbCas12a using an undiscovered pathway.

Careful sequence analysis revealed that the anti-CRISPR protein contains a segment of 29-Lys-Arg-Gln-Gly-Ile-Gly-34, which shares striking homology with the conserved (Arg/Gln)-X-X-Gly-X-(Gly/Ala) motif found in GCN5-related NAT (GNAT) superfamily acetyltransferases, Further assays confirmed that acetyl-CoA(AcCoA) was the small molecule catalytic substrate of AcrVA5 needed for MbCas12a's covalently modification. The AcrVA5 binding with AcCoA catalyzes and transfers the acetyl group from AcCoA to MbCas12a both in vitro and in vivo, and subsequently the acetylated MbCas12a becomes fully inactivated. Finally, the crystal structure of AcrVA5 binding with AcCoA also confirms that it functions as an acetyltransferase to block the MbCas12a.

The authors then seek to find the critical amino acid residue of MbCas12a modified by AcrVA5 via Mass Spectrometric analysis. The results of MS seem to show an indiscriminate modification of lysine residues surrounding the MbCas12a while one of the lysine residues K635 locates in the key PAM-interacting (PI) domain of MbCas12a. A homologous protein Mb2Cas12a from another strain Mb58069 whose key amino acid residue locating in K635 of the PI domain is arginine is discovered that it could resist the acetylation modification from AcrVA5. Amino acid residue mutation assays of MbCas12a and Mb2Cas12a further confirm the effect of the critical modification to DNA cleavage. The Cryo EM structure of acetylated MbCas12a indicates that the acetylation of Lys635 not only results in the loss of hydrogen bonding interactions with dT2 and dA(3*) but also may generate steric hindrance with neighboring PAM DNA and thus preventing MbCas12a from binding dsDNA.

This research article is the first to report such an anti-CRISPR protein that utilizes its own enzyme catalytic activity to inactivate the effector protein Cas12a, distinct from all the inhibition mechanisms discovered before in various types of the CRISPR-Cas system, and suggests an evolutionary arms race mechanism between phage and bacteria.

Professor Huang Zhiwei is the corresponding author of the research article, and PhD student Dong Liyong, Guan Xiaoyu and Associate Professor Li Ningning from Peking University are the co-first authors. Associate Professor Zhang Fan and PhD student Zhu Yuwei made important contributions to this research. Shanghai Synchrotron Radiation Facility helped support the data collection. This research was funded by the National Natural Science Foundation of China and the Young Elite Scientists Sponsorship Program by CAST.

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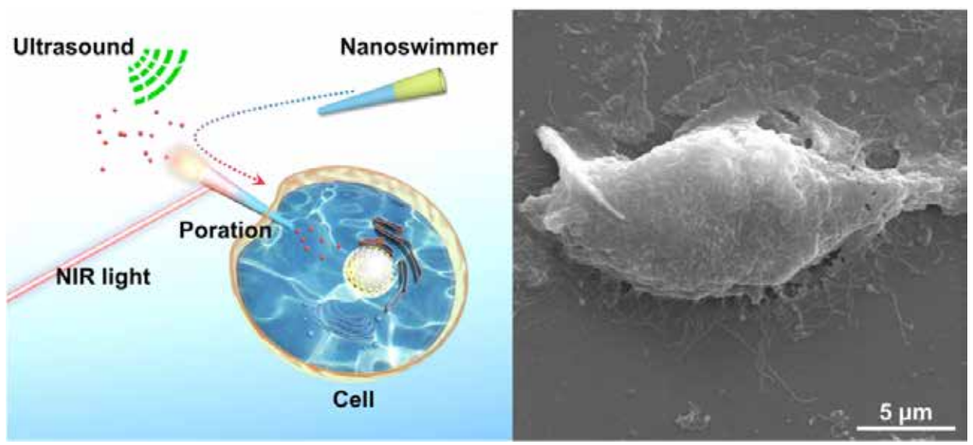
SWIMMING NANOMACHINES MECHANICALLY OPEN SINGLE CELL MEMBRANE

Professor He Qiang's group from the Key Laboratory of Micro-systems and Micro-structures Manufacturing, recently published a paper titled "Gold-Nanoshell-Functionalized Polymer Nanoswimmer for Photomechanical Poration of Single-Cell Membrane" at the top chemistry journal, Journal of the American Chemical Society.

Single cell poration plays an important role in intracellular delivery for various medical and biological strategies, including subcellular surgery, artificial insemination and genome editing. Traditional strategies to open cell membranes, such as electroporation and optoporation, rely on the disturbance of lipid molecules under the instantaneous physical fields to generate holes on



cell membranes and a change in membrane permeability. However, these strategies are hampered in precise poration on the targeted single cell.

A nanoswimmer could overcome the drag force in fluids at low Reynolds numbers and accomplish efficient propulsion through converting chemical or physical energies into mechanical movement. The research team fabricated a gold-nanoshell-functionalized polymer nanoswimmer by using the nanoporous template-assisted layer-by-layer (LbL) deposition of two types of oppositely charged polymers and a seed-growth method to produce gold nanoshell inside. Upon an external acoustic field, the as-prepared nanoswimmer could actively transport in biological media and then approach the targeted single cell. However, the nanoswimmer could not open the cell membrane under acoustic field alone. To address this issue, NIR light illumination was conducted to provide an extra mechanical force through the photothermal effect of gold nanoshells and thus accomplished the poration of cell membrane within 0.1 s. The investigation addresses the bottleneck of the single cell membrane poration utilizing nanoswimmers, providing considerable promise in various biomedical applications, such as intracellular drug delivery, artificial insemination and subcellular surgery process.

This work was financially supported by the National Natural Science Foundation of China.

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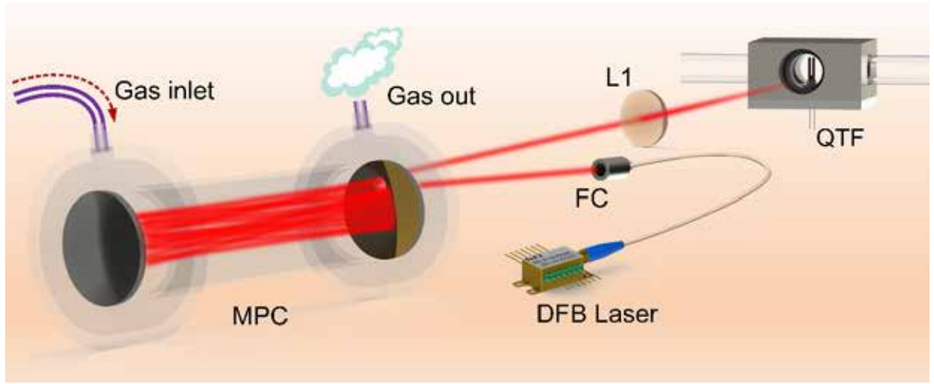
NEW REPORT ON LIGHT-INDUCED THERMOELASTIC SPECTROSCOPY

In 2019, a team led by Professor Ma Yufei from the National Key Laboratory of Science and Technology on Tunable Laser, School of Astronautics, Harbin Institute of Technology published a research paper titled “Ultra-High Sensitive Light-Induced Thermoelastic Spectroscopy Sensor with a High Q-Factor Quartz Tuning Fork and a Multipass Cell” in the journal Optics Letters co-authored with Professor Frank K. Tittel from Rice University. This work was recommended as a candidate for “China’s Top 10 Optical Breakthroughs in 2019”.

In this work, the research group



demonstrated the first light-induced thermoselastic spectroscopy (LITES). It shows an excellent capability with non-contact and full wavelength coverage measurements in laser-based trace gas sensing research. To demonstrate the LITES sensor performance, a resonant quartz tuning fork with an improved high Q-factor in a low pressure environment and a Herrior multipass cell with an optical pathlength of 10.1m were applied. Carbon monoxide (CO) was chosen as the analyte. The performance of LITES and widely used tunable diode laser absorption spectroscopy (TDLAS), and quartz-enhanced photoacoustic spectroscopy (QEPAS) were experimentally investigated and compared. This comparison illustrated that the LITES sensor system has an excellent sensing sensitivity with a minimum detection limit (MDL) of 17 ppbv (parts per billion by volume). Moreover, it also shows a long-term measurement performance with 800s integration time in the data acquisition and processing.

Professor Ma's group focuses on the research of solid state lasers and laser based gas sensing techniques, including near-infrared novel mixed crystal lasers, mid-infrared linear frequency modulated lasers used for gas sensing, TDLAS, Photoacoustic Spectroscopy (PAS), QEPAS, and LITES in trace gas detection. In recent years, more than 100 papers have been published in Applied Physics Letters, Optics Letters, Sensors and Actuators B, Optics Express, CLEO, etc.

The paper was financially supported by the National Natural Science Foundation of China, the Natural Science Foundation for Outstanding Young Researchers of Heilongjiang Province, and Top Young Talent of Harbin Institute of Technology.

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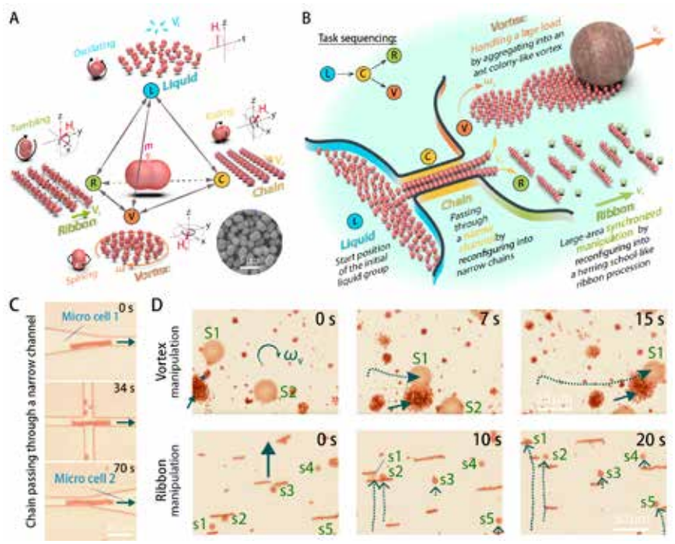
RECONFIGURABLE MAGNETIC MICROROBOT SWARM: MULTIMODE TRANSFORMATION, LOCOMOTION, AND MANIPULATION

Professor Xie Hui from the State Key Laboratory of Robotics and Systems, Harbin Institute of Technology (HIT), recently published a paper titled "Reconfigurable Magnetic Microrobot Swarm: Multimode Transformation, Locomotion, and Manipulation" in the internationally renowned journal Science Robotics.

Recently, micro- and nanorobots have demonstrated great potential for in-body diagnosis and treatment at the cellular or even molecular level, which requires a tiny robot with great precision and robustness. However, integrating drive and sensing functions into micro- and nanoscale robots remains a challenge. In addition, because of the limited capabilities of a

single micro- and nanorobot, only a vast number of collaborative micro- and nanorobots with independent drive and locomotion capabilities would be able to treat internal parts and organs of the human body that were previously inaccessible or offer high-contrast bioimaging of the disease site. Fortunately, colloidal systems composed of microscopic active agents provide a promising candidate to build such a micro- and nanorobot system. Powered by external magnetic fields, electric fields, light, or chemical reactions, self-propelled colloidal individuals can form a swarm-level out-of-equilibrium system via physical or chemical interactions rather than informatic communications in the macrorobotic swarm. Nevertheless, regulating swarming micro- and nanobot systems have high flexibility to implement tasks in dynamically changing environment remains challenging, because relevant fundamental mechanisms, swarm-environment interactions, and the highly flexible coordination strategies in response to environmental changes and task variations are still under investigation.

In this work, we present a strategy that uses alternating magnetic fields to program hematite colloidal particles into liquid, chain, vortex, and ribbon-like microrobotic swarms and enable fast and reversible transformations between them. The chain is characterized by passing through confined narrow channels, and the herring school–like ribbon procession is capable of large-area synchronized manipulation, whereas the colony-like vortex can aggregate at a high density toward



coordinated handling of heavy loads. Using the developed discrete particle simulation methods, we investigated generation mechanisms of these four swarms, as well as the "tank-treading" motion of the chain and vortex merging. In addition, the swarms can be programmed to steer in any direction with excellent maneuverability, and the vortex's chirality can be rapidly switched with high pattern stability. This reconfigurable microrobot swarm can provide versatile collective modes to address environmental variations or multitasking requirements; it has potential to investigate fundamentals in living systems and to serve as a functional bio-microrobot system for biomedicine.

This paper was financially supported by the National Key Research and Development Programme of China and the National Natural Science Foundation of China.

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NEWS & EVENTS

CHINA'S SPACE DAY 2019

Since 2016 China has set April 24th as the country's Space Day, an occasion to remember the country's achievements in its quest to conquer space.

In Harbin Institute of Technology, the opening ceremony of the 4th China Space Day was held, with the theme “Pursue Space Dream for Win-Win Cooperation.” HIT Party Secretary Wang Shuquan, HIT Vice Presidents Ren Nanqi and Ding Xuemei, HIT Secretary of the Commission for Discipline Inspection Cai Jujin, HIT Vice Presidents An Shi, Xu Dianguo and Xu Xiaofei, and Assistant Principal Peng Yuankui attended the ceremony.

Various activities, such as a space quiz, a space knowledge explanation, virtual model airplane making and a memory game were held, becoming a window for the public and the world to get a better understanding of China's aerospace progress. The Model Aircraft Design Contest attracted more than 70 students from China, Korea, Malaysia and Pakistan to participate. More than 20 works competed with each other through the overall rating of build quality, design and flying time. HIT Party Secretary Wang Shuquan came to Harbin Xianghe Primary School to celebrate Space Day with the pupils and unveiled the Aerospace Culture Reading Room together with principal of Xianghe Primary School Zhao Cheng. On the same day, an open day was held at Harbin Institute of Technology, HIT Weihai and HIT Shenzhen respectively.■

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THE 99TH ANNIVERSARY OF HARBIN INSTITUTE OF TECHNOLOGY

On June 6th, the 99th Anniversary of Harbin Institute of Technology was held and the preparation for the HIT centennial began its countdown. A flag-raising ceremony was held simultaneously at 3 HIT campuses. HIT Party Secretary Wang Shuquan, HIT President Zhou Yu, Academician of the CAE Qin Yukun, HIT alumni representative Jiang Yidong and student representative Qiu Shi started the countdown together. Deputy Vice President Han Jiecai chaired the ceremony.

After the flag-raising ceremony, an HIT flag relay activity was started. HIT Party Secretary Wang Shuquan presented the school flag to Vice Chairman of Harbin Alumni Association Ma Renyuan and Secretary General Cao Liang. To welcome the centennial anniversary, more than 160 HIT alumni associations all over the world participated in the flag relay. They will also organize various activities and record videos to send their best wishes to their alma mater.

During the ceremony, Academician Qin Yukun made a speech to review HIT's history and look forward to the future. He hoped that HIT will cultivate more and more talents and become a world-class university. HIT President Zhou Yu on behalf of HIT expressed his gratitude for the support from all leaders and society, conveyed warm greetings and best wishes to students and faculty in 3 campuses and all HIT alumni, and expressed respect for the pioneers who made significant contributions to the construction of HIT. He said, "The best commemoration of history is to create a new history. Creating history needs a broad and strong mind. The development of HIT serves for the development of China space and our country. Everyone will work hard to achieve the goal." ■

HIT VICE PRESIDENT REN NANQI ATTENDED THE "ONE BELT ONE ROAD" EDUCATION SEMINAR

In May, HIT Vice President Ren Nanqi led a delegation to attend the “One Belt One Road” education seminar in Central and Eastern Europe countries (CEECs) for promoting international cooperation and exchanges.

On May 17th, the HIT delegation participated in the 7th China-Central and Eastern Europe Educational Policy Dialogue and held extensive dialogues with other participants on three themes: how to promote teaching through university cooperation, how to strengthen language teaching cooperation, and how to develop high-quality vocational education.

On May 18th, the delegation took part in the 6th Meeting of the China- CEEC Higher Education Institutions Consortium, which was organized by the China Education Association for International Exchanges at West University of Timisoara, Romania. More than 150 delegates from nearly 100 universities in China and CEECs exchanged views on some issues, such as promoting learning and teaching, school-enterprise cooperation, educational science and technology and university cooperation, and strengthening the construction of the China-CEEC Higher Education Institutions Consortium.

On May 23, the delegation went to Greece to participate in the first China-Greece Higher Education Forum jointly sponsored by the China Education Association for International Exchanges and the University of Athens. More than 70 university leaders and representatives from 40 Chinese universities gathered with the presidents from 15 Greek universities to express their views and seek cooperation in the field of higher education between China and Greece. Ren Nanqi made a keynote speech on behalf of the Chinese side with the title "Practice and Prospect of Engineering Education--Taking Harbin Institute of Technology as an Example." In the forum, there were four sections: education informationization, education and innovation, language and culture teaching, and student mobility. Fu Qiang, Dean of the School of Science and Industrial Technology at HIT, served as the chairman of the Education and Innovation and Entrepreneurship Section. He exchanged views with the participants on the conditions and prospects of educational innovation and entrepreneurship, scientific research cooperation and other aspects of Chinese universities and universities in Central and Eastern Europe.

The forum is the largest and highest-level educational exchange event since the diplomatic relations established between China and Greece. It became a new starting point for implementing the consensus reached by Xi Jinping, General Secretary of CPC Central Committee and Prokopis Pavlopoulos, President of Greece, to serve the One Belt and One Road construction and further strengthen cooperation.

During the visit, in order to effectively implement the cooperation between HIT and universities in CEECs, Ren Nanqi exchanged views with Chinese Ambassador to Greece Zhang Qiyue. Zhang Qiyue expressed hope that Harbin Institute of Technology would play a greater role in personnel training and scientific research cooperation between China and Greece. The delegation also met with the rectors from the Technical University of Crete and the National Technical University of Athens, respectively, to share the latest achievements in the development and construction of the university, international cooperation and exchanges, and in-depth exchanges with colleges and universities on specific cooperation contents, such as teacher-student exchanges, joint personnel training, scientific research cooperation and innovation, which laid the foundation for potential cooperation in related disciplines.

HIT-BMSTU JOINT SCHOOL OF ENGINEERING ESTABLISHED

On February 25th, the unveiling ceremony of the HIT-BMSTU Joint School of Engineering was held in the auditorium of the HIT museum. The HIT-BMSTU Joint School of Engineering was jointly established by Harbin Institute of Technology (HIT) and Bauman Moscow State Technical University (BMSTU). HIT Vice President Ding Xuemei and Vice-Rector of BMSTU Sergey V. Korshunov unveiled a plaque together. Deputy Director General of the Education Department of Heilongjiang Province Wang Shuyun, HIT Vice President Ren Nanqi and BMSTU Vice-Rector for International Relations Mikhail Kuznetsov attended the ceremony and delivered speeches.

In recent years, the China-Russia comprehensive strategic partnership has entered a new era, and there are breakthroughs in cooperation in various fields. HIT is actively involved in extensive exchanges and cooperation with Russian universities. In March 2011, HIT and BMSTU jointly established the Association of Sino-Russian Technical Universities (ASRTU), which created a precedent for the cooperative league of the universities of China and Russia and set a good example for scientific and cultural exchanges among the universities. In order to further deepen the China-Russia strategic cooperation and friendly exchange in education and create a new chapter of cooperation and development between universities of China and Russia, the two sides jointly established the HIT-BMSTU Joint School of Engineering.

The HIT-BMSTU Joint School of Engineering is a public full-time college. There are two undergraduate programs: Material Science and Engineering and Environment. During the operation, more and more top edge engineering programs in Russia will gradually be opened. Students need to be registered in both universities at the same time. The school has adopted the cultivation of joint management and co-training by sharing teachers, curriculums, teaching materials, and personnel training programs. The school was supported by the ASRTU and has integrated high-quality scientific and technological teachers from the ASRTU. It will provide strong talent support and think tank guarantees for regional social and economic development, as well as make greater contributions to further promoting the revitalization of Northeast China and deepen China-Russia comprehensive strategic partnership of cooperation.

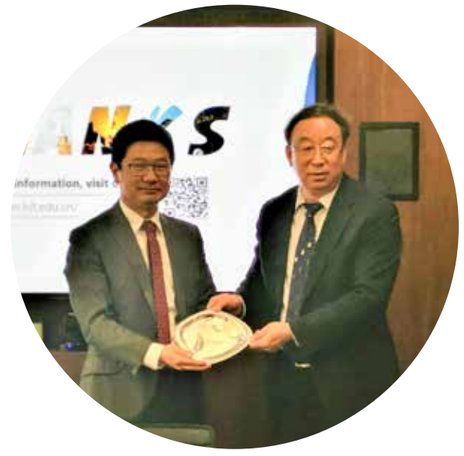
News & Events
HIT TIMES 2019

HIT VICE PRESIDENT XU DIANGUO VISITED AUSTRALIAN UNIVERSITIES

Recently, HIT Vice President Xu Dianguo led a delegation to visit the University of Sydney (USTD), University of Technology Sydney (UTS), Monash University, and Royal Melbourne Institute of Technology University (RMIT) in order to further deepen the exchange and cooperation between HIT and universities from the Group of Eight (Go8) and the Australian Technology Network (ATN).

Xu Dianguo met with Deputy Vice-Chancellor Philippa Pattison, Vice President of USTD Leo Mian Liu, Dean of the Faculty of Engineering Elizabeth Croft at Monash University, Executive Dean of the School of Engineering at RMIT Adrian Mouritz, and other heads of relevant departments. He introduced the state of affairs of HIT in detail, including the latest development and construction achievements, the situation of international cooperation and exchange, and major scientific research platforms. He also conducted in-depth exchange with universities on specific cooperation topics such as exchanges between teachers and students, joint training of talented individuals, scientific research cooperation and innovation, joint construction of advantageous disciplines, and Sino-foreign cooperation in running schools, laying a foundation for the potential cooperation in related disciplines.

During the visit, the delegation visited the relevant facility and key laboratories of the universities. Xu Dianguo also had talks with HIT Alumni - Australia and students in the Sino-foreign cooperative education program between HIT and the Electrical Engineering Department of USTD. ■



HIT VICE PRESIDENT DING XUEMEI ATTENDED THE CAUSTL 2019

On May 17th, the 5th China-Australia University Summit on Teaching & Learning (CAUSTL 2019) themed with "Higher Education Evaluation Assurance" was held at the Centre for Academic Activity, Minhang Campus of Shanghai Jiao Tong University. HIT Vice President Ding Xuemei attended the summit.

Leaders from world-class universities at home and abroad attended the summit, including Harbin Institute of Technology, Fudan University, University of Science and Technology, University of Western Australia, University of Adelaide, University of Sydney as well as representatives from C9 and Go8. Zhao Yaqin, Deputy Dean of the Undergraduate College and Director of Teaching Research and Quality Management Office, made a keynote speech. She shared her experience of continuously improving courses. Professor Huang Furong from the school of Foreign Language at HIT, taking an actual course as an example, explained how to reform teaching by using the means of information technology and discussed the application of information technology in course evaluation.

"CAUSTL" was jointly established by Harbin Institute of Technology (HIT) and the University of Adelaide in 2014 on the background of globalization of higher education, aiming at further promoting and widening long-term friendly cooperation of teaching and student development between the universities and institutions of both countries.

THE 10TH ANNUAL CONSTRUCTION FESTIVAL AND 2019 HOLLOW-PLATE ARCHITECTURAL DESIGN AND CONSTRUCTION COMPETITION

On June 2nd, the 10th Annual Construction Festival and 2019 Hollow-Plate Architectural Design and Construction Competition was held. The Deputy Party Secretary of HIT and Secretary of the Commission for Discipline Inspection Yao Limin attended the opening ceremony and delivered a speech.

42 teams from six universities and nine key senior high schools in Heilongjiang province participated in the competition. They showed their innovative talent by creating unique architecture designs with different shapes and elements. People were attracted to visit and experience the beauty and joy of the buildings in the space made of white hollow-plates.

A work from Northeast Forestry University and a work from Harbin Institute of Technology won 1st prize in the university group. A work from Heilongjiang Experimental High School won 1st prize in the high school group.■

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