SOUTH CHINA UNIVERSITY OF TECHNOLOGY

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SCUT Newsletter 华工新闻快讯

1. SCUT's Materials Science Ranks in the Top 0.01% Globally by ESI

华南理工材料科学跻身ESI前万分之一

On January 8, Clarivate released the latest statistical data from the Essential Science Indicators (ESI) database. The "Materials Science" at South China University of Technology entered the global top 0.01% for the first time, ranking 16th globally. This is SCUT's third discipline to enter the ESI top 0.01%, following Engineering and Chemistry.

1月8日，科睿唯安公布基本科学指标数据库（Essential Science Indicators，简称ESI）最新统计数据，华南理工大学"材料科学"学科首次进入全球前万分之一行列，全球排名第16名。这是学校继工程学、化学后第三个进入ESI前万分之一的学科。

ESI Top 0.01% Disciplines of Chinese Mainland Universities

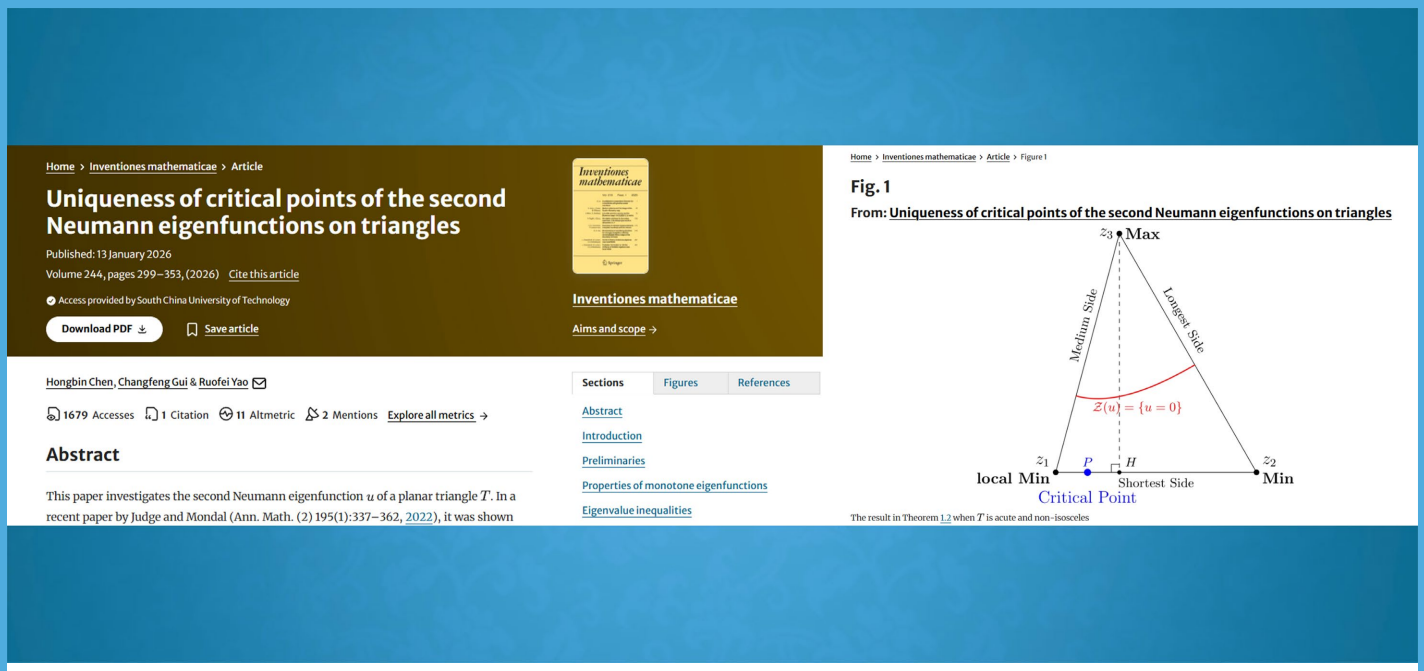
January 2026

University	Number of Disciplines	Top 0.01‰ Disciplines
University of Chinese Academy of Sciences	7	Agricultural Sciences, Chemistry, Engineering, Environment/Ecology, Geosciences, Materials Science, Plant & Animal Science
Tsinghua University	5	Chemistry, Computer Science, Engineering, Environment/Ecology, Materials Science
Zhejiang University	5	Agricultural Sciences, Chemistry, Engineering, Materials Science, Pharmacology & Toxicology
Peking University	3	Chemistry, Environment/Ecology, Materials Science

Tianjin University	3	Chemistry, Engineering, Materials Science
South China University of Technology	3	Chemistry, Engineering, Materials Science
China Agricultural University	2	Agricultural Sciences, Plant & Animal Science
Harbin Institute of Technology	2	Engineering, Materials Science
Shanghai Jiao Tong University	2	Engineering, Materials Science

ESI is an analytical and evaluative tool for measuring scientific research performance and tracking scientific development. Disciplines in the top 1% are considered high-performing, those in the top 0.1% are outstanding, and those in the top 0.01% are pioneering. Currently, SCUT has 18 disciplines in the ESI global top 1%, of which 5 are in the top 0.1%, and 3 are in the top 0.01%.

ESI是衡量科学研究水平、跟踪科学发展趋势的分析评价工具，进入前百分之一的学科为优秀，前千分之一的学科为卓越，前万分之一的学科则为领先。目前，华南理工大学共有18个学科进入ESI前百分之一，其中5个学科进入ESI前千分之一，3个学科进入ESI前万分之一。



2. Solving Key Problem of "Hot Spots Conjecture" SCUT's Research Findings Publishes Again in a Top Global Mathematics Journal

破解“热点猜想”关键难题　华南理工成果再登世界四大顶尖数学期刊

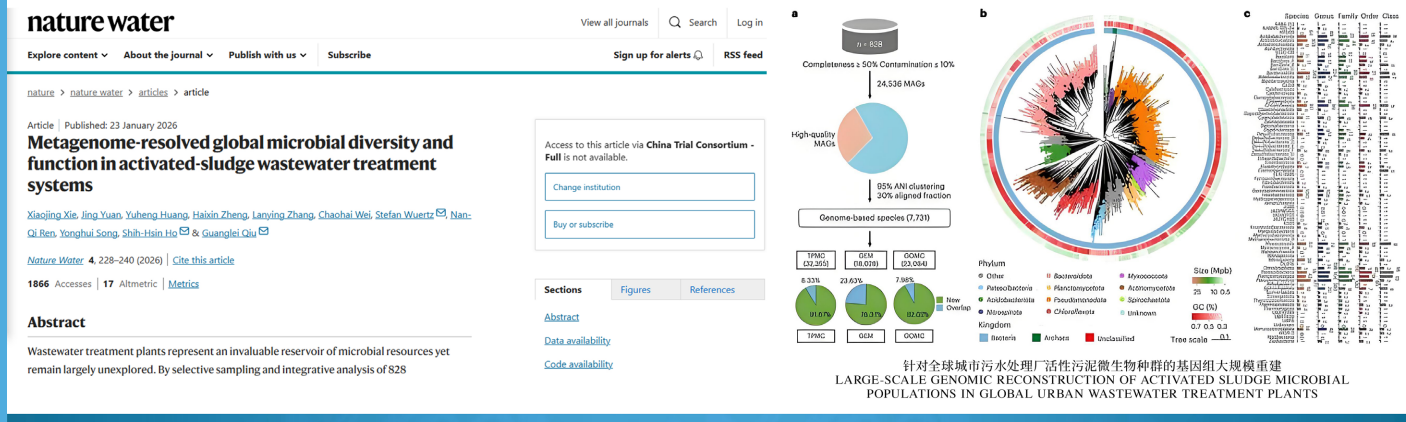
On January 13, a paper titled "Uniqueness of critical points of the second Neumann eigenfunctions on triangles", which was co-authored by Associate Professor Yao Ruofei from SCUT, Professor Chen Hongbin from Xi'an Jiaotong University, and Professor Gui Changfeng from University of Macau, was published online in *Inventiones Mathematicae*.

1月13日，华南理工大学姚若飞副教授与西安交通大学陈红斌教授、澳门大学桂长峰教授合作的论文，以题为"Uniqueness of critical points of the second Neumann eigenfunctions on triangles"在线发表于*Inventiones Mathematicae*（《数学新进展》）。

The paper focuses on the triangular case, conducting systematic and in-depth analysis. It not only solves the open problem of "the precise location of the maximum" proposed by Fields Medalist Terence Tao in the Polymath Project 7 in 2012, but also advances and refines the open problems and main conclusions

regarding critical points proposed in a related article in Annals of Mathematics (2020) (a subsequent revision of that article pointed out incomplete proof of the original theorem). It also provides answers to the monotonicity problem of eigenfunctions raised by Professor David Jerison of Massachusetts Institute of Technology (MIT). Furthermore, the research offers further solutions to several open problems, including the location of nodal lines of eigenfunctions and eigenvalue inequalities for mixed boundary value problems.

论文聚焦三角形情形，开展了系统而深入的分析：不仅解决了菲尔兹奖得主陶哲轩于2012年在Polymath Project 7中提出的"最大值的精确位置"公开问题，还推进并完善了 Annals of Mathematics（2020）相关文章中提出的关于临界点的公开问题及其主要结论（该文后续修订指出原定理证明不完整），并对麻省理工学院 David Jerison 教授提出的特征函数单调性问题给出了解答。此外，研究还就特征函数节点线位置、混合边值问题的特征值不等式等若干公开问题给出了进一步解答。



3. Development of the First Global Scale Repository - Major Progress in Activated Sludge microorganisms Made by SCUT

构建首个全球尺度资源库　华南理工团队在活性污泥微生物研究中获重大进展

A team led by SCUT Professor Qiu Guanglei, in collaboration with Harbin Institute of Technology and Nanyang Technological University, has developed the first global scale activated sludge metagenomic repository. The related findings were published online in Nature Water on January 23 titled "Metagenome-resolved global microbial diversity and function in activated-sludge wastewater treatment systems".

华南理工大学邱光磊教授团队与哈尔滨工业大学、南洋理工大学合作，构建了首个全球尺度的活性污泥宏基因组资源库。相关成果以题为"Metagenome-resolved global microbial diversity and function in activated-sludge wastewater treatment systems"于1月23日在线发表于*Nature Water*。

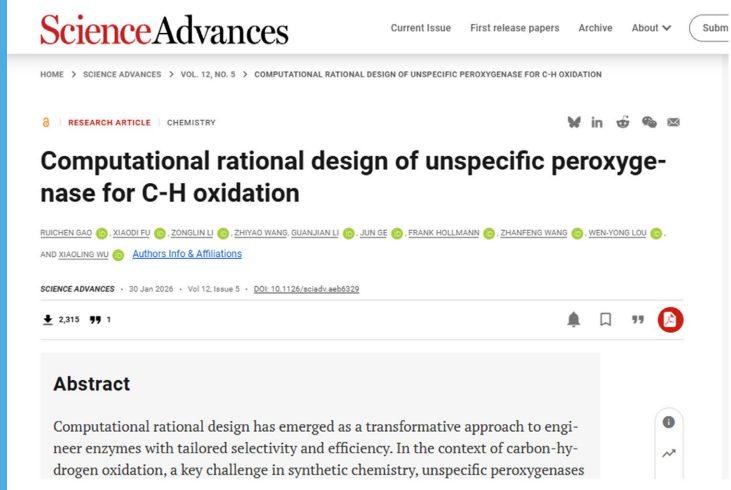
Wastewater treatment plants constitute one of the world's most important artificial microbial ecosystems. Historically, methods such as gene marker analysis have been insufficient for deciphering the population structure, diversity, metabolic capabilities, and global distribution patterns of key functional microorganisms. Consequently, numerous core microbes that drive wastewater treatment processes

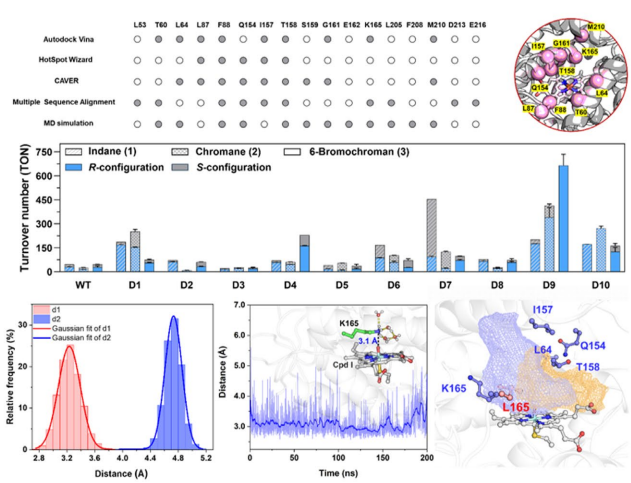
remain inadequately recognized, understood and characterized. To bridge this knowledge gap, the research team conducted sampling across all administrative regions at provincial level in China while systematically integrating activated sludge metagenomic datasets from wastewater treatment plants spanning six continents. From this, they successfully recovered and reconstructed 24,536 metagenome-assembled genomes (MAGs). Through an integrative analysis of phylogenetic relationships, global biogeography, and functional potential, the team systematically elucidated key functional modules spanning nitrogen removal, phosphorus removal, plastic degradation, biopolymer synthesis, and virulence factors. This work culminated in the world's first "function-to-phylogeny" correlation map for activated sludge microorganisms.

污水处理厂是全球最重要的人工微生物生态系统之一，长期以来，基因标志物分析这类方法在解析关键功能微生物的种群结构、多样性、代谢潜力及其在全球尺度上的分布格局等方面存在不足，致使大量在污水处理过程中发挥核心作用的微生物未得到充分认识、理解与表征。为此，研究团队通过在全国各省级行政区取样，同时系统整合来自全球六大洲污水处理厂的活性污泥宏基因组数据，回收重建了24536个宏基因组组装基因组。团队将系统发育关系、全球分布与功能潜力进行整合解析，全面解析了脱氮、除磷、塑料降解、生物合成及毒力因子等关键功能模块，首次在全球尺度上构建了活性污泥微生物的"功能 - 系统发育"对应关系图谱。

This research not only provides an authoritative reference for comparative genomics and multi-omics studies, but also lays the foundation for transitioning wastewater treatment engineering design from experience-driven approaches to genome-based precise regulation. It marks a new stage in microbiome engineering research for wastewater treatment.

该研究不仅为比较基因组学和多组学研究提供了权威参考，也为从经验驱动走向基于基因组的精准调控的污水处理工程设计奠定了基础，标志着污水处理微生物组学工程研究迈入新阶段。





4.SCUT Team Breaks Bottleneck in Selective C-H Oxidation

计算辅助酶催化剂理性高效设计　华南理工团队首次突破碳氢键选择性氧化瓶颈

On January 30, a team led by Professor Wu Xiaoling and Professor Lou Wenyong from the School of Food

Science and Engineering at South China University of Technology (SCUT) published an online paper entitled "Computational Rational Design of Unspecific Peroxygenase for C-H Oxidation" in Science Advances. The team proposed a new strategy for computer-aided design of enzyme catalysts, which significantly reduced experimental workload, rapidly generated high-performance enzyme mutants and provided in-depth insights into the underlying mechanism.

1月30日，华南理工大学食品科学与工程学院吴晓玲教授和娄文勇教授团队以题为"Computational rational design of unspecific peroxygenase for C-H oxidation"在线发表于Science子刊Science Advances。团队提出计算机辅助设计酶催化剂的新策略，大幅减少了实验工作量，快速获得了高性能酶突变体，深入解析了其机制。

This breakthrough overcomes a critical bottleneck of catalytic activity and selectivity in UPOs, establishing an efficient enzyme engineering workflow and providing important references for the directed evolution of enzymes. The obtained enzyme mutants can be applied in food, pharmaceutical, biocatalysis and other fields, supporting the green and high-quality development of related industries.

该成果突破了UPOs催化活性与选择性瓶颈，建立了高效的酶改造流程，为酶定向改造提供了重要参考。所获突变体可应用于食品、医药、生物催化等领域，助力产业绿色高质量发展。

5.SCUT Design Project Wins Award at International Competition

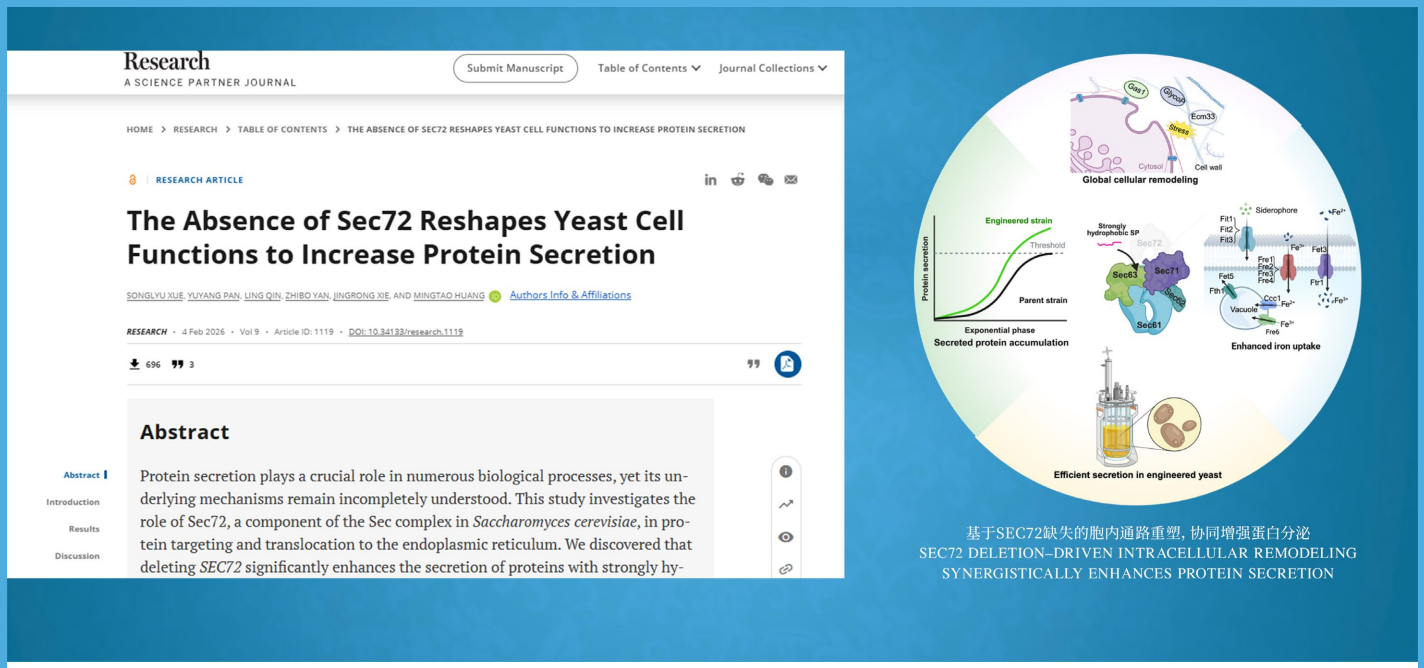
华南理工设计作品获国际大赛奖项

On February 1, the awards ceremony for the 2025 "Better Design Award" was held in Guangzhou. A project from South China University of Technology (SCUT), "IntelliHaptic. Advanced", a force-feedback device, won the Concept Design Award. Centered on the integration of visual, auditory, and tactile channels, the project presents a systematic design exploration of force tactile interaction and typical application scenarios. By deeply integrating design creativity with technological innovation, it demonstrates strong social value and prospects for industrial transformation in industrial teleoperation and medical virtual training, as well as in the cultural and tourism sector and the field of social care.

2月1日，2025年"越来越好"国际设计大赛（Better Design Award）颁奖典礼在广州举行。华南理工大学作品"IntelliHaptic. Advanced 力反馈设备"荣获本届大赛概念设计奖，作品以"视—听—触"多通道融合为核心，围绕力触觉交互与典型应用场景展开系统化设计探索，深度融合设计创意与技术创新，在工业遥操作与医疗虚拟培训领域、文旅领域及社会关怀领域展现出卓越的社会价值与产业转化前景。

Built around an evaluation framework of "forward-looking, industrial application, and people-centered" criteria, this competition brought together 15,691 entries from 69 countries and regions focusing on the development direction of "new quality productive forces", and has become an important platform for promoting international design exchange and showcasing China's design concepts.

本届大赛以"前瞻性、产业化、人民性"为核心评价体系，来自全球69个国家和地区的15691件参赛作品聚焦"新质生产力"发展方向，成为促进国际设计交流、展示中国设计理念的重要平台。



6.SCUT Team Reports New Progress in Recombinant Protein Expression

Sec72缺失提升酵母分泌能力　华南理工团队在蛋白表达研究中取得新进展

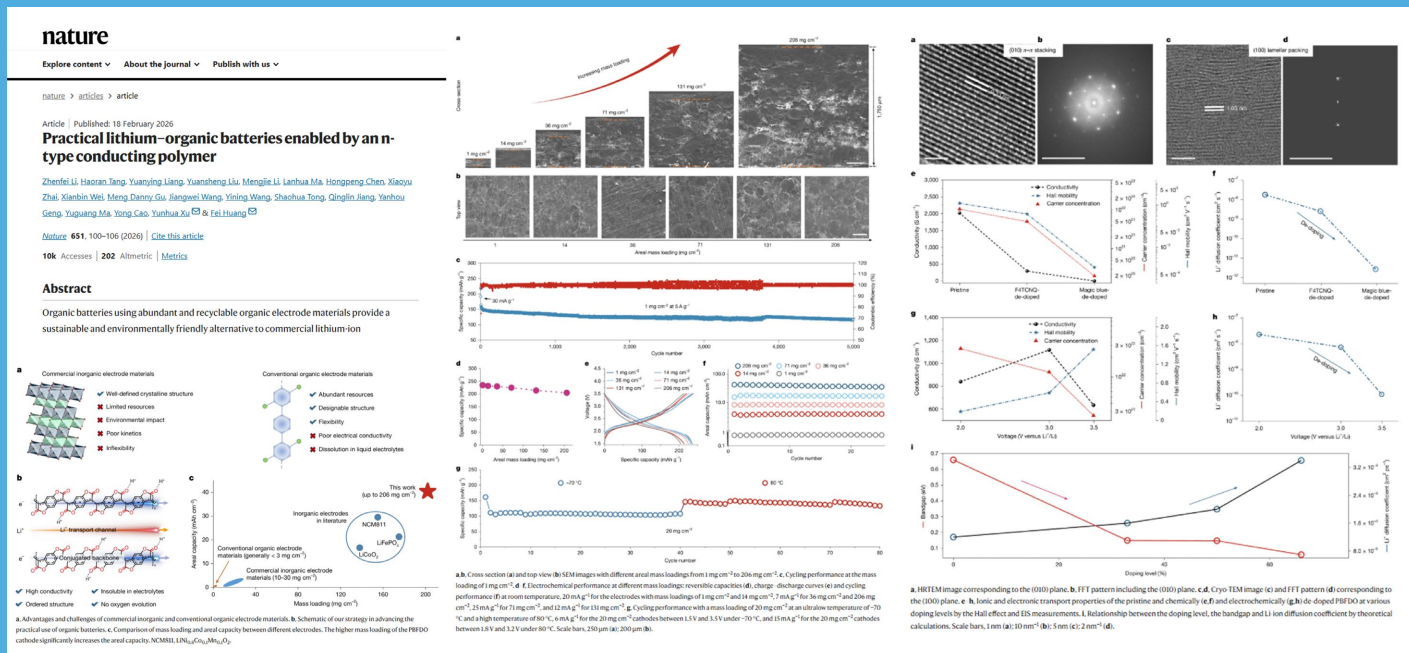
On February 4, a team led by Professor Mingtao Huang from the School of Food Science and Engineering at South China University of Technology (SCUT) published a paper in Research titled "The Absence of Sec72 Reshapes Yeast Cell Functions to Increase Protein Secretion". Focusing on steps in endoplasmic reticulum (ER) targeting and transport in yeast *Saccharomyces cerevisiae*, the team elucidated the role of Sec72, a subunit of the Sec complex, in signal peptide–mediated entry of proteins into the ER. It also proposed a secretion-enhancement strategy based on Sec72 deletion.

2月4日，华南理工大学食品科学与工程学院黄明涛教授团队在期刊***Research***发表题为 "The Absence of Sec72 Reshapes Yeast Cell Functions to Increase Protein Secretion" 的研究论文。研究团队围绕酿酒酵母内质网靶向与转运的关键过程开展研究，阐明了Sec复合体亚基Sec72在信号肽介导蛋白进入内质网过程中的功能作用，并提出基于Sec72缺失的分泌增强策略。

This study showed that Sec72 deletion differentially affects secretion depending on signal peptide properties and validated a Sec72 deletion-centered strategy to enhance secretion. By connecting signal

peptide properties with ER translocation and system-level cellular responses, the study outlines key engineering targets and combinatorial directions for improving yeast secretion and recombinant protein production.

研究揭示了Sec72对不同信号肽属性底物分泌的选择性影响，提出并验证了以Sec72缺失为核心的增强分泌策略。该工作将信号肽性质与内质网转运机制及细胞系统响应相联系，提出提升酵母分泌能力的关键工程靶点与组合优化思路，为重组蛋白高效表达及相关生物制造应用提供理论与技术支撑。



7.Breakthrough Published in Nature: SCUT-Led Team Achieves Major Advance in Lithium-Organic Batteries

再登！华南理工合作研究实现有机锂电池研究重大突破

On February 18, Professor Huang Fei's team from the State Key Laboratory of Luminescent Materials and Devices, South China University of Technology (SCUT), in collaboration with Professor Xu Yunhua's team from Tianjin University and other partners, successfully fabricated a high-mass-loading organic electrode based on the n-type conducting polymer poly(benzodifurandione) PBFDO and developed an organic pouch cell with an energy density exceeding 250 Wh/kg. The battery demonstrates robust cycling stability and can operate over a wide temperature range from -70 °C to 80 °C, while also offering excellent flexibility and safety... The findings were published in Nature under the title "*Practical lithium-organic batteries enabled by an n-type conducting polymer*".

2月18日，华南理工大学发光材料与器件全国重点实验室黄飞教授团队，联合天津大学许运华教授团队等科研力量开展合作，基于n型导电聚合物PBFDO成功制备出高负载有机电极，并实现能量密度突破250Wh/kg 的有机软包电池。该款电池具备优异的循环稳定性，可在-70℃至80℃的超宽温域内工作，并兼具良好的柔性与安全性。相关研究成果以题为 "Practical lithium-organic batteries enabled by an n-type conducting polymer" 的研究论文发表于国际顶级期刊*Nature*。

Electrodes based on PBFDO exhibit high electron conductivity, high specific capacity, and a high lithium-ion diffusion coefficient. , effectively overcoming traditional organic electrode limitations of poor conductivity and the difficulty of fabricating high-mass-loading electrodes. This achievement validates the

feasibility of organic electrode materials in practical energy storage systems and marks a critical step in advancing organic battery technology from laboratory research toward industrial application.

基于PBFDO的电极兼具高电子导电率、高比容量与高锂离子扩散系数，有效突破了传统有机电极材料导电性差、高负载电极制备难度大等关键技术瓶颈。这一研究成果验证了有机电极材料在实用化储能系统中的可行性，标志着有机电池技术正式从实验室基础研究阶段，向产业化应用阶段迈出了实质性的关键一步。

8.Tang Hongwu Appointed as the Chancellor of SCUT, Yang Zhongmin Appointed as the President of SCUT

唐洪武任华南理工大学党委书记，杨中民任华南理工大学校长

On February 27, the Ministry of Education announced leadership appointments at SCUT. Tang Hongwu was appointed as the Chancellor of SCUT, transitioning from his previous role of President of the University. Yang Zhongmin was appointed as the President of SCUT.

2月27日，教育部在华南理工大学宣布了唐洪武同志由华南理工大学校长转任党委书记，杨中民同志任华南理工大学校长、党委副书记。

Biography of Tang Hongwu

唐洪武同志简历

Tang Hongwu, born in September 1966, holds Ph.D in Engineering. He is a Deputy to the 14th National People's Congress, Professor and Academician of the Chinese Academy of Engineering. He previously served as the Chair of Hohai University Council, and subsequently the President of SCUT.

唐洪武，1966年9月出生，研究生，工学博士，中共党员，第十四届全国人大代表，教授，中国工程院院士。曾任河海大学党委书记，华南理工大学校长、党委副书记。

Biography of Yang Zhongmin

杨中民同志简历

Yang Zhongmin, born in November 1971, holds Ph.D in Engineering. He is a Professor and Academician of the Chinese Academy of Engineering. He previously served as the President of South China Normal University.

杨中民，1971年11月出生，研究生，工学博士，中共党员，教授，中国工程院院士。曾任华南师范大学校长、党委副书记。

9.SCUT Wins First Prize at the 24th Chinese National Round for Jessup International Law Moot Court

华南理工大学代表队获Jessup国际法模拟法庭竞赛中国区一等奖

From February 25 to 28, the 24th Chinese National Round for Jessup International Law Moot Court was held at China University of Political Science and Law. South China University of Technology (SCUT) team was awarded a First Prize at the national level, with team captain Zhao Yuhang named Best Oralist. The team was coached by Hu Henan of the School of Law.

2月25日至28日，第二十四届Jessup国际法模拟法庭竞赛中国区比赛在中国政法大学举行。华南理工大学代表队荣获全国一等奖，队长赵禹杭获评全国最佳辩手。本届比赛由学校法学院胡赫男担任指导教师。

The Jessup International Law Moot Court Competition is widely recognized as the world's largest and most prestigious moot court competition, with a long-standing history and distinguished academic reputation.

Each year, it brings together hundreds of universities from over 100 countries and regions. Dedicated to advancing the study and research of public international law, the competition serves as a key indicator of a university's legal education quality, academic standing, and global impact.

据悉，“Jessup国际法模拟法庭竞赛”是法学领域的高水平国际竞赛，是国际上规模最大、历史最悠久的模拟法庭赛事，每年有来自全球100多个国家和地区的数百所大学参与。赛事旨在推动国际公法的学习与研究，是衡量高等院校法学教育水平、学术声誉和国际影响力的重要指标。

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