

Address: Building A, 388 Ruoshui Road, Suzhou Industrial Park, Jiangsu, P.R. China, 215123 Tel : 0086-512-62869088 Email : info@oxford-oscar.cn Website : https://oscar.web.ox.ac.uk/

#### 联系

地址:中国江苏省苏州工业园区若水路 388号A幢(215123) 电话:0086-512-62869088 电邮:info@oxford-oscar.cn 官网:https://oscar.web.ox.ac.uk/ 微信公众号:牛津大学高等研究院(苏州



WeChat / 微信公众号







## OSCAR OXFORD

NEWSLETTER 050 SEPTEMBER 2021





## **CONTENTS**

- OSCAR RESEARCHERS DEVELOP NEW TECHNOLOGY FOR MULTILAYER SOLUTION-PROCESSED ORGANIC LIGHT EMITTING DIODES
- OSCAR ACADEMIC SEMINAR SERIES: SURFACE CHEMISTRY AND SYNTHETIC BIOLOGY
- OSCAR'S DYNAMIC WORKFORCE
- 06 MEET OSCAR'S NEW STAFF MEMBERS
- OSCAR IMPACT AND COLLABORATION
- 13 SIP NEWS IN SEPTEMBER

Front cover image: a glimpse of OSCAR's Energy Storage and Conversion Laboratory. Photo credit: Dr. Chenbo Wang

## OSCAR researchers develop new technology for multilayer solution-processed organic light emitting diodes



Printed emitter films

photosensitive layer, and preparing method thereof" in the patent application, which was filed with the China National Intellectual Property Administration (CNIPA) on September 6, 2021.

Organic light-emitting diodes (OLEDs) represent the third generation of display technology. OLEDs have a simple device structure, in which a series of nano-scale organic thin layers are sandwiched between two electrodes. This flat light emitting technology possesses many excellent properties such as self-emission, lightweight, thinness, flexibility and rollability, and high colour contrast. Commercial OLED manufacturing methods currently available rely primarily on vacuum thermal evaporation technology, and the products are applied to small and medium-sized display terminals such as mobile

Scientists in OSCAR's Optoelectronic Technology Laboratory (OeTL) have developed a new technology to facilitate multi-thin-layer structures prepared by a solution process, enabling fully-printed OLED manufacturing. The technology is a collaborative invention of OSCAR PI Prof. Paul Stavrinou, Co-PI Dr. Jingsong Huang and Research Technician Wenwen Tao. The technology was described as a "coating solution for forming an organic light-emitting layer or a photosensitive layer, and light-emitting layer or

#### OXFORD SUZHOU CENTRE FOR ADVANCED RESEARCH

phone screens. However, deposition methods come with serious drawbacks, including low material utilization, poor scalability, high capital cost, and difficulty in patterning, leading to poor cost-effectiveness.

Solution-processed methods are compatible with conventional printing technologies, such as inkjet printing, slot die coating and other roll-to-roll manufacturing methods. These methods significantly improved material utilization and production efficiency, and therefore are considered an effective way to address the high cost of OLEDs and realize large-area devices and flexible/rollable devices. However, solution-processed multilayer OLEDs are more challenging to fabricate. This is due to the major issue of intermixing of layers as deposition of a layer may dissolve or mix with the preceding layer. Without the use of a multilayer structure, the performance of solution-processed devices is inferior to their evaporated counterpart.

The new method developed by scientists at OSCAR's OeTL can avoid interfacial miscibility and facilitate the formation of a good multilayer structure. The technique has been successfully demonstrated using traditional spin-coating methods to prepare a fully solution-processed multilayer OLED. Compatibility of this method with industrial-grade inkjet printing technology to fulfil its potential commercial value has also been verified.



## OSCAR Academic Seminar Series: surface chemistry and synthetic biology

OSCAR PIs, Visiting Academics, and researchers met online and in-person for a new OSCAR Academic Seminar session on Friday 24th September. Dr. Dandan Wang, a Research Scientist in Professor Mark Moloney's OSCAR Chemistry Lab, and Dr. Yun Wang, a Senior Research Scientist working in the Synthetic and Single Cell Biology group and OSCAR's Innovation and Technology Centre (ITC) for Molecular Diagnostics led by Prof. Wei Huang, were invited to give talks on their respective research topics. Dr. Dandan Wang was the first speaker at the seminar; her talk focused on carbene modified surfaces and application in enzyme immobilization. Her experiments were all conducted in OSCAR, complementing Prof. Mark Moloney's previous research in Oxford into the modification of surfaces through carbene derivatives.

Surface modification has always been important for adhesion and wettability, with applications in medical devices and implants, and energy technologies. Prof. Mark Moloney's group in Oxford has been developing a general but effective method to modify a variety of surfaces via carbene derivatives. The functional group on the modified surface enables further modifications leading to not only colour-wettability changes but also enabling enzyme immobilization.

The second talk, delivered by Dr. Yun Wang, informed participants of single cell Raman micro spectroscopy, one of the research focuses of OSCAR's Synthetic and Single Cell Biology group. Raman spectroscopy has been widely applied in many research areas including pharmaceutical, geology, materials, food safety and biology. A Raman spectrum can reflect the 'chemical fingerprint' of a material/cell. **OXFORD SUZHOU CENTRE FOR ADVANCED RESEARCH** 

With this Raman platform, single cell identification, isolation and genomic sequencing can be achieved. As Dr. Yun Wang discussed, this Raman platform can provide detailed information, including the metabolic pathway in response to nutrients in the vast majority of as-yet-uncultivated microorganisms, and in the development mechanisms of tumor cells or stem cells.

The talks sparked cross-disciplinary discussions among lots of OSCAR PIs and researchers. Prof. Mark Moloney, who chaired the seminar, plans to continue the discussions beyond the meeting in order to develop interesting questions for further research between OSCAR groups.

#### About the speaker



#### Dr. Dandan Wang is a

**Research Scientist** at OSCAR in Professor Mark Moloney's group. Her research interests lie in the surface modification of various materials for

application in enzyme immobilization, biosensing and other areas. Dr. Dandan Wang received her doctoral degree from the Department of Chemistry, National University of Singapore, and joined OSCAR in February 2019.

Dr. Yun Wang is a Senior Research Scientist at OSCAR working in the Synthetic and Single Cell Biology group and ITC for Molecular



Diagnostics led by Prof. Wei Huang. Her research interests include molecular diagnostics for infectious diseases, biosensor applications for environmental monitoring, and single cell Raman spectroscopy for antimicrobial resistance research. Dr. Yun Wang received her PhD from the University of Sheffield in 2011 and joined OSCAR in 2018.



"Putting people first" has been a core element of OSCAR's operations and development. High on the priority list of OSCAR is the creation of an inclusive and dynamic workplace where its staff feel at home and supported. Guided by this principle, consistent efforts have gone into making a people-orientated approach a built-in feature of OSCAR's working environment.

In early September, OSCAR saw a makeover that turned a plain wall on the second floor of the OSCAR building into a forum where staff can post pictures, share insights, voice opinions, solicit input, or simply drop a line using stickers. The move is intended to provide a vehicle for informal communication to help give employees more of a voice, enable employee interaction and inspire lines of discourse at OSCAR.



OSCAR also offers its staff opportunities to connect with each other outside of the work environment. In late September, the OSCAR "big family" held an outdoor barbeque as part of the annual team building day, which included a number of relaxing recreational activities and out-of-hours socialising.

"The people make the OSCAR" - OSCAR believes that employee views and the interchange of ideas within its heterogeneous workforce plays an important role in stimulating creativity and innovation at the organization level.



## Meet OSCAR's New Staff Members

#### Dr Haiyun Pei

Senior Research Scientist in Prof. Zhanfeng Cui's group

Dr. Haiyun Pei joined OSCAR in September 2021 as a Senior Research Scientist in the Regenerative Medical Engineering group, led by Prof. Zhanfeng Cui. She was a post-doctoral associate in the Stem Cell Institute and in the Department of Chemical Engineering and Materials Science at the University of Minnesota. Her previous research focused on differentiation of embryonic stem cells toward the hepatic lineage, generation of induced pluripotent stem cells through reprogramming technology, as well as proliferation and differentiation of hematopoietic stem cells.

"I'm glad to join the big OSCAR family here," Haiyun said, "OSCAR has a great environment for research, and I believe that we will stride forwards towards the great goal of science and technology." At OSCAR, she will use advanced tissue engineering technology and bioreactor system to develop cell expansion approaches. "This platform will make great contributions to the commercialization of cell therapy products." said Haiyun. for hematop

Dr. Huilin Li

Dr. Huilin Li joined OSCAR in September 2021 as a Research Scientist in the Regenerative Medical Engineering group, led by Prof. Zhanfeng Cui. She earned her PhD in 2021 at the Stem Cell and Regenerative Medicine Lab, Institute of Health Service and Transfusion Medicine, AMMS. Her former research focused on the direct hematopoietic reprogramming, hematopoietic stem cell expansion ex vivo, integration-free reprogramming of induced pluripotent stem cells and preferential hematopoietic differentiation in induced pluripotent stem cells. During her study, she published, as the co-first author, three SCI papers with Impact Factors of 3.929, 4.556 and 6.832 respectively. She also had a fourth SCI paper published with an Impact Factor of 4.963 as the second author.

"It is a great honour for me to join Prof. Zhanfeng Cui's group at OSCAR," Dr. Li said, "This is a great place to perform research study with a pleasant academic atmosphere, first-class research equipment and very professional multidisciplinary research teams." Dr. Li has always been interested in the application of large-scale preparation of functional blood cells in regenerative medicine. Although there has been exciting progress in this field in recent years, there remain many opportunities and challenges ahead. "Application requires efficient and stable cell sources, but unlike theoretical research, the establishing of industrialized preparation processes cannot be completed by a single discipline." Dr. Li said.



#### Research Scientist in Prof. Zhanfeng Cui 's group

#### Yu Gao

#### Research Technician in Prof. Ian Thompson's group

Yu Gao joined OSCAR on 1st September 2021, as a Research Technician in Prof. Ian Thompson's group. In 2020, he graduated from Wuhan Institute of Technology with a master's degree in Engineering. During his master's study, he was engaged in the preparation of carbon nanomaterials as the anode materials for microbial fuel cells using biomass waste as a precursor, converting chemical energy in wastewater into electrical energy by use of microorganisms.

Yu has one year's industry experience in membrane biotechnology. He joined OriginWater Technology, a membrane developer and manufacturer, as a research and development project leader in 2020. There, he participated in the development of a new electrochemical method for sterilization and disinfection to improve drinking water safety. He also gained mastery of the basic operations of bacteria cultivation and counting.

"I am proud to join Prof. Ian Thompson's group at OSCAR" Yu says, "The atmosphere here is very pleasant and free, and especially suitable for research. My current work mainly involves the biodegradation of metal working fluids. We obtained a large number of different strains of microorganism from the environment. Then we use different metal working fluids to screen and domesticate these strains. It is hoped that through the process, desirable strains will be obtained and be applied in metalworking fluids treatment and help produce additional useful products efficiently. I will make my best effort to do a good job during my time in OSCAR."

#### Dr. Jingjing Feng

#### Executive Assistant to Director and Research Coordinator

Dr. Jingjing Feng received her PhD in Physics from the University of Texas at Austin in 2019, where she used statistical modelling to study quantum transport and solar panel metamaterials. Her research was published in American Physical Society peer-reviewed journal articles and conference talks.

She also systematically studied public policy as a way to understand the world macroscopically. She worked at the United Nations Office for Coordination of Humanitarian Affairs and Division for Sustainable Goals, where she conducted projects related to technology park and innovation policy, energy and environmental policy, digital governance, among others. Jingjing's interdisciplinary experiences in both natural and social science allowed her to go beyond the traditional scope. At OSCAR, Jingjing will serve as the Executive Assistant to Director and Research Coordinator to help coordinate between Oxford and OSCAR on international research collaboration.

OXFORD SUZHOU CENTRE FOR ADVANCED RESEARCH



# OSCAR Impact and Collaboration

#### FUNSOM explores collaboration with OSCAR's OeTL

Dr. Pirzado Azhar Ali Ayaz, from the Functional Nano & Soft Materials (FUNSOM) Laboratory in Soochow University, visited OSCAR's Optoelectronic Technology Lab (OeTL) on 9 September. A seminar was held with Dr. Ayaz giving a talk on the synthesis and growth of carbon materials and perovskite single crystals for optoelectronic applications. Dr. Jingsong Huang, Co-PI of OeTL, introduced to Dr. Ayaz the group's research and interests.

> This visit saw OSCAR and FUNSOM agree on an initial collaboration focusing on perovskite single crystals for optically pumped laser application.

### UK Consul and Policy Officer Exchanges Insights on Healthcare with OSCAR

On 17<sup>th</sup> September 2021, Mr. Stephen Brennan, Consul of Science and Technology from British Consulate-General Shanghai and Ms. Ella Mackay, Senior Policy Officer of Science and Technology from British Embassy Beijing visited OSCAR and met with Ms. Leah He, the General Manager of OSCAR. Mr. Stephen Brennan is the sector lead for Sustainable Urban Environment and the health and life science, clean energy and future manufacturing sectors. Ms. Ella Mackay oversees Covid-19 and healthcare data. The meeting helped update the UK Embassy and Consulate on OSCAR's latest technologies and operations, as well as strengthen UK-China and information-sharing.

Accompanied by Ms. Leah He, the visitors visited the OSCAR-Prenetics Innovation and Technology Centre (ITC) for Advanced Molecular Diagnostics, OSCAR's first ITC, on the 6th floor. Dr. Haiyun Pei, Senior Research Scientist from Prof. Zhanfeng Cui's group, and Dr. Yun Wang, Senior Research Scientist from Prof. Wei Huang's group, introduced the exciting scientific collaboration taking place within the ITC, in particular, further R&D efforts in rapid testing technologies to fight the global pandemic.

The visitors were also introduced to Dr. Zhangdaihong (Jessie) Liu from OSCAR's Digital Health group. The visitors expressed great interest in OSCAR's advancement in digital healthcare and exchanged concerns on China's new data policy. Both sides agreed that both the UK and China are strengthening their position in the digital healthcare market, and that in a post-pandemic era, the global healthcare industry will embrace new digital technologies. The two sides also expressed wishes for long-term partnerships on healthcare data policy.

#### OXFORD SUZHOU CENTRE FOR ADVANCED RESEARCH



#### Sino-Securities Index Information Service (Shanghai) visits OSCAR

On 29th September, Mr. Zhong Liu, President of Sino-Securities Index Information Service (Shanghai) Co. Ltd. and Associate Prof. Changging Hu from Soochow University visited the Mathematical Modelling and Data Analytics Centre at OSCAR. OSCAR General Manager Leah He, Research Scientist Dr. Liang Zhao, and visiting students Xingyue Pu, Chao Zhang and Yihuang Zhang met with the visitors.

The visit started with a tour of OSCAR's exhibition hall and the Mathematical Modelling and Data Analytics Centre, followed by a productive discussion between the two parties. The discussion focused on the latest developments in the field of mathematical finance, and insights into future prospects for the industry. Mr. Liu and Prof. Hu also shared informative cases in which mathematical modelling had successfully addressed real-world problems in the financial sector. During the visit, both parties expressed strong interest in further cooperation.

## SIP News in September

### 2021 Global AI Product Expo presents an impressive report card of Al industry

The 2021 Global Artificial Intelligent Product Expo opened on 16<sup>th</sup> September in Suzhou Industrial Park (SIP). The Expo lasted for three days, featuring a dazzling display of advanced technologies and new AI-enabled products. This is the first grand gathering of the AI industry following Suzhou's successful bid to be the "National New Generation Al Innovation and Development Pilot Zone". Qingwen Wu, Deputy Secretary of Suzhou Municipal CPC Committee and Acting Mayor, said in his speech that the artificial intelligence industry is one of the leading industries in Suzhou towards which plentiful resources and efforts are directed. Suzhou is open to global Al specialists who seek to innovate, start businesses and help advance AI-enabled economic transformation and development.

At the Expo the latest innovations integrating AI with the manufacturing, medical, financial and tourist industries were presented. The audience at the Expo were also offered interactive experiences, including autonomous driving, unmanned delivery and unmanned cleaning.

Artificial intelligence has always been an emerging industry of strategic importance for SIP. More than 830 AI technology companies are now established in SIP, of which 10 are publicly listed. Fourteen national-leading experts and twelve national-level research institutes are leading research efforts in allied fields.

