Contact us
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/

联系我们
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

UNIVERSITY OF OXFORD

NEWSLETTER 024 JULY 2019

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MPLS Division Head's Visit to OSCAR

Prof. Sam Howison (the interim Head of Oxford's Mathematical, Physical and Life Sciences Division) visited OSCAR in July to check research progress in the Centre and to discuss future strategic plans.

On 10 July, Prof. Howison held a meeting with SIP Chairman Ding Lixin together with Prof. Zhanfeng Cui, PI Prof. Luet Wong, and Leah He (OSCAR General Manager).

Prof. Howison with OSCAR staff and PIs

On 11 July, Prof. Howison held a meeting to review OSCAR's progress and work plan with OSCAR Director and the General Manager. After the meeting, Prof. Howison was taken on a tour of the building to check lab progress.

PIs Working in OSCAR

On 4 July, the Neural Function and Regeneration Laboratory was unveiled by OSCAR PI Prof. Zhanfeng Cui.

On 5 July, Prof. Donal Bradley visited the Vacuum Interconnected Nanotech Workstation (NANO-X) of the Chinese Academy of Sciences, Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO). Dr. Jingsong Huang and Dr. Keval Sonigara also participated in the visit.

Prof. Donal Bradley (R1), Dr. Jingsong Huang (L1), Dr. Keval Sonigara (L2)

From 28 June to 13 July, PI Prof. Luet Wong worked at OSCAR. His work mainly focused on the final steps of layout on the 8th floor, and installation of equipment in the laboratories of chemistry, microbiology and material science.

On 4 July, Prof. Luet Wong held a meeting with visitors from Apple Flavor and Fragrance Group Co., Ltd, discussing potential collaboration with OSCAR in synthesis of flavour, fragrances and food additives. On 9 July, Prof. Luet Wong had a meeting with Professor Ciao-Ming Gao of Soochow University about potential collaboration between OSCAR and his team in drug discovery.

Meeting on 4 July

Meeting on 9 July

PI Prof. Wei Huang worked at OSCAR in July and had several meetings.
Director Wu Xiaohong and Director Li Shaolian from National Institute for Laboratory and Inspection Body (CNLAB) visited OSCAR on 20 July. Prof. Wei Huang showed them around the lab on the 8th floor and had an in-depth discussion with them about future collaboration on biosensor applications, particularly in the food safety area.

Prof. Wei Huang visited BioX Life Intelligence Industry Research Institute on 23 July. Mr. Bo Liang showed their labs and facilities and had a brief discussion about using Raman for embryo screening.

Prof. Jian Ye from Shanghai Jiaotong University visited the microbiology lab of OSCAR, and afterwards had a joint visit to Institute of Functional Nano & Soft Materials, Soochow University with Prof. Wei Huang.

On 29-30th July, Prof. Paul Stavrinou, PI of the Optoelectronic Technologies Laboratory, worked at OSCAR. Prof. Stavrinou participated in the group's weekly meeting, checked the progress of the lab establishment, and listened to recent research activities and progress.

Optoelectronic Technology Laboratory in OSCAR

The Optoelectronic Technology Laboratory (OeTL), led by Professors Donal Bradley and Paul Stavrinou, is focused on the development of novel semiconducting optoelectronic materials and devices and their application. In addition to the material development, the research spans the requisite studies into photophysical processes that underpin device operation and, from the molecular level, examines both micro- and nano-scale processes to provide high-performance components that include light-emitting diodes, laser and amplifier components, solar cells and detectors. While a natural extension of activities currently underway at Oxford University, the OeTL is building capacity towards cost-effective scale-up manufacturing for near-term commercialisation. A key aspect being the development of new device architectures, their manufacturing and deployment into new application fields, such as biological sensing and solid-state lighting.

The OeTL comprises four main laboratories at OSCAR:
- Advanced Material Development
- Multifunctional Device Fabrication
- Printed Electronics Processing
- Optoelectronic and Photonic Characterisation

People

PI: Donal Bradley

- Fellow of the Royal Society.
- Commander of the Order of the British Empire.
- Fellow of the Institute of Physics.
- Fellow of the Institution of Engineering and Technology.
- Chartered Engineer and Fellow of the Royal Society for the encouragement of Arts, Manufactures and Commerce.
- Visiting Professor in the Department of Physics, University of Oxford.
- Vice President for Research and Distinguished Professor of Materials Physics & Device Engineering, King Abdullah University of Science and Technology.

PI: Paul Stavrinou

- Associate Professor of Engineering Science, University of Oxford.
- Fellow of Lincoln College, Oxford.
- Adjunct Professor in the Department of Physics, University of Montreal.
- Former Director of the Plastic Electronics Centre for Doctoral Training (PE-CDT) and co-Director of the cross-faculty Centre for Plastic Electronics (CPE), Imperial College London.

Group members:

Jingsong Huang
- Senior Research Scientist
- Research interests: organic optoelectronics and its applications in information display, solar cells and biosensors; micro-nano manufacturing technologies.
- Dr Huang has a 20-year track record of research activities in leading universities and industries.

Keval Sonigara
- Research Scientist
- Research interests: development and application of synthetic organic photoactive materials and aqueous polymer gel electrolytes for advanced photovoltaic and energy storage devices.
- Dr Sonigara received his Doctoral degree from Department of Chemistry, Sardar Patel University.

Haiyu Liu
- Research Technician
- Research interests: liquid phase synthesis of inorganic semiconductors; fabrication of semiconductor composites and their applications.
- Haiyu Liu got his master's degree from Soochow University.

Advanced Material Development

The Advanced Materials Laboratory investigates the synthesis and study of materials for a range of device technologies, e.g. molecular and polymeric materials for charge transport and optoelectronic properties, hybrid materials (organic/inorganic) for charge transport and photonics, and perovskite-based materials. Current projects include solution-based charge transport materials and advanced material design utilising conformation control.

Multifunctional Device Fabrication

The fabrication of various optoelectronic devices is carried out in the Multifunctional Device Fabrication Laboratory. Capabilities include an advanced integrated multi-chamber glovebox and cluster tool allowing for manufacturing in vacuum or an inert atmosphere; particularly important for materials that are sensitive to oxygen and water. The laboratory also comprises wet- and dry fabrication methods accompanied by a range of encapsulation techniques.

Printed Electronics Processing

A crucial step towards producing cost-effective optoelectronic devices is to utilise soluble materials that allow manufacture by a variety of printing techniques. The Printed Electronics Laboratory is equipped with a range of bench-top coaters to help examine and develop the processes behind the manufacture of devices. In conjunction with other laboratories within OeTL, materials can be prepared specially for the manufacturing mode and optimised for scaling-up to meet demand for large throughput commercial routes. The facilities, which will include inkjet printer, spray coater, slot-die coater, screen printer, etc., also provide exposure and access to a range of next-generation manufacturing techniques.

Optoelectronic and Photonic Characterisation

The characterisation and assessment of materials and devices play a key role, not only to probe the underlying physics of semiconductor devices but also to evaluate and optimise their performance. A suite of optoelectronic and photonic test equipment enables materials development and provides useful insight when optimisation for a particular manufacturing process is required. The full range of device performance metrics can be assessed, including electrical-to-optical conversion efficiencies and charge transport properties. Equally important are the photonic aspects, i.e. the control and distribution of light within the structures and the wider environment. Full angular- and spectral response of devices and structures, from either incident or emitting radiation, can be assessed following steady-state and/or transient excitation.

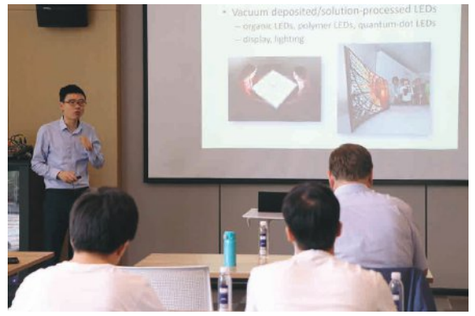
Oxford-SIP Cooperation and Development Board Meeting

Prof. Cui (OSCAR Director) attended the Oxford-SIP Cooperation and Development Board second board meeting on 10 July.

The board is co-chaired by Prof. Zhanfeng Cui (representing OSCAR) and Mr. Lin Xiaoming (Deputy Chairman of SIP).

The meeting was to review OSCAR's progress during the previous six months and to discuss its work plan for the next six months. Matt Perkins (CEO of OUI, OUSST board director, and board member of Oxford-SIP Cooperation and Development Board) and Leah He (Oxford-SIP Cooperation and Development Board secretariat) also attended.

OSCAR Thinking



On 3 July, the Optoelectronic Technologies Laboratory invited Prof. Jianpu Wang and Prof. Youtian Tao from Institute of Advanced Materials, Nanjing Tech University for a seminar at OSCAR. Prof. Bradley hosted the seminar as part of the OSCAR Thinking series events.

Prof. Youtian Tao gave a talk of "Molecular engineering on colour tunable thermally activated delayed fluorescence materials for OLED". Prof. Jianpu Wang gave a talk of "Perovskite LEDs for displays".

On 10 July, Prof. Cui invited Prof. Lee Ann Laurent-Applegate from Regenerative Therapy Unit, University Hospital of Lausanne for a seminar about "Skin regeneration and anti-aging: cellular therapies to the rescue" at OSCAR. Prof. Cui hosted the seminar as part of the OSCAR Thinking series events.

Prof. Lee Ann Laurent-Applegate was awarded as Visiting Professor of OSCAR.

Meet OSCAR Staff

Exclusive Interview-Dr. Keval Sonigara

Dr. Keval Sonigara joined OSCAR in April 2019 as a Research Scientist in Prof Bradley & Prof Stavrinou's group. He is also a visiting fellow at Soochow University, a main collaborator of the Bradley & Stavrinou group. Dr. Sonigara completed his PhD from Sardar Patel University in India specialising in organic photovoltaics, designing and synthesising advanced organic molecules for optoelectronic devices, and polymeric organic material for energy storage. We interviewed Dr. Sonigara to find out about his research and his life in Suzhou:

Q: What is your current main research project and how is it progressing?

K: "For the last four months, I have worked with my research group members to fully develop the Advanced Material Synthesis Lab at OSCAR. As OSCAR is still a fairly new research institution, we have to build our lab from scratch, and we are currently installing equipment and purchasing chemicals. The lab will be in full work flow by the end of August and I am also ensuring that our lab is of the highest safety standards. Once the lab is ready, I will be developing and synthesising advanced organic compound for printing type photovoltaic devices. Moreover, I am currently writing project proposals to attract potential fundings and cooperation.

In the meantime, I spend about 60% of my time in Soochow University, I have started a project working with Prof. Jian Fan's team, experimenting on synthesising charge transport material for optoelectronics devices. Additionally, I work with some master level students in Soochow University and providing them with academic support and guidance."

Q: How are you finding your time working in OSCAR?

K: "Our research group at OSCAR is well managed by the Senior Research Scientist Dr. Jingsong Huang, and all members are very supportive and helpful. I have met with both of our PI in the last month at OSCAR which is helpful for our future research. The OSCAR research environment is professional yet relaxed, for example, our informal weekly group meeting assists me to catch up with others' work, discuss any finds or challenges, and to plan my week ahead. As I am working at two institutions concurrently, I find it is very helpful that I have lots of freedom on deciding my own schedule.

Furthermore, the administration team of OSCAR is very friendly and they are always happy to help. As a foreigner who doesn't speak Chinese, OSCAR staff all know English well and it is very easy for me to communicate with them. In particular, they are informative and attentive on offering me general guidance and answering any personal questions."

Q: Having lived in Suzhou for more than 4 months now, how do you find the city and how are you adapting and integrating your life here in Suzhou?

K: "To me, Suzhou is a very wonderful city, especially the Suzhou Industrial Park, which is really modern, vibrant and well developed. Currently, I live here with my wife near OSCAR, and we have recently attended many events celebrating both local and international culture, including the International Yoga Day, the International Family Day as well as the Dragon Boat Festival.

As vegetarians, my wife and I have found that there are lots of options available here in Suzhou. We are also able to buy Indian groceries online and we have found many good Indian restaurants in SIP. There is also the Suzhou Indian Association which has more than 250 members and it connects us to the local Indian community."

Q: Looking ahead, what are some of your plans and goals to achieve?

K: "Short-term, I am aiming to have the Advanced Material Synthesis Lab up and running in full work flow by the end of this month, so I can start two concurrent projects relating to material development for printing optoelectronics devices and perovskite devices. In the meantime, I am working on a project with my former colleague now based in National University Singapore which I hope will have some good output in about 6 months time.

On a longer time scale, I hope that out of all my projects, I will be able to obtain some healthy and constructive outcomes for potential publications. Furthermore, I really hope that by working with the research group here in OSCAR as well as at Soochow University, the material compound I develop can be studied and explored at OSCAR which already has excellent facilities and equipment and thus, attracting wider interest and cooperation with not only neighbouring research institutions and universities, but also with national and international counterparts."

Interviewed by Qimu Yuan (Oxford student in Physics and intern in OSCAR)

OSCAR Honours

Dr. Yun Wang, OSCAR Senior Research Scientist in Prof. Wei Huang's group, was awarded the Jiangsu Provincial Double Innovation talent programme. This is the first time that OSCAR has won such an honour at the Jiangsu provincial level.

The application started in March 2019, and the result was released on 19 July http://www.jszzb.gov.cn/tzgg/info_112.aspx?itemid=27447&from=timeline&isappinstalled=0 (Chinese only). Dr. Yun Wang was awarded "Double Innovation-Innovative PhD" under the subcategory of research institutions. Only 50 were awarded in this subcategory across Jiangsu Province.

OSCAR's New Staff

Jiachen Zhu
Research Technician/ Prof. Cathy Ye's group

Jiachen Zhu received the master's degree from Soochow University in July 2019 and then joined OSCAR. Her research focuses on the development of silk protein micropattern biomaterials. The main work now is about the differences in gene expression of stem cells on the different surfaces of biomaterials.

Office Automation System to Streamline Internal Management

To reduce paperwork and increase administrative efficiency, OSCAR has been building an Office Automation system for online approval. This will reduce the load of email approvals on PIs and board directors. All data will be saved on OSCAR Server in the Building.

Following initial building in April and user acceptance testing in June, the system went live on 22 July. All requests, including purchasing, contracts, leave, travel and recruitment will be online via the OA system, but identical with former paper forms.

This system is part of the OSCAR operation team's commitment to providing high quality and efficient support to researchers.

Open to Collaborations

On 2 July, the delegation from the University of Sydney led by Professor Philippa Pattison AO (R3), the Deputy Vice-Chancellor (Education), visited OSCAR to initiate further bilateral exchanges.

On 12 July, a group of Shandong University teachers visited OSCAR to exchange ideas and establish contacts.

On 17 July, SIP led a delegation of officials from Dongguan city (in Guangdong Province) Technology Bureau to visit OSCAR to have a basic understanding of OSCAR.

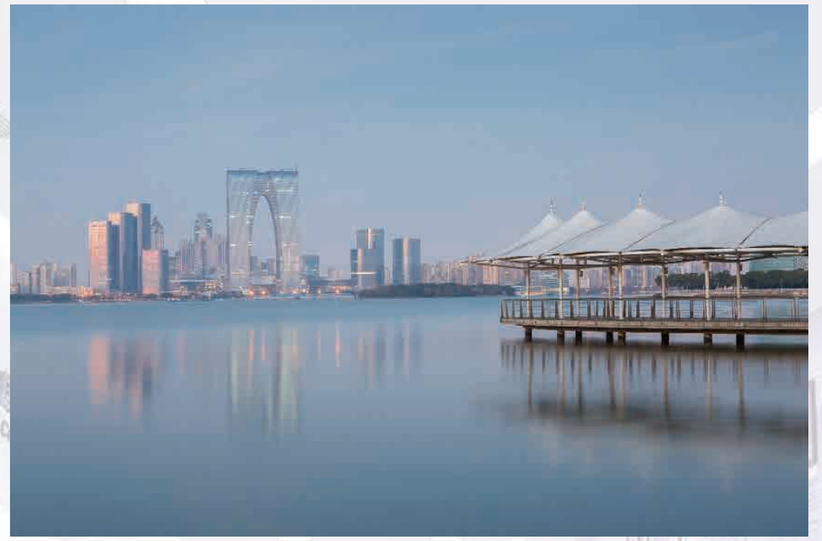
On 17 July, SIP accompanied Jon Price (Head of Business Engagement) and Prof. Paul Townsend (Associate Dean for Business Engagement) from the University of Manchester to visit OSCAR to understand the collaboration between Oxford and Suzhou.

On 18 July, the Beijing Fazheng Group delegation led by its vice president Pan Jun visited OSCAR to establish initial contact.

On 23 July, a delegation of professors from Beijing Institute of Technology visited OSCAR to exchange ideas and seek cooperation possibilities.

SIP News in July

SIP Sees Remarkable Fruits in Rolling out Its Development Model



SIP has seen remarkable results in recent years in rolling out its development model in other areas of the country.

Following SIP's example, several industrial parks have been set up in Suqian and Nantong in East China's Jiangsu province and Chuzhou in the neighboring Anhui province, all with remarkable achievements in attracting investment. Horgos Economic Development Zone in Northwest China's Xinjiang Uygur autonomous region is developing fast with experience drawn from SIP, yielding local GDP of RMB 5.45 billion and total imports and exports of USD 2.008 billion last year.

Moreover, the SIP-Xiangcheng Cooperative Economic Development Area in Xiangcheng District, a district under the jurisdiction of Suzhou, has become a major driver for local economic growth. Additionally, the cooperative industrial park being built in Yinchuan, capital of Northwest China's Ningxia Hui autonomous region, and another one in Jiashan County in East China's Zhejiang province are expected to greatly drive local economic development based on SIP's experience.

Suzhou Daily,
19 July 2019

http://www.sipac.gov.cn/english/news/201907/t20190721_1040965.htm