OSCAR

UNIVERSITY OF
OXFORD

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Headlines

Research

Environmental and Synthetic Biology Group in OSCAR

Environmental Biotechnology and Synthetic Biology Laboratory

The research focus will be on the environmental clean-up of soil and water, monitoring and pollution prevention with emphasis on industrial effluent, treating recalcitrant waste streams and bio-manufacturing biofuels. Technologies will be developed to enable wastewater remediation on site, with recovery of polluting elements (such as high value metals). In addition to microbiological processes, we use physical and chemical applications such as redesigning of anaerobic digesters for increased efficiency of bioconversion and employing of ultrasound and nanomaterials to optimize engineered microbial processes. Further scale-up for commercial applications is performed in collaboration with the industry. Synthetic biology approaches will be used to develop novel organisms which can convert organic components to electricity and high value products such as bioplastics and biofuels.

Cell Design Laboratory

Our group here aims to establish a novel bioengineering platform for synthetic biology - Simple Cell (SimCell). A SimCell is a genetically reprogrammable 'artificial cellular machine', or 'bio-robot', performing advanced bioengineering functions in an easy-to-use, safe-to-handle, and reliable-to-build manner. SimCells are non-dividing, biochemically active and designable smart bioparticles, potentially making them acceptable to deploy in the public domain, avoiding the risks of using living genetically modified organisms (GMOs). These semi-artificial SimCells will provide a bottom-up platform and will have enormous potential for applications in cancer treatment, vaccines, bacterial diagnosis/therapy, biofuels, bio-pesticides, biocatalyst for solar-panel and smart materials for biomanufacturing.

Single Cell Biology Laboratory

A single cell Raman spectrum is a chemical 'fingerprint' of a cell. Prof. Wei Huang is one of the pioneers of single cell Raman biotechnology, developing Raman-stable isotope probing (Raman-SIP), Raman-fluorescent in-situ hybridisation (Raman-FISH) and Raman activated cell sorting (RACS) systems, making the single cell Raman technology a powerful tool for environmental microbiology, microbiome, cancer diagnosis, disease diagnosis and cell sorting. We will apply all these techniques to characterise cell function and link phenotypes to genotypes of single cells and single cell genomics will be employed for analysis of environmental and gut microbiome. Currently, collaborating with Chinese hospitals and industry, we have applied the single cell Raman technology for developing rapid diagnosis of Antimicrobial Resistance (AMR).

The Environmental and Synthetic Biology Group in OSCAR is co-led by Professor Ian Thompson and Professor Wei Huang. The research interests of this group include development of biotechnologies for biosensing pollutants and microbial transformation of industrial and green waste to high value chemicals, stimulating microbial cleanup of industrial wastewaters, controlling antibiotic-resistant bacteria and utilization of carbon dioxide (CO_2). Specifically, physical, chemical and biological approaches are to be employed including biosensors, SimCells, ultrasonic gene transfer and single cell Raman spectroscopy.

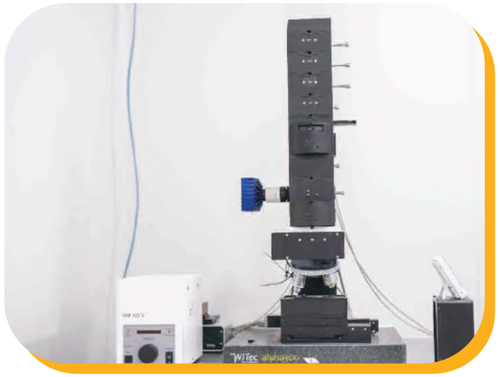
PI

Wei Huang

- Associate Professor in Department of Engineering Science, University of Oxford
- EPSRC Fellow in Synthetic Biology
- Fellow of St Edmund Hall College, University of Oxford
- Visiting Professor in Beijing Normal University, Beijing Genomic Institute (BGI) and the Chinese Academy of Sciences (CAS)

Ian Thompson

- Professor in the Department of Engineering Science, University of Oxford
- Fellow of St Edmund Hall College, University of Oxford
- Honorary Professor of the Institute of Urban Environment, CAS



Group members

Yun Wang

Senior Research Scientist

Research interests: Biosensor application for environmental monitoring; Single cell Raman spectroscopy for antimicrobial resistance study

Muhammad Irfan Arif

Research Scientist

Research interests: Industrial wastewater treatment; Transformation of organic wastes and CO_2 emissions into high value products; Bioremediation

Mengmeng Ji

Research Technician

Research interests: Single cell genomics and metagenomics analysis; Biosensor application

PI Ronald Roy's Work in OSCAR

Ultrasound lab

On 26 June, OSCAR PI Prof. Ronald Roy visited Nanjing and met with several collaborators: Prof. Juan Tu (Nanjing University), Prof. Jian Liu and Prof. Baoqing Nie (Soochow University).

3D laser printer Lab

On 27 June, Prof. Ronald Roy visited the School of Biological Science and Medical Engineering (SBSME), Southeast University, where he held discussions with Prof. Gu (head of SBSME) on potential collaborations.

On 27 June, Prof. Ronald Roy visited Jiangsu Institute of Medical Device Testing (JSMIT) and discussed with Mr. Hu (Head of JSMIT) on their ongoing collaborations.

Acoustic testing Lab

Electrical magnetic testing Lab

OSCAR at JITRI-UK Partners Cooperation Symposium

JITRI-UK Partners Cooperation Symposium was held in University of Oxford on 28 June. The event was chaired by Prof. Zhanfeng Cui (Director, Strategic Projects – China, MPLS Division) and Dr. Paul Burrows (Deputy Vice President of JITRI).

Four of JITRI specialty institutes (Institute of Novel Metals and Applied Technologies, Institute of Graphene, Institute of Biomedical Engineering and Technology, Institute of Digital Manufacturing Equipment and Technology) and two of JITRI's joint innovation centres (JITRI-KERUN Joint Innovation Center, JITRI-Fasten Joint Innovation Center) also introduced their research interests and technology needs.

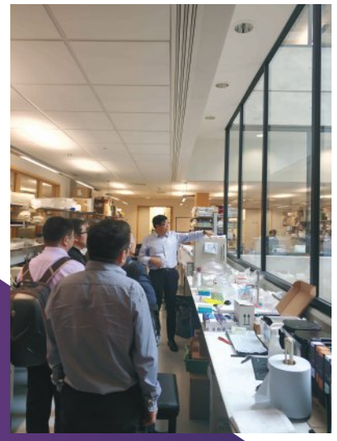
Prof. Patrick Grant (Pro-Vice-Chancellor (Research) of University of Oxford) gave the opening speech and introduced his research in battery manufacturing. Prof. Sam Howison (Head of MPLS Division) also attended the event. Dr. Paul Borrows introduced the progress of JITRI in the past year and plans for the next five years; he also announced details of the IMPACT programme for University of Oxford researchers.

Mr. Sunan Jiang (Minister Counsellor for Science and Technology, the Chinese Embassy in the UK) delivered a talk on current Science, Technology and Innovation cooperation between China & UK, noting that he expects a bright future for China and the UK to collaborate in this area. Other Keynote speakers including Prof. Donal Bradley (Vice President, King Abdullah University of Science and Technology (KAUST), Prof. Andrew D Ball (Pro-Vice-Chancellor (Research & Enterprise), University of Huddersfield), Prof. Jon Frampton (Deputy Pro-Vice-Chancellor (China), University of Birmingham) and Dr. Steve Shi (Director, China Programme Manager, TWI) introduced their cooperation with JITRI.

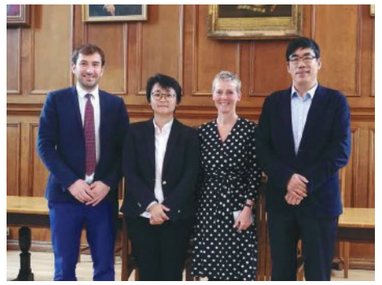
15 researchers from five different UK universities, including OSCAR PIs & Senior Researchers (Prof. Mark Moloney, Prof. Ian Thompson and Prof. Wei Huang, Dr. Jason Raymond) introduced their research in the after session. Prof. Paul Stavrinou and Dr. Hui Wang also attended the event.

A roundtable meeting was held on 27 June to discuss the future cooperation of JITRI & UK Partners. Dr. Paul Burrows exchanged ideas with the representatives from five different UK Universities & Institutes to expedite the existing collaboration and to expand future cooperation.

The JITRI delegation visited Prof. Zhanfeng Cui, Prof. Donal Bradley and Prof. Moritz's laboratory before the roundtable meeting and were impressed by the research conducted by Oxford researchers in these labs.



General Manager's Visit to Oxford University



Meeting with Hertford College
L-R: Fatjon Alliaj, Leah He, Caroline Rice, Prof. Zhanfeng Cui

In June, OSCAR General Manager Leah He visited the University of Oxford to better integrate with the University, to understand how OSCAR can work more closely with MPLS departments and PIs, and to publicize OSCAR activities.

As General Manager of OSCAR, Leah has led the operation team to support PIs and researchers, to ensure that the operational work in OSCAR sets an example of quality, efficiency, reliability and integrity. Leah has also led the team to follow the University policies in the context of OSCAR. For example, regulations including the Recruitment Policy, Anti-Bribery Policy, Anti-Fraud Policy, and Finance Regulations, Health and Safety, Data Use Regulations etc. are in place and implementation.

At Encaenia Leah He with Vice-Chancellor Professor Louise Richardson (middle)

During her visit to the University, Leah reported the development of OSCAR to the MPLS divisional General Purposes Committee, OUSST Board, the Pro-Vice-Chancellor (Research) Prof. Patrick Grant, Head of MPLS Division Prof. Sam Howison, MPLS Divisional Administrators' meeting and the Finance Division etc. Also, Leah had meetings with Heads and Administrators of Department of Mathematical Institute, Department of Chemistry, Department of Computer Science, OSCAR PIs, the Research Services Office etc. All these efforts were made to ensure that OSCAR's operation is in line with the University's requirement and standards.

Attending Oxford Innovation Society Meeting
L-R: Matt Perkins (OUI CEO), Alex Yang (OSCAR JITRI Fellow), Leah He

In order to promote OSCAR in the University, Leah also had various visits to the Development Office, International Strategy Office, OUI, Begbroke Science Park, and the Careers Service Office. Leah also met with the Vice Chancellor Prof. Louise Richardson at the Encaenia, and attended the Oxford Innovation Society meeting, and the JITRI-UK Partners Cooperation Symposium.

OSCAR Researchers

Haiyu Liu
Research Technician/Prof. Paul Stavrinou's group

Haiyu Liu is now a research technician in profs. Bradley and Stavrinou's team. He completed his master's degree in Soochow University as an Excellent Graduate. His research fields include: (i) liquid phase synthesis of inorganic semiconductor (perovskite, transition metal disulfide/TMD, metal sulfide, metal oxide, etc.), (ii) fabrication of semiconductor composite utilizing different synthetic methods, and (iii) applications of semiconductor and their composites.

In June, OSCAR (Dr. Wenshuo Xu) attended the New Materials Technology Forum. Dr. Xu was invited to the Youth Talents Promotion Project, which is not only a platform for academic communications, but an opportunity for self-development and to gain support for research.

In late June, Dr. Wenshuo Xu was invited to the 2019 TechConnect World Innovation Conference & Expo held in Boston, Massachusetts, U.S.A. She gave a talk about the atmospheric pressure chemical vapour deposition growth and post-treatment of 2D materials toward catalytic applications. She also submitted a manuscript entitled Defect Engineered Single-Layer MoS2 Dendrites as an Efficient Electrocatalyst for Hydrogen Evolution Reaction, which is now being reviewed by the conference committee.

OSCAR Senior Research Scientist
Dr. Wenshuo Xu (Prof. Jamie Warner's group)

OSCAR Open Day

On 29 June, OSCAR held its second OSCAR Open Day for the local community, with OSCAR research groups giving introductions to their research at OSCAR. About 70 people from collaborators, universities, research institutions, and industry attended the event.

Jiangsu in Efforts to Promote Commercial Use of 5G Technology

The Ministry of Industry and Information Technology of China on June 6 granted 5G licenses to China Telecom, China Mobile, China Unicom and China Broadcasting Network Corp, quickening the pace to popularize 5G technology. This has offered Jiangsu province that has been conducting 5G trials in Nanjing and Suzhou since last year a chance to go ahead for full commercial deployment of 5G network.

It is learnt that the East China province has made remarkable achievements in building 5G facilities and piloting 5G services, especially in Nanjing Jiangbei New Area and SIP where huge 5G networks have taken shape.

"Take SIP for instance, a 5G network has covered an over-10-square-kilometer zone in Hudong sub-district, and is expected to dramatically change local people's life," a China Mobile staff said.
According to China Mobile's Jiangsu branch, a number of trial 5G calls have been accomplished in nearly 30 provinces and municipalities, including one in Nanjing, and the branch plans to set up 12 outlets in the future in Nanjing, Suzhou and Wuxi to provide 5G services.

At the same time, Jiangsu province is enhancing efforts to expand use of 5G technologies in industrial production, traffic, education, tourism and other fields.

Xinhua Daily,
10 June 2019

http://www.sipac.gov.cn/english/news/201906/t20190611_1031143.htm

Suzhou Seeing a Boom in Nanotech Sector

Suzhou is seeing a boom in the nanotech sector. Home to over 600 enterprises engaged in the sector, it recorded a total output value of nanotech industry of RMB 70.6 billion last year. Besides, it has hosted the globally renowned nanotech feast CHInano, attracting a host of nanotech experts, professionals and exhibitors to the city each year.

SIP, the newly accredited "National Demonstration Area for Standard Nanotech Industrialization", is one of the biggest contributors to the city's nanotech boom. Many of the best-developed Suzhou-based nanotech businesses are located in SIP, and the Vacuum Interconnected Nano-X Research Facility (Nano-X), the world's largest multifunctional nanoscience and nanotech research platform, and an integrated MEMS (micro-electro-mechanical systems) manufacturing chain have taken shape in the area. Statistics show that the total output value of the local nanotech sector increased from about RMB 4 billion in 2012 to RMB 66 billion in 2018.

www.inewsweek.cn,
24 June 2019

http://www.sipac.gov.cn/english/news/201906/t20190626_1034805.htm