OSCAR

UNIVERSITY OF OXFORD

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Oxford Suzhou Centre for Advanced Research

Triennial yearbook 2019-2021

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OSCAR, the Oxford Suzhou Centre for Advanced Research, is the University of Oxford's first and only engineering and physical sciences research institute outside of the UK. Located in Suzhou Industrial Park, China, it is a window through which Oxford showcases its research and innovation to East Asia.

This Yearbook looks back on how the OSCAR's story began, and charts three years of achievements, made possible by our people and their scientific endeavors, which forms the foundation for the Centre's continuing success.

contents

A Home for Oxford in China

The idea to establish an Oxford laboratory in China can be traced back to 2011. Years of co-operative engagement and diligent scrutiny then followed, ultimately bringing the OSCAR project across the line when the Collaboration Agreement between Oxford University and Suzhou Industrial Park was signed in December 2016.

"This Centre is situated in Suzhou for the express purpose of further enhancing the already mighty impact Oxford research has on the world. We are bringing world-class scientists with years of experience in applied research here to Suzhou, an international hub for high-tech industry, so that they can carry out their work in close proximity to institutes and businesses and will further develop and commercialize new technologies that OSCAR's research made possible. Locating our research here will speed up the process for scientific discovery to the manufacture of new technology."

– Prof. Louise Richardson, Vice Chancellor of University of Oxford

Seven years of endeavour of Oxford University and the Suzhou Industrial Park climaxed at the grand opening of OSCAR on 22nd November 2018.

Our mission

OSCAR's mission is to create a long-term international collaboration between the UK and China, combining academic research, technological development, and commercial exploitation via a mutually beneficial partnership with Suzhou Industrial Park's expert manufacturing base, to bring innovative technologies of global benefit to market. OSCAR leads research in modern biotechnology, advanced materials, computational approaches and manufacturing techniques to provide innovative solutions to current global healthcare, energy, environmental and financial challenges. Locating Oxford research in China enables our researchers to work closely with business sectors and partners not readily accessible in the UK, and to define and solve interesting research problems of benefit globally. OSCAR will further the University of Oxford's mission to promote and enable ambitious research of exceptional quality and of global benefit to all people.

Our vision

OSCAR will conduct internationally leading research and development, accelerate the commercial adoption of new technologies, foster interactions between academia and industry, nurture next generation researchers and promote international research co-operation for the benefit of local, regional, national, and international societies.

"Our vision for OSCAR is that it is a home for 'Oxford in China' and allows our researchers to collaborate more effectively with our Chinese counterparts, and to undertake research that is better and more impactful in that it has closer ties to local industries, health services and because it addresses particular local challenges more effectively."

– Prof. Patrick Grant, Pro Vice Chancellor (Research) of University of Oxford

OSCAR's core belief is that the future of science is global.

The Chinese characters for 'Oxford' and 'Suzhou' were projected onto the side of SIP landmark building to celebrate OSCAR's inauguration

Celebrating the journey of OSCAR

Celebrations took place at both Oxford University, and at OSCAR to mark the three year anniversary.

November 2021 marked three years of the Centre's full operation. For three years, OSCAR has worked hard to demonstrate the value of international collaboration on the world stage. OSCAR's unique marriage of Oxford's research strength within the fertile translational environment of the Suzhou Industrial Park has brought together some of the brightest minds in the world with some of the best facilities available, all within an active and thriving research and development ecosystem.

OSCAR Principal Investigators and Research Scientists gathered at St Peter's College in Oxford to mark the occasion, looking back on OSCAR's academic outputs and operational performance, and mapping the path forward.

"OSCAR is a flagship project to show the added value of international collaboration. We have a great team on the ground to implement the Oxford University culture, governance, IP and data protection policies. Despite the pandemic, OSCAR has made great progress in scientific research and social impact."

– Prof Zhanfeng Cui, Director of OSCAR, Foreign Member of the Chinese Academy for Engineering, Donald Pollock Professor of Chemical Engineering, University of Oxford

(left to right) Pro Vice Chancellor (Development and External Affairs) Prof David Gann, OSCAR Deputy Director Prof. Mark Moloney, Vice-Chancellor Prof. Louise Richardson, OSCAR Director Prof. Zhanfeng Cui, Pro Vice Chancellor (Research) Prof. Patrick Grant, and Master of St. Peter's College Prof. Judith Buchanan

Perhaps there is no better way to mark the occasion than to share our passion and pride with our families. OSCAR employees and their families were invited to a Family Day inside the OSCAR building, to observe OSCAR's 3rd Anniversary.

Empowering the world with close-to-market innovation

Established professors from the University of Oxford steer OSCAR's research initiatives. Our research portfolio now spans biomedical engineering and healthcare, environment and biotechnology, mathematical modelling and data analytics, nanotechnology and functional materials.

The appointment of eminent international academics as Visiting Academicians and Professors adds to OSCAR's already outstanding expertise and research.

"Here in OSCAR, we have a very talented group of scientists who are working on a huge range of problems. They are working on problems in chemistry, in nanomaterials, in AI for healthcare, and a whole range of others... As OSCAR matures, it is starting to take the fruits of its research and translate them into impact in wider society.

– Prof. Sam Howison, Head of Mathematical, Physical, and Life Sciences Division, University of Oxford

Principal Investigators

Biomedical Engineering and Healthcare

Zhanfeng Cui

Fellow of The Royal Academy of Engineering
Donald Pollock Professor of Chemical Engineering, University of Oxford

Ronald Roy

Professor of Mechanical Engineering
Head of Department of Engineering Science, University of Oxford

David Clifton

Professor of Clinical Machine Learning, University of Oxford

Cathy Ye

Associate Professor of Engineering Science, University of Oxford

Jason Raymond

Departmental Lecturer in Physical Acoustics, University of Oxford

Environment and Biotechnology

Ian Thompson

Professor of Engineering Science, University of Oxford

Wei Huang

Professor of Biological Engineering, University of Oxford

Jeremy Robertson

Professor of Organic Chemistry, University of Oxford

Luet Wong

Professor of Inorganic Chemistry, University of Oxford

Visiting Investigators

Nanotechnology and Functional Materials

Mauro Pasta
Associate Professor of Materials,
University of Oxford

Mark Moloney
Professor of Chemistry,
University of Oxford

Paul Stavrinou
Associate Professor of Engineering Science,
University of Oxford

Jingsong Huang
Visiting Fellow in the Department of Engineering Science,
University of Oxford
Co-PI of Optoelectronic Technology Lab, OSCAR

Visiting Academicians

Donal Bradley
CBE, FRS
Optoelectronics and Devices

Nigel Slater
FREng
Biopharmaceuticals and Bioformulation

Jonathan M Cooper
FREng, FRSE
Medical Devices and In Vitro Diagnostics

Kenneth Timmis
FRS, AAM
Microbiology and Environmental Biotechnology

Mathematical Modelling and Data Analytics

Rama Cont
Professor of Mathematical Finance,
University of Oxford

Terry Lyons
Fellow of the Royal Society,
Fellow of the Royal Society of Edinburgh,
Wallis Professor of Mathematical,
University of Oxford

Hanqing Jin
Associate Professor,
Mathematics Institute,
University of Oxford

Zhongmin Qian
Professor of Mathematics,
University of Oxford

Visiting Professors

Lee Ann Laurent-Applegate
Professor of Regenerative Therapy,
Lausanne University

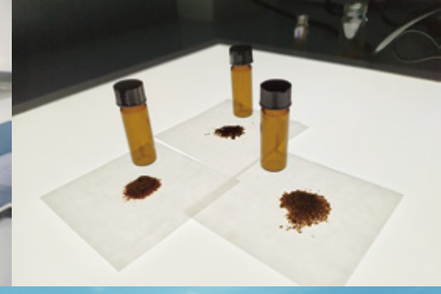
Monique Andersson
Consultant, Clinical Virology,
University of Oxford

Tiantian Zhang
Professor of Reproductive Cryobiology,
Bournemouth University

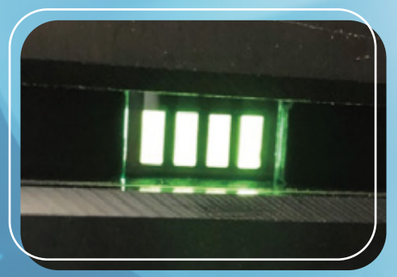
Hong Chang
Visiting Professor from Industry,
In Vitro Diagnostics and Medical Materials



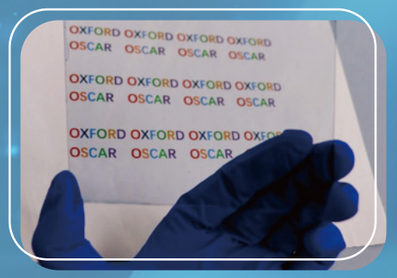


Game-changing semiconducting materials. OSCAR scientists put forward a new idea to form excellent moisture-proof films through a molecular auto-encapsulation strategy.



OSCAR scientists present a new technology to facilitate multi-thin-layer structures prepared by a solution process, enabling fully-printed OLED (Organic light-emitting diodes) manufacturing. Compatibility of this method with industrial-grade inkjet printing technology to fulfil its potential commercial value has also been validated.

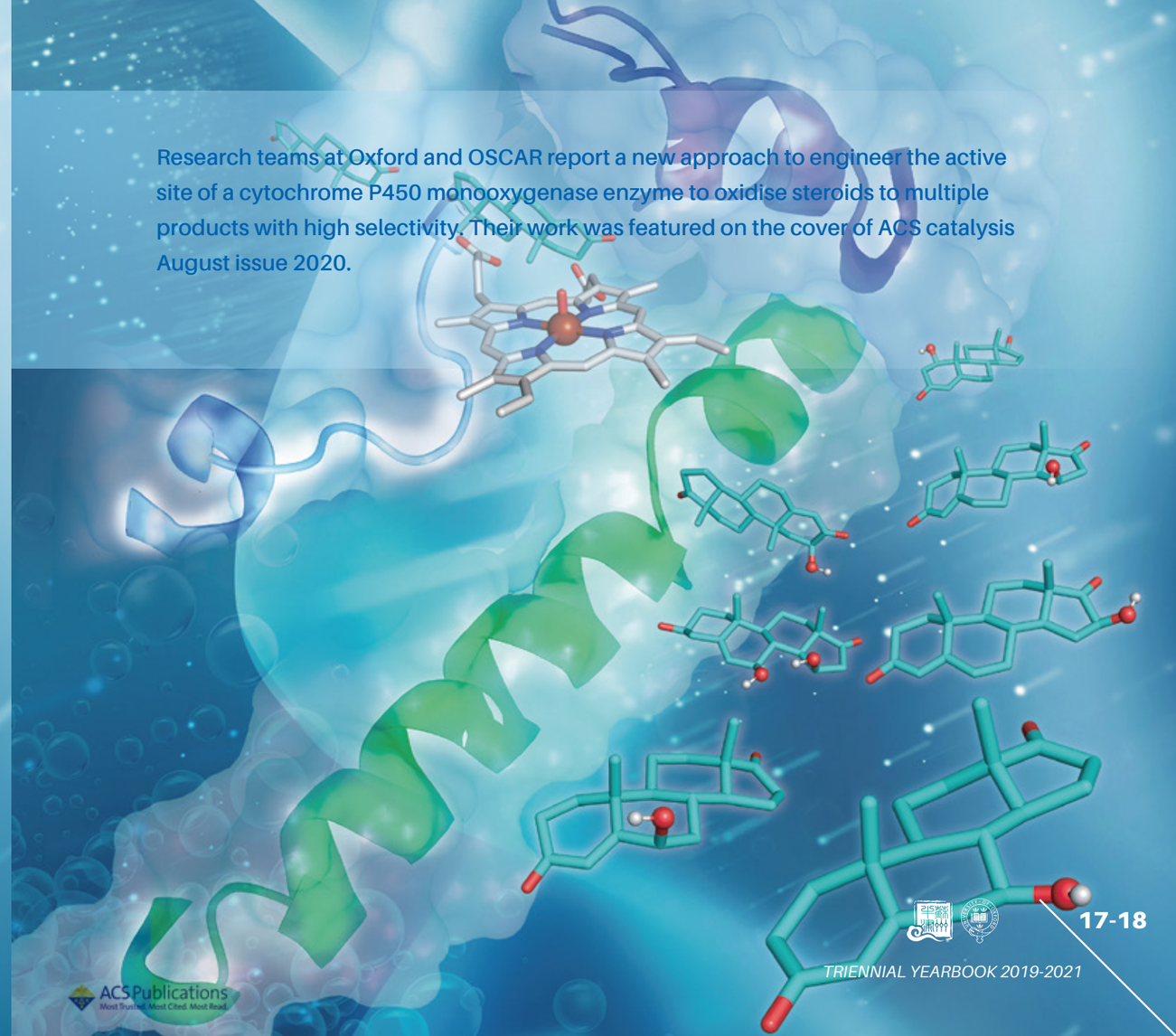


OSCAR scientists have developed a low-cost process to fabricate PEDOT films on rigid and flexible substrates via solution process techniques. The demo transparent conducting films (TCFs) are fabricated on 10 x 10 cm2 glass substrates, which show good transparency at various thicknesses and low sheet resistance.

ACS Catalysis

AUGUST 7, 2020 VOLUME 10 NUMBER 15 PUBS.ACS.ORG/ACSCATALYSIS

Research teams at Oxford and OSCAR report a new approach to engineer the active site of a cytochrome P450 monooxygenase enzyme to oxidise steroids to multiple products with high selectivity. Their work was featured on the cover of ACS catalysis August issue 2020.



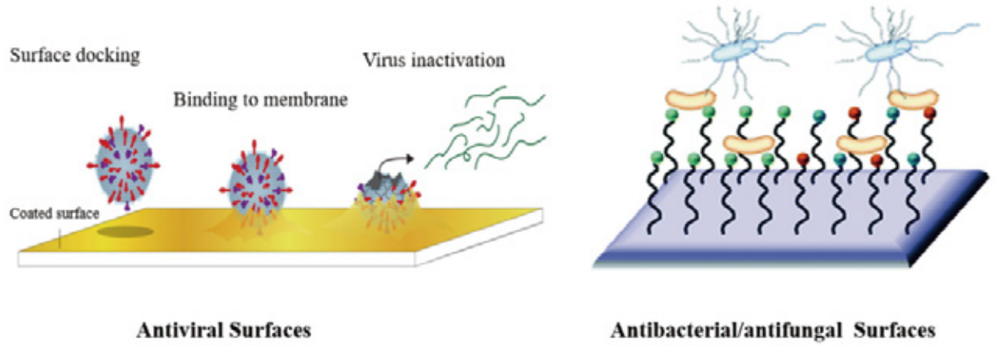
Global public health crisis spurs research excellence and catalyzes commercial adoption of new technologies

As the pandemic was unfolding in February 2020, OSCAR wasted no time in joining the scientific community's response to the Covid-19 pandemic.

Scientists at the University of Oxford and OSCAR pooled wisdom and resources available in each other's country, and in just six weeks, delivered an impressively fast and reliable testing solution to SARS-CoV-2.

The rapid testing technology was soon spun out into the company 'Oxsed', and led to a continuing collaboration with Prenetics Limited, a global leader in diagnostics and genetic testing. Prenetics acquired Oxsed in October 2020. Millions of COVID-19 tests were conducted using the rapid RT-LAMP kit developed by the joint Oxford-OSCAR team. This is OSCAR's first case of IP commercialization generating revenue.

This success speaks volumes about the immense societal benefits that international collaborative research can deliver.



Another solution presented by OSCAR scientists mitigates risks of contracting Covid-19 at point of contact.

Following the outbreak of the pandemic, OSCAR scientists adapted research to target SARS-CoV-2, developing a versatile single antimicrobial coating technology (OSCoatAM™). The coating can be applied to all surfaces, and is capable of killing all kinds of microbes, including SARS-CoV-2.

Work is underway to spin off the new technology into OSCAR's first company incorporated in China.

Our ability to develop scientific solutions to global challenges is enhanced by our close partnerships with industry and collaborations with scientists and engineers across the world. This is epitomized by our 'Innovation Technology Centres' (ITC); purpose-built in-house facilities tasked to quickly translate highly promising technologies from the lab to the market. OSCAR's ITCs operate with significant industry involvement and interdisciplinary input from the best minds in academia.

In June 2021, the OSCAR-Prenetics Innovation and Technology Centre for Advanced Molecular Diagnostics, and the first ITC at OSCAR, was launched, following a landmark multi-million-pound collaboration between the University of Oxford, OSCAR and Prenetics Limited. The ITC is committed to developing affordable, decentralised point-of-care tests for infectious diseases around the globe.

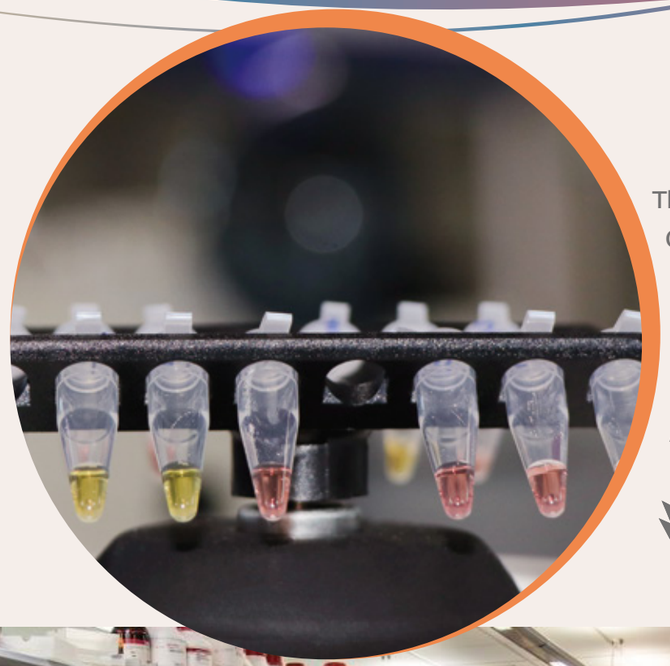
The ITC facility was launched with a ceremony attended by Her Majesty's Ambassador to China, Dame Caroline Wilson DCMG, British Consul-General in Shanghai, Chris Wood, and joined on line, from the University of Oxford: Professor Louise Richardson, Vice-Chancellor, Professor Patrick Grant, Pro-Vice Chancellor Research, and Professor Sam Howison, Head of the Mathematical, Physical and Life Sciences Division.

The pandemic prevents travelling, but not performance

Covid-19 spawned sweeping changes to the way we work. For two years, since regional outbreaks escalated into a global pandemic, lasting travel restrictions have kept Principal Investigators from visiting OSCAR. This did not stop communication, and regular contact of the Oxford and OSCAR teams is maintained online.

Our people on the ground in Suzhou are incredible stewards of OSCAR's mission and core belief, putting in painstaking work and maintaining OSCAR's upward trajectory, despite the challenges posed by the global pandemic.

This is a true testament to the persistence and resilience of our people. We appreciate all members of our team for their part in every academic achievement and every distinction OSCAR has received.



The team behind the extraordinary Covid-19 rapid test were recognised for their achievements as one of the 19 winners of the Royal Academy of Engineering President's Special Awards for Pandemic Service.

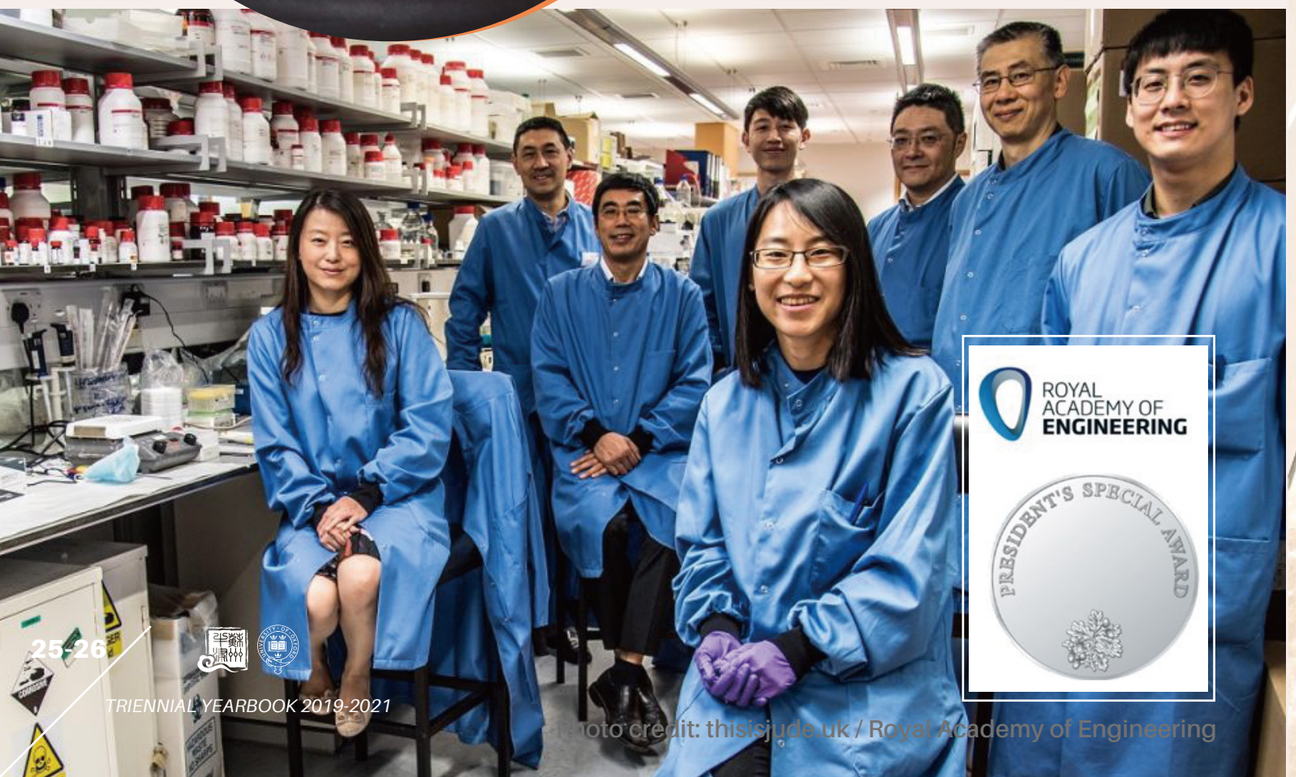


Photo credit: thisisjude.uk / Royal Academy of Engineering

OSCAR is one of the only two projects in the Suzhou Industrial Park selected in 2021 to receive funding under the 'Suzhou International Research Institute Programme', securing additional municipal level resources for OSCAR's sustainable development.

OSCAR has been identified as a key part of Jiangsu's scientific and collaboration strategy in its new five-year plan and objectives to year 2035.

OSCAR has been listed as an 'International Science and Technology Cooperation Platform', a commendation awarded by China's Ministry of Science and Technology.

OSCAR was named one of the 2020 and 2021 winners of the 'Organizational Excellence Award' presented by the Administrative Committee of Science, Education and Innovation District, Suzhou (SEID), demonstrating OSCAR's contribution to SEID's technological advancement and the active role it has served to promote UK-China research collaboration.

OSCAR was named winner of the 'Integrated Innovation Award 2021' by Suzhou Industrial Park in recognition of OSCAR's part in SIP's innovation and development.

OSCAR received two 'Foreign Expert Workshop' Awards and one 'Foreign Academician Workstation' Award.

OSCAR was recognised for excellence in media and communications by SEID.

OSCAR scientists have received awards through diverse talent programmes

OSCAR received the 2019 and 2020 Outstanding Organization Awards in Safety presented by SEID in recognition of OSCAR's EHS practices and protocols

Publications

OSCAR's research efforts over the past three years have been reported and published in 38 publications as at January 2022.

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Brinkhof, Bas & Zhang, Bo & Cui, Zhanfeng & Ye, Hua & Wang, Hui. (2020). ALCAM (CD166) as a gene expression marker for human mesenchymal stromal cell characterisation. Gene: X. 5. 100031. 10.1016/j.gene.2020.100031.

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Van HMT, Hao NV, Phan Nguyen Quoc K On behalf of the Vietnam ICU Translational Applications Laboratory (VITAL) Investigators, et alVital sign monitoring using wearable devices in a Vietnamese intensive care unitBMJ Innovations 2021;7:s7-s11.

Patents

Ullah, Salim & Ali, Wadud & Qureshi, Muhammad & Hussain, Zahid & Ullah, Ismat & Kalsoom, Umm-e & Rahim, Fazal & Siddique, Sardar & Sultana, Nighat & Khan, Muhammad. (2021). Antidiabetic and Hypolipidemic Potential of Green AgNPs against Diabetic Mice. ACS Applied Bio Materials. 4. 10.1021/acsabm.1c00005.

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Lim B, Ratcliff J, Nawrot DA, Yu Y, Sanghani HR, Hsu CC, Peto L, Evans S, Hodgson SH, Skeva A, Adam M, Panopoulou M, Zois CE, Poncin K, Vasudevan SR, Dai S, Ren S, Chang H, Cui Z, Simmonds P, Huang WE, Andersson MI. Clinical validation of optimised RT-LAMP for the diagnosis of SARS-CoV-2 infection. Sci Rep. 2021 Aug 10;11(1):16193. doi: 10.1038/s41598-021-95607-1. PMID: 34376716; PMCID: PMC8355225.

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OSCAR's IP team has helped identify 17 IP projects with six successful IP applications as at January 2022:

Auto-encapsulating organic blend materials for stable perovskite film fabrication. Kevalkumar Kishorbhai Sonigara, Jingsong Huang, Haiyu Liu, Donald Bradley

RT-LAMP for rapid diagnosis of coronavirus SARS-CoV-2. Zhanfeng Cui, Wei Huang, Yun Wang, Hui Wang

Surface coated-nylon membranes with antibacterial properties. Muhammad Kamran Khan, Mark Moloney, Dandan Wang

Fabricating functional layer with a cross-Jinked host and small molecule. Wenwen Tao, Jingsong Huang, Paul Stavrinou,

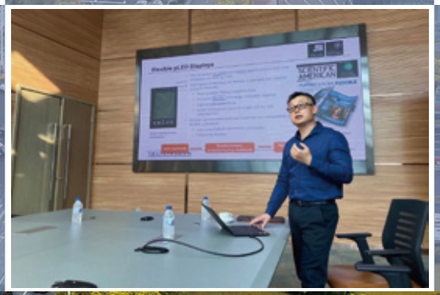
PEDOT film fabrication technology. Kevalkumar Kishorbhai, Jingsong Huang, Paul Stavrinou, Donald Bradley

Polymers with anti-infective properties by surface coating. Muhammad Kamran, Mark Moloney

OSCAR is increasingly 'seen' and 'heard'

OSCAR nurtures informed intellectual discourse and open-minded discussion. Whether it is through the OSCAR Academic Seminars, Open Days or alumni events, we keep academic exchanges alive, support engagement with industry for technological development and the wellbeing of global communities, and we help inspire the next generation of young scientists.

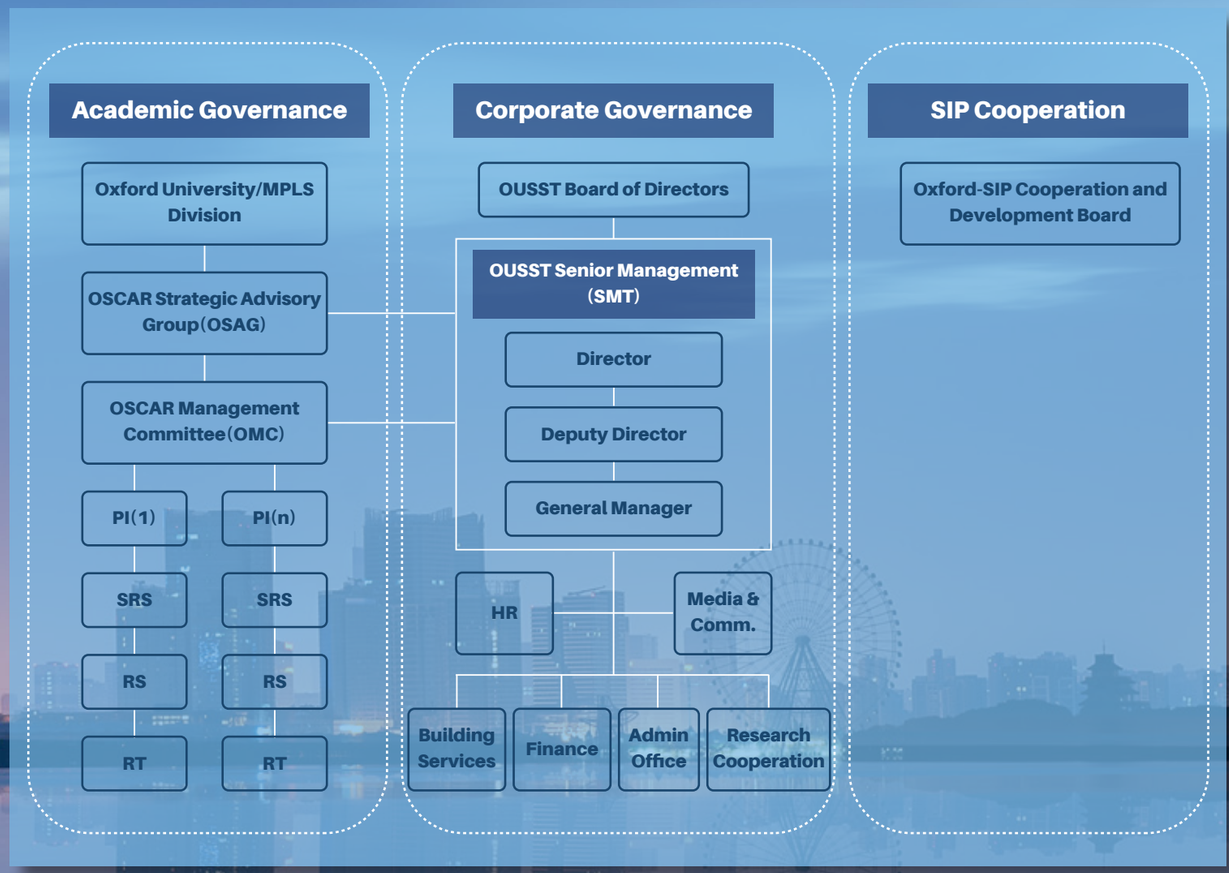
OSCAR provides a lens through which to see the future of technological innovation.



Governance and leadership

OSCAR was legally registered as a wholly foreign owned enterprise, 'Oxford University (Suzhou) Science & Technology Co., Ltd. (OUSST)', in Suzhou, China in August 2017. Our governance structure spans both the academic and corporate perspectives, evolving over time as necessary for the sound development of OSCAR.

OSCAR Governance Structure 2021



OUSST Board of Directors

Dr Richard Liwicki
Chairperson and Legal Representative

Professor Alison Noble
FREng, FRS, Institute of Biomedical Engineering, University of Oxford

Dr. Matthew Perkins
FREng, CEO, Oxford University Innovation Ltd.

Jeremy Sims
Divisional Financial Controller, Mathematical, Physical and Life Sciences Division (MPLS), University of Oxford

OSCAR Senior Management Team

Professor Zhanfeng Cui
FREng, Donald Pollock Professor of Chemical Engineering, University of Oxford
Foreign Member of Chinese Academy of Engineering
Founding Director of OSCAR

Professor Mark G. Moloney
Sydney Bailey Fellow and Tutor in Chemistry, St. Peter's College, Oxford
Deputy Director, OSCAR

Lea He
General Manager, OSCAR

Turning a new page

OSCAR has developed rapidly in its set-up phase, which ran from 2016 to 2021. 2022 represents the start of a more advanced phase of development for OSCAR, in pursuit of the objectives set in its Strategic Plan 2021-2025, which details ambitions for how we deliver impact, engage with partners, develop our people and how we manage our resources.

OSCAR's Building Services professionals are the driving force of OSCAR's facilities.

Upgrading our infrastructure comprises an essential part of OSCAR's blueprint for the next five years.

Phase II fit-out construction is in full swing, covering the whole of 7th and 4th floors, and selected spaces on the 3rd and ground floor. Planned Innovation and Technology Centres, an Academician Cluster and labs for mathematical research will sit within these newly refurbished spaces.

The overall objective of OSCAR Strategic Plan 2021-2025 is to create a roadmap to make OSCAR financially and environmentally sustainable, while advancing and protecting Oxford University's global reputation for rigorous academic standards and world-leading research of global value.

Research and Development

OSCAR builds on the University's long tradition of conducting world leading research and transferring its outputs to application, through industrial collaboration, licensing, and the creation of spin-out companies, for the benefit of society. In less than two years of operation, OSCAR has already generated IP, filed patent applications, and launched its first spin-off, OXSED, in collaboration with the University and Oxford University Innovation (OUI). Over the next five years OSCAR will continue this trajectory through innovative research and close working relationships with allied industrial partners.

Collaboration and Partnership

Engagement between OSCAR and eminent industrial, academic and government partners in allied fields is vital to strengthen OSCAR's research impact and its ability to generate meaningful change to the research and technology landscape. Collaboration is essential for diversifying resources, skills and knowledge and accelerating advances. Dissemination through a range of channels will promote both OSCAR and Oxford's research presence in China.

A continued partnership between the University of Oxford and Suzhou Industrial Park is key to OSCAR's success.

People

OSCAR will put people first and create more channels to attract and retain eminent global leaders, research stars and young talent. OSCAR will continue to foster a skilled, innovative, dynamic, motivated, and contented workforce.

Resources

As MPLS's first overseas research centre, OSCAR is a new and experimental project. OSCAR's governance and legal structure have been carefully planned to ensure effective and transparent resource management to drive innovative research and successful projects. The key priority for the next five years is to continue this success, expanding multi-source funding to secure OSCAR's longevity and making it financially and environmentally sustainable, and to become a net contributor to the University.