



UNIVERSITY OF
OSCAR OXFORD

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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）



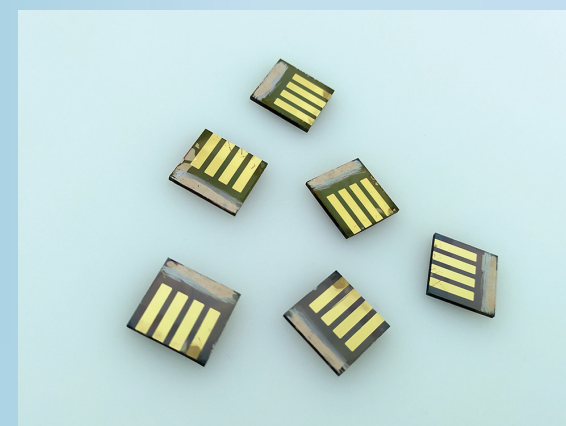
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Patent Application Filed by OSCAR OeTL Group

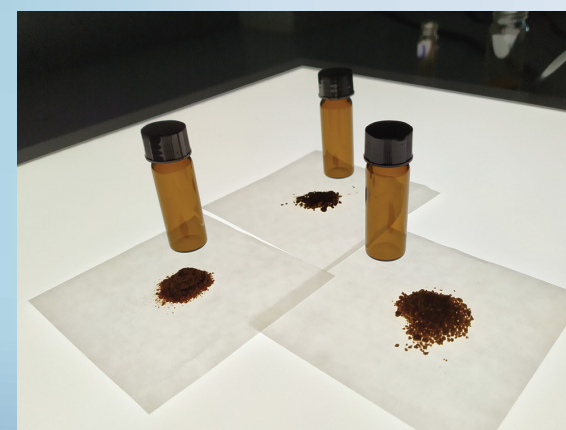


OSCAR's Optoelectronic Technology Laboratory (OeTL) led by Prof. Donal Bradley & Prof. Paul Stavrinou has developed new materials to promote perovskite technology. They filed a patent application entitled *"Auto-encapsulating organic blends, and perovskite precursor materials and derivatives of thereof"* to China National Intellectual Property Administration (CNIPA) on 25th May 2020.

Game-changing semiconducting materials

Organic-inorganic metal halide perovskites have recently emerged as promising candidates for various optoelectronic applications such as solar cells, light-emitting diodes, lasing, and photodetectors. Their potential and versatility is due to their tunable optical bandgap, attractive absorption, narrow emission, and extraordinary charge-transport properties. Astonishingly rapid progress has been made towards commercialization in the past few years. However, perovskite stability remains a major issue to be solved before effective industrial exploitation can commence.

OeTL scientists put forward a new idea to form excellent moisture-proof films through a molecular auto-encapsulation strategy. These materials are designed in such a way that they provide space for the preparation of new perovskite precursor materials resulting in n- or p- type blends with promising properties, such as high absorption, controlled crystallization, long-term humidity stability. Furthermore, they are capable of fabrication in an ambient environment. Together, these properties represent an important step towards realistic and economic commercialisation. The OeTL group is currently demonstrating these materials in the application of optoelectronic devices and exploring scale-up synthesis routes.



Recent OSCAR Publications

Prof. Wei Huang's group and Prof. Zhanfeng Cui's group jointly published their second research article arising from their work designing and developing a rapid test kit to detect SARS-COV-2 (COVID-19). The paper, entitled "*Development of a rapid test kit for SARS-CoV-2: an example of product design*", was printed in *Bio-Design and Manufacturing*. Prof. Zhanfeng Cui, Dr. Hui Wang, Dr. Huidong Jia, Dr. Yun Wang, Yida Zeng, Mengmeng Ji, Dr. Weizhi Liu, Catriona Inverarity and Prof. Wei Huang are joint authors with an OSCAR affiliation.

<https://doi.org/10.1007/s42242-020-00075-7>

Research Article | [Open Access](#) | Published: 11 May 2020

Development of a rapid test kit for SARS-CoV-2: an example of product design

[Zhanfeng Cui](#) , [Hong Chang](#), [Hui Wang](#), [Boon Lim](#), [Chia-Chen Hsu](#), [Yejiang Yu](#), [Huidong Jia](#), [Yun Wang](#), [Yida Zeng](#), [Mengmeng Ji](#), [Weizhi Liu](#), [Catriona Inverarity](#) & [Wei E. Huang](#)

Bio-Design and Manufacturing **3**, 83–86(2020) | [Cite this article](#)

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Abstract

We present an example of applying 'need-driven' product design principle to the development of a rapid test kit to detect SARS-COV-2 (COVID-19). The tests are intended for use in the field and, longer term, for home use. They detect whether a subject is currently infected with the virus and is infectious. The urgent need for large numbers of tests in field setting imposes constraints such as short test time and lack of access to specialist equipment, laboratories and skilled technicians to perform the test and interpret results. To meet these needs, an antigen test based on RT-LAMP with colorimetric readout was chosen. Direct use of swab sample with no RNA extraction was explored. After extensive experimental study (reported elsewhere), a rapid test kit has been fabricated to satisfy all design criteria.

Meet OSCAR's Researchers

Interview with Dr. Avinash Pandreka



Dr. Avinash Pandreka joined OSCAR in August 2019 as a Research Scientist in Prof. Luet Wong's group. He received his PhD, elucidating the biosynthesis of limonoids and metabolic engineering in yeast, from the AcSIR-Institute of Genomics and Integrative Biology in India. His research work mainly focuses on metabolic engineering of microbial acetyl CoA and isoprene unit biosynthesis to increase the production of terpenoids.

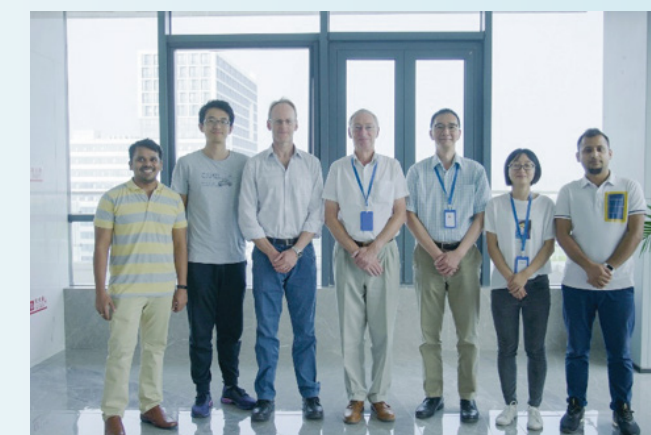
Q: Why did you decide to join OSCAR?

I joined OSCAR as a Research Scientist in Synthetic Biology in August 2019. I had completed my doctoral degree on plant secondary metabolites, which helped me to understand the physiological role of

these metabolites in plants and application for sustainable future. After my doctoral study, I was looking for an opportunity in the same field for further exploration. Prof. Luet Wong's group is working on rational engineering of bacterial cytochrome P450 to act on various chemicals and metabolites which includes regenerating plant secondary metabolic pathway. I got very much interested in this project and saw an opportunity from Prof. Wong's group on metabolic engineering of plant secondary metabolites in microorganisms through OSCAR in February 2019 and therefore applied for it. Apart from this, I am curious to develop the project from the start with the help of world leading experts.

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

I am working on regenerating and metabolic engineering of microorganisms to produce natural products like terpenes which are having application in food, fragrance industry and medicine. This project helps to produce the desired metabolites from microorganisms in a very short time without depending on the natural sources (mostly plants) where the production rate is low and takes longer time. I have taken couple of months to gather the





literature, plan the work and arrange importing of important plasmids from overseas institutes. Bacteria must have higher metabolic flux of isoprene unit biosynthesis from glucose to produce terpenoids. To achieve this, several genes related to mevalonate pathway are overexpressed and reasonable production of precursor is observed. We started co-expression of terpene synthase with cytochrome P450 system for regenerating the biosynthetic pathway of terpenoids. Right now, we are optimising the expression conditions to achieve the maximum production of terpenoids. Started purifying the metabolites to confirm the biosynthesis. In OSCAR, every researcher is encouraged to attend conferences and workshops. In December 2019, I attended a workshop on TWI innovation management training.

Q: What are your short-term and long-term research plan and aims at OSCAR?

In the short term, I will be focusing on regenerating the terpenoid biosynthesis in bacteria. Fine tuning the expression level of regenerated pathway to achieve maximum production. Rational mutagenesis of different enzymes to increase their selectivity and efficiency. Optimising the cofactor biosynthesis, and expression conditions like temperature, culture media, pH and others to decrease the stress on the bacteria.

In the long term, my research plan includes standardise the protocol for regenerating and metabolic engineering in microorganisms for commercially important metabolites, increase acetyl-CoA flux and co-factor turnover towards the regenerated pathway, stably integrate the regenerated pathway into microorganisms and optimise the expression conditions and downstream process to purify the metabolites.

Q: What surprises you most when working at OSCAR and living in Suzhou?

The first thing that surprised me is the admin team: their helping nature for joining in OSCAR and for settling in Suzhou. Thanks to admin team, otherwise it might take longer time for me and my family. The working culture in OSCAR is energetic, multidisciplinary, supportive, and encouraging. Finally, the pleasant nature of Suzhou with rich traditional culture, lakes, parks, gardens, shopping malls, and vibrant nature of Suzhou Industrial Park.

The management team efforts, friendly working environment, guidance from world leading scientists keeps me focusing on the research project as well as enjoying the balanced life in OSCAR.



Meet OSCAR's New Researcher



Zhangdaihong Liu

Research Scientist

Prof. David Clifton's group

Zhangdaihong (Jessie) Liu undertook her PhD at the Mathematics for Real-World Systems CDT at the University of Warwick. During this time, she was also a visiting PhD student at the Big Data Institute, University of Oxford, and a PhD enrichment student at the Alan Turing Institute. Prior to this, she obtained an MSc in Mathematics of Systems from the University of Warwick, an MSc in Mathematical Finance from Loughborough University, and a BSc in Mathematics from Shandong University, China.

Dr. Liu's PhD thesis entitled 'Latent Variable Modelling of Population Neuroimaging and Behavioural Data' focused on the development of a dimension reduction method that improves the interpretability of latent variable models applied to health-related datasets. Her research also involved uncovering latent patterns between neuroimaging, behavioural and demographic measures, as well as the application of various large dataset processing techniques.

Dr. Liu's research interests also include predictive modelling, feature extractions, recommender systems, deep learning and reproducible research.

Email: Jessie.Liu@oxford-oscar.cn

“ Collaboration Opportunities

On 13th May, Prof. Jian Fan and Prof. Baoquan Sun, from Institute of Functional Nano and Soft Materials (FUNSOM), Soochow University, visited the Optoelectronic Technology (OeTL) group and discussed potential cooperation opportunities. Senior Research Scientist Dr. Jingsong Huang introduced the OeTL group's research areas and led a tour of the lab.

On 19th May, Ms. Mengjia Shi and Mr. Qiang Qian from Science and Technology Bureau of Kunshan Economic and Technology Development Zone visited OSCAR. They met with Senior Research Scientist Dr. Jingsong Huang discussed the potential cooperation between OSCAR and optoelectronics industries in Kunshan.

On 20th May, Ms. Xi Yang, CEO of Nuoman Regenerative Medical Co., Ltd., visited OSCAR to meet with the Regenerative Medical Engineering group and discuss the potential for cooperation in 3D bioprinting for regenerative medication.

On 20th May, a delegation from the Foreign Affairs Office of the Nantong Municipal People's Government, led by Director Mr. Pujian Wang, visited OSCAR to tour the facilities and understand OSCAR's position in SIP.

On 25th May, the newly appointed Deputy Director of SEID Administrative Committee, Ms. Zhen Zhao, and Director of SEID Science and Technology Innovation Bureau, Mr. Wendong Teng visited OSCAR and exchanged ideas regarding OSCAR's strategic research development.



“ SIP News for May

Suzhou FTZ Offers No-cap Subsidies for Global Talents



Suzhou Free Trade Zone (FTZ) released “Several Opinions on Accelerating the Gathering of High-end and Urgently-needed Talents” (a document comprising 30 new policies for recruitment) on 8th May, initialising a new effort to attract high-end talents around the world with upgraded initiatives.

The new policy package is divided into seven sections (start-up

support, talent subsidy, talent housing, talent introduction, talent training, foreign talent introduction and talent service), and is designed to involve talented personnel from each and every link in major industrial chains, with particular support weighted towards biomedicine and other key emerging industries.

In terms of the support to innovation and entrepreneurship, Suzhou FTZ promises a subsidy of up to 50M RMB. For ‘top talents’, there is no ceiling on the amount of subsidy. In addition to a housing allowance of up to 5M RMB, there are also preferential policies such as talent public housing, price-fixed housing, discount rental housing, and a housing accumulation fund loan on favourable terms to further help high-calibre talents settle in the city.

Suzhou FTZ has also created the “Special Reward for High-end and Urgently Needed Talents” to give eligible talents an annual reward of as much as 1M RMB in addition to their personal income.

As specified in the new policy package, Suzhou FTZ will establish a closed loop system for talent training by introducing relevant training institutions, building training platforms, subsidising training projects and high-level skilled talents. Additionally, the package includes a number of incentives to assist with the logistics of relocation, such as provision of children’s education, social and health insurance and residence registration.

9th May 2020

<http://en.isuzhou.me/2020/0509/2691022.shtml>

Microsoft to Add Investment in SIP



On 15th May, Wu Qingwen, member of the Standing Committee of CPC Suzhou Committee and Secretary of CPC SIP Working Committee, met with Wang Yongdong, Global Senior Vice President at American tech behemoth Microsoft and Managing Director of Microsoft’s Search Technology Centre (STC) Asia, and his contingent. The two parties signed an agreement for the second phase of the project at Microsoft Asia-Pacific

Research and Development Group (ARD)’s Suzhou facility.

ARD is a complete innovation chain of fundamental research, technology incubation, product development, and strategic partnerships. It is the largest and most comprehensive R&D base for Microsoft outside of the United States. It has established offices in Beijing, Suzhou, Shanghai and Shenzhen. The Suzhou office, also known as STC Asia Suzhou, launched in SIP in 2013 to handle Internet engineering and hardware development. Since then, Microsoft launched a project last year to set up a new AI innovation centre in SIP.

The new project will commence later this year and is due for completion in 2023. It is expected to help further improve Microsoft’s R&D capacity in Suzhou and enable it to better integrate into the local technology innovation ecosystem. Moreover, Microsoft disclosed that it will enhance cooperation with local research organisations and enterprises to help promote science and technology innovation and digital transformation in SIP and Suzhou.

19th May 2020

http://www.sipac.gov.cn/english/news/202005/t20200520_1118717.htm