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UNIVERSITY OF OSCAR OXFORD NEWSLETTER 038 SEPTEMBER 2020

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OSCAR FILES ITS THIRD PATENT

OSCAR's third patent, 'Surface Functionalized Materials and Modified Materials and Preparation Method and Applications Thereof' (表面功能化材料和改性材料及其制备方法和用途) was filed on 4th September. The patent is based on novel research by OSCAR's Deputy Director Prof. Mark Moloney and his two researchers Dr. Muhammad Kamran Khan and Dr. Dandan Wang of the Surface Chemistry group.

Background

Several viruses with pandemic potential, including SARS, MERS, Ebola, and SARS-COV-2 (COVID-19), have emerged in recent years. In addition to these viruses, nosocomial bacteria also pose a great threat to humans because of their resistance to antibiotics. Fungal diseases like nail infections, skin rashes and vaginal infections are very complicated to treat.

To minimise the spread and the risk of catching these diseases, there is a huge market for antibacterial, antifungal, and antiviral materials in Personal Protective Equipment (PPE), textiles, and electronic devices such as air conditioners, air purifiers, mobile phones and tablets.

Summary of the technology

The Surface Chemistry group at OSCAR has developed a single antimicrobial coating technology (OSCoatAM[™]) suitable for application onto any material. The coating can kill all kinds of microbes – bacteria, viruses, and fungi – including SARS-COV-2 (the COVID-19 coronavirus). It is suitable for all kinds of widely used polymeric and composite material including polypropylene, cellulose, nylon, polyamide, polyacrylamide and polyethersulfone.



Antiviral Surfaces

The figure above shows the mechanism of action of our antimicrobial materials

OXFORD SUZHOU CENTRE FOR ADVANCED RESEARCH

Antibacterial Surfaces

Superior aspects of our technology include:

Antiviral activity: OSCoatAM[™] technology can kill viruses including the influenza virus H1N1 (which caused both 2009 swine flu and the 1918 influenza pandemic), other influenza viruses and coronaviruses like SARS. This technology can kill the current coronavirus (SARS-COV-2) with reduction of ≥5.9 log. OSCoatAM™ technology can be used in PPE and air purifiers to control and reduce the spread of viruses.

Antibacterial activity: OSCoatAM[™] technology can kill both gram-positive and gram-negative bacteria. Due to the antibiotic resistance developed by bacteria, serious bacterial diseases are becoming established. Using

Antifungal activity: OSCoatAM[™] technology is also active against fungi. Unlike many other treatments for bacteria and viruses fungal tretements are very slow. Our coating can be used to treat fabrics like clothes, socks, and towels to avoid fungal diseases. Additionally, the 'green' technology has low environmental impact.

The benefits of OSCoatAM[™] technology includes:

fungi, virus.

- The coating process is simple and economical and easy to scale up.



Examples of products that can be manufactured coated materials with antiviral, antifungal, and antibacterial properties using the Surface Chemistry group's technology.

'MEETING MINDS': OSCAR PIS ZHANFENG CUI AND DAVID CLIFTON PRESENT THEIR COVID-19 RESEARCH

This year Oxford's annual alumni event took place online, with a weeklong 'Meeting Minds Global' event taking place between 7th and 12th September. In place of the traditional congregation in Oxford to network and celebrate research, daily talks and events were held via Zoom.

Talks were held covering a wide range of disciplines and topics. Highlights included Chancellor Lord Patten of Barnes examining the role of Britain's soft power, an audience with the Vice-Chancellor, Prof. Louise Richardson, Prof. Sir John Bell talking about Oxford's contributions to COVID-19 research, and a celebration of the 100th anniversary of Oxford's famous PPE degree led by a panel of distinguished alumni including US politician Pete Buttigieg.

The Department of Engineering Science offered its own programme, culminating with a series of invited talks around the theme 'Engineering Solutions for COVID-19'. The event opened with two talks by OSCAR PIs Prof. Zhanfeng Cui (Founding Director; Regenerative Medicine and Biomedical Engineering) and Prof. David Clifton (AI for Healthcare).



Prof. Cui began his talk, 'Responding to the Unexpected - Development

of COVID-19 Rapid Tests', considering the many way the pandemic has affected society and what biomedical engineers can do to address some of these problems. In Prof. Cui's case, this came from his researchers travelling from China to Oxford for Chinese New Year and noticing a lack of testing available at transport hubs. This observation was the catalyst for a need-driven product developed jointly by OSCAR and Oxford, taking advantage of shifting restrictions (giving lab access and flexibility) and case load (needed to access clinical samples for validation) between China and the UK. His talk covered the development of this test, **Oxsed RaViD Direct**, that he, Prof. Wei Huang and their teams took from initial ideas to commercialisation within 6 months.

Learn more about Oxsed RaViD Direct here: https://www.ox.ac.uk/news/2020-07-08-oxford-scientists-form-spinout-launch-rapid-covid-19-virus-test



Prof. Clifton presented his research focused on **'Al for Healthcare During the COVID-19 Pandemic'**. Unlike earlier pandemics throughout history, a range of healthcare data is now routinely collected at large scale. This presents an opportunity for Al researchers to develop tools that help clinicians utilise this data to tackle various aspects of the pandemic – for example, using blood tests and vital signs to determine the chance of patients presenting at emergency departments testing positive for the coronavirus.

This work, by Prof. Clifton in conjunction with Prof. David Eyre (Oxford Big Data Institute) and Dr. Andrew Soltan (John Radcliffe Hospital, Oxford) is important for triage and quarantine procedures and can help protect patients with and without COVID-19 as well as the healthcare professionals treating them.

Learn more about this work, the **'CURIAL' AI test**, here:

https://www.ndmrb.ox.ac.uk/about/news/new-ai-test-identifies-covid-19-within-one-hour-in-emergency-depa rtments

These talks were followed by the 33rd Jenkin Lecture 'OxVent – medical device innovation and spinout for the pandemic' presented by Associate Professor Mark Thompson, Professor Andrew Farmery, Associate Professor Alfonso Castrejon-Pita (University of Oxford) and Dr. Federico Formenti (King's College London). There was also a short talk by undergraduate student Kirsty Gouck, who won the 2020 final year undergraduate project prize for her work on 'Metallic Resource Recovery from Industrial Wastewater'.



Meeting Minds is free to attend for all Oxford alumni, and offers an opportunity to hear from world-leading academic regarding their latest research across myriad disciplines, including science and technology, medical sciences, humanities and social sciences.

In addition to the main programme, many colleges offer additional events for their alumni.

For more details about this year's event, and for upcoming events, please see the Oxford University Alumni website, alumniweb.ox.ac.uk.

OSCAR ACADEMIC SEMINAR SERIES

OSCAR's academic seminar series was established this summer, as a means for researchers to share their work with colleagues from other disciplines and with PIs in Oxford while the pandemic restricted travel. Sharing ideas in this way encourages is an important platform for OSCAR researchers as it facilitates exchange of knowledge and ideas and is essential for interdisciplinary research.

The third seminar took place last month with two short talks given by Prof. Jeremy Robertson, Professor of Organic Chemistry and joint PI of OSCAR's Chemistry group, and Prof. Rama Cont, Professor of Mathematical Finance, Head of the Oxford Mathematical and Computational Finance group and one of OSCAR's four Mathematics PIs. Deputy Director Prof. Mark Moloney chaired the seminar.



Jeremy Robertson, a "Jinji Lake Leading Talent", specialises in Organic Chemistry in his research both at OSCAR and at Oxford University. He and Prof. Luet Wong (Inorganic Chemistry) lead OSCAR's Chemistry research group, whose research focuses on the modification of enzymes to achieve chemical reactions that would be difficult or even impossible using conventional reagents. These transformations have application in a range of industries, including pharmaceuticals and new drug development, food additives and fine chemicals.

Prof. Jeremy Roberson's talk, "C-H Activation for Drug Discovery and Synthesis", presented research he and Prof. Wong began 7 years ago to develop efficient paths to organic targets using a combination of modified P450BM3 enzymes and chemical synthetic reagents. He also presented recent results his research group have achieved in the synthesis of natural product, anisodamine, as well as some fragment based drug discovery research.



The second speaker, Prof. Rama Cont, is currently a scientific advisor to the International Monetary Fund (IMF) and the Central Bank of Norway in addition to his roles at OSCAR and the university. His research interests include stochastic analysis, stochastic process and mathematical modeling in the financial field.

Prof. Cont's presentation, "Modelling COVID-19 dynamics: Risk assessment and targeted mitigation policies", focussed on his recent and highly topical research on different epidemiology models and how they can be used to examine how epidemics behave in certain populations. This information has application in determining effective regional policy to prevent spread and mitigate the effects of epidemics. This mathematical model divides the patient population into four categories: susceptible (S), exposed (E), infected/asymptomatic infected (I), removed (recovered or deceased) (R) (SEIR model). It considers various different demographics stratifying by age groups, contact rates, and region. This research studied spread of the virus through the UK. Notably, this model predicted a much higher number of coronavirus cases than officially diagnosed and reported. As the 'second wave' of infections, coinciding with winter flu season, is observed across the world, models such as this offer an mechanism for making informed decisions and taking preventative action to limit the spread of the virus particularly through vulnerable populations.

MEET OSCAR'S NEW RESEARCHER



Zhongqing Liu **Research Scientist in Prof. Mauro Pasta's group**



Yuxuan Lu

Yuxuan Lu is a first year DPhil candidate from the Department of Chemistry at the University of Oxford.

Dr. Zhongqing (Jerry) Liu joined OSCAR at the beginning of September as a Research Scientist in Prof. Mauro Pasta's Energy Storage and Conversion group. He holds a Master's degree and Ph.D. from the University of Augsburg in Germany. Dr Liu spent eight years living in Germany which has given him a cross-cultural background.

Dr. Liu studied solid electrolytes for six years. His doctoral research involved the solid-state NMR studies on the NASICON-type Li solid electrolyte glass ceramics. NASICON-type Li solid electrolyte glass ceramics are a special glass-ceramic that can be used in Li-metal all solid state batteries. After studying the glass-ceramics for its structure, the glass-to-crystal transition, phase separations, possible impurities, and the electrochemical performance, Dr. Liu was able to develop glass ceramics with an ionic conductivity of approx. 0.5*10-3 S cm-1 and the potential to be assembled as a real all solid-state Li-metal battery.

Dr. Liu worked as a postdoctoral researcher in the Helmholtz Association-Jülich Research Center (IEK-12, Ionics in Energy Storage). After that, he joined SCHOTT AG (SCHOTT Glass Technology Co., Ltd.) and worked as a Product Development Specialist of solid electrolytes in SCHOTT AG's R&D Center in China. During his time with SCHOTT AG, he participated in an advanced training programme for capable managers (EDP, Executive Development Programs) at the School of Management, Zhejiang University. His research focuses on glass ceramics, solid-state electrolytes, and all solid state battery (ASSB).

He aims to deepen his research in battery and contribute to the commercialization of all solid state battery in the future.

Email: zhongqing.liu @oxford-oscar.cn.

Yuxuan is a visiting student in Prof. Luet Wong's group working on rational engineering of bacterial cytochrome P450 to act on various chemicals and metabolites. Her doctoral research involves oxidative diversification of drug fragment molecules by Cytochrome P450BM3.

"I like the strong academic atmosphere in the industrial park where OSCAR is located and being surrounded by many universities and higher institutions has added a breath of youth and energy to its vibe. I settled smoothly which I have to thank the extremely helpful admin staff and the friendly team.

OSCAR is a great platform for collaborations and innovations with enormous potentials in cutting-edge science; and Oxford, a world-leading university is blending the traditional cultures into advanced scientific research. I miss the campus life and working in the lab with the most beautiful view of Oxford at sunset, but I also believe what I will learn at OSCAR will be priceless, I am looking forward to this new experience."



MEET OSCAR'S VISITING STUDENT

DPhil student at the University of Oxford

OSCAR BRINGS STAFF TOGETHER IN WUZHEN FOR TEAM-BUILDING AND A TASTE OF LOCAL CULTURE

As most regions in China recover from the aftermath of the Covid-19 pandemic, both economic and social activities are resuming in Suzhou.



To revive social bonding and morale within OSCAR, the administration team organized a day of team building and local cultural experience on 25th September that took OSCAR employees to Wuzhen, an ancient water town south of the lower reaches of the Yangtze River in China) charm with quaint architecture, engaging history and authentic local food, and the opportunity of socializing within the OSCAR family outside the work environment.

strained our mental health. In the workplace, having to live with especially cohesion-boosting and stress-alleviating for OSCAR staff, as it helps bring our people back in touch with each other outside the office environment. Unfortunately, some of OSCAR's



OUTREACH AND COLLABORATION OSCAR Explores Cooperation Opportunities with Shanshan and OXCELL

On 22nd September, Xueming Zheng, Board Chair of Shanshan Business Corporation and Yanqing Xiang, Board Chair of OXCELL (Shanghai) Biotech visited OSCAR.



Dr. Weizhi Liu, a Research Scientist with the Regenerative Medicine/Biomedical Engineering group at OSCAR, talked about the group's ongoing projects on tissue engineering and biomaterials, cells and advanced

Xueming Zheng expressed his intention to engage in joint research with OSCAR and bring the research outputs to the market.





Environmental and Synthetic Biology group at OSCAR, introduced the visitors to the group's research focus on the Raman technology. She also spoke at Oxsed RaVid Direct, the Zhanfeng Cui and Prof. Wei Huang 's teams at OSCAR and at



The Shanshan Group, founded in 1989, began as an apparel business. It has since expanded into a diversified industrial cluster encompassing new energy technology, medical care and health products, film and culture, trade and logistics, tourism and leisure, financial investment alongside fashion garments. Shanshan has consistently ranked among the top 500 Enterprises in China since 2012.

OXCELL (Shanghai) Biotech is a subsidiary of SINOPHARM Shanghai GeneoDx Biotech Co., Ltd. It was set up to commercialize the rapid COVID-19 diagnostic kit developed by OSCAR researchers in China.

OSCAR Presents Research Progress to British Consulate General in Shanghai and Changzhou First People's Hospital

Last month, OSCAR welcomed Tim Johns, Director of Data and Medical Services of the Department of International Trade of the United Kingdom, Lu Jian, Senior Officer of Jiangsu Regional Affairs of the British Consulate General in Shanghai, and Wang Mengjie, Director of the Foreign Affairs Office of Changzhou First People's Hospital.

General Manager Leah He offered the guests a tour of OSCAR's state-of-the-art exhibition centre before showing them the Regenerative Medicine research lab (led by Prof. Cathy Ye and Prof. Zhanfeng Cui) and the AI for Healthcare laboratory (led by Prof. David Clifton). Both research groups have recently been involved in ground-breaking research to address the coronavirus pandemic. Following the tour, the two sides held talks.



Dr. Weizhi Liu, a Research Scientist with the Regenerative Medicine/ Biomedical Engineering group, outlined their research scope and goals. He also introduced research collaboration currently underway within the lab and off-site in partner hospitals in China. Such collaborations are a cornerstone of OSCAR's research mission, and allow enhanced research with access to world class facilities and real clinical samples.

Dr. Yang Yang, a Senior Research Scientist with Prof. David Clifton's AI for Healthcare group and a postdoctoral researcher at the University of Oxford, explained the content and impact of her group's research. She particularly focused on clinical artificial intelligence and specific research projects that have been carried out in China. The guests all expressed interest in scientific research cooperation with the institute. Both parties will carry out further discussions on specific areas of cooperation and research content.



The guests also visited the Oxford Technology Accelerator on OSCAR's second floor, and learned in detail about current incumbent company Oxford Mestar and its products. The company has developed the world's first digital at-home early screening test for colorectal cancer, "Measure". It detects tiny levels of haemoglobin in faecal occult blood, which can be indicative of cancerous cells. While the disease is highly treatable in its early stages, it is commonly diagnosed during the advanced stages when the prognosis is much worse. Convenient, quick and effective early testing therefore offers improved treatment options and outcomes for cancer patients. The company hopes to adapt its technology as a platform to diagnose other diseases.



The guests and researchers from the AI for Healthcare group outside OSCAR after a successful day of introductions

Professor Feng Li, Jilin University, visits OSCAR



Prof. Feng Li from Jilin University, visited the Optoelectronic Technology Laboratory (OeTL) group on 28th September. He is a professor with the State Key Laboratory of Supramolecular Structure and Materials, College of Chemistry. His research focuses on organic optoelectronic materials and devices based on new concepts, for example the OLEDs in which the emission comes from doublet exciton. In 2019, he won the National Science Fund for Distinguished Young Scholars of China. During his visit to OSCAR, Prof. Li gave a talk on the topic of "Organic light-emitting materials and diodes with doublet emission" at the invitation of Senior Research Scientist Dr. Jingsong Huang.

SIP NEWS FOR SEPTEMBER Suzhou section of Jiangsu Pilot FTZ takes national lead



Agreements for 100 investment projects totaling 50 billion RMB in investment value were signed on 1st September during an event to mark the one-year anniversary of the establishment of the Jiangsu Pilot Free Trade Zone (FTZ).

Figures released at the event show that the Suzhou section of the FTZ has made excellent headway one year after its establishment.

As the largest of the three sections of the Jiangsu Pilot FTZ, the Suzhou section added an average of 1.3 foreign-funded companies, 3.8 new science and technology projects and 116 market entities every working day. The output value by high-tech companies climbed up to account for 72 percent of the total.

The FTZ Suzhou section is ranked first in a number of key indicators including attraction of foreign investment, foreign trade, and outward investment; becoming a new platform for China-Singapore cooperation and promoting the rapid development of 12 industrial parks both in and outside China.

To facilitate industrial upgrading, the Suzhou section is striving to build four 100bn RMB industrial clusters dedicated to new-generation information technology, high-end equipment manufacturing, biomedicine and nanotechnology applications. Currently, the industries of biomedicine, artificial intelligence and nanotechnology applications have reported growth of more than 20 percent.

On the front of scientific and technological innovation, the Suzhou section has opened seven new overseas innovation centers and is home to over 1,400 high-tech enterprises and 15,000 new high-end talent. Companies from the Suzhou section are also engaged in two of five schemes to develop coronavirus vaccine in China.

https://mp.weixin.qq.com/s/wJMVEvoB9DvNkrlWhE1CqQ

