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/



WeChat / 微信公众号



OSCAR'S INNOVATIVE PROJECT wins first place in "Maker in China" SME Innovation and Entrepreneurship Contest

### FORMER OSCAR SCIENTIST CONTRIBUTES TO BOOK on metal oxides published





## OSCAR UNIVERSITY OF OXFORD

NEWSLETTER 060 AUGUST 2022

### CONTENTS



OSCAR'S INNOVATIVE PROJECT WINS FIRST PLACE IN "MAKER IN CHINA" SME INNOVATION AND ENTREPRENEURSHIP CONTEST

- FORMER OSCAR SCIENTIST CONTRIBUTES TO BOOK ON METAL OXIDES PUBLISHED

OSCAR STAFF HONOURED WITH SIP EDUCATORS OF THE YEAR AWARD

WHEN SCIENTIST MEETS OSCAR': DR. XIAOSONG LIU

SIP NEWS IN AUGUST

### OSCAR's innovative project wins first place in "Maker in China" SME Innovation and Entrepreneurship Contest

OSCAR's Energy Storage and Conversion Lab (ESC Lab) came in first place in the final of the "Maker in China" Jiangsu SME Innovation and Entrepreneurship Contest 2022 (Jiangsu Chapter) for demonstrating marked savings in hydrogen production costs using a new innovative catalyst. The project has been advanced to the national finals, where the top 500 projects selected from across China will compete in the Maker's category.



A The ESC team at the final. Left to right, Xinxin Chen, Dr. Chenbo Wang and Yixuan Guo

The "Maker in China" SME Innovation and Entrepreneurship Contest is directed by China's Ministry of Industry and Information Technology and the Ministry of Finance. In its seven years of running, the contest has attracted thousands of SMEs and entrepreneurs to showcase innovative technology projects, spurring engagement and collaboration, and the birth of new products, technologies, and business models. OSCAR's entrant, 'Single Atom/Nanocluster Catalysts for industrial H<sub>2</sub> production', topped the ranking of 32 projects that qualified for this year's final road show in Jiangsu.



Hydrogen production and utilization facilities rely on the use of a considerable amount of precious metal as catalysts, which contributes up to 53% of the total equipment cost. While precious metal nanoparticle catalysts dominate the market, catalyst production incurs more than 99% waste of precious metal raw materials. Switching to single-atom catalysts, however, can achieve up to 100% utilization of precious metal raw materials, saving over 99% of the precious metals, without compromising the catalytic performance.

According to researchers from the ESC Lab, under demo conditions, their single-atom catalyst technology achieved more than a 50% saving in precious metal raw material use. The team is confident in realising 90% savings in the near future.



Prof. Mauro Pasta

Professor Mauro Pasta, Professor of Applied Electrochemistry, steers OSCAR's ESC Lab which focuses on developing novel electrocatalysts for the water splitting reaction. 'This recognition further validates our team's research direction and is particularly meaningful considering the very ambitious targets that the Chinese government has set in terms of green-hydrogen production.' says Prof. Pasta.

### THE TEAM BEHIND THE INNOVATIVE PROJECT



### Dr. Chenbo Wang

Dr. Wang obtained his MPhil in Nuclear Energy at the University of Cambridge and his DPhil in Physical and Theoretical Chemistry at the University of Oxford. His research focuses on photo-electrochemistry and the semiconductor-electrolyte interface.



Yixuan Guo received his Master's degree in Polymer Chemistry and physics from Fudan University in 2022. His current research work at OSCAR involves the electrochemistry of next-generation clean energy technologies, including water electrolysis and lithium-ion batteries.





### Peng Tang

Peng is a fourth-year DPhil student from the Department of Materials at the University of Oxford, supervised by Prof. Mauro Pasta. He visited OSCAR in 2020 when he worked on projects to synthesize efficient, inexpensive, and stable single atomic catalysts and to conduct electrochemical characterization.



### Xinxin Chen

Prior to OSCAR, Xinxin served as a senior technician at the Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences (NIMTE CAS). He has extensive experience in glove boxes and the operation, management, and maintenance of battery assembly lines.

# Former OSCAR scientist contributes to book on metal oxides published

'Advances in Metal Oxides and Their Composites for Emerging Applications' (eBook ISBN: 9780323857062), as part of Elsevier's 'Metal Oxides Series' has recently been published online.

Dr. Keval Sonigara, a former Research Scientist in OSCAR's Optoelectronic Technology Laboratory, is the co-author of chapter three on the topic of 'Metal oxides as photoanodes for photoelectrochemical water splitting: synergy of oxygen vacancy', and chapter nine which reviews the 'Role of metal oxides as photoelectrodes in dye-sensitized solar cells'.

#### About the book

Advances in Metal Oxides and their Composites for Emerging Applications introduces the fundamental properties of metal oxide-based composites, paying

special attention to physicochemical, optical, electrical and structural characteristics. It provides an overview of the synthetic protocols used to design and tune the properties of metal oxide-based composites for key emerging applications. It also discusses metal oxide-based composites and their use in energy applications such as energy storage, energy harvesting and environmental remediation.

This book is an ideal resource for materials scientists and engineers working in academia and R&D. In addition, it's appropriate for those who either need an introduction to potential research directions or for experienced researchers and practitioners looking for a key reference on the latest advances.

#### The book is available at

https://www.sciencedirect.com/book/9780323857055/advances-in-metal-oxides-and-their-c omposites-for-emerging-applications#book-description Chapters co-authored by Dr. Keval Sonigara are available to read at: https://doi.org/10.1016/B978-0-323-85705-5.00017-8 (chapter three) https://doi.org/10.1016/B978-0-323-85705-5.00009-9 (chapter nine)

Metal Oxides Series Series Editor Ghenadii Korotcenkov **Advances in Metal Oxides and** 

**Their Composites for Emerging Applications** 

Sagar D. Dele

# OSCAR staff honoured with SIP Educators of the Year Award

OSCAR's IP Manager Yechen Gui and Research Scientist Dr. Kamran Khan were both honoured with a Suzhou Industrial Park Educators of the Year (2021-2022) Award for delivering remarkable results in scientific research, social services and technology transfer and commercialisation.

Yechen has 10 years of experience in the field of patent examination and operation. She is a Senior Intellectual Property Officer accredited by the China National Intellectual Property Administration (CNIPA).

She is well-versed in intellectual property protection and the promotion and transfer of new technologies. She is also active in the dissemination of intellectual property know-how and scientific research management.

'I am very honoured to receive this award.' says Yechen, 'As OSCAR's IP manager, I hope to seek the most optimized way to assist OSCAR with developing IP strategies that best benefit our research, the economy and society, so as to realize the concept of 'from idea to impact'.'

Dr. Kamran Khan is a Research Scientist in Prof. Mark Moloney's research group. Driven by the Covid-19 public health crisis, Dr. Khan and his colleagues developed a long-lasting anti-virus coating technology that helps reduce the risk of infection by exposure to Sars-Cov-2. The coating can be used in medical protective products (including masks and protective clothing), air purification and filtration, textiles, plastic products and other surface coated products. Dr. Khan is working to bring the technology into commercial adoption. Dr. Khan has also devoted time to training the next generation scientists and community service.

Dr. Khan says he feels really honoured to receive the Educator of the Year Award from the SIP government which recognises his research and volunteering activities against Covid-19. 'It inspires me to use science for the benefit of humanity and solve problems like the Covid-19 pandemic. Regardless of our educational or cultural background, we can always come together and do our part to solving problems like the Covid-19 pandemic, world hunger, climate change and many others.' Says Dr. Khan.







# When Scientist meets OSCAR': Dr. Xiaosong Liu



'So far so well living in Suzhou. The city is surrounded by several beautiful and well-known lakes. The views are fantastic throughout the changing seasons, though the spring and fall are quite short here.' OSCAR Research Scientist Xiaosong Liu describes his impressions of Suzhou in the nine months he's lived here. Xiaosong

points out a minus in the climate; 'I don't like the summer in Suzhou when we suffer from two months of high temperatures and heavy moisture in the air, which makes breathing quite stiff. Other than that, Suzhou is good enough to live in.'

Dr. Xiaosong Liu joined Prof. Mark Moloney's functional materials group in December 2021, soon after completing his second doctoral programme in Mechanical Engineering at Villanova University in July that same year. Prior to Villanova University, he had already obtained his first PhD in Textile Science and Engineering from Donghua University in 2015. He is now continuing his academic journey at OSCAR, working on biscarbene synthesis and its applications in the surface modification of renewable biobased polymers.

When asked about why he chose to pursue his academic goals at OSCAR, Xiaosong says, 'Prof. Moloney is the reason I chose OSCAR at the very beginning. He has contributed a lot of effort and energy to organic chemistry, especially in surface science, which makes him the kind of icon that I aspire to become one day. Secondly, OSCAR is a part of the University of Oxford which has a great reputation for scientific development and academic training, and I'd like to learn more things that could be of great benefit to my future academic development. Most importantly, I'd like to choose the line of work I enjoy while enjoying the one I chose.



'Choosing the line of work you love while loving the one you've chosen.' This may be a tenet shared by all accomplished scientists, and Xiaosong's long-term career goal is to become one of them. 'A top-notch professional who can develop and apply new surface modification technologies to materials,' he details, 'to enrich people's daily lives.' Xiaosong understands it takes day-to-day practical work to realise that career ambition.

He's already made progress with his research in the past nine months, with the help of teammates and colleagues in the chemistry research group. He dug into the thermal properties of bisdiazo compounds and worked with the team to determine the general temperature range and time duration for bisdiazo compounds in the thermally induced surface modification on all possible substrates. 'The so-called self-coupling or self-polymerization that occurred during thermal performance evaluations also caught my attention. Especially when bisdiazo compound solids were heated up and polymer-like products were obtained, which has been checked out through its molecular weight distribution. In the realm of surface modification, this phenomenon is very interesting. Furthermore, such bisdiazo compounds would grow different nanostructures on biopolymers and water-soluble polymer thin films. While some key findings are still missing, we are working on them at the time being.'

Xiaosong's work is assisted by the research environment OSCAR has provided. 'All the PIs we are working with are full professors at Oxford University. I also get to work with quite a lot of well-educated and talented young research scientists and assistants who discuss different angles of inspiring views with me, which helps clear my mind for my research and studies. All of us are one together, though each one of us is focusing on different subjects in the realm of scientific work.'





### SIP News in August

### SEID CELEBRATES 20 YEARS OF METAMORPHOSIS

OSCAR is located in Suzhou Dushu Lake Science, Education and Innovation District (SEID), a district in southern SIP with a high concentration of science, education and innovation activity. Being in SEID offers many strategic benefits to Oxford's research mission through access to state-of-the-art facilities, a research environment enriched by 33 local and foreign universities and institutions and 15 Chinese Academy Institutes, and a substantial company base including more than 5,000 high-tech enterprises.

When OSCAR Director Professor Zhanfeng Cui was in SEID with Oxford's Pro-Vice Chancellor to investigate the location for the OSCAR building, he was amazed by how SEID had been shaping up, from a green field to the home for more than 20 universities and over 100 innovative enterprises in merely 10 years. 'It's so exciting to build Oxford University's overseas research centre here!' recalls Professor Cui.

The year 2022 marks the 20th anniversary of the advent of the Suzhou Dushu Lake Science, Education and Innovation District (SEID). The past 20 years mark the metamorphosis of this area from wilderness into a modern urban area that boasts dynamic education and scientific research activities, thriving emerging industries and pleasant amenities for living.

2()()2

SEID first came into being in 2002 as the 'Suzhou Postgraduate City', following a China-Singapore joint decision to double down on efforts to train high-level talents.



August 29, 2002, the foundation stone of 'Suzhou Postgraduate City' was 🔺 laid, sowing the seeds of a "science and education dream".

## 2005

Three years later in 2005, the Postgraduate City was upgraded and scaled up to become a 'Higher Education District', opening its arms to a wider spectrum of talents who attended junior colleges, universities and graduate schools here. This move went a long way towards nurturing a sound mix of talented people who proved vital for the development of Suzhou Industrial Park.

## 2008

In 2008, taking a page from Stanford University's role in the emergence of Silicon Valley, SIP reintroduced the 'Higher Education District' as 'Suzhou Dushu Lake Science, Education and Innovation District', giving a central place to universities and research facilities, and partnerships between industry and academia.

Born liberal and innovative, SEID puts itself on the map as a 'Wisdom Lake' in China that leads in the industries of biomedicine, nanotechnology application and artificial intelligence.

At SEID, academia and industry have formed a positive upward spiral.

- ▶ Thirty-three prestigious Chinese and overseas institutions of higher learning have set up campuses and research facilities here.
- Fifteen national technical institutes affiliated with the Chinese Academy of Science are located in SEID, including the Suzhou institute of Nano-Tech and Nano-Bionics (SINANO) and the Suzhou Institute of Systems Medicine. World-leading multinational companies such as Microsoft and Siemens are moving ahead with plans to set up R&D centres.
- > Thirty-eight research workstations for academicians and post-doctoral researchers are set up in SEID.
- More than 30 technology service platforms are made available to the public, meeting needs for biopharmaceutical separation and purification, micro and nanoelectromechanical manufacturing, and software evaluation.
- More than 5,000 high-tech enterprises with good commercialisation prospects are running in SEID, of which 35 are publicly listed.

