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

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）

WeChat / 微信公众号

Headlines

P02 Director Prof. Zhanfeng Cui in OSCAR

CHI Lab Holds Visits in Suzhou and North China P03

P04 OSCAR Publications

Visits to OSCAR P05

P08 Meet OSCAR's New Staff

OSCAR Open Day and Winter Reception P09

P10 SIP News in January
China's First Whitepaper on AI-related IP Rights Released in SIP

SIP Endeavors to Push on Its Environmental Management Partners Program P11

Director Prof. Zhanfeng Cui in OSCAR

In mid-January 2019, OSCAR Founding Director Prof. Zhanfeng Cui met with the OSCAR management team, collaborators, and researchers to set the strategy and plans for OSCAR in 2019, both in terms of administration and research. Prof. Cui also visited Jiangsu Industrial Technology Research Institute (JITRI) in Nanjing to hold discussions with JITRI's President Dr Qing Liu to explore the possibility of co-organizing events in 2019.

Prof. Zhanfeng Cui

Donald Pollock Professor of Chemical Engineering, University of Oxford (since 2000)
Director, Oxford Centre for Tissue Engineering and Bioprocessing (since 2001)
Director, JITRI IMPACT Institute at University of Oxford
Director, Strategic Projects (China), Mathematical, Physical and Life Sciences Division (since 2017)
Founding Director, Oxford Suzhou Centre for Advanced Research (OSCAR) (since 2017)

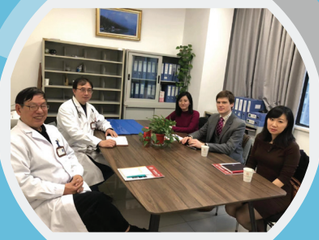
CHI Lab Holds Visits in Suzhou and North China

The Computational Health Informatics (CHI) Lab visited potential academic and commercial collaborators in Suzhou and Jinan of Shandong Province in January 2019.

This included visits to the Kowloon Hospital, Suzhou and a large cloud-service provider in Suzhou and Jinan. At the meeting with the Cardiovascular Department of Kowloon Hospital (Suzhou), the teams decided to initiate collaboration on a 'smart mattress' project for home-care of patients with cardiovascular disease, which will also involve hardware collaborators from the Suzhou Institute of Biomedical Engineering and Technology (Chinese Academy of Sciences). The three parties agreed to prepare a collaboration agreement after the Chinese Spring Festival, followed by an application for Jiangsu Industrial Technology Research Institute (JITRI) funding.

The cloud service provider has interest in healthcare data, where the CHI Lab has expertise, including involvement with analogous commercial collaborators in the UK. Seeking to emulate the University-hospitals-industry arrangement that has proven successful in Oxford, the OSCAR team is discussing potential joint-ventures between UK and Chinese collaborators. This would focus on the analysis of healthcare data for improving patient outcomes.

Kowloon Hospital and Suzhou Institute of Biomedical Engineering and Technology (Chinese Academy of Sciences) visited OSCAR



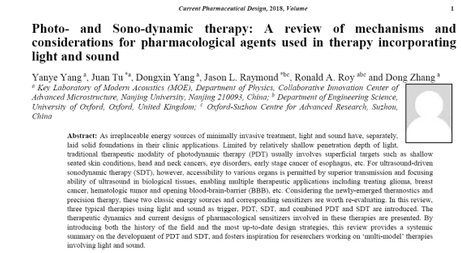
OSCAR team visited Kowloon Hospital

OSCAR team visited JITRI

OSCAR Publications

Prof. Ronald Roy
(OSCAR Principal Investigator)

A joint review article with Nanjing University ***Photo- and Sono-dynamic therapy: A review of mechanisms and considerations for pharmacological agents used in therapy incorporating light and sound*** was accepted for publication, with the OSCAR affiliation used by Prof. Ronald Roy (Principal Investigator of OSCAR) and Dr Jason Raymond.



Current Pharmaceutical Design, 2018, Volume 1

Photo- and Sono-dynamic therapy: A review of mechanisms and considerations for pharmacological agents used in therapy incorporating light and sound

Yanye Yang [a], Juan Tu [*a], Dongxin Yang [a], Jason L. Raymond [?b,c], Ronald A. Roy [d,b,c] and Dong Zhang [a]
[a] Key Laboratory of Modern Acoustics (MOE), Department of Physics, Collaborative Innovation Center of Advanced Microstructure, Nanjing University, Nanjing 210093, China; [b] Department of Engineering Science, University of Oxford, Oxford, United Kingdom; [c] Oxford-Suzhou Centre for Advanced Research, Suzhou, China

Abstract: As irreplaceable energy sources of minimally invasive treatment, light and sound have, separately, laid solid foundations in their clinic applications. Limited by relatively shallow penetration depth of light, traditional therapeutic modality of photodynamic therapy (PDT) usually involves superficial targets such as shallow seated skin conditions, head and neck cancers, eye disorders, early stage cancer of esophagus, etc. For ultrasound-driven sonodynamic therapy (SDT), however, accessibility to various organs is permitted by superior transmission and focusing ability of ultrasound in biological tissues, enabling multiple therapeutic applications including treating glioma, breast cancer, hematologic tumor and opening blood-brain-barrier (BBB), etc. Considering the newly-emerged theranostics and precision therapy, these two classic energy sources and corresponding sensitizers are worth re-evaluating. In this review, three typical therapies using light and sound as trigger, PDT, SDT, and combined PDT and SDT are introduced. The therapeutic dynamics and current designs of pharmacological sensitizers involved in these therapies are presented. By introducing both the history of the field and the most up-to-date design strategies, this review provides a systemic summary on the development of PDT and SDT, and fosters inspiration for researchers working on 'multi-model' therapies involving light and sound.

Prof. David Clifton
(OSCAR Principal Investigator)

On 28 January, in Prof. David Clifton's group, the paper ***DeepAMR for predicting co-occurrent resistance of Mycobacterium tuberculosis*** was accepted for publication, with the OSCAR affiliation used by Prof. David Clifton and Dr Yang Yang.
To find out more, please follow this link https://academic.oup.com/bioinformatics/advance-article/doi/10.1093/bioinformatics/btz067/5303535

Subject Section

DeepAMR for predicting co-occurrent resistance o *Mycobacterium tuberculosis*

Yang Yang [1], Timothy M. Walker [2], A. Sarah Walker [2,3], Daniel J. Wilson [5], Timothy E.A. Peto [2,3], Derrick W. Crook [2,3,4], Farah Shamout [1], CRyPTIC consortium, Tingting Zhu [1], David A. Clifton [1],

[1] Institute of Biomedical Engineering, Department of Engineering Science, University of Oxford, Oxford, UK, OX3 7DQ
[2] Nuffield Department of Medicine, University of Oxford, John Radcliffe Hospital Headley Way, Oxford, UK, OX3 9DS
[3] NIHR Oxford Biomedical Research Centre, John Radcliffe Hospital, Headley Way Headington, Oxford, UK, OX3 9DU
[4] National Infection Service, Public Health England, Wellington House 133-155 Waterloo Road, London, UK, SE1 8UG
[5] Big Data Institute, Nuffield Department of Population Health, Li Ka Shing Centre for Health Information and Discovery, University of Oxford, Old Road Campus, Oxford, UK, OX3 7LF

* david.clifton@eng.ox.ac.uk.

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Abstract

Motivation: Resistance co-occurrence within first-line anti-tuberculosis (TB) drugs is a common phenomenon. Existing methods based on genetic data analysis of *Mycobacterium tuberculosis* (MTB) have been able to predict resistance of MTB to individual drugs, but have not considered the resistance co-occurrence and cannot capture latent structure of genomic data that corresponds to subgroups of poly-resistant MTB.
Methods: We used a large cohort of TB patients from 16 countries across six continents where whole-genome sequences for each isolate and associated phenotype to anti-TB drugs were obtained using drug susceptibility testing recommended by the World Health Organization. We then proposed an end-to-end multi-task model with stacked denoising auto-encoder (DeepAMR) to learn low-dimensional latent structure and perform multi-label classification.
Results: The results showed that DeepAMR outperformed baseline model (a method that predicts resistance of an isolate when a single previously identified mutation is present) and four machine learning models (i.e., support vector machine, random forest, multi-label K-nearest neighbors and ensemble classification chain) with mean AUROC from 94.4% to 98.7%, for predicting resistance to four first-line drugs (i.e., isoniazid (INH), ethambutol (EMB), rifampicin (RIF), pyrazinamide (PZA)), multi-drug resistant TB (MDR-TB) and pan-susceptible TB (PANS-TB: MTB that is susceptible to all four first-line anti-TB drugs). In the case of INH, EMB, PZA, and MDR, DeepAMR achieved its best mean sensitivity of 94.3%, 91.5%, 87.3% and 96.3%, respectively. While in the case of RIF and PANS-TB, it generated 94.2% and 92.2% sensitivity, which were lower than baseline model by 0.7% and 1.9%, respectively. A comparison of visualisation using t-distributed stochastic neighbor embedding for latent space learned by DeepAMR and its variant shows that the DeepAMR distorts the latent space to better separate susceptible and resistant classes, yet the its variant captures the lineage-related clusters in latent space.

Visits to OSCAR

On 15 January, Prof. Zhanfeng Cui received a visit from a delegation led by the Suzhou Vice Mayor, Mr. YANG Zhiping, to check the progress of recruitment and the fit out of the building after the Opening Ceremony on 22 November 2018. Mr. YANG Zhiping attended the OSCAR Grand Opening, where he delivered a speech.

In 2012, Mr. Yang was the chairman of Suzhou Industrial Park Administrative Committee and he led a delegation to Oxford to initiate the first extensive discussions about cooperation between Oxford and SIP. With his endeavor throughout the years, the cooperation project evolved from an idea into reality. In December 2016, on behalf of SIP, he signed the Collaboration Agreement with the Mathematical, Physical and Life Sciences Division of the University of Oxford to establish the Oxford Suzhou Centre for Advanced Research in Suzhou.

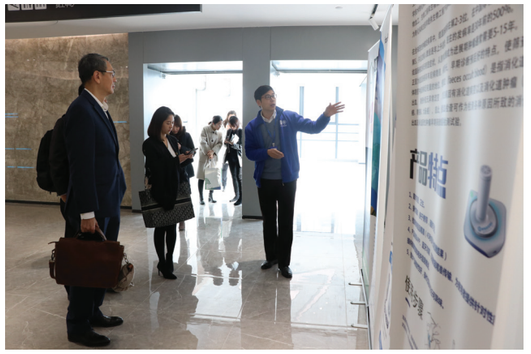
YANG Zhiping (L3), Vice Mayor of Suzhou;
Prof. Zhanfeng Cui (R3), OSCAR Director;
Leah He (R1), OSCAR General Manager

Vice Mayor Yang with OSCAR researchers

On 18 January, the Singapore Agency for Science, Technology and Research (A*STAR) visited OSCAR to explore the possibility of collaboration with OSCAR.

A*STAR, 'a statutory board under the Ministry of Trade and Industry of Singapore, spearheads economic development-oriented research to advance scientific discovery and develop innovative technology'. To find out more, https://www.a-star.edu.sg/

The delegation being introduced to OSCAR by GM Leah He and OSCAR JITRI Fellow Alex Yang



The delegation speaking with OSCAR researchers

On 30 January, Mr. CHEN Zhenyi, Chairman of the Standing Committee of the Suzhou Municipal People's Congress, led a delegation of about 30 people to OSCAR.
This visit to OSCAR was part of Mr Chen's wider visit to key projects across the Suzhou Industrial Park to check their progress, achievements and prospects.

The delegation being introduced to OSCAR by GM Leah He and OSCAR JITRI Fellow Alex Yang

The delegation speaking with OSCAR researchers

Meet OSCAR's New Staff

Mary Ma
EHS Supervisor of OSCAR on Board on 10 January

Mary joined OSCAR as EHS (Environment Health Safety) Supervisor of OSCAR (reporting to the Head of Building Services and Facilities). She is responsible for work related to safety, environmental protection and occupational health, including chemical safety, biological safety, laser safety, radiation safety, fire safety, environmental management, etc.

Mary obtained her bachelor's degree and master's degree in safety engineering from Jiangsu University. She received the national certified safety engineer certificate in 2014. From 2014 to 2018, she worked as EHS engineer in a state-owned enterprise in Suzhou Industrial Park (SIP). She is experienced in the establishment of EHS system and is familiar with Chinese laws and regulations related to environmental protection, safety and occupational health.
Email: Mary.Ma@oxford-oscar.cn

OSCAR Open Day and Winter Reception

On the afternoon of 27 January 2019, the Oxford Suzhou Centre for Advanced Research (OSCAR) held an Open Day and Winter Reception to host colleagues, collaborators, and governmental officials who have supported OSCAR along the way.

Guests from Suzhou Municipal Government departments, Suzhou Industrial Park Administrative Committee departments, Suzhou Dushu Lake Science and Education Innovation District Administrative Committee departments, neighboring institutes and universities, collaborators and OSCAR team family members all joined the OSCAR Open Day.

At the Open Day, OSCAR General Manager, Leah He, briefed the attendees on the progress OSCAR has made in 2018 and expressed OSCAR's wishes for continued collaboration in the future. Later on, the audience were led by Office Manager Steven Chen to have a tour in the building.

What are OSCAR Open Days?

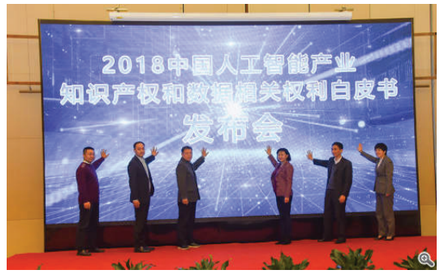
OSCAR Open Days are a series of events with different themes to strengthen OSCAR's relationship with the local community. The first OSCAR Open Day was held on 23 November 2018: 'A Dialogue with Oxford' was held during the Oxford Week in Suzhou (19-23 November). More than 70 teachers and students from neighboring schools and universities attended the Dialogue which was open to the public. OSCAR will continue to organize Open Days to create more opportunities to meet with friends from industries, research institutions, universities, technology transfer organizations, and others.

SIP News in January

China's First Whitepaper on AI-related IP Rights Released in SIP

The 2018 Chinese Whitepaper on AI-related Intellectual Property Rights and Data-related Rights (hereinafter referred to as the whitepaper), the first of its kind in the country, was released in SIP on January 24.

Compiled by Shanghai Jiao Tong University (Suzhou) AI Research Institute, Intellectual Property and Competition Law Academy at Shanghai Jiao Tong University and several other organizations authorized by Artificial Intelligence Industrial Alliance of China, the whitepaper gives explicit definitions of AI-related intellectual property rights and detailed analysis of related patent assessment systems, legal practices and other issues.



According to Yu Kai, executive president at Shanghai Jiao Tong University (Suzhou) AI Research Institute, the whitepaper will be updated every year to cover the latest and top concerns about AI-related IP rights. 'We are trying to make it a very useful reference for AI companies,' Yu said.

The whitepaper launch was followed by a forum on AI-related IP rights, where a host of AI experts and legal professionals exchanged opinions on a list of hot topics about AI development and related legal issues.

January 24, 2019
http://www.sipac.gov.cn/english/news/201901/t20190125_979288.htm

SIP Endeavors to Push on Its Environmental Management Partners Program

SIP EMPP Promotion Board, executor of SIP Land Resources and Environmental Protection Bureau (SIP-LREPB)'s Environmental Management Partners Program (EMPP), convened a meeting at Genway I-Park Convention Center, SIP on January 24, in an effort to further push on the program. A number of officials from local environmental management authorities, experts from SIP Environmental, Health and Safety (EHS) Association and representatives from the participating enterprises were present.

SIP-LREPB initiated the EMPP in August 2018 in a move to lend local enterprises a hand in environmental management during their production and operations. Last year, 20 SIP-LREPB staff and 30 EHS experts were paired with 60 pilot enterprises to help them detect loopholes in environmental management and figure out solutions. Statistics show that the program has helped address hundreds of problems so far.

At the event, a number of individuals and enterprises received awards for their outstanding performance under the program, and three enterprises shared their good practices in environmental management. Besides, a law professor from Soochow University expounded on laws on pollution prevention and control and corporate environmental credit rating to the enterprise representatives.

January 24, 2019

http://www.sipac.gov.cn/english/news/201901/t20190125_979287.htm