国家留学基金委与利物浦大学联合奖学金（自然科学与工程学院）：
2019 年度博士生项目招生宣传

国家留学基金委与利物浦大学 (UoL)2019 年度的博士及访问学者项目-自然科学与工程学院-招生正在进行，该项目以中国国家留学基金管理委员会(CSC)和利物浦大学(UoL)之间已签订的合作协议为基础，旨在为中国大学/研究机构的符合资格的学生、学者提供优质的研究培训与合作，为中国大学及研究机构的研究生和访问学者提供独特的机会和良好的平台，在这一世界领先的研究机构中进行科学研究、开发应用，在最高级别的期刊上发表研究成果，并在化学、材料、药物、生物化学等相关领域获得全新研究技术方面的丰富经验。

1. 计划概述

CSC/UoL 联合奖学金项目将在以下三个项目类别中展开合作：

1.1 化学、材料、药物、生物化学及相关领域全日制攻读博士学位学生

所选中国学生将参加 CSC/UoL 的指定博士计划，时长不超过 48 个月。如果所选中国学生成功完成指定项目的要求并为论文答辩，UoL 将依据其正常资格授予规则和程序向该等学生授予博士学位。此类学生人数不限制名额。

1.2 化学、材料、药物、生物化学及相关领域的定期访问学者

访问学者将加入 CSC/UoL 的指定研究项目，时长在 6 个月至 12 个月之间。此类访问学者的人数不限名额。

2. 合作领域

遴选的参与 2019 年的 CSC/UoL 联合博士生项目的导师包括：

1. Hardwick 教授 （Stephenson 再生能源研究所主任）—电化学以及电化学反应界面机理研究，金属-空气电池/锂、钠-离子电池（Stephenson Institute for Renewable Energy (SIRE) is leading edge fundamental energy technology research. As a specialist energy technologies research institute, SIRE focuses on the physics and chemistry that will transform the future of energy generation and storage. We are bridging the gap between fundamental science and applied engineering by combining both academically, as well as industrially relevant questions. Prof Hardwick's research focus on 1) understand the chemistry of energy materials; 2) Establishment of surface sensitive spectroscopic techniques to probe interfaces; 3) Development of advanced materials for lithium & sodium batteries and supercapacitors. Selected publications: 1) Template-free Synthesis of Nitrogen doped Carbon Materials from an Organic Ionic Dye (Murexide) For Supercapacitor Application, Serwar M. et al ***RSC Adv***. *2017*, 7, 54626; 2) Batteries: Avoiding oxygen, Hardwick L. ***Nature Commn.*** **2016**, 1, 16115; 3) Solvent-Mediated Control of the Electrochemical Discharge Products of Non-Aqueous Sodium-Oxygen Electrochemistry, Aldous I. et al ***Angew. Chem. Int Ed.*** **2016**, 55, 8254; 4) Mechanistic Insight into the Superoxide Induced Ring Opening in Propylene Carbonate Based Electrolytes using In Situ Surface-Enhanced Infrared Spectroscopy Padmanabhan V. et al ***JACS***, **2016**, 138, 3745; 5) A Highly Active Nickel Electrocatalyst shows Excellent Selectivity for CO2 Reduction in Acidic Media Gaia N. et al ***Chem. Sci.*** **2016**, 7, 1521.

（相关链接：https://www.liverpool.ac.uk/chemistry/staff/laurence-hardwick/）

2. O' Neil 教授—药物化学，药理化学（Prof O'Neil's research interests include synthetic methodology including catalytic oxidation processes, fluorine substitution in bioorganic chemistry, drug metabolism and the medicinal chemistry of antimalarial and antimycobacterial drugs and novel drugs for the treatment of filariasis, pancreatitis and neuropathic pain. His group also has been involved in a project focused on the rationale redesign of resistance breaking vector control agents. He have published over 150 papers and reviews and fifteen patents. His research has led to a drug candidate (Isoquine) entering clinical trials in 2008 and they also have recently candidate selected three additional antimalarials (RKA 182, FAQ4, E209) for full preclinical testing on route to Phase 1 clinical trials in humans. More recently, they have also candidate selected a new potential drug, AWZ1066, for the treatment of the filial diseases lymphatic filariasis (elephnatisais) and ochocerciasis (River blindness). They have also initiated research into superoxide dismutase (SOD-1) that are relevant to its involvement in motor neuron disease with Hasnain and Antonyuk.
He currently run the Medicinal Chemistry Group at Liverpool which is one of Europe's leading academic groups focused on early stage drug discovery. Through the establishment of public private partnerships with major pharma and organisations such as the Medicines for Malaria Venture (MMV) and TB Alliance many of our early stage projects have been developed to the point of candidate selection and clinical trials in humans. His group works on a wide range of therapeutic areas focussed on antimalarial, antibacterial (Anti-Wolbachia), anti-tuberculous agents with more recent studies focused in the pain, pancreatitis and anti-fungal areas. There are four main research themes that include: (1) Drug Design of New Antimicrobial Agents; (2) Molecular Modelling and Cheminformatics; (3) Safe-Drug Design; (4) Semi-synthetic Natural Product Drug Design.1）M. J. Capper, Gareth. S.A. Wright et al., The cysteine-reactive small molecule ebselen facilitates effective SOD1 maturation, *Nature Communications*, **2018**, 9, 1693。 2）Johnston, K. L.; Cook, D. A. N.; Berry, N. G.; Hong, W. D.; Clare, R. H.; Goddard, M.; Ford, L.; Nixon, G. L.; O'Neill, P. M.; Ward, S. A.; Taylor, M. J., Identification and prioritization of novel anti-Wolbachia chemotypes from screening a 10,000-compound diversity library. *Science Advances* **2017,** *3* (9). 3）O'Neill, P. M.; Amewu, R. K. et al., A tetraoxane-based antimalarial drug candidate that overcomes PfK13-C580Y dependent artemisinin resistance. *Nature Communications,* **2017,** 8, 15159。 4）Hong, W. D.; Gibbons, P. D. et al., Rational Design, Synthesis, and Biological Evaluation of Heterocyclic Quinolones Targeting the Respiratory Chain of Mycobacterium tuberculosis. *Journal of Medicinal Chemistry,* **2017,** *60*, 3703-3726. 5）Ismail, H.M.; Barton, V.E.; Panchana, M.; Charoensutthivarakul, S. et al., A Click Chemistry-Based Proteomic Approach Reveals that 1,2,4-Trioxolane and Artemisinin Antimalarials Share a Common Protein Alkylation Profile, *Angewandte Chemie-International Edition* **2016**, 55, 6401-6405。 6）Ismail, H. M.; Barton, V.; Phanchana, M.; Charoensutthivarakul, S.; Wong, M. H. L. et al., Artemisinin activity-based probes identify multiple molecular targets within the asexual stage of the malaria parasites Plasmodium falciparum 3D7. *Proc. Natl. Acad. Sci. U. S. A.*, **2016**, *113*, 2080-2085。 7）Wong, M.N.L.; Bryan, H.K.; Copple, I.M.; Jenkins, R.E. et al., Design and Synthesis of Irreversible Analogues of Bardoxolone Methyl for the Identification of Pharmacologically Relevant Targets and Interaction Sites, *J. Med. Chem.* **2016,** *59* , 2396-2409。

（相关链接：https://www.liverpool.ac.uk/chemistry/research/medicinal-chemistry/）

3. Brust 教授—功能化界面化学，纳米金属表面化学及成膜

（Prof. Mathias Brust has 25 years of experience in the chemistry of metal nanoparticles. His best-known work is the development of a simple two-phase liquid/liquid route for the preparation of thiolate-protected gold nanoparticles. This protocol is now generally referred to as the Brust-Schiffrin-method and is being used in laboratories all over the world for a host of applications ranging from molecular electronics to cancer research.
Much of the more recent research in the Brust group has focused on the interactions of metal nanoparticles with biological systems, chiefly on the cellular and subcellular level. Particular attention has been paid to cellular uptake and intracellular fate of nanoparticles and to opportunities arising from it for imaging, diagnostics and therapy.
Brust was awarded a prestigious European Research Council Advanced Grant in 2013 and, over the past five years, has explored the possibilities of creating active matter on the nanoscale, far away from chemical equilibrium. Energy conversion in living cells, such as ATP production, has served as a guiding principle. This has led to novel research on ion and electron transport in micro-heterogeneous systems including emulsions and dispersions of vesicles.

Current and future projects include studies of ion and electron transfer across biological membranes, the use of gold nanoparticles as artificial carriers and shuttles for ionic and electronic charge, electrochemical studies in emulsions and Pickering emulsions, interactions of gold nanoparticles with green plants and chloroplasts, self-propelling nano-motors, and nonequilibrium nanotechnology in general. We are interested in everything that is novel, exiting and can be attempted with simple functionalized gold nanoparticles.）

（相关链接：https://www.liverpool.ac.uk/chemistry/staff/mathias-brust/research/）

4. Cosstick 教授—药物、生物化学（DNA (deoxyribonucleic acid) is the permanent repository of genetic information and the acquired understanding of the structure and function of DNA and the related RNA

(ribonucleic acid), represent one of the greatest ever triumphs for chemistry and biology. It is not surprising that most of the licensed antiviral drugs (e.g. Zovirax and AZT) and many anticancer drugs are nucleoside analogues which are able to interfere with nucleic acid biosynthesis in a selective manner. Additionally, much of the recent information on the structure/function relationship of nucleic acids has come from using DNA/RNA probes that contain a subtle chemical modification. Present work within the group is concerned with studies on the synthesis of novel nucleic acids analogues as both potential therapeutic agents and as probes for understanding the precise mechanism by which nucleic acids fulfill their biological functions。

（相关链接：https://www.liverpool.ac.uk/chemistry/staff/richard-cosstick/research/）

5. Shchukin 教授—新材料，新能源（Prof. Dmitry Shchukin, works on controlled delivery of active agents and energy (electric, bio, thermal) by Layer-by-Layer planar and encapsulation approaches (>250 publications, H-factor 60, >10000 citations). He has been awarded by ERC Consolidator grant (2015), ERC Proof-of-concept grant (2017), and RSC Brian Mercer (UK) awards, Nanofutur and ForMat (Germany) prizes.

Research activities include the study of the non-equilibrated interfaces, development of composite hollow nanocontainers with controlled shell permeability for encapsulation of the energy-enriched materials, phase change materials, drugs, corrosion inhibitors; development of nanocontainer-based feedback active surfaces for further application in active self-healing materials, catalysis, biochemistry and medicine; synthesis of nanomaterials with new properties in the ultrasonic cavitation zone, synthesis of amorphous nanocomposites with enhanced catalytic performance in non-equilibrated conditions at the cavitation interface; ultrasonic surface modification of metals for catalytic and biomedical (implants) applications.

Applications from students with the background in materials chemistry, polymer chemistry, ultrasound, physical chemistry, self-healing materials, energy harvesting, storage and controlled delivery and other related fields.

Potential research topics are： 1） new nanomaterials for energy applications;2）- self-healing materials (also including materials for wood and historical heritage preservation); 3） antifouling coatings; 4） application of ultrasound in photocatalysis and photovoltaics）

相关链接：https://www.liverpool.ac.uk/chemistry/staff/dmitry-shchukin/,

6. Aissa 副教授—有机合成化学，精准催化合成 （Christophe Aïssa obtained his PhD under the supervision of Professor Malacria (University Paris 6, France) in 2001, focussing on the study of the factors influencing the outcome of transannular radical cyclisations cascades directed toward the synthesis of natural sesquiterpenes. He then joined Professor Fürstner group (MPI for coal research, Mülheim/Ruhr, Germany) as postdoctoral research assistant, working on the total synthesis of biologically active marine secondary metabolites. In 2003, he was appointed senior scientist within the same group, working further on total syntheses, but also on transition-metal catalysed reactions. In July 2007, he was appointed Lecturer at The University of Liverpool with a RCUK fellowship。

His group works on organic synthesis through transition-metal-catalysed activation of otherwise inert bonds, in particular C–H and C–C bonds, with the long-term aim to develop sustainable synthetic chemistry. Here is a selection of papers that illustrate their work：Barday, M.; Janot, C.; Halcovitch, N. R.; Muir, J.; Aïssa, C. Cross-Coupling of α-Carbonyl Sulfoxonium Ylides with C–H Bonds. Angew. Chem. Int. Ed. 2017, 56, 13117–13121.2)Yip, S. Y. Y.; Aïssa, C. Isomerization of Olefins Triggered by Rhodium-Catalyzed C–H Bond Activation: Control of Endocyclic β-Hydrogen Elimination. Angew. Chem. Int. Ed. 2015, 54, 6870–6873. 3)Aïssa, C.; Ho, K. Y. T.; Tetlow, D. J.; Pin-No, M. Diastereoselective Carbocyclization of 1,6-Heptadienes Triggered by Rhodium-Catalyzed Activation of an Olefinic C–H Bond. Angew. Chem. Int. Ed. 2014, 53, 4209–4212. 4)Ho, K. Y. T. H.; Aïssa, C. Regioselective Cycloaddition of 3-Azetidinones and 3-Oxetanones with Alkynes through Nickel-Catalysed Carbon-Carbon Bond Activation. Chem. Eur. J. 2012, 18, 3486–3489. 5)Crépin, D.; Dawick, J.; Aïssa, C. Combined Rhodium-Catalyzed Carbon-Hydrogen Activation and β-Carbon Elimination to access Eight-Membered Rings. Angew. Chem. Int. Ed. 2010, 49, 620–623.）

（相关链接：https://www.liverpool.ac.uk/chemistry/staff/christophe-aissa/）

7. Hasell 研究员—富硫有机聚合物的研发与应用开发 Porous materials are permeable, high surface area materials with applications in gas storage, catalysis, and filtration. There has been considerable interest in porous materials over the last ten years, and metal-organic frameworks and porous polymers with incredible properties have been reported. However, many of these new materials are limited in application due to the high cost of production. We are developing new porous materials from inorganic waste and other low cost or renewable resources. The target is to produce materials with superior properties, but at a cost that makes them useful for widespread practical applications, especially filtration of toxic pollutants from water and air flows. A good example is sulphur-polymers. Sulfur is an industrial by-product of oil refining. We recently showed that when polymers made from elemental sulfur are made porous, they can be used to filter mercury from

water. （相关链接：https://www.liverpool.ac.uk/chemistry/staff/thomas-hasell/）

8. Cowan 副教授---有机电化学，表面电化学 （Dr Alex Cowan (AC) is a Reader in Chemistry and EPSRC Research Fellow (2013-21) in the Department of Chemistry and the Stephenson Institute for Renewable Energy at the University of Liverpool (UoL). Prior to this role AC held the independent positions of Senior Lecturer (2015-2017) and Lecturer (2012-2015) at UoL and Lecturer in Renewable Fuel Synthesis at Imperial College London (2011-12). AC is a former associate editor of RSC Advances and he sits on the advisory board of the UK Solar Fuels Network (EPSRC). Through this role, and through additional activities with the Royal Society, AC has represented the UK academic communities interests in CO2 conversion extensively to both UK Government/Policy makers and to policy and science leaders world-wide.

His research focuses on scalable catalytic systems for the production of fuels from abundant and was molecules including carbon dioxide and water. AC has particular expertise in the development and spectroscopic study of photo- and electrocatalytic water splitting and CO2 catalysts and electrodes. His group is widely recognised for the application of fast transient spectroscopy to rationalise device and catalyst efficiencies under operating conditions. Recent highlights in CO2 chemistry (Chem. Sci., 2018, 2016, J. Am. Chem. Soc., 2017) and water splitting materials (Adv. Energy Mat., 2017, Chem Sci, 2015, Angew. Chem. Int Ed., 2016, 2014) appearing in high impact journals.

Project for Joint PhD: Understanding the mechanism of electrochemical carbon dioxide reduction to fuel – enabling rational material design: The application of surface selective (Sum Frequency Generation (SFG) spectroscopy to rationalise the mechanisms occurring during carbon dioxide reduction at electrodes. This knowledge will then be applied, through collaborative partnerships, to the design of new improved electrode materials.

(相关链接：https://www.liverpool.ac.uk/chemistry/staff/alexander-cowan/)

3. 入选标准

（1） 候选人在申请之际是中华人民共和国的公民和永久居民；

（2） 候选人当前未在国外工作或学习；

（3） 成功入选的候选人在完成学习和/或研究后必须回到中国；

（4） 候选人必须持有 UoL 的无条件录取通知书。因此，他们必须满足 UoL 规定的相关学术入学要求，包括较高的英语熟练度；

（5） 候选人应有志在 UoL 和 CSC 确定的某个优先学术领域中学习/研究。但是，其他学习/研究领域的申请者，亦会列入考虑范围之内。此外，支持的学术领域，还受到 UoL 相关学习计划可得性的约束。

(6) 候选人应填写“CSC 申请表”和“CSC 用人单位推荐表”（可从以下网址获取：http://apply.csc.edu.cn/），来满足 CSC 制定的选拔标准。

(7) 英语成绩要求：

雅思： 总成绩 6.5， 各单项成绩不低于 5.5。

托福： 总成绩 88， 各单项成绩写作、听力不低于 21；阅读不低于 22；口语不低于 23。

4. 申请和选拔流程

（1） UoL 应在每个学年开始之际，告知 CSC 随后学年提供的奖学金数以及建议的项目名称。

（2） 候选人应在 UoL 所规定申请截止日期前直接申请 UoL 录取。

候选人应在申请中表明其申请 CSC/UoL 联合奖学金计划， 并注明博士期间所感兴趣的研究领域/方向以及所选导师， 如：锂-离子电池/Hardwick 教授 或者 纳米表面化学/Brust 教授等等。

（3） UoL 将对候选人进行评估。每年 3 月 1 日前，UoL 会向 CSC 和每一位合资格候选人提供录取通知书的副本。该录取通知书，在学术表现和英语能力方面应是无条件的。该录取通知书还应表明，若合资格候选人获得 CSC 支持，UoL 将提供奖学金免除全额学费。

(4) 候选人在收到 UoL 录取通知书后，必须填写资金赞助申请表和用人单位推荐表（表格可通过以下网址在线获取：http://apply.csc.edu.cn），另外向 CSC 申请资金赞助。已签名的“CSC 申请表”以及填写好的“CSC 用人单位推荐表”的复印文本、UoL 完整申请的副本（包括其它支持性文件）、UoL 无条件录取通知书的副本，必须在每年 3 月 20 日之前通过 CSC 申请机构提交至 CSC。

(5) CSC 将依据 CSC 的要求和优先考虑事项对候选人进行评估，并向 UoL/MIF 提供奖学金获得者的最终名单，告知成功入选的候选人。

5. 资金赞助模式

UoL 将为成功入选的申请者提供奖学金免除全额学费。CSC 将考虑为成功入选的申请者提供中国政府规定的生活津贴、往返英国的国际机票费用以及签证申请费。

对于每位全日制博士学位计划的奖学金享受者，将获得长达 48 个月的奖学金保证，对于每位共同指导式“三明治”博士学位项目的奖学金享受者，将获得 6-24 个月的资金赞助。

6. 候选人指导

UoL 将为成功入选的候选人分配一位主要学术导师。学生将有权使用自然科学与工程学院的相关科研配套设备。

7. 联系方式

请将填好的报名申请表与相关要求文件发送至：

Dr. Xiaofeng Wu, Email: cscfse@liverpool.ac.uk,
xfwu@liverpool.ac.uk

8. 背景介绍

利物浦大学化学系

利物浦大学化学系是集有机化学、无机化学、材料化学、生物化学、分析化学、表面化学以及均相多相催化化学等于一体的大系。化学家罗伯特•鲁宾逊爵士在此工作期间获得了 1947 年的诺贝尔化学奖。利物浦化学系一直在发展壮大。在最新的进展中，2014 年 12 月 18 日，英国唯一由官方每 7 年发布一次的 REF 英国大学科研实力（原 RAE）评比中，利物浦大学化学系整体排名位列全英国第 2 名（仅次于剑桥），化学系的材料化学以及发表高质量论文数量更是排名第 1。这充分体现和说明了利物浦大学化学系的科研实力以及竞争力，特别是材

料学科的科研竞争力和成果更是让人惊叹！

2014 rank order by GPA	Institution	Total number of FTE staff submitted	% of 4* research activity	GPA
8 Chemistry				
1	Cambridge	63	57	3.54
2	Liverpool	34	51	3.50
3	Oxford	84	49	3.43
4	Bristol	59	39	3.35
5	Durham	41	35	3.31
=6	UCL	62	37	3.30
=6	Imperial	55	34	3.30
=6	Warwick	35	32	3.30
9	Cardiff	23	32	3.29
10	UEA	20	29	3.27
11	Manchester	52	33	3.24
=12	Southampton	45	29	3.23
=12	Edinburgh (joint submission with St Andrews)	43	28	3.23
=12	St Andrews (joint submission with Edinburgh)	37	28	3.23

利物浦大学材料创新工场（Materials Innovation Factory, MIF）

利物浦大学材料创新工场（MIF）是英国政府和联合利华联合投资 6800 万英镑建立的英国最大和最前沿的创新材料研发和应用基地。该创新工场是以利物浦大学化学系 Andy Cooper 教授为首席科学家和运行主任建立的。并专门为之在化学系旁边建设一幢科研大楼。科研大楼共建有 4 层，底楼是仪器设备以及公共开放区域，2 楼是联合利华的实验室， 3 楼和 4 楼是利物浦大学化学系材料方向的实验室。有 250 名左右的科研人员在该研发基地（http://news.liv.ac.uk/2014/06/23/65-million-research-facility-to-open-in-liverpool/）。所有设备和仪器都将采用最先进和最前沿的，同时和英国及欧洲其它大的科研研发中心、仪器设备中心相互共享各自的仪器设备。