

UNIVERSITY COLLEGE LONDON

Job Description

Job Title:	Research Associate in Physical Organic Chemistry
Department:	Institute for Materials Discovery / Department of Chemistry
Location:	UCL Bloomsbury Campus
Reports to	Tung Chun Lee
Grade:	7

Topics: Reaction mechanism, supramolecular chemistry, host-guest complexes, catalysis, mass spectrometry

The Project

This position is available to work in the fields of reaction mechanism, supramolecular chemistry and mass spectrometry. The project aims to explore anomalous chemical reactivity of organic molecules encapsulated within a nanoscale cavity (i.e. a “nanoreactor”, as found in zeolites, metal-organic frameworks and enzymes). For instance, it is known that the reaction rate of a specific pathway can be enhanced if the intermediate species are stabilised by interaction with the cavity wall. Nevertheless, the role of nano-cavities in catalytic mechanism is largely unexplored because it is difficult to isolate and study the highly unstable, short-lived reaction intermediates within the “inner phase”. Using a novel mass spectrometry approach,^[1] this project aims to reveal fundamental insights of how molecules react in a nanoreactor that can lead to more efficient chemical processes and beyond.

This position is funded by the Leverhulme Trust for 24 months initially. The successful candidate will join Dr Lee’s research group in the Institute for Materials Discovery and Department of Chemistry at the Bloomsbury Campus of University College London. Further information about the group can be found in the following link (<http://tungchunlee.weebly.com/>).

Relevant publications:

- [1] “Chemistry inside molecular containers in the gas phase”, *Nat. Chem.*, **2013**, *5*, 376–382.
- [2] “Transition-metal-promoted chemoselective photoreactions at the cucurbituril rim”, *Angew. Chem. Int. Ed.*, **2011**, *50*, 545–548.
- [3] “Cucurbiturils: from synthesis to high-affinity binding and catalysis”, *Chem. Soc. Rev.*, **2015**, *44*, 394–418.

Main Purpose

The post-holder will design and synthesise a series of reactive molecules using standard techniques of organic synthesis. The resultant molecules will be encapsulated into molecular containers via aqueous self-assembly to form host-guest complexes. Reactivity investigation of encapsulated molecules will be performed mainly by advanced mass spectrometry (MS), including collision-induced dissociation and ion-mobility MS, in collaboration with University of Jyväskylä. The post-holder will also analyse the measurement data and deduce reaction mechanisms. Experimental work on the project will be complemented by computational work performed by collaborators.

Duties and Responsibilities

- To contribute to the selection and design of a series of guest molecules that exhibit rich and interesting chemistry, in collaboration with computational chemists and other collaborators.
- To set up and maintain a Schlenk line system for organic and organometallic synthesis.
- To synthesise, purify and characterise the selected molecules and their host-guest complexes.
- To investigate chemical reactivity of encapsulated molecules by mass spectrometry and other means.
- To contribute to the data analysis and deduction of reaction mechanisms in collaboration with our team of experts from various background.
- To contribute to the organisation of and to participate in mutual visits between project collaborators.
- To contribute to the drafting and submitting of papers to peer reviewed journals.
- To prepare progress reports on research for funding bodies as required.
- To contribute to the preparation and drafting of research bids and proposals.
- To contribute to the overall activities of the research team and department.
- To undertake a limited amount of teaching in relation to subject area as required.
- To contribute to the induction and direction of other research staff and students as requested.
- Responsible for ensuring that equipment is safe and maintained in working order.
- The job description reflects the present requirements of the post, and as duties and responsibilities change/develop, the job description will be reviewed and be subject to amendment in consultation with the post-holder.
- The post-holder will carry out any other duties as are within the scope, spirit and purpose of the job as requested by the line manager.
- The post-holder will actively follow UCL policies including Equal Opportunities and be expected to give consideration within their role as to how they can actively advance equality of opportunity and good relations between people who share a relevant protected characteristic and people who do not share it.
- The post-holder will maintain an awareness and observation of Fire and Health & Safety Regulations.
- To be aware of and act upon:
 - Disciplinary procedure and Disciplinary rules
 - Grievance procedure
 - Section 7 and 8 of the Health and Safety at Work Act

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Institute for Materials Discovery / Department of Chemistry

Person Specification for the Post of Research Associate

Essential [E] and Desirable [D]

Knowledge – including Qualifications

Having obtained or being near to obtaining a PhD in Chemistry or a relevant subject area [E]

Knowledge in physical organic chemistry [E]

Knowledge in mass spectrometry [E]

GCSE English Grade C or above (or equivalent, e.g. IELTS) [E]

Skills

Proven research skills in organic synthesis and characterisation [E]

Proven research skills in chemical kinetics and reaction mechanism [E]

Proven research skills in mass spectrometry [E]

Proven research skills in supramolecular chemistry [D]

Ability to analyse and write up data [E]

Ability to present complex information effectively to a range of audiences [E]

Effective written and verbal communication skills in English [E]

Experience

Experience in organic synthesis and characterisation [E]

Experience in setting up a Schlenk line [D]

Experience in mass spectrometry [E]

Experience in single-crystal X-ray crystallography [D]

Experience in molecular modelling [D]

Experience in catalysis research [D]

Experience in working in a research environment [E]

Experience in performing interdisciplinary research [D]

Experience in supervising students [D]

Experience in training and teaching different audiences [D]

Personal Qualities

Commitment to high quality research [E]

Ability to work collaboratively and as part of a team [E]

Other

An appropriate number of publications in prestigious journals, patents, and conferences [E]

General Information

Terms & Conditions of Employment

The post is a UCL grade 7 post, the salary for which ranges from £34,056 to £41,163 per annum (including London Allowance of £2,980 p.a.). Starting salary is usually £34,056.

Please note, appointment at Grade 7 is dependent upon having been awarded a PhD; if this is not the case, initial appointment will be at Research Assistant Grade 6B (salary £29,809 to £31,432 per annum, including London Allowance of £2,980) with payment at Grade 7 being backdated to the date of final submission of the PhD thesis.

Progression through the salary scale is incremental. Cost of living pay awards are negotiated nationally and are normally effective from 1st August each year. UCL's non-clinical pay and grading structure is at http://www.ucl.ac.uk/hr/salary_scales/final_grades.php.

UCL's terms & conditions for research staff are at http://www.ucl.ac.uk/hr/salary_scales/Support_Research_tcs.php

The full range of benefits is at http://www.ucl.ac.uk/hr/benefits/employee_benefits.php

Equal Opportunities

UCL recognises that in our society, individuals and groups are discriminated against both directly and indirectly on the grounds of: age, colour, disability, ethnic origin, gender, HIV status, marital, social or economic status, nationality, race, religious beliefs, responsibility for dependants, sexual orientation, trades union membership or unrelated criminal convictions.

To counteract discrimination, UCL is committed to actively opposing all forms of discrimination, raising awareness and tackling the causes and consequences. It is committed to providing a learning and working environment in which the rights and dignity of all its members are respected and which is free from discrimination, prejudice, intimidation and all forms of harassment including bullying; to making staff and students feel valued, motivated and enabled to do their best work and to creating a safe, welcoming working environment accessible to all.

The Department has been awarded a Bronze Athena Swan Award and we support the Athena beliefs that:

- The advancement of science, engineering and technology (SET) is fundamental to quality of life across the globe.
- It is vitally important that women are adequately represented in what has traditionally been, and is still, a male-dominated area.
- Science cannot reach its full potential unless it can benefit from the talents of the whole population, and until women and men can benefit equally from the opportunities it affords.

Further information on Athena Swan is at <http://www.athenaswan.org.uk/>

TO APPLY

Apply online at: <http://www.ucl.ac.uk/hr/jobs/> Search under **Ref no: 1634019**

You will need to register to use the system if you have not used it before and are able to do this after you have found the vacancy and clicked on the '**Apply now**' button at the bottom of the online advert.

Thank you for your interest in this post and the Institute for Materials Discovery / Department of Chemistry at UCL.