Job Description

Research Fellow in Quantum Condensed Matter Systems

Ref: 1840852

Department: Electronic & Electrical Engineering

Reports to
Dr Sanjeev Kumar

Context
We wish to appoint a Research Fellow to work on the UKRI funded project titled, “Engineering Future Quantum Technologies in Low-Dimensional System”. The major objective of the project is to investigate new quantum phenomena in low-dimensional semiconductor nanostructures, and exploiting them for possible future quantum technologies. We are looking for an enthusiastic researcher to take a proactive role in performing research activities as outlined below.

The successful candidate will have an opportunity to develop expertise in a specialised field of experimental quantum condensed matter physics by discovering new phenomena and taking part in group activities towards delivering objectives of the project. The post holder will have full access to research infrastructure comprising state-of-the-art equipment in nanofabrication, ultra-low temperature cryostats and measurement electronics. In addition, the post holder will have access to a variety of training programmes for career development exclusively available to UCL staff.

Grade: 7 - £35,965 - £43,470 per annum inclusive of London Allowance

Location: London

Funding
The post is available from 1st January 2020 or as soon as possible thereafter for three years, in the first instance.

Major research activities of the job:
- The investigation of the influence of the electron interaction on electron transport in semiconductor nanostructures at ultra-low temperature and high magnetic field.
- Determine applicability of results to new schemes of quantum computation and technologies in which decoherence is largely eliminated.
- Prepare samples by advanced fabrication techniques in a cleanroom environment.

Duties and responsibilities:

The following is indicative of the duties and responsibilities associated with this post:
- Fabrication of high-quality semiconductor nanostructures in cleanroom.
- Low temperature quantum transport measurement using a dilution refrigerator with large magnetic field.
- Analysis of experimental results in light of existing theory and developing new theoretical modelling.
• Develop numerical algorithms and computer codes that can be used to simulate nanoscale devices, and ability to simulate potential profiles in semiconductor nanostructures.
• Taking a lead in liaising with manufacturers of cryofree dilution refrigerator and coordinating its installation and operation.
• Liaison with growth facilities and design of nanostructures.
• Collaborating with experimental and theoretical colleagues within the UCL and outside.
• Regularly communicate and work in close collaboration with the post supervisor and national and international collaborators.
• Reporting experimental results in consultation with line manager in national and international conferences; attending group meetings and preparing minutes as required.
• Reporting high quality, reproducible experimental data in leading scientific journals and conference proceedings.
• Taking proactive approach in supervising undergraduate, postgraduate and research students.
• Contribute to the preparation of reports and the presentation of results at progress meetings.
• Contribute to the overall activities of the research team and department as required.
• Ensure that equipment is safe and maintained in working order and to maintain an awareness of UCL Fire and Health and Safety regulations.
• Actively follow UCL policies including Equal Opportunities policies.

As duties and responsibilities change, the job description will be reviewed and amended in consultation with the postholder, and will carry out any other duties as are within the scope, spirit and purpose of the job as requested by the line manager or Head of Department/Division.

The post is to be held in the UCL Department of Electronic and Electrical Engineering.
Person Specification

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<tr>
<th>Criteria</th>
<th>Essential or Desirable</th>
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<tr>
<td><strong>Qualifications, experience and knowledge</strong></td>
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<tr>
<td>PhD degree (or about to submit) in Physics, Materials Science, Electrical Engineering or a related field.</td>
<td>Essential</td>
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<td>Proven track record of publications in leading scientific journals</td>
<td>Essential</td>
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<td>Experience of advanced semiconductor device fabrication in a cleanroom environment</td>
<td>Essential</td>
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<td>Experience of handling cryogenics and low-temperature high magnetic field equipment</td>
<td>Essential</td>
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<td>Understanding quantum effects in solids and semiconductors</td>
<td>Essential</td>
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<td>Demonstrated supervision experience of research students</td>
<td>Desirable</td>
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<td>Ability to simulate and model semiconductor nanostructures/heterostructures</td>
<td>Desirable</td>
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<td><strong>Skills and abilities</strong></td>
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<td>Skills in Low temperature, electrical transport measurement</td>
<td>Essential</td>
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<td>Skills in handling delicate samples</td>
<td>Desirable</td>
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<td>Ability to present technical information effectively to a range of audiences</td>
<td>Desirable</td>
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<td><strong>Personal attributes</strong></td>
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<td>Demonstrated ability to work in a team and independently</td>
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<td>Commitment to high quality research</td>
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<td>Ability to develop harmonious working relationships</td>
<td>Essential</td>
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If the successful candidate has not yet been awarded their PhD, appointment will be made as a Research Assistant (Grade 6B)*. Payment at Grade 7 will be backdated to the date of final submission of the PhD thesis including corrections, once the PhD has been awarded.

* Research Assistant (Grade 6B): point 24-26. Salary range £31,479 to £33,194 (inc. London Allowance of £3,148 pa).
About UCL and the Department of Electronic and Electrical Engineering

University College London (UCL) was founded in 1826 as the third university in England, after Oxford and Cambridge. UCL is the first university in England to admit students of any race, class or religion, and the first to welcome women on equal terms with men. UCL is organized into 11 constituent faculties, within which there are over 100 departments, institutes and research centres. UCL has 983 professors and more than 7000 academic staffs who are dedicated to research and teaching of the highest standards. Its student community is almost 36,000, the largest in the UK. There are 29 Nobel Prize winners and three Fields medalists amongst UCL’s alumni and current and former staff. UCL is the top rated university in the UK for research excellence (REF2014). It has a strong tradition and large knowledge base in medical research with a dedicated institute on Healthcare Engineering and 10+ hospitals. UCL has world-class support for researchers and has been voted the best place for postdoctoral researchers to work for consecutive years by The Scientist magazine. The main campus of UCL is located in central London, close to British Museum, West-End and Thames River.

The Department of Electronic and Electrical Engineering (EEE) at UCL was established by Professor Sir Ambrose Fleming, inventor of the thermionic valve and hence the founder of the discipline of electronics, in 1885 as the first department of electrical technology in England. That same pioneering tradition of innovation and excellence continues to underpin our work. We push in new directions across research, education and entrepreneurship, building on our long-established links with industry and benefitting from our loyal and supportive alumni community. We are committed to develop individuals and careers, across staff and students, developing and supporting our subject discipline.

Further information regarding UCL may be found at:  
www.ucl.ac.uk/

Information about the departments may be found at:  
www.ucl.ac.uk/eee

How to Apply

Interested applicants are encouraged to make Informal enquiries about the post to Dr Sanjeev Kumar.

+ 44 (0)20 7679 7758 | sanjeev.kumar@ucl.ac.uk

All applications should be submitted via UCL online recruitment system at the following link:  
http://www.ucl.ac.uk/hr/jobs/

Job Reference: 1840852

If you have any queries regarding the application process please contact Vicky Coombes at v.coombes@ucl.ac.uk quoting reference 1840852

UCL Taking Action for Equality.