

Research Associate in Experimental Photonics

Job Ref: REQ240218

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

The Emergent Photonics Research Centre is a 500m² university research facility completely dedicated to complexity in Photonics within the domains of Ultrafast Photonics, Optical Combs and Terahertz technology. The Centre hosts a multi-million portfolio of facilities and running research grants from several funders including the European ERC, EPSRC, DSTL, Innovate-UK, The Leverhulme Trust, US ARMY. These include several early career Fellowships and PhD studentships.

The Physics Department at Loughborough University has a vibrant community of scholars who are committed in supporting each other to deliver outstanding research. It hosts a very significant theoretical expertise in covering the foundation of complexity and nonlinear dynamics in several disciplines, with a high international profile and staff members collaborate with the top physicists in the world.

Loughborough University holds the Athena SWAN Bronze award, recognizing its commitment to improving the representation and career progression of women in STEM (science, technology, engineering and mathematics) subjects. The Department of Physics is committed to creating a diverse and inclusive culture in which staff and students are able to thrive, regardless gender, religious and philosophical beliefs

Project Description

AMPERE (Active Metaspintronics) is an ambitious research initiative designed to pioneer advancements in the field of spintronics, interfacing with ultrafast photonics to explore and harness spin phenomena at unprecedented temporal scales. Funded by the United States ARMY and building upon the successful groundwork laid by the EU-ERC Project TIMING, AMPERE aims to advance our understanding and control of magnetic materials through light-induced and terahertz-induced spin manipulations. This project promises to break new ground in data storage, information processing, and energy efficiency, contributing to faster, more efficient, and powerful electronic devices for the future.

Central to our project is the synergy between the Nonlinear Ghost Imaging technique with spintronics, terahertz (THz) photonics, and metasurfaces. Nonlinear Ghost Imaging, a concept refined in the TIMING project, provides a unique framework for capturing complex optical information with high temporal resolution. By applying this technique within the context of spintronics, we aim to achieve precise control and observation of ultrafast spintronic effects that are coupled with terahertz radiation.

The successful implementation of AMPERE will not only advance our fundamental understanding of spintronics and THz photonics but will also pave the way for the development of new materials and devices. These advancements promise significant impacts across various sectors, including quantum computing and ultrafast electronics, marking a transformative step in the technological landscape. Through AMPERE, we are set to explore the uncharted territories of research and technological innovation, bridging the gap between nonlinear optics, spintronics, and terahertz science in a manner that has never been conceived before.

The successful applicant will be based in the Department of Physics and in the Emergent Photonics Research Centre at Loughborough University. They will work with Prof Marco Peccianti and be part of a larger group of Loughborough researchers based in Physics, Chemistry and Computer Science who are active in the fields of Photonics.

We are looking for a postdoctoral Research Associate in experimental Photonics to start on the <*****> or soon after.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in the area of Terahertz Imaging and Ultrafast Photonics and to be responsible for the theoretical and experimental development of terahertz imaging experimental setups. To investigate theoretically and experimentally the physical framework of complex propagation of broadband terahertz pulses in the time-domain. To lead independently a small research team that may include PhD, graduate and undergraduate students. To undertake primary data collection, to analyse data in the physical framework of ultrafast broadband terahertz probaton. To lead the dissemination of the specific research activity in major research journals and dissemination outlets.

Job Duties [suggested wording to include a breakdown of at least 3 project specific requirements of the role]

- To investigate theoretical models related to broadband Terahertz pulse interaction with spintronics emitters.*
 - To design and develop experimental demonstrators based on Ultrafast Photonics and related methodologies.*
 - To apply specialist knowledge in the planning of next project phases, including direct contribution to new grant bids.*
 - To advise and co-supervise PhD students on the specific subject field.*
 - To manage, collate and evaluate data obtained from simulations and experiments in form of specialist reports suitable for publication in peer-reviewed scientific journals*
 - To organise and advise on applications relevant to securing partnerships and research funds*
 - To lead cross-pollination and networking activities with other research running at the Emergent Photonics Research Centre.*
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- To be responsible for conducting the day-to-day running of the project.*
 - To formulate detailed plans for the project based on broad guidance from the project team.*
 - To feedback to the project team on progress, to make recommendations for next steps.*
 - Write up regular progress reports and present outcomes to all Investigators and Collaborators.*
 - Travel to attend meetings and make presentations both within the project partners working group and to external stakeholders.*
 - To write research papers suitable for publication in high quality academic journals.*
 - To attend and contribute to conferences.*
 - To assist the academic staff in the project team with the supervision of undergraduate MSc and PhD project work and day-to-day supervision and support of other researchers.*
 - Where appropriate, to deliver teaching, tutorial and laboratory sessions to students.*
 - Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.*

- *Undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.*

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to Prof Marco Peccianti

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

- 1 – Application
- 2 – Test/Assessment Centre/Presentation
- 3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	<i>Background in Ultrafast Photonics</i>	1,2
	<i>Background in Electromagnetic Scattering</i>	1,2
	<i>Project specific experience</i>	1,3
	<i>Authoring original work for academic journal papers, conference papers or technical reports</i>	1
	<i>Understanding of Project Specific Physical Challenges</i>	3
Skills and abilities		
	<i>Project specific skills</i>	1
	<i>Good written and oral communication skills, including writing peer-reviewed research publications</i>	1,2
	<i>Self-motivated with ability to meet deadlines</i>	3
	<i>Good interpersonal, and organisational skills</i>	3
	<i>Working knowledge of Matlab</i>	1,3
	<i>Ability to write project reports and make technical presentations to industrial and academic research groups</i>	1,2
	<i>Knowledge of relevant Health & Safety issues</i>	2,3
Training	<i>Demonstrate evidence of having undertaken further training</i>	3
Qualifications	<i>PhD (or near completion)</i>	1
Other	<i>Commitment to observing the University's Equal Opportunities policy at all times.</i>	3

Desirable Criteria

Area	Criteria	Stage
Experience	<i>Track record in Terahertz</i>	1,3
	<i>Track record in Terahertz Imaging</i>	1,3
	<i>Developing proposals for funding from external agencies</i>	1,3
	<i>Working in a high quality academic research environment</i>	1
	<i>Experience of teaching and / or supervision of students in relevant areas</i>	1,3
	<i>A strong publication track record</i>	1
Other	<i>Able to travel Independently.</i>	3

	<i>Ability to manage independently working patterns following project needs</i>	3
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Conditions of Service

The position is Full Time and Fixed Term for 21 months with possible extension of 2 years. Salary will be on Grade 6, £33,966 – £44,263 per annum, at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's Terms and Conditions of Employment for grades 6 details of which can be found [here](#).

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which can be found [here](#).

The University offers a wide range of employee benefits which can be found [here](#).

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: <http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html>)

In addition, the University is supportive, wherever possible, of flexible working arrangements. We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see <http://www.lboro.ac.uk/services/hr/athena-swan/>

Applications

The closing date for receipt of applications is **3rd April 2024**