School of Science

Loughborough University

Research Associate in Experimental Photonics

Job Ref: REQ230543

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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 500m^2 university research facility completely dedicated to complexity in Photonics within the domains of Ultrafast Photonics, Optical Frequency Combs in Microresonators, Artificial Intelligence for Photonics 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. 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

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Project Description

Applications are invited for a Postdoctoral Research Fellow in Experimental Photonics at the Emergent Photonics Centre in the Department of Physics at Loughborough University. The duration of the position is originally for 1 year with the possibility of an extension for a further 2 to 4 years based on research requirements. **The position is part of the EPSRC Programme grant, Chip-scale Atomic Systems for a Quantum Navigator** (for a value of about £10,000,000). This collaborative project involves the University of Glasgow, University of Strathclyde, University of Birmingham and Loughborough University. It envisions to pioneer a mobile phone sized quantum navigator by combining chip-scale quantum clocks, accelerometers and rotation sensors (gyroscopes) that can be manufactured on silicon chips to be used for position, navigation and timing without reliance on signals from satellites. This project aims to take photonic integrated circuit and MEMS technologies to develop chip-scale atomic clocks, quantum rotation sensors / gyroscopes and quantum accelerometers to build much smaller and more practical quantum navigators that will have many applications and benefits to UK and global society.

The specific aim of this post involves the development of novel approaches towards the realisation of compact optical frequency combs in microresonators. Key to the project success are elements directly inherited from nonlinear photonics, fibre photonics, mode-locked lasers and optical frequency combs. This project transversely intersects the kernel of our research interests. The outcomes will have a key impact in several domains, from quantum technologies to environmental sensing, metrology, manufacturing, and others.

The successful applicant should have a PhD in a field related to our research areas, nonlinear photonics, ultrafast photonics, nonlinear wave propagation, and background preferably intersecting soliton and optical complexity with a good publication record. Previous experimental experience with photonic benches implementation would be desirable, along with basic knowledge of ultrafast laser operation and a history of international involvement and aggressive publication strategy. Evidence of potential leadership, independence and a strong motivation are also

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essential. Some of the typical tasks for this position include the operation of ultrafast lasers and optical frequency combs, the design of optical benches, the acquisition of data using fast electronics and their analysis.

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 Alessia Pasquazi, in direct collaboration with researchers involved in the ERC funded project TELSCOMBE-Temporal Laser Cavity-Solitons for Microcombs (for a value of about £1,200,000) and Innovate UK funded project, CIFS - Calcium Ion Frequency Standard. They will 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 01/07/2023 or soon after.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in the area of microcombs and nonlinear photonics and to be responsible for the theoretical and experimental development of compact, microresonator-based frequency combs. To investigate theoretically and experimentally the physical framework of broadband optical states, like solitons in microcombs. To lead independently a small research team that may include PhD, graduate and undergraduate students. To undertake primary data collection and analyse data, develop theoretical modelling and design integrated photonics chip. To lead the dissemination of the specific research activity in major research journals and dissemination outlets.

Job Duties

- To investigate theoretical models related to microcomb research
- To design and develop experimental demonstrators based on nonlinear photonics and related methodologies for microcomb research.
- 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 the 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.
- 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.

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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 Alessia Pasquazi

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

Desirable Criteria

Area	Criteria	Stage
Experience	Track record in photonics	1,3
	Track record in nonlinear optics	1,3
	Developing proposals for funding from external agencies	1,3
	Working in a high quality academic research environment	1
	Experience of teaching and / or supervision of students in relevant areas	1,3
	A strong publication track record	1
Other	Able to travel Independently.	3
	Ability to manage independently working patterns following project needs	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 **21 August 2023**

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