Research Associate in Algebra and Geometry
Exotic Representation Theory
Job Ref: REQ240418

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

Project Description

Loughborough University is seeking to appoint a Postdoctoral Research Associate in the areas of Algebra and Geometry to conduct research under the direction of Dr Jason Semeraro on an EPSRC funded project "Exotic Representation Theory". The aim of the project is understand how recent state-of-the-art advances in homotopy theory (related to fixed points of classifying spaces) can be applied to study the local-global conjectures of modular representation theory.

The project will last for up to 22 months and will be carried out jointly by the RA and Dr Jason Semeraro as the Supervisor / Principal Investigator (PI).

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose
To conduct research in algebra and geometry; in particular generalisation of Deligne—Lusztig theory to the setting of spetses by applying methods from homotopy theory. To develop new techniques to tackle local-global conjectures in modular representation theory using fusion systems. To investigate the relationship between Hecke algebras and blocks of unipotent groups.

Job Duties
- To become familiar with relevant literature on Deligne—Lusztig theory and spetses.
- To learn and apply relevant homotopy-theoretic techniques such as constructing classifying spaces, decomposing spaces as homotopy colimits and taking fixed points under unstable Adams operators.
- To develop new techniques to prove local-global counting conjectures (relating local and global information concentrated at a prime).
- To apply methods from fusion systems to extract local information about compact Lie and p-compact groups.
- To write research papers suitable for publication in high quality academic journals.
- To disseminate results of the project at both national and international conferences.
- To support the PI by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
- To undertake tasks assigned by the PI.
- To participate in activities within the Loughborough Geometry and Mathematical Physics group, including regular research seminars.

- There will be an opportunity to do a small amount of teaching in the Department of Mathematical Sciences, if desired.
- To 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 the Principal Investigator, Dr Jason Semeraro

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 algebra and/or algebraic topology	1,2,3
	Experience of preparing and/or publishing original work as academic journal papers and/or conference papers	1
Skills and abilities	Research in representation theory and/or homotopy theory and/or group theory and/or fusion systems	1,2
	Excellent written and oral communication skills	1,2,3
	Self-motivated with ability to meet deadlines	3
	Excellent interpersonal, and organisational skills	1,3
	Ability to work as part of a team and collaborate with others	1,3
Training	Willingness to undertake further training as required	3
Qualifications	PhD (or near completion) in mathematics	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Familiarity with the local-global conjectures in modular representation theory and the application of Deligne—Lusztig theory to these problems	1,2,3
	Acquaintance with homotopy theory, p-local analysis, Hecke algebras and/or the theory of fusion systems	1,2,3
	Knowledge of methods to reduce problems of representation theory to the case of simple groups	1,2,3
	Working in a high-quality academic research environment	1,3
Skills and abilities	Authoring original work, in the highest quality refereed academic journals	1,2,3
	A strong publication track record	1
	Ability and willingness to teach at an undergraduate level	1,3
Qualifications	Prior postdoctoral experience	1

Conditions of Service

The position is FULL TIME and FIXED TERM until 31 March 2026. Salary will be on Specialist and Supporting Academic 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 and above 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/