



PDRA IN ALGORITHMS AND HARDNESS FOR TARSKI AND BANACH FIXED POINT PROBLEMS

Grade and salary: Grade 7, £39,906 – £46,049 pa

Working hours: Full time

Tenure: Fixed term for 3 years, from 1st of January 2027

Location: Hybrid working, Liverpool campus

Faculty: Faculty of Science and Engineering

Recruiting department contact: Email: john.fearnley@liverpool.ac.uk

Job ref: 118294

The Role

Role overview and University context:

This role is a three-year postdoctoral position funded by the EPSRC project Algorithms and Hardness for Tarski and Banach Fixed Point Problems.

The project will be led by John Fearnley (<https://cgi.csc.liv.ac.uk/~john/>) and Rahul Savani (<http://www.csc.liv.ac.uk/~rahul>) and will run for three years starting from the 1st of January 2027.

The project will explore the computational complexity of the Tarski problem (finding a fixed point of a monotone function) and the Banach problem (finding a fixed point of a contraction map).

- The project aims to build new faster algorithms for solving these two problems, as well as the related monotone contraction problem.
- It also aims to show lower bounds for the problems, including query complexity lower bounds, as well as computational complexity lower bounds with a particular focus on the complexity class UEOPL.

Informal enquiries are welcome, and should be directed to john.fearnley@liverpool.ac.uk.

Key responsibilities:

You will carry out research on the project in collaboration with the project leads. This will include:

- Staying up to date with the latest publications in the area
- Generating new research ideas
- Writing up results for publication
- Traveling to conferences and workshops to present our research

In addition to the above, all University of Liverpool staff are required to:

- Adhere to all University policies and procedures, completing all obligatory training and induction modules, including Equality & Diversity and Health & Safety.
- Support the University's vision to drive forward environmental and social equity through delivery of our [Sustainability Strategy](#) and associated action plans.
- Demonstrate customer service excellence and continuous improvement in engaging with all stakeholders.
- Respect confidentiality: all confidential information should be kept in confidence and not released to unauthorised persons.
- Participate in the University's Professional Development Review scheme and take a proactive approach to own professional development.
- Embody and uphold the University's Vision and Values.
- Demonstrate flexibility in on-campus-presence to enable participation in business-critical activities, including reasonable participation in such things as: open days, invigilation, welcome week activities, confirmation and clearing and financial year-end activities.

About you

Experience

Essential

1. A strong research background, as evidenced by publications or manuscripts under submission, in Theoretical Computer Science or a related area.

Desirable

1. Publications at strong TCS conferences or journals.
2. Prior experience of presenting work at international workshops and conferences.

Education, qualifications and training

Essential

1. A completed, or close to completed, PhD in Computer Science or a related area.

Skills, general and specialist Knowledge

Essential

1. A background in Theoretical Computer Science.
2. Good writing and presentational skills.

Desirable

1. Good background knowledge of the techniques used in computational complexity.
2. Prior work on the complexity of total search problems.

Personal attributes

Essential

1. Excellent interpersonal and communication skills.
2. Ability to work independently, and organise own workload.

Desirable

1. Experience of participating in collaborative research projects.

About us

Established in 1881, we are an internationally renowned Russell Group university recognised for our high-quality teaching and research. We are consistently ranked as one of the best universities both nationally and globally, and the majority of our research is rated world leading or internationally excellent. [Find out more about us.](#)

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As a global institute, we welcome applicants from all nationalities, moving from a different country can be challenging and we would like to help as much as we can, we have put together some information on eligibility to work documentation, accommodation, schools, healthcare, life in Liverpool and the UK as well as other practical information. Discover more about [moving from abroad.](#)

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Whether it be their friendly colleagues, supportive managers or our outstanding facilities, our staff can explain better than anyone what it is like to work for us and why they enjoy their role. See what our [colleagues have to say.](#)

How to Apply

Application process

Our e-recruitment system enables you to register for an online account, where you can view, copy and edit your applications. Set up your account on our [Vacancies Portal.](#)

Once you submit your application you will receive an automatic email acknowledgment. You can view your application at any time by clicking into the application history section of your account.

The recruiting department will endeavour to respond to each application. However, if you have not heard within six weeks of the closing date, please take it that your application has not been successful on this occasion.

Job description

After the closing date this job description will be removed from our website. Should you wish to refer to this information at a later date please ensure you save a copy of this document.

Right to work

We have a legal responsibility to ensure that you have the right to work in the UK before you can start working for us. If you do not have the right to work in the UK already, any offer of employment will be conditional upon you gaining it. If the role is based outside the UK, you will need to demonstrate your right to work for the country in which you are to be based.

Disabilities and alternative formats

If you have any other requirements which will help you access the application or interview process or employment opportunities at the University, or if you require copies documentation in alternative formats, please email: jobs@liverpool.ac.uk or telephone 0151 794 6771.

