



UNIVERSITY OF LEEDS

CANDIDATE BRIEF

**Research Fellow in Liquid-Liquid Extraction of Metals,
Faculty of Engineering and Physical Sciences**



Salary: Grade 7 (£41,064 – £48,822 p.a.) Due to funding restrictions, an appointment will not be made higher than £43,482 p.a.

Reporting to: Professor Nik Kapur

Closing date: Sunday 13 September 2026

Reference: EPSME1219

Fixed Term (for up to 31 months, with the possibility of an extension - to complete specific time limited work)

Location: Leeds main campus

We are open to discussing flexible working arrangements

Research Fellow in Liquid-Liquid Extractions of Metals, School of Mechanical Engineering.

Do you have a strong technical background in flow chemistry and a proven record in the development of complex hardware systems? Are you interested in working in partnership with industrial partners to develop extraction methods for dilute metals within aqueous streams?

Overview of the Role

A robust supply of rare earth metals is vital for a range of applications, from nuclear energy to medicine, battery manufacturing to catalysis. Yet such metals have high production costs because they are low in abundance (requiring high volumes of ore to be mined, often in regions of political instability) and typically come with extensive purification requirements. Thus, the supply of such materials is accompanied by extreme risk.

The TOMoRROW project (Targeted Optimisation for Intensified Metal Recovery from Wastes) explores the recovery of metals from complex mixed metal waste streams, including those that result from nuclear energy production, decommissioning and waste management activities. Some of these waste streams are unique to the UK and have resulted in considerable stockpiles of rare metals including (for example) protactinium and actinium. These are of particular interest to the nuclear medical industry as a source of radioisotopes for new techniques for treating cancer with minimal side effects and excellent outcomes.

This project examines the recovery of rare earth metals, uses a coalescence separator to provide high separation efficiencies on mixed liquid-liquid systems. It utilises readily available non-woven fabrics and has already demonstrated efficiencies in separating complex aqueous-solvent systems which are otherwise stable over many hours and do not readily separate using other approaches. The project is in close collaboration with our industrial partners. This specific project addresses the design of the coalescing system (including remote operation) and quantification of system performance. In addition, you will work with a second Research Fellow optimising the chemical used within the process.



Main duties and responsibilities

- Developing automated hardware to robustly control the operation of coalescence separators, allowing them to be cascaded together easily. This will involve the design of custom equipment where required, and integration of OEM parts;
- Developing robust testing strategies for the demonstration of cascaded separators under remote conditions;
- Characterising the performance of separators using a range of test systems identified from within the literature and identifying operability windows to establish go, no-go operating conditions;
- Collecting appropriate data to define performance and to map this onto sustainability metrics;
- Carefully documenting the methods and results obtained;
- Independently writing reports and delivering presentations to key stakeholders and actively working to translate knowledge;
- Working within and applying the standard operating procedures, health and safety regulations and quality assurance procedures of the School, Faculty and University;
- Providing support with training on the use of specialist equipment, where appropriate;
- Generating and pursuing independent and original research ideas in the appropriate subject area;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team including preparing proposals for funding in collaboration with colleagues;
- Evaluating methods and techniques used and results obtained by other researchers, and to relate such evaluations appropriately to your own work;
- Making a significant contribution to the dissemination of research results by publication in leading peer-reviewed journals and by presentation at national and international meetings;
- Working independently and as part of a larger team of researchers, both internally and externally, to develop new research links and collaborations and engage in knowledge transfer activities where appropriate;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;



- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

Qualifications and skills

Essential

- A PhD (or have submitted your thesis before taking up the role) in Chemistry, Chemical Engineering, Mechanical Engineering or a closely related discipline, with experience in the design, operation and analysis of experimental flow systems for chemical or process engineering applications;
- Strong skills in the design, integration and testing of sensing, control and physical hardware systems for flow-based process equipment;
- Demonstrable experience in developing software for flow-based systems, including hardware control, data acquisition and process monitoring;
- Strong experience in conducting chemical transformations in flow systems and optimising process performance through data-informed system redesign;
- Demonstrable experience in the automated processing, analysis and interpretation of experimental and process data;
- Experience of working with industry and translating findings into an industrial context;
- Good time management and planning skills, with the ability to meet tight deadlines and manage competing demands effectively without close support;
- A developing publication profile, evidenced by peer-reviewed publications and/or high-quality unpublished research with a clear plan for submission to international journals;
- Excellent communication skills both written and verbal, and the ability to communicate your research at national and international conferences;
- A proven ability to work well both independently and in a team;
- A strong commitment to your own continuous professional development.



Desirable

- Experience of pursuing external funding to support research;
- Experience of process automation and remote operation of laboratory or pilot-scale equipment;
- Experience in liquid-liquid separation, coalescence technology or multiphase flow systems.

How to apply

You can apply for this role online; more guidance can be found on our [information page](#). Applications should be submitted by **23:59** (UK time) on the advertised [closing date](#).

Contact information

To explore the post further or for any queries you may have, please contact:

[Prof Nikil Kapur](#), Professor in Applied Fluid Mechanics

Tel: +44 (0)113 343 2152

Email: N.Kapur@leeds.ac.uk

Additional information

Faculty and School Information

Further information is available on the research and teaching activities of the [Faculty of Engineering & Physical Sciences](#), and the [School of Mechanical Engineering](#).

Working at Leeds

We are a campus-based community and regular interaction with campus is an expectation of all roles in line with academic and service needs and the requirements of the role. We are also open to discussing flexible working arrangements. To find out more about the benefits of working at the University and what it is like to live and work in the Leeds area visit our [Working at Leeds](#) information page.



A diverse workforce

As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Engineering and Physical Sciences we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

The Faculty of Engineering and Physical Sciences are proud to have been awarded the Athena Swan Silver Award from [AdvanceHE](#). The [Athena Swan Charter](#) is a framework which is used across the globe to support and transform gender equality within higher education and research. Our [equality and inclusion webpage](#) provides more information.

Information for disabled candidates

Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found under the 'Accessibility' heading on our [How to Apply](#) information page or by getting in touch by emailing HR via hr@leeds.ac.uk.

Criminal Record Information

Rehabilitation of Offenders Act 1974

A criminal record check is not required for this position. However, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our [Criminal Records](#) information page.

Salary Requirements of the Skilled Worker Visa Route

Please note that this post may be suitable for sponsorship under the Skilled Worker visa route but first-time applicants might need to qualify for salary concessions. For more information, please visit [the Government's Skilled Worker visa page](#).



For research and academic posts, we will consider eligibility under the Global Talent visa. For more information, please visit [the Government's page, Apply for the Global Talent visa.](#)

