UNIVERSITY OF LEEDS

# CANDIDATE BRIEF

## Research Fellow in Automation and Flow Reactor Engineering, Faculty of Engineering and Physical Sciences

**Salary: Grade 7 (£39,355 – £46,735 p.a.)**

**Reference: EPSCH1121**

**Location: Leeds main campus**

**Closing date: Sunday 08 June 2025**

**Fixed-term for 36 months**

**We are open to discussing flexible working arrangements**

# Research Fellow in Automation and Flow Reactor Engineering,
# Institute of Process Research and Development (iPRD), School of Chemistry.

**Are you an experienced and ambitious researcher looking for your next challenge? Do you want to further your career in one of the UK's leading research-intensive Universities? Are you looking to apply your skills in automation and reactor engineering to the development of new microwave flow platforms for use in materials chemistry?**

Metal-organic frameworks (MOFs) have attracted extensive interest from academia and industry owing to their unprecedented porosity and structural and functional diversity. Application of MOFs in catalysis (*e.g.* $CO_2$ valorisation) and healthcare (*e.g.* biomarker detection/drug delivery) offer huge potential for addressing key global challenges in energy, mitigation of pollution, and disease diagnostics and treatment.

However, current methods for discovering and optimising MOFs rely on trial-and-error, are poorly reproducible and scale-up takes many years/is not possible as conditions optimised in batch are not readily translatable to scaled up processing.

This project, funded through a UKRI Future Leaders Fellowship, will develop (i) AI-guided self-optimising flow microwave reactor platforms equipped with real-time analyses and (ii) deliver new fundamental understanding of crystallisation processes for MOFs. This will accelerate the development of MOFs for targeted applications without wasting time, energy, or chemical resources and overcome considerable issues with reproducibility thus unlocking their commercial exploitation.

We are seeking a Research Fellow to develop automated flow microwave reactor platforms for reaction screening and process optimisation of metal-organic frameworks (MOFs). You will integrate flow and microwave technologies with inline and online analyses to enable rapid collection of process relevant data. This will require development and integration of machine learning protocols for reaction optimisation and mapping chemical reaction space. You will work alongside other members of the team at the University of Leeds in the Institute for Process Research and Development (iPRD) & School of Chemistry to establish these capabilities and apply technologies developed towards MOF production. You will also work with

collaborators Diamond Light Source and Mettler Toledo and researchers based at the Flow-XI facility in Leeds. As this role is funded by Dr Andrea Laybourn's UKRI Future Leaders Fellowship, you will be provided with opportunities for travel to partner universities and there is financial support to attend national and international conferences and development training.

You will have a PhD in Chemical Engineering, Chemistry or a related discipline with experience in reactor automation and flow technology, together with a demonstrable record of the ability to design new technologies and generate process understanding. While experience of MOF chemistry and/or programming and/or microwave technologies would be advantageous, they are not a pre-requisite for the role. This post would be ideal for an ambitious and innovative researcher who is driven, enjoys working in a diverse and interdisciplinary team, is excited to learn new skills, and is keen to support setting up the laboratory facilities and share knowledge, and eager to train others in the group.

## What does the role entail?

As a Research Fellow, your main duties will include:

- Designing, building, and operating automated flow microwave platforms equipped with in- and on-line analyses;
- Developing and integrating machine learning protocols for reaction optimisation and mapping chemical reaction space with application in metal-organic framework production;
- Actively engaging with collaborators including spending time at collaborator facilities at appropriate times in the project;
- 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 research;
- 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.

## What will you bring to the role?

As a Research Fellow, you will have:

- A PhD (or have submitted your thesis before taking up the role) in Chemical Engineering, Chemistry, or a closely allied discipline;
- A strong background in reactor automation and flow technology, including risk assessment of such equipment;
- Experience in analytical techniques for characterisation and quantification;
- Good time management and planning skills, with the ability to meet tight deadlines and manage competing demands effectively without close support;
- A developing track record of peer-reviewed publications in leading 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.

You may also have:

- Experience in writing and/or editing computer programs in Python or MATLAB and an understanding of hardware communication protocols;
- Experience in synthetic metal-organic framework chemistry;
- Experience in microwave technologies;
- Experience of pursuing external funding to support research.

## How to apply

You can apply for this role online; more guidance can be found on our How to Apply 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:

**Dr Andrea Laybourn, UKRI Future Leaders Fellow and Associate Professor**
Email: A.Laybourn@leeds.ac.uk

OR

**Prof. Richard Bourne, Professor of Digital Manufacturing**
Email: R.A.Bourne@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 Chemistry.

**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 the Equality Challenge Unit, the national body that promotes equality in the higher education sector. 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.