



UNIVERSITY OF LEEDS

CANDIDATE BRIEF

Research Fellow in Digital Reaction Engineering,
Faculty of Engineering and Physical Sciences



Salary: Grade 7 (£37,099 – £44,263 p.a.)

Reference: EPSPE1109

Location: Leeds campus

Closing date: Sunday 14 July 2024

Fixed-term for 3 years

We are open to discussing flexible working arrangements

Research Fellow in Digital Reaction Engineering, Institute of Process Research and Development (iPRD), Schools of Chemical and Process Engineering & 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 reaction engineering to the development of new automated reactor platforms for reaction screening and process optimisation?

Development of synthesis and optimisation of reactions remain rate-limiting factors in pharmaceutical process development, often relying on resource-intensive trial-and-error approaches that are costly, time-consuming, and wasteful. This highlights the need to develop new digital methods that are capable of rapidly responding to emerging health challenges.

In this EPSRC funded project, we will combine expertise across the Universities of Leeds (Dr Adam Clayton, Prof. Richard Bourne), Liverpool (Prof. Anna Slater) and Cambridge (Prof. Alexei Lapkin) to create a network of digitally coupled reactors, capable of high-throughput screening and self-optimising manufacturing processes. This will be achieved by combining different flow reactor technologies, analytical techniques, and automated workflows to provide enhanced mapping of chemical space and generation of robust high-quality datasets.

Modular experimental platforms will be designed, capable of efficiently exploring complex mixed variable design spaces on the microlitre scale. Our multisite reactor network will be driven by next generation machine learning algorithms, which will use knowledge from prior experimental campaigns to increase library synthesis success rates and accelerate the development and optimisation of chemically related processes. In collaboration with our partners in the pharmaceutical industry, we will leverage this novel workflow to accelerate lower cost and more sustainable manufacturing of future medicines.

At Leeds, we are seeking a Research Fellow in Digital Reaction Engineering to develop automated flow platforms for reaction screening and process optimisation. You will integrate liquid handling robotics, continuous flow technology and inline analytical techniques to enable rapid collection of process relevant data. This will



require integration of machine learning algorithms for reaction optimisation and mapping of the design space. You will work alongside other members of the team to add these capabilities to a multisite reactor network and apply this technology towards pharmaceutically relevant case studies.

What does the role entail?

As a Research Fellow, your main duties will include:

- Contributing to the development of the project, working alongside the academic team by developing and testing new flow reactor technologies;
- To design, build and operate automated flow reactor platforms, including integration of liquid handling robotics, inline analysis and machine learning algorithms, and apply them to a range of case studies;
- 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;
- 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;
- Actively engaging with placements at industrial partners at appropriate times in the project;
- 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;
- Evaluating methods and techniques used and results obtained by other researchers and to relate such evaluations appropriately to your own research;
- 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 Chemistry, Chemical Engineering or a related field;
- A strong background in organic synthetic chemistry and analytical techniques for characterisation and quantification;
- Experience in flow chemistry and/or autonomous experimentation including risk assessment of this equipment;
- Excellent interpersonal skills to enable effective communication with industrial collaborators with complementary expertise;
- Demonstrable ability in independent planning of medium-term objectives, effective methods for delivering those objectives, and ability to contribute to planning of longer-term objectives within a team environment;
- 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 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 individually and in a team;
- A strong commitment to your own continuous professional development.

You may also have:

- Experience in chemical and/or biocatalysis in flow;
- Experience of applying machine learning algorithms for reaction optimisation;
- The ability to write computer programs in Python or MATLAB and an understanding of hardware communication protocols;
- 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 Adam Clayton](#), Lecturer in Sustainable and Digital Chemistry

Email: A.D.Clayton@leeds.ac.uk

[Prof. Richard Bourne](#), Professor of Digital Manufacturing

Email: R.A.Bourne@leeds.ac.uk

Additional information

Please note: If you are not a British or Irish citizen, you will require permission to work in the UK. This will normally be in the form of a visa but, if you are an EEA/Swiss citizen and resident in the UK before 31 December 2020, this may be your passport or status under the EU Settlement Scheme.

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 Chemical and Process Engineering](#) and the [School of Chemistry](#).

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.



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.

Information for disabled candidates

Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found on our [Accessibility](#) information page or by getting in touch with us at 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.

