

## Research Role Profile

<b>Job Title:</b>	Research Fellow (1A)
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<b>Responsible to:</b>	Head of research group, or principal investigator
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<b>Responsible for:</b>	Not applicable
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<b>Job Summary and Purpose:</b>
To undertake research in accordance with the specified research project(s) under the supervision of the principal investigator.

<b>Main Responsibilities/Activities</b>
<p>To undertake a range of research activities within a specified research area, assuming responsibility for specific areas of projects and making use of new research techniques and methods, in consultation with the research award holder or supervisor. This may include fieldwork, interviews, laboratory experimentation, critical evaluation and interpretation, computer-based data analysis and evaluation or library research.</p> <p>Using initiative and creativity to identify areas for research develop new research methods and extend the research portfolio. Analysing and interpreting results of own research. Write up results and prepare papers for submission to appropriate journals and conferences, and other outputs as required and/or appropriate. Attend appropriate conferences for the purpose of disseminating research results of personal development. The post holder may also contribute to writing bids for research grants and will contribute to collaborative decision making with colleagues in areas of research.</p> <p>Continually to update knowledge and develop skills, and translate knowledge of advances in the area into research activity.</p> <p>To plan and manage own research activity in collaboration with others. To carry out administrative tasks associated with specified research funding, for example risk assessment of research activities, organisation of project meetings and documentation. Implementation of procedures required to ensure accurate and timely formal reporting and financial control.</p> <p>To contribute to teaching in the Faculty by carrying out student supervision and/or demonstrating within the post holder's area of expertise and under the direct guidance of a member of departmental academic staff, as appropriate.</p> <p>The post holder may occasionally be required to supervise more junior research staff.</p>

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### Person Specification

#### The post holder must have:

A doctoral degree in a relevant discipline (although individuals who have almost completed a doctoral degree may be appointed). Consideration may also be given to individuals who do not hold a doctoral degree but have required skills based on a number of years experience in specified / relevant fields.

The post holder will have authority over some aspects of project work and must be capable of providing academic judgement, offering original and creative thoughts and be able to interpret and analyse results.

### Relationships and Contacts

Direct responsibility to the principal investigator or academic supervisor. The post holder may be asked to serve on a relevant Faculty committee. There may be additional reporting and liaison responsibilities to external funding bodies or sponsors. The post holder may work on original research tasks with colleagues in other institutions.

### Special Requirements

To be available to participate in fieldwork as required by the specified research project

#### All staff are expected to:

- Positively support equality of opportunity and equity of treatment to colleagues and students in accordance with the University of Surrey Equal Opportunities policy.
- Help maintain a safe working environment by:
  - Attending training in Health and Safety requirements as necessary, both on appointment and as changes in duties and techniques demand
  - Following local codes of safe working practices and the University of Surrey Health and Safety Policy
- Undertake such other duties within the scope of the post as may be requested by your Manager.

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### Addendum to Role Profile

<b>Job Title:</b>	Postdoctoral Research Fellow in Discrete Element Modelling of Pharmaceutical Processes
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#### Job Summary and Purpose

The School of Chemistry and Chemical Engineering at the University of Surrey invites applications for a full-time Postdoctoral Research Fellow position for 24 months specialising in mechanistic modelling of pharmaceutical processes. Successful candidates will join a vibrant research team focused on advancing the understanding and innovation of pharmaceutical formulation and manufacturing processes.

The role involves developing and implementing mechanistic models to analyse and predict the behaviour of pharmaceutical processes. The postdoctoral research fellow will work to identify key challenges within these processes, construct accurate and robust models, and apply simulations that deepen our understanding of the underlying physics involved. The ultimate goal is to develop predictive, physics-based models that enhance process optimisation and control within pharmaceutical manufacturing.

These positions offer significant opportunities for interdisciplinary collaboration, both within the University and with external research and industrial partners, to address industry-relevant challenges and contribute to advancements in pharmaceutical technology.

#### Main Responsibilities/Activities

The Postdoctoral Research Fellow will work collaboratively with other researchers and industrial collaborators to develop and enhance discrete element models (DEM) by integrating physics-based mechanistic models. They may also need to couple DEM with computational fluid dynamics (DEM-CFD) or other fluid solvers, such as smoothed particle hydrodynamics (SPH), lattice Boltzmann methods (LBM), or coarse-grained molecular dynamics (CGMD), as needed for accurate simulation of complex fluid and particulate systems.

Key responsibilities include:

1. Modify and adapt existing in-house coupled discrete element method codes (e.g., DEM, DEM-CFD, DEM-LBM, or DEM-SPH) to incorporate relevant mechanistic models that accurately describe the targeted physical phenomena in pharmaceutical processes.

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2. Conduct verification of newly developed models to ensure they accurately simulate intended processes, and validate these models using experimental data to ensure accuracy and reliability.
3. Apply the developed hybrid models to simulate pharmaceutical processes, performing sensitivity analyses and optimizations to identify key parameters and improve process efficiency.
4. Analyse simulation results, write detailed technical reports and research papers, and actively disseminate findings at national and international conferences to advance knowledge and best practices in the field.
5. Mentor and supervise postgraduate and undergraduate students involved in related research projects, guiding their technical and professional development.
6. Organize project meetings, seminars, and other professional activities to facilitate collaboration, knowledge exchange, and progress tracking among project team members and stakeholders.

This role requires an ability to work independently and as part of a team, with a proactive approach to problem-solving and innovation in pharmaceutical process modelling.

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### Person Specification

The ideal candidate will possess a strong numerical background with proficient computer programming skills (Essential). They should have a proven research track record, demonstrated through publications and code development (Essential), and experience in developing discrete element models (DEM) or hybrid models, such as DEM-CFD or DEM-SPH (Essential). A good understanding of high-performance computing techniques is also preferred (Desirable).

The candidate is expected to have a high level of research ability, independence, and collaborative skills to interact effectively with other researchers, industry partners, and international academic collaborators (Essential). Prior experience in developing and applying numerical models for particle technology and pharmaceutical Engineering would be advantageous but is not essential.

#### Qualifications and Skills:

- Doctoral Degree in a relevant field, although candidates nearing completion of their doctorate may be considered. Exceptional candidates without a doctoral degree but with extensive experience in the field may also be considered.
- Capable of providing sound academic judgement, formulating original ideas, and interpreting and analysing research results.

This role involves some authority over project work, allowing the candidate to demonstrate academic judgement, contribute creative ideas, and guide the interpretation of research findings.

### Special Requirements

This project involves collaboration with universities and industrial partners both within the UK and internationally. Strong teamwork and communication skills are essential for effective collaboration.

### Relationships and Contacts

Direct responsibility to the principal investigator or academic supervisor. The post holder may be asked to serve on a relevant Faculty committee. There may be additional reporting and liaison responsibilities to external funding bodies or sponsors. The post holder will work on original research tasks with colleagues in other institutions.