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Research Role Profile

Job Title:	Research Fellow A in Discrete Element Modelling of Tablet Disintegration

Responsible to:	Head of research group, or principal investigator

Responsible for:	Not applicable

Job Summary and Purpose:
To undertake research in accordance with the specified research project(s) under the supervision of the principal investigator.

Main Responsibilities/Activities
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. 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. Continually to update knowledge and develop skills, and translate knowledge of advances in the area into research activity. 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. 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. The post holder may occasionally be required to supervise more junior research staff.

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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

This document provides additional information relating to both specific aspects of the post/faculty and any post specific person specification criteria. The information contained within this document should always be read in conjunction with the accompanying generic Job Purpose.

Job Title:	**Postdoctoral Research Fellow in Discrete Element Modelling of Tablet Disintegration**

Background Information/Relationships

The School of Chemistry and Chemical Engineering at the University of Surrey invites applications for a full-time Postdoctoral Research Fellow position in the mechanistic modelling of pharmaceutical tablet disintegration. This UKRI/EPSRC-funded project offers a unique opportunity to join a dynamic research team collaborating with a consortium of academic and industry partners.

The post holder will be responsible for developing and implementing mechanistic models, primarily using the Discrete Element Method (DEM), to analyse and predict pharmaceutical tablet disintegration. The goal is to construct robust, physics-based simulations that deepen the understanding of the underlying processes and ultimately create predictive tools for optimisation and control.

The ideal candidate will hold a PhD in a relevant discipline (or be near completion) and possess a strong numerical background with proficient programming skills. Essential experience includes developing Discrete Element Models (DEM) or hybrid models (e.g., DEM-CFD, DEM-SPH). A proven research record through publications and code development is required. We are seeking a proactive individual with strong initiative, problem-solving skills, and the ability to work both independently and as part of a team. Excellent communication skills are essential for collaboration with UK/international universities and industry partners.

Person Specification

This section describes the sum total of knowledge, experience & competence required by the post holder that is necessary for standard acceptable performance in carrying out this role. This is in addition to the criteria contained within the accompanying generic Job Purpose.

Qualifications and Professional Memberships	**Desirable**
A higher research degree (PhD) or equivalent experience in a relevant subject. (Candidates nearing PhD completion or exceptional candidates with significant field experience will also be considered.)	**Essential**
Technical Competencies (Experience and Knowledge) This section contains the level of competency required to carry out the role (please refer to the competency framework for clarification where needed and the Job Families Booklet).	**Essential/ Desirable**
Possess a strong numerical background with proficient computer programming skills	**Essential**

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Have a proven research track record, demonstrated through publications and code development	**Essential**
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	Desirable
Special Requirements	**Essential/ Desirable**
A high level of research ability, independence, and collaborative skills to interact effectively with other researchers, industry partners, and international academic collaborators	**Essential**
Experience in developing and applying numerical models for particle technology and pharmaceutical Engineering	**Desirable**

Key Responsibilities

This document is not designed to be a list of all tasks undertaken but an outline record of any faculty/post specific responsibilities (5 to 8 maximum). This should be read in conjunction with those contained within the accompanying generic Job Purpose.

1. 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. needed for accurate simulation of complex fluid and particulate systems.
2. Key responsibilities include:
3. 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.
4. 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.
5. Apply the developed hybrid models to simulate pharmaceutical processes, performing sensitivity analyses and optimizations to identify key parameters and improve process efficiency.
6. 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.
7. Mentor and supervise postgraduate and undergraduate students involved in related research projects, guiding their technical and professional development.
8. Organize project meetings, seminars, and other professional activities to facilitate collaboration, knowledge exchange, and progress tracking among project team members and stakeholders.

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9. 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.

N.B. The above list is not exhaustive.