ROLE PROFILE

Job Title: Research Associate/Fellow - Upstream Processing Engineering Scientist in Feedstock Pre-Treatment

School/Department: Faculty of Engineering – Sustainable Process Technologies Group (Green Chemicals Beacon)

Job Family and Level: Research and Teaching Level 4 Training Grade/Level 4

Contract Status: Fixed-term for a period of 36 months

Hours of Work: Full-time (36.25 hours per week)

Location: Faculty of Engineering - Sustainable Process Technologies Group

Reporting to: Professor Alex Conradie

Background to the Role:
The Government's White Paper 'Industrial Strategy – Building a Britain fit for the future' (November 2017) has identified maximising the advantages for UK industry from the global shift to clean growth, as one of four grand challenges. The Secretary of State for Business, Energy and Industrial Strategy, Greg Clark, has stated that 'The move to cleaner economic growth is one of the greatest industrial opportunities of our time.' (The Clean Growth Strategy – Leading the way to a low carbon future, October 2017). This appointment will ensure that the University of Nottingham makes an impact on rapidly shifting practices in sustainable manufacturing associated with global clean growth strategies through excellence in the optimal development of feedstock pre-treatment processing.

This appointment is firmly aligned with the University’s Research Strategy which is accompanied by a major investment into the University’s Green Chemicals Beacon of Excellence. As part of the University’s expansive vision to address global challenges, the Green Chemicals Beacon aims to secure the low carbon economy of the future. Through this multi-disciplinary effort, the Green Chemicals Beacon will address several UN Sustainable Development Goals, such as Climate Action and Sustainable Industrialisation, by:

- Focusing on carbon feedstocks derived from waste outside the food value chain with minimal impact on land security;
- Spearheading the transformation from a petrochemical, energy intensive economy to a sustainable and more circular economy;
- Gearing research activity towards processes with favourable Life Cycle Analysis (LCA) outcomes.

The Green Chemicals Beacon integrates metabolic engineering, process development and green chemistry into a sustainable manufacturing paradigm. The Beacon aims to speed the development cycles through the technology readiness levels, particularly blending advances in computational chemistry, big data analytics and machine learning with world leading white biotechnology and enzyme engineering. Integrated, continuous processing is at the heart of the Beacon’s vision, facilitating technology demonstration from carbon feedstock to purified product at large laboratory scale. Achieving these objectives, the Beacon will establish three application platforms harnessing emerging technologies to realise sustainable processing, viz. (1) an aromatics platform, (2) an aldehyde platform and (3) a terpenoid platform.

Through its investment in the Green Chemicals Beacon, the University strongly believes the next global industrial revolution will be driven by a step change in sustainable processing; where this appointment in Sustainable Feedstock Pre-Treatment Processing will strengthen collaborations across the University, international academics and industry.

The Purpose of the Role:
Working collaboratively with multi-disciplinary scientists and engineering to develop sustainable manufacturing processes for aromatics, aldehydes and terpenoids; the role entails the development and characterisation of feedstock pre-treatment processes at large laboratory scale. Furthermore, the role will
encompass integrated process development with continuous upstream processing. The primary aim of the position is to maximise carbon utilisation and the availability of reducing equivalents within a technoeconomically feasible framework. You will work closely with metabolic and upstream processing engineers, contributing in a multi-disciplinary environment towards integrated, continuous sustainable manufacturing processes.

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<tr>
<th>Main Responsibilities</th>
<th>% time per year</th>
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<tr>
<td>1. Development of an optimal feedstock pre-treatment through characterisation and intensification of a range of feedstock pre-treatment technologies, maximising carbon utilisation and the availability of reducing equivalents alongside process integration with the first upstream unit operation.</td>
<td>70%</td>
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<td>2. Produce written progress reports and presentations; informal reports on a monthly basis and formal oral and written reports every 3 months. Prepare conference presentations and journal publications. Attend project meetings and conferences.</td>
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<td>3. Use scientific literature to develop research plans and interpret findings.</td>
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<td>4. Liaise with other members of the project team to ensure effective collaboration, and communicate important findings to project stakeholders by telephone or email when appropriate.</td>
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<td>5. Assist in supporting PhD students, good laboratory practice and safe working within the laboratory.</td>
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### Knowledge, Skills, Qualifications & Experience

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<th>Essential</th>
<th>Desirable</th>
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| **Qualifications/ Education** | • Equivalent to UK first or upper second BSc or BEng (or MSc with Distinction) in Chemical Engineering or a related discipline.  
• PhD (or near completion) or equivalent in Chemical Engineering or a related discipline. |
| **Knowledge/ Skills/Training** | • PhD aligned with industrial biotechnology.  
• Experience in industrial biotechnology.  
• Experience with solids handling (e.g., biomass and slurries) and size reduction unit operations.  
• Experience with feedstock pre-treatment technologies using sub-critical and supercritical fluids.  
• Experience with microwave processing.  
• Experience with continuous adsorption and solvent extraction. |
| **Experience** | • Research at PhD level.  
• Publications in peer reviewed journals and presentations at international conferences.  
• Experience of multi-disciplinary research.  
• Excellent written and verbal communication skills.  
• Proven presentation skills.  
• Ability to work to deadlines and prioritise tasks.  
• Proven ability to work in a team environment.  
| **Desirable** | • Experience of collaborating with academic groups. |

The University of Nottingham strongly endorses Athena SWAN principles, with commitment from all levels of the organisation in furthering women’s careers. It is our mission to ensure equal opportunity, best working practices and fair policies for all.