

**UNIVERSITY OF NOTTINGHAM**  
**ROLE PROFILE FORM**

**Job Title:** Research Associate/Fellow – Synthetic Biologist / Molecular Biologist

**School/Department:** School of Life Sciences – Synthetic Biology Research Centre

**Job Family and Level:** Research & Teaching Level 4

**Contract Status:** Fixed term until 31 December 2019

**Hours of Work:** 36.25 hours per week

**Location:** Synthetic Biology Research Centre (SBRC)

**Reporting to:** SBRC Director and/or delegated Line Manager

**Job Outline:**

The SBRC-Nottingham is a project partner in ENGICOIN (Engineered microbial factories for CO<sub>2</sub> exploitation in an integrated waste treatment platform). This European Horizon 2020 project led by Fondazione Istituto Italiano di Tecnologia involves 12 research partners across Europe. The project will holistically develop three new integrated microbial factories exploiting CO<sub>2</sub> sources and renewable H<sub>2</sub> within an industrial anaerobic digestion (AD) platform for the treatment of the organic fraction of municipal solid waste

The SBRC-Nottingham component focuses on metabolic engineering of:

- (i) *the aerobic and toxic metal tolerant *Ralstonia eutropha* to produce PHA bioplastics from biogas combustion flue gases and complementary carbon sources derived from the AD digestate.*
- (ii) *The anaerobic, acetogen *Acetobacterium woodii* to produce acetone from the CO<sub>2</sub> stream from biogas-to-biomethane purification.*

We have four post-doctoral positions available, each for a two year period to work on this exciting sustainability project. The ideal candidates will have experience of microbiology and the application of advanced genome engineering techniques in the metabolic engineering of microbial chassis.

**Project background**

It is imperative that the world intensifies research efforts aimed at utilising CO<sub>2</sub> as a raw material for the sustainable production of chemicals and fuels, replacing those derived from fossil sources. Recent agreements made at the COP21 conference in Paris have highlighted the crucial need to reduce CO<sub>2</sub> emissions to keep anthropogenic global warming well below 2°C (ideally 1.5°C. At present only about 15% of global fuel demand comes from biomass, while 85% is derived from fossil fuels. This makes the production of renewable fuels from CO<sub>2</sub> an obvious target if meaningful impacts on the greenhouse effects are to be achieved. The conversion of CO<sub>2</sub> into valuable chemicals and materials by the use of renewable energy (e.g. based on H<sub>2</sub>) may also provide a significant additional contribution if large market products are targeted (e.g. the production of plastics accounts for about 4% of the global oil consumption). The most amenable CO<sub>2</sub> sources for proof-of-concept work are those derived from fermentations or biogas- to-biomethane purifications owing to their purity and availability at virtually no costs.

The SBRC-Nottingham is equipped with state of art facilities including laboratory suites dedicated to multiplexed gas fermentation, high-throughput robotics and analytics (HPLC, GC, GC-MS, LC-MS-MS). It is a vibrant research environment catering for the needs of over 100 researchers in the university's flagship life-sciences research building. The interdisciplinary research environment of the SBRC provides opportunities to work and collaborate with researchers who have expertise in sciences supporting synthetic biology, including molecular biology and microbiology, chemistry and engineering, computer science and systems biology.

Candidate should hold a PhD (pending or awarded) in a discipline relevant to microbial strain engineering or synthetic biology. Past experience in metabolic engineering or/and synthetic biology of microbial species is essential. Knowledge of advanced genome editing, high-throughput -omics techniques and/or metabolic pathway analysis are desirable.

<b>Main Responsibilities</b>	
1	To plan and conduct research using recognised approaches, methodologies and techniques within synthetic biology and metabolic engineering to support the development of SBRC objectives and proposals for own and/or collaborative research area.
	To perform the metabolic chassis engineering, develop and used advanced genetic engineering, as well as high-throughput experimentation.
2	To ensure all research undertaken conforms to Responsible Research Innovation (RRI) practices as defined by the SBRC Core Management team
3	To analyse and illuminate data, interpret reports, evaluate and criticise texts and bring new insights to research area.
4	To contribute to writing up research findings for publication in leading journals.
5	To assist with the preparation of proposals and applications to both external and/or internal bodies for funding, contractual or accreditation purposes.
6	To contribute to the preparation of internal and external written reports and presentations to the sponsors.
7	To build internal and/or external contacts to develop knowledge and understanding, forming relationships for future collaborations.
8	To provide guidance as required to support staff and students, where appropriate in own area of expertise.
9	To collaborate with academic colleagues on areas of shared interest for example, course development, collaborative or joint research projects.
10	To plan and manage own research activity and resolve problems, if required, in meeting own/team research objectives and deadlines in collaboration with others.
11	To utilise and contribute to organising research resources and facilities, laboratories and workshops as appropriate.
12	To play an active role in outreach activities designed to promote public engagement in the science being undertaken within the SBRC.
13	Where appropriate, to make a contribution to teaching, for example through laboratory demonstrations, lectures to postgraduate workshops and delivery of Level 1 modules to the SBRC DTC and/or BBSRC DTP.
14	Any other duties as assigned by the SBRC Director

### **Knowledge, Skills, Qualifications & Experience**

	<b>Essential</b>	<b>Desirable</b>
<b>Qualifications/ Education</b>	<ul style="list-style-type: none"> <li>PhD or equivalent (pending or awarded) in a discipline relevant to microbial Synthetic Biology or Metabolic Engineering.</li> </ul>	
<b>Skills/Training</b>	<ul style="list-style-type: none"> <li>Strong background and expertise in microbial genetics.</li> <li>Excellent oral and written communication skills, including the ability to communicate with clarity on complex information.</li> <li>Evidence of sufficient breadth or depth of research methodologies and techniques to work in Synthetic Biology.</li> <li>Developing research skills, with the ability to creatively apply relevant research approaches, models, techniques and methods.</li> <li>Ability to contribute to method improvement.</li> <li>Analytical ability to facilitate conceptual thinking, innovation and creativity.</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge of key concepts of: <ul style="list-style-type: none"> <li>– metabolic networks and gene regulation</li> <li>– genetic modification</li> <li>– microbial fermentation</li> </ul> </li> <li>Ability to assess and organise resource requirements and deploy effectively.</li> <li>Ability to foster a research culture and commitment to learn in others.</li> <li>High analytical ability to analyse and illuminate data, interpret reports, evaluate and criticise texts and bring new insights.</li> </ul>

	<ul style="list-style-type: none"> <li>• Ability to build relationships and collaborate with others, internally and externally.</li> </ul>	
<b>Experience</b>	<ul style="list-style-type: none"> <li>• Research experience in the modification/ exploitation of a microbial process or attribute for the purpose of strain engineering.</li> <li>• Ability to develop and apply new concepts and methods.</li> <li>• Working in a similar research environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Interaction with computational/ mathematical modellers and/or bioinformaticians.</li> <li>• Track record in academic publication</li> <li>• Supervising or helping with the supervision of research students.</li> <li>• Metabolic engineering and synthetic biology or a related discipline with extensive experience of bio-part engineering, DNA synthesis and analysis, in-silico design and synthetic biology, chemical engineering and analytical capabilities.</li> </ul>