Research Associate: Development of Concrete Biotreatments for Nuclear Decommissioning

Department	Civil and Environmental Engineering (www.strath.ac.uk/civeng/)		
Faculty	Faculty of Engineering (www.strath.ac.uk/engineering/)		
Staff Category	Research	Reference No	109384
Reports To	The Head of Department, through Dr Joanna Renshaw	Grade:	7
Salary Range:	£31,604 - £38,833	Contract Type:	Fixed Term (24 months)*
FTE:	1	Closing Date	Sunday, 18 March 2018

Job Advert

The Department of Civil and Environmental Engineering seeks to recruit a Research Associate for an initial two-year* fixed term position (with a probable extension of at least one year) to work on concrete biotreatment for nuclear decommissioning. The project is funded by a combination of the UK Engineering and Physical Sciences Research Council and by industry partners. The Department has over two million pounds of current research projects in the Nuclear sector and leads the Decommissioning and Waste Management theme in the Advanced Nuclear Research Centre (ANRC) at the University of Strathclyde.

The overarching aim of this research project is to develop a novel microbially-treated 'decommissionable' concrete that minimises the need for mechanical scabbling during decommissioning, by containing radionuclides within a thin removable layer. Traditionally, concrete structures such as ponds and silos must be surface decontaminated to minimise the requirements for waste disposal. This process involves removal of highly contaminated surface material and is both expensive and hazardous, often resulting in the spread of contaminated particulates over large areas. This research will develop a new technology for treatment of concrete structures to produce a thin concrete surface, tailored for rapid, safe decommissioning and waste minimisation. The project will involve development of a technology that deploys biomineralisation of apatites onto, and slightly within, a concrete surface. Initial research will optimise creation of apatite using bacterial biofilms. Batch experiments will be conducted to optimise conditions for microbially-mediated HAP deposition. Biomineral layers deposited will be examined using ESEM, energy dispersive spectroscopy (EDS) and X-ray Diffraction Radionuclide uptake will be quantified by use of ICPOES. A number of techniques will be trialled to facilitate rapid, efficient removal of the HAP layer prior to concrete decommissioning.

The successful candidate will (1) investigate the efficacy of selected microorganisms to facilitate precipitation of microbially-mediated hydroxyapatite on concrete surfaces (2) characterise the biominerals formed (3) develop technologies for rapid removal of the biomineral layer. The Research Associate will also liaise with ANRC industry partners who will provide input to the project.

To be considered for the role, you will be educated to a minimum of PhD level in a relevant field (e.g. Materials, Environmental Microbiology, Environmental Analytical Chemistry, Chemical, Civil or Environmental Engineering) or you will have significant relevant experience in addition to a relevant Degree (e.g. Microbiology/Biotechnology, Materials, Environmental Engineering, Civil Engineering, Chemistry, Environmental Sciences, Chemical Engineering). You will be able to conduct individual research work, to disseminate results and developing ability to prepare research proposals. You will have an ability to plan and organise your own workload effectively and o work within a team environment. You will have excellent interpersonal and communication skills, with the ability to listen, engage and persuade, and to present complex information in an accessible way to a range of audiences.

*Whilst the initial postdoctoral contract will be for a 2-year period, if successful, it is anticipated that the project will be extended using existing funding.

Job Description

Brief Outline of Job:

The researcher will develop a novel, microbially-treated 'decommissionable' concrete that minimises the need for mechanical scabbling during decommissioning by containing radionuclides within a thin readily-removable layer.

The successful candidate will lead the development and implementation of the experimental programme. Initial research will be at a laboratory scale. The research is highly multidisciplinary, spanning microbiology, radiochemistry, materials and civil engineering.

Main Activities/Responsibilities:

1.	Design, develop and conduct the experimental programme
2.	Develop efficient HAP production protocols and characterise biominerals formed
3.	Characterise penetration distances of radionuclides into biotreated concrete surfaces
4.	Develop a methodology for efficient HAP layer removal from the bioteated concrete
5.	Write up research work for publication, individually or in collaboration with colleagues, and disseminate results as appropriate to the discipline by, for example, peer reviewed journal publications and presentation at conferences.
6.	Manage own research activities (with guidance as required) in order to meet project milestones
7.	Disseminate research results as agreed by project partners via oral presentations and posters at international conferences
8.	Liaise with and report to interested ANRC industry partners as required
9.	Identify sources of funding and contribute to the securing of funds for research, including drafting grant proposals and planning for future proposals.
10.	Engage in continuous professional development
11.	Contribute to supervision of undergraduate and postgraduate student projects
12.	Contribute to Knowledge Exchange Activities and establish further research links with industry, as appropriate

Person Specification

Educational and/or Professional Qualifications

(E=Essential, i.e. a candidate must meet all essential criteria to be considered for selection, D=Desirable)

E1	PhD (or equivalent professional experience) in an appropriate discipline e.g. Material Science, Environmental Microbiology, Environmental Analytical Chemistry, Chemical or Civil and Environmental Engineering
E2	Good honours degree in a relevant discipline
D1	Membership of relevant Chartered/professional bodies (including Higher Education Academy).

Experience

E3	Experience working with microorganisms
D2	Analytical techniques such as ICPOES, XAS, XRD, spectroscopic methods

Job Related Skills and Achievements

E4	Developing ability to conduct individual research work, to disseminate results and to prepare research proposals.
E5	The ability to manage complex and dynamic workloads and schedules
E6	Ability to work within a team environment.

Personal Attributes	
E7	Excellent verbal and written communicate skills and the ability to interact with a range of stakeholders, including industrial partners
E8	Ability to plan and manage own work effectively

Application Procedure

Applicants are required to complete an application form including the name of three referees who will be contacted before interview without further permission, unless you indicate that you would prefer otherwise. Applicants should also submit a Curriculum Vitae and a covering letter detailing the knowledge, skills and experience you think make you the right candidate for the job. Applicants should also complete the Equal Opportunities Monitoring Form.

Other Information

Further information on the application process and working at Strathclyde can be found on our website (http://www.strath.ac.uk/hr/workforus).

Informal enquiries about the post can be directed to Joanna Renshaw, Senior Lecturer (Joanna.renshaw@strath.ac.uk/ 0141 548 4865).

Conditions of Employment

Conditions of employment relating to the Research staff category can be found at: Conditions of Employment.

Probation

Where applicable, the successful applicant will be required to serve a 9 month probationary period.

Pension

The successful applicant will be eligible to join the Universities' Superannuation Scheme. Further information regarding this scheme is available from Payroll and Pensions.

Interviews

Formal interviews for this post are expected to be held on the week commencing 26 March 2018.

Equality and Diversity

We value diversity and welcome applications from all sections of the community.

The University currently holds a Bronze Athena SWAN award, recognising our commitment to advancing women's careers in science, technology, engineering, maths and medicine (STEMM) employment in academia.