University of Nottingham
UK | CHINA | MALAYSIA

Role profile

Job title	Research Associate/Fellow in Bioelectronics (Combining Bipolar electrochemistry, additive manufacturing, nanofabrication, and cell biology)	Job family and level	Research and Teaching Level 4 (Appointment will be Level 4 Career training grade where an appointment is made before PhD has been completed)
School/ Department	School of Pharmacy	Location	University Park Campus

Purpose of role

Bioelectronic medicine is an exciting new area using electricity to treat disease. This research aims to develop a new bioelectronics medicine approach to treating disease based on wireless electrochemical technology. These new bioelectronic therapeutic tools will be used to treat cancer non-invasively, moreover, it will offer a new wireless approach to modulating the central nervous systems' cellular electrical activity in a targeted manner, with positive implications for treating central nervous system based diseases. A multidisciplinary team spanning the Engineering, Science and Medical Faculties in Nottingham, has been brought together to realise the vision. The post aims to apply in-house developed wireless electrochemical systems to treat disease. It will exploit wire and nanoparticle technology to actuate cell behaviour (https://pubs.acs.org/doi/10.1021/acsami.8b22075, https://www.sciencedirect.com/science/article/pii/S0021979720316817), for example by enhancing electric field effects in cancer cell models. In addition, you will use CNT porins inserted into cell membranes to modulate action potentials in stem cell-derived neuronal cells.

	Main responsibilities (Primary accountabilities and responsibilities expected to fulfill the role)	**% time per year**
1	**Plan and conduct supervised research using recognised approaches, methodologies and techniques within the EPSRC Healthcare Technology Challenge Award. This will include but is not limited to:** ▪ Using Additive Manufacturing to build electronics to stimulate bipolar electrochemistry and modulate biology. ▪ 3D printing of suitable 3D geometric conductive materials, via inkjet, extrusion, stereolithographic and metal jet, to build systems capable of directing sufficiently strong electron fields to modulate cellular membrane potentials using Carbon nanotube porins. ▪ Culture 3D cell models and use bipolar electrochemistry to enhance tumor treating electric fields via BPE induced interfacing of conductive polymers with tumor models. ▪ Undertaking bioassays to correlate cell response with electric fields. E.g. viability assays, metabolic assays and fluorescent microscopy.	40%

	▪ Use established procedures to fabricate chemically functionalize bipolar electrodes. Analysis using FTIR, SEM, UV-VIS, AFM-SECM and fluorescent microscopy to characterize. Liaising with central facilities to direct these experiments.	
2	▪ Analyse and interpret data, literature, evaluate and criticise texts and bring new insights to the research area.	10%
3	▪ Prepare research work for publication and/or contribute to the dissemination to relevant groups including external bodies and conferences, resulting in successful research outputs.	10%
4	▪ Plan and manage assigned research activity and resolve problems, if required, in meeting own/team research objectives and deadlines in collaboration with others.	10 %
5	▪ Develop research objectives and proposals for own and/or collaborative research area.	5%
6	▪ Build relationships with both internal and external contacts to exchange information, form relationships for future collaborations and identify potential sources of funds and/or opportunities for collaboration. In particular building good working relationships with the existing international partners.	5%
7	▪ Locally co-ordinate the operational aspect tasks within the grant, for example, arranging meetings and updating websites, etc. and contribute to collaborative decision-making with colleagues in the area of research.	5%
8	▪ Work in conjunction with others in the research team to achieve objectives and make an active contribution to the success of the team. Provide support, guidance, and supervision to other staff, where appropriate in their own area of expertise.	5%
9	▪ Assist in the supervision of undergraduate and/or postgraduate student projects, fieldwork and placements, as appropriate. To participate in the assessment of student knowledge and co-supervise projects at Masters level.	5%
10	▪ Contribute to the organisation of research resources and facilities, laboratories and workshops as appropriate. Undertake general laboratory duties such as ordering of reagents, equipment maintenance, and laboratory housekeeping.	5%

Person specification

	Essential	Desirable
Skills	▪ Chemistry/bioelectronics/electrochemistry/ nanotechnology ▪ A strong commitment to interdisciplinary research, in particular between cell biology and materials, electrochemistry and electronics ▪ Excellent oral and written communication skills including the ability to communicate complex information with clarity and write to a publishable standard. ▪ Strong analytical skills including the ability to analyse and illuminate data, interpret reports, evaluate and criticise texts and bring new insights. ▪ Excellent problem solving, IT and organizational skills including the effective deployment of resources. ▪ Ability to build effective relationships as part of a team and collaborate with others, both internally and externally. ▪ Flexible, proactive and dedicated approach to work. ▪ Ability to travel within the UK and overseas.	▪ Cell culture experience and bioassay ▪ Optical microscopy-cell imaging ▪ Surface chemical analysis ▪ AFM ▪ Electron microscopy ▪ Additive manufacturing
Knowledge and experience	▪ Presenting work effectively to a variety of professional and academic audiences at meetings and conferences. ▪ A consistent track record of published research in high impact peer-reviewed journals and writing high quality reports and papers for publication.	▪ First author publications in high impact factor journals. ▪ Previous success in gaining support for externally funded research projects. ▪ Experience of developing new approaches, techniques or methods in bioelectronics. ▪ Training and/or supervision of staff or students.
Qualifications, certification and training (relevant to the role)	▪ A 1st or upper-second class honours degree and a Ph.D (or close to completion) in Chemistry, Materials, Engineering, Pharmacy or related discipline.	

The University of Nottingham is focused on embedding equality, diversity and inclusion in all that we do. As part of this, we welcome a diverse population to join our work force and therefore encourage applicants from all communities, particularly those with protected characteristics under the Equality Act 2010.

The University is a signatory of the Declaration on Research Assessment (DORA). As such we commit to focus on the scientific content of publications (where requested or provided as part of the recruitment and selection process) as a basis for review of quality, and consideration of value and impact of research conducted, rather than any proxy measures such as Journal Impact Factor.

Expectations and behaviours

The University has developed a clear set of core expectations and behaviours that our people should be demonstrating in their work, and as ambassadors of the University's strategy, vision and values. The following are essential to the role:

Valuing people	Is friendly, engaging and receptive, putting others at ease. Actively listens to others and goes out of way to ensure people feel valued, developed and supported.
Taking ownership	Is clear on what needs to be done encouraging others to take ownership. Takes action when required, being mindful of important aspects such as Health & Safety, Equality, Diversity & Inclusion, and other considerations.
Forward-thinking	Drives the development, sharing, and implementation of new ideas and improvements to support strategic objectives. Engages others in the improvement process.
Professional pride	Is professional in approach and style, setting an example to others; strives to demonstrate excellence through the development of self, others and effective working practices.
Always inclusive	Builds effective working relationships, recognising and including the contribution of others; promotes inclusion and inclusive practices within own work area.

Key relationships with others