Job Title:	Research Engineer
Department/Division/Faculty:	Imperial Global Singapore – IN-CYPHER
Campus location:	CREATE Tower, 1 CREATE Way Singapore
Job Family/Level:	Academic and Research $5,000 to $9,000 Monthly dependent of experience
Responsible to:	Professor Anil Anthony Bharath, IN-CYPHER Programme Co-Director
Key Working Relationships (internal):	IN-CYPHER researchers, Collaborators within Imperial College London, Collaborators within Nanyang Technological University
Key Working Relationships (external):	As identified within the Singapore Healthcare, Governmental, Cybersecurity and Startup Ecosystem
Contract type:	2 years fixed term (subject to 6-month probation)

Purpose of the Posts

Imperial College London and Nanyang Technological University (NTU) are seeking Research Engineers to join the exciting new **Imperial/NTU CYber Protection for HEalthcaRe (IN-CYPHER)** research programme on the cybersecurity of connected medical devices and systems. The research programme represents a collaboration between the United Kingdom and Singapore and will be based at the newly established Imperial Global Singapore (IGS).

We are particularly looking for **Wet Lab Specialists** with the following backgrounds:

- Biomedical sensor design and fabrication
- Electrochemistry
- Biomedical Engineering
- Wet lab experience with regard to protein and small molecule assays
- Translational and regulatory expertise in medical devices

As a Wet Lab Specialist, the successful candidate will contribute to the programme by developing novel biosensors that are secure by design, and work toward translating the devices into clinical practice to drive the future of personalised medicine.

IN-CYPHER is comprised of four interacting themes, spanning the design of intelligent medical devices through to the use of their data in informing personalised healthcare. Allied to other programmes in Singapore and the UK, it represents a unique opportunity to be at the forefront of research and development into securing the vital information that flows between implantable, wearable and connected medical devices, including those currently in use, and those yet to be developed.

There are four themes of IN-CYPHER.

Theme 1 Protecting Implantable Devices
Implantable and wearable medical devices – including both sensors and active devices – operate under strong design constraints. Our research in this area seeks to embed secure design from first principles, and at the most fundamental levels (silicon or substrate) of device design; we also

recognise the need to consider the challenge of post-quantum cryptographically secure techniques in the immediate future.

Theme 2 Securing Connected Wearables & Healthcare Systems
Increasingly, medical devices incorporate some form of connectivity, and many of these devices are necessarily designed to be in use for between one and two decades. There is a constant risk of exploit of zero-day vulnerabilities, and therefore a requirement to detect breaches in extremely intricate complex networks and data flow pipelines. We seek solutions to this challenge that embed security at hardware level.

Theme 3 Algorithms for Privacy, Security and Provenance
To control active medical devices – such as closed-loop drug-delivery systems – information moves from sensors and devices along different communications channels; data provenance and integrity are important. Moreover, the use of data-driven algorithms potentially exposes protected patient characteristics, presenting specific technical challenges not only within operational use, but also to product development cycles.

Theme 4 Clinical Innovation & Translation
Personalised or precision medicine relies on the ability to detect biomarkers or monitor biochemical processes on an individual level, underscoring the need to continue developing novel biosensors. Furthermore, as more patient data is collected there is a need for better protection of sensitive patient information and methods for handling and processing the increasing amount of healthcare data – building on from the objectives of Themes 1, 2, and 3. With key researchers and teams from both Lee Kong Chian School of Medicine and Imperial College Healthcare NHS Trust, we seek to develop threat models that are suitable for emerging approaches to personalised medicine, and particularly where data-driven techniques might offer improvements to patient outcomes.

Given the span of the IN-CYPHER programme, we are seeking research engineers to join IN-CYPHER Theme 4 and contribute to the design and fabrication of novel biosensors, which complements the work of Themes 1 – 3. Unique in its scope, we are developing technologies that span embedded systems, and the protocols used to control and communicate sensitive patient information, all the way up to interventional devices and systems for personalised healthcare.

The collaborating Departments include senior academics from the Department of Metabolism, Digestion and Reproduction and the Department of Bioengineering at Imperial – the largest Biomedical Engineering Department in the UK – and senior researchers from the School of Computer Science and Engineering (SCSE), School of Electrical and Electronic Engineering and the Lee Kong Chian School of Medicine at Nanyang Technological University. Candidates will be employed by Imperial Global Singapore, a research division of Imperial College London, consistently ranked within the top 10 of the QS University Rankings. Candidates must be resident and based in Singapore, but there will be opportunities for research visits to Imperial's London-based locations.

Informal enquiries are greatly welcome. You are encouraged to send an e-mail to Dr Viktor Schlegel, Deputy Programme Director v.schlegel@imperial.ac.uk, outlining your experience and ambitions for the role.

Questions about the recruitment process, should go to Paige Noyce, Associate Director p.noyce@imperial.ac.uk.

Key Responsibilities

Main Duties

- Take initiatives in conducting and planning experimental work
- Assist with laboratory hazardous and non-hazardous waste removal (as required).

- Assist senior technical staff and researchers with stock control and inventory.
- Maintain and restock depletable consumables.
- Organise departmental pipette and centrifuge servicing.
- Support staff and researchers with relocation of equipment as required (laboratory and office).
- Assist researchers with tasks such as autoclaving, routine maintenance of equipment.
- Assist and advise researchers regarding general housekeeping
- Maintain highly organised and accurate record of work
- Maintain and promote the highest standards of scientific integrity
- Actively participate in all aspects of the research programme of IN-CYPHER
- Report activities both internally and externally
- Attend relevant workshops as necessary
- Promote the positive reputation of IGS, IN-CYPHER Programme
- Maintain high-quality documentation of your work in a way that it can be directly as part of other documents, such as reports, academic publications or grant applications
- Participate in group research meetings and internal seminars
- Contribute to the smooth running of IN-CYPHER and other programmes under IGS
- Assist in the supervision of undergraduate interns, postgraduate research students and research assistants as required
- Comply with IGS' and CREATE practices and to attend courses on safety when appropriate
- Any other duties as may be deemed reasonable by scientific and operations managers of IGS, IN-CYPHER and scientific investigators of the relevant Themes.
-

Other Duties

- Undertake any necessary training and/or development
- Undertake appropriate administration tasks
- Attend relevant meetings
- Observe and comply with all IGS policies and regulations, including the key policies and procedures on:
  - Confidentiality,
  - Conflict of Interest
  - Business Continuity
  - Data Protection
  - Equal Opportunities
  - Ethics related to scientific conduct and to considerations of patient data, where appropriate
  - External Interests
  - Financial Regulations
  - Health and Safety
  - Use of Information Technology
  - Policies regarding smoking and e-cigarettes
  - Undertake specific safety responsibilities relevant to individual roles, as set out by IGS

Positions are based in Singapore at Imperial Global Singapore at the National Research Foundations Campus for Research Excellence and Technological Enterprise (CREATE) located on the campus of the National University of Singapore

Job descriptions cannot be exhaustive and the post holder may be required to undertake

other duties, which are broadly in line with the above key responsibilities. **Imperial Global Singapore is committed to equality and values diversity. IGS adheres to Imperial** Values and Behaviours framework**.**

Person Specification

Requirements Candidates/post holders will be expected to demonstrate the following	**Essential (E)/ Desirable (D)**
Education	
A good undergraduate degree in biomedical engineering or bioengineering or a topic allied to the biological/healthcare sciences.	E
Relevant Master's Degree or equivalent Research or Industry experience	D
Experience	
Practical experience within a research environment and publication in relevant and refereed journals.	E
Significant wet lab experience in a relevant field; by way of illustration, such topics might include: • biomedical sensor design fabrication • electrochemical or biochemical detection of small molecules, peptides and proteins, or nucleic acids • healthcare research, with specific foci on data science, physiological or pharmokinetic modelling, diabetes or cardiovascular research	E
Experience of: • engineering in a research environment, • strongly interdisciplinary research	D
Experience in analysis, interpretation and visualisation of scientific data	E
Experience in lab facility management, including performing risk assessments (particularly in a biolab), procurement of reagents and consumables.	D
Practical experience in any of the following tools/techniques/areas: • medical device design • medical regulatory processes	D
Authorship of peer-reviewed academic articles	D
Knowledge	
Knowledge of research methods and statistical procedures	E
Knowledge of data presentation and analysis as relevant to Theme 4	E
Knowledge of biochemical or electrochemical sensing techniques	E
Knowledge of different methods to develop and analyse computational models	E
Knowledge of biosafety procedures and protocols	E
Knowledge of computational or engineering techniques relevant to Themes 1 – 3	D
Skills & Abilities	
Ability to design and conduct experiments in the wet lab	E

Ability to work independently in the lab	E
Ability to collect, manage, and analyse data in an organised fashion, and to communicate results and findings	E
Ability to conduct a detailed review of recent literature	E
Ability to develop and apply new concepts	E
A creative approach to problem-solving	E
Excellent verbal communication skills and the ability to effectively collaborate	E
Excellent written communication skills and the ability to write for scientific publication to achieve impact	E
Ability to prioritise own work in response to deadlines	E
A skill-set aligned with Theme 4, preferably with additional skills relevant to the other IN-CYPHER themes	E
Ability to work collaboratively, as part of a large, distributed team, potentially across different time-zones	E
Other	
A flexible attitude towards work	E
Discipline and regard for confidentiality and security at all times	E
Willingness to undertake any necessary training for the role	E
Willingness to travel both within the Singapore and to the United Kingdom, and other destinations as required to conduct and disseminate research	D
Willingness to work out of normal working hours (including weekends) if the requirements of the project demand.	D

Imperial Global Singapore is committed to equality of opportunity and to eliminating discrimination. All employees are expected to:

1) Champion a positive approach to change and opportunity
2) Encourage inclusive participation and eliminate discrimination
3) Communicate regularly and effectively within and across teams
4) Consider the thoughts and expectations of others
5) Deliver positive outcomes
6) Develop and grow skills and expertise
7) Work in a planned and managed way

Employees are also required to comply with all IGS policies and regulations, paying special attention to:

- Confidentiality
- Conflict of Interest
- Data Protection
- Equal Opportunities
- Financial Regulations
- Health and Safety
- Information Technology
- Smoking
- Private Engagements and Register of Interests
- The regulations of CREATE Tower and of Singapore

They must also undertake specific training and assume responsibility for safety relevant to specific roles, as set out on the College Website Health and Safety Structure and Responsibilities page.

IGS observes the San-Francisco Declaration on Research Assessment (DORA), which means that in hiring and promotion decisions, we evaluate applicants on the quality of their work, not the journal impact factor where it is published.

IGS believes that the use of animals in research is vital to improve human and animal health and welfare. Animals may only be used in research programmes where their use is shown to be necessary for developing new treatments and making medical advances. IGS is committed to ensuring that, in cases where this research is deemed essential, animals in are treated with full respect, and that any and all staff involved with this work show due consideration at every level. For further details, applicants are directed to:
http://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-integrity/animal-research/