Job Description

Job title:	Software Developer
Division:	BRC Clinical Research Informatics Unit
Board/corporate function:	Corporate
Salary band:	Band 8
Responsible to:	BRC CRIU Director
	BRC CRIU Manager
Accountable to:	BRC CRIU Director
	BRC Chief Operating Officer
Hours per week:	37.5
Location:	Farr Institute, 222 Euston Road, London

Background Information

University College London Hospitals NHS Foundation Trust

University College London Hospitals NHS Foundation Trust (UCLH) is one of the most complex NHS trusts in the UK, serving a large and diverse population.
We provide academically-led acute and specialist services, to people from the local area, from throughout the United Kingdom and overseas.

Our vision is to deliver top-quality patient care, excellent education and world-class research. We provide first-class acute and specialist services across eight sites:

- University College Hospital (incorporating the Elizabeth Garrett Anderson Wing)
- National Hospital for Neurology and Neurosurgery
- Royal National Throat, Nose and Ear Hospital
- Royal London Hospital for Integrated Medicine
- University College Hospital Macmillan Cancer Centre
- The Hospital for Tropical Diseases

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- University College Hospitals at Westmoreland Street
- Eastman Dental Hospital

We are dedicated to the diagnosis and treatment of many complex illnesses. UCLH specialises in women's health and the treatment of cancer, infection, neurological, gastrointestinal and oral disease. It has world class support services including critical care, imaging, nuclear medicine and pathology.

University College London

University College London (UCL) is London's leading multidisciplinary university, with approximately 11,000 staff and 38,000 students from 150 different countries. The university operates in a global context and is committed to excellence, innovation and the promotion of global understanding in all activities: research, teaching, learning, enterprise and community engagement. UCL is the top rated university for research strength in the Research Excellence Framework (REF), published in December 2014.

BRC Clinical Research Informatics Unit

The BRC Clinical Research Informatics Unit (CRIU) at UCL/UCLH opened in 2017 to provide a more advanced approach and better use of clinical data to support one of the world's leading teaching hospitals.

The facility is a partnership between UCL and University College London Hospitals NHS Foundation Trust (UCLH) with research consent models, research capacity into Electronic Health Records with integrated omics, wearables, bioinformatics, natural language processing, machine learning and artificial intelligence; improving current research commitments as well as allowing potential new research outcomes to be developed.

UCLH is one of five NHS Trusts with the largest Biomedical Research Centers (BRCs) collaborating in the National Institute for Health Research (NHIR) Health Informatics Collaborative (HIC) Programme, for which the initial objective was to demonstrate how sharing of NHS clinical information, held electronically, could facilitate more effective clinical research, leading to benefits for patients and the public, researchers and NHS staff.

One of the BRC CRIU priorities is to continue the internal development of a sustainable in-house informatics platform in order to allow various research themes to grow and achieve their objectives. It is essential to build a viable research environment, continue the work in progress (data warehouse, metadata catalogue) and improve our current research informatics capabilities. Also we need to continue the proof of concept infrastructure for the management of biomedical research data, and support the elements of the research data life-cycle that must be addressed within the context of UCLH prior to data being made available to academic researchers.

Institute of Health Informatics (IHI)

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The Institute of Health Informatics (IHI) was established in August 2014 as part of the Faculty of Population Health Sciences (FPHS) within the UCL School of Life and Medical Sciences (SLMS). The Faculty of Population Health Sciences has established itself as UCL's largest research-based faculty encompassing seven institutes. Research income across the Faculty of Population Health Sciences leapt from £48M in 2011, to £73M in 2013, and is now top of the UCL tables for research funding. UCL School of Life and Medical Sciences (SLMS) brings together four UCL Faculties to create one of the largest and most prestigious aggregations of academics in biomedical, life and population health sciences. The School has a global reputation for teaching informed by cutting-edge research. A full profile of the School can be found at: http://www.ucl.ac.uk/slms/about-us. In addition to its Faculties, the School also coordinates three Research Domains (http://www.ucl.ac.uk/slms/domains) which are informal networks that bring together researchers regardless of their host Faculty. Colleagues engage in as many of the domains as are relevant to their area of research activity, encouraging inter-disciplinarity across our School and beyond. UCL also provides a range of services for computationally intensive research, including high performance and high throughput computing, software development and data management platforms.

The aim of the Institute of Health Informatics is to conduct high quality research that leverages big data and health informatics approaches to improve health at local, national and international levels. Members of the Institute are the Clinical Epidemiology Group (CEG), the Infectious Disease Informatics (IDI) Group and the Centre for Health Informatics and Medical Education (CHIME). The skill mix of data science, epidemiology, health informatics, clinical science, statistics and public health provides the scientific basis to underpin an internationally competitive research programme.

The Institute Director is Professor Harry Hemingway.

BRC Healthcare Informatics, Genomics/ Omics and Data Science (HIGODS)

The aim of our Healthcare Informatics, Genomics/Omics, and Data Science (HIGODS) theme of NIHR UCLH Biomedical Research Centre is to improve health through data. We aim to deliver patient centred analytics across a wide range of clinical record, genetic, imaging and mobile and wearable data for patient benefit. 'Data-based medicine' has the opportunity to improve the precision, quality, outcomes and efficiency of healthcare and to accelerate drug discovery.

Our theme will launch new initiatives in:

- Developing Clinical Research Informatics capability within the NHS: seizing the opportunity provided by the EPIC procurement at UCLH, and delivering novel methods for evaluating regulatory pathways, including NICE recommendations.

- Real time analytics for safety and quality of care: we will develop some of the core infrastructure to enable use of 'high velocity' data, with applications in exemplar clinical areas.

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- UCLH BRC 'About Me': a flagship project linking genomic (and other omics) information to routinely collected healthcare data to enable:
- Patient participation in research studies
- Immediate return of information About Me including ancestry, genetic predisposition to healthy and unhealthy behaviour and, eventually, predictive information on disease risk and drug response
- Creation of an embedded NHS research platform that uses human genomics to better understand causes of disease and through this to provide an accelerator for drug development.

- 'About Me' will develop processes transportable to other UCL-affiliated BRCs at Moorfields Eye Hospital (MEH) and Great Ormond Street Hospital (GOSH), to other BRCs nationally, and beyond BRCs to the wider NHS

UCL Research Software Development Group (RSDG)

The primary aim of the UCL RSDG's involvement will be to improve the robustness, scaling and automation of the critical care analysis pipeline.

With increased volumes of data coming from the partner hospitals, the existing pipeline was found to exceed the memory available within the UCL Data Safe Haven (DSH) machines on which it runs. Work has begun to change the underlying data storage to use a database, allowing the pipeline to scale to foreseen data sizes (and beyond) while still maintaining a simplified interface for researchers.

Ongoing technical issues with the DSH itself have also prevented fully automatic processing of new datasets as they arrive. The RSDG and the new software developer will investigate the use of alternative systems, whether the next generation of the DSH currently being developed within UCL, or commercial providers such as Microsoft Azure, which has recently launched a certified platform for health data processing.

The RSDG will also provide training for the CRIU staff (including the software developer) in using, maintaining and developing the pipeline.
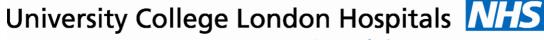
The software developer will be an associate member of the RSDG, attending group meetings and benefitting from peer-learning and code-review opportunities, along with connections to the vibrant broader research programming community within UCL.

1. Job Purpose

The Software Developer will work within the Biomedical Research Centre (BRC) Clinical Research Informatics Unit (CRIU) at UCL/UCLH. The role will be expected to benefit various initiatives such as our Healthcare Informatics, Genomics/Omics, Data Science (HIGODS) themes as well as the NIHR Healthcare Informatics Collaborative programme as part of the

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NIHR BRC at UCLH.

This key role is central to contribute to the development of the BRC CRIU with a more sophisticated and sustainable in-house informatics platform for clinical research purposes at UCL/UCLH and to support the NIHR BRC Health Informatics Collaborative Programme with a focus on the UCLH Critical Care theme.

Key Working Relationships

- BRC CRIU Director
- BRC CRIU Manager
- BRC CRIU/ EHRS Chief Research Information Officer
- BRC CRIU team
- EHRS Programme Team
- Clinicians, Researchers and other relevant staff
- UCL/UCLH Biomedical Research Centre (in particular HIGODS theme)
- NIHR BRC Health Informatics Collaborative
- Institute of Health Informatics
- The Farr Institute
- UCL Research Software Development Group
- The Wellcome Trust
- The Alan Turing Institute

2. Main Duties and Responsibilities

Technical:

- Support the development of a centralised data repository and data catalogue for clinical research purposes as part of the BRC CRIU expansion
- Development and maintenance of the BRC CRIU infrastructure alongside the UCLH EHRS Implementation strategy
- Work alongside UCL scientists and the NIHR BRC HIC Critical Care theme on improving the robustness, scaling and automation of the critical care analysis pipeline as part of the NIHR BRC Health Informatics Collaborative Programme

- Using technical expertise and experience, guide users and other stakeholders on the most effective way to solve business problems when developing bespoke software applications
- Develop new highly complex coding and methodologies for the analysis and interpretation of data
- Routinely solve highly complex technical and business logic problems, providing for the most part, effective solutions that make use of suitable software patterns

Communication & Networking:

- Work as part of a multidisciplinary team of bioinformaticians, biostatisticians, clinicians, scientists and support staff within the collaboration as well as other related organizations and develop good working relationships
- Work closely with colleagues, customers and senior staff on a daily basis and primarily through face-to-face communication to complete tasks
- Discuss progress and provide regular reports to the BRC Clinical Research Informatics Director/Manager as required
- Discuss ideas with colleagues and review tasks and priorities in collaboration with other team members and senior staff
- Contribute ideas on how to become more effective during regular team meetings
- Mentor junior colleagues, analysing their strengths and weaknesses and providing advice and guidance to develop their skills and abilities (particularly their technical expertise)
- Deal with complex and conflicting subject matter problems in day to day work and maintain excellent working relationships with a broad range of internal and external stakeholders on a range of research projects
- Responsible for day to day management, including recruitment, appraisal, discipline, training of junior staff within the department.
- Speak confidently to groups of users or peers; Demonstrating ideas, concepts and software and answering questions
- Communicate highly complex statistical/epidemiological data matters with other Healthcare / Scientific and Research professionals

Decision Making, Planning and Problem Solving:

- Participation in the strategic planning of multiple projects within the BRC CRIU with lead responsibilities for software development
- Be responsible for day-to-day decisions in carrying out this project with minimal supervision and will be expected to make major decisions in consultation with professional leads as appropriate
- Provide direction to junior analysts and ensure that all programme team members have a sound understanding of the CRIU internal software development processes
- Estimate the effort required to complete development tasks
- Collaborate with other team members to complete work items identified during development phases (such as HIC Critical Care Sprint meetings)
- Develop suitable test plans and supporting test data to prove the correct operation of code during unit testing
- Assist with the maintenance of existing systems when required
- Keep business and technical skills up-to-date by attending courses and seminars
- Provide well written technical documentation to ensure software applications are well understood and maintainable
- Support software development and any external procurement within the delegated budget restraints
- Ensure that future software procurement is cost-efficient and standardised across the CRIU

Analysis & Research Development:

- Contribute to the development of research strategies within the BRC CRIU.
- Develop and implement computationally efficient complex algorithms to solve a variety of problems in the management of clinical data
- Provide expertise and solutions around complex software development as well as manage expectations with stakeholders where opinions may differ (conflict management with or without any precedents)
- Analyse requirement's specifications (that maybe provided in a variety of formats) and assess their suitability before proceeding to the software build stage
- Research relevant new technology as it is released, assessing its potential for enhancement of existing services
- Advance the process of continual improvement within the BRC CRIU team by introducing the use of technologies

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- Implement complex third-party solutions and where appropriate integrate them with existing systems to add value to the services the organisation provides

Policy/ Service Development Implementation:

- Identify and assist the BRC CRIU Data Sharing and Discovery Manager and BRC CRIU Data Manager with the introduction of continual improvements and refinements to the practices used to develop software within the organisation
- Ensure that the CRIU policies and strategies around future software developments are in aligned with the wider UCLH initiatives. Develop and update changes to CRIU software development policies as may be required
- Working with other staff across development teams, identify and implement continual improvements to development practice (i.e. continual integration, automated unit testing, code reviews)
- Working with other staff across development teams (i.e. UCL Research Software Development Group), identify opportunities for code sharing and implement common by design software components (such as authentication, authorisation and cataloguing)
- Contribute to the production of suitable quality control records (such as problem or change records) for application and system software changes
- Assist team members in ensuring that software applications have full patch and version control in place and that the BRC CRIU has a comprehensive record g all these amendments
- Implement system software upgrades, when required.

Other:

The job description is not intended to be exhaustive and it is likely that duties may be altered from time to time in light of changing circumstances, following consultation with the post holder.

You will be expected to actively participate in annual appraisals and set objectives in conjunction with your manager. Performance will be monitored against set objectives.

- To comply with all Trust Policies and Procedures, with particular regard to
- Risk Management - Health & Safety - Information Governance
- Confidentiality - Data Quality - Freedom of Information
- Equal Opportunities - No Smoking - Being Open: a duty to be candid

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- All staff have a responsibility to comply with the current infection prevention and control policies, procedures and standards and ensure they have received an annual update on infection prevention and control issues including hand hygiene. All staff should practice and encourage appropriate hand hygiene and act professionally to ensure the hospital environment is clean, safe and tidy.

- To perform your duties to the highest standard with particular regard to effective and efficient use of resources, maintaining quality and contributing to improvements.

- To follow all the Trust Security policies and procedures and be vigilant to ensure the safety and secure environment for care.

- All staff that have access to or transfers any data are responsible for those data, it must be kept secure and they must comply with the requirements of the Data Protection Act 1998 and the common law on confidentiality. All data must be kept in line with the Trust's policies and procedures. Data includes all types of data i.e. patient, employee, financial, electronic, hard copies of printed data or handwritten data etc.

- The post holder is responsible for data quality and complying with the policies, procedures and accountability arrangements throughout the Trust for maintaining accuracy and probity in the recording of the Trust's activities.

- The Trust is committed to carefully screening all staff who work with children and vulnerable adults. If this applies to this post, the appointment will be subject to a satisfactory Disclosure and Barring Service disclosure (formerly the CRB disclosure) of the appropriate Level.

- All staff will receive training on Child Protection -Safeguarding Children Policies and Procedures as part of Induction and updates, this will equip the post holder with the knowledge of what you will need to do if you have concerns about the welfare of a child/young person under aged 18.

- Participate in an annual Appraisal and Development Review meeting and ensure you are meeting the Trust's Performance Standard for the post.

Our Vision and Values

The Trust is committed to delivering top quality patient care, excellent education and world-class research.

We deliver our vision through values to describe how we serve patients, their families and how we are with colleagues in the Trust and beyond.

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We put your **safety** and wellbeing above everything

Deliver the best outcomes	Keep people safe	Reassuringly professional	Take personal responsibility

We offer you the **kindness** we would want for a loved one

Respect individuals	Friendly and courteous	Attentive and helpful	Protect your dignity

We achieve through **teamwork**

Listen and hear	Explain and involve	Work in partnership	Respect everyone's time

We strive to keep **improving**

Courage to give and receive feedback	Efficient and simplified	Develop through learning	Innovate and research

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University College London Hospitals NHS

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Person Specification

REQUIREMENTS		How Tested? Application/Test Interview/Reference			
Qualifications	**E/D***	**A**	**T**	**I**	**R**
Relevant Master's Degree (mathematical, computer science, bioinformatics or equivalent)	E	√			
Relevant BSc (mathematical, computer science, bioinformatics or equivalent)	E	√			
Relevant PhD degree (biological science, statistics, computer science, bioinformatics or equivalent) or equivalent professional experience	D	√			
Knowledge/ Aptitude					
Advanced Java 2 development	E	√		√	
In-depth knowledge of Javascript, web frameworks and web technologies (e.g. HTML, CSS, XML, AJAX, REST, AngularJS or NodeJS)	E	√		√	
Knowledge and understanding of distributed software applications, including scalability, performance, and reliability considerations	E	√		√	
Up to date with new approaches in software development such as microservice architectures	E	√		√	
Significant knowledge of SQL and NoSQL Database Management systems	E	√		√	
Experience					
Extensive Experience of Software Development, specifically using J2EE and Spring Framework	E	√		√	
Developing standard APIs and shareable libraries for general use.	E	√		√	
Demonstrable experience with Hadoop ecosystem	E	√		√	
Experience with Django or similar frameworks	D	√		√	
Experience with queuing systems such as Apache Kafka	D	√		√	

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REQUIREMENTS		How Tested? Application/Test Interview/Reference			
Qualifications	**E/D***	**A**	**T**	**I**	**R**
Experience with software design patterns and messaging patterns	E	√		√	
Experience of Relational and Star-Schema database modelling techniques	E	√		√	
Experience with the software development life-cycle and working in teams using Scrum and TDD methodologies	D	√		√	
Extensive experience of data analysis using R	D	√		√	
Experience with developing software in Python	D	√		√	
Skills, Abilities, Knowledge					
Excellent interpersonal & communication (written & verbal) skills	E	√		√	
Professional and enthusiastic	E	√		√	
The ability to work independently and without direct supervision	E	√		√	
The ability to operate in a multidisciplinary environment and cooperate with team members	E	√		√	
The ability to be proactive and organise own time	E	√		√	
Desire to learn new methods and technologies	E	√		√	

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