Job Description

Research Fellow Software Developer

Department of Medical Physics and Biomedical Engineering

Location: UCL Bloomsbury campus, London

Grade 7 – £35,328 to £42,701 per annum, inclusive of London allowance. Appointment at Grade 7 is dependent upon having been awarded a PhD. Or if about to submit a PhD, the appointment will be at Grade 6B (£30,922 - £32,607 salary, inclusive of London Allowance) with payment at Grade 7 being backdated to the date of final submission of the PhD thesis.

Deadline: TBC

Reports to:

Dr Bradley Treeby.

Context

Biomedical Ultrasound Group

The Biomedical Ultrasound Group at University College London (UCL) was formed in 2013 to bring together researchers in acoustics, medical physics, and computer science with doctors and front-line users in medicine and the life sciences (http://bug.medphys.ucl.ac.uk). The group currently comprises twelve full-time research staff, with expertise extending from physical acoustics and numerical modelling, through to ultrasonic and optical instrumentation, and in vivo experimentation.

The group has a particular focus on the development of advanced computer models which can predict how ultrasound waves propagate in the human body. These models have many applications in therapeutic and diagnostic ultrasound, including imaging, treatment planning, image reconstruction, and hardware design. The results of our modelling research have culminated in ten releases of an open-source acoustics toolbox called k-Wave (http://www.k-wave.org). The toolbox is widely used in both academia and industry, and currently has more than 11,000 registered users in 70 countries.

University College London (UCL)

UCL is one of the UK's premier universities and is consistently ranked in the world's top-10. UCL brings together world-renowned experts, from across the

academic spectrum. It is a world-class research and teaching institution whose staff and former students include 28 Nobel Prize winners and three Field's medallists.

Founded in 1826, it was the only university in England at that time which admitted students regardless of race or religion. UCL was also the first to admit women on equal terms with men. Today, UCL is an inspiring university in which to work and study, and it continues to thrive on the diversity and creativity of its community.

UCL currently employs approximately 8,000 staff across 54 Academic Departments and Institutes whose activities span arts and humanities, social and historical sciences, law, architecture and the built environment, engineering sciences, mathematical and physical sciences, life and clinical sciences, and medicine. UCL's academic and research staff are a truly international community with more than a quarter coming from 84 countries outside the UK.

Main purpose of the job

The aim of the project is to develop a user interface and other software and algorithms to allow end-users (including doctors) to perform treatment planning for ultrasound therapy, including non-invasive brain stimulation. The developed front-end software will be deployed locally within a hospital environment, and will interface with remote HPC facilities running large-scale ultrasound simulation software being developed by our group (along with other hardware and software components). The front-end software will be used to define inputs for treatment planning simulations in an intuitive way, as well as processing and visualising simulation outputs to convey the relevant clinical information. A particular requirement is that the software is developed to satisfy regulatory requirements for medical software. The project is part of a larger research program to develop treatment planning software and hardware for stimulating the brain using ultrasound (https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?Grant Ref=EP/P008860/1). The post offers an opportunity to undertake research at an internationally leading university and contribute to the state-of-the-art in ultrasound simulation. Funding for training and conference travel is also readily available.

The post will be held in the Department of Medical Physics and Biomedical Engineering, however, the post-holder will also be an associate member of the UCL Research Software Development Group (https://www.ucl.ac.uk/research-it-services/research-software-development). The Research Software Development Group works with researchers across UCL to build and maintain readable, reliable and efficient research software. The team is friendly and diverse, with a range of backgrounds and specialist skill sets represented. There are good opportunities for personal development and career progression within the group, in both technical and managerial tracks.

Duties and responsibilities:
Research programming (80%)

- Develop a graphical user interface and other front-end software and algorithms to allow end-users (including clinicians) to easily interface with HPC ultrasound simulation software to plan and evaluate therapeutic ultrasound treatments.
- Implement, develop, and apply appropriate processing and visualisation tools.
- Investigate novel deployment paradigms for the user interface, including web-based software as a service, and the use of cloud computing HPC facilities.
- Work closely with the project team as well as clinical and industrial partners to develop and refine the functionality of the user interface and other software components.
- Write codes to adhere to the regulatory requirements required for medical software in the EU and/or North America.
- Write comprehensive unit and integration tests.
- Maintain accurate and up-to-date technical and user documentation for all delivered software.
- Collaborate with research colleagues within the group to construct, improve, and maintain codes used for modelling, analysis and simulation.
- Contribute to projects on an intellectual as well as technical level.

- Follow good software engineering and reproducible research practice and disseminate this practice to collaborating partners.
- Support the release and dissemination of research software, through open source, scholarly, and commercial channels.
- Contribute to research papers published in the academic literature, project reports and case studies, and code documentation and manuals.
- Provide online and face-to-face user support for software we create or maintain to both UCL and external users.
- Extend expertise in many areas of computational research through independent study and training courses.
- To carry out any other duties as are within the scope, spirit and purpose of the job as requested by the line manager or Head of Department.
- To actively follow UCL policies including Equal Opportunities and Race Equality policies.
- To maintain an awareness and observation of Fire and Health & Safety Regulations.
- As duties and responsibilities change, the job description will be reviewed and amended in consultation with the post holder.

Provide training relating to research software engineering (5%)

- Train UCL research staff and students in the effective use of software for research.
- Develop training materials in research computing, suitable for a range of audiences with a very variable degree of computational experience.
- Advise researchers on software practices, techniques, design, and architecture.

Engage with and contribute to wider research software community (5%)

- Build and maintain relationships within the research and e-Infrastructure communities in UCL and beyond, actively seeking opportunities for collaboration with researchers.
- Contribute to community activities such as seminars and networking events.
- Attend conferences and community events in a variety of software engineering/research computing fields in the UK and abroad.

- Contribute ideas, experience and thinking to technical working groups in and beyond UCL.

Maintain and support research software development infrastructure and services (5%)

- Maintain and support the state-of-the-art infrastructure and services needed for effective research software engineering, in areas such as continuous integration, version control, and code review.
- Maintain and manage systems and servers used to deliver software development infrastructure services.
- Author and maintain documentation relating to software development infrastructure services.
- Assist Research IT Services colleagues in the delivery of other departmental services.
- Contribute to the wider ecosystem of support for computational research in UCL, working with departmental IT staff and ISD colleagues to help build and maintain integrated systems and services that meet the needs of researchers.
- Contribute to wider departmental and divisional activities through discussions and meetings.

Flexible personal allocation (5%)

- A divisional initiative for staff to spend time on their own projects, e.g. contributing to open source software or learning a new technology.

Person specification

Criteria	Essential or Desirable
Qualifications	
Graduate degree with a significant computational component.	Essential
PhD degree in a computationally based field or equivalent professional experience (significant experience programming for Research and Development in an academic or industrial setting).	Essential
Experience and knowledge	
Experience in computer programming using C/C++ in a scientific field including algorithm development.	Essential
Experience of analysing, researching and solving complex programming problems.	Essential
Knowledge of and commitment to software development best practise including issue tracking, testing, documentation, version control and continuous integration.	Essential
Experience in the development of user interfaces using the Qt framework (or equivalent UI frameworks).	Desirable
Knowledge of user interface design principles including user-centred design.	Desirable
Experience in using the open-source image analysis libraries ITK and/or VTK.	Desirable
Experience in using SQL databases and object relational mapping systems.	Desirable
Experience in working with common medical image and scientific data formats (e.g., DICOM, NIFTI, HDF5).	Desirable
Experience in developing software within a quality management system.	Desirable
Knowledge of and experience with common software architectural patterns.	Desirable
Experience in using HPC software on computer clusters, including the use of job submission and scheduling scripts (e.g., using PBS).	Desirable
Skills and abilities	
Excellent written and verbal communication skills including the ability to effectively present complex or technical information to a range of audiences.	Essential
Ability to prioritise and work efficiently as well as a willingness to support development projects when meeting deadlines.	Essential
Ability to work collaboratively within a multidisciplinary team of software engineers, physicists, engineers, and clinicians.	Essential
Attributes	
Desire to keep up-to-date and learn about new developments in computational research.	Essential

Criteria	Essential or Desirable
Willingness to learn and develop new skills as required	Essential
Commitment to supporting the work of UCL and the Department	Essential
Commitment to continuous professional development	Essential
Commitment to UCL's policy of equal opportunity and the ability to work harmoniously with colleagues and students of all cultures and backgrounds	Essential

Apply

To apply for this position visit:

ucl.ac.uk/jobs