

**Information for Candidates**  
**The School of Informatics**  
**Research Associate**  
**Vacancy Reference:**

The School of Informatics, University of Edinburgh invites applications for a Research Associate position to work on a project with Facebook Reality Labs. **Two positions** are available: one about **animating hand-object interactions** and another about **animating human-human interactions**. This is 100% funded research position for three years with annual revision. The successful candidate will be supervised by Dr Taku Komura (University of Edinburgh) and Facebook Reality Labs.

The objectives of the project are to investigate how to let neural networks learn representations that can be used for human-object grasping and human-human interactions for virtual reality and computer graphics applications.

This position is full-time, available from 1<sup>st</sup> November 2018. The project duration is 36 months. The contract will be updated every 12 months.

To apply please include:

- a brief statement of research interests (describing how past experience and future plans fit with the advertised position)
- complete CV, including list of publications
- the names and email addresses of two references

The closing date is 15th October 2018.

Salary scale: UE07: £32,548 - £38,833pa

Informal enquires can be made to Taku Komura [tkomura@ed.ac.uk](mailto:tkomura@ed.ac.uk) .

## **Project information**

### **Animating Hand-Object Interactions**

#### Research Purpose:

Automatically generating animation of characters to grasp and manipulate 3D objects, given its geometry, label and action required by the character.

The research result will enable two types of applications in VR:

1. The animation model can be used as a strong prior for tracking virtual humans interacting with virtual or physical objects. Given low dimensional sensor input or tracking artifacts, the animation model can be used to fill in missing details and produce high fidelity output.
2. The motion synthesis technique can be used to animate virtual assistants or companions that interact autonomously with human users in VR in social, productivity, or entertainment activities.

#### Research Description:

We will use a data-driven approach for achieving this task. More specifically, we will capture the motion of a person grasping and manipulating everyday objects, including mug cups, vases, bags, chairs, tables, boxes, etc. The motion of the objects will also be tracked. An

optical motion capture system will be used for this purpose. The collected data will be used to generate synthetic depth images, which correspond to what the character is seeing during the action. An end-to-end deep neural network scheme will be established where the motion of the character at every frame is computed based on the state of the character and the object as captured from motion sensors or image sensors.

The main research tasks will include (a) mapping low dimension or low quality input to high fidelity input, for both hands and the body, with object manipulation motions, (b) predict hand manipulation motions from initial states, including cluttered environment, novel objects, and both hands, (c) extend the second one to full body, and also explore strategic manipulations.

### **Animating Human-Human interaction**

Research Purpose: Developing a statistical human model that can talk to one another, or having physical interactions such as shaking hands, dancing, playing sports, etc.

Research Description:

The purpose of this project is to develop a responsive character model that can interact with each other, or with a real human in real-time. Such a model will be useful for controlling a virtual character to interact with users wearing VR headsets, or animating the interactions between two virtual characters.

We will target two types of interactions: (a) two persons talking to each other, and (b) two persons conducting physical interactions, such as shaking hands, dancing and playing sports.

We will adopt a data-driven approach for achieving this task. The motions of two persons interacting with each other will be captured using an optical motion capture system equipped in the School of Informatics, University of Edinburgh. For the conversation task, we will also record the voices of the subjects. These data will be used to train a statistical model based on deep neural networks. In order to increase the amount of data, we will also do a data augmentation task, where the motions will be edited while the constraints and spatial relations are preserved.

### **1. Job Details**

Job title: Research Associate  
School: School of Informatics  
Line manager: Principal Investigator

### **2. Job Purpose**

Research staff are normally employed to work on a particular project. Occasionally a post holder will work on more than one project. This job description sets out the very general nature of such a post. Specific responsibilities will be determined by the project itself, and the member of staff (Principal Investigator) responsible for that project.

### **3. Representative Work Activities**

In general, to support the Principal Investigator of a specific project in achieving the goals of that project, under her direction.

- Undertaking a specific role in the research project under supervision.
- Taking responsibility for some elements of the planned research.
- Planning and carrying out a work programme appropriate to the research activity.
- Developing own research portfolio in related areas.
- Contributing to the writing of research grant applications.
- Contributing to dissemination and publication of personal and/or the research team's findings as appropriate.
- Contribute to learning and teaching through activities such as project supervision, tutoring and marking (limited to no more than 5% on an annualised basis).

### **4. Planning and organising**

The post holder will agree a general plan of research with the Principal Investigator and progress will be monitored at pre-scheduled meetings.

### **5. Problem Solving**

The problems to be faced are purely scientific and the post holder will supply the detailed expertise for delivering a solution. They will be expected to achieve this under instruction by and with advice from the Principal Investigator and other academic and senior research staff.

### **6. Decision making**

The post holder will determine the specific techniques and approaches to be used in the course of the research, in agreement with the Principal Investigator.

### **7. Key contacts/relationships**

The postholder will principally interact with the Principal Investigator and other research staff and research students. More generally, the postholder will discuss the work, and other questions of scientific interest, with other members of the School. The postholder will be expected to represent the University externally, by presenting their work at specialist meetings or workshops in the relevant research area. They may also be required to provide advice and support to research students.

### **8. Knowledge, Skills and Experience Needed for the Job**

#### Essential

- PhD in Computer Graphics, Computer Vision, Machine Learning, or closely related area.
- Strong publication record at top computer graphics and/or computer vision and machine learning venues (SIGGRAPH, SIGGRAPH Asia, TOG, CVPR, ICCV, ECCV, PAMI, IJCV, NIPS, ICML, ICLR).
- Very good programming skills
- Experience in using deep learning libraries (e.g. PyTorch, TensorFlow, Caffe)

- Ability to work independently and manage own academic research and associated activities.
- Highly motivated and willing to work with PhD students
- Proficient in English, both written and spoken

#### Desirable

- Background and expertise in object detection and semantic segmentation.

### **9. Dimensions**

There are no line management responsibilities associated with this post.

#### **Informal Enquiries**

Informal enquires can be made to Taku Komura. [tkomura@ed.ac.uk](mailto:tkomura@ed.ac.uk).

#### **Application Procedure**

All applicants should apply online by accessing the link below and clicking the button at the bottom of the website.

[https://www.vacancies.ed.ac.uk/pls/corehrrecruit/erg\\_jobspec\\_version\\_4.jobspec?p\\_id=045477](https://www.vacancies.ed.ac.uk/pls/corehrrecruit/erg_jobspec_version_4.jobspec?p_id=045477)

The application process is quick and easy to follow, and you will receive email confirmation of safe receipt of your application. The online system allows you to submit a CV and other attachments.

The closing date is 5pm on 29th October.

#### **Eligibility to Work**

In accordance with the Immigration, Asylum and Nationality Act 2006 and Immigration Act 2016 the University of Edinburgh, as an employer, has a legal responsibility to prevent illegal working and therefore must check that all employees are entitled to work in the United Kingdom (UK).

To do so, the University requires to see original documents evidencing right to work in the UK before commencement of employment and this is normally carried out at interview. Details will be provided in any letter of invitation to interview.

For further information on eligibility to work please visit our <https://www.ed.ac.uk/human-resources/recruitment/eligibility-immigration>

If you are from outside the EEA and not currently eligible to work in the UK, there are visa routes that may be available to you, for example:

Tier 1 (Exceptional Talent): If you are an academic in the field of sciences; humanities; engineering; medicine; digital technology; or the arts, it may be possible for you to apply for a Tier 1 (Exceptional Talent) visa. This route requires you to apply to be endorsed as an internationally recognised leader or emerging leader in your particular field by a designated competent body (Arts Council England, British Academy, Royal Academy of Engineering, Royal Society, Tech City UK). However, if you are applying for a senior academic role, e.g.

Professor/Reader there is an accelerated route to endorsement. Further information can be found on the <https://www.gov.uk/tier-1-exceptional-talent>

Tier 2: The University is a UKVI licensed sponsor and is able to issue a Certificate of Sponsorship (CoS) to successful candidates who are offered highly skilled roles and meet the eligibility criteria. The CoS enables candidates to apply for a Tier 2 (general visa).

Further information about whether you require a visa and other visa routes can be found at: <https://www.gov.uk/check-uk-visa>

## **Conditions of Employment**

### **Pension Scheme**

This role is grade UE07 and therefore the post holder is automatically included in membership of the Universities Superannuation Scheme (USS), subject to the USS membership criteria, unless they indicate that they choose not to join the Scheme.

For further information please visit our <http://www.ed.ac.uk/schools-departments/finance/pensions/auto-enrolment>

### **Salary**

The role is grade UE07 and attracts an annual salary of £32,548 to £38,833 for 35 hours each week. Salary is paid monthly by direct transfer to your Bank or Building Society account, normally on the 28th of the month. Salaries for part-time staff are calculated on the full-time scales, pro-rata to the Standard Working Week.

**The University reserves the right to vary the candidate information or make no appointment at all. Neither in part, nor in whole does this information form part of any contract between the University and any individual.**