

<b>Job Title:</b>	Research Assistant/Associate
<b>Department:</b>	Department of Electrical and Electronic Engineering
<b>Faculty:</b>	Engineering
<b>Job Family and Level:</b>	Academic and Research, Level A/B
<b>Responsible To:</b>	Professor Yiannis Demiris
<b>Works Closely With:</b>	Professor Yiannis Demiris, members of the Personal Robotics Lab, Research Group Administrator
<b>Duration:</b>	28 months with possibility of extension

## **Summary of the post:**

The post is funded by EPSRC as part of a USA-UK MURI (Multidisciplinary University Research Initiative) to investigate Closed-Loop Multisensory Brain-Computer Interfaces for Enhanced Decision Accuracy.

To carry out a research programme in computational modelling of human attentional processes using machine learning on human physiological and behavioural data. This research will be done in the context of high performance assisted driving using driving simulators and virtual/augmented reality systems.

## **Research Duties**

- To take initiatives in the planning and execution of the research programme:
  - To identify and develop suitable computational techniques for the collection and analysis of human physiological and behavioural data, including eye tracking data, head and body kinematics, heart rate, respiration, and user actions and corresponding performance data in the driving scenario. To conduct data analysis and to ensure the validity and reliability of data at all times.
  - To develop and apply machine- learning algorithms on the collected data to characterise user performance and infer underlying human states, including attentional workload, and stress, and human intentions.
  - To develop intelligent algorithms for deciding how multimodal information should be presented to the user to mitigate the effects of attentional workload. To validate the approach with multiple experiments using driving simulators and virtual/augmented reality setups.
  - To collaborate with other scientists from the MURI consortium (USC, CHSL, UC Berkeley, Harvard, and NYU in the USA, and Essex and UCL in the UK) to promote the programme's scientific objectives.
- To maintain accurate and complete records of all findings, maintain highly organised and accurate record of experimental work and developed software, write reports for submission to research sponsors, present findings to colleagues and at conferences, and submit publications to refereed journals.

- To actively participate in the research programme of the Personal Robotics Laboratory, contribute to the smooth running of the lab's facilities with other scientists, clinicians, technicians and students within the laboratory.
- To comply with the College, Division, and Unit safety practices and to attend courses on safety when appropriate.
- Any other duties as may be deemed reasonable by Professor Demiris, or the Head of the Department.

**Where Imperial or funder conditions necessitate, you will be required to complete timesheets for your work on projects in a timely manner.**

#### **Other Duties**

- To undertake any necessary training and/or development
- To undertake appropriate research programme administration tasks and to attend relevant meetings
- To observe and comply with all College policies and regulations, including the key policies and procedures on Confidentiality, Conflict of Interest, Business Continuity, Data Protection, Equal Opportunities, Ethics related, External Interests, Financial Regulations, Health and Safety, Imperial Expectations (for new leaders, managers and supervisors), Information Technology, and Smoking.
- To undertake specific safety responsibilities relevant to individual roles, as set out on the College Health and Safety Structure and Responsibilities web page: [www.imperial.ac.uk/safety/policies/organisationandarrangements](http://www.imperial.ac.uk/safety/policies/organisationandarrangements).
- To undertake [Business Continuity responsibilities](#) relevant to individual roles

**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.**

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## IMPERIAL COLLEGE LONDON

### PERSON SPECIFICATION

Applicants are required to demonstrate that they possess the following attributes:

#### **Qualifications:**

Research Associate

- Hold a PhD (or equivalent) in Computer Science, Electrical Engineering, Mathematics, or a closely related discipline.

Research Assistant

- MSc (or equivalent) in related disciplines with a strong computational and mathematical core, coupled with equivalent research, industrial or commercial experience.

#### **Knowledge / Experience:**

Essential

- Strong background in one or more of signal processing, machine learning, control, brain-machine interfaces, optimisation, or mathematical modelling of neural processes with practical experience within a research environment and / or publications in relevant refereed journals and conferences
- Strong software engineering skills, e.g. in C++/Python, with a demonstrable record of experience in implementing substantial algorithms.
- Strong interest in understanding and modelling human brain processes in order to design, implement and evaluate real brain-machine interfaces for assisting drivers.

Desirable

- Experience in collecting and analysing multimodal human behavioural and physiological data, including eye tracking data; experience in designing algorithms for processing and classifying such data.
- Experience in the development of virtual reality environments or 3D games; experience in developing brain-machine interfaces.
- Experience in real time control and distributed processes.

#### **Skills and Abilities:**

- Excellent verbal and written communication skills, with a strong ability to write clearly and succinctly for publication, project deliverables, and presentations.

**Other:**

- Willingness to work as part of a team, locally and with other academic partners, and to be open-minded and cooperative
- Discipline and regard for confidentiality and security at all times
- Willingness to travel both within the United Kingdom and abroad to conduct research, collaborate with academic partners, and attend conferences and project meetings.