Title: Haptic Teleoperation for Space applications

Type of award: PhD Research Studentship

Department: Mechanical Engineering

Scholarship Details: The scholarship covers the following:
- full PhD tuition fees for UK/EU (EU applicants who have UK residency prior to October 2020)
- Tax-free stipend topped up above the current RCUK rate (£15009 in 2019/20) to a minimum of £16,000 (increasing each year).
- Generous allowance for conference travel and equipment/consumables.

EU nationals resident in the EU may also apply but will only qualify for PhD tuition fees.

Duration: 4 years

Eligibility: Home/EU applicants only

Start Date: 1 October 2020

PhD Topic Background/Description

This is a prestigious EPSRC iCASE studentship co-funded by Thales Alenia Space (Bristol Office).

This is a PhD opportunity to join the dynamic and inter-disciplinary research communities of the Bristol Robotics Laboratory and the University of Bristol via the FARSCOPE CDT programme. FARSCOPE’s vision is ubiquity – robots everywhere – and will require a step-change in the richness with which robots interact with their surroundings. Ubiquity promotes consideration of contextual impact beyond the machine, including social and societal considerations that are common to robotics deployments in any scenario; extreme and challenging environments, next-generation manufacturing, autonomous transport and health and social care.

Robotics in various complex environments has become a new challenge covering applications in underwater or nuclear environment, space, as well as healthcare (assisted living, diagnostics and surgery). Such areas, where safety issues prevent use of autonomous robots, can benefit from teleoperation, user-centred design and haptics.

Haptic feedback provides the operator with additional information which can allow for better judgment during teleoperation compared to systems which include only (and often limited) visual feedback. This can be a crucial asset, especially in fine manipulation tasks or under stressful conditions.

This project will specifically address the use of haptics in teleoperation for space applications. In-orbit robotic systems are being developed that can be operated from the Earth’s surface, removing the need for humans in-orbit to assemble large structures for lunar or planetary exploration in Low Earth or Cis-Lunar orbit. This approach is also expected to be developed for missions to the Moon or Mars where surface robotic systems would be operated from Moon or Mars orbit.
The project will aim to assess the impact of signal delay/loss during teleoperation of a robotic arm when haptic feedback is available and to investigate into methods that can be implemented to support the dexterity and efficiency of the user during such events. Furthermore, different types of haptic feedback (such as tactile, kinaesthetic vibration) can affect the teleoperation capability of the operator in various ways. Exploring the effectiveness of various methods will provide a complete assessment of the challenge.

URL for further information:
https://www.farscope.bris.ac.uk
https://www.thalesgroup.com/en/countries/europe/united-kingdom/markets-we-operate/space

**Further Particulars**

**Candidate Requirements**
We are looking for a committed and highly motivated PhD student holding an upper second-class honours degree in a Robotics, Engineering, Computer Science, Physical Sciences, Mathematical Sciences or a relevant discipline.

You should have strong mathematical and programming skills and be fluent in written and spoken English. If English is not your first language, please provide a recognised English language qualification at Profile E. Further information: [http://www.bristol.ac.uk/study/language-requirements/profile-e](http://www.bristol.ac.uk/study/language-requirements/profile-e)

Please note that, whilst based at the University of Bristol, this EPSRC iCASE studentship requires a minimum of 3 months, usually working 1 day per week, to be spent on site at Thales Alenia Space, Bristol. Candidates will be required to undergo baseline security vetting.

**Equal opportunities statement**

We seek an inclusive environment that respects the diversity of our staff and students and enables them to achieve their full potential, to contribute fully, and to derive maximum benefit and enjoyment from their involvement in the life of the University. We are committed to building and sustaining an excellent learning experience for our students, where staff are equally valued and respected, and students are inspired to thrive academically.

**Scholarship Details**
£16,000 1st year, £16,500 2nd year, £17,000 3rd year, 17,500 4th year

**Informal enquiries**
Please email Dr Antonia Tzemanaki (Antonia.Tzemanaki@bristol.ac.uk)
For general enquiries, please email sceem-pgr-admissions@bristol.ac.uk

**Application Details**
Prior to application, send your CV and cover letter describing your interest and proposed direction for this studentship to Dr Antonia Tzemanaki (Antonia.Tzemanaki@bristol.ac.uk).

To apply for this studentship submit a PhD application using our online application system [http://www.bristol.ac.uk/study/postgraduate/apply/]
Please ensure that in the Funding section you tick “I would like to be considered for an iCASE funding award from the Mechanical Engineering Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor.

Interested candidates should apply as soon as possible.