

Psychological safety Doctoral Studentship

Student Fee status: Home or Overseas

Start Date: To be confirmed – may be earlier than standard October 2022 start if agreed by all parties

Being safe, feeling safe: designing, measuring and evaluating underlying factors determining safety and trust in autonomous vehicles.

Background and rationale

There is currently significant research focus on making autonomous systems (including artefacts such as robots, drones, autonomous vehicles, as well as disembodied artificial intelligences) 'trustworthy' and 'safe'. There is not yet a consensus around what those terms may mean.

Although the maintenance of physical safety in human robot interaction has received much attention from industry and academia, little attention is given to the investigation of attributes determining the psychological harms that may be caused by autonomous systems of various kinds, and the need to investigate psychological safety in such systems.

Drawing on a Responsible Innovation approach, this research role will explore the relationship between psychological safety and the dimension of trust/confidence in autonomous vehicles (AVs), such as the impact of trust, over-trust and under-trust in perceived and actual safety. The focus of the research will be on both the AV's user (driver and passengers) and other road users.

The studentship will be located within the Responsible Technology Institute (RTI) at the University of Oxford, and will be supervised by Dr Lars Kunze (Oxford Robotics Institute) and Dr Pericle Salvini (RTI). The RTI has several relevant projects that may be expected to both inform and learn from the studentship, and the student will have the opportunity to collaborate widely within the research group. For the psychological element, the students will liaise with experts, including from Oxford University and from Trustworthy and Autonomous System Hub and Nodes. There may also be opportunities to undertake work at the industrial sponsor.

Research challenges/outcomes

- Literature review on psychological safety in the field of AVs and factors of trust/confidence in AVs.
- Engaging with main stakeholders to identify challenges and evaluate possible solutions around trust/confidence and psychological safety in AVs
- Running user studies (using a driving simulator and an immersive driving experience) to measure factors of trust/confidence in safety critical driving scenarios using appropriate metrics, such as questionnaires, behavioural observations, or physiological parameters as well as AV data.
- Validating a toolkit for designers and developers containing recommendations on how to embed trust/confidence in AVs, based on the project outcomes.

Potential impacts

For academia

- Advancing the state of the art in research in psychological safety in AVs
- Creating collaborative interactions between different disciplines: robotics engineers, psychologists, social scientists

- Advancing scientific knowledge on issues affecting trust/confidence in AVs.
- Publishing research outcomes in leading journals and conferences.

For industry

- Provide AVs developers and designers with practical recommendations on how to perform risk assessment of psychological safety in AVs.
- Set a new benchmark for trust/confidence in AVs
- Create a framework that can offer both widely applicable and generalisable methodologies for psychological safety as well as guidance on where and how these need to be tailored for context.
- Collaborate with standards associations, such as IEEE or BS, to develop a new standard on psychological safety specifically designed for AVs.
- Participate in interactions with ongoing research in the field such as within the Trustworthy Autonomous Systems Hub and Nodes.

Essential criteria

- Experience of, or a strong interest in, the interplay between developing technology in AVs and user-perceived safety
- Demonstrated ability to conduct and manage a research project Excellent verbal and written communication in English
- Demonstrated ability to author and deliver clear, well-constructed scientific writing and presentations.
- The student will be expected to utilise both qualitative and quantitative methods for their studies.
- The student will participate in the RTI student network and be involved in the RTI's other projects (such as the RAILS project involving autonomous vehicles and drones) to a degree compatible with their programme of research.

Collaboration with industrial partner

The studentship is funded in partnership with a global engineering R&D company and it is anticipated that there will be an ongoing working relationship with the funder as the industrial partner. This is likely to take the form of regular meetings, anticipated to be every six months.

The funder will also support the student's work through access to technical facilities (such as simulators or other hardware), datasets, and/or expertise (eg for stakeholder workshops or qualitative studies) dependent upon the student's research plan. It is anticipated that the student's focus will be complementary to the funder's areas of expertise.

Studentship details and how to apply

The studentship will provide an annual stipend (at the UKRI rate) of at least £15,840 per annum for 3.5 years (42 months).

The project will also cover the cost of course fees at the level set for either Home students or Overseas students (as applicable).

Applicants must satisfy the usual requirements for studying for the DPhil in Computer Science at Oxford.

Applicants should apply for the DPhil in Computer Science online by midday UK time on Friday 7 January 2022, quoting studentship reference 22-CS-CGO in their application.