

PhD Studentship – ROBOT VISION

(for award and course start date of October 2019)

The School of Computer Science and Electronic Engineering in the Faculty of Science and Health at the University of Essex are pleased to announce a PhD grant studentship available in ‘**Robot Vision**’.

This studentship award and course will start from **October 2019** and the successful applicant will receive a scholarship for three years (subject to satisfactory progression).

The studentship includes:

- A full Home/EU fee waiver or equivalent fee discount for overseas students (£4,630 in 2019-20). International students will need to pay the balance of their fees.
- A doctoral stipend equivalent to the Research Councils UK National Minimum Doctoral Stipend (£15,009 in 2019-20)

Project Information

For the next level of robot intelligence, maps need to extend beyond geometry and appearance — they need to contain semantics. The inclusion of rich semantic information within a dense map enables a much greater range of functionality than geometry alone. The PhD student will be investigating how knowledge from visual SLAM and machine-learned labelling can be brought together to enable powerful semantic and object-aware mapping in extreme environments. Recent works [1, 2, 3] on dense semantically annotated 3D maps of indoor scenes hint at the improvements possible with significantly longer trajectories, such as those of an autonomous robot in a nuclear facility, making direct use of the semantically annotated 3D map. More specifically, the PhD student will tackle this problem using visual SLAM approach as it is a key enabler for both ground-based and aerial platforms (such as drones). The PhD student will employ event cameras, as they have enormous potential for fast and low power vision algorithms for robots, and will develop new algorithms for solving the challenging problem of visual SLAM. The PhD student will perform joint estimation of 3D scene structure, 6-DoF camera motion and up to scale scene intensity from a single event camera moving in an unstructured extreme environment of which it has no prior knowledge.

References

- [1] John McCormac, Ankur Handa, Andrew J Davison, Stefan Leutenegger. SemanticFusion: Dense 3D Semantic Mapping with Convolutional Neural Networks. IEEE International Conference on Robotics and Automation (ICRA), 2017.
- [2] J. Stückler, B. Waldvogel, H. Schulz, and S. Behnke, “Multi-resolution surfel maps for efficient dense 3d modeling and tracking,” Journal of Real-Time Image Processing JRTIP, vol. 10, no. 4, pp. 599–609, 2015.
- [3] A. Hermans, G. Floros, and B. Leibe, “Dense 3d semantic mapping of indoor scenes from rgb-d images,” in Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2014.

Please address any additional questions and queries about the studentship to:

Prof Klaus McDonald-Maier (kdm@essex.ac.uk) and Dr Shoaib Ehsan (sehsan@essex.ac.uk)

Entry Requirements

The successful candidate would be expected to speak fluent English and meet our English Language requirements and will have a good honours BSc or BEng degree (1st, 2:1, or equivalent) in computer science, electronic engineering or a related subject.

An MSc with Merit or Distinction is desirable (but not essential for students with a first class degree). Strong analytical and mathematical skills are required, as well as good programming skills. Knowledge of computer vision, machine learning, and/or robotics are desirable but not essential.

How to Apply

Please note that to be considered for this award you must submit the following:

- a PHD course application via the university PG Admissions online course process, and in addition
- a separate CSEE school application form

Please ensure you follow the application instructions below:

1. Please access the school studentship application form here: <https://www.essex.ac.uk/-/media/documents/departments/csee/studentships/csee-scholarship-application-form-oct-2019.doc> , complete the form and submit this by email to: csee-pgadmissions@essex.ac.uk by the deadline of: **17 May 2019** and please include the studentship project title: 'Robot Vision'.
2. You must also apply for your PHD course via the University of Essex online admissions application process here: [website](#), (including uploading all supporting documents required) by the deadline of: **17 May 2019**. Please select "PhD Computer Science" as your course.
3. Please note on your PG Admissions application form in the 'Proposed research topic or area of research' field that you wish to apply for this studentship and include the title of the award "Robot Vision".

Notes for Applicants:

- It is expected that successful shortlisted candidates will be invited to attend interviews on: **3 June 2019**
- Successful applicants will be informed of the outcome of their scholarship award application by: **10 June 2019**.
- All applicants will be notified of the outcome of their PHD application in a separate letter from PG Admissions.

For information on research in CSEE please refer here: [research interests](#) and for staff profiles <https://www.essex.ac.uk/departments/computer-science-and-electronic-engineering/people/academic>.

If you have a disability and would like information in a different format telephone (01206) 873521/874588.