Fully funded PhD Studentships

The Crabb Lab at City University London provides a lively research environment with a unique mixture of vision scientists, ophthalmologists, computer scientists and mathematicians. For more information: [www.staff.city.ac.uk/crablab](http://www.staff.city.ac.uk/crablab)

Two full time PhD studentships in “data science” are now available (October 1st 2016) in this lab focussing on:

1. **Detecting and monitoring glaucoma using eye movement scan paths**

Eye movements (EMs) are the most frequent voluntary action we make in our waking day, occurring more times per second than our hearts beat. A predominant EM is the saccade – the quick, ballistic action the eyes make as they move between fixations. Our overall working hypothesis is dysfunction in the visual system can turn up in the form of telltale differences in a person’s gaze measured by state-of-the-art eye tracking, including a novel analysis of patterns of saccades, as a person watches a film. Glaucoma detection and monitoring is done, mainly inadequately, in a clinic; a system that is likely unsustainable in the future. Instead of relying on infrequent tests in a clinic, focus should shift to capturing vision loss as part of a person’s ordinary daily activities. Our contention is that anomalies in EMs tracked during viewing of stimuli have the potential to be developed into a rigorous test that could be incorporated into an everyday activity, like something as simple as watching a movie. Our research lab is collecting an archive of EM data in people with and without glaucoma as they watch different types of movies & footage of natural scenes and this data is available for analysis in this project. We therefore seek a creative scientist that can further develop methods to analyse these data.

**Supervision**
Prof. David Crabb [www.staff.city.ac.uk/crablab](http://www.staff.city.ac.uk/crablab)

**References**
2. Combining imaging and functional measurements in glaucoma

In clinical practice, the main measurement of vision loss in glaucoma is done with automated perimetry yielding visual field maps. These maps exhibit massive measurement variability often meaning delayed identification of disease deterioration, with a consequence on treatment outcomes, and the requirement for frequent clinic visits for visual field examinations, with consequent cost and patient inconvenience. This programme of work will investigate if combining information from retinal imaging and conventional visual field measurements accelerate the reliable identification of vision loss in patients with glaucoma. This programme of work will adapt and develop statistical models for detecting glaucoma progression already developed at City University London and will also incorporate modern statistical methods (feature extraction) for assessing changes in shapes in the retinal images. The project will take advantage of huge data sets of measurements taken from clinics and clinical trials. We seek a creative data scientist who will develop these statistical methods to potentially provide improved clinical outcomes. The scientist will also work directly with software engineers at Heidelberg Engineering with the aim of implementing the methodology on clinically used instruments.

Supervision
Prof. David Crabb  www.staff.city.ac.uk/crabblab
Heidelberg Engineering  http://www.heidelbergengineering.com/

References
The studentships

Training in software engineering, programming, statistics, biomedical engineering, computer science (at Masters level). Detailed knowledge about vision or eyes will not be required, but a flair for creatively analysing data is essential. Alternatively someone with clinical (biomedical) expertise and some knowledge/expertise of the above.

The 3-year studentship has a salary of about £25K pa with all fees for PhD registration paid. Eligibility criteria of the Marie Skłodowska-Curie grant apply. There will be training opportunities too. More details regarding the positions can be found on the EGRET+ website: http://egret-plus.eu/

Applications (CV, including names of two referees and a statement of interest about the project) should be submitted by email to:

Professor David Crabb.
School of Health Sciences,
City University London, Northampton Square, London EC1V 0HB  Tel: +44 (0)20 7040 0191
Email: d.crabb@city.ac.uk  Informal enquires are strongly encouraged.