

PhD position in Strasbourg (Sept. 2020): Self-regularised deep learning in the presence of limited data for medical imaging

A PhD position is open at the University of Strasbourg (ICube) – France, starting September 2020

Self-regularised deep learning in the presence of limited data for medical imaging

The adoption of deep learning techniques in medical imaging applications has been limited by the availability of the large labelled datasets required for robust training, as well as the difficulty of explaining their decisions. This thesis will make contributions towards overcoming both of these limitations.

It will achieve this by developing approaches to learn more robust representations using explainability. These approaches will be referred to as self-regularised deep learning in the presence of limited data. The problem of domain adaptation and learning domain invariant representations in histopathological whole slide segmentation will be taken as the initial focus of this study, but this is open to be expanded during the project. Current approaches fail to achieve domain invariance because of the large domain shifts between histochemical and immunohistochemistry stainings.

An initial research direction will be to develop novel training mechanisms that are aware of, and therefore avoid, situations in which the network focusses only on limited parts of the salient information (as defined by the expert through few manual annotations) will be developed. These will force a more general representation to be learnt. The benefit being threefold: the model will be more generalisable, more domain invariant, and more amenable to transfer learning.

Strasbourg: Strasbourg is a beautiful medieval city (its historic city centre is a UNESCO World Heritage Site) on the crossroads of Europe, with Germany a tram ride away, and both Switzerland and Luxembourg short train trips away. The [University of Strasbourg](#) traces its roots back to the 16th century, has numerous Nobel laureates, and is a member of several prestigious research networks and France's *Initiative d'Excellence*.

ICube and SDC: Created in 2013, [ICube](#) laboratory brings together 650 researchers in the fields of engineering and computer science. The [Data Science and Knowledge](#) research team (SDC) covers a large spectrum of research in artificial intelligence, particularly data science, machine learning, and their applications. The team has close collaborations with several hospital research departments, both in Strasbourg and abroad, and through these, the research has the potential to impact medical and biological research.

Candidate Profile: The position is open to both foreign and French students who hold a Master's degree in Computer Science. The candidate must have a good mathematical background, skills in machine learning (supervised and/or unsupervised). Experience in deep learning and representation learning would be a plus. French is not necessary, but the candidate must be confident in spoken and written English.

Send a letter of motivation, your CV, and a transcript of grades to [Dr Thomas Lampert](mailto:lam1pert@uni2stra.fr) (lam1pert@uni2stra.fr - !remove the numbers!) and Prof Pierre Gañarski (gan1carski@uni2stra.fr - !remove the numbers!).

The application deadline is 20th May.