

PhD proposal – TIMC-IMAG laboratory – Grenoble, France

Needle and seed detection in ultrasound images for adaptive prostate brachytherapy

Supervisors: Jocelyne Troccaz, Céline Fouard and Sandrine Voros

The context of this PhD is image-guided medical interventions and more precisely concerns the treatment of prostate cancer by ultrasound-based interstitial brachytherapy. The treatment, consisting in inserting radioactive seeds (small cylinders 0,5x10mm) through needles, is prepared in order to deliver a given dose to the prostate while sparing organs at risk. In practice, several factors result in a difficult placement of the seeds at their planned position. The needle insertion and seed injection is controlled by the operator based on ultrasound images guidance. This thesis is about the development of automatic image processing methods and image fusion for the accurate and fast localization of needles and seeds. Such automatic methods are necessary to automatically adapt the treatment plan during the clinical protocol, based on actual positions of seeds.

This work takes place in the context of a 3-years collaborative project, named FOCUS, including two French laboratories, their associated clinical partners and a company.

The applicant should hold a master degree in image processing. He/she should be a skilled programmer in C++. Since the work is not limited to software development behind a computer screen, he/she should be interested in clinical applications and should feel able to set-up and handle experiments on real data.

Applicants should send a detailed CV and motivation letter to: jocelyne.troccaz@imag.fr before the end of October. The PhD should start by the end of this year or at the latest, in early January 2017.