

## **Improving Quality of Ultrasound Zoomed Images**

### **Host entity:**

*Philips Healthcare* is a world leader in medical imaging. Its products cover the full range of imaging modalities: X-Rays, MRI, Ultrasound, CT, etc. The company is internationally recognized for the excellence of its technology, developed within innovative research groups.

*Philips Healthcare Medisys Research Lab* is based in Suresnes (92) and is dedicated to medical image processing. The team, with about thirty researchers and engineers, is focused on delivering the most innovative solutions in the domain and is in close contact with famous universities and clinical sites in France and abroad.

### **Intern description:**

High ultrasound image quality is one of the most important factors for a successful ultrasound system design. A common operator, zooming, alters both contrast resolution and spatial resolution through an interpolation. This makes a zoomed image coarser and more blobby, thus less eye-pleasing from the human visual perspective. In this intern, we are interested in improving ultrasound image quality under a zooming operator by introducing a preprocessing step in order to gain a sharper and finer zoomed image. This step will be derived from mathematical optimization procedures based on a system modeling either in a statistical or in a variational framework.

The student will make a bibliographic research before focusing on several state-of-the-art methodologies. The student will implement these approaches with various numerical schemes in Matlab and/or in C++ and make inter-method comparisons as well as validations on a given image base. Time permitted, the intern objective may be extended to more challenging problems.

The student should manifest passion and curiosity for image processing scientific research, as well as an application-oriented vision with the capability of proposing solutions and making adaptations for real problems.

### **Candidate profile:**

- Training : Third year of engineer school/ Master 2 Recherche, with specialty in image processing
- Solid basis on image filtering, denoising, inverse problems, multi-resolution analysis, statistical estimation and numerical optimization techniques will be important and be appreciated
- Experience in Matlab and C++
- English reading and writing is required
- Good communication skills and ability to work in a team

**Duration:** 6 months

**Preferred start date:** from Mar. 2010 or later.

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