

Internship location: LTSI Inserm U1099, Université de Rennes 1, Rennes, France.

Internship supervisors: Pierre Jannin, pierre.jannin@univ-rennes1.fr

Starting date: February-March 2016; **Duration:** 5 to 6 months

Keywords : Surgical Process Models, dataviz, software development, Qt.

1. The CAMI context

Medical Interventions (surgery, interventional radiology, radiotherapy) can provide a significant boost for progress in terms of patient-specific optimal planning and performance. To fulfill patient's demand for Quality, Senior Operators demand to see beyond the immediately visible, to be assisted in their real-time vital decisions and to accede to enhanced dexterity, while junior operators request to "learn to fly" before being left alone, and Public Health Authorities and companies require demonstration of the Medical Benefit of innovations.

The Computer Assisted Medical Interventions LABEX (CAMI LABEX) strategic vision is that an integrated approach of medical interventions will result in a breakthrough in terms of quality of medical interventions, demonstrated in terms of medical benefits and degree of penetration of CAMI technology in routine clinical practice.

Among the different actions undertaken in the scope of the CAMI LABEX, about 10 internships are to be financed yearly. The following internship proposal deals with themes within LABEX's scientific field.

2. Subject

(see next page).

Internship 2016

Surgical Process Model analysis and visualization

Supervision:

- Contact: JANNIN Pierre, CR1 INSERM (pierre.jannin@univ-rennes1.fr)

Location: MediCIS team, U-1099 LTSI. INSERM/Université Rennes 1. Campus de Medecine, 35043 Rennes Cedex, France. <https://medicis.univ-rennes1.fr/>

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Context

The MediCIS team has been working on surgical process modeling for many years. The aim is to understand what occurs in the Operating Room during an intervention, such as actions performed by the surgeon himself or by members of his staff. With those actions, it is possible to create accurate models for any type of surgery which could be of use to assist a surgeon during a procedure. Software has been created in order to record actions in the OR: such as ProcSide (<https://medicis.univ-rennes1.fr/index/software/procside>). As of now, such software can be used to record a full SPM (i-e: both pre-operative and intra-operative information), however there is neither efficient/intuitive way to display a recorded SPM nor a way to visually compare different SPMs.

Internship focus

The internship work will focus on the visualization of SPMs from the data visualisation. The main objective of this internship is to create a module offering a visual representation (2D or 3D) of one or many SPM's simultaneously. Data visualization techniques will be studied. Additionally, methods will be studied for quantitative comparison of the displayed SPM's using visual features or some statistical analyses.

Trainee profile

- Master or engineering school curriculum.
- Programming skills: C/C++, Qt, CMake or Visual studio.
- Would be of advantage: statistical analysis, data visualization, data-mining knowledge.
- English (read, written).

Duration: 5 to 6 months starting February 2016. Earnings planned.