

# Development internship proposal

## 3D Point-cloud Registration: Graphical Front-End for OpenGR

Themes : computer science, computer graphics, shape registration, point cloud

Affiliation : IRIT UMR 5505, Université Paul Sabatier, Université Fédérale de Toulouse

Location : Rangueil, Toulouse, France

Research Group : STORM

Supervision : Nicolas Mellado (nicolas.mellado@irit.fr)

---

The internship will take place in the IRIT laboratory, on the Université Paul Sabatier Campus of Toulouse. The recruited intern will be a full member of the STORM research team, working with the other team members, PhD students and permanent researchers. He/she will participate to working groups, scientific seminars and other activities of our group.

The front-end will be implemented in modern C++ using Radium, a research 3D engine developed at STORM. The processing back-end is OpenGR, an open-source registration library developed and maintained by Nicolas Mellado.

### Context

3D scanner and point data acquisition hardware is today ubiquitous, e.g. for industrial applications, Cultural Heritage preservation and makers/DIY enthusiasts. The large variety of acquisition techniques (from very cheap to expensive solutions) has led in the past few years to the multiplication of acquired raw point-clouds representing physical objects (Fig 1). There is nowadays a strong need for algorithms to process these acquired point-cloud, and make them usable for 3D applications such as retro engineering, fabrication, or augmented reality.



Figure 1: Example of 3D point-clouds of the Pisa Cathedral (source).

### Objectives

This project focuses on the **registration** of point-clouds, a critical pre-process that aims at aligning several views of an object to a single coherent point-cloud. The main goal of the internship is to provide an easy to use software with a graphical user interface, to control and explore registration results provided by the OpenGR library.

### Student profile

- Master student in Computer Science or Applied Mathematics
- Strong programming skills + prior participation to medium-large size development projects.
- Knowledge on point-cloud processing
- Basic knowledge on computational geometry and shape analysis
- Fluent English or French spoken

### Contact

Nicolas Mellado: nicolas.mellado@irit.fr