

# Internship proposal

## PyPonca: A Python interface for the Point Cloud Analysis Library

Themes : computer science, python, C++, computer graphics, shape analysis, 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](mailto:nicolas.mellado@irit.fr))

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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. Experiments will be implemented on top of Ponca, a Point Cloud Analysis library developed in the team.

### Context

3D scanner and point data acquisition hardware are more and more used in the industry to capture our environment (Fig 1). A wide range of applications exploit point clouds, for instance retro engineering, automatic analysis of used part, augmented reality for technical intervention, topography, etc. In comparison to image processing, analyzing and processing 3d point clouds requires to use very specific models and algorithm.

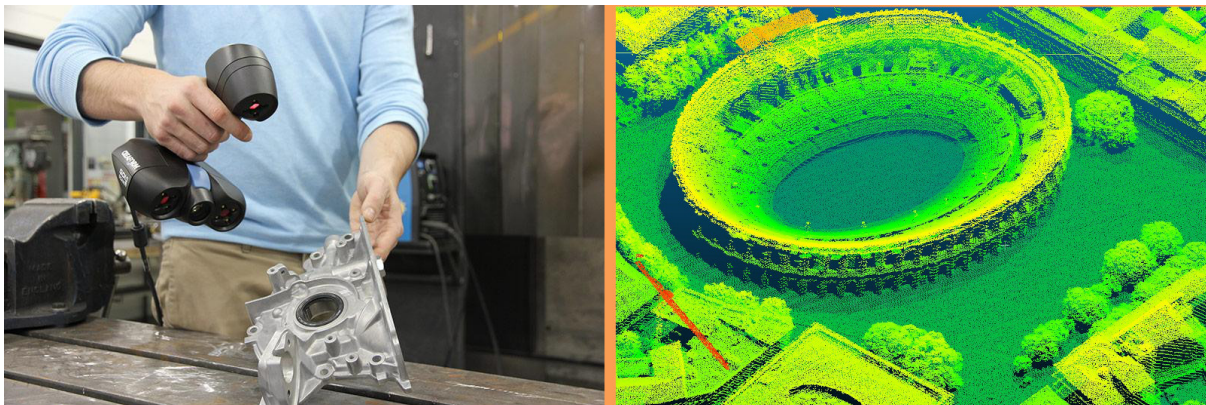


Figure 1: Left: Man-made object scanning using a Go!Scan3D portable point cloud scanner. Right: Point cloud of the arena of Nimes, acquired by the IGN (<https://geoservices.ign.fr/lidarhd>).

### Objectives

The Ponca library provides a set of tools to query, analyze and process 3d point clouds. It is written in C++, and use template programming to provide efficient and versatile tools. For some users however, these technologies appear to be difficult to understand and use.

The goal of this project is to develop a python interface to Ponca, using the Pybind library: <https://github.com/pybind/pybind11>. In collaboration with the supervisor, the first task of the intern will be to define the API that will be made accessible to python users. Then, he/she will implement this API, as well as examples, docs and tests demonstrating its usage.

Ponca is a library used by several research teams, and this internship is a great opportunity to participate to an open-source project providing cutting-edge research results to its community.

**Student profile**

- Student in Computer Science
- Good programming skills
- Knowledge on common Python frameworks
- Fluent English or French spoken

**Contact**

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**References**