

# Proposal of Scientific Project for validating Benke

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**Title :** Developing image processing and 3D techniques for cultural heritage

**Supervisor :** Sylvie TREUILLET (PhD, Ass. Professor), [sylvie.treuillet@univ-orleans.fr](mailto:sylvie.treuillet@univ-orleans.fr)

**Laboratory :** PRISME – Computer Vision & Image Processing team

**Internship period :** From January 15th till May 2016

## Scientific work

In Cultural Heritage, 3D modeling offers not only new fascinating and pedagogical representations for the general public, but also powerful tools that can be applied for visualization, analysis, restoration and preservation of cultural heritage. The use of 3D numerical technologies has progressed very far over the last few years among archaeologists and cultural heritage experts. It spreads a wide range of applications: landscape analysis, documentation of excavation areas, creation of digital representations of monuments and artifacts. However, most of the applications are focused on the use of point-cloud data for representation rather than solid model information required for structural analysis. We propose to develop and mix image processing and 3D techniques to provide some useful tools for historical monuments analysis. During this internship, the student will manipulate images and point-cloud data from available 3D modeling of world-class archeological Castel of Chambord by photogrammetric or laser scanning approaches to extract a semantic library of shapes and features driven by archeological knowledge. The study will be focused on detecting artifact in stones to prevent and guide the monuments preservation.

**Required skills:** good knowledge of programming skills.



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**Title :** Developing a low-cost image-based tool for early-diagnosis of skin-wounds in tropical areas

**Supervisor :** Sylvie TREUILLET (PhD, Ass. Professor), [sylvie.treuillet@univ-orleans.fr](mailto:sylvie.treuillet@univ-orleans.fr)

**Laboratory :** PRISME – Computer Vision & Image Processing team

**Internship period :** From January 15th till May 2016

## Context

Skin ulcers (SU) are one of the most frequent causes of consultation in primary health-care units in tropical areas. However, a large proportion of their diagnosis is performed by physicians not specialized in dermatology. This fact leads to a prolonged time without a proper management to adopt the right steps for correct diagnosis and adequate therapy. We propose to develop novel computer-aided-diagnosis and telemedicine tools based on image processing technologies which can be easily transferred and applied to under-served areas settings to improve the diagnosis and follow up of treatment of skin wounds. This research project will be developed in the context of international collaboration with Latin America countries (Peru, Colombia).

## Scientific work

The proposed tool will include evaluating the evolution in time of shape (depth, area and volume) and appearance (color and texture) as features for SU type differentiation and therapy monitoring, and should be embedded in an easy-to-use system (i.e. Tablet or Smartphone). During this internship, the student will have to consider the previous works (listed in bibliography below) to develop software on Smartphone to extract features from a series of images to evaluate the healing process of a SU at different time points. In particular color and texture will be considered with machine learning techniques to provide a robust tissue classification.

**Required skills :** good knowledge of programming skills.

## Bibliography

Leslie Casas, Sylvie Treuillet, Braulio Valencia, Alejandro Llanos and Benjamín Castañeda, Low-cost uncalibrated video-based tool for tridimensional reconstruction oriented to assessment of chronic wounds, SIPAIM, Cartagena, Colombia, October 14-16th, 2014.

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