



## Thesis Project Form

**Title (tentative):** The role of graphics realism in behavioural and physiological responses in Virtual Reality

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### Description

#### Motivation and application domain

The main motivation of this thesis is to analyze the role of graphics realism and computer graphics details in virtual reality applications for healthcare, from training to rehabilitation.

#### General objectives and main activities

Virtual Reality environments can be created with different levels of graphics details and realism, ranging from cartoonized and stylized scenes to high-quality and high-realism approaches like Gaussian splatting 3D rendering techniques.

The main objective of this thesis is to analyze the role of visual quality on user behaviour, to understand whether high realism is a desirable feature, and when low-poly and low-res graphics are preferable.

The students should implement the same scenario, considering different level of realisms, and then implement inside it a set of cognitive/motor tasks.

Behavioural, physiological, and self-reported quality measurements will be collected.

The collected data will be analyzed and used to build a model that could be used as a feedback signal to modulate the scene's graphics details.

Specific case studies will also be considered, e.g., existing exergames/serious games.

#### Training Objectives (technical/analytical tools, experimental methodologies)

The thesis will consist of a preliminary part consisting of programming the virtual environment, with the possibility of modulating the graphics realism parameters.

Then, the experiments should be designed and implemented.

Finally, an experimental study will be conducted to collect the data necessary to model the user behaviour as a response to the environment's graphics quality.

**Place(s) where the thesis work will be carried out:** DIBRIS - Valletta Puggia (PILab)

### Additional information

**Pre-requisite abilities/skills:** Programming in C++ or C, Basic knowledge of Unity3D

**Maximum number of students:** 2