3D graphic engineer/Master's thesis internship

Location: INRAE/Jouy-en-Josas **Department:** Computer Science **Experience:** Master

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INRAE/MaIAGE and INRIA/AVIZ join their efforts to create efficient software for the investigation of complex image data in the live sciences. Specifically, we are investigating the use of Hololens2 helmet to provide augmented reality visualization of image data obtained from 3D or 3D+Time microscopy acquisition.

During this internship the objective is the handling of one or several collection or set of valuated mathematical graphs. Different features, depending on the application, may be associated to the nodes and edges of the graphs. Some metric could also be considered on the graphs ,allowing their comparison. Moreover, a geometric context or environment could be associated to a collection of graphs. The two main tasks of the internship consist in a) adding context or environment in the 3D visualization of collection of graphs, b) designing clever selection tools in order to focus the attention on a subset of graphs that will be highlighted and also reorganized and registered in a new scene inside the user environment.

At this moment we are interested in two applications of such Hololens device : the analysis of endocytosis tracks, the cell lineage during early development.

The design and implementation of this interface for enriched visualization and clever selection of graphs are the core aspects of the internship and Master's research.

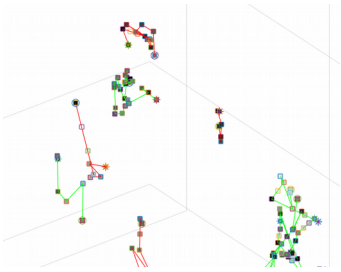

Fig. 1 Some tracks related to endocytosis.

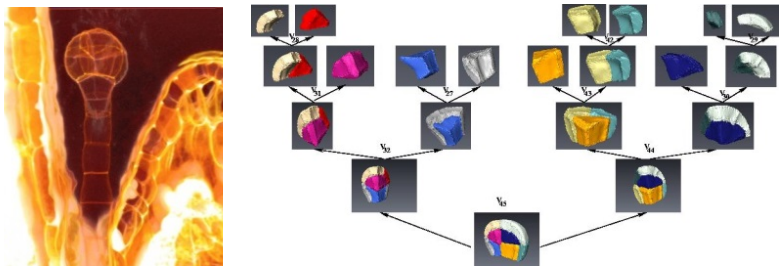

Fig. 2 Lineage tree of half of an embryo.

Position overview

As an intern you will be expected to:

- collaborate with computer scientists, computer graphics researchers, and biologists to define the user interface for fast lineage of plant embryos,
- create a functioning prototype implementation in a participatory design process,
- document the prototype, and
- conduct scientific research (including literature studies) and write a Master's thesis on the project.

Requirements/skills:

- you are a highly motivated student who is pursuing MS degree in computer graphics, visualization, HCI, or related computer science topics,
- you have experience with software development, in C++ and/or Java,
- you have experience in modern computer graphics (GPU) and/or visualization programming
- you ate able to communicate on a regular basis with supervisors and end-users,
- you will spend parts of the project in AVIZ research team at DIGITEO Moulon (e.g., 1 day per week).
- you are receptive to directions and feedback from supervisors, and
- you are able to clearly and concisely communicate in English in written and spoken form.