Nov 2014 – mar 2016

C3D3 project (Culture 3D Cloud)

In charge of the surface reconstruction component

- **Achieved tasks**

  - **Development of the scale space reconstruction component** (console .exe + GUI)
    Point set processing package integration
    Polygon mesh processing package integration
    Robust non manifold algorithm for edges and vertices
    Process parallelization with Intel TBB
    Color computations

  - **Photogrammetry**
    Acquisitions on real data (monuments, statues)
    Photogrammetry learning and mastering with MicMac IGN software
    Reconstruction tests set for C3DC online platform

  - **CGAL** (C++ library for algebraic geometry)
    Scale space reconstruction unitary tests
    Euler operations : tests and review

Mar 2016 – oct 2016

Benchmark for CGAL surface reconstruction techniques (TITANE intern project)

- **Achieved tasks**

  - **Design** of original **algebraic geometry surfaces** for reconstruction tests (sinusoidal icosahedron, virus cell-like surface). 3D printed some of them. Online Sculpteo shop : my Sculptéo gallery

  - Multi-parameters tunable point sets matrices **generation** program (isotropy, sampling, level of noise, percentage of missing data)

  - Fully automatic reconstruction **accuracy evaluation algorithm** (**error estimation and comparison**) for CGAL reconstruction methods : scale space, advancing front, Poisson reconstruction

- **Programming languages, libraries, versioning tools and OS**

- Languages and softwares : C++, Matlab, Meshlab, MicMac
- Libraries : CGAL, Qt, Intell TBB
- Versioning : Git, Svn
- OS : Linux

- **Collaborations and partnerships**

  - Pierre Allier, Thijs Van Lankveld
  - Geometry factory, CNRS Map, IGN, Telecom Sud Paris

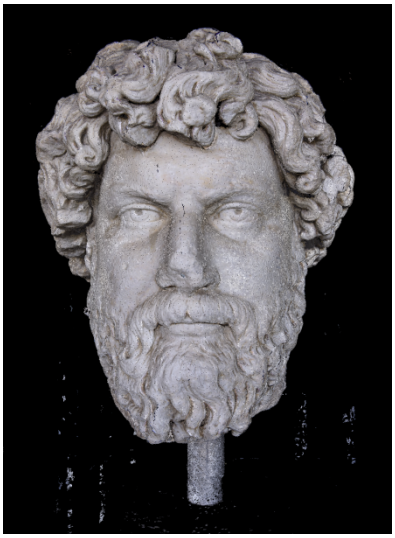
- **Main achievements**

Scale space reconstruction is part of the whole numerization pipeline of C3DC project which is now available online, see :

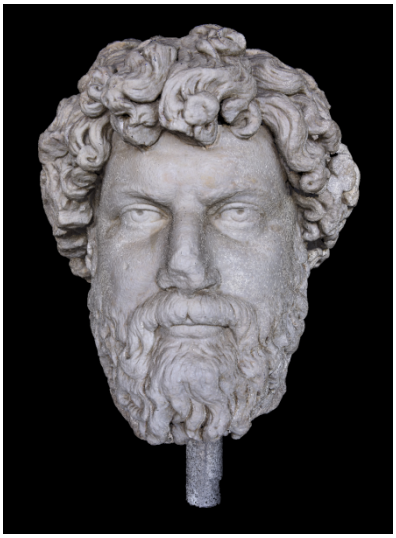
- www.mymultimediaworld.com:8088/gui/?next=/gui/projects/

- Culture 3D Cloud

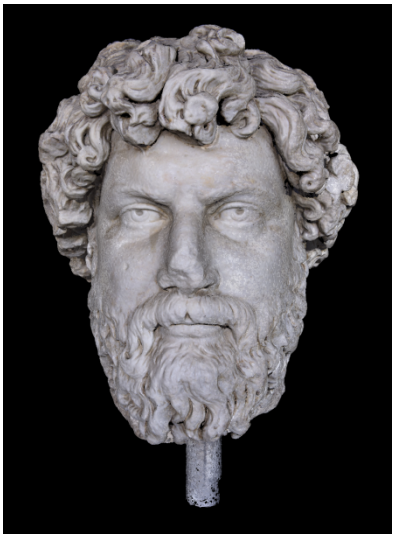
Grec “hero” Aelius Verus full pipeline : reconstruction and processing



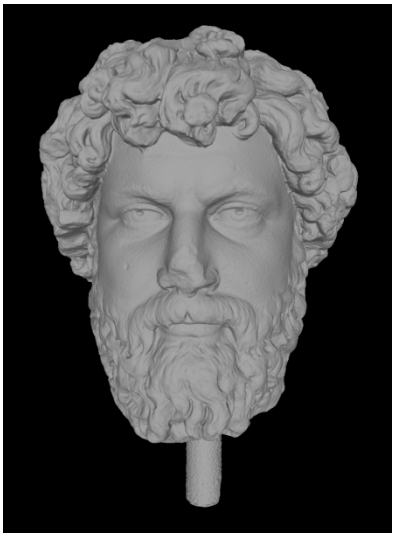
Raw point set (14M vertices)



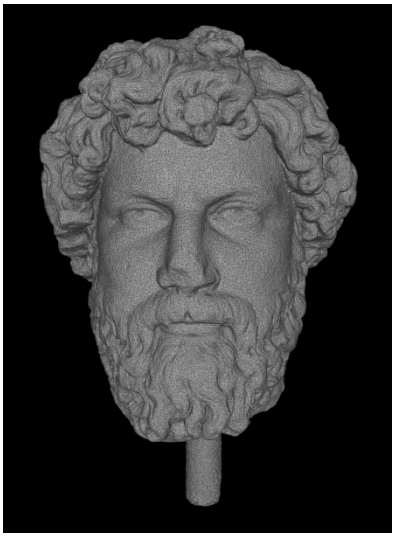
Cleaned point set



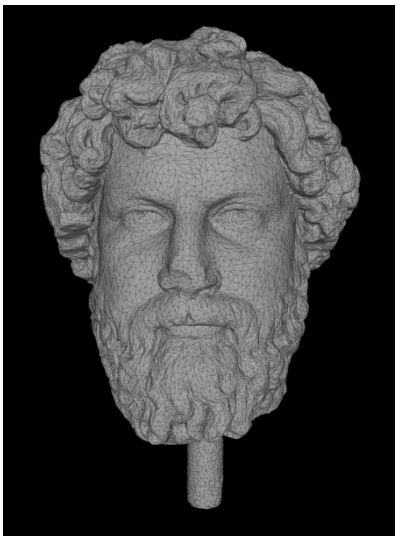
Triangulation (28M triangles)



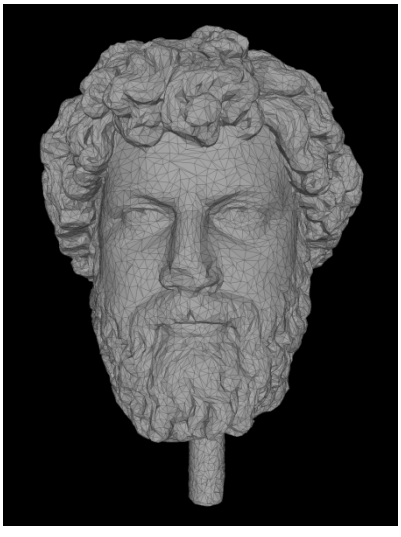
Holes filled version



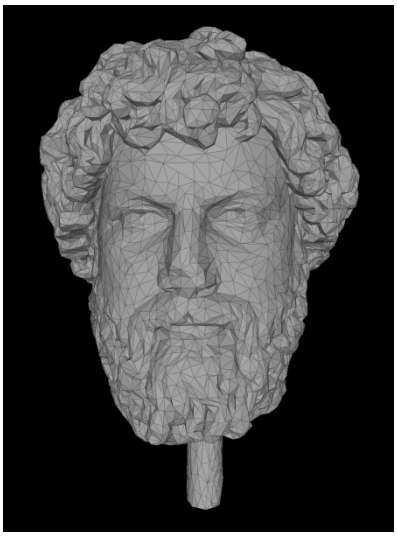
Mesh simplified 1.56%



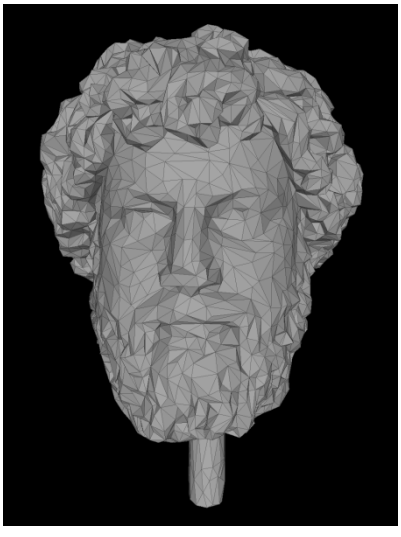
Mesh simplified 0.78%



Mesh simplified 0.39%



Mesh simplified 0.19%



Mesh simplified 0.004%