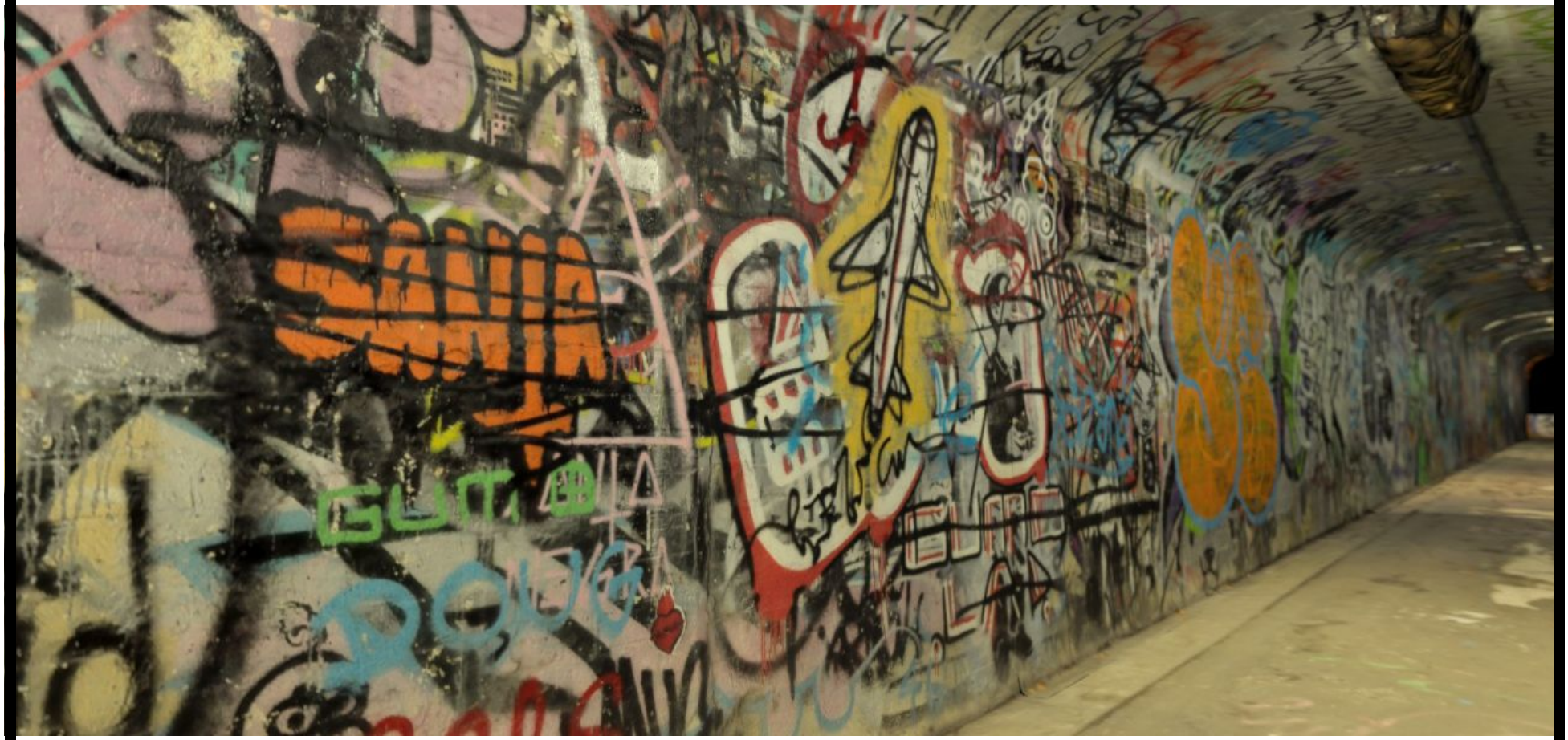
UNLEASH YOUR SCANS:

Making 3D models of sites, and making them portable



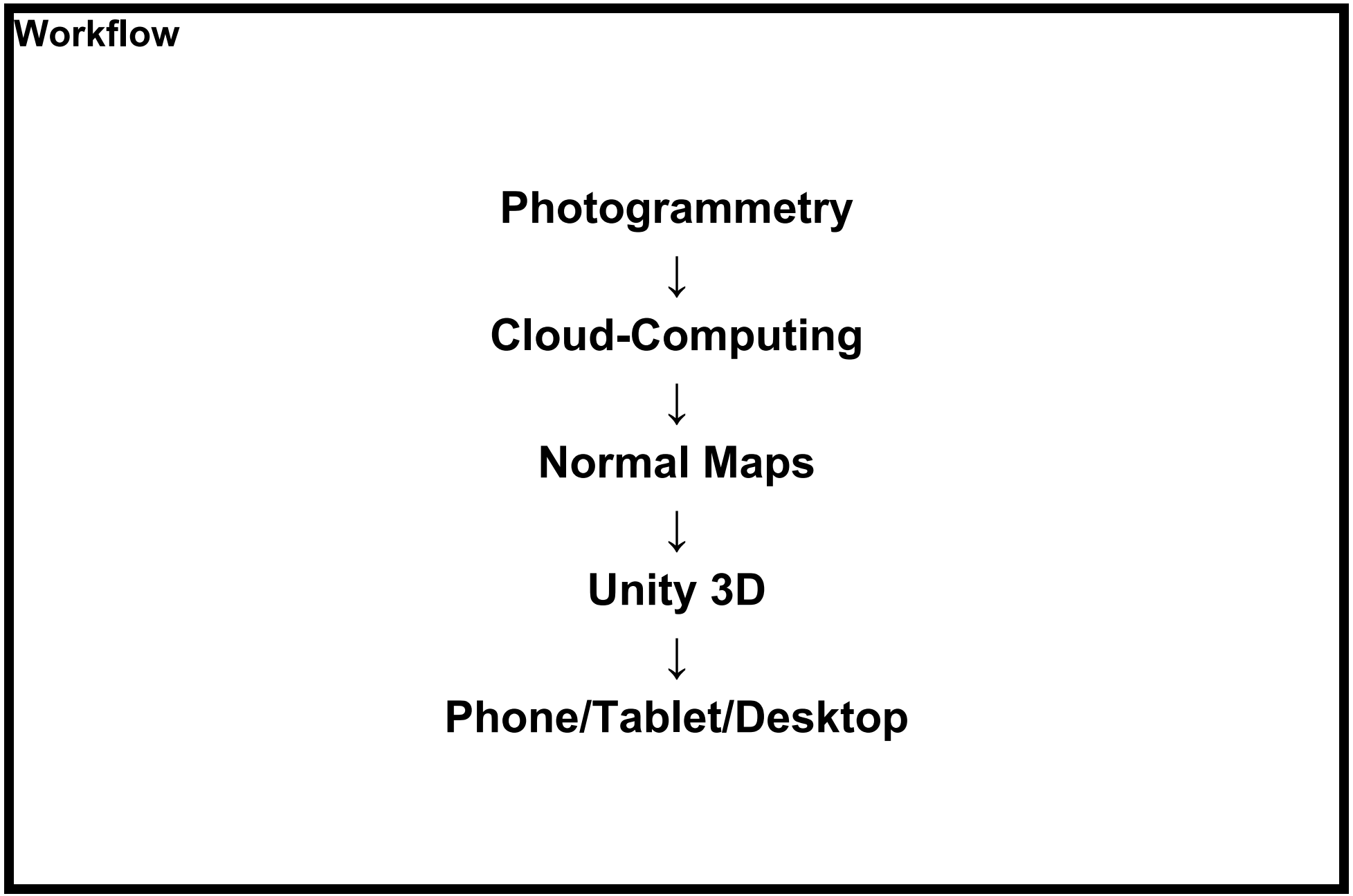
Dr Josh Harle

Australia Council Artist in Residence

The opposite to Sarah Kenderdine's IGLAM representation – small, cheap, portable devices.

Today: How to make these reconstructions, and then how to share them.

Workflow

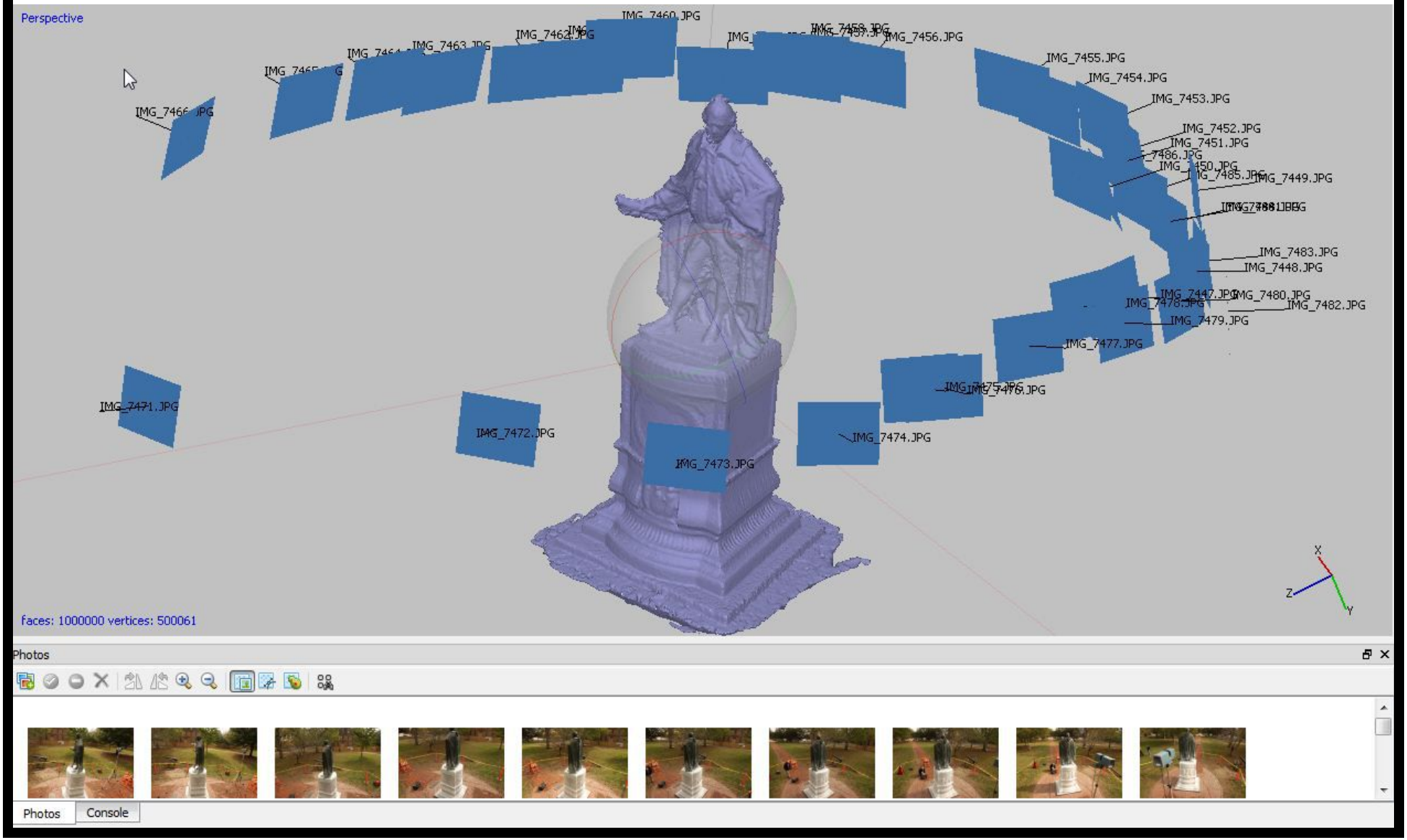

Photogrammetry
↓
Cloud-Computing
↓
Normal Maps
↓
Unity 3D
↓
Phone/Tablet/Desktop

Demos

<Video: Showreel>

<Demo: Trafalgar Street Tunnel app>

Photogrammetry – Stages, what you get, how to deal with it..?



Cloud computing

Gives access to very powerful machines.

Get an account, start up instance, install software, upload dataset, leave to process.

AWS:

~100 hours @ $2.50
= $250

ICU:

University Researchers now have access to cloud-based computing for free, but must apply.

Thinking like a game developer

Computer graphics hardware developed in parallel with newest games.

Segmenting

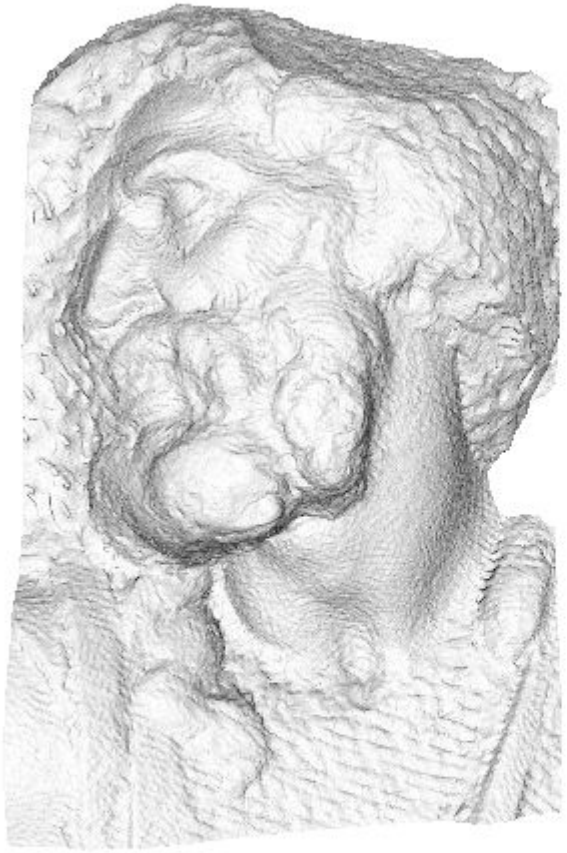
Make a low-poly proxy of the original model.

Split it into bite-sized chunks that are small enough to give plenty of texture detail (i.e. speading a 4k texture over them)

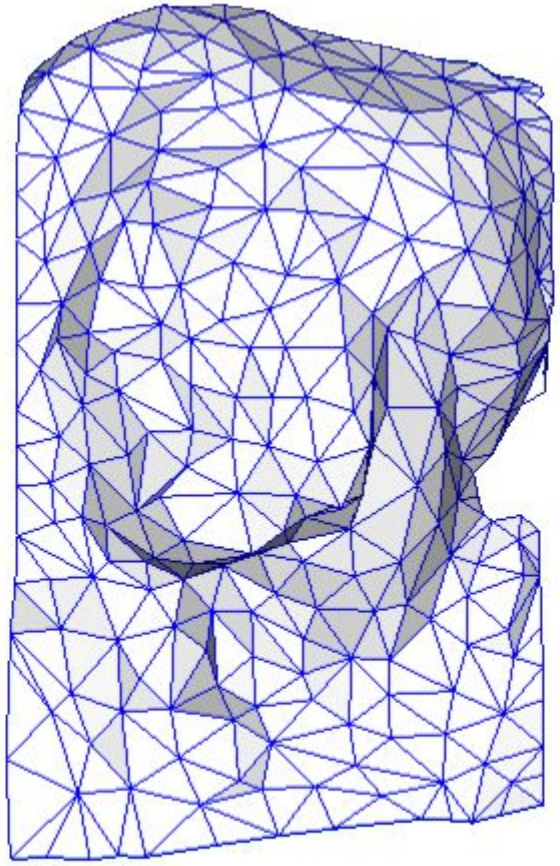
Allows optimization by substituting for simpler mesh when further away.

Initial stage of height + normal mapping.

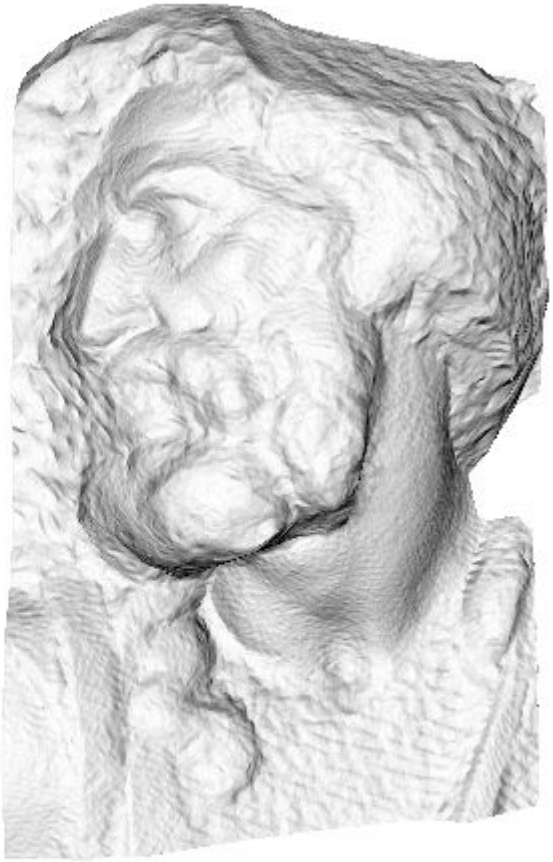
Height and Normal Mapping



original mesh
4M triangles



simplified mesh
500 triangles



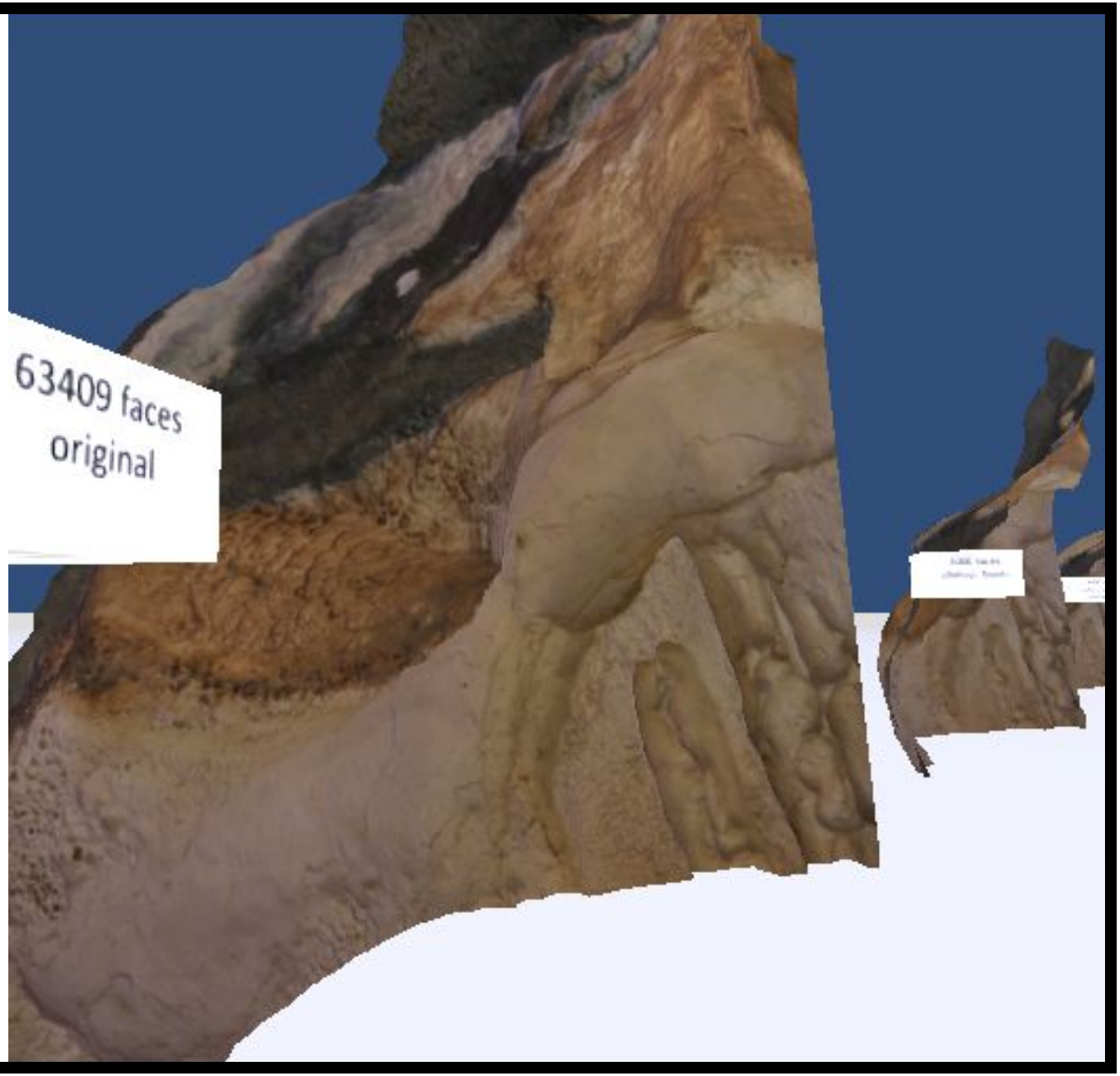
simplified mesh
and normal mapping
500 triangles

Geometry “veracity”

Attention needs to be paid to how the reduced poly-count geometry will look.

At what point is the appearance effected too much?

<rock formations>



Concluding thoughts

With graffiti tunnel, I reduced a 30m model to 200k = 150x smaller. Moved type of processing to allow optimisation with mobile platforms, i.e. can run happily on iPad.

You can keep all the data, so the high-geometry reconstruction is not lost, but it's important to define what level of compression is acceptable for different applications: research, management, public exposure.

Further Research

ToDo: Unity 3D scripts for setting up navigator to dynamically switch resolution and compression type for texture, normal map, and height map.

More info: http://tacticalspace.org/unleashing-photogrammetry/

Questions time!