

# A Unified Web-Based Visualisation and Mesh Processing Application for Medical 3D-Printing

Donnelly Luke, Haslam Niall, Magee Justin, Wilson Shane

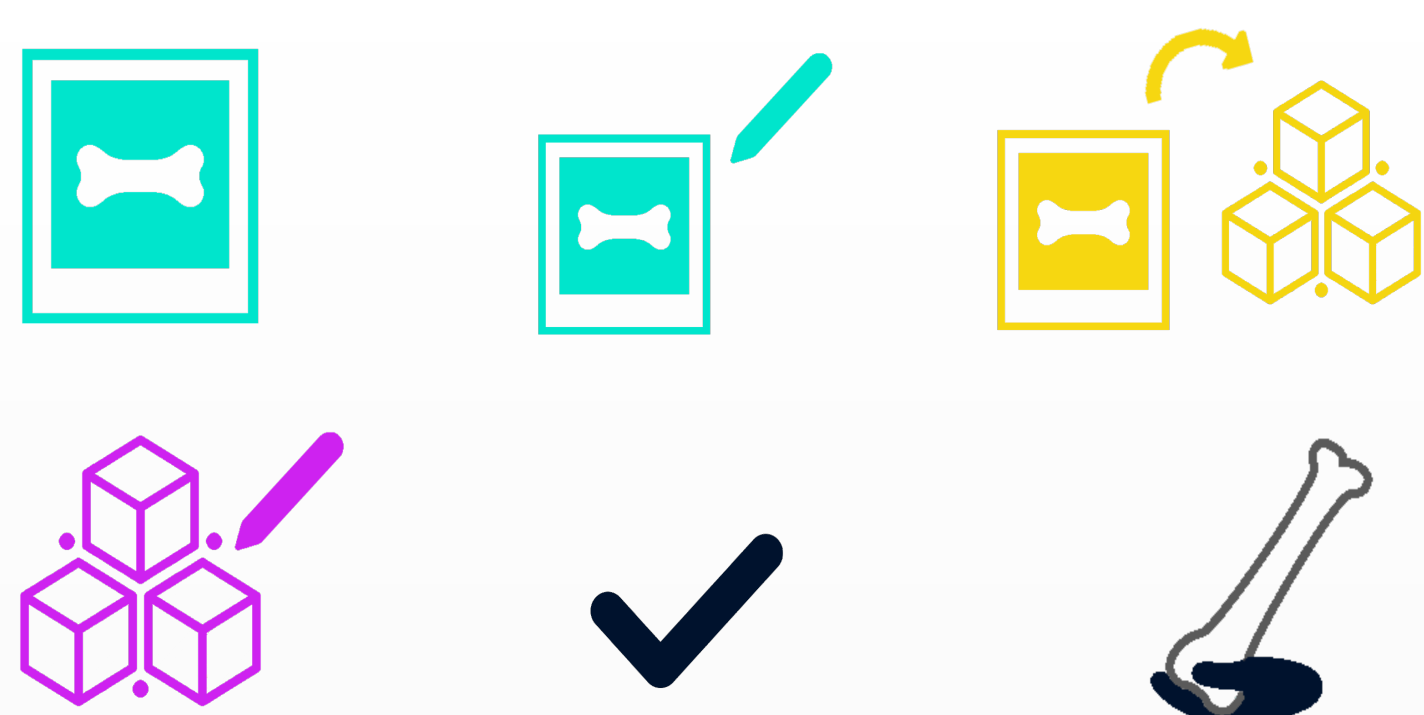
{l.donnelly, n.haslam}@axial3d.com, {jdm.magee, s.wilson}@ulster.ac.uk

## Introduction

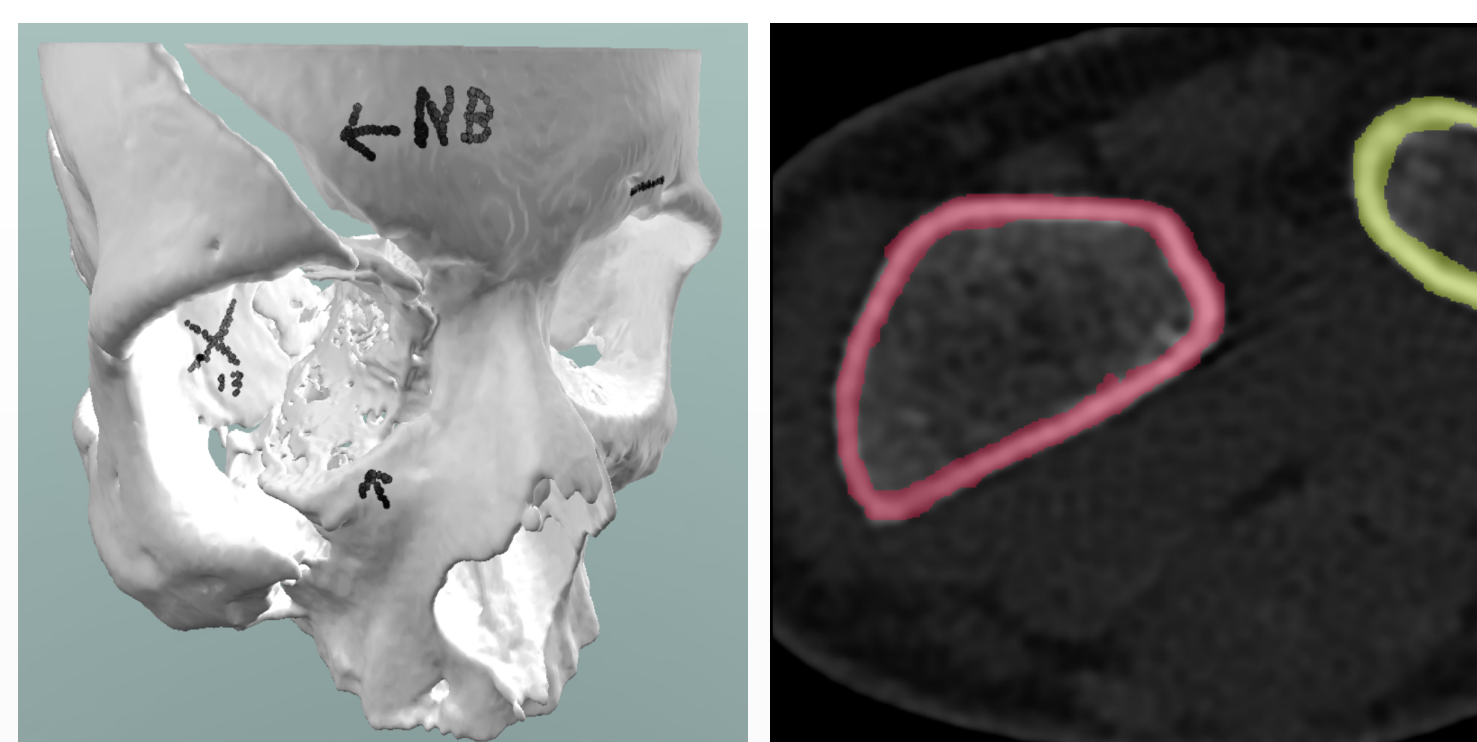
The 3D printing of models generated from medical scan data is a relatively new application within the medical field. However, there has yet to be established any standardized pipeline for creating, processing and validating of image segmentations and generated 3D meshes. While the features and functions necessary to do so can be assembled from various collections of open and closed source software, this requires users to repeatedly export and import their work between these applications and become familiar with the basic usage and idiosyncrasies of each.

This application aims to bring together the required features from each of these different application classes into a single web based tool. It can handle every step of the process; moving from source medical scan images to a completed and validated 3D mesh, which is ready for printing.

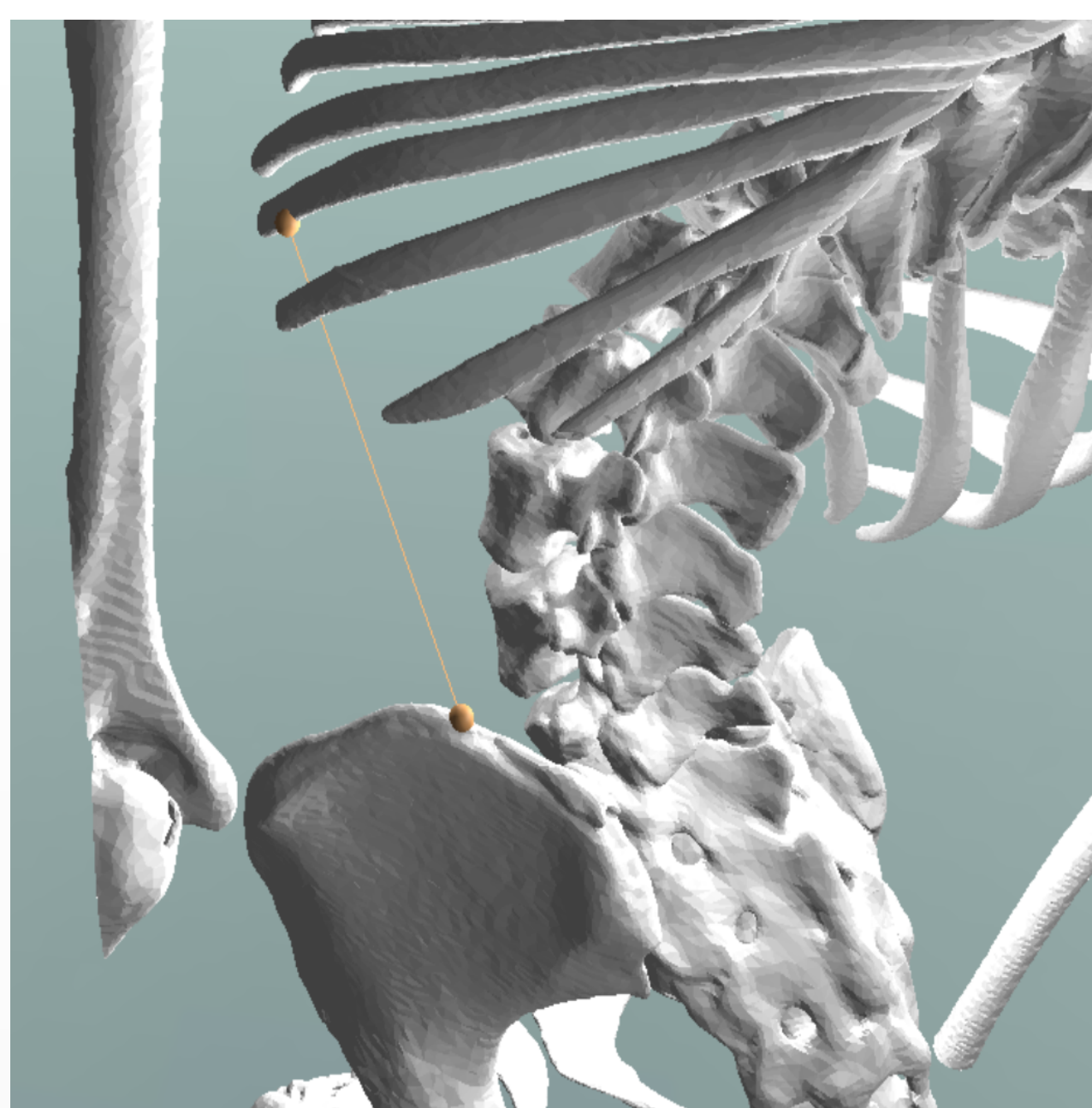
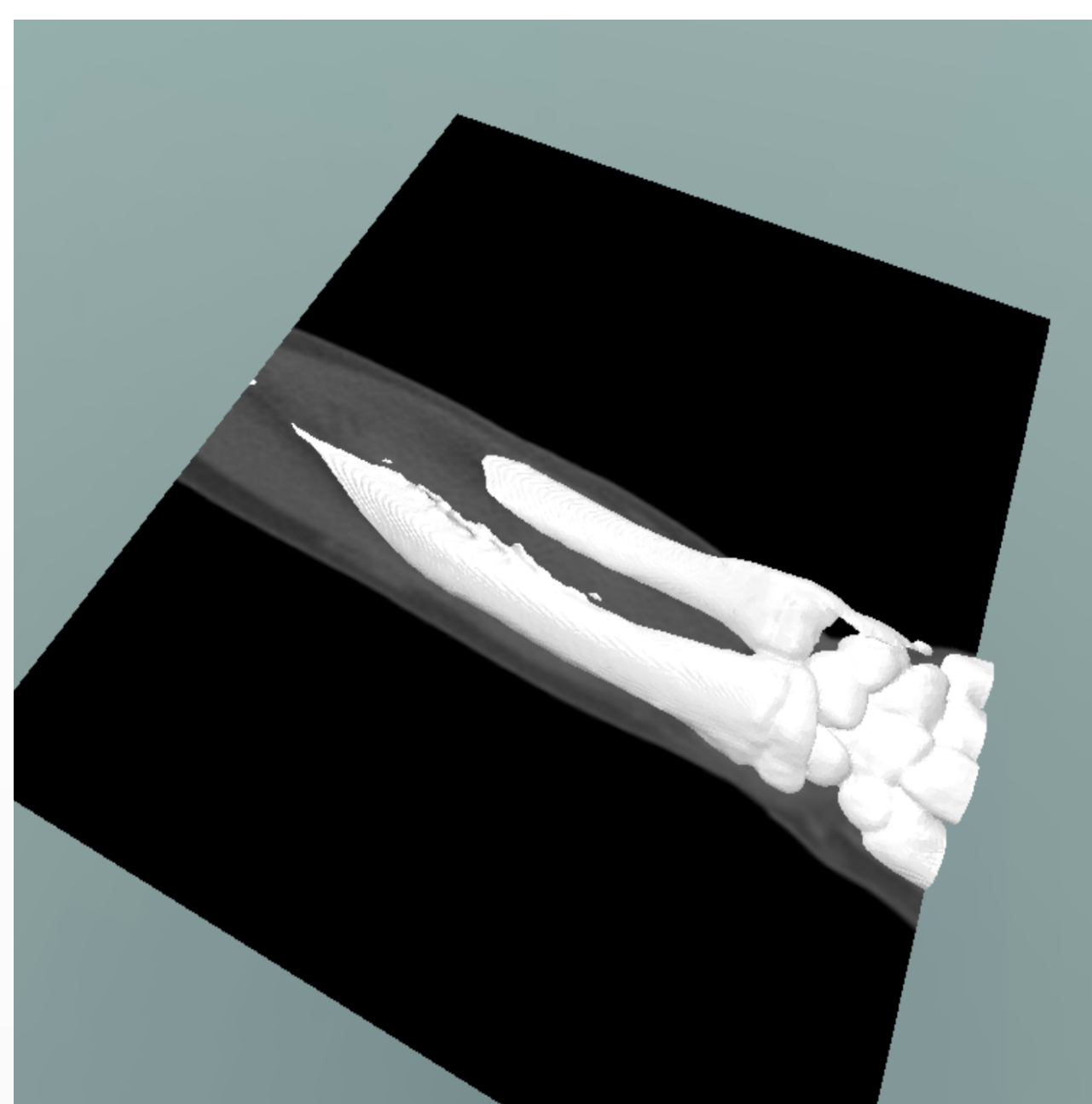
## Typical Pipeline



## Annotation

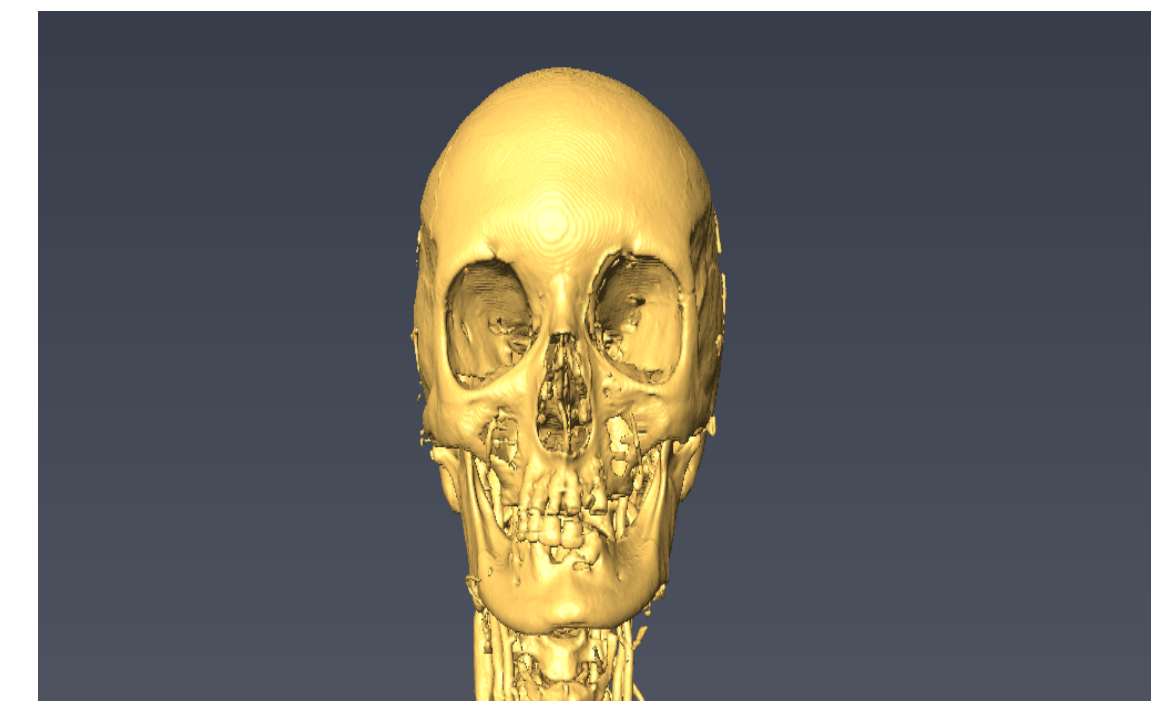


## Verification

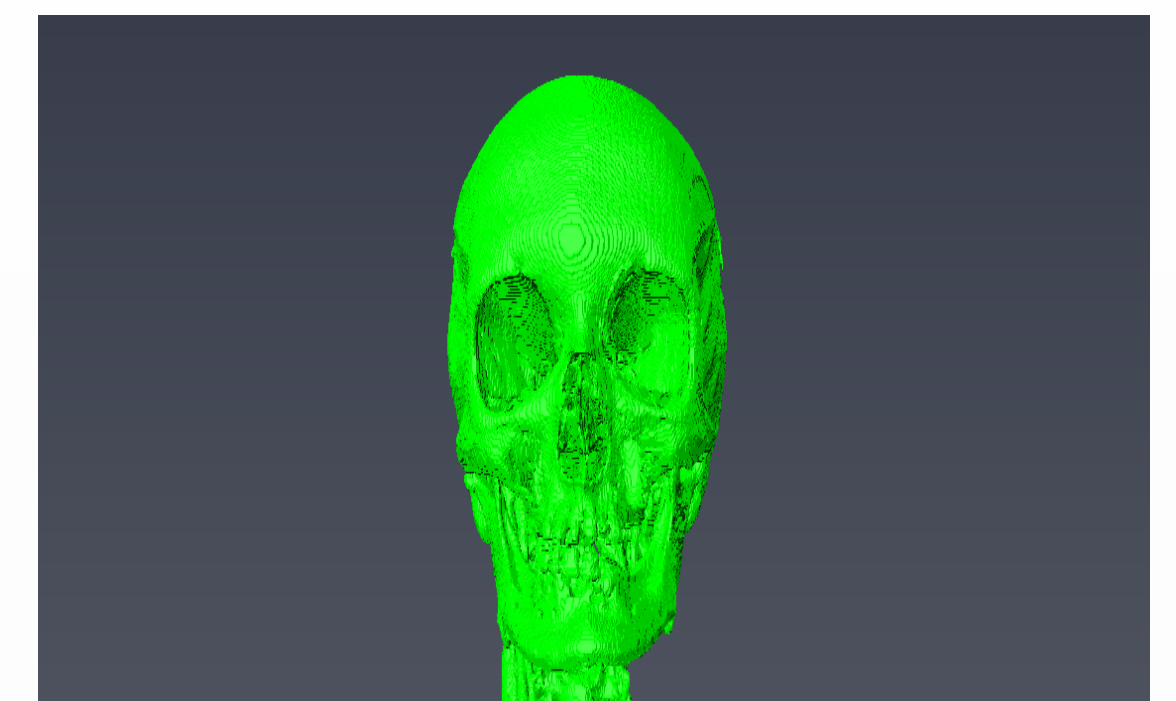


## Centralised Work Flow

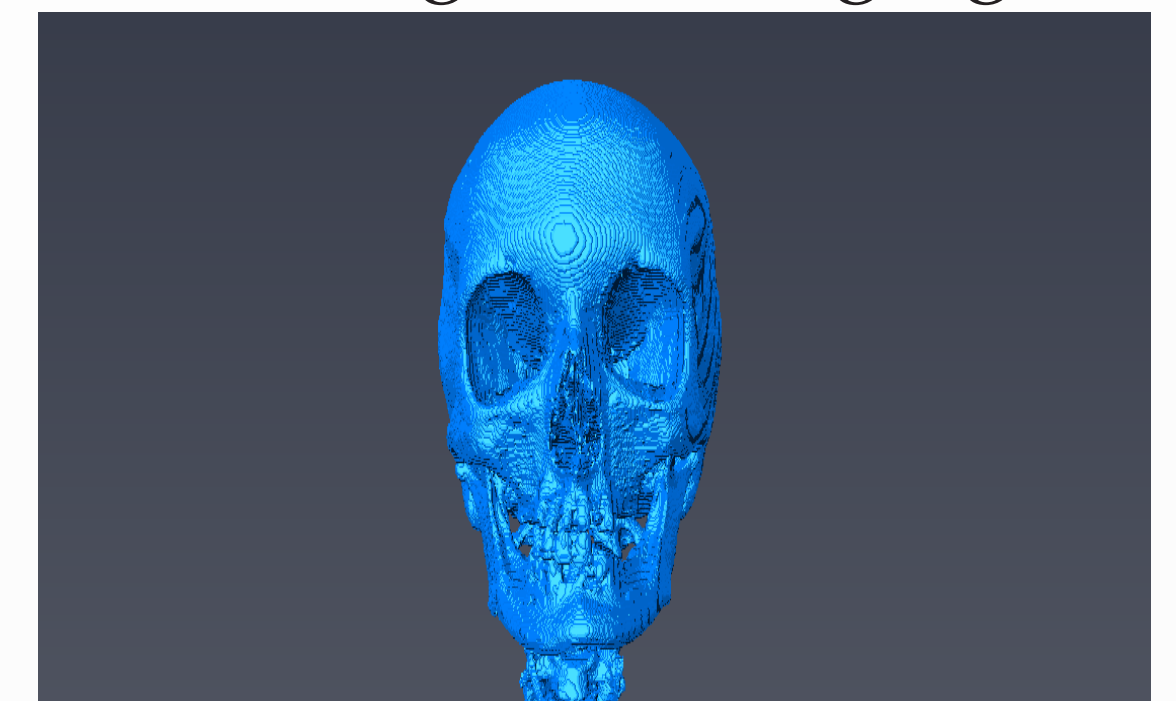
### Model Generation



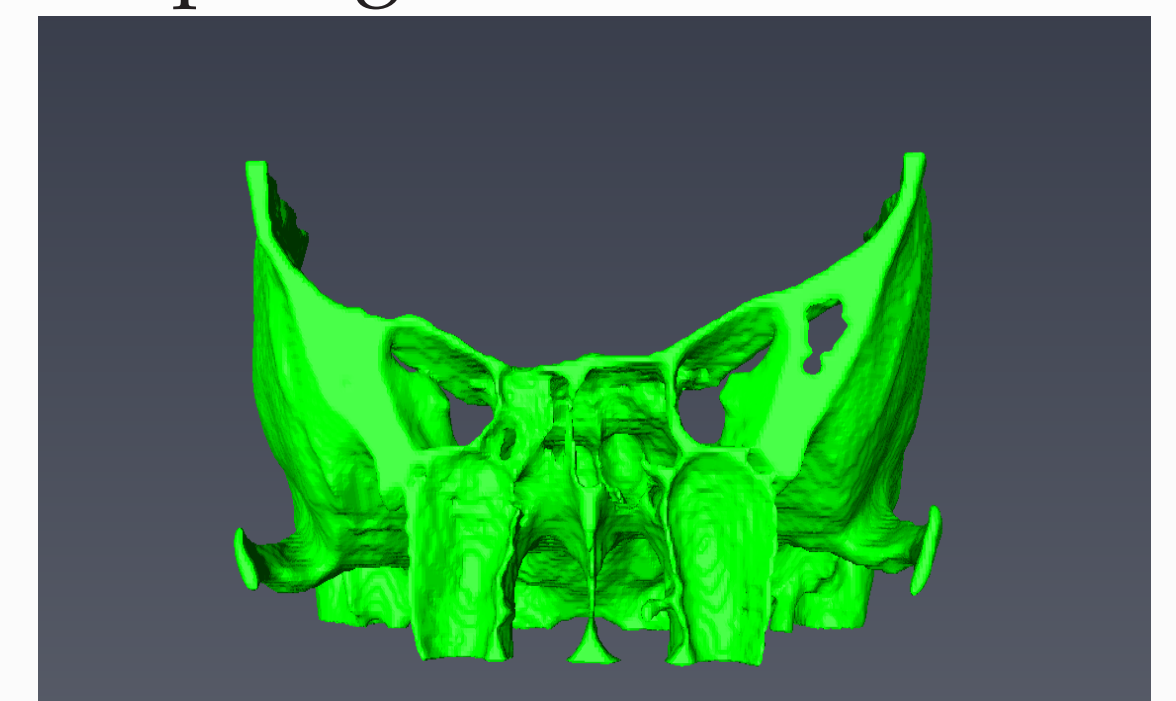
### Removal of Islands



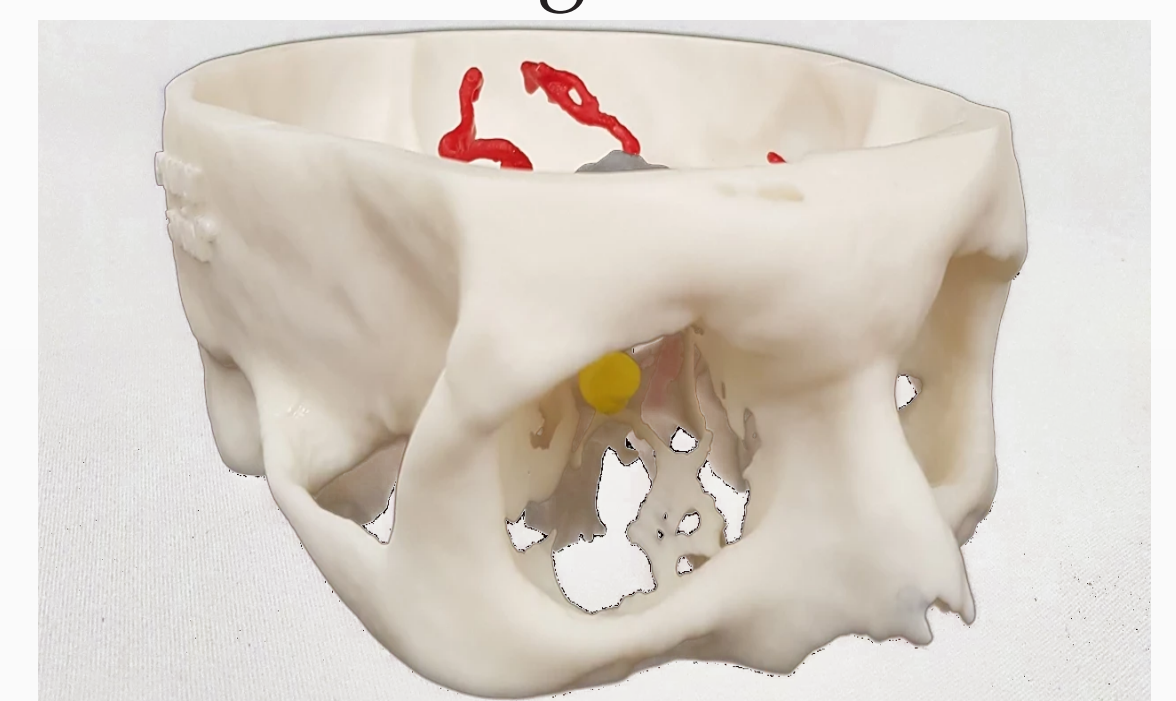
### Culling and Merging



### Topological Corrections



### Printing of Model



## Affiliations, Sponsors

Innovate UK



We'd like to thank Innovate UK for supporting and funding the work of this project, Andy Henry for his useful advice and Shane McGrath for his unrelenting encouragement.

## Future Development

Continued development of the service will include refinement of the current implementation, in addition to:

- Comprehensive User Testing
- Full integration of a segmentation editor
- Implementation of an AR viewer
- In browser mesh deformation library
- Remote DICOMweb integration

