Brain Visualizations

Brought to you by the Brain Stormers

Goal

Compare 3D models of brain volumes from fossilized dinosaur skulls and regular bird skulls to observe changes in brain structure caused by evolution

Process

CT scanner

Skull slices (.tiff)

+ Manually select brain area in each tiff
+ Generate brain stl from all tiffs
+ Many hours for birds
+ Many hours x10 for dinosaurs

Proprietary Software

Brain (.stl)

Smoothing Application

+ Clean up stl file in another application

Comparative Analysis

Pain Points

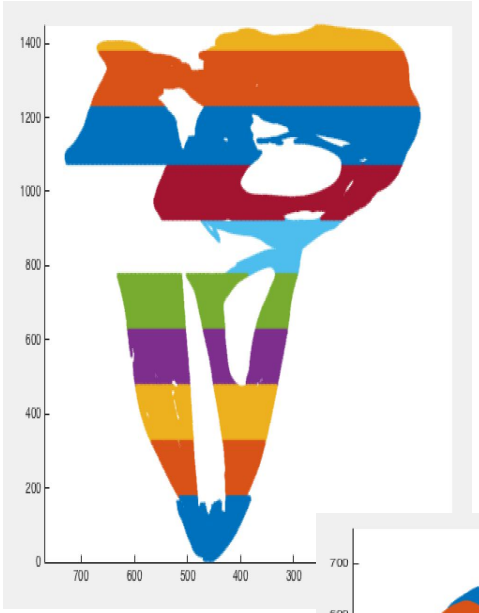
- Manual braincase selection process is burdensome
- Second smoothing process required
- Resolution of brain volumes is coarse

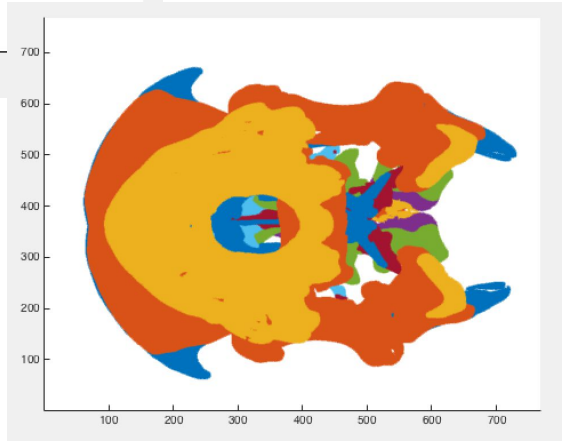
Our Solution

Today: Script that takes in all tiff files and outputs a 3D volume with all of the edges identified

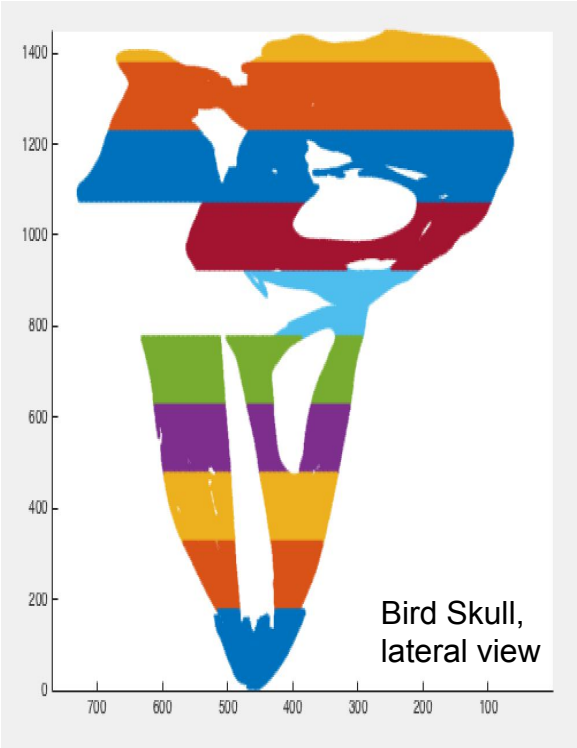
Future: Extend script to cluster edges and provide an interactive tool allows researcher to select *in one operation* which cluster(s) form the region of interest**

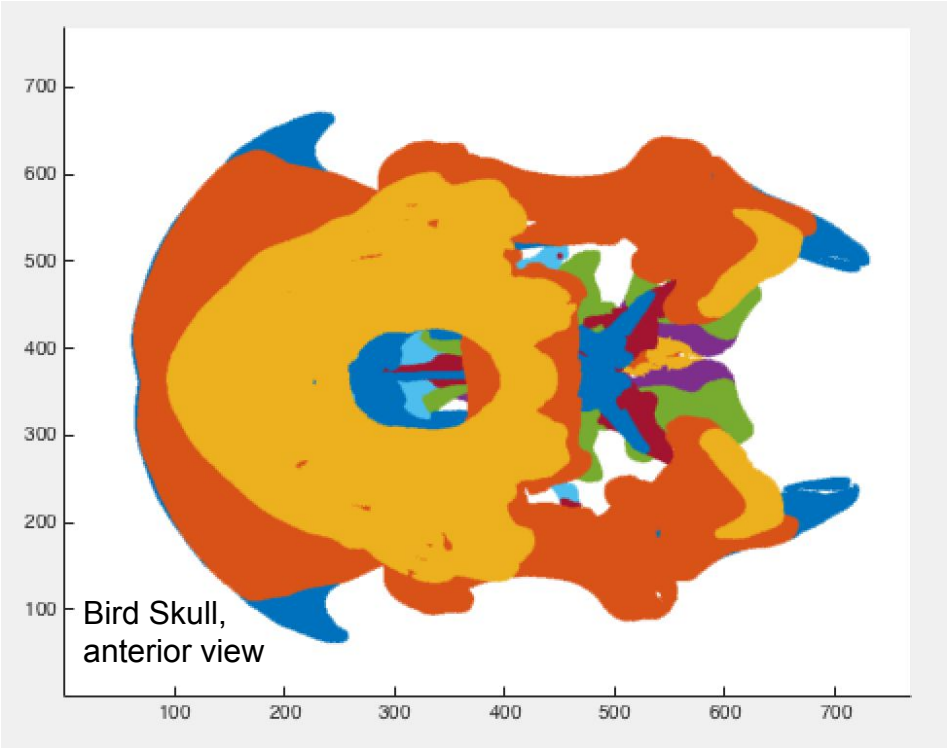
**Clustering is too computationally intensive to run at the Hack, but could be run without human intervention





Our Solution



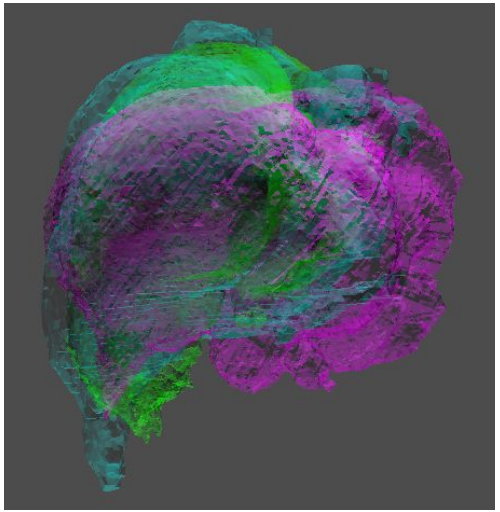


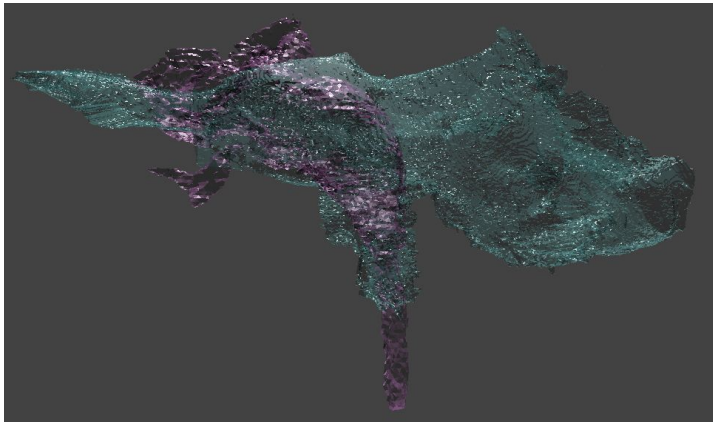
Our Solution

Today: Blender script that facilitates comparison of 3D objects by overlaying them and varying their transparencies and colors

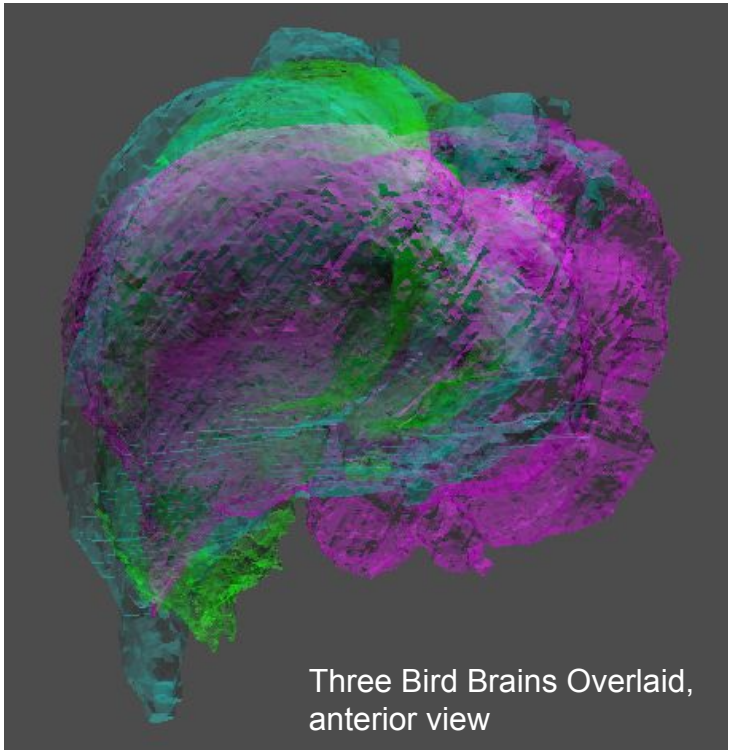
Future: Integrate script into a Blender panel with several options, and automate normalization of brains**

**Steeper than expected Blender learning curve, and little knowledge of brain's structural areas to made effectively normalizing brains difficult

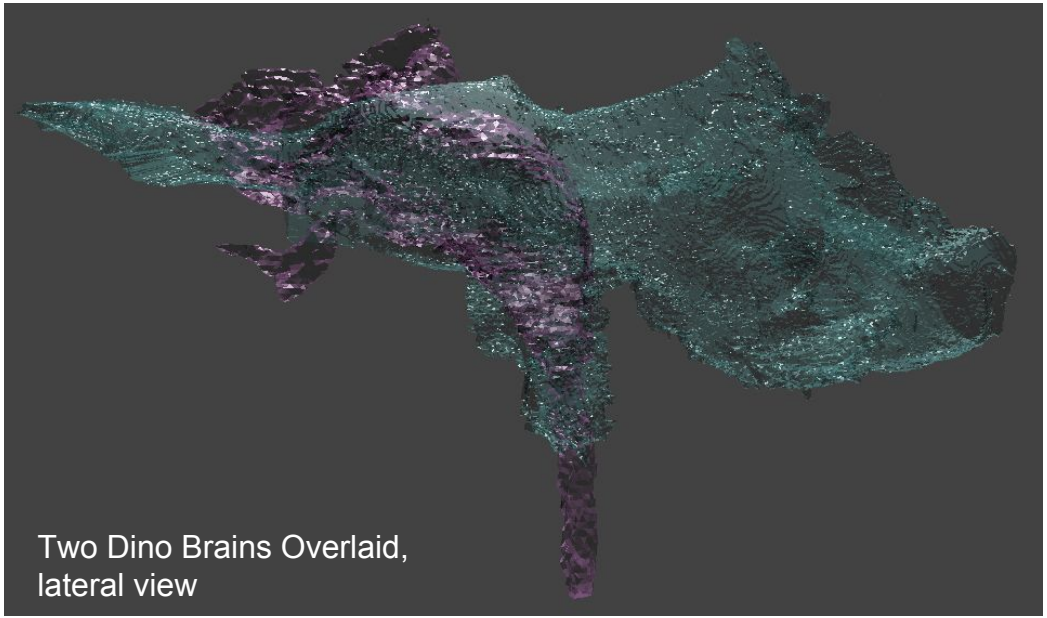




Our Solution



Three Bird Brains Overlaid,
anterior view



Two Dino Brains Overlaid,
lateral view

Future Work

- Complete enhancements on 3D rendering tool and Blender viewing tool
- Test Blender tool with outputs from 3D rendering tool