

Lidar & Photogrammetry

Andrew Sumner

My Background

- Tech Artist at Purdue Envision Center
- CGT major - Visual Effects
- Specialization in pipeline and production
- Often caught taking photos of trees



What is lidar?



Light Detection And Range sensors

LIDAR

LIDAR

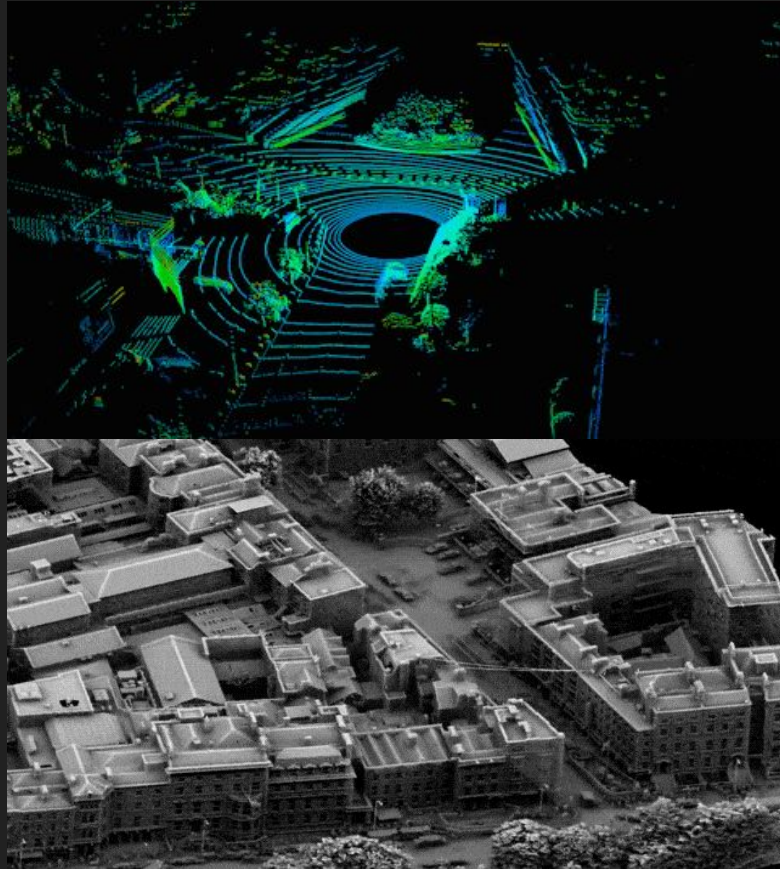


Object



Use Cases

- Driverless Vehicles
- Land Management
- Data Science
- Virtual Environments
- Visual Effects




Cost

Balance between speed, accuracy, and range of motion

Leica RTC360 Laser Scanning System



 click to enlarge



Item #: 6012673

Price: \$78,000.00

OTHER ITEMS YOU MAY NEED



Leica RTC360 Backpack (865471)

\$300.00



[View More](#)

Quantity:

ADD TO CART

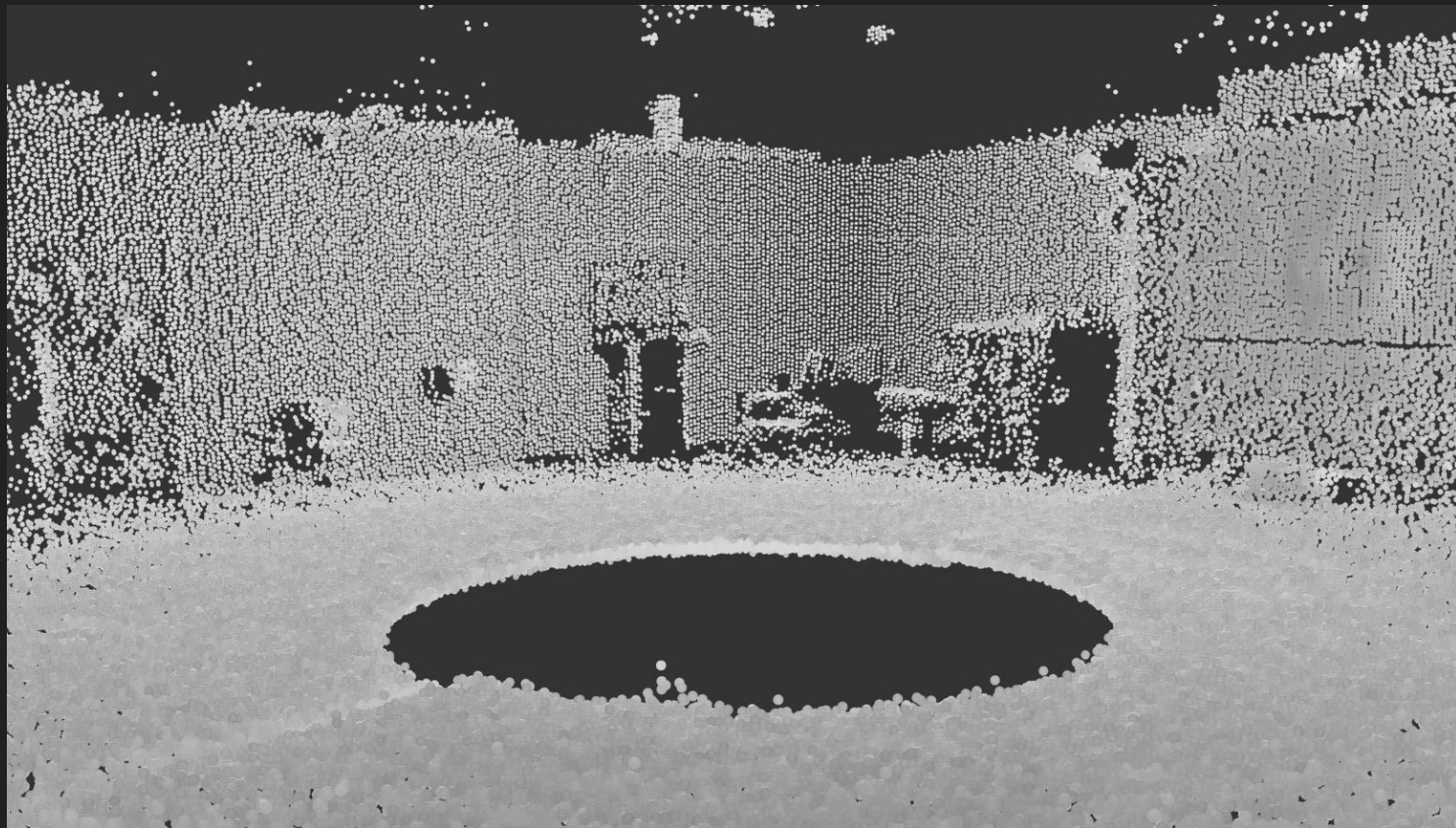


Scanse ~\$800

- 360 sweeping Lidar kit
- 3D printed body
- Raspberry Pi
- Affordable for home use



<https://skfb.ly/6MHZw>



Workflow

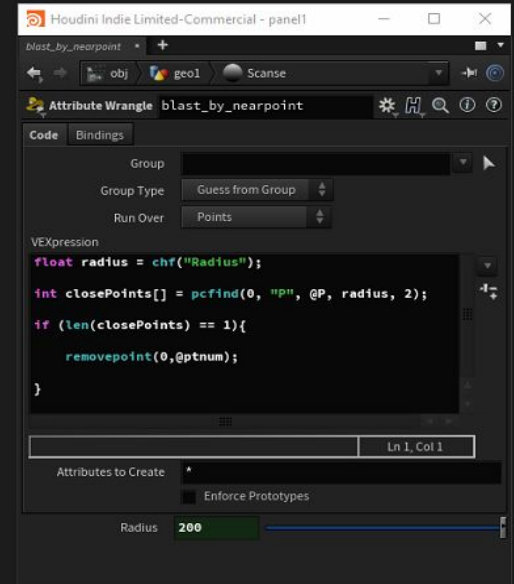
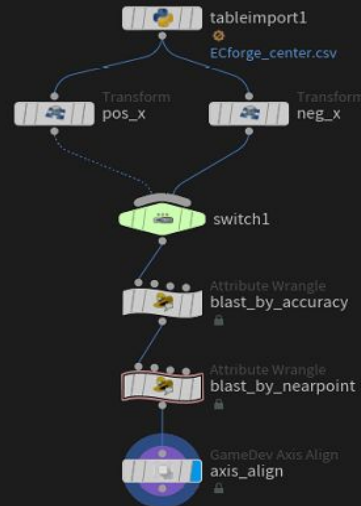
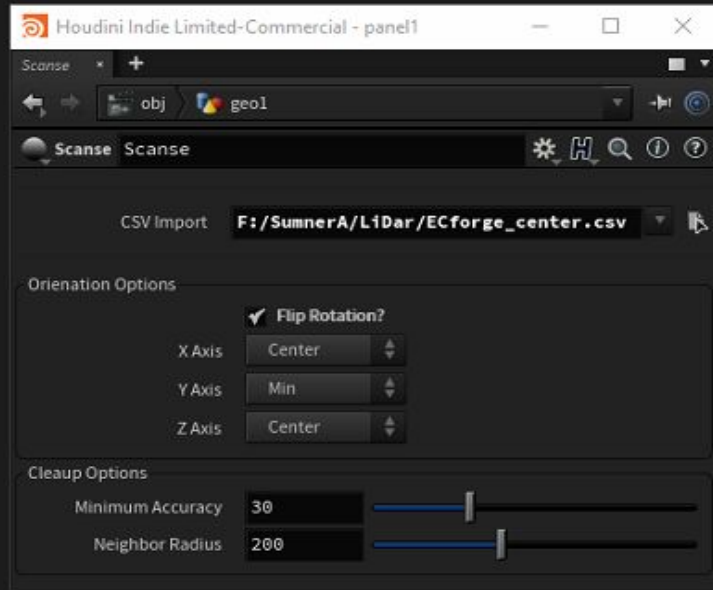
1. Physical capture
2. Point cloud editing - CloudCompare
3. Export .ply, .asc, .las
4. Upload to Sketchfab - Adjust point size in 3D Settings
5. View in VR - Supports cardboard, vive, rift, daydream

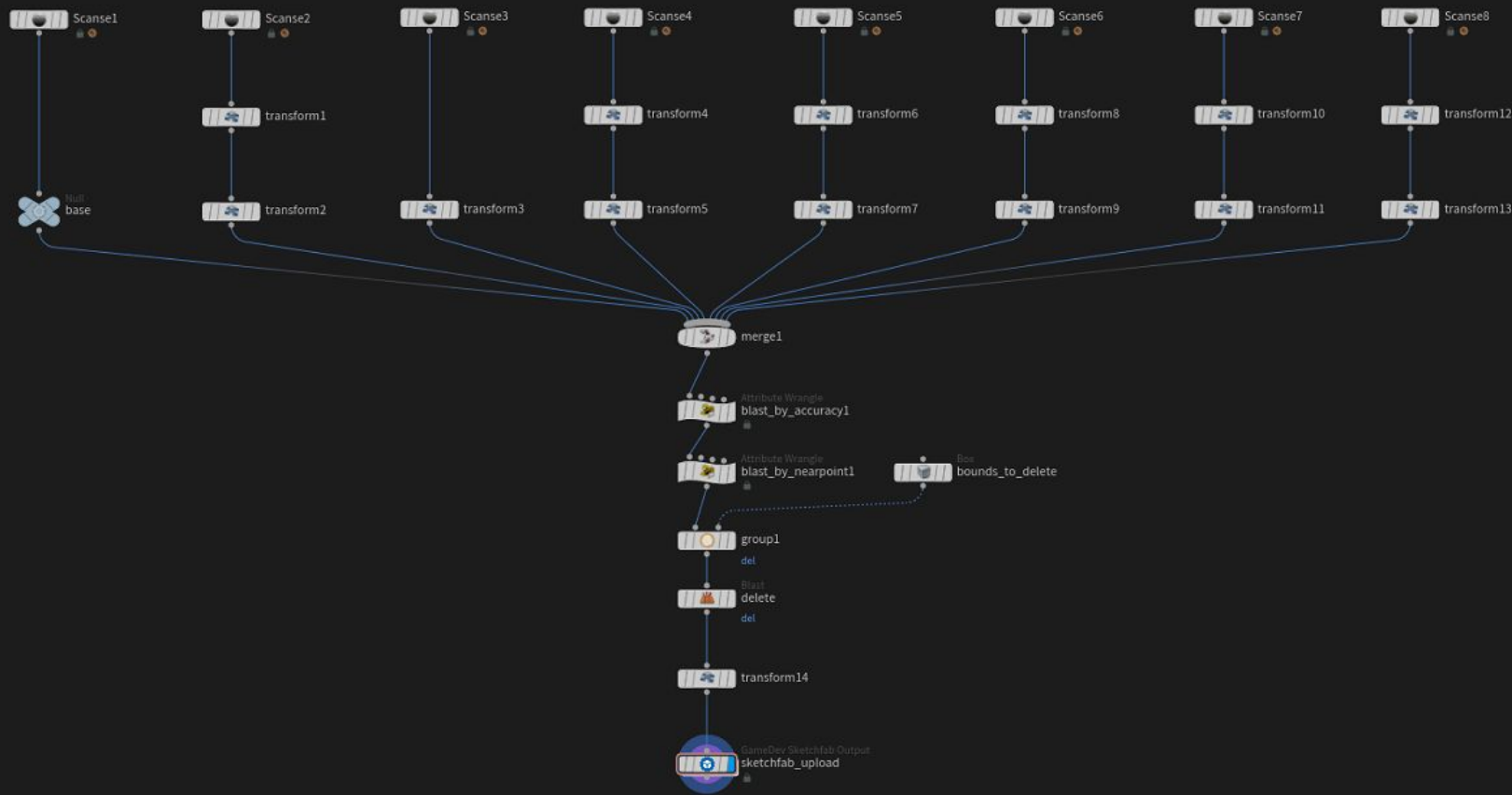
Unity & Unreal: Free plugins for point cloud rendering as particle sprites

Scanse Capturing Tips

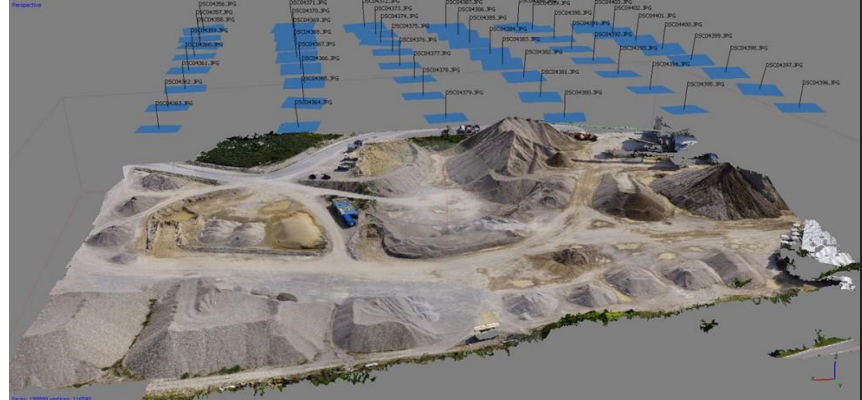
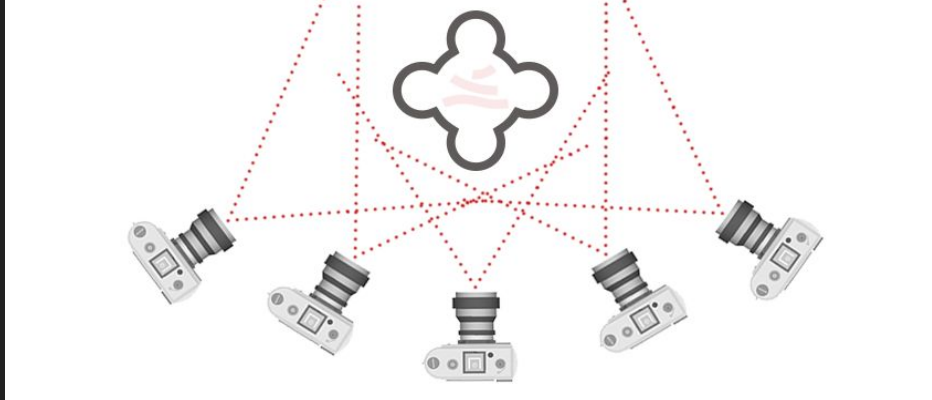
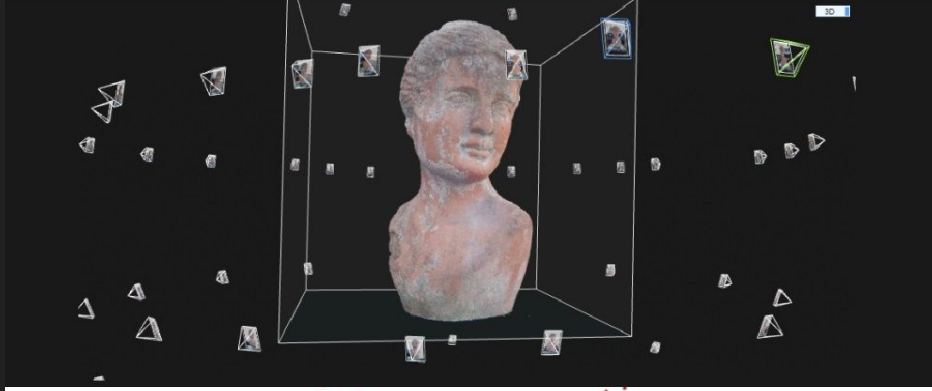
- Capture as many scans in the space as you can
- Aim for large overlap of defining features to merge scans
- Slowest scan is best quality
- Reflective surfaces don't scan well
- Adopt a naming convention for your files (gridxy1 etc)
- Filter out as much low signal strength as you can

Houdini - Custom Tools





Alternative: Photogrammetry





IMG_4048.CR2



IMG_4048.tif



IMG_4049.tif



IMG_4050.tif



IMG_4051.tif



IMG_4052.tif



IMG_4053.tif



IMG_4054.tif



IMG_4055.tif



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IMG_4099.tif



IMG_4100.tif



IMG_4101.tif



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IMG_4103.tif



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IMG_4108.tif



IMG_4109.tif



IMG_4110.tif



IMG_4111.tif



IMG_4112.tif



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IMG_4135.tif



IMG_4136.tif



IMG_4137.tif



IMG_4138.tif



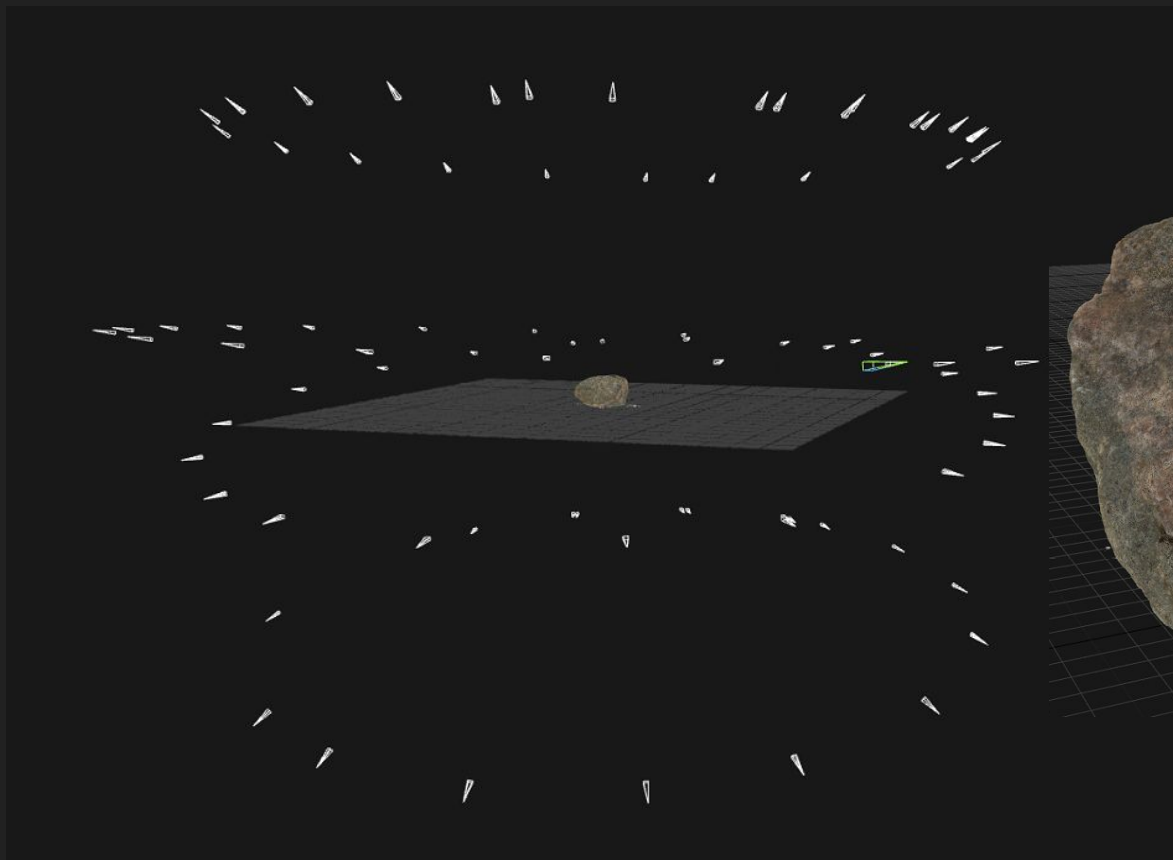
IMG_4139.tif



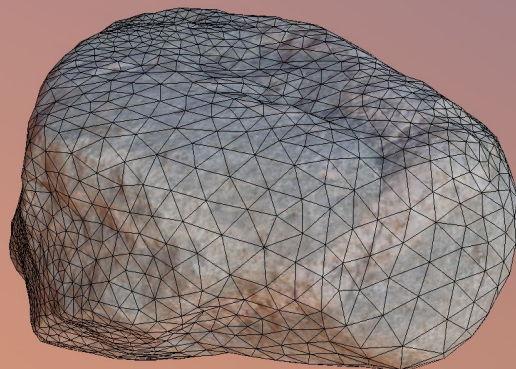
IMG_4140.CR2



IMG_4140.tif



<https://skfb.ly/6NJqW>







WORKFLOW

ALIGNMENT

RECONSTRUCTION

SCENE

Normal
Detail

Preview

High Detail

Settings



Colorize Texture

Process

Set Reconstruction Region

Define Ground Plane

Reset Ground

Model Alignment

Lasso

Rect

Box

Expand

Advanced

Invert

Selection

Select All

Deselect

Invert

Filter Selection

Simplify Tool

Smoothing Tool

Ortho Projection

Texture Reprojection

Unwrap

Tools

Duplicate Model

Close Holes

Info Panel

Check Integrity

Check Topology

Clean Model

Mesh

Render

Video

Reconstruction Region

Upload To Sketchfab

Export

Import Model

Reconstruction Region

Import

- Images
- Control points
- Component 0
 - Camera poses
 - Source HIGH
 - Bound HIGH
 - Bound LOW

1Dx

181 images

empty

180/181 cams, 3 models

180 registered

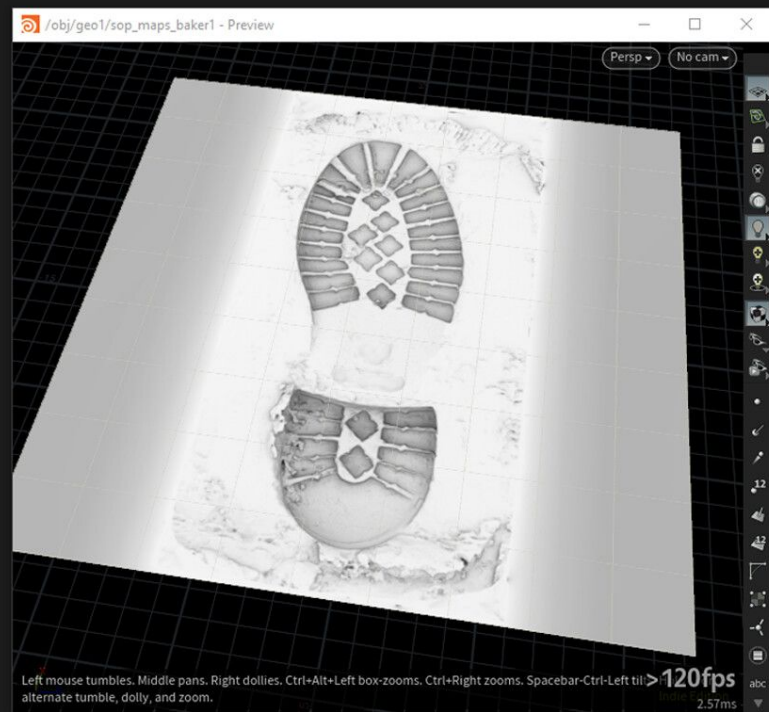
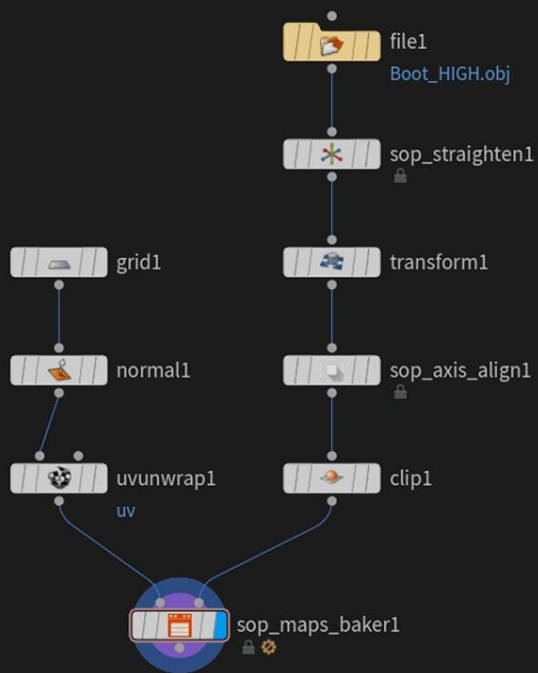
12 parts, 23.3M tris, large

10 parts, 11.8M tris, large

2.0M tris, singleton

Selected model(s)

Name	Source HIGH
Triangles' count	23.3M (23270448)
Vertices' count	11.7M (11664010)





Questions?

Contact: sumnera@purdue.edu