Follow along with the protocol as you watch the video

GETTING SETUP FOR GEOMAGIC ALIGNING

1. Navigate to the folder "NMNH Summer 2023 david scans (raw-not geomagic aligned-not fused)"
    a. Choose whichever cabinet folder you are working in
    b. Choose whichever box folder within the cabinet folder you are working in
    c. Copy the folder name of the specimen you will be aligning
2. Navigate to the folder "NMNH Summer 2023 david scans (geomagic aligned-not fused)"
    a. Create a new folder, paste the copied name from above into the folder and add _cabinet#_drawer#_box#_GA
        i. Ex: SWT027-6_cabinet1.b_drawer1_box2_GA
3. Open the google drive excel file for the data: NMNH Data Collection Summer 2023
    a. Complete the fields in columns A-F

GEOMAGIC

1. Open Geomagic Design X
2. Either open the folder with the raw scan files and drag in all of the individual scans
    a. OR **import** the scans by selecting import (top left hand of the screen, red arrow pointing down) and navigating to the proper raw scan file folder and using the CTRL+A to select all scan files.
    b. **Change the sample size unit to mm for every scan if geomagic asks!**
3. On the left hand navigation panel, the bottom section labeled "Model", there will be an option labeled "**Meshes**" once the individual scan data has uploaded.
    a. Click "**Meshes**" to automatically select all the meshes at the same time
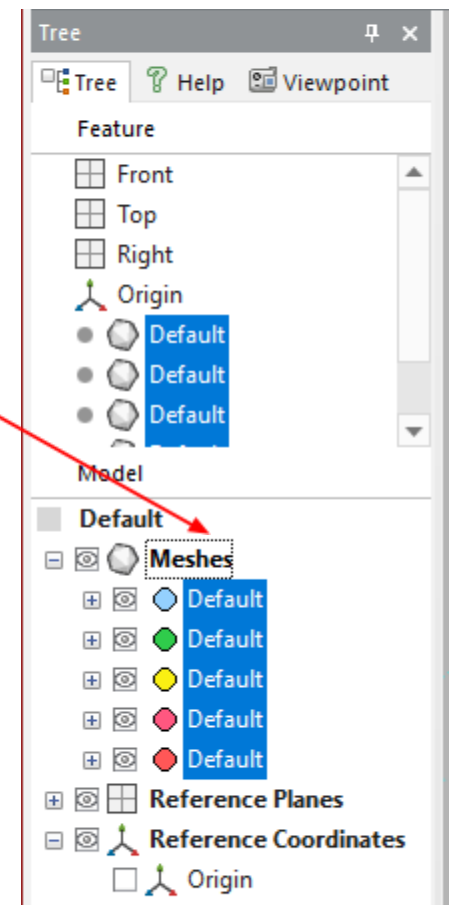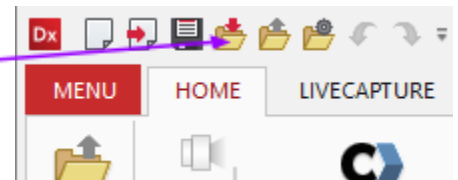
4. Either in the "**HOME**" or "**ALIGNMENT**" tabs, click the icon labeled "Align Between Scan Data"
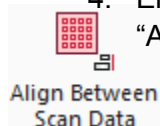
   a. Select the open circle next to "Global And Fine" and ensure the selections match the photo below

   b. Click the ✔ next to "**METHOD**"

   c. The value next to "Max. Average Deviation" (should be a 0.00# mm value), record that value in golem G of the spreadsheet. "alignment error (mm)"

   d. Click the ✔ next to "**Align Between Scan Data**" to complete the alignment

   e. If you forget to record the Max Average Deviation value before completing the alignment, thats OK! Just follow steps 3-4 again.
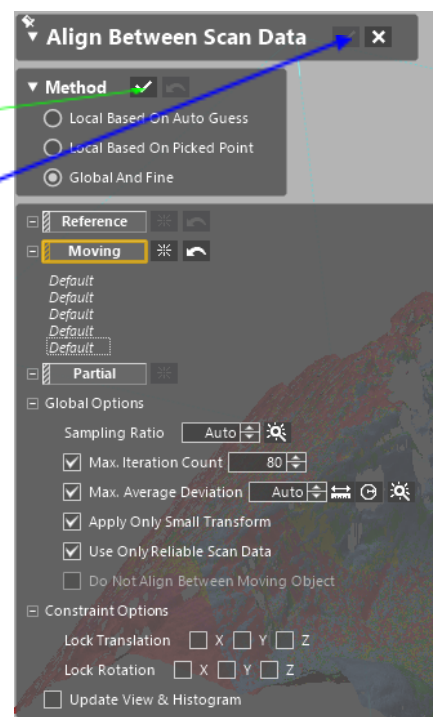
5. Make sure all the meshes are highlighted still! (if not, repeat step 3.a), click **export**

   a. Click the Check mark next to export
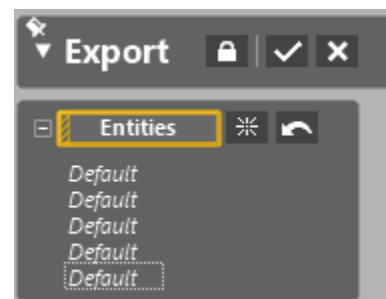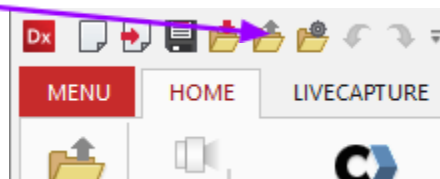
   b. Navigate to the folder in "NMNH Summer 2023 david scans (geomagic aligned-not fused)" you created for the aligned files in "Getting Setup"

      i. **Click the box next to "Export Each Scan Data As A Separate File"**
      ii. **Change the file name to SWT###-##_GA**
      iii. Save the files as **.obj** files

6. Repeat these steps for every set of scans.
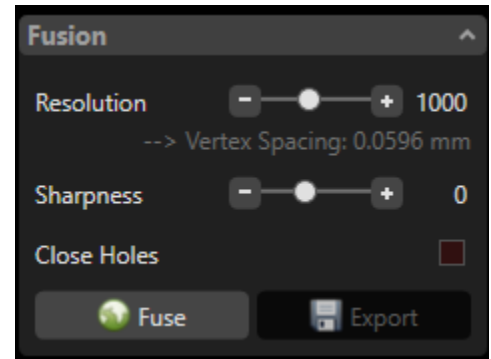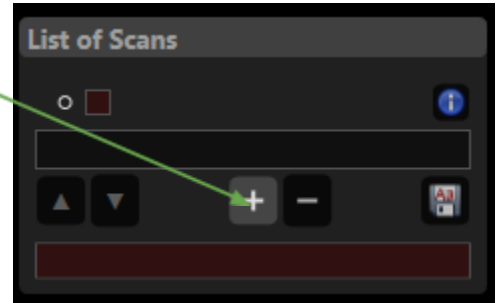
   a. If there's a scan file with a single scan, put N/A in columns F and G and Save the scan in the new folder following 5.b.ii

   b. If the scan looks funky after aligning, contact project overlord (Samantha).
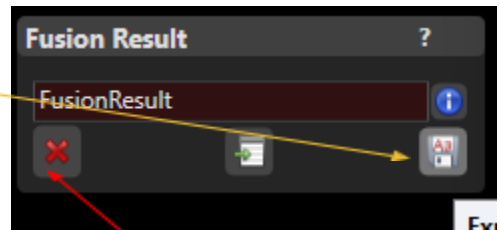
GETTING SETUP FOR DAVID FUSING

4. Navigate to the folder "NMNH Summer 2023 david scans (geomagic aligned-not fused)"

   a. Copy the folder name of whichever specimen you are working on

5. Navigate to the folder "NMNH Summer 2023 david scans (FUSED)"

   a. Create a new folder, paste the copied name from above into the folder and add _FUSED

   i. Ex: SWT027-6_cabinet1.b_drawer1_box2_FUSED

6. Open the david software

7. In the Shape Fusion tab (should automatically open to this tab), on the right hand side of the software, click the **+** within the box labeled "**List of Scans**"
    a. Navigate to the folder "NMNH Summer 2023 david scans (geomagic aligned-not fused)" and open the folder for the specimen you are working with, Select all scans (Ctrl + a) and click "Open"
8. On the left hand side locate the box labeled "**Fusion**"
    a. Use the +/- buttons to change the <u>resolution</u> so that the vertex spacing is as close to 0.05mm as possible
        i. If the options are 0.6 and/or 0.4, go with 0.4.
    b. <u>Sharpness</u> should be **0**
    c. <u>Close Holes</u> box should be **UNCHECKED**.
    d. Click fuse!
9. Open the google drive excel file for the data: NMNH Data Collection Summer 2023
    a. Locate the specimen you are working with and complete columns H-L
10. On the right hand side locate the box labeled "**Fusion Results**" and **click save** (bottom right corner)
    a. Navigate to the folder "NMNH Summer 2023 david scans (FUSED)"
        i. Locate and open the folder you created in step 5
        ii. Change the name from FusionResult to specimen ID_fused
            1. Ex: SWT###_##_fused
11. On the right hand side locate the box labeled "**Fusion Results**" and click the **red X** (bottom left corner) to return to the individual scans

12. On the left hand side locate the box labeled "**Alignment**", use the dropdown arrow to select <u>Global Fine Registration</u>
    a. Set iterations to 80
    b. Click "Align Scans"
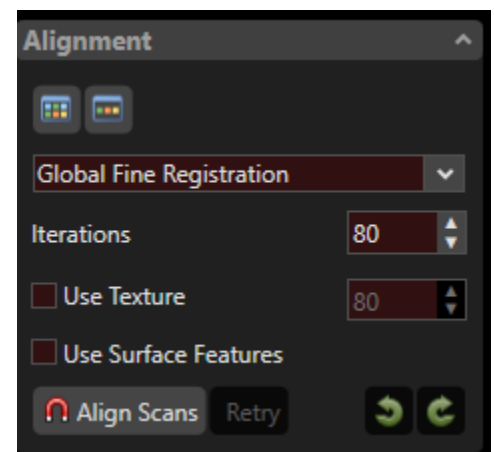
13. **Click fuse as you did in step 8**
14. On the right hand side locate the box labeled "**Fusion Results**" and click save (bottom right corner)
    a. Navigate to the folder "NMNH Summer 2023 david scans (FUSED)"
        i. Locate and open the folder you created in step 5
        ii. Change the name from FusionResult to specimen ID_GFA_fused
            1. Ex: SWT###_##_GFA_fused