Final Implementation

**Design:** The current implementation of our project features a Blender add-on with a working pop-up dialog box inserted into Blender’s toolbar, with variables for the user to change that will be fed to our python script(s). These variables create a header file for an AnisoMPM animation process.

**Limitations:** Our script to transfer between .obj and .bgeo files is still not complete, which is required to make Blender’s objects work with AnisoMPM and to bring the final animation frames back into Blender, so it is not currently fully functional.

**Future Direction:** To finish our add-on for the future, we will finish our script for file type conversion, and feed the objects into the code produced from our header file from user input to produce the animation, and export the specified number of frames back into blender as objects. We will also look to add functionality for more diverse material types, beyond the ones from the AnisoMPM demos.

**Statement of Work:**

* Chase:
  + Worked on AnisoMPM denos for WIndows with Ubuntu (20.03)command line,
  + Tried to use Addison’s work on TetWild to get a .mesh into AnisoMPM on Ubuntu (20.03) command line and tried to run the new .mesh with base inputs from AnisoMPM, AnisoMPM crashed.
  + Thomas was Looking into converting .bgeo files to .obj with his own code, as he was doing this I was trying add-ons for blender one being “[Open Mesh Effect For Blender](https://www.sidefx.com/forum/topic/74275/)”
    - Open Mesh Effect For Blender, Needed to be compiled before running blender using cmake, try this with both Ubuntu (20.03)command and WIndows’ command Prompt
* Addison:
  + Wrote initial Blender add-on script
  + Built the TetWild and PyMesh projects to convert .mesh files for Blender compatibility
  + Tried Docker and other tools to get an Ubuntu command environment working within Windows
  + Worked with Chase to build AnisoMPM demos and discovered .bgeo outputs
  + Researched .bgeo file type after TetWild work had to be scrapped
* Alex:
  + Created the primary Blender Add-on
    - Got familiarized with working with the Blender utilities and the Python scripting environment for Blender
    - Created several add-ons with different functionality in order to understand the different things that can be done with Blender
    - Got a base down to expand upon with functionality to call on scripts to animate (when said scripts are able to be enacted)
    - Added functionality to create objects in Blender
  + Helped to troubleshoot/teach Ubuntu utilities to the rest of the team, including with some issues with compilers and make
* Thomas:
  + Worked on getting AnisoMPM to work within Windows
    - Chase was working on this too, but we took different approaches. He focused on trying to get Ubuntu command lines running in Windows so we could just use that. I tried to get GNU functionality within the Windows command line.
    - Chase was getting better results with his method, so I let him take care of this part and moved on to do other things.
  + Created python scripts to Generate headers used by AnisoMPM
  + Looked very closely at finding patterns within .bgeo files to convert to .obj
    - It took a lot of trial and error
      * Using a hex editor
      * Converting byte by byte into integers, unsigned integers, floats, doubles, using big/little endian, etc.
    - Eventually found some kind of pattern. Skipping the first 3 bytes and then converting 4 bytes at a time into floats gave us readable numbers. We could also see groups of values that corresponded to each point. But, we didn’t get the exact numbers we needed. The numbers were all between 1 and 10 now, instead of random numbers of random magnitude. But they weren’t the exact coordinates we needed.