# Human Model Generation

In order to create a human face based on microbial sample data, we need a way to generate highly detailed and realistic human models. This can be done several different ways but the three technologies we have chosen to look into are MakeHuman, Fuse Character Creator by Mixamo, and generating a series of Blender scripts to create our human model.

# Option 1: MakeHuman

MakeHuman is a computer graphics software which allows users to create 3D human models through the use of a series of Blender scripts. One of the biggest benefits of MakeHuman is that it is open source with a very unrestricting license which allow it to be free used with commercial and non-commercial projects. This allows us to have control over every aspect of the technology without having to spend time creating our own scripts. MakeHuman also has an in depth API which allows for easy creation and exporting of models based on various criteria. It has proved itself as a high quality project when it was awarded the Suzanne Award for best Blender Python script in 2004. The primary foreseeable downside for MakeHuman is the potential difficulties of utilizing the API in our own software. Overall however, MakeHuman is a well-rounded project with a very clear method utilization, making it a great potential choice for our project.

# Option 2: Fuse Character Creator

The second possible technology which could be used is the Fuse Character Creator. The Fuse Character Creator is a computer graphics software developed by Mixamo which allows the creation of 3D character models. The software is mainly designed for use by video game developers and the like. Overall, the models have great detail and could even be considered more realistic than the MakeHuman models. Fuse Character Creator also allows for users to easily import external user generated content, which could potentially be utilized in our project. Unfortunately, Fuse Character Creator carries with it some fairly heavy caveats. Firstly, the software is not open source, meaning we would not be able to easily access the core functionality of the project in addition to having no access to any API whatsoever. Secondly, the product licenses are required to use the software which costs money to obtain. Overall, the Fuse Character Creator is a great looking tool and would be great to use. Unfortunately, there seems to be a great deal of restrictions which would hold us back.

# Option 3: Python Scripts for Blender

The third, and by far the most invested option would be to use python to generate scripts for Blender to create a human model. The primary benefit of this option is that it gives us an enormous amount of control over our code. Theoretically, the potentially of this option are limitless. Unfortunately, our project is confined to a 9 month period split between two different people. The amount of ground work required just to get something like this off the ground is astronomical for two people with no experience in the field. Overall, creating Python scripts for Blender simply is not a realistic option given the restrictions of our time and man power.

# Final Choice: MakeHuman

Considering these option, it has been made abundantly clear that MakeHuman is the best option for us the use. The MakeHuman project provides all of the benefits of using the Fuse Character Creator without any of the immense downsides. Being open source means that we can still retain a level of control similar to that of generating our own Python scripts with all of the groundwork already completed.