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Personal Artwork Review: 3D Character Models

In the summer of 2024, I was granted the opportunity to 3D model a stylized character for a short film called *Kate Shelley & the Bridge of Darkness*. I had never done any character modeling before, so I eagerly seized the challenge and ran with it. Since then, I have modeled four additional characters for the production. The following writing sample analyzes three of these character models. I discuss the techniques I used to create them, and reflect on how they could be improved.

The first character I modeled was “Wilbur”, a lengthy old man. This model is based on Gabrielle DeLo’s character design for Wilbur. I made it in about three and a half months using Blender. I poly-modeled everything, making use of mirror and subdivision surface modifiers to maintain symmetry and apply smoothing. Creating the 3D version of Wilbur required a substantial amount of research, practice, and trial and error. The feedback I received from daily critique meetings, as well as the character modeling pointers I picked up from watching online tutorials, taught me the importance of building models with clean topology. One of the industry standard topology techniques I implemented in Wilbur’s model was circular edge flows around his joints, such as the wrists, elbows, knees, and ankles (see Fig. 1). This technique contained denser geometry to a specific area, which helped to control the direction of mesh bending in preparation for the rigging and animation processes. Another practice I followed included giving Wilbur’s face an eye mask (see Fig. 2). This allowed me to shape his eyelids and eye sockets without deforming the geometry around his nose and mouth. In terms of improvements, a technical way Wilbur’s model could be refined is by reducing the mesh density of his hair and clothes. I applied two levels of subdivision smoothing to each object’s mesh (see Fig. 3), when I could have achieved a similar level of detail with just one level. Making this fix could help speed up scene loading and rendering times. On the other hand, an aesthetic way this model could be improved is by adding some noticeable wrinkles to Wilbur’s face. Since Wilbur is meant to be an old man, his lack of wrinkles feel a bit unnatural and distracting. The addition of wrinkles would add a layer of realism to the model, which could make Wilbur feel more alive to the audience.

The second character I modeled was “Kate Shelley”, the film’s teenage protagonist. I made Kate’s model in about five months using Blender. I frequently referenced her 2D character design to help me poly-model the general structure of her body, face, hair, and clothes. The process of creating this model taught me a lot about proper human anatomy. For instance, I realized that I could not reference parts of Wilbur’s hand topology to help me make Kate’s hands because the anatomy was not correct. Wilbur’s thumbs contained extra bones and faced straight up to the sky instead of resting at an angle. This made them look uncanny. Additionally, they did not have the correct edge flows to initiate movement in the directions that thumbs are expected to move in. Upon identifying these mistakes, I studied hand anatomy (which included hand bones and muscles) to ensure that Kate’s hands looked and moved correctly (see Fig. 4). I also spent a substantial amount of time altering the topology on Kate’s face to achieve edge flows that mimicked the natural flow of facial muscles. This included an eye mask (*orbicularis oculi*), edges that form a circle around the mouth (*orbicularis oris*), and geometry that bridges the forehead and nose (*procerus*) (see Fig. 5). It was pivotal that Kate’s facial topology followed facial modeling

standards, so that her mesh would not majorly deform during the rigging and animation processes. Moving on, a technical way that Kate's model could be improved is by reducing the mesh density of the objects that comprise her hair; the base, front swoop, braid, and braid tail (see Fig. 6). Reducing the applied subdivisions on each of these objects by two levels could speed up screen loading and rendering times. Finally, an aesthetic way that Kate's model could be improved is by making surfaces of her hair objects appear consistent with each other. Right now, her hair base object contains dull lines (from sculpting), her front swoop and braid tail objects have sharp lines (from curves), and her braid object has no lines. Making the surfaces of these objects consistent with each other could make Kate's 3D design more appealing. Doing so would also promote 3D design consistency across all characters in the film, as their hair objects appear smooth.

The fifth and final character I modeled was "James Shelley", Kate's preteen brother. His model took me 8 days to complete. By this point in time, I had four character models under my belt. I used the techniques and knowledge I acquired from building the other models to streamline my process for making James. For example, I referenced the flow of topology on Kate's body and face to help me poly-model James. I also resized and reused Kate's hands on James's model for efficiency purposes. Additionally, I focused on lowering the mesh density of objects and eliminating unnecessary geometry *as* I modeled, instead of *after* I modeled (see Fig. 7). A technical way James's model could be improved is by making the edges in each of his hair strand pieces conjoin from quad faces into an endpoint. Currently, the end parts of his hair strands form n-gons, which is not ideal for UV unwrapping and laying down textures (see Fig. 8). This fix could help eliminate these issues. Finally, an aesthetic way that James's model could be refined is by pushing his eye sockets forward a little. Right now, they seem to sit a bit too far back in his head (see Fig. 9). Pushing them forward could make his face appear more proportionate and natural.

Over the past year, I gained invaluable knowledge and experience in the realm of 3D character modeling. The creation of each model brought its own challenges and lessons. The making of Wilbur allowed me to explore and experiment with modeling techniques that I had never seen before. The construction of Kate taught me the importance of translating human anatomy into good character topology. The crafting of James gave me the opportunity to further practice and refine my 3D modeling skills. I am extremely grateful to my instructors, Stephen Jennings and Professor Anthony Summey, for giving me the chance to dive into 3D character modeling. I would also like to thank them for their daily feedback and support. Looking forward, I am excited to apply what I have learned to future animation projects.

Figures



Fig. 1. Some of the circular edge flows in Wilbur's model (highlighted in orange).

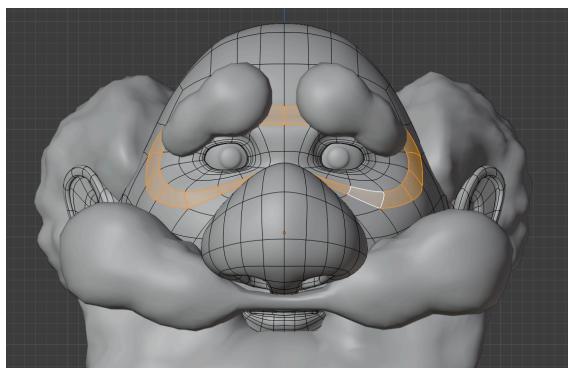


Fig. 2. Wilbur's eye mask.



Fig. 3. The high mesh densities of Wilbur's hair and vest after applying two levels of subdivisions.

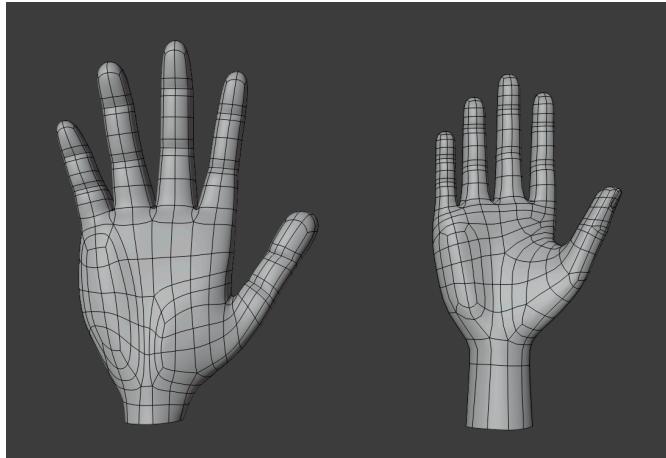


Fig. 4. Comparing Wilbur's hand topology (left) to Kate's hand topology (right).

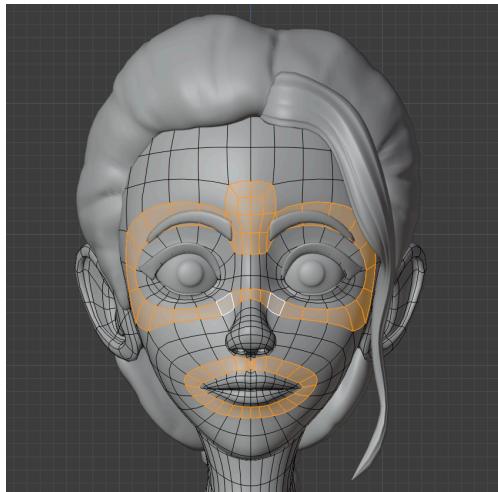


Fig. 5. Kate's eye mask, mouth edge flow, and forehead topology (highlighted in orange).



Fig. 6. The high mesh densities of the objects that comprise Kate's hair.

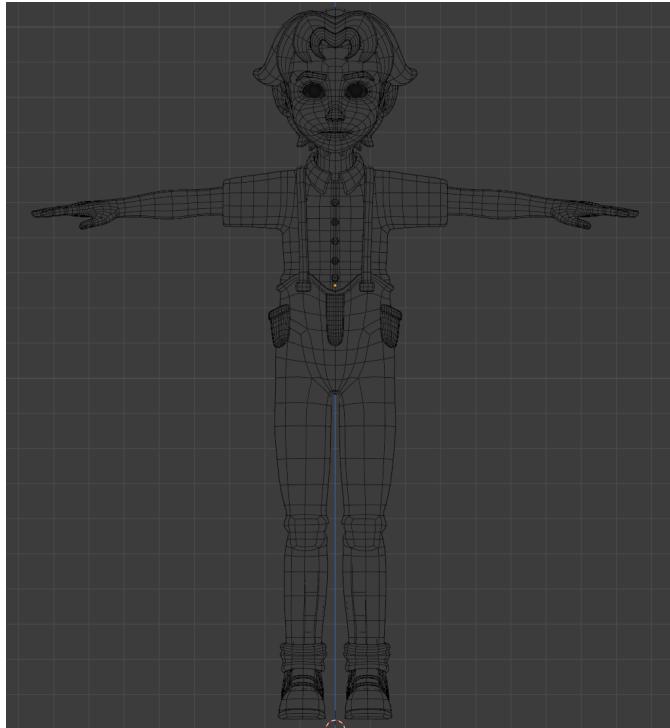


Fig. 7. James's clean mesh topology.

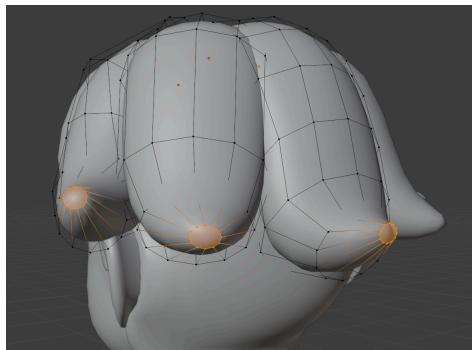


Fig. 8. N-gons located at the ends of James's hair strands (highlighted in orange).

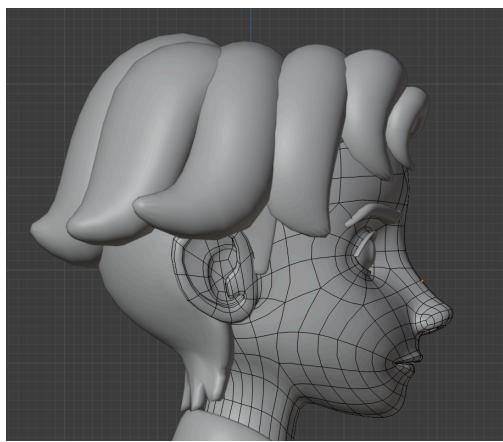


Fig. 9. The placement of James's right eye socket from his side profile.