I WANT A HIPPOPOTAMUS FOR CHRISTMAS:
ANIMATING WITH DIGITAL CLAY

by

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THESIS SUBMITTED TO THE DIVISION OF VISUAL ARTS,
IN SUPPORT OF SENIOR-YEAR ART RESEARCH, *SENIOR EXHIBITION*,
AND IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF FINE
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      Bachelor of Fine Arts in CAD
          Concentration in Animation

My thesis investigates the computer-generated methods used to create the realistic

texture of clay, stylistically combining the art of stop motion with the art of computer

animation.

My pursuit of a degree in computer animation is rooted in my life-long interest in stop-motion animation. My growing knowledge of how clay animations are created, as well as how computer animation is executed, led to a desire to create the appearance of traditional clay animation by using computer animation software. Meindbender Animation Studio in Sweden has achieved this and is one of the major inspirations for this particular project. By using the right digital materials, understanding the physical properties of real clay, and by optimizing my render settings, I successfully simulated clay within a computer animation program. I applied the techniques of successful stop-motion artists such as Ray Harryhausen and Peter Lord to my computer animation, sometimes using physical clay models and lighting in a real studio set-up as a reference. I also researched the techniques and computer programs used by Michael Bengtsson of Meindbender and applied his findings to my work. Through this research project I have learned a more efficient way to produce an animation that offers the appeal and charm of a clay animation without the cost in materials and studio space. As a result, I am able to offer a wider variety of artistic skills to potential clients and employers.

Thanks to many gifted animators, such as Nick Park, Henry Selick, and Michael Bengtsson, the animation world has a wealth of knowledge from which new artists such as myself can draw upon. In my project *I Want a Hippopotamus for Christmas*, I chose to pull various techniques and ideas from many of these animators to create an animation using computer software that allows me to create the look and style of a clay animation.

I Want a Hippopotamus for Christmas was first written as a children's story by John Rox in 1950. In 1953, he put his story to song, and it was sung by ten-year-old Gayla Peevey. The song became quite a hit, as did Gayla, and she sang the song again as a fund-raiser to adopt a hippopotamus for the Oklahoma City Zoo. Children literally sent in pocket change, but it was enough money to adopt Mathilda, a pygmy hippopotamus, that was delivered and presented to Gayla at the zoo on Christmas Eve in 1953 (see Image 1). Hundreds of people attended the zoo on Christmas Day to see the first hippo the zoo ever had. Mathilda lived until 1998 at the Oklahoma City Zoo with her mate, Norman. Gayla was sad to hear of the hippo's passing, but in November 2011, Gayla returned to the Oklahoma City Zoo to visit the new ZooZeum, a section of the zoo dedicated to the memories of past zoo animals and their stories. Gayla led a sing-a-long for the song *I Want a Hippopotamus for Christmas* with zoo attendees, in memory of Mathilda (Bryant).

I chose this song for my animation project because when I was a child, I loved listening to people tell stories, reading stories myself, and watching them on television, especially at Christmas time. There were always so many Christmas specials to enjoy, and the majority of those specials were stop-motion animations, such as *Rudolf the Red-Nosed Reindeer* and *Santa Claus is Coming to Town*. My love and fascination for the art of clay animation never left me, and I always had a desire to make my own. John Rox's song about

a little girl who loves hippopotamuses struck me as a great subject for a clay animation

because of the potential action in the song, the vivid imagery, and the entertaining and

charming subject of the song itself.

Claymation, the art of manipulating clay in slight degrees and taking a photograph of

each new movement to compile as an animation, is a term that was coined and

trademarked by Will Vinton in 1978, the artist responsible for such productions as the

California Raisins commercials (Orfano). One of Vinton's inspirations was animator Art

Clokey, creator of the *Gumby* series in the 1950s. Clokey had a passion for his artwork and

understood the complexity of the medium and impact it had on its viewers. He stated that

the movement you see in a film affects your nervous system, and therefore the way your

eyes transmit information to your brain. In Clokey's words, "When you organize the

images in the movement from cut to cut, it stimulates the autonomic nervous system. It

gives you added excitement and it can start a feeling of movement" (gumbyworld.com).

Although I do not feel my nervous system reacting, I do know that stop-motion films

certainly capture my attention and cause me to get excited about the art of the stop-motion

itself.

At the same time that Vinton was receiving acclaim in the 1970s, animators like Nick

Park and Peter Lord were across the pond in England, pursuing their love for clay

animation and developing their own techniques for this medium. Park, who started

animating in his teens, became one of the best-known names in animation for such works

as the *Wallace & Gromit* series, *Creature Comforts*, and *Chicken Run*. Meeting fellow

animator Peter Lord enabled Park to produce his efforts through Lord's Aardman

Animation Studios. Both animators began animating at a young age, and both felt they were

alone in what they were doing. However, over time the animation world grew and recently Park stated "there is now a great deal more information available about animation, especially now that computer animation has become so prominent" (Lord, Sibley 7). Growing technology has made personal computers more affordable, as well as software programs designed to meet the increasing demands of animators and other technologically inclined artists around the globe.

As computer animation has been popularized, animators such as Michael Bengtsson have found a new way to incorporate clay into computer animations. Rather than model his characters from actual clay and animate them by hand, frame by frame, Bengtsson has mastered the art of using computer animation software to create the appearance of clay characters and render out highly detailed animations. He recognized the advantage to studying physical clay in order to achieve success with his productions. In addition to finding a highly effective rendering process for his animations, Bengtsson said "'it all came down to studying the real thing. Learn[ing] how materials reflect and absorb light in different scenarios'" (Hellard).

When I first saw Meindbender's short *The Pirate*, I questioned whether I was viewing clay animation or computer animation. For a clay production, it was extremely dynamic and smooth, but for a computer animation, it was so detailed and realistic (see Image 2). This inability to determine the medium used for this short sparked my curiosity, and I therefore looked into how Meindbender created this production. I found that it was indeed computer animation, but that they had intentionally gone for the style of clay animation. They achieved this style largely through the rendering software they used, Maxwell Renderer. Learning this information caused me to realize I also had the

opportunity to combine two media I am highly interested in; I could create my own digital clay animation.

Another animation artist that influenced my current project is Ben Hibon, who directed *The Three Brothers* animation sequence from the major motion picture *Harry Potter and the Deathly Hallows, Part 1.* Hibon, influenced by the works of German silhouette artist Lotte Reiniger, used computer animation to create a three-dimensional world for his characters, even though they still retained the hand-crafted representation characteristic of stop-motion puppets and shadow puppetry (see Image 3). The peculiar movements made by these computer-generated puppets added to the eeriness that fit the story so well (Hibon). I enjoyed watching an animation that, like Bengtsson's animations, made me question, at least initially, whether I was watching something filmed in live action, or if it was computer animated. Hibon stated that his animation

> designs are reminiscent of handcrafted wooden puppets; their gestures are limited to basic articulation. The crude feel of the animation accentuates the characters' theatrical performances, the simple outlines drawing our attention to the smallest of details — each subtle hand movement, each head motion gets interpreted as another nuance of human emotion (Hibon).

Hibon has also created the opening animation sequence for the movie *Mirror Mirror*, telling, in visual format, the early story of Snow White. Here again Hibon draws inspiration from old-fashioned puppetry in the design of his characters, creating a beautiful and realistic animation (see Image 4).

Whereas computer animation is obviously a simulation, stop-motion animation is much closer to the acceptance that what is seen is real because it has been filmed and not simulated. Yet the audience must still willingly suspend their disbelief because everyone

knows that clay cannot move by itself. Henry Selick said, "Stop-motion has a certain 'grittiness' and is filled with imperfections, ...People are always going to be drawn to something that is shaped by the human hand in an undeniable way" (Noyer). This statement is supported by the evidence that in our current era of advancing technology, stop-motion animation is still widely used and continues to entertain, even to the point that computer artists are aspiring to re-create clay animations with computer technology.

Not having the time or resources to create a production-quality clay animation of my own, I wanted to take this opportunity to develop and expand my skills as a computer animator by exploring the re-creation of clay animation with the aid of a computer. As Selick pointed out, I would not be able to emulate the natural "grittiness" that comes from physically handling and manipulating clay, but I could manufacture the facade of clay which, for me, would bridge the gap between clay animation and computer animation. I believe both Hibon and Bengtsson have been highly successful in doing this and I want to explore this technique myself. I agree with Selick when he says, "CG clearly has taken effects in live-action films to places that stop-motion could never really go in terms of worlds created and the seamless blending of so many visual layers" (Ziebarth). Until I have the time and resources to create a stop-motion animation, I will take advantage of the ever-advancing techniques that computer animation software offers.

I found the process of acquiring permission to use this song quite confusing. I may have made it more difficult than it needed to be initially, but that is because I have never gone through this process before. I began by seeking out the artist who performed the song which was, in this case, Gayla Peevey. I found her through a website especially dedicated to this song and one other she performed for the same album in 1953. Ms. Peevey was very gracious and returned communication promptly, informing me she had no ownership of the song but to contact Edwin H. Morris & Co. or Sony Records. I found contact information for Edwin H. Morris, a subsidiary of MPL Publisher, and sent an inquiry. They informed me that they had 100% US ownership of the song but that I would have to get permission from the master owner as well, of whom they had no information. This is where my confusion and some frustration began, but upon more research of the process, an article pointed me to look at the information on the song's album cover. I had bought the song through iTunes and it belonged to an album put out by CRS Records Ltd (see Image 5). Therefore, in this case, CRS Records would be the master owner of the specific version of the song I bought. I found their contact information and sent an inquiry to get permission. This company is in the UK, so the response came a few days later, but they were very obliging since I am a student and offered an agreement that would not incur any charges for the song's limited use. I then contacted MPL Publishers with this information. From there, MPL Publishers drew up a contract I had to sign, and I had to pay a fee to use the song for a year, beginning February 1, 2013 (see Image 6). Prior to accepting my contract, however, they requested a copy of my storyboard, which I had already completed at this point.

In the midst of the song permission process, I went ahead with my character

designs. I already had a general idea of how I wanted them to look: cute enough to be appealing without copying Disney, and I wanted the girl to be a little chubby and to make it clear that pink is her favorite color (see Image 7). However, when I decided I wanted more of a clay animation appearance, I was forced to do a little re-designing on my characters. I now had to think more in terms of how a clay figure would be modeled by hand as well as how it would move, while also considering the fact that a thinner character is easier to deal with than a chubby one when dealing with computer animation (see Image 8). I also began thinking more about the texture for my models: while many stop motion animations have very texturally smooth characters due to their use of soft foam latex, a traditional clay animation character will inevitably retain surface flaws from repetitive handling. Mineral oil is usually used to smooth flaws out, which in turn can give the clay a subtle sheen, but some flaws can still be detected on the surface.

Character development continued to be a work in progress, but once I received permission to use the song, I mapped out the mouth shapes I would need for the girl. This mouth shape key was necessary for every word she would be seen singing. It was also important during the rigging process so that I could create the appropriate facial blend shapes needed for the animation (see Image 9). Creating blend shapes is an alternate to creating several joints in the face and can save a lot of time. I also used the blend shape method for the little girl's doll as well as for the spider, rather than creating a skeleton and rig (see Image 10). If, however, these two characters were to be used more extensively than they are in this particular animation, I would have most likely rigged them for greater control and finer movement. It was for these reasons I created skeletons and rigs for the crocodile and rhinoceros; their roles were a bit larger and their movements required more

specific control. I repeated the process of creating facial blend shapes for the hippopotamus as well, but his were confined to expressions rather than mouth shapes as he does not speak or sing in the animation (see Image 11).

With the song rights sorted and the storyboard ready to go, I moved on to the next step and created a reference video. Reference video is an animator's best friend when it comes to working out correct timing and movement in the animation. To help me were some close friends of mine. I used a male friend around 6 feet tall to act as the hippopotamus, and his 12-year-old niece to play the girl. Prior to shooting the video, I laid out the storyboard for them to study and to get a good idea of what their actions would be. We used props, and my male friend doubled for the crocodile, and I stood in for the rhinoceros. In order to make sure we got the timing correct, another friend made sure to play the appropriate part of the song. I then took the video footage and edited it in Premiere to correctly match the song to the video sequence I needed as reference. Once I began animating with the reference as an aid, I quickly realized how invaluable that reference was. It left out much of the guesswork I would have otherwise had (see Image 12).

In setting up my animation scenes in Autodesk's Maya software program, I referenced the original character files in order to have lighter scenes to work with, therefore not over-burdening my computer while running the animation program. Other advantages to referencing a file is that I can create several files referencing one original file, and if I need to make a change to the master file, all the scenes will update automatically. This saves me the trouble of having to make changes several times over, or even start completely over with the new file. Referencing the original files was proving helpful to me

in the process of weight painting. After you rig a character, often times you need to correct the way the geometry is affected by the rig. I went through as many joints in the characters' bodies as possible and assigned a value of 1 in the Component Editor. This helped to cut down on hours of weight painting, but there was still plenty to do, as it is unavoidable that more than one joint will affect certain parts of the body (see Image 13). But here again, during this part of the process, I had to consider what a clay character would look like when moving and deforming as opposed to an actual human being or even a computer animated character. I decided that some squashing around joints and certain deformations were preferable to make the clay animation effect a little more believable.

With the animation sequences completed and the weight painting resolved, I focused on the final textures for the characters and props. While I could achieve the clay texture on the girl's character by simply applying a bump map created from a picture of clay, I realized that I had less control over the entire outcome of the model's appearance. The texture looked well on her body and hair, but I had decided I wanted her face to remain smooth. As an alternative, I created a normal map in 3D-Coat by importing the girl's geometry mesh into that program and painting texture on it that could then be exported as a normal map (see Image 14). This also enabled me to create more than one map for the girl. My goal was to give the impression throughout the animation that the model had been touched several times throughout the animation process. I accomplished this by creating subtle differences on the different normal maps that would resemble clay being pushed around slightly. Back in Maya, I would change out the normal maps at the appropriate places in the animation sequence.

Once all the animations and textures were completed, I needed to be sure I had

appropriate lighting for my scenes. Some clay animations can be very complex in their lighting, but for this particular project, I wanted to keep everything well-lit and somewhat artificial, so I went for the standard 3 point lighting system, which calls for a key light, a back light, and a fill light. This helped to round out the shadows in each scene, therefore adding to the three-dimensionality needed to achieve a clay appearance for the animation.

The final step in Maya was the rendering, which produced a final, high quality image for each frame of the animation. Utilizing the depth of field option for the camera in Maya, I was able to render out images that more closely resembled how a still would look from a stop-motion set (see Image 15). I then took these images into Premiere and assembled them, in order, to sync them with the song. Premiere also allowed me to create title slates for the animation, as well as transitions, special effects, and image editing where necessary. When I was satisfied with the final outcome, I exported the entire sequence with a high quality render.

In conclusion, I am very pleased with the outcome of my animation. Due to time restrictions, I was not able to fully research other rendering software as I had intended, but found that the program I had available to me – mentalRay – was more than suitable for producing the results I was after, particularly for lighting, and the final appearance of my rendered images. I believe that despite my currently limited resources regarding software programs, fellow animators, visual effects personnel, and finances, I came very close to achieving the clay animation appearance I had envisioned for this project. Additionally, I believe the final product is appealing and entertaining.

Bibliography

Bryant, Beverly. "New Oklahoma City Zoo Exhibit Tells Story of Mathilda the Hippo."
    The Ponca City News. 24 November 2011. 20 October, 2012.
    http://assets.mediaspanonline.com/prod/7346641/pcn-2011-11-24-c-
    008.pdf.

Clokey, Art. 20 October 2012. http://www.gumbyworld.com/art-clokey/.

Hellard, Paul. "Meindbender." CG Society. 16 February 2010. 29 September 2012.
    http://www.cgsociety.org/index.php/CGSFeatures/CGSFeatureSpecial/meindbend
    er.

Hibon, Ben. "How the first animated sequence in a 'Harry Potter' movie came about."
    L.A. Times Blog Awards Tracker. 28 January 2011. 20 October 2012.
    http://latimesblogs.latimes.com/awards/2011/01/how-the-first-animated-
    sequence-in-a-harry-potter-movie-came-about.html.

Lord, Peter and Brian Sibley. *Creating 3-D animation: the Aardman book of
    filmmaking*. Revised Edition. New York, NY: Harry N. Abrams, Inc., 2004.

Maraffi, Chris. *Maya Character Creation: Modeling and Animation Controls*.
    Indianapolis, IN: New Riders Publishing, 2004.

McKinley, Michael. *Maya Studio Projects: Game Environments and Props*.
    Indianapolis, IN: Wiley Publishing, Inc., 2010.

Noyer, Jeremie. "Perfect *Nightmare*: Henry Selick on Making *Christmas* before time!"
    Animated Views. 22 August 2008. 20 October 2012.
    http://animatedviews.com/2008/perfect-nightmare-henry-selick-on-making-
    christmas-before-time/.

Orfano, Finn. "Who Invented Claymation?" Bright Hub. 17 December 2009. 20
    October 2012.
    http://www.brighthub.com/multimedia/video/articles/59445.aspx.

Rolnik, Daniel. "Meindbender – Interview." Argot & Ochre. 18 May 2011. 29

      September 2012. http://www.argotandochre.com/2011/05/meindbender-
      interview/.

Shaw, Susannah. *Stop Motion: Craft skills for model animation*. Burlington, MA: Focal
      Press, 2004.

Sheady, Ilan. "Interview with Michael Bengtsson from Meindbender Animation
      Studio." Skwigly {Online Animation Magazine}. 4 May 2011. 29 September
      2012. http://www.skwigly.co.uk/interview-with-michael-bengtsson-from-
      meindbender-animation-studio/.

Smith, Geoffrey. *Photoshop 5 3D Textures f/x and design*. Scottsdale, AZ: The Coriolis
      Group, Inc., 1999.

Webster, Garrick. "Putting it all into motion." Computer Arts. 2 December 2008. 29
      September 2012. http://www.computerarts.co.uk/features/putting-it-all-
      motion.

Wissler, Virginia Bowman. *Illuminated Pixels: The Why, What, and How of Digital
      Lighting*. Boston, MA: Course Technology, a part of Cengage Learning, 2013.

Ziebarth, Christian. "Henry Selick talks *Moongirl* and more." Animated Views. 23
      November 2005. 20 October 2012.
      http://animatedviews.com/2005/henry-selick-talks-moongirl-and-more/.

Images

Image 1.

CHILD SINGER Gayla Peevey is shown in this Oklahoma Publishing Company photograph with the staff of the Oklahoma City Zoo when Mathilda the Hippopotamus was delivered to the Oklahoma City Zoo.

Image 2.

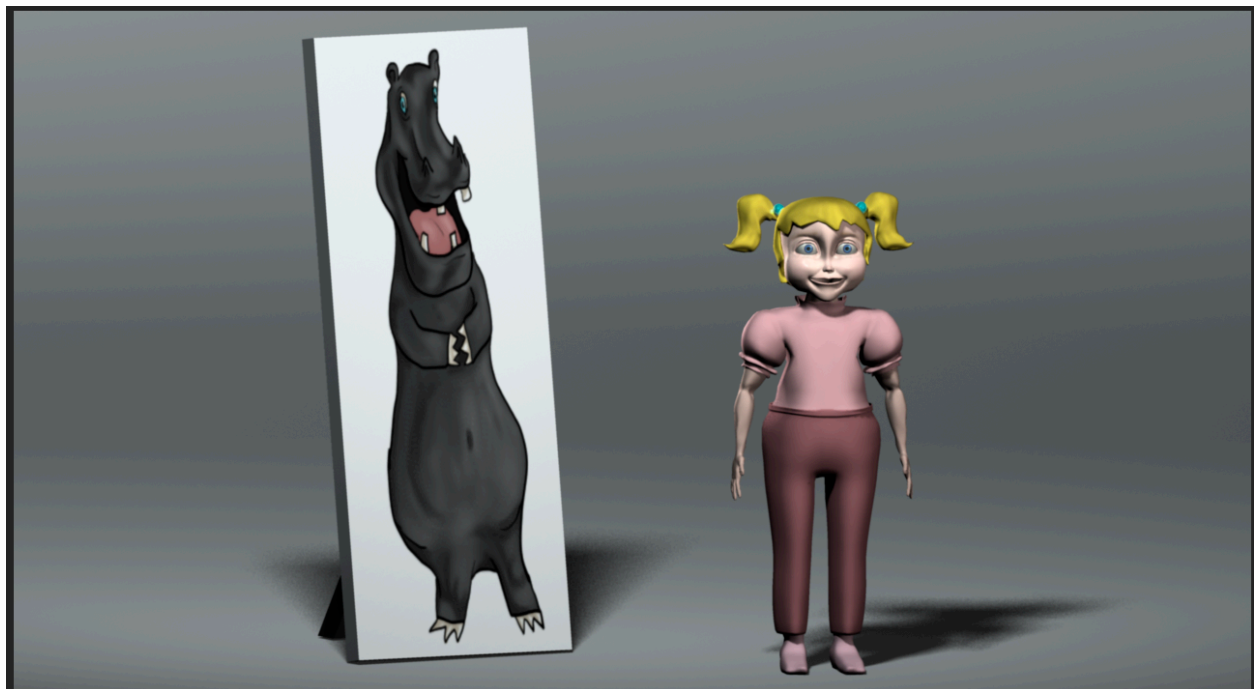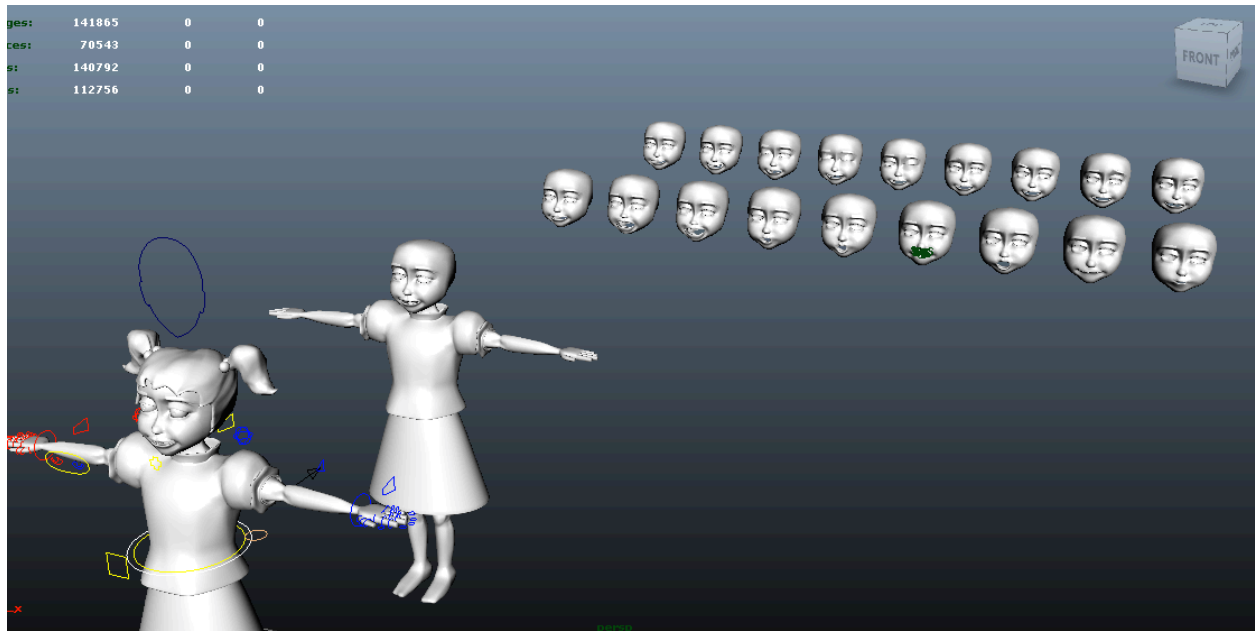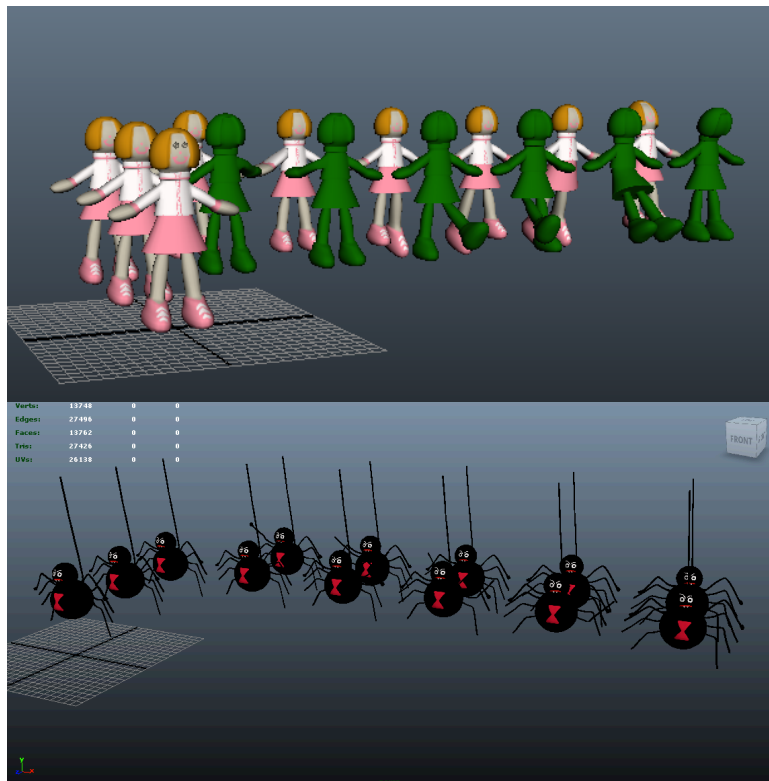
Image 3.

Image 4.

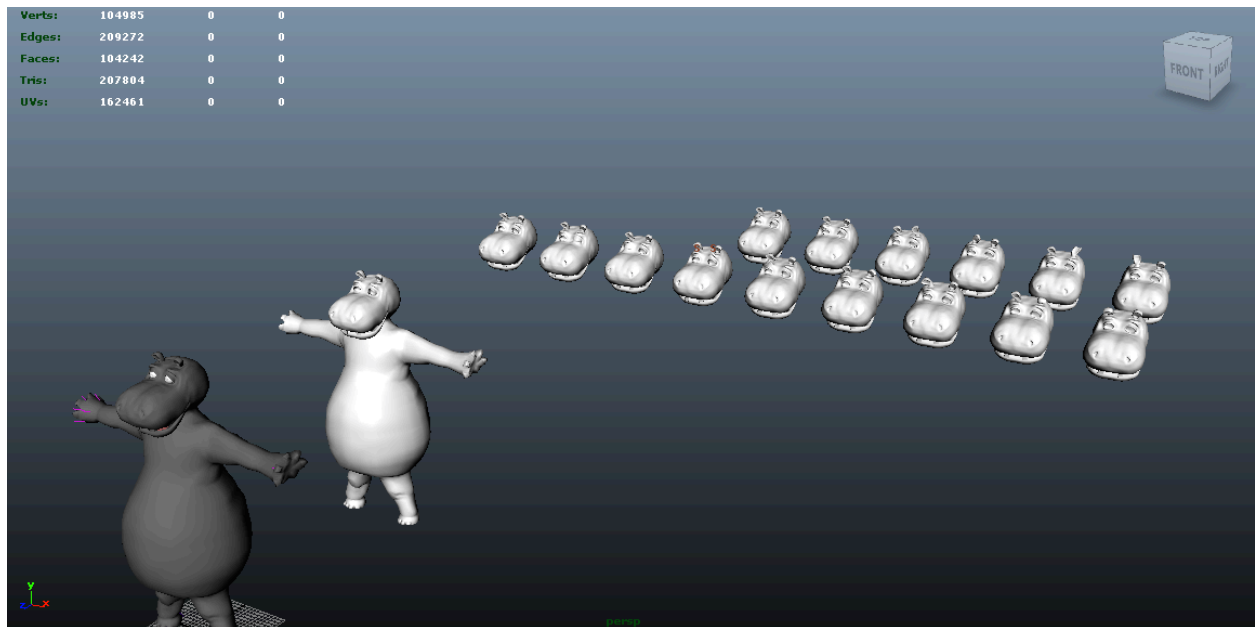Image 5.

Image 6.

Image 7.

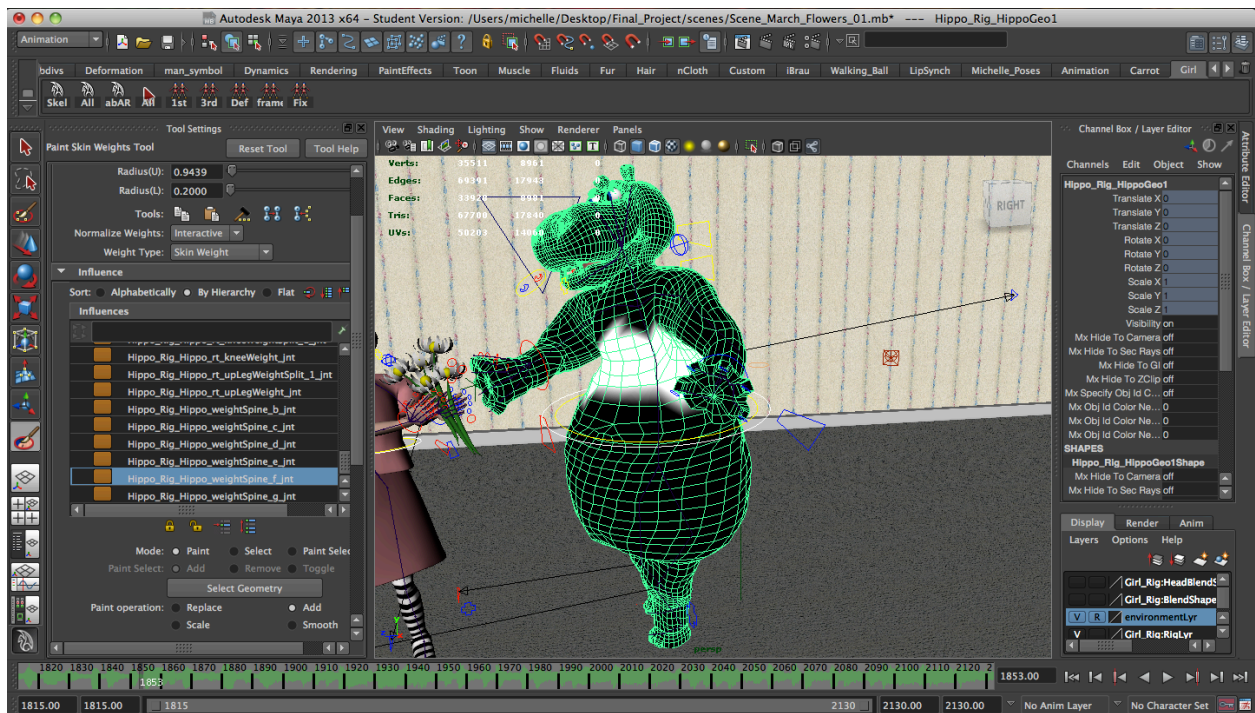Image 8.
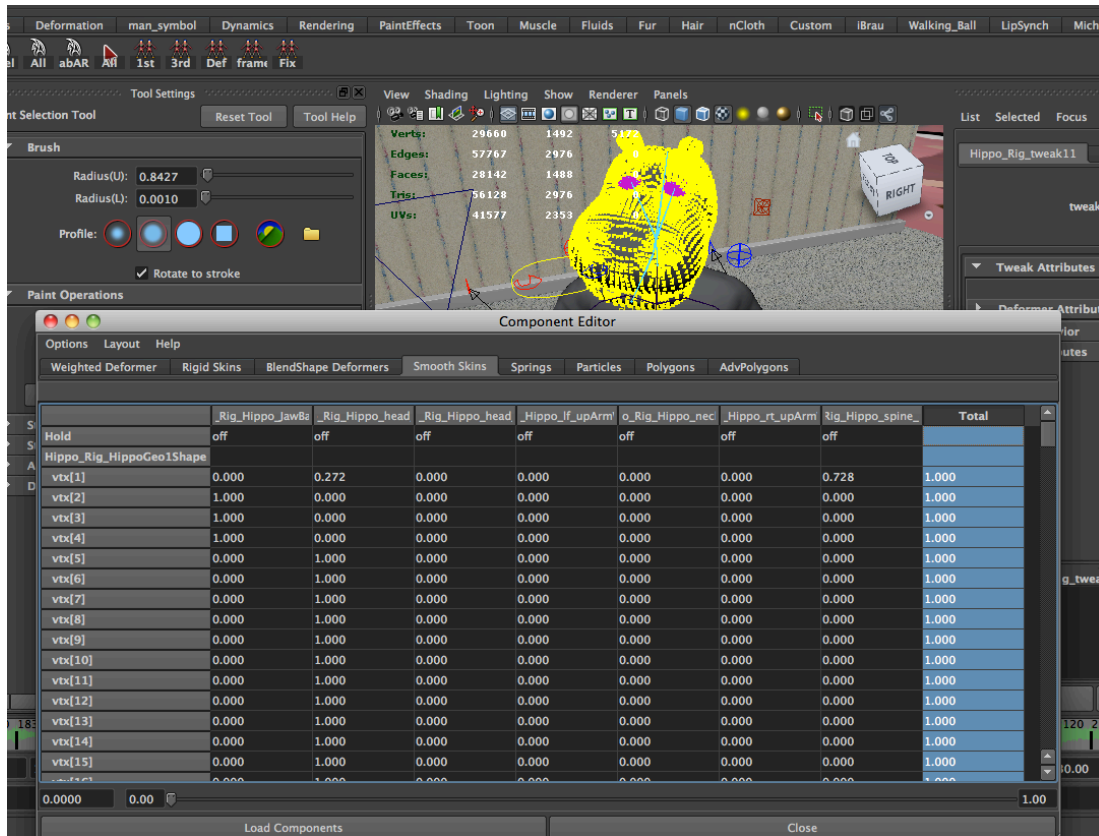
Image 9.

Image 10.

Image 11.
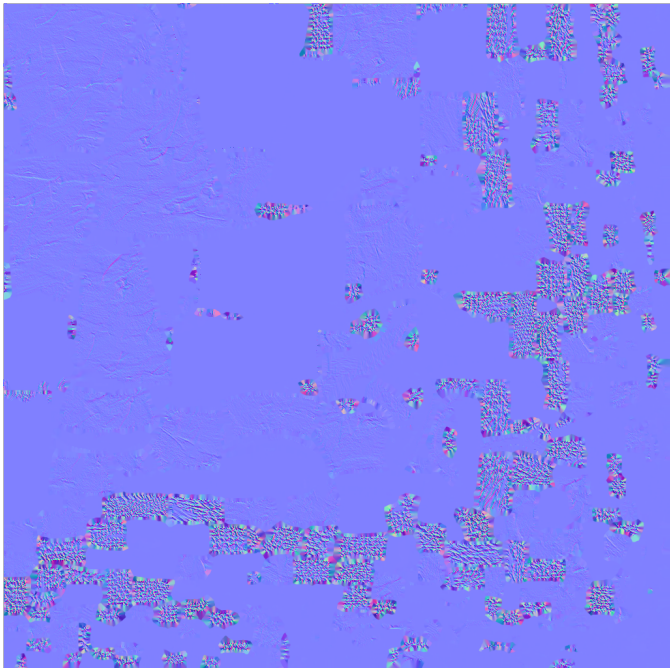

Image 12.

Image 13.

Image 14.

Image 15.

**A final image from my animation will be placed here once the rendering has been completed.