Scaling Up

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Thesis Report
February 21, 2007

Scaling Up

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Preface

The purpose of this report is to explain the artistic and technical processes used for the creation of my 3D animated thesis film, *Scaling Up*. A summary will be given for each major method and/or thought process used throughout the course of development, which spans almost three years.

The first major section that will be discussed is called preproduction. It will start off with previously proposed thesis ideas; what they were, how they were accepted by the committee, and finally why there were abandoned. The conceptual statement for *Scaling Up* follows, which will talk about why the director chose this story idea, his vision for what he was trying to achieve, and what he hopes the audience will take from it. The storyboarding section, which aids in the design process, will be discussed in more depth. Next, the creation of the timeline, which can often be the trickiest part of pre-production, will be explained in more detail as well. *Scaling Up* had a limited budget to work with, so finding ways to maximize production most efficiently with limited capital was a key part of the process. There was a good amount of reference materials used for the creation of the film and these will be discussed in greater detail.

The second major section, where the most time is spent, happens in production. First, the classic musical number *Boogie Woogie Bugle Boy* was arranged and performed by the director. This was done early in production, since a lot of the animation needed to be timed to it. A large chunk of production time is spent modeling absolutely everything that is seen in the film. Once all of the models are finished, textures are created and applied to everything. Next, animation techniques are discussed for turning a lifeless character into a believable, emotional actor. The final process of production involves lighting the 3d scenes then taking all the data, computing it and writing it out to an image, which is the rendering phase.
Almost all production pipelines do not happen in a linear fashion, as was the case with *Scaling Up*, so it was very common to backtrack and fix something, before being able to progress.

Post production is the third and final section for film creation. This is where all the parts of the film get pieced together and are output to a media source. Compositing, or the layering of multiple images on top of each other to create a single image, will be talked about in more depth. Creation for how the special effects were completed will be explained in detail. Sound effects for characters and props were recorded to add realism and create a more believable environment. One of the final steps during the creation of *Scaling Up* was to compose a musical score. The musical score is a very important element in storytelling, and the reasons why will be discussed in greater length. Once everything is pieced together, the film is ready to be written to DVD. This process will be explained as well as the extra features that were created along with the final film.

The exhibition section will talk about life after the creation of *Scaling Up*. It had its debut screening at the Rochester Institute of Technology and some interesting discussion topics were brought up. One of the director’s goals for this film is to get it seen by as many people as possible, so begins the process of submitting *Scaling Up* to film festivals throughout the country. This is one of the marketing tactics that the director is using to promote the film, and it will be discussed along with others in more detail at the end of this report.

**Pre-production**

**A. Previous Thesis Proposals**

The first thesis idea, entitled *Playing with Fire*, was proposed back in April of 2004. It was a comedy at heart, but a very faced-paced action film about a man...
being chased through the woods by a ferocious dragon. The shots composed were very dynamic and exciting, which I knew would keep the audience on the edge of their seat. The film also had an ironic twist at the end. The entire time, you’re thinking that this dragon wants to have this man for supper, but in the end, we find out that they’re just playing a friendly game of tag and the story ends happily ever after. The proposed story was accepted by the thesis committee, on agreement that the characters would be given unique character traits that made them special, and the ending for the film would be changed. After a revision was made, the new ending had an extra special twist. During the film, the dragon would exhibit characteristics of having a cold, by facial twitching mannerisms, sneezing out small spurts of fire, etc. The original ending had the man sneaking up on the dragon near the edge of a nearby cliff and yelling “BOO”. In fright, the dragon jumps off the cliff and flies back upwards saying “Hey, you can’t scare me like that during hide and seek”. The man jumps on the dragons back and both of them fly off into the sunset. Thinking back on this idea now, this sounds like the stupidest film ending ever. In the revised ending, the man is running away from the dragon and appears to have fallen off the cliff. When the dragon goes to investigate, the man sneaks up behind the beast with his sword drawn, then suddenly taps him on the back and yells “Tag, you’re it!” Scared out of his mind, the dragon flips around and sneezes a ball of fire right onto the man, which incinerates him instantly. Overall this was a much better idea, but was eventually scrapped for a few reasons. I felt that a thesis film should have more character depth and a deeper meaning that what was proposed. Also, if you’re going to be working on something for over a year, I felt that it should be a topic that you’re truly passionate about, because the film would come out better because of it. I’ve also been known as a comedic filmmaker, and I wanted to be more versatile, and take on something more challenging. Comedic films are the
easiest to create with animation, because the stories can be short and simplistic, not to mention the market is flooded with them.

It took most of summer break to realize those points and by that November, I had begun pre-production on a new thesis idea, entitled *Ricky Jones*. This idea took on many revisions but the main focus was it was a story about the love of baseball. It was an underdog story about a boy who was told he could never make it as a professional athlete and coaxed to just give up. His goal was not to be a great baseball player, but just to have the chance to walk up to the batter’s box just once in his life and take it all in. He eventually overcomes the odds and makes it up to the plate, and through the medium of animation, we get to see the environmental and psychological experiences one might exhibit at-bat during his first professional baseball game. It was questioned “Why not just do it with live-action?” This film idea made it through the storyboarding stage and it explains where the strengths of animation come into play. For baseball and most other sports, a big part of the game is psychological, and I was choosing to explore that part, rather than just the action you see in everyday baseball games. Many of the shots focused on fading from a normal state into a state of supernatural then jerking back to reality with increasing intensity. The real and supernatural feelings experienced in this situation are juxtaposed successfully. Overall, I felt this story was much stronger than my first attempt, something I was a lot more passionate about, and it was also ridden of the numerous clichés that so many baseball films have. My thesis advisor liked the direction it was heading and we were set to show it to the committee, until of course I changed my mind again. As much as I enjoyed the story this time around, I realized I was biting off way more than I could chew. The amount of time needed to create this animated baseball film and have it be done right would have been at least four years. The story had numerous characters and environments in it that needed to be modeled. I create my models with more realism and am not accustomed to
making things look too stylistic. It was also frustrating to change ideas again, because I had already started modeling props for the film in 3D. In the end, it just wasn’t a one-man project and therefore that idea was shelved as well. The new goal was to find a strong short story that was simplistic in nature, but something I was still passionate about.

B. Scaling Up Proposal

In February 2005, I had my latest and final thesis proposal ready for the committee. The story idea came from personal experiences in my life. I used to practice the trumpet everyday when I was young, and I never enjoyed playing boring scales or the random compositions in the learning books. The most enjoyment came when putting in my favorite musical soundtrack or orchestral piece and trying to play along with it. It seemed at times to take you away from the reality of your bedroom and make you feel as if you were someplace else, or somebody else. Using these thoughts and also inspiration from a short Pixar film, Red’s Dream, I found a new story that I was passionate about. The original story idea involved a discouraged young boy who just can’t play his scales, but gets inspired when he listens to a trumpet solo on one of his CDs. His bedroom morphs into a stage where he finds himself all dressed up and performing in front of an audience. After the performance is done the boy bows to the crowd. He continues to bow and the scene morphs back into his bedroom and eventually the boy realizes where he is and gets back to practicing his scales. With the help from my advisor, we modified the story and set up the scene inside an old jazz club. We replaced the CD player with a phonograph, which turns on when the boy kicks his trumpet case off the stage in frustration when he can’t play his scales. The story still transforms into a magical world, but this time reality breaks when the boy trips over the phonograph cord and unplugs the music, letting reality come crashing back. This
idea was proposed to the thesis committee and passed under the following conditions (see Appendix A). It was pertinent to have the trumpet act as another character. It was also important to show why this film is made for animation and not for live-action. The committee felt that there should be some sort of authoritative figure on the boy’s case about practicing, because that was relatable to more people. They also felt that there needed to be more back-story and some reason for why the boy was sitting alone in a jazz club. I was set on using Boogie Woogie Bugle Boy for the fantasy song, since that was always the song our high school stage band had the most difficulty playing. It was a personal test of mine to attempt to perform all of the music myself for this film, rather than hire somebody. The committee stated that if I could make the song work around the main story, than that would be acceptable. In the end, the main point was it was easy for the committee to see my passion in the film, but it had to be portrayed to the audience in a way that intrigued everyone and not just me. Taking all that was said into account, and with the help of my thesis advisor, I came up with the final synopsis for Scaling Up:

To cover his affair, Jimmy’s father takes him to a local jazz club so Jimmy can practice his trumpet. With his father in another room, Jimmy sits on the stage and reads his comic book. Suddenly, a door opens and a faint promiscuous laughter echoes throughout the club, followed by the booming voice of Jimmy’s father, “Hey Jimmy, how come I’m not hearing those scales!” A disgruntled Jimmy makes way for his trumpet. After a few moments of lackluster practice, Jimmy hears a muffled sound coming from a pile of old instruments, shrouded in the shadows on the side of the stage. Figuring it was his imagination, he shrugs it off, but then shortly thereafter, he hears a few more notes spit out from the same area. Tentatively, he investigates the noise, eventually spotting an old trumpet. As Jimmy clutches the instrument, a subtle aura radiates off the cold brass. Curious as can be, Jimmy slowly places the silver mouthpiece to his lips and something magical happens.
While Jimmy gets lost in this experience, his father opens the door and reality comes crashing back. Now, Jimmy is faced with which trumpet to take home: the new uninspiring one or the old magical one?

C. Conceptual Statement

Besides providing an entertaining experience for the audience, one of my goals while creating Scaling Up was to tell a story that would entice the viewer, young or old, to try out a musical instrument if they have never done so before. Someone’s passion for something most likely won’t be seen the same way by the next person, so the real challenge in telling this story was not only to excite the filmmaker about this film, but also have the audience come away with a satisfying experience. Another way to get the audience involved was to present a situation that most of us have experienced, and in this film, it happens to be the moral dilemma that Jimmy is situated with. There is a personal connection within the story and title for Scaling Up. Creating an animated film of this size and length proved to be a stressful challenge for one person. Working on the same thing day in and day out for over a year can take its toll on you mentally and physically, but as with Jimmy, he never gives up and is determined to not only play his scales, but get better and move up in the world, just like I am doing.

D. Storyboarding

Storyboarding is a great visual aid that was created during pre-production and used throughout the entire production and post-production cycle. I started out by sketching out the action on file cards. File cards are nice to work with because you can easily lay them out and move them around to reorder the shots. Once they were arranged in a favorable manner, I scanned each card into Adobe Photoshop and created a little checklist worksheet for each image (see Appendix B). I was able to keep track of a number of important elements, such as the shot number, duration,
and description. Other parts of the production and post production process were written on the sheet with little checkboxes next to each procedure. I printed out the entire storyboard and posted it on a nearby wall in my work area, so it was easily accessible at all times for referencing and checking off tasks as they were accomplished. It proved to be a great time-management tool and also helped set the pace for how the film was going to flow.

E. Timeline

Creating a timeline for Scaling Up that was accurate was a very difficult task. Nothing ever goes exactly according to plan when working on a 3D animated film. There will always be roadblocks and artistic and technical problems that arise during production and post production that are very difficult to account for. I found that the best plan in creating a timeline is to always give yourself more time than needed for any given task, which would allow room for problem solving. I found myself revising my timeline a lot because I was too stubborn to set aside the proper amount of time needed to do something, and instead would try and condense everything to meet a certain screening deadline at the end of the quarter. After a few timeline revisions, I was able to overcome this and finally create a manageable timeline that was followed faithfully throughout the remainder of the production.

F. Budgeting

Producing Scaling Up with a limited budget was manageable. Towards the beginning of production, I chose to do some freelance work on the side to earn some extra capital I could use for the film. Eventually I decided to put all my efforts on the film and nothing else. I could’ve continued to work on the side, which would prolonging the entire film production process, or I could choose to use the money I had and just go all out with the film, which is eventually what I chose to do. This film was not created at RIT, but back in Buffalo, NY at my home. I had the option to
drive to RIT everyday and work on the computers there and use them for rendering, but with all the travel and the amount of data that needed to be transferred between computers everyday, that option was unacceptable. I already had two working computers at home that I could use and it wasn’t really necessary to have more than one computer until the rendering phase of production. When that time came, I browsed online and purchased computer parts and built two more computers on my own, which saved a lot more money than buying them from the store or Dell, etc. When rendering out images from a 3D software application, processor (cpu) speed and RAM are of the utmost importance, so it was essential to build the machine cheaply around those two items. I was fortunate during the last month of production to use my sister’s computer for rendering, which brought the render farm up to five machines. Since the film has been completed, I am planning to resell the now-unused computer parts on EBay.

G. Reference Materials

The following are a list of the major reference materials that I used throughout the production of Scaling Up. I found the Maya Techniques DVDs to be one of the best investments for this thesis. They are all taught by industry professionals, and the techniques they teach are actually used in the production pipeline for their respective studio they work at. Those DVDs were used a lot for my reference, but there were a few other references used as well:

Modeling:

- I traveled to my high school band teacher’s room and took pictures of instruments and props there
- Digital pictures of my own trumpet, and my own body and face
- Maya Techniques: Hyper-Realistic Modeling
- Google searches for online images of props

Texturing:

- CGtalk.com forums for skin shading and UV texture layout
- Google searches for UV texture layout
Rigging:

- Maya Techniques: Hyper-Realistic Facial Setup
- Maya Techniques: Hyper-Realistic Facial Rigging II
- Maya Techniques: Hyper-Realistic Body Setup
- Maya Techniques: Hyper-Realistic Body Rigging II
- Maya Techniques: Jason Schleifer’s Fast Animation Rigs

Animation:

- Maya Techniques: Hyper-Realistic Animation
- DV Footage of myself for animation reference

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**Production**

**A. Boogie Woogie Bugle Boy Arrangement**

I knew that this part of production would either make or break the entire film.

I arranged my own version of *Boogie Woogie Bugle Boy* which contained parts for a trumpet, alto saxophone, bass guitar, piano, and drums. This was daunting because it was the first time I’ve ever composed a piece of music. However in musical terms, it’s called an arrangement, since I didn’t actually write the original score for the song.

Each part was written by hand on notation paper (*see figure 1*). I found the easiest way to compose was to actually play the notes on my trumpet first to make sure they sounded right, and then quickly jot the notes down. It took awhile to complete this process, but eventually the music was ready to be transferred to the computer. The piece was written in a music notation program called MakeMusic Finale (*see figure 2*). It took some time to learn how to use this versatile software, but it quickly became very intuitive and fun to work with. It enabled you to preview
your music with MIDI (Musical Instrument Digital Interface) software playback, which are standard specifications that enable electronic instruments to communicate with one another and with computers. I did not want *Boogie Woogie Bugle Boy* to sound like the music you’d find in a 1980s home computer game. I felt that if it did, it would take away from the audience’s immersion throughout the entire fantasy sequence and destroy the film. To make the instruments sound more authentic, I incorporated stereo sampled instrumental sounds as plug-ins into the notation software. Whenever the computer is ready to spit out a note through the midi interface, the stereo sampled instrumental sound that is connected to that midi output plays instead. There are a number of these sample sound libraries that can be purchased online, but I found the Garritan Jazz & Big Band Collection ([http://www.garritan.com/jazz.html](http://www.garritan.com/jazz.html)), to be ideal for the sound I was looking for and the instruments I had in my score.

![Figure 2](image)

This improved the sound dramatically, but one thing these sample libraries have trouble reproducing is the sound of brass instruments. This wasn’t a problem
however, since I had originally planned to record myself playing the trumpet part. The trumpet piece was a challenging part to play because it involved tricky fingering, a high range of notes, and an upbeat swing tempo. The only way to take this piece on was to practice everyday for a month, in one hour sessions and of course, be a skilled trumpet player to begin with. After gaining enough confidence, I eventually rented out audio equipment at a local store in Rochester and reserved a soundproof room to record in, on campus in the Information Technology building. I spent an hour recording there and a few more hours recording back at home. While I had the equipment, I also used this time to record sound effects and dialogue that I knew were needed. The trumpet part was digitally transferred onto the computer, and thus began another very tedious process.

The trumpet part was recorded in segments that would later be pieced together in the computer to sound like it was all recorded in one take. This live human performance had to be matched exactly with the computer performance of the other instruments. The big difference between these two methods is that with a human performance, there is always going to be some room for error involved, whether it’s rushing certain parts of the song, holding your breath a split second too long or short, etc. Whereas with the computer performance, everything is spaced out evenly and it is perfect in every way, which is why people can usually tell when something sounds like computer music. The solution to this was to manually take in each trumpet segment into a sound editing application and modify it so it matches with the computer version. I used Sony’s Sound Forge to edit the pitches and durations of each trumpet segment (see figure 3). Often at
times, I would be required to zoom in to the waveform and make the slightest adjustments, down to the tenth of a second, in order to get the human performance to match with the rest of the band.

Finally, I used Cakewalk’s Sonar Producer edition to integrate all the live trumpet parts with the rest of the computer instruments (see figure 4). The final output was play-tested and listened to by a few different people and we came to the conclusion that it would work for the film. I also felt fairly confident because I knew that most people would be focusing on the fast-paced visuals during the musical number.

![Figure 4](image-url)

**Figure 4**

### B. Modeling

Modeling props in polygons using the Maya environment is fairly straightforward, especially if the props don’t have any major deformations. However, modeling a human character properly, takes a lot more research and planning. It is very helpful to know the anatomy of the human body and have reference books that show where all the muscles are in your body and how they operate. Modeling according to muscle flow is extremely important (see figure 5). When you model
according to muscle flow, your edge loops will help maintain the location of your muscle which will give a more realistic look when deforming. It is also a very good idea to model human characters or bipeds in polygons rather than with nurbs. One of the biggest advantages with polygonal modeling is that you have the ability to localize detail on a single surface mesh. I found a good method for modeling Jimmy was to block out the rough shape for his body first and get everything proportionately correct. A great way to test this was to view the model as a silhouette. It is extremely helpful when you are examining the character’s rhythm, shape, form and proportions. I also imported image planes of my body into Maya and used those as references for modeling. Once the shape was roughed out, I would concentrate on splitting edges to match muscle flow. If I wanted to concentrate on a certain body part, I would literally rip that section off the model and work on it individually, then reattached it after. This made it easier to focus all my attention and detail on one specific body part. Once the main edge loops were constructed for the body parts, I would then go back and add in more detail where necessary.

I learned that it was also important to space the geometry uniformly. When modeling in polygons, it is most common to model in quads, so a single surface will always be comprised of four points and four edges. The number of polygon quads in any given model determines how dense or heavy the model is. As mentioned before, it is important that the size of each of these quads is spaced as uniformly as possible, so when the surface gets subdivided or smoothed, the surface will react in the most predictable manner. The other benefit is that this technique makes texturing and
skinning the model easier. Also modeling in quads, and not triangles, will result in many of the same benefits as mentioned above.

In preparation for animation, I knew that I was going to need a series of facial expressions for Jimmy, every time he closed his eyes, raised an eyebrow, lowered his lip, or smiled, etc. I ended up modeling over 100 different versions of Jimmy’s face, with each one incorporating a specific facial nuance. Each of these extra models is considered a blend shape (see figure 6). During the animation process, the default character pose is linked to each of these blend shapes and controlled on a slider with a range from 0 to 1. At 0, the character remains neutralized, but as the slider reaches 1, the points that make up the model perform a linear interpolation and move positions from the base model position, to the target blend shape position. A new slider is created for each blend shape and eventually the animator has a hundred control sliders to work with for animating the face. This was cumbersome to manage so I’ll explain in the animation section what I did to make the process more intuitive.

![Figure 6](image)

C. Texturing

Texturing is an area that I would have liked to spend more time with during production, but as with any project, limits need to be set in order to get things done within the budget and deadline. I chose to put more detail into the textures that are seen more often and/or seen in close-ups. An amateur texture artist will almost
always make all their textures look "too clean". I read a great series of texturing articles on the CGTalk.com network called "Photorealistic texturing for Dummies", posted by Leigh van der Byl (http://leigh.cgcommunity.com). She talks about how important it is in learning how to properly observe surfaces in the world around you. In your mind, you need to break the surface apart into its different aspects and study the variations in color, notice how the light is broken up along an object’s surface, feel the scratches and bumps, etc. For all the props and characters in Scaling Up, I tried to obtain as much photo reference as possible. I didn’t mind having all the instruments in the fantasy sequence look perfectly clean, because that is acceptable in a magical environment. Certain textures, such as the ones found on the old trumpet and the textures that make Jimmy’s face are created by layering multiple textures on top of one another. Almost all of the textures created for the film were crafted using Adobe Photoshop. A wacom tablet was used to draw in finer details for certain textures, such as the veins and scratches in Jimmy’s arms and hands and the stitching in his sneakers.

The process of placing these 2d textures onto a 3d surface is a more complex procedure, called UV mapping (http://en.wikipedia.org/wiki/UV_mapping). “UVs” is a way of saying u, v texture coordinates (as opposed to the X, Y, and Z axis that is used in the Maya environment to construct your models on), which are points which define 1 by 1 positions within an image. These connect to points in the 3d model, and are used to position an image texture onto its surface. They can be thought of as virtual “thumb tacks” because they pin an exact spot on the image that you wish to use to texture your model to a specific point on the object’s surface. Between these points, the software will stretch the image smoothly. In order to texture parts of Jimmy’s body,
such as his head, the UVs need to be unwrapped. Unwrapping is the actual process whereby the X, Y, and Z information is translated into the flat UV template (see figure 7). There are many ways to unwrap UVs, but the most common is the planar option. The resulting UV coordinates are basically a flattened out straight-on projection through the surface mesh along the desired axis. So for Jimmy’s head, I would perform four planar projections: one for the front of his face, one for each side of his face, and one for the back of his head. In the UV texture editor these four UV maps were sewed together to form one large map. Each point on the UV map needed to be moved around to limit the amount of texture stretching to a minimum. In order to see how a texture is stretching, I placed a temporary texture on Jimmy’s head, which had a red background with a bunch of black spots all over it. This gave a visual representation to see where the image was too congested or being stretched too far. The process of moving the points around in the UV map to get rid of all distortions took hours to accomplish. After I was happy with the UV layout, it could be easily imported into Photoshop where the texture would be painted on top of the UV coordinates. As a final step, the finished texture would be imported back into Maya and placed on a shader and applied to the head. So the main color map for the head texture is now finished, but in order to create a more realistic looking head many other texture layers were created in Photoshop and layered on the head as well. Some of these include: a diffuse map, specularity map, reflection map, translucency map, and bump map (see figure 8).

![Figure 8](image)
D. Animation

1. Rigging

Once Jimmy’s character was completely modeled and textured it was ready to set up for animation. The first step in the animation process is to construct a skeleton of connected joints underneath the model of the character. These were created in similar fashion to the major bones that we actually have in our body. I created two different skeletal rigs, a control rig, and a bound rig (see figure 9). The purpose for creating two different rigs is because each rig is going to control different geometry of Jimmy’s character. Currently, a high-resolution model of Jimmy exists, but it’s almost useless for animation, since it completely bogs down the system and the response time for feedback is terrible. I created a low-resolution model of Jimmy very quickly only using basic geometric shapes. This gets connected to the control rig, because it is the rig that I will be doing all the animation with. The high-resolution model is connected to the bound rig. I then parent constrained each joint in the bound rig to the respective joint in the control rig. When the control rig is animated, the bound rig follows its motion exactly. This becomes very useful for animation because I was able to hide the bound rig and high-resolution geometry,
only showing the control rig and low-resolution character. I only wish I used this technique for my last two films, because it proved to be an absolute lifesaver in the animation process. I could now quickly pose my character in positions and scrub through the timeline to get instant feedback. I created a bunch of simple MEL script buttons, which let me toggle between visibilities of the meshes so I could see how the high-resolution mesh was deforming.

![Figure 10](image)

I found it very useful to create intuitive user interface controls located directly on the control rig (see figure 10). It becomes very tedious during animation when you have to go hunting for individual joints to select, or rummaging through a window of blend shape sliders looking for the “frown” control. It is very simple to directly connect these attributes to visible curves that are drawn on the character. For the facial controls, I created a big smiley face on top of Jimmy’s head. The smiley face had curves for eyes, eye brows, and lips. If the lips curve was selected, an interface control window would open showing just the controls that were directly
connected to all of the blend shape lip sliders (see figure 11). The big smiley face was parented to the head joint of the character, so that they would always move around together. A similar approach was used for the rest of the curves seen all throughout the body. To animate the character, I would just select the appropriate curve and animate the translation or rotation of that, and it would control the corresponding joints.

Spending the time to set up all these controls was well worth it as it made the animation process quicker and much easier to control.

2. Skinning or Binding

The terms skinning and binding are interchangeable, but they both mean the same thing: it’s the process of attaching the polygonal geometry to the skeletal joints. The initial bind actually happens in a few button clicks in the Maya environment, but it’s the long tedious process after, that is the real challenge. By default when Jimmy’s character was bound, each vertex point in the geometry is attached to one of the joints in the skeleton. When that joint rotates or moves, the vertex points associated with that joint deform as well. If I was to rotate Jimmy’s arm into his body, it would fold right in half and look completely unnatural. To make this deformation look more natural, the vertex points on the model need to be eventually connected to the nearest joints, not just a single one, but averaged out
between 3, 4 or however many are specified. Weighting or painting weights is the process of adding influence maps (an influence map is created for each joint in the skeleton that you select to be an influence) for each point in the bound geometry. Within the Maya environment, you select the influence that you want to edit, and use a brush to paint the vertices that you would like that influence to affect. Painting weights on Jimmy’s body took roughly a week to do (see figure 12). It is a very time consuming process because after painting weights and smooth everything out, I did a quick animation test with the rig to see if the character was deforming properly. Often at times when you get one part of the body moving the way you want it, you inadvertently mess up another part of the body’s deformation. There are parts of the body that no matter how they are weighted will still not deform correctly. This is most often the case when a joint is twisted. In these cases, I created corrective blend shapes (see figure 13). They are similar to the facial blend shapes described earlier, but these are used for body parts.

![Figure 13](image)

3. Animation

I found it very useful to always work with file referencing as much as possible. It keeps the scenes lighter and leaves more space on your hard drive. The other advantage is if I need to go back and change Jimmy’s character, that change would
be apparent in all the referenced file versions. Whereas, if I was to import his character into each scene, any changes made to the original character would have to be done to each imported version as well.

The first step performed in animating a shot was to align Jimmy’s world node with the through line of the animation. For example, in one shot Jimmy walks from his chair across the stage to a pile of old instruments. It was important initially align Jimmy to be facing his destination in world space. In doing so, the primary forward motion of the character has been isolated along only one channel, whether it be X, Y, or Z. This allows for easy identification and adjustment for any problems in the animation with the graph editor in Maya.

The next step is to block out the character’s key poses. It was important to create a sense of timing for each shot to be able to tell which key poses happen when. To aid in this process, I took reference footage with my DV camcorder for all the actions that Jimmy performs. I would bring these clips into QuickTime on my other monitor and have a great reference for the animation and timing of each shot.

After the key poses were animated, I began creating in-betweens that add the foundation of follow through and weight to the animation. It was not important to put a key frame on every control, but rather to just key frame the controls necessary to hit that in-between and let the rest continue to go from blocking pose to blocking pose. Once I was happy with the in-betweens, I would go back over the animation again and work on the finer details, such as the fingers, and contact positions of the hands and feet.

While doing some research on the Hyper-Realistic Animation DVD, I realized that I did not animate my character’s eyes correctly in my last two films. Eye movements are extremely subtle and complex because they usually dart from one object to another with intermittent pauses on objects of interest before darting off again. Eyes never scan across a space smoothly unless they are locked on an object
that is traveling smoothly. Using these two conventions wisely can convey several different types of emotions. For example, if I kept Jimmy’s head still, and just rapidly darted his eyes around, he would feel nervous or scared, but if I locked the eyes on a target, and slightly raised his head up, he would now feel confident. In my film, Jimmy is not the most confident character and he does a lot of thinking, especially at the end of the film. I noticed from video reference that when I am thinking hard about something, my eyes have a tendency to dart around as they lock onto objects, so I implemented this into his character.

I was also able to convey emotion through the way Jimmy blinks. Too many blinks could make him look unsure of himself, whereas not enough blinks would make him look crazy. A fast blink gave the feeling of alertness and a slow blink, the feeling of annoyance or drowsiness. In studying human behavior, it’s common for someone to naturally blink during a large head or eye movement, so I took this into account as well when animating Jimmy.

When animating Jimmy’s other facial features, I would often focus on one feature at a time and get that to look as close to the reference footage as possible before moving onto the next facial feature. Thinking about all the facial controls at once was just too overwhelming at times, so I found the best procedure to only focus on one at a time before moving onto the next.

4. Magical Trumpet Animation

In telling a better story, it was important to make the trumpet an actual character in the film. Besides giving it its own voice in sound effects and music, personifying it through animation was a major focus of mine. The point I was trying to get across in the film is that Jimmy is having trouble playing on his own, and from the muffled trumpet sounds heard in the beginning, the trumpet is also incapable of playing well on its own. So in a way, both characters are lost, yet in search of each
other. The trumpet coaxes Jimmy to play it, and after pure fright of what initially happens, Jimmy can’t resist the temptation to play it again. I chose to animation the mouthpiece of the trumpet using a simple blend shape, one that morphs into a comfortable position around Jimmy’s lips. In showing this, it’s more believable that the trumpet is actually taking over Jimmy, but not to the point where it’s in complete control. During the fantasy sequence the trumpet is rigged with squash and stretch deformers, which gives the trumpet more character. Jimmy and the trumpet are having a blast during the song and the trumpet acts as an extension of Jimmy’s body. For example, when he plays a long note with vibrato in it, the trumpet slithers like a snake to exemplify that. The harder Jimmy blows on the horn, the bigger the bell gets. In performing these animations, I chose not to abide by volume preservation. In reality, if a horn stretched out really far, the bell would get smaller at the end, and if the horn squashed in, the bell would be huge. I felt that in doing the exact opposite, it looked better and seemed more exaggerated for the look I was going for.

The magical trumpet really gives Jimmy a confidence boost towards the end of the film. At first when his father walks back into the room, he is unsure if he can play, but as soon as he notices the magic horn is for real, he has all the confidence in the world. He resolves the moral dilemma at the end of the film by taking his new trumpet back with him, and leaving the old magical one behind. Jimmy feels that he shouldn’t give up hope for being able to play on his own, yet he asks his father if they can come back again, so he might have the opportunity to delve into his fantasy world once more.

E. Lighting & Rendering

Similar to shooting live-action photography, everything in the Maya environment needs to be appropriately lit for each shot to set the mood for the scene,
and also so the objects actually show up in the render. I chose to light my character fairly intensely because he is under hot stage lights for the entire film. Jimmy’s skin actually ends up being overexposed in most of the film and that is something I would definitely fix, if I had the time to go back and do it again. I found it very difficult to light Jimmy’s skin consistently throughout the film. Any subtlety in his movement could and often would throw off the look of his skin. It wasn’t until after the film was complete when I realized that I should have ‘baked’ the lighting into the character’s skin texture. This process of baking textures is common practice for many characters in video games, and the benefits being the character’s skin looks the same from whichever angle the camera is positioned, plus render times are improved since there is less computational time involved for the lights.

I used light linking for just about every shot in the film. Lights can be controlled to only affect certain objects in any given scene. There were times in which I needed more light on Jimmy’s skin, but not as much on Jimmy’s clothing. I would link lights with higher intensities to his skin and another set of lower intensity lights to his clothing. Overall, light linking provides an extra amount of control when creating a certain mood for any shot.

The rendering process in Scaling Up was very involved and much more complex than in previous films. Rendering comes at the end of production and it is a process that adds in textures, lights, and bump mapping too all modeled objects seen through the camera resulting in a completed image that the view sees. When rendering images I use the option of ray tracing, which does additional calculations for how light reflects and refracts off of objects throughout the environment.

I used to render everything in a single file because the computer could handle it and it was easy to piece together in post production. For Scaling Up, the computer could only handle rendering certain objects in a shot, so it took a lot longer to set up the shots for rendering, but also provided for more flexibility in post production. All
of the shots were set up to render in layers, so I would have only the background elements rendering in a single pass. Then I would have Jimmy’s character render in his own pass, the instruments in another, then the foreground elements, and so on. I would also render out layers for just the shadows and reflections. I had to construct an excel spreadsheet to keep track of the all the layers (the first shot in the film alone was made up of over 30 layers). The benefit to rendering out everything in its own layer was that each layer could be easily adjusted in after effects or re-rendered in Maya, without having to re-render the entire shot from scratch. It also becomes much easier to add effects such as depth of field or motion blur in post when you can isolate that effect on a particular layer. This process of rendering in layers is used in every single animation studio in the country. Up front it takes more work to set up and there are more files eating up hard disk space, but in the long run I saved countless hours of render time and had ten times the amount of control when editing the film in post.

**Post Production**

A. **Special Effects**

The terminology for what exactly is a special effect can vary from different people’s opinions. For an animated film, everything in a sense is a special effect, but I like to associate special effects for instances where either natural phenomenon is involved, objects inside of Maya are given dynamics attributes, or some extra visual flare that gets added to the film in post. *Scaling Up* had a number of special effects: the spit from the trumpet, the trumpet glow, the smoke from the magic poof during the fantasy sequence, the light fog rising from the stage lights, and the fireworks.
The trumpet spit was created in Maya using particle instancing (see figure 14). Particle instancing is the process of using the position and behavior of particles to control the position and behavior of instanced geometry. I created a particle emitter that was attached to the spit valve on the trumpet. As the spit valve gets pressed, this triggers a number of particles to emanate from the emitter. The particles have a dynamic gravity field applied to them, so they appear to fall to the ground. I modeled one droplet of spit and textured it to look like water. Using particle instancing, each particle was replaced with an instance of that water droplet, so it looked like spit was falling to the ground.

There is a part in the film where the trumpet glows, and then another part where just the mouthpiece glows as it morphs into shape (see figure 15). Both of these affects were done as a post process in after effects, the compositing software used for the film. Since the trumpet was rendered in its own layer, it was easy to apply the glow effect to that single layer. In order to isolate the glow to just the mouthpiece, I created a mask in after effects which was applied to the same layer, so the glow would only show up inside the portion that I had masked off. Masks are commonly used post production to hide or show certain elements of an image or effect.

During the fantasy sequence, a trumpet mute appears out of a cloud of smoke. The smoke was creating using Maya fluids, which are substances that change shape continuously or flow in response to forces. Fluids effects can be used to create a wide variety of 2D and 3D atmospheric effects, pyrotechnic effects, space, and viscous liquid effects. The smoke was created inside of a container which contains an emitter. The emitter was programmed to produce a large number of smoke fluids at a specified time interval and then immediately stop.
The lifespan of the fluids was set to a very low number, so the smoke would appear
to poof out of nowhere, and then dissipate quickly into thin air (see figure 16).

Light fog is visible from the stage lights during the fantasy sequence. The particles near the light source rise into the atmosphere, which is what happens in real life as well. Particle and/or fluids could have been used to demonstrate this, but weren’t worth the cost in computational time. I learned on the web about a trick to cheat this effect. I mapped a 3D procedural fractal texture onto each spot light, and then animated the 3d texture placement node upwards along the Y axis, to give a convincing look of rising fog (see figure 17).

The fireworks were created in Digital Fusion, which is a piece of compositing software similar to affect effects, except it’s node-based and handles particles better. I had never used this software before, so I quickly scoured the web for tutorials on finding my way around. The terminology used is the same as in any other piece of compositing software, so once I learned the interface and its node-based architecture, it was fairly straightforward to use. I created a number of particles to emit upward from a horizontal line along the base of the image. These particles were textured to look like mortars. The lifespan of each mortar varies a little, so some shoot up higher than others. Just as the mortar is about to die, it acts like an omni-directional emitter and fires out a two more sets of particles. The first set is randomly colored and looks like sparks, while the second set is textured to look like smoke. Both of these particle sets have a gravity and turbulence force applied to them, so the fireworks appear to fall gracefully while the smoke gets blown away in the wind (see figure 18).
B. Sound Effects

The sound effects were actually recorded during production, but they are added into the final composition during post. I was recommended by Dave Sluberski, an RIT professor who specializes in audio, to obtain a pair of Sennheiser 421 dynamic microphones. From his experience they work well for recording brass instruments like the trumpet, which is what I used them for, and also for recording miscellaneous sound effects and dialogue. I recorded all the sounds in stereo using the ORTF technique. The dynamic microphones were paired together, but spread to a 110 degree angle. The result was a realistic stereo field that has reasonable compatibility with mono playback. Because of the angle of the microphones, less of the ambient room characteristics are picked up. A Sony DAT machine was used to record the audio which was then digitally transferred into Sony Sound Forge where it was edited.

C. Original Musical Score

Adding in a musical score to accompany the film was a decision made during post production. In the back of my mind, I always envisioned there being one, but wasn’t sure it would work with the fantasy song. This is film that has two different worlds, so the original score didn’t have to sound anything similar to the piece played during the fantasy sequence. I was nervous at first in doing this myself since I’ve never composed music for a film before, but after becoming accustomed to the notation software and with the surprise success of the fantasy arrangement, I was confident in proceeding. I wanted the music to help tell the story. My goal was to have it aid in the emotional experience that Jimmy was going through. This is a film that involves fantasy and magic, so I used instruments that I thought best represented a mystical feeling, such as the plucking of the harp, which is heard scaling up and down accompanying the main theme. The music was written to fit
with the title of the film. The main theme is a variation of a scale that ascends up to a peak and comes down to a resolve. Not only the main theme, but almost the entire piece composed of rising and falling scales. In addition to the scales, I gave the magical trumpet its own musical voice. There is a sound effect of a chorus singing a note that has a perfect mystical sound to it. Every time the old trumpet is heard playing or when it’s seen in the shot, I used this sound effect and gave the old trumpet a voice as if it was calling out to Jimmy. There is a scene where Jimmy is curious about playing this old trumpet, but nervous at the same time. For the music here, I chose to have the string section of violins play in tremolo, which is the rapid repetition of one note in music or a rapid alternation between two or more notes. Hearing this immediately adds tension to the shot. Overall, I wasn’t sure how the audience was going to accept the musical score, but I’ve been receiving very good feedback pertaining to it, which has been a very satisfying experience.

D. Compositing & Output to DVD

Compositing is the process of creating new images by combining images from different sources and layering them on top of each other. I used Adobe After Effects to create the final composition for the film. The images obtained from Maya are stacked on top of each other starting with the image that is furthest away from the camera. I sometimes needed to make minor adjustments to certain layers, such as adjusting the brightness and contrast.

In order to address the issue of long render times, one of the approaches applied, was rendering of depth of field effects in 2D using Frischulft’s “Lenscare”, rather than inside of Maya. Z-depth passes were rendered, output with floating Z-depth information only, ignoring the lighting and texture. This information was used by the after effects plug-in and combined with a composite of the color passes. This was a great tool and approach because it allowed flexibility in changing the focal
depth as the production progressed without the need to re-render any shots. A similar approach was used for the motion blur. Motion blur takes very long to render inside of Maya, but a very similar result was achieved with an after effects plug-in, ReelSmart motion blur. It analyzes an image sequence and compares the pixels between each image to determine how much they moved and the amount blurring that should be applied. There is also an interface to control the blurring manually as well.

It was very common to add masks to many of the layers to hide certain parts of the shot or to hide parts of an added effect that I didn’t want showing. Since each shot was composed of multiple layers, I found it essential to create nested compositions inside the software. Each shot consist of its own composition with all the images and sound effects used for that particular shot. One large composition was created that included all of the nested ones as well as the music and any extra sound effects. After effects has the option of rendering the composition straight to an MPEG-2 file for DVD encoding.

![Figure 19](image-url)
Adobe Encore was used to output the film on DVD. I thought it would be nice to create a trailer as well as a scene selection menu for the film, so both of those elements were created and added to the DVD using encore (see figure 19).

**Exhibition**

**A. RIT Screening**

*Scaling Up* was screened in front of the RIT community in November of 2006. I thought the film was accepted well and the professors provided good feedback and constructive criticism. It was common to hear them remark about my eye for detail in my films, which is a lot more apparent in *Scaling Up* than in past films.

One of the topics of discussion during the proposal was, “*Why this film can’t be done with live-action?’*” One of the professors commented that he realized why I chose to use animation instead, but he still would’ve liked to see more extreme uses of it during the fantasy sequence. He said he would’ve liked to see the boy squash and stretch and all the instruments follow suit. There was a time during production when I asked myself if the other instruments should deform and came up with two answers for why I chose not to do that. There was only so much I could do with the time I had, so I focused my efforts on what I thought was most important for the story to work. The boy and the old trumpet are the main characters in this film, so I felt they should be extra special and stand out, by having the trumpet deform and the boy dressed in a suit. My concern for having all the instruments squash and stretch was that I didn’t want to steal the thunder away from the main characters. I wanted them to stand out and be the main visual focus for the fantasy sequence.

Another professor brought up the moral dilemma that I presented at the end of the film, and he was confused to as how it was resolved. I felt that it was resolved and clear as to the decision that Jimmy makes. To support this conclusion
an audience poll was taken and they were asked which trumpet Jimmy took home with him. Everyone except one person came up with the right answer, so I am still confident that I resolved the moral dilemma presented at the end.

B. Film Festivals

Scaling Up took up a large chunk of my life for a few years and I always had an overall goal to have as many people see it as possible. I personally enjoy making films that cater to the masses, and Scaling Up is no exception. Even though the story has some adult matters in it, it is a film that can be enjoyed by all audiences and cultures. Submitting a film to a festival was somewhat of a new process for me. I submit my last film Ninjutsu to three film festivals and managed to take home a prize for one, but I really wanted to get Scaling Up out there. I feel it is my best work and has a strong story, which brings up some good issues. I created an account on Withoutabox.com, which is a resource for independent filmmakers to search festivals and competitions worldwide and submit their work. To date, I have applied to 60 film festivals, most of which don’t take place until late 2007. As of now, Scaling Up been accepted into eleven film festivals already and has been doing better than I originally anticipated.

Film Festivals

- San Fernando Valley Film Festival
- Sunscreen Film Festival
- Buffalo Niagara Film Festival
- San Francisco International Children's Film Festival
- California Independent Film Festival
- Santa Cruz Film Festival
- Delray Beach Film Festival
- Show Me Missouri Independent Film Festival
- Phoenix Film Festival
- Zion Independent Film Festival
- Foursite Film Festival
C. Marketing Tactics

In order to get *Scaling Up* out to the public, I have taken a professional approach to marketing the film with a very low budget (see figure 20). Most of the costs were submitting the film to festivals, which is one of the best ways for people to see the film. I have created a short one minute trailer for the film to help in its promotion. This trailer, along with the entire film has been uploaded to many major mass media web sites, such as YouTube, AtomFilms, iKlipz, AniBoom, and iFilm. I have created a web site for Scaling Up at http://www.brianblasiak.com/scalingup/. This website lists any and all information related to the film and is updated on a constant basis. I have also created a press kit for the film, which is on the website, and submitted along to film festivals (see Appendix C).

![Figure 20](image-url)
Formal Conclusion

Looking back on this entire process, it’s mind-boggling to think about the amount of work that went into this film. Overall, this has been a great learning experience, but one I would never want to go through again. For the past three years almost, this thesis has been my entire life. I found working an average of eighty hour work weeks to be mentally and physically draining beyond belief. There were times during production where I just wanted to throw in the towel. That’s why it was so important to choose a story idea I was passionate about - it keeps you going. I also found it inspiring and motivational to go to the show often and watch current feature films; and at other times, musical inspiration was needed. These are the types of things that help jumpstart my mind and push myself to new limits. The production of this film has vastly improved my knowledge of how each part of the filmmaking process works, and it will be beneficial in the real world. I will most likely end up with a job that concentrates on one specific part of the production process, but knowing how every other department works will only aid in the production. For example, if I’m modeling a character, I know how to sculpt the character efficiently, so it makes the rigger’s job that much easier when it comes time to set that character up for animation.

I am very satisfied so far, for how Scaling Up is being received by film festivals. It’s just reassurance that RIT has provided me with the knowledge to tell an engaging story. I felt that this was the masters program’s strength – teaching students more traditional aspects of filmmaking with storytelling at the forefront. But in terms of software and technical tools, I found the best way to learn was to just get your hands dirty. It was very common to learn new software as I went along, run into roadblocks, and then research online for solutions and workarounds. There is an unexplainable satisfaction obtained when I can figure things out on my
own. It’s much easier to remember and learn this way rather than a teacher telling you in the classroom. After every film I ask myself the same question and always come up with the same answer – was it all worth it? But when your film is finally on the big screen and you’re surrounded by an audience who’s enjoying the experience, it just doesn’t get any better than that and it makes the entire painstaking filmmaking process worthwhile.
Appendix A – Thesis proposal
A young teenage boy is determined to better his trumpet skills after listening to an inspiring jazz song.

The scene opens up inside an old jazz improv bar/club. We see a wide shot of the place and a young boy sitting down in a chair with a trumpet at center stage. The stage is dimly lit and houses an old wooden floor with faded out curtains. His trumpet case lay beside him on one side and his trumpet stand on the other. A music stand is positioned in front of him. An old phonograph player is plugged in set aside at the end of the stage. Off screen, we hear an informative voice yell, “Keep playing those scales until you get them right!” followed by a door slam. As the camera slowly dollies in, the boy attempts to play some scales, but keeps messing up. During this camera dolly, the opening title slates appear on the screen. We cut to a close up of the youngsters who is struggling to find the right notes and pitches. Frustration quickly sets in. His practicing becomes frantic, and he empties the spit valve on his instrument thinking that may be part of the problem. When he’s finished cleaning the valve, he begins again, but it had no effect. In frustration he knocks his music stand over and slams his trumpet on back on its stand. He stands up and kicks his trumpet case off to the side of the stage. The case slams into the phonograph, which causes the needle to drop down on top of a record that currently resides in it. The phonograph turns on and a very catchy trumpet tune echoes throughout the club. After
listening for a few seconds, the boy becomes entranced by the upbeat tempo and prominent trumpet soloing. A close-up shows the boy’s eyes widening with excitement.

When the shot pulls back we see a brand-new looking stage with vibrant maroon colored curtains in the background and a spotlight shining brightly on the boy. The boy is made up nicely and dressed in a flashy suit. His trumpet looks shinier and happy, as if it had risen from its grave. The boy is brilliantly blowing out the notes to the song. He gets really into it and his body becomes extremely animated – his trumpet becomes personified through his playing. The horn has a life of its own, distorting and scaling in size to the beat of the song.

All of a sudden the music stops and the scene comes back to reality. The boy doesn’t realize right away that he has just tripped over the phonograph cord and unplugged the machine. He is still playing his air trumpet for a few seconds before he realizes what happened. The boy eagerly sets his stand back up with his music, sits back down in his seat and picks up his trumpet. He starts practicing the scales again. He still has difficulty, but remains calm and keeps trying until he successfully plays them up and down. The camera pans back and the scene fades out. While the credits roll, we hear the boy attempting to play what he heard on the CD.

Conceptual Statement

Music is a comprehensive experience in nearly every young person’s schooling, and it is considered the universal language. The sounds of music can be both inspirational and motivational. In this story, I am showing the profound impact that a classical trumpet solo piece has on a boy’s drive to excel in the art of music, both physically and psychologically.

Approach
This film will be done in 3D within the Maya environment. I will be shooting some live-action reference footage of myself performing to enhance the quality of the animation. Some of the textures will be created using Adobe Photoshop, while others will be created inside the Maya environment. The film will be assembled in Adobe After Effects and written to tape using Final Cut Pro. I will be using a combination of original music performed on the Trumpet by myself as well as some old jazz or big band pieces for the songs played during the film. If there are copyright issues with the songs I choose, then I will perform and record them myself. Sound effects will be obtained through a combination of sound recorded by myself, effects purchased online, and sound effect CD’s located in the 4th floor video cage.
Appendix B – Storyboard
Start ___ End ___
[ ] Animation [ ] F/X [ ] Rendered
[ ] Lighting [ ] Composited
[ ] Polished [ ] Final Render
Description:
Camera starts high in rafters of Jazz Club and slowly dollies in towards boy on stage (opening credits roll)
Sound Effects:
Ambience

Start ___ End ___
[ ] Animation [ ] F/X [ ] Rendered
[ ] Lighting [ ] Composited
[ ] Polished [ ] Final Render
Description:
Boy reads comic on music stand, flips page - door opens and authoritative voice says "Hey, why don't I hear those scales!?" Boy does startled take - camera shakes as door slams
Sound Effects:
Ambience, Door Open, Authoritative voice

Start ___ End ___
[ ] Animation [ ] F/X [ ] Rendered
[ ] Lighting [ ] Composited
[ ] Polished [ ] Final Render
Description:
Boy rips comic book off of stand which reveals scales or blues scales
Sound Effects:
Ambience, Page Crinkling

Start ___ End ___
[ ] Animation [ ] F/X [ ] Rendered
[ ] Lighting [ ] Composited
[ ] Polished [ ] Final Render
Description:
Camera pans around boy as he picks up his trumpet and begins playing
Sound Effects:
Ambience, Trumpet
**Shot**

**Duration**

**Finished**

---

**Start**

**End**

- [ ] Animation
- [ ] F/X
- [ ] Rendered
- [ ] Lighting
- [ ] Composited
- [ ] Polished
- [ ] Final Render

**Description:**

Close-up of boy playing and messing up

**Sound Effects:**

Ambience, Trumpet

---

**Shot**

**Duration**

**Finished**

---

**Start**

**End**

- [ ] Animation
- [ ] F/X
- [ ] Rendered
- [ ] Lighting
- [ ] Composited
- [ ] Polished
- [ ] Final Render

**Description:**

Boy loosens up valves

**Sound Effects:**

Ambience, Trumpet Valves

---

**Shot**

**Duration**

**Finished**

---

**Start**

**End**

- [ ] Animation
- [ ] F/X
- [ ] Rendered
- [ ] Lighting
- [ ] Composited
- [ ] Polished
- [ ] Final Render

**Description:**

Boy plays again, but still sounds like crap

**Sound Effects:**

Ambience, Trumpet

---

**Shot**

**Duration**

**Finished**

---

**Start**

**End**

- [ ] Animation
- [ ] F/X
- [ ] Rendered
- [ ] Lighting
- [ ] Composited
- [ ] Polished
- [ ] Final Render

**Description:**

Boy empties spit valve on trumpet

**Sound Effects:**

Ambience, Trumpet Spit Valve, Gurgle
**Start ___ End ___**

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

Boy is about to play again - hears muffled horn off-screen - turns head to examine.

**Sound Effects:**

Ambience, Muffled Trumpet

**Shot___ Duration___ Finished___**

**Start ___ End ___**

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

POV of boy looking off to junk and old instruments at the side of the stage.

**Sound Effects:**

Ambience

**Shot___ Duration___ Finished___**

**Start ___ End ___**

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

Boy looks back to music and tries to play again.

**Sound Effects:**

Ambience, Trumpet

**Shot___ Duration___ Finished___**

**Start ___ End ___**

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

Pan up to boy's face - he messes up again and gets frustrated.

**Sound Effects:**

Ambience, Trumpet
<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
<th>Animation</th>
<th>F/X</th>
<th>Rendered</th>
<th>Lighting</th>
<th>Composited</th>
<th>Polished</th>
<th>Final Render</th>
</tr>
</thead>
</table>

**Description:**

- **First Scene:**
  Boy puts trumpet down and closes eye and covers with hand.
  Sound Effects:
  Ambience

- **Second Scene:**
  Hears muffled horn off screen - immediately opens eyes and looks again.
  Sound Effects:
  Ambience, Muffled Trumpet

- **Third Scene:**
  Focuses in on old horn laying on piano - camera dollies in a little.
  Sound Effects:
  Ambience

- **Fourth Scene:**
  Turns head back, thinks for a second, then puts trumpet on stand and walks out of the frame.
  Sound Effects:
  Ambience
**Shot** | **Duration** | **Finished**
--- | --- | ---

**Start** | **End**
--- | ---

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

POV shot of boy walking toward trumpet and grabbing it - trumpet seems to glow when touched.

**Sound Effects:**

Ambience, glow sound, footsteps

---

**Shot** | **Duration** | **Finished**
--- | --- | ---

**Start** | **End**
--- | ---

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

Boy examines trumpet and begins to raise it towards his mouth.

**Sound Effects:**

Ambience

---

**Shot** | **Duration** | **Finished**
--- | --- | ---

**Start** | **End**
--- | ---

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

Slowly puts trumpet to mouth - mouthpiece molds itself to mouth.

**Sound Effects:**

Ambience, mouthpiece sound

---

**Shot** | **Duration** | **Finished**
--- | --- | ---

**Start** | **End**
--- | ---

- **Animation**
- **F/X**
- **Rendered**
- **Lighting**
- **Composited**
- **Polished**
- **Final Render**

**Description:**

Amazed, boy pulls back trumpet and mouthpiece, which goes back to its normal shape.

**Sound Effects:**

Ambience, mouthpiece sound
Description:
Puts mouth back on mouth piece and blows 1st part of Boogie Woogie perfectly

Sound Effects:
Ambience, Trumpet

Description:
Boy smiles, puts trumpet back up to mouth and plays again - camera shakes back to beat of riff

Sound Effects:
Ambience, Trumpet

Description:
Bird's eye view looking down on boy - begins solo part of song

Sound Effects:
Ambience, Trumpet
Shot   Duration   Finished

Start   End

[ ] Animation   [ ] F/X   [ ] Rendered
[ ] Lighting   [ ] Composited
[ ] Polished   [ ] Final Render

Description:
Low angle looking up at boy playing
Sound Effects:
Ambience, Trumpet

Shot   Duration   Finished

Start   End

[ ] Animation   [ ] F/X   [ ] Rendered
[ ] Lighting   [ ] Composited
[ ] Polished   [ ] Final Render

Description:
Close-up of boy blowing through mouth piece
Sound Effects:
Ambience, Trumpet

Shot   Duration   Finished

Start   End

[ ] Animation   [ ] F/X   [ ] Rendered
[ ] Lighting   [ ] Composited
[ ] Polished   [ ] Final Render

Description:
Close-up of valves moving
Sound Effects:
Ambience, Trumpet

Shot   Duration   Finished

Start   End

[ ] Animation   [ ] F/X   [ ] Rendered
[ ] Lighting   [ ] Composited
[ ] Polished   [ ] Final Render

Description:
Close-up of end of horn
Sound Effects:
Ambience, Trumpet
Description:
POV of Boy looking at horn
Sound Effects:
Ambience, Trumpet

Description:
Long hold after 1st solo - camera dollies back from close-up of face to reveal fantasy setting
Bright & lively, new instruments and clothing
Sound Effects:
Ambience, Trumpet, Band

Description:
Drums play by themselves
Sound Effects:
Ambience, Drums, Band

Description:
Piano is playing on its own - legs are dancing and body is bending
Sound Effects:
Ambience, Piano, Band
Description:
Horn enlarges in size and moves up and down
Sound Effects:
Ambience, Trumpet, Band

Description:
Sax sways back and forth playing to the beat and the horn enlarges and bends
Sound Effects:
Ambience, Sax, Band
Shot: Bass guitar bends neck and plucks its own strings to beat of music
Sound Effects: Ambience, Bass, Band

Start: [ ] Animation [ ] F/X [ ] Rendered
End: [ ] Lighting [ ] Composited
Description: Bass guitar bends neck and plucks its own strings to beat of music
Sound Effects: Ambience, Bass, Band

Shot: Panning wide shot of stage
Sound Effects: Ambience, Trumpet, Band

Start: [ ] Animation [ ] F/X [ ] Rendered
End: [ ] Lighting [ ] Composited
Description: Panning wide shot of stage
Sound Effects: Ambience, Trumpet, Band

Shot: Close-up of valves moving as boy plays
Sound Effects: Ambience, Trumpet, Band

Start: [ ] Animation [ ] F/X [ ] Rendered
End: [ ] Lighting [ ] Composited
Description: Close-up of valves moving as boy plays
Sound Effects: Ambience, Trumpet, Band
<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
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</thead>
<tbody>
<tr>
<td>Animation</td>
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<td>Lighting</td>
<td>Composited</td>
</tr>
<tr>
<td>Polished</td>
<td>Final Render</td>
</tr>
</tbody>
</table>

**Description:**
Medium shot of horn dancing to beat of music

**Sound Effects:**
Ambience, Trumpet, Band

---

**Description:**
Playing with one hand while bending knees dancing to the beat and waving arm

**Sound Effects:**
Ambience, Trumpet, Band

---

**Description:**
Boy gets down on one knee while playing

**Sound Effects:**
Ambience, Trumpet, Band
Playing final notes - pans and dollies in from horn to face - close-up of eyes closed - sound of door opens - music stops and eyes open

Sound Effects:
Ambience, Trumpet, Band, Door Opening

Boy plays scale perfectly - camera pans from face to horn - authoritative voice says "Good, now let's get out of here"

Sound Effects:
Ambience, Trumpet, Authoritative Voice
Description:
POV shot of boy looking at old trumpet

Sound Effects:
Ambience

Description:
Close-up of new trumpet on stand

Sound Effects:
Ambience
Description:
Close-up of empty trumpet case - shot fades to black

Sound Effects:
Ambience
Press Kit

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Synopsis

To cover his affair, Jimmy’s father takes him to a local jazz club so Jimmy can practice his trumpet. With his father in another room, Jimmy sits on the stage and reads his comic book. Suddenly, his father’s voice booms through the room. After a few moments of lackluster practice, Jimmy hears a muffled sound coming from a pile of old instruments. Tentatively, he investigates the noise, eventually picking up an old trumpet. As the trumpet meets his lips, something magical happens. While Jimmy gets lost in this experience, his father opens the door and reality comes crashing back. Now, Jimmy is faced with which trumpet to take home: the new uninspiring one or the old magical one?

Log Line

Discouraged by tedious repetition, Jimmy discovers an awe-inspiring ability when he finds a mystical trumpet.
Press Kit

Director's Statement

Besides providing an entertaining experience for the audience, one of my goals while creating "Scaling Up" was to tell a story that would entice the viewer, young or old, to try out a musical instrument if they have never done so before. Someone's passion for something most likely won't be seen the same way by the next person, so the real challenge in telling this story was not only to excite the filmmaker about this film, but also have the audience come away with a satisfying experience. Another way to get the audience involved was to present a situation that most of us have experienced, and in this film, it happens to be the moral dilemma that Jimmy is situated with. There is a personal connection within the story and title for "Scaling Up". Creating an animated film of this size and length proved to be a stressful challenge for one person. Working on the same thing day in and day out for over a year can take its toll on you mentally, but as with Jimmy, he never gives up and is determined to not only play his scales, but get better and move up in the world, just like I am doing.

Brian Blasiak
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**Scaling Up Facts**

- Written and Directed by Brian Blasiak
- 07:47 minute animated drama
- Production began in 2005
- Post-Production completed November 2006
- 74 Shots
- 14,000 Frames
- Film completed by 1 person
- Director is actually playing the trumpet in the film
- Work weeks ranged from 40-140 man-hours

**Software Used**
- Modeled in Autodesk Maya 7
- Textures in Adobe Photoshop CS2
- Rigged and Animated in Maya 7
- Rendered with Maya Software and Mental Ray in Maya
- Additional 3d tools - Joe Alter’s Shave and a Haircut
- Composited in Adobe After Effects 6.5
- Additional 2d tools - Digital Fusion, RSMB, Lenscare
- Audio tools - Sony Soundforge, Cakewalk Sonar 5

**Hardware Used**
- 4 computers (originally started with 2)
- Dual Core 2.66 ghz, 2 GB RAM

**Scaling Up Specifications**

- Duration 7 minutes 47 seconds @ 30 fps
- Audio Format 2.0 (Dolby Digital)
- Aspect Ratio: NTSC (4:3)
Press Kit

Production Notes

**Boogie Woogie Bugle Boy**

Boogie Woogie Bugle Boy was chosen as the fantasy piece not only because it’s a trumpet featured song, but also because the filmmaker used to have to play this song in his high school band, but it always fell apart, because the song was too fast and complex for the trumpet players to handle. So up to the challenge, Brian practiced his trumpet everyday for a

**Musical Instruments**

All the musical instruments heard, except the trumpet, were performed by the Computer, but used the technique of using stereo sampled instruments overlayed on top of MIDI, to get a more realistic sound.

**Render Farm**

The rendering process for *Scaling Up* started out on one computer, but due to the intensity of the project, it soon escalated to 5 computers by the time the rendering was complete.

**Work Hours**

During the production of *Scaling Up*, Brian managed to pull off one 140 hour work week, which wasn’t very fun at all.

**October Surprise**

The production for *Scaling Up* took place during one of the worst winter storms Buffalo has ever seen and that’s saying a lot. Powerlines were out for over one week in certain areas. With the deadline quickly approaching, Brian’s quest for electric power began in a Rochester motel and ended at a relatives house, which he managed to hook up five rendering computers in their living room.

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Director’s Biography and Filmography

Born in Buffalo, New York in 1980, Brian Blasiak went on to complete a Bachelor of Science in Information Technology at Rochester Institute of Technology in 2002. He has extensive experience in web design, programming, and 3D applications, and he is currently completing his Master of Fine Arts in Computer Animation at RIT where he has earned the top ranking position in his department. Brian completed his first major film project in the Spring of 2003; the film titled Vending Rage features a young boy who has trouble buying a bag of chips from a snack machine. His second major film project titled Ninjutsu is an animated comedy starring a ninja, his ninja cat, and a pesky ninja bug. In between films, Brian had an enjoyable experience working as an animator for Fisher Price in East Aurora, NY. He also did some freelance work creating a website for a local Biotech company. Scaling Up is the third short film created by Brian. Completed for his master’s thesis and spanning over a year in production, Scaling Up showcases Brian’s mastery of artistic detailing while engaging the audience in his magical tale about a young boy and an old trumpet. It also marked his first attempt at composing, arranging and performing his own music for a film. Brian has a long-held interest in the entertainment industry and would like to work for a special effects house, animation studio, or video game company upon completion of his master’s program.

Filmography

Scaling Up (2006)

Ninjutsu (2004)

Vending Rage (2003)

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Available Sample Artwork Index

Production Stills

Name: 01.tif
Format: TIFF
Dimensions: 2180 x 1453
Size: 9.08 mb

Name: 02.tif
Format: TIFF
Dimensions: 1440 x 960
Size: 3.97 mb

Name: 03.tif
Format: TIFF
Dimensions: 720 x 480
Size: 1.0 mb

Name: 04.tif
Format: TIFF
Dimensions: 720 x 480
Size: 1.0 mb

Name: 05.tif
Format: TIFF
Dimensions: 720 x 480
Size: 1.0 mb

Name: 06.tif
Format: TIFF
Dimensions: 720 x 480
Size: 1.0 mb

Director Stills

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Format: JPEG
Dimensions: 747 x 914
Size: 227 KB

Name: blasiak02.jpg
Format: JPEG
Dimensions: 930 x 1305
Size: 901 KB

Name: blasiak03.jpg
Format: JPEG
Dimensions: 1095 x 1239
Size: 999 KB

Name: blasiak04.jpg
Format: JPEG
Dimensions: 572 x 719
Size: 350 KB

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Press Kit

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Appendix D – 6 Colored Stills
Scaling Up