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### The Process and Flow of Animation: For the Record

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The Process and Flow of Animation: For the Record

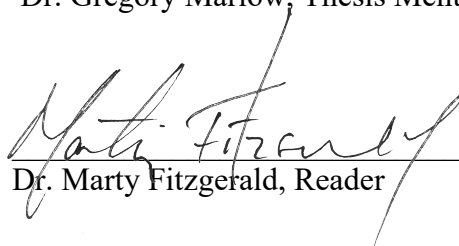
By

Dylan Michael Gordon

An Undergraduate Thesis Submitted in Partial Fulfillment  
of the Requirements for the  
Fine and Performing Arts Honors Program  
and the  
Honors College  
East Tennessee State University

  
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### **Dedications**

*To my mother and father:*

*A thank you for allowing me to watch a soccer ball be created all those years ago.  
That opportunity has granted me nothing but fulfilment since then.*

*-Dylan*

## **Abstract**

A comprehensive study in the processes of animation in various forms, from concept to simple layout animation to complex overlapping action and splining, and even lighting and texturing, I will be using a popular podcast musical as a basis to study the pipeline that's used to create an industry animation.

## Introduction

Often in animation we are tied to a specific area in a field that merges creativity with technology. In my thesis, I sought to explore multiple genres of animations and break the box that I usually confine my artistic nature to. I wished to dissect the pipeline of animation and, as such, broaden the well of knowledge I have on the medium I've so brazenly called my own. This experimentation is not to create a perfect animation, but one that hits multiple facets of the artistry that it encompasses.

Before we dive into the concepts and scripts, early versions of the animation and so on let's discuss the plot a bit. The story follows our distressed character, Jase, is trying to find the courage in himself to remain stoic in the face of his estranged wife Judith. The song follows the plot of him convincing himself that the 36 questions he had been given will help him to finally prove that his relationship is no longer salvageable, even if his consciousness doesn't necessarily agree. With all that said, before we even step foot into Maya, Unreal, or Premiere, we must take a step into pre-production and outline what needs to be created.

## Conceptualization

As I scrolled through the internet to find the right subject matter to aid in my inspiration for the upcoming piece, I was listening to music to help focus on what I was doing. During that time, a song from a podcast play I had watched not a few weeks earlier began and I was struck with a well of ideas. The song was "For the Record" created by Two-Up Production, an entertainment company with a penchant for plays and musicals. The musical it was based off of is called *36 Questions* and it became my main source of inspiration. After gaining the approval

of the company to use the song, I began my work with creating some basic scripts and timelines so that I can use it to gauge for the layout animation, which we'll discuss separately.

Originally it was planned to finish through the first half of the song, but as the year through, it had to be shortened to only when the main character and his conscious are discussing the absurdity of the situation in the opening of the song. To note, despite this some portions of

the layout animation especially and even early

animation passes did feature the female rig,

known as the "Amy Rig" by Gabriel Salas.

After I had weighed options and changed

around the script, I wanted to do a few

storyboards to help set the scene a bit better.

So, going into Maya I grabbed a few basic rigs

and placed them around a quickly made

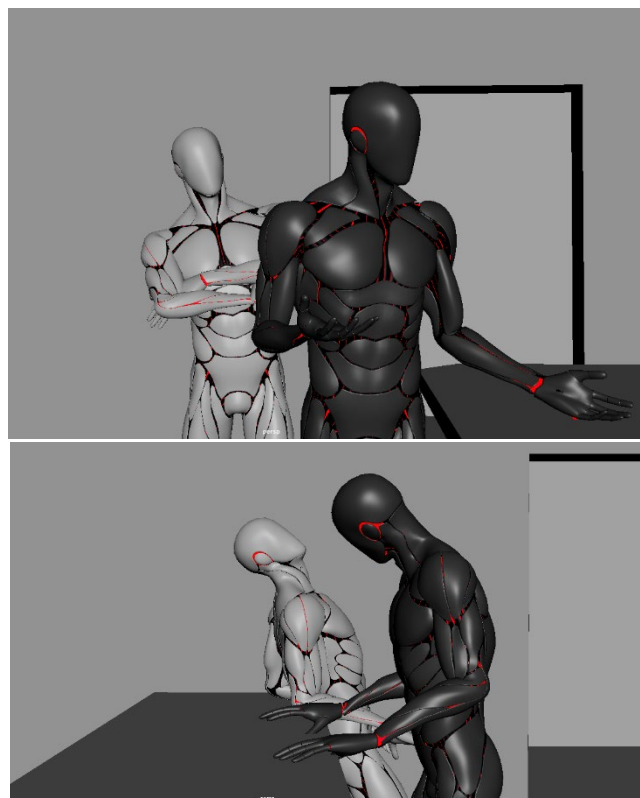
environment to test different camera cuts,

simple poses, and the general direction of the

piece. Additionally, I began to think about

their personalities and how I wanted the main

character's to be worried and nervous, while his inner consciousness to be bold and forthcoming.



*Figure 1-2: The two characters interacting with each other in the storyboard.*

The basic idea of the consciousness being physically seen by both the viewer and the main character was something I had wanted to stick with for a while. From a creative standpoint, it helps to keep the viewer aware of the inward battle going on between himself, but also as a comedic tool to make sure things don't get too dark in a moment that, for the lyrics, aren't in as dark of a place as the film might convey if done improperly. As a result, I tried to gravitate

myself more and more towards the interactions between the two, along with how the ghost of a person's mind may manifest to themselves.

This leads itself finally into the placement of the scene and finding the right environment. I knew I wanted to have it set into a dining room right away due to sound cues and the general atmosphere of the entire song. Eventually I settled on an environment in Unreal Engine called simply "Realistic Dining Room" by Replex, with a wonderful setup that fit exactly what I was looking for. Finally, I settled on the Sam rig by Gabriel Salas as the main character that would be used for the short. To show the difference between them, I had the consciousness' shirt be a light blue, mainly to act as a way to solidify their differences physically. Now, as all the pieces to the animation were found, I could now move on to layout animation, the next step in the animation pipeline.

## **Layout Animation**

Simply put a layout animator's role is to further take the storyboard and put it into 3D motion using the environment and characters given. While I sort of already did this through the use of basic 3D environments and the cyborg rig as shown in *Figure 2*, my job would be to essentially put everything out and organize it into the actual scene. A layout artist's job, as told by Walt Disney Animation Studio's website, is to use proper cinematography, very rough character animation, and good staging to create clear story structure in the animated movie or video game. As such, it would seem on the surface level to be an easy part in the process, but there were hurdles that I had to go through as it became abundantly clear the level of detail you need in just the animation by itself.



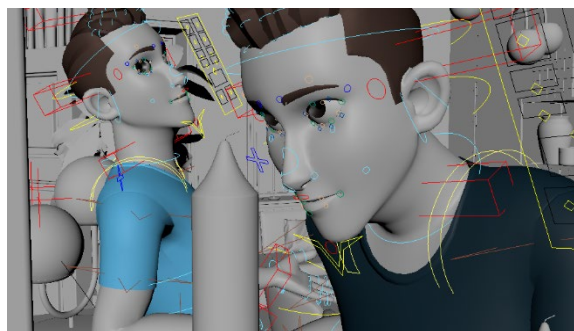
To start, I went into the Unreal scene and exported the environment as an .OBJ, a type of file that simply pulls the individual model, or object, from one program and allows importation into another. After putting it into Autodesk Maya and loading in the two Sam rigs, I began laying out what I had in mind for my storyboards. The problem that I clearly faced was inefficiency. To properly be a layout artist, one must be able to work effectively to meet the specific deadlines that were set, even if those deadlines were set by the layout artist themselves. As such, I felt my indecisiveness led to inefficient work, and along with that came a span of backtracking that lost me time.



*Figure 3: Layout Animation of Previous Idea*

The second biggest obstacle was what layout animators would do in the industry almost naturally. If they needed to, they would create simple lights, extra actors, or other 3D models to get a sense of composition. Additionally, layout animators are the ones initially in charge of camera work as they attempt to interpret the storyboards set upon them. Unlike someone in another department who focuses on solely one type of animation, or modeling and lighting, a layout animator does everything as quickly as possible. As such, I was constantly asking myself questions, such as what camera shots would look the best, what did I want to keep from the storyboards or take out, and so on.

Asking myself these questions, however, were able to give me a clear look into what I was trying to create. As the sole creator of this project, it felt akin to blurry vision at the start and slowly watching it get clearer as you



*Figure 4: Initial layout shot for opening.*

put on your glasses. The storyboards were a good base, but the layout animation truly helps me to visualize what I want before I even begin the blocking process in animation. Most of my camera work was finished then and there as result until the final polish, and at this point I had trimmed down the scene to take away the female character due to the time constraints I was facing. At this point, the experimentation now gives way to what I'm wholly familiar with, the blocking and splining process of animation.

## **Blocking, Splining, Overlapping**

Finally, we hit the three most essential phases of animation. For a general animator the typical way of creating an animation of this quality is to block out, or create the main poses of the characters, then do a more detailed blocking pass, and finish with a splining polish that focuses on heavily on the timing and weight of each movement. However I typically do not use this method. The blocking phase, mainly the initial one, always confused me more than helped me. Often seeing the uncut, blocky motion would eventually cause me to misjudge the timing and weight of each work, so as such I've forgone that part of the process entirely. What I call "progressive animating," I work not by creating key poses and animating between them, but instead working through the timeline from the start to finish, sort of like a printer printing out a document or image. Essentially, I skip straight through to the second blocking phase, which we'll talk about first in the section.

The main challenge of this phase was controlling the rig so that no odd rotations or movements were made and that everything was intentional. If the character were to pick up a plate, then each finger would slide under the plate as in real life. If the main character's consciousness appears and disappears from one area only to show up in another, even that must

fit the timing of the situation and correctly read the main concept aligned with doing so in animation. In this section of the animation process, a lot of time was spent on taking the scene I had from the base layout animation and cleaning up any timing issues and adding more complex motions to the characters. Some changes were made during this time, such as cutting out the female character from production and shortening the actual length of the video so I can better focus on the details of the main character and his conscious talking. Once I was satisfied, it was time to go back to the beginning of the timeline and start splining.

The splining process is, personally, my favorite part of animation. It is the act of taking the animation and looking in between the main parts of it and adding in more details. During this time, I added facial animation and the lip sync, as well as more complex hand and finger motions. The process for splining is a bit slower than blocking, but at this point you shouldn't have to worry about timing or weight as much and really dig into all of the little details. Often at this point I'm heavily thinking about how the body moves even in small ways, such as how your head may move a little when your eyes look towards something else, or how your eyebrow may squint a little as you blink. A good rule of thumb is that nothing is motionless, and too much inactivity can give a sense of uncanny valley as a result. Splining helps to clean that up, and make sure the animation in between your major frames go unnoticed and people can enjoy the animation without the feeling that something is off.

The final step in my personal animation process is overlapping action and another pass through with details. Overlapping action is when a character's different body parts may move at different speeds before going to rest. I typically leave this part for last so that I can make little changes along with it. With the different rules of animation, I'm always thinking about timing. Perhaps I want the first to land on a down beat in the music, or for the character's head to snap

over at a climatic part in the song. For this animation, I focused on Jase and his consciousness' personalities the most in this part as well. Locking down the rest of the piece and making any other changes that need to be made, at this point the animation itself was pretty much finished. Now, at least at the time, all that had to be done left was to push the characters over into Unreal Engine and let the rest be done for me, or so I assumed.

## **Unreal Obstacles**

This was hardly my first time in the Unreal Engine. I had a previous experiment I had used Unreal for, and at the time I was constantly working in it for a specific productions class. Perhaps it was overconfidence, or just naivety, but I had assumed it would work just as well. Often, I was at a loss and felt out of my element at the time. The scene which I had used worked fine, and everything in it ran smoothly. It was a well put together piece, but it was the rigs I had chosen themselves that proved to be an issue, much to my surprise. This setback went from a simple importation to a learning experience, and one I'll be more careful to think about when working in Unreal.

Initially the plan was to take the Sam rig in its entirety and upload it as an FBX, which is an export option similar to an OBJ but keeps the textures and animation created in Maya and importing it over into Unreal Engine. Quickly, however, I was marked with an issue I wasn't expecting. Unreal has a rule where the rigs used can only have one skeleton in the rig, but some rigs can have up to two or even three depending on complexity and size. The Sam rig I had wanted to use held complex, multiple bone structures that Unreal did not allow in its program. The FBX option simply wouldn't work the way that I had intended it to, though I did try to work around the issue with little success.

The next work around was to use an alembic file which with help from Maya's website is a way to transfer animations and geometries (but not joints and rigs) to your Unreal scene. The difference between an alembic and FBX is that alembics download the animation by finding the point in space each model's vertices currently were, and then placing them in the same spot in another program. This can work great as well, though it is a bit more intensive and can be a bit bloated storage-wise. Still, at the time it was my best option but ended up not being the correct answer. The problem with alembics is that it doesn't register the materials like an FBX does, and as such had to be individually placed onto the model again after importing them separately. Now that wouldn't be a problem usually, however the problem I was running into was that the alembic was combining the geometries of the rig as one instead of it all being separated like it should be. This caused some materials to not be viable or usable, and ended up not being a solution.

There was a way to force them to stay separated, and thus had their own slots for materials, but doing so would lead to another unique issue that completely halted any progress I may have made. The animation essentially would be missing a few frames, creating a weird glitching look and after image effect unwanted in the scene. At this point, I had lost a lot of progress and time for something that should be as simple as importation, and after double checking online for any possible solutions and testing those out with little result, I threw up my hands and decided to try rendering in Maya instead. Luckily, there was a way to take the materials from Unreal Engine and export them out to Maya, and that's what was set in motion. After setting the scene up and that the MTL file that I had exported for the materials was working, I knew I could make this work.

## **Rendering and Compositing**

The final step in the animation process was lighting up the scene and then rendering it out. With discarding the aforementioned idea for rendering above, I had to resort to what I was thankfully more used to: maya rendering. Something that I've grown accustomed to, and easy to set up, still came with its fair share of obstacles along the way. From having to re-texture certain materials due to incomplete versions from the Unreal end to the length of time it took to render out the massive 1553 frame render on three separate computers, the drive to finish the project and the thankfully in-depth knowledge I have at lighting in the program prove to be a useful boon for the tail end of this animation process.

The main lighting system I used was a simple two-point lighting set that flooded the room from one side, where the windows were held, to the other end. At first, I attempted to try to use the hanging lights in the environment as well but felt that the light received from the window and the ceiling to be too busy and opted for a slightly more dramatic shot with just the window lights instead. This did prove to be effective however, as most of the camera angles required no additional effort and the dark spots of the room added depth to a nicely lit scene, as shown in *figure 5*.



*Figure 5: Post lighting shot example*

My main render engine was Redshift, a program made by Maxon that I had found only a year ago but grew attached to as time went on. It's entirely GPU based, providing faster renders in place of more intensive GPU usage. Despite that, the quality of the render and the speed at which it churns images out is something that seldom can be ignored. I had grown quite accustomed to Redshift, and it was my basis for the batch render I had needed to use to complete

the animation in its entirety. With three computers the renderer was able to complete in little under 14 hours or so, and when it comes to animation, is blindingly fast for anyone and whatever they may be creating.

The final process is compositing, which for this I used both Nuke and Premiere Pro to set up. Postproduction and compositing work is when the editing that may come with the animation. Final tweaks on lights and some post camera changes, such as adding light shake, may be added into the video so that it can give it a more natural feel to it. Once the audio has been put over the silent version of the animation, everything else pretty much falls right into place. Afterwards it was watched a few more times, slight changes were made in the splining process, it was re-rendered in those sections and then put together into the full animated video.

## **Conclusion**

The entire journey, from the conceptualization to animation to compositing, was crafted all within about a ten-month period on top of regular school and life work. A lot was gained from this experience, and in the end the animation feels good and easy to look at. Much to my surprise, I found something enjoyable in every aspect of the process, along with a setback in just about each one as well. Nothing is perfect, and due to it the process had hiccups, but it came out with a completed, polished work. Being able to work with a production company's music was a big spur of inspiration and felt as if the four years I've spent studying in the Digital Media program was well worth the effort. An animator's job is vast, with plenty of options in front of them to find joy in their creator's heart, but along with that came the appreciation for the concept artists, the storyboard artists, the editors, and the composers as well.

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