12-2014

Peanut Butter Jelly: An Animated Short Film

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PEANUT BUTTER JELLY: AN ANIMATED SHORT FILM

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Fine Arts
Digital Production Arts

by
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December 2014

Accepted by:
Dr. Jerry Tessendorf, Committee Chair
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Abstract

Peanut Butter Jelly is an animated short film based on the concept of two species of Jellyfish clashing over a jar of peanut butter. The production spanned a year and involved the artistic effort of 12 Digital Production Arts graduate students as well as a support team of 10 students from various programs within the University.
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Chapter 1

Story

The narrative of the short film originated with a concept from Dr. Tessendorf, centered around the idea of a Jellyfish finding a jar of peanut butter. The concept was designed to push the production into unfamiliar grounds that would inspire innovation and force creative separation from past productions.

Based upon the practical observation that every second of a professional quality animated film takes several hundred man hours to produce, the story needed to be brief enough for a small team to execute while maintaining the classical story arc elements of a setup, conflict, climax and resolution that appeal to a general audience. In order to clearly sell a story within such a brief presentation the conflict was chosen to be a physical altercation revolving around the gag that jellyfish have a natural desire for peanut butter due to their material composure. It was clear that a satisfying ending had to consist of a creature eating the peanut butter and jellyfish together. In order to progress up to that climatic moment the conflict was built as a series of escalating attacks where each attempt for the peanut butter jar brought greater tension and danger than the previous. With each jellyfish refusing to yield, their unrelenting pursuit causes them to loose sight of their surroundings and become prey for a large grouper fish swimming nearby. This concept played into the larger theme of mutually assured destruction where the jellyfish’s refusal to compromise binds their fate together with the only outcome being terminal.

The fact that the plot boiled down to what is essentially a physical fight left the story feeling hollow. In order to add a layer of depth to both the struggle at hand and the characters themselves, two underwater wrecks were added to the story, a World War II fighter plane and a pirate ship.
These acted as a dividing factor between the two species of jellyfish and a driving force for the way each character responds to the situation at hand. This allowed the jellyfish to take visual as well as personality traits from the wrecks they live on. The fact that they lived in a space that humans once occupied gave foundation to the reason these underwater creatures have human characteristics. The pirate ship and fighter plane also have a historically unique and charismatic group of people associated with them. This allowed the audience to draw logical connections between the inhuman characters and their human mannerisms. Because pirates and pilots typically act in groups, the scale of the battle could be expanded to include supporting jellyfish of both the flyboy and pirate species, aiding the efforts of their leader. Adding supporting roles allowed the battle to grow in scale and thus imply a greater risk and potential for loss. Figure 1.1 shows a storyboard depicting the pirate’s gang by his side.

The story design evolved during the year long production. Initially, the ending consisted of a crab in a cave making a peanut butter sandwich from the peanut butter jar, a clam as bread and a jellyfish (see figure 1.2). This scene required generating several new effects and an entirely new set, surfacing and lighting. Due to the large amount of time required to create such a setup, the ending was cut and replaced by a simpler ending that could reuse existing assets. The altered ending replaced the crab den with a tug-of-war struggle between the pirate and flyboy over the jar. The result of which entangles their tentacles and leaves them at the mercy of a large predatory fish that eats the peanut butter and both jellyfish in one gulp (see figure 1.3). This maintained the original gag of a creature eating peanut butter and jelly but only required the new predatory fish to
be modeled and surfaced: the rig was repurposed from the fish that act as the jellyfish eyes.

As an artist, the ultimate challenge was creating a relatable story that could connect with an audience in the brief time it would appear on screen. The basic concept of the story, two groups of jellyfish fighting over a jar of peanut butter, caught people’s interest as something new and unusual. Having an unique concept as a starting point was advantageous. The story was tested against a class of students in the form of drawings which detailed the broad story arcs. After students agreed that there was an interesting story arc, the story was flushed out into a series of storyboards numbering over 200 panels. The storyboards were shown in animatic form, over and over, to improve the quality of the story through peer feedback. Cute and funny visuals, as opposed to serious and dark, always
had a larger appeal to the test audience. This curved the look and feel of the film as production entered visual development. The characters ultimately served as the intermediary between the story and the audience and were the most enjoyable, complex and frustrating aspects of the production.
Chapter 2

Characters

The original concept for the jellyfish stemmed from the plot point that both species of jellyfish take physical and emotional characteristics from the underwater wrecks that they lived on. Jellyfish swimming around the pirate ship would have pirate like traits, and jellyfish around the World War II P-51 mustang would have flyboy traits. Early concepts of the pirate jellyfish combined physical aspects from real jellyfish while adding a bandana-like bell pattern and golden rings around the tentacles to push the pirate aspect of his design. Figure 2.2 is an early design illustrating the bandana and rings. The bandana was inspired by historical depictions of Edward Teach, also known as Blackbeard, as well as John Rackham. Paintings were studied depicting the legendary pirates with decorative red bandanas underneath their hats and golden rings on almost every finger. Complications arose in the facial representation of a creature that has no discernible facial features. Early cartoon-like eye concepts were unconvincing (see figure 2.1). Dreamworks Character Technical Director Robert Helms recommended that the eyes of the jellyfish belong to a separate creature or organism living on or within the jellyfish bell. New art (figure 2.3) and animation tests involving two fish living within the bell of a jellyfish and acting in tandem with each other were well received. The cohabitant nature of the relationship between the fish and jellyfish added an extra layer of depth and interest to the characters as well as an added degree of fascinating unfamiliarity.

The personality of the pirate jellyfish was designed to change over the length of the film. The pirate was meant to be the jellyfish that the audience wanted to succeed. Because of this, the pirate’s personality in the beginning of the film was designed to be an innocent and child-like. Full of wonder at the sight of the peanut butter jar. This friendly aspect was intended to have the
Figure 2.1: Concept drawings for jellyfish facial setup

Figure 2.2: Pirate Jellyfish Concept Art
Figure 2.3: Pirate jellyfish concept art with fish inside the jellyfish bell
audience relate quickly with the pirate. Once the pirate becomes engaged by the flyboy, the pirate’s true personality is exposed which mimics the aggressive nature of the real pirates that inspired his visual design.

The flyboy jellyfish was designed to bring out characteristics of pilots from the golden age of flight as illustrated in figure 2.4. Employing a sunken plane into the environment as a basis for a flyboy character was inspired by a recent personal discovery of the story of the Flying Tigers. A group of American volunteers in World War II, who managed to shoot down three hundred planes in six months defending the Chinese from Japanese attacks [4]. Inspired by John Wayne’s costume in the 1942 film Flying Tigers, the leather cap with the dangling chin straps was worked into the jellyfish design in order for the audience to easily recognize the jellyfish as pilots. Different patterns from real jellyfish were used in order to bring the jellyfish back to a more familiar visual space for the audience. The brown nature of pilot garb was kept and the fish were altered to have bold stripes in order to inspire a military-like connotation.

John Wayne’s persona also attributed to the acting of the flyboy jellyfish. Wayne, a cultural icon as an American hero, stood 6’4” tall with impactful facial expressions accompanied by few words [5]. The flyboy’s animation was designed to embody the strong confidence that Wayne would portray on screen. The moral heroics of Wayne’s demeanor were replaced with moments of arrogance to keep the audience from favoring the flyboy over the pirate. Both the flyboy and pirate’s performance would evolve throughout the short. The overall character arc was designed to reflect the fact that the more the flyboy and pirate resisted each other, the more singular they became. This paralleled the story theme of mutually assured destruction and how the pirate and flyboy’s fate would become intertwined due to their lack of compromise. This was achieved by starting with their differing personalities based on human characters and moving to a crazed, animalistic obsessiveness as their efforts for the peanut butter are repeatedly cut short. Brad Pitt’s character in the 1997 film fight club, Tyler Durden, was looked to for his amusement in danger coupled with a relentless, psychotic instability towards a particular goal. With this in mind, moments were constructed such as the pirate switching quickly between heavy laughter and aggressive attacks. Dog barks and various other aggressive animal actions were also used as reference for acting in the later parts of the film.

Clear distinction between the pirates and the flyboys was a primary concern. The pirates were intended to be brutish, fighting with strong emotion while the flyboys embodied a calm confi-
dence contending with precision, elegance and speed. The pirate versus flyboy conflict was not only a struggle between different types of warriors, but warriors of different time periods. To contrast against the old world of the pirates, the flyboys were given the ability to produce electric current. This attribute was originally implemented as an exaggerated sting but became an arcing electric discharge that not only functioned as a weapon to inflict paralysis but as propulsion device for rapid movement. With this in mind, a style guideline for character animation was created. Inspired by the exaggerated animal characteristics portrayed in the Disney animated feature, The Jungle Book, classical Disney animators Frank Thomas and Ollie Johnston were looked to as pioneers of incorporating human elements into wild creatures. Shown in figure 2.5 and 2.6, jellyfish swim poses were deconstructed and pushed both spatially and temporally in order match the bold, fast paced style of the film. Animation tactics learned from Marek Kochout and Kristof Serrand, Dreamworks animation supervisors with backgrounds in classical two dimensional animation, were used as a foundation for the subtle moments when characters were emotionally reacting rather than fighting. This involved filming video reference of the animators acting out a multitude of ways the character could react. This human touch was important in making the characters feel realistic and relatable. In order to avoid pushing the characters too far in the human direction, motor skills had to be addressed cautiously. Because jellyfish tentacles don’t contain muscle structures for voluntary movement, tentacle animation was kept as reactionary unless the characters needed to grasp an object.
Figure 2.5: A breakdown of jellyfish movement for rigging guidelines

Figure 2.6: Flyboy Jellyfish with exaggerated stretch to visual reinforce speed
As the production began animating for shots, the character personalities were further explored leading to the reexamination of the relationship between the fish that act as emotion and the jellyfish they dwell within. The fish, being the source of emotion, became the relatable aspects of the characters while the jellyfish fell into the role of an apparatus: a suit-like ensemble that the fish would control in order to perform larger tasks. This caused both the plot and character animation to adjust in order to elevate the role of the fish to be the brains among the mindless jellyfish.
Chapter 3

Visual Design

The visual design of the film was inspired by Pixar’s Finding Nemo and Dreamworks Animation’s Turbo. These films are structured on realistic elements pushed in bright, colorful, soft direction.

The softness is a visually pleasing design that can be attributed to the lack of harsh transitions between elements in the scene. This was adapted into all aspects of the environment as well as the characters. The coral specifically was implemented in a unique fashion using descriptions listed on the Renderman website detailing a resource efficient way of procedurally shading coral including a fake method for recreating the look of subsurface scattering [1]. The subsurface scattering gives the edges of objects a pleasant glow which, used in tandem with round features, created a soft, non threatening look for the coral. The coral shaders where structured in conjunction with a tool written for Maya, and shown in figure 3.1, which allowed all color aspects of the coral shader to be changed to different, predefined color presets randomized for variation. This was critical in recreating the infinite variation that occurs naturally within a coral reef. Aside from color, a script was created to walk the surface of each modeled coral and measure distances from the base and nearest tip. This data was stored per vertex and interpolated in the shader to procedurally determine displacement, color mixing, and the subsurface magnitude of the coral.

Quoting from Making Nemo, a documentary about the making of Finding Nemo, John Lasseter says, "No matter what the subject is, you cannot do enough research. Because so much believability will come out of what’s really there” [2]. With this in mind, every aspect of the film was based on something from real life. Archives of images and videos were collected to help each
artist have a foundation for their work. Years of scuba diving in tropical locations helped to quickly identify coral, fish, and organisms that would help portray a tropical coral reef setting. All natural environmental elements were picked, based on past experience, for their color, silhouette, texture and variation from one another. Figure 3.2 shows a coral reef off the coast of the Apo Islands in the Philippines. This location was used as the basis for modeling the overall look of the reef. The reefs surrounding the Apo Islands contain uniquely shaped rock formations with a limited number of coral species that repeat continuously throughout the rocks. The limited variety in coral species allowed the team to focus on 9 distinct types of coral. Each coral type’s model was then altered in shape 8 times in order to create variation within a species of coral. The water quality and color also had a distinct tropical notion at a depth that would submerge the tall mast of the pirate ship.

The experience of being underwater consists of many complex audio and visual queues. Finding Nemo served not only as a guideline for visual aesthetic but as a foundation for compounding the necessary visual queues for creating the underwater experience. An audience most likely has preconceived notions of what it feels and looks like to be underwater and it is important that those expectations are met. Building on Pixar’s solution to satisfy those expectations, several scenes from Finding Nemo were deconstructed to find that caustics, godrays, particulate, depth fog and color attenuation would be required to achieve a convincing coral reef setting.
Caustics are the light patterns on underwater objects generated from sun light being refracted through the surface of the ocean. These provide a movement of light across objects that implies a moving body of water. To achieve such an effect Dr. Jerry Tessendorf’s wave generation software was used to recreate the patterns cast by an ocean surface at a specified depth. These patterns were projected on a flat surface and saved out as high resolution images. These images were then multiplied into the output of a light within the scene, representing the sun. The caustic pattern tended to add an overwhelming sense of movement. In order to counteract this effect each asset being rendered was given two key light passes, with and without the caustic pattern, in order to balance the impact of the caustics in compositing.

Godrays consist of shafts of light formed by sunlight, refracted through the surface of the ocean, and scattered by particulate and organisms within the water. These subtle light effects not only add to the beauty to the final image but contribute to the notion of waves above and atmospheric density. Gowthaman Ilango, a fellow digital production arts graduate student, created a volume rendering application that calculated these shafts of light based on the normal of each polygon within an animated ocean surface mesh. The results were generally moving at a high speed and were slowed down to be less distracting and to better fit the aesthetic of the film.

Particulates, or small organisms and materials floating within the water, were also critical in recreating the feel of ocean water as well as establishing the sense of a water current. This was achieved with a consistent directional movement with a slight push and pull motion. With depth of field applied the particulate had an added benefit of increasing the sense of depth within a scene. In order to diminish the potential for distraction, the particulate was graded in compositing with respect to the luminance of the scene in order to even out the contrast as the particulate moved.
Figure 3.3: Initial experiments with color attenuation and atmospheric fog

across an object in shadow.

Depth fog with respect to underwater environments involves mixing between the rendered object and an atmospheric color, based on the objects’ distance from the camera. First attempts in creating the atmospheric color involved painted maps which were simple combinations of ramping colors from a deep blue up to a lighter, greener blue at the surface. When moving cameras were desired, a new approach of using volumes to create the atmospheric color was constructed. Directly linking the incandescent property of the volume shader with the desired color based on the y coordinate in space allowed the camera to freely move through the scene, prompting the atmosphere to get brighter and greener or darker and bluer depending on the camera’s orientation and position.

Color attenuation in underwater environments is the loss of energy as light moves through
water. However, each frequency of light is not degraded at the same rate. Predefined equations and variables for energy loss with respect to the red, green and blue channels of images were coupled with distance information from depth passes to calculate the correct color falloff for each pixel of the rendered images [3]. Due to the steep attenuation that occurs on the red channel in particular, 28.6 percent per meter, artistic liberties were used to decrease the intensity of the fall off past the point of realistic conditions. This increased the vibrancy of our characters and coral while maintaining the expected loss of color at a distance [3]. Figure 3.3 illustrates the color loss and atmospheric blending applied in compositing.

The environment, inspired by a multitude of past experiences was shaped to feel warm, tropical and full of history. The pirate ship needed to feel like it had been sunken for hundreds of years which involved covering it in coral and and thousands of smaller growths like bacteria, algae and barnacles. This meant that the shape had to be instantly recognizable. Drawing upon past experiences in the Cayman Islands and Bahamas, where history and tourism is saturated in pirate lore, there are distinct bow shapes, decorative trim, and deck structures that help identify a ship as a pirate ship. With an idea of features the ship needed, a design was created from different aspects of several British war and merchant ships from the 1600s. These ships existed during the time period where piracy was at its peak. Though the ships were not used as pirate ships during their existence, they had a structural architecture that has been represented in pirate ships in films such as Treasure Island, Hook and Pirates of the Caribbean.

The P-51 mustang was inspired by a life-long fascination in World War II and historical icons like the Flying Tigers. Films such as Saving Private Ryan and Empire of the Sun have portrayed the powerful silhouette with the slight upward slant of the wings as an symbol of strength and intimidation. The plane was scaled to be 78 percent of its real-life size in order to prevent the plane from making the ship or flyboy jellyfish from feeling small. Different underwater growths were added across the surface of the plane. In order to make the plane feel like it had been wrecked for a lesser period of time than the pirate ship, coral and other growths were scattered in patches rather than blanketing the entire surface.
Chapter 4

Directorship

The Peanut Butter Jelly production team consisted of 12 graduate students occupying artist roles with an additional 10 students in support roles. Artist roles generally fell into the categories of story, visual development, modeling, surfacing, fx, rigging, animation, lighting and compositing, see figure 4.1. Recruiting students for artist positions involved pitching the story along with any content that existed at the time. Due to the brevity of previous projects it was difficult for students to fill substantial time with high quality material on their demo reels. Peanut Butter Jelly offered an opportunity to fill that void. Key to finding volunteers was to only offer work specifically tuned to the interests of the person being asked. This meant that someone who was interested in fx only ever had to touch fx. Compared with previous projects, there was an appeal for students to work on a project purely in their intended field of study.

Most of the students involved with Peanut Butter Jelly had worked together in some fashion before. This allowed for a preexisting established trust that the project was heading in a meaningful direction and that the work at hand could be completed at a high level of craftsmanship. This trust allowed feedback on their work to be taken more seriously, ultimately allowing a singular, central source of feedback to guide the look of the film in a unified direction across many artists.

Getting students to accept the work was, for the most part, not difficult. Keeping the artists motivated to finish their work proved to be a challenging task. Most students had a full schedule and were sacrificing their free time in order to produce work for Peanut Butter Jelly. Speaking generally, large achievements for the production tended to inspire the group as a whole and push work through at a faster pace for a period of time. Such achievements were always visual and typically involved...
an impressively rendered image or animated character. Also reassurance that the production was moving forward at a quick pace motivated students to match that pace. Periods of low work output tended to happen when nothing substantially new had been shown in dailies for several weeks. The level of participation and motivation varied from artist to artist.

Typically students worked on their own schedule with most deadlines being labeled ‘as soon as possible’. Rigid schedules were setup at several points throughout the production but never successfully motivated students to meet the listed deadlines. Tasks would extend as needed to produce the optimal quality for that particular asset. Since all artists volunteered for their role, the forgiving schedule seemed to keep them satisfied with the work load. Asking the artists for more work than they had intended to produce was always a consideration and avoided as much as possible. An unhappy volunteer typically does not remain a volunteer for long.

The support roles were generally new students to the digital production arts graduate program or undergraduate students that were interested in production. They would monitor renders only when they made themselves available. A few students who made themselves readily available were asked to manage the distribution of tasks that entered the queue for rendering.

Overall Peanut Butter Jelly would not have been possible without the large effort put forth by those who volunteered. A lot was asked of them and they rose to the challenge to achieve a visually complex and convincing result for the project with a larger scope than they have previously encountered.

Peanut Butter Jelly was a notable highlight in a life full of creative pursuits. My personal artistic expression began in fourth grade with a guitar and a fascination with the emotional impact that a melody could have. Shortly after I began filming my action figures with my parents’ video camera, where any visuals were driven and influenced by the accompanying melodies. An interview
with Steven Spielberg which accompanied the DVD of Saving Private Ryan, detailed how he created war films as a child. This inspired me to expand the scope of the short films I was creating. Each short story got more elaborate than the previous and eventually involved friends, family, lights, sets and crude fx. Music has always remained an integral source of inspiration. Any character or story I create is the result of an image I see when I listen to music.

When it came time to designate a career, the University of North Carolina at Wilmington was chosen for its notable film school. Dissuaded by film professors equating directing big budget feature films with winning a lottery, I switched majors to computer science to pursue my technical skills. Within computer science I discovered Autodesk Maya, a computer program which allowed an artist to build and animate any character they could imagine. Encouraged by my advisor, Dr. Eric Patterson, to use my computer skills along side my passion for filmmaking, I came to Clemson University to develop the skills I needed to tell the stories I wanted to tell. Film was never a political nor social tool for me. I don’t set out with a strong message I wish to convey. It has always been the characters that interest me the most. There is a deep, uncontrollable surge of emotion that overcomes me when a powerful image is combined with the right music. This connects me with a character on such a deep, personal level that a piece of that character stays with me long after the film is over. I may walk taller, speak kinder, or feel wiser all because of a story’s resonation within me. While Peanut Butter Jelly might fail to resonate in such a way, it has progressed my capabilities as an artist and a filmmaker in a direction that brings me closer to sharing that experience with an audience.
Chapter 5

Results

The following figures present a single frame from each of the eighteen shots in the film plus the production credit and title. Each frame was chosen as a representative image that embodies the purpose and intention of the shot.

Figure 5.1: Clemson Digital Production Arts Credit
Figure 5.2: Shot 1: Two fish are disturbed by the sound of a large boat horn.

Figure 5.3: Shot 2: The fish swim into the jellyfish bell and take control.

Figure 5.4: Shot 3: A peanut butter jar sinks from above.
Figure 5.5: Shot 4: The pirate jellyfish is captivated by the peanut butter

Figure 5.6: Shot 5: Electrified by another jellyfish’s tentacle, the pirate is paralyzed

Figure 5.7: Shot 6: The flyboy is revealed and joined by his crew
Figure 5.8: Shot 7: Other pirate jellyfish throw a sword to the captain who attempts to fight off the flyboy.

Figure 5.9: Shot 8: The flyboy retreats to his plane.

Figure 5.10: Shot 9: Bullet-shaped jellyfish swim into the plane’s gun barrel aimed at the pirate.
Figure 5.11: Shot 10: The flyboy gives a confident smirk towards the pirate

Figure 5.12: Shot 11: The flyboy pulls the trigger, sending electrical current through the joystick

Figure 5.13: Shot 12: Evading the bullet jellyfish, the pirates retreat to their ship
Figure 5.14: Shot 13: The flyboy makes an attempt for the peanut butter and is stopped by a cannon shot from the pirates

Figure 5.15: Shot 14: The pirate captain orders the cannon to fire again

Figure 5.16: Shot 15: Dodging the cannon fire, the flyboy grabs the jar
Figure 5.17: Shot 16: Seeing the flyboy with the jar the pirate makes a final attempt for the peanut butter

Figure 5.18: Shot 17: The pirate and flyboy struggle for the jar and find themselves tangled in their tentacles up in open water
Figure 5.19: Shot 18: The grouper swims away with peanut butter on his face

Figure 5.20: Title Screen
Bibliography


