

STORM
AN EXPLORATION OF HOME THROUGH PAINTERLY ANIMATION

by

KIRSTIN HARDIN
B.A., Morehead State University, 2017

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Fine Arts
in the School of Visual Arts and Design
in the College of Arts and Humanities
at the University of Central Florida
Orlando, Florida

Fall Term
2021

© 2021 Kirstin Hardin

ABSTRACT

Storm is an animated short film that follows a family of Florida Sandhill Cranes. The family experiences a storm that destroys their nest and separates them from their smallest chick. The reunion of the cranes, at the end of the film, symbolizes that the sense of home consists of the members of the family, and not the physical place. The film combines digital two-dimensional (2D) animation with traditional paint on glass animation to create visual contrast between the cranes and the storm.

The stylistic choices that I have made include showcasing paint strokes, going with a lineless and painterly animation style, using colour to highlight emotions, and animal characters that have anthropomorphic expressions. The fluidity of the paint strokes reiterates the naturalistic story of the cranes. Allowing the medium to come through strongly in the final animation is a quality that I strived for in my thesis short film. I want the paint strokes to be a focus, not hidden within the animation.

For James, my guiding light by my side, every step of the way.

For my mama, my two little brothers, and dachshund, Pippin: the original cranes.

ACKNOWLEDGEMENTS

I am grateful to my thesis committee for all of the advice and support over the past three years: Cheryl Briggs, my committee chair; Darlene Hadrika, and Jo Anne Adams. I appreciate every moment that you spent with me and my film. You gave me the opportunity to pursue a lifelong dream: to become an animator.

To Cohort 1, thank you for leading the way for us, and sharing your wisdom!

To Cohort 2, I am proud to be a part of the Clementines! I have enjoyed seeing each of our vastly different films develop from the early stages.

TABLE OF CONTENTS

LIST OF FIGURES	viii
INTRODUCTION	1
REVIEW OF RELATED LITERATURE	2
DESCRIPTION OF FILM	7
NARRATIVE RELEVANCY	8
Environmental Aspects.....	8
Social Climate of Today	9
CHARACTER AND ENVIRONMENT DESIGN.....	11
Identity & Character Design.....	11
Narrative Influences	18
Set Design Influences.....	19
Plot Devices	22
Music & Sound	27
PROCESS AND METHODOLOGY.....	28
Animating in Digital and Traditional Mediums.....	28
Building My Paint on Glass Rig.....	30
Paint on Glass Animation Process	34
Compositing Paint on Glass Animation	36

CONCLUSION.....	46
LIST OF REFERENCES	47

LIST OF FIGURES

Figure 1: Still image from <i>Storm</i> showing the use of anthropomorphic expression to depict emotion. Source: Kirstin Hardin.....	11
Figure 2: Character design sheet depicting the father crane and mother crane. Source: Kirstin Hardin.....	13
Figure 3: Character studies of the parents for <i>Storm</i> . Source: Kirstin Hardin.....	14
Figure 4: Character studies of the babies for <i>Storm</i> . Source: Kirstin Hardin.....	15
Figure 5: Finalized character designs of the two babies for <i>Storm</i> . Source: Kirstin Hardin.....	16
Figure 6: Still image from <i>Storm</i> showing the final character designs of the babies. Source: Kirstin Hardin	17
Figure 7: Concept art for <i>Storm</i> of the storm that destroys the home of the cranes. Source: Kirstin Hardin	19
Figure 8: Still image from <i>Storm</i> showing the environment of the cranes. Source: Kirstin Hardin	20
Figure 9: Still image from <i>Storm</i> showing the layered foreground and background elements in an environment for depth. Source: Kirstin Hardin	21
Figure 10: Still image from <i>Storm</i> showing the reflection of the storm clouds. Source: Kirstin Hardin.....	23
Figure 11: Still image from <i>Storm</i> depicting the fallen oak tree. Source: Kirstin Hardin	25
Figure 12: Colour palette created for <i>Storm</i> . Source: Kirstin Hardin	26
Figure 13: Still image from <i>Storm</i> of the warm, golden colour palette in the final shot of the film, representing the joyful reunion of the family. Source: Kirstin Hardin	27

Figure 14: An early paint on glass test for *Storm* completed before constructing the final animation rig. Source: Kirstin Hardin.....33

Figure 15: A work in progress picture of the paint on glass animation for shot 010. Source: Kirstin Hardin.....35

Figure 16: Still image from the rough animation of Shot 012 from my thesis film *Storm*. Rough animation for Shot 012 by Danny McCabe. Source: Kirstin Hardin.....40

Figure 17: Still image of the paint on glass animation for Shot 012 from my thesis film *Storm*. Source: Kirstin Hardin41

Figure 18: Still image showing the solid black and white render of the rough animation for Shot 012 of my thesis film *Storm*. Rough animation for Shot 012 by Danny McCabe. Source: Kirstin Hardin.....42

Figure 19: Layers in Adobe After Effects depicting the luma matte layer above the linked Tree layer. Source: Kirstin Hardin.....42

Figure 20: Still Image of the background effects applied to Shot 012 from my thesis film *Storm*. Source: Kirstin Hardin43

Figure 21: Still Image of the final look for Shot 012 from my thesis film *Storm*. Source: Kirstin Hardin.....44

INTRODUCTION

My film *Storm* is an exploration of the sense of home, which I define as encompassing more than the place. Home is your loved ones who have been there for you, not the physical location. This ability to rebuild a home has to do with the importance being placed not on the structure, but on those that you love. The story follows a family of Florida Sandhill Cranes, who experience a storm that destroys their home. During the storm, they become separated from the smallest member of their family. The film concludes with the reunion of the family unit, symbolic of their home being rebuilt now that they are together again.

The genre for my animated short film is Family, due to the subject matter of the story. The story is inspired by the experiences of my own immediate family. Our numerous moves while growing up and familial hardships inspired me to develop a film that portrayed the concept that having your loved ones with you gives you a sense of being at home. Centralized on that message, I created my animated film with the desire for it to be relatable for audiences of all ages.

My intent in creating my thesis film is to showcase how traditional and digital methods of animation can be combined for highlighting specific elements of a story. By using both types of animation in the film, I build contrast between the storm and the non-storm sequences. Additionally, the overall painterly style of animation for *Storm* suits a story featuring a pastoral environment.

REVIEW OF RELATED LITERATURE

My thesis is relevant for the animation and visual effects community as unique potential in storytelling lies in the combining of traditional methods of animation, such as paint on glass animation, with modern, digital animation technologies. Gary Wilson's article from *Animation Studies* is a comparison of traditional mediums and digital mediums in animation. The author argues for the use of both traditional and digital animation being combined to create animated works. He feels that the mimicking of under the camera animators when using digital methods leads to a "greater array of stylistic options" (Wilson). Conversely, Wilson points out that digital technologies give "permanence" to traditional animation methods.

The development of digital technology has aided in the processes of "under the camera" animation (Curtis). If there is a mistake in a frame, an animator can now digitally manipulate it after capturing it with a camera. Without these digital capabilities to quickly fix any issues in the painted frames of animation, the animator would have to redo the entire shot of paint on glass animation.

Storm is built upon the foundation laid by prior works in animation that utilize traditional mediums, mixed digital and traditional animation techniques, and stories that are conveyed to the audience through the use of animal characters. I have found both inspiration and validation for my animation choices through these relevant animated pieces, particularly the more recent works by paint on glass animators Miyo Sato and Aleksandr Petrov.

Aleksandr Petrov is an Academy Award winning paint on glass animator. Petrov uses brushes, a rubber scraper to remove paint, and his fingers as his primary tools (*Alexandre*). His animation style is realistic, while maintaining the visibility of his paint strokes. He argues that

the reason he uses his fingers to create his paintings is that they are “the shortest distance between the heart and the painting” (*Alexandre*).

Aleksandr Petrov’s film *The Old Man and the Sea* (1999) has had one of the greatest impacts upon my thesis work. His style is both painterly and realistic. Petrov utilizes paint on glass animation to create his work. While he uses oil paint in his animation, I am using gouache paint mixed with glycerin for my thesis as it is less harsh to work for prolonged hours within a workspace. In addition to his paint on glass animation being influential on my own work, I am inspired by *The Old Man and the Sea* to use a version of multiplaning in my short film to capture depth and space.

Conversely to Petrov, Japanese paint on glass animator, Miyo Sato, animates in an abstract and simplistic visual style that relies on gesture. She is best known for her work on the Japanese animated series entitled *Mob Psycho 100* (2016). It is a current show that utilizes both digital 2D animation and traditional sand and paint on glass animation. The combination of these different animation techniques has culminated into a show that features a distinctive art style amongst modern Japanese animated series. The show comes out of the highly acclaimed animation studio, Bones. Bones is known for their action-based animated series. It has been inspirational for me to witness a frontrunner in the Japanese animation industry utilize traditional animation within their high-action anime.

Animator Miyo Sato created the ending credits using paint on glass animation. The style of the paint on glass is loose and fluid, highlighting the movement of the paint strokes and paint colours. Miyo Sato’s work on *Mob Psycho 100* has illuminated the potential for traditional methods of animation when combined with digital 2D animation. *Mob Psycho 100* is a digitally

2D animated show that composites Sato's paint on glass animation on top in order to depict spirits and other dream like sequences.

In her short film, *Fox Fears* (2015), Miyo Sato uses both sand on glass animation and paint on glass animation. Her choice of animation mediums and techniques coincide with the child-like fable that is being narrated. I particularly enjoy the contrast of animation techniques between the sand on glass animation and the paint on glass animation in this short. In my thesis film, I am contrasting my digital 2D animation with traditional paint on glass animation to represent the differences between the idyllic world of the crane family with the destructive storm. As in *Mob Psycho 100*, I have composited the paint on glass animation on top of the 2D digital animation in order to transition between the two types of animation. During the storm, the film consists of entirely paint on glass animation.

The animators and artists having the greatest impact upon my thesis are the aforementioned Aleksandr Petrov and Miyo Sato. Artist Tyrus Wong, art director and background artist Kazuo Oga, animator and director Te Wei, director Hayao Miyazaki, animator Yuri Norstein, and artist Eyvind Earle are the other key inspirations for my work. Next, I will explore the reasons behind why each of these animators and artists have been influential in my thesis work.

Eyvind Earle art showcases vibrant and flat colour use and unique shapes. I have drawn inspiration from Eyvind Earle's bold colour use and art nouveau curving shapes. Walt Disney said, "What we want out of this is a moving illustration" regarding adapting Earle's concept art to animation (Solomon). With my thesis, I aim for the same look that Disney mentioned. I want my film to look like a moving painting or illustration.

Chinese ink wash animation is another form of traditional animation that has influenced the development of my own style of animation. Chinese animators adapted the same processes used in traditional ink wash painting to animation. The animation captures the fluidity and expression from the brushstrokes and ink application. In my thesis film, I explore my own painterly style that builds upon more traditional animation, such as Chinese ink wash animation.

Animator and director Te Wei's *Tadpoles Searching for Mother* (1960) is the first Chinese ink wash animated short film. Similarly, to this style, my story focuses upon a natural setting with birds as the main characters. Within the animation, the viewer observes tadpoles swimming together looking for their mother frog. During their search, they see chickens, crawfish, crabs, turtles, and fish. These animals are animated in a realistic style while showcasing the soft washes of ink.

Feeling from Mountain and Water (1988) is a later Chinese ink wash animated short by Te Wei. This film is much more elaborate than *Tadpoles Searching for Mother* in both story and animation. *Feeling from Mountain and Water* does not have dialogue, instead using the sounds of water, wind, and birds along with the two musical instruments played by the characters to tell the story. The colour palette is soft and limited, putting the emphasis on the expressionistic line quality and strokes of the ink work.

Artist Tyrus Wong, similarly, focused upon brush strokes and expressionistic line quality. He is described as a fine artist who “primarily did illustrations for motion pictures” (*Tyrus*). Tyrus Wong's art is highly influential upon my own artistic style. I am drawn to his painterly style and colour usage, especially within his art that features animals and natural environments. His paint strokes are gestural and fluid, which is an element that I strive for in my painterly

animation. The quote from Tyrus Wong that stands out as defining his art is if you can finish a painting in “five strokes instead of ten” then your art “will sing” (*Tyrus*).

Kazuo Oga is an art director and background artist for Studio Ghibli. Oga has a similar masterly ability to Tyrus Wong for using colour and paint strokes to capture a scene. His backgrounds feature soft, rich colouring. For my thesis film, I have found inspiration in his artwork, especially in Oga’s background paintings that depict natural environments. His backgrounds give only enough information and details to evoke the overall feeling of the setting. It is refreshing to hear Oga talk about following his intuition when painting (*Ghibli*). With my thesis, I often find myself trusting my artistic instincts as far as colour choices and paint strokes.

Director Hayao Miyazaki is another of my influences hailing from Studio Ghibli. Miyazaki story content for his animated films is what I have found inspiration in as his films are influenced by his own “knowledge of nature and ecology” (Gossin). Art for Miyazaki is not just an “organic process;” the art itself is a living organism (Gossin). This viewpoint on art applies to my own process for my thesis film. My painterly style gives the animation a fluid, living quality. One of Miyazaki’s most prominent themes is environmentalism (Odell). His animated works are often centralized by nature and our relationship to the natural world (Odell).

Russian animator Yuri Norstein often uses animals and natural elements as symbols within his animation (Haggart). His animated films showcase experimental techniques, such as his use of multi-planing and textured cell animation (Haggart). I find that my film echoes Norstein’s stories in that both feature “anthropomorphized animals to act out the narrative” (Haggart).

DESCRIPTION OF FILM

My film, entitled *Storm*, starts by showing a family of Florida Sandhill Cranes waking up to begin their daily activities. The family consists of the parent cranes and their two recently hatched babies. While wading in the water near their nest, a storm moves toward the cranes. The parents quickly herd the two chicks back to their nest, located under a large oak tree for shelter. Before they can reach their nest, the tree is struck by lightning and crashes down on the family. The parents and one of the chicks have been separated from the smaller baby in the chaos. After the storm has passed, the cranes cautiously come out from their hiding place near the tree to search for their lost family member. At the end of the film, they are reunited with the baby and rebuild their nest.

NARRATIVE RELEVANCY

Environmental Aspects

My thesis film conveys a relevant message to audiences both for current environmental and social issues being faced. First, I will discuss the relevancy of the story in its environmental aspects. The Florida Sandhill Cranes are a non-migratory subspecies of Sandhill Cranes that reside year-round in Florida. Due to their limited range, the biggest issue faced by the Florida Sandhill Cranes is habitat loss (Stys). This subspecies of Sandhill Cranes prefers to live in “open prairies, improved pastures, and wetland habitats” (Stys). This combined with the small size of hatchlings produced from a successful breeding pair, usually only one to two; overall small population numbers; and seasonal nesting pushed the Florida Game and Fresh Water Fish Commission to list the Florida Sandhill Cranes as threatened in 1974 (Stys).

While 1974 was almost half a century ago, the habitat loss and displacement of the Florida Sandhill Cranes has only increased during that time with the development of new housing communities and large shopping centers. Unfortunately, the habitat of choice by the cranes is also the easiest one to develop for human usage (Nesbitt and Hatchitt). From the time that the Florida Sandhill Cranes were listed as threatened in 1974 to 2003, the cranes experienced a 16.6% of habitat loss during each decade (Nesbitt and Hatchitt).

My thesis film depicts a family of Florida Sandhill Cranes losing their home and subsequently, rebuilding their nest. This is a similar situation to the ongoing habitat loss and displacement that the subspecies face in Florida. While the storm in my film is a natural disaster, it can be equated to habitat loss due to human activity as the cranes have no control in either

situation. The rebuilding of the nest is symbolic of the way the number of cranes could be maintained if a conscious effort is made to preserve or set aside suitable habitat ranges for the Florida Sandhill Cranes. On top of the underlying message of hope, I want audiences to gain awareness for these creatures that have been around for millions of years in Florida.

Social Climate of Today

Similar to the loss of suitable habitat experienced by the Florida Sandhill Cranes, people are facing a rise in evictions and homelessness in the U.S. This crisis was building prior to the global COVID-19 pandemic due to the growing discrepancy between the cost of rent and wages earned by renters (“Eviction and Health”). Data over the past two decades shows that the median rent has increased by 13 percent while the median income only increased by less than 0.5 percent (“Eviction and Health”).

The further economic strain caused by the pandemic has placed even more renters at risk of eviction. To temporarily alleviate this crisis due to the urgent health concerns involving the spread of COVID-19, policy makers “implemented eviction moratorium” (“Eviction and Health”). The fear is that once the eviction moratorium expires on June 30, 2021, there will be a “flood of newly homeless families” (Santich).

Some groups are developing innovative ways to provide the emergency relief and support needed. The Salvation Army “wants to raise \$1 million to build a community” of 50 Pallet shelter units in Central Florida to act as temporary shelter for homeless people as they work toward transitioning into permanent housing (Santich). These fiberglass and plastic temporary shelters feature “air conditioning, heat, electrical outlets, smoke alarms, and carbon monoxide

detectors” (Santich). The community could house up to 80 residents, allowing families and people with pets to remain together (Santich). In another community located in Tacoma, Washington, using the same units as temporary shelter for homeless people over the last 4 ½ years: 400 of the 450 people that were residents transitioned into permanent housing (Santich).

While my thesis film shows the emotional terror of losing a home, I want the viewer to feel a sense of hopefulness from the ending. The cranes are able to rebuild their home and their lives after the detrimental storm. I believe this message is particularly relevant with the current housing and economic concerns stemming from the global COVID-19 pandemic. Efforts by groups; such as The Salvation Army in Orlando, Florida; in providing assistance to newly homeless people will help spark that hope of rebuilding after the pandemic (Santich).

CHARACTER AND ENVIRONMENT DESIGN

Identity & Character Design

Classic Disney films such as *Bambi* (1942) and *The Lion King* (1994), have been influential in my character design. The Florida Sandhill Cranes in my film are realistic in body build and proportions, while utilizing an anthropomorphic way of showing emotions through expression. This is similar to the animals found in the aforementioned Disney films. Both *Bambi* and *The Lion King* feature animal characters who retain their overall realistic appearances and movements. The designs of the characters add to their appeal through bigger eyes and expressive faces while maintaining a sense of realism.



Figure 1: Still image from *Storm* showing the use of anthropomorphic expression to depict emotion. Source: Kirstin Hardin

Disney's *Bambi* is one of the animated films that has had the greatest influence upon my art, including my thesis film. The film uses animals to tell a story about loss, love, and friendship. Emotional moments in *Bambi* are depicted through the use of body language, sound effects, music, silence, facial expressions, and cinematography. The deer in *Bambi* walk on four legs, keeping a realistic range of motion, however, the viewer sees the characters show emotion through laughing and crying. My thesis film, similarly, features animals within their natural environment. I strive to capture emotion in my work through the expressive features of the Florida Sandhill Cranes.

Additionally, the golden eagle from Disney's *The Rescuers Down Under* (1990) has been instrumental in my character design process. The eagle is designed in a realistic way, while conveying a range of emotions to the viewer through body language and facial expressions. I am building off of this type of animal design in my short film by maintaining the key physically identifying traits of Florida Sandhill Cranes while exploring ways for the audience to feel emotionally invested in the characters through design.

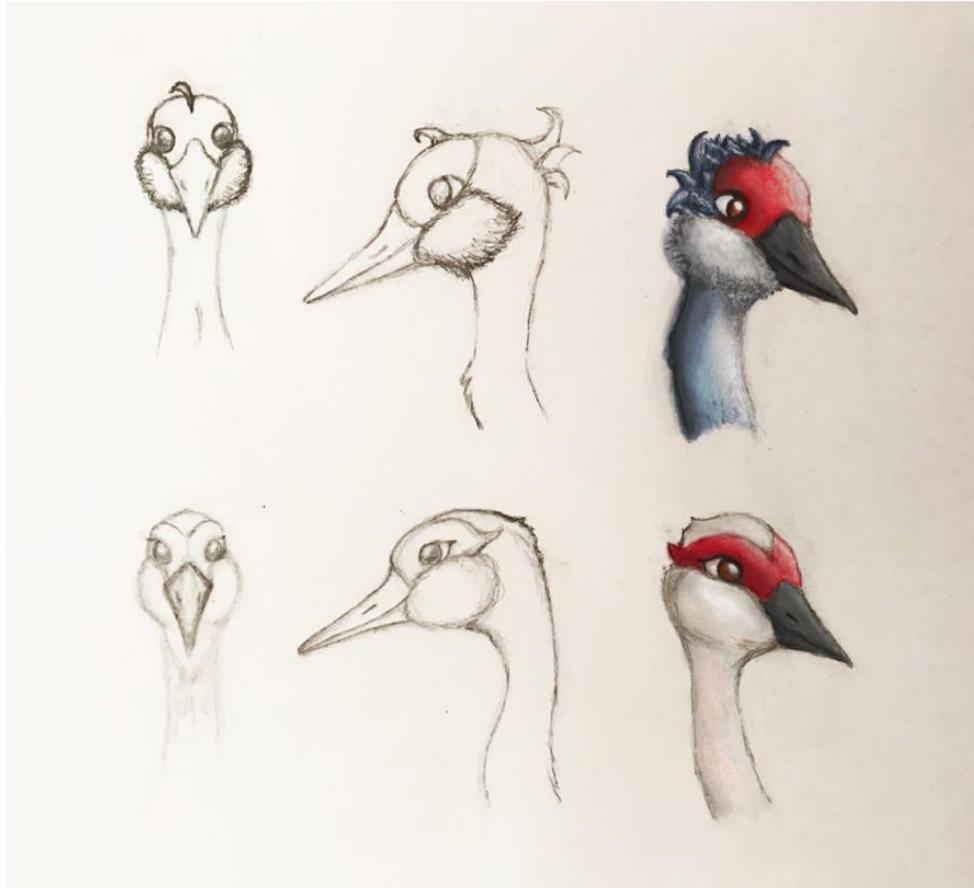


Figure 2: Character design sheet depicting the father crane and mother crane. Source: Kirstin Hardin

I have designed the parent cranes to allow the audience to distinguish between the two adults. In reality, both female and male Florida Sandhill Cranes are indistinguishable in the field (Stys). In *Storm*, I use colour, facial features, and feathers to individualize the parents. The mother crane has a sleek, smooth look to her feathers with fluffy cheeks. The father crane has scruffy feathers on his cheeks and chin to resemble a beard. His overall colouring is cooler than the colours of the mother crane, showing that he has a calming presence over the family. The mother has feathers that consist of warm, rich colours that symbolize her love for her mate and children.



Figure 3: Character studies of the parents for *Storm*. Source: Kirstin Hardin

Certain traits of the parents have been kept in line with real Florida Sandhill Cranes. This subspecies of cranes has an identifying red patch of skin on their head. I designed the mother and father cranes with this red patch to indicate their particular type of subspecies. This red facial marking, along with their body build, and habitat helps the audience to conclude that these are Florida Sandhill Cranes.

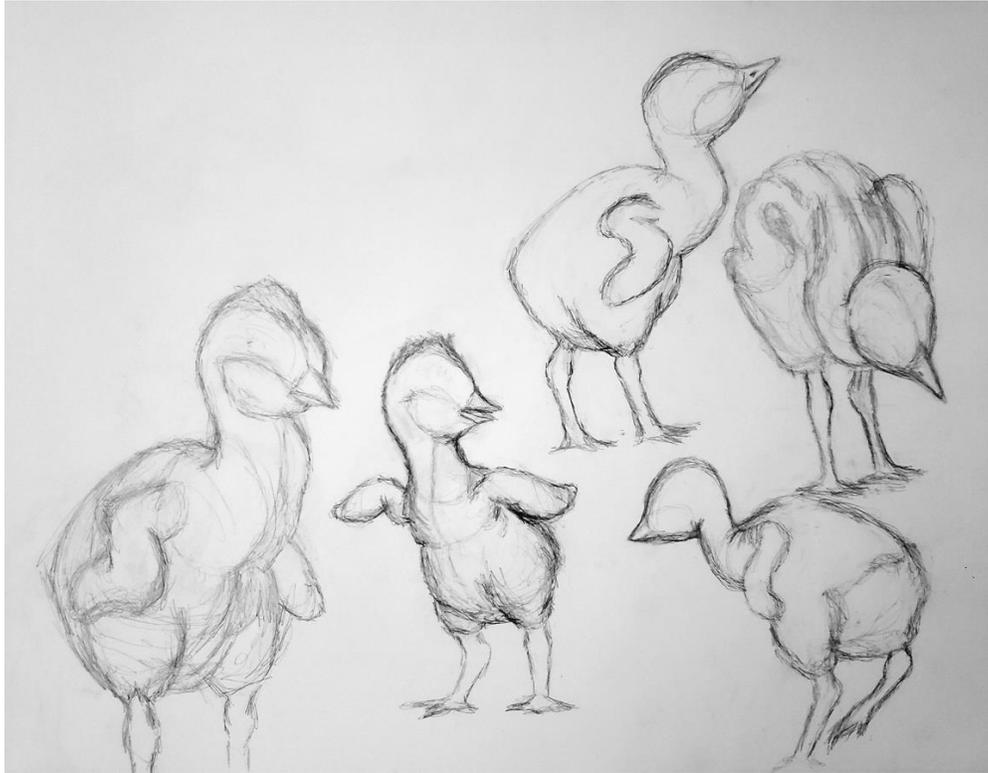


Figure 4: Character studies of the babies for *Storm*. Source: Kirstin Hardin

Similarly, the two baby cranes are individualized in their designs. Early in the developmental phase of the project, the initial concept art of both baby cranes had a slightly older appearance compared to their final design. To add to their overall appeal, I chose to ultimately design the babies with a rounder and fluffier look. In addition, they have bigger heads, their legs are further apart, and they have smaller beaks than in the original concept art. The intent here is to show their vulnerability as newly hatched baby cranes. They are pre-fledglings, meaning they cannot fly, resulting in their complete dependency on their parents for food and protection. As the little cranes are unable to fly away from the storm with their parents, the only option is to take shelter.

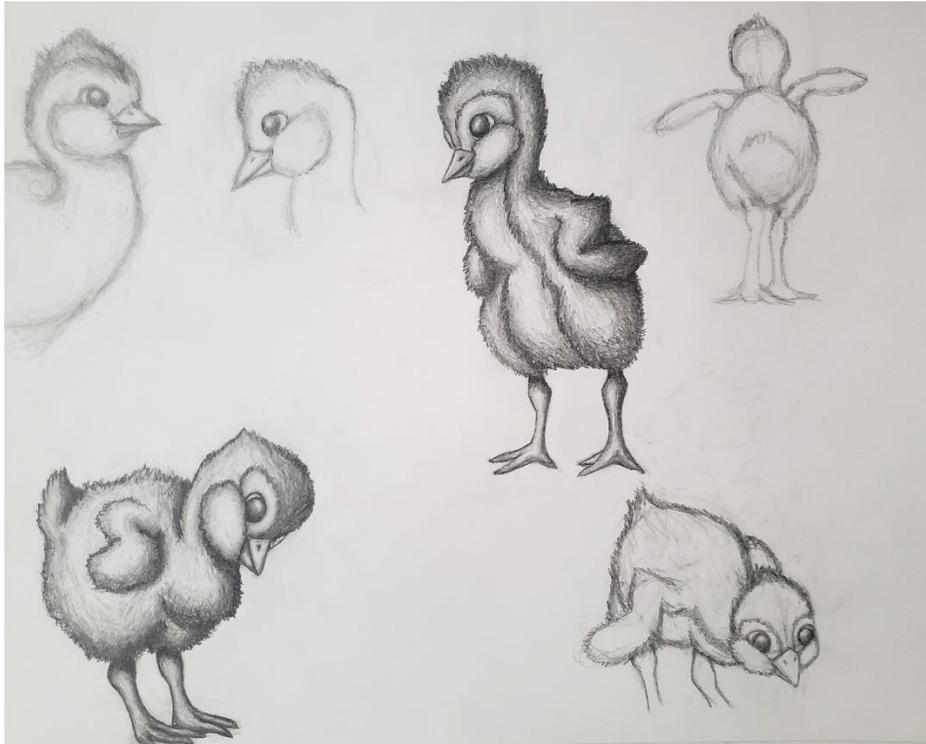


Figure 5: Finalized character designs of the two babies for Storm. Source: Kirstin Hardin

The older baby is slightly darker in colouring than his sibling, representing that he is more mature. He has warmer colouring, reminiscent of their mother. I am using warm colours for his feathers to represent his love for his smaller sibling. The smaller baby, who becomes lost in the story, is fluffier than his brother and golden in colour. His design represents his innocence and purity. This contrasts greatly with the intensity and massive scale of the storm.



Figure 6: Still image from *Storm* showing the final character designs of the babies. Source: Kirstin Hardin

I chose to create a story about animals as it places importance on the everyday lives of non-human creatures. While the cranes in my film are anthropomorphic in their expressions, they still maintain a strong animal-like essence. I did not want to anthropomorphize my characters to the point where they were more humanoid than animal as that would have undermined showcasing a realistic story about a family of Florida Sandhill Cranes. The earliest Florida Sandhill Crane fossil was found in the Macaspahlt Shell Pit in Florida and is estimated to be 2.5 million years old (Cornell Lab of Ornithology). This fact combined with the lack of human presence in my film gives the story a sense of timelessness.

As to my decision to write and animate a story about Florida Sandhill Cranes, I am greatly inspired by their tight-knit family units. Pairs of Florida Sandhill Cranes mate for life,

which can be 20 years or more (Stys). Both male and female cranes build the nest and incubate the eggs (Stys). Their family units are strengthened further by the extended length of time that their colts, the term used for Florida Sandhill Crane chicks, stay with their parents. The colts can remain with the parents for up to 10 months (Stys).

Narrative Influences

Two films that have had an influence on my narrative are Disney's *The Old Mill* (1937) and Disney's *Bambi*. My thesis film features the destructive force of a storm as the main catalyst of the story. Similarly, *The Old Mill* shows the actions of various animals that live within and around an old windmill during a thunderstorm. I find Disney's use of hand drawn effects in this short as inspirational in my own work. The water, the lighting, and the wind are all effectively used in capturing the storm's interaction with the environment. The animals are portrayed in a realistic way, while showing emotions through body language and facial expressions that the audience can understand.



Figure 7: Concept art for *Storm* of the storm that destroys the home of the cranes. Source: Kirstin Hardin

Set Design Influences

My story takes place within the Kissimmee Prairie Preserve. It is a Florida state park near Okeechobee. One of the largest populations of Florida Sandhill Cranes can be found in this area of central Florida (Meine & Archibald). I have placed my story near one of the inland ponds inside of the preserve. Florida Sandhill Cranes often choose inland ponds as nesting sites (Stys).

I aimed to keep the essential natural elements of central Florida in order to best represent an actual habitat for a family of cranes. To maintain the realism, I designed the matte paintings for the backgrounds to feature Spanish moss, oak trees, and cypress domes. The sets immerse the audience directly into the lives of the Florida Sandhill Cranes.



Figure 8: Still image from *Storm* showing the environment of the cranes. Source: Kirstin Hardin

While keeping true to the appearance of the Kissimmee Prairie Preserve state park, I added my painterly style to the set designs. I utilize colour, lighting, and the texture of the paint strokes to evoke the natural landscape of central Florida. My influences for the art style of the environmental designs include Art Nouveau, Disney’s *The Old Mill* (1937), Japanese animated series *Mushishi* (2005), and Disney’s *Bambi* (1942).

The art movement of Art Nouveau influenced my passion for art that depicts nature. It inspired me artistically to focus on subject matter that showcases plants, animals, and other natural elements. I use my own stylization and view of nature to capture its beauty and power within my animation. Interestingly, Art Nouveau was inspired by Japanese wood-block prints that “featured floral forms and a type of naturally flowing line known as the whiplash curve”

(Lasky). This ties into my animation being influenced by traditional Japanese sumi-e ink painting, Japanese manga, and Japanese animation. Alongside this influence, Art Nouveau stemmed from a fascination with nature and “organic aesthetics” (Lasky).

Disney’s *Bambi* (1942) and the Japanese animated series *Mushishi* (2005) were both used for reference in how I wanted to layer foreground elements into my environments. I strive to achieve a similar depth to my background paintings to give the viewer the sense that they are only being shown a small portion of a larger environment.



Figure 9: Still image from *Storm* showing the layered foreground and background elements in an environment for depth. Source: Kirstin Hardin

Disney’s early animated shorts pushed the boundaries of the simplistic ink line backgrounds that were more typical of the time period by adding washes and varying line width for perspective (Barbagallo). Disney went on to create *Snow White and the Seven Dwarfs* (1936)

and *Bambi* (1942). *Bambi*'s backgrounds were based on concept art by Tyrus Wong (Barbagallo). *Bambi* and Wong's work on the film has been influential in my artistic approach to my film. I am building upon this history of presenting nature through paint strokes and colour in my thesis film's representation of Florida's natural environment.

Plot Devices

The beginning of the film shows the family having a slow start to their morning. The cranes stretch and yawn allowing the audience to relate to how it feels to wake up in the morning. I use softs cuts, which are cross fades over several frames, between shots in the opening of the film. The soft cuts help keep the slow pacing in the editing.

The babies enter the water first to splash and play, showing that they are more unaware of their surroundings than their parents. As a symbol, the water represents the fluidity of life. Water is constantly moving, as is the family of cranes on the path of life. They must adapt and change after their physical home is destroyed by the storm. Similar to water, the family maintains strength through their familial bonds.



Figure 10: Still image from *Storm* showing the reflection of the storm clouds. Source: Kirstin Hardin

The reflection of the storm represents an emotional change within the story. Up until the reflection foreshadows the oncoming conflict between the cranes and the storm, the film has a soothing pace for the audience. The reflection of the dark clouds first appears in a close up shot of the two babies playing in the water. To enhance the strength of the storm, I wanted the darkness of the clouds to contrast with the innocent little cranes. The viewer is aware that the dark reflection is moving toward the playing babies, heightening the suspense and tension within this shot.

During the storm sequence, the film has a faster pacing to both the action on camera and to the harder cuts between shots. These cinematic storytelling devices are used to heighten the sense of chaos and panic felt by the audience as the cranes attempt to take shelter from the storm.

Once the storm has passed, the editing returns to a slower pace with a cross fade to show the uneasy silence as the cranes cautiously venture back out.

The camera angles during the storm sequence are more dynamic than in the beginning of the film and after the storm. The terrain of Florida is typically flat, especially the open, grassy habitats preferred by the Florida Sandhill Cranes. In contrast, I chose to stylize the terrain during the storm sequence by setting the camera at various angles. When the cranes are running back to the tree, the camera angle makes the environment feel like a steep slope that they must struggle against. Additionally, the camera is kept close to the ground to further illustrate how small the baby cranes are in comparison to the storm. They are the most terrified during the sequence, therefore, the audience views the storm from the level of the two little ones.

The trees during the storm are depicted without any foliage, making them appear haunting and angular against the dark sky. This better represents how scary their surroundings would feel during the storm to the cranes, particularly the two babies. The warmth and softness of their world is gone during this sequence.

I use a form of stop-motion, paint on glass animation, for the storm to increase the uneasiness of emotion felt by the viewer. Stop motion is considered to be unnerving due to it featuring physical inanimate objects that appear to “come to life” (Kim). It is apparent that this portion of the film was created using a different method from the surreal way the paint moves. The paint feels more tangible and harsher when compared to the soft, colourful beginning of film. This is representative of the little cranes facing the harshness of life for the first time.

The lightning is the pinnacle of the storm’s intensity. It strikes the large oak tree that protects the nest of the cranes, causing it to fall to the ground. Their home is effectively

destroyed by the fallen tree. The lightning burns scars into the bark of the tree as it wraps around its trunk. The burn marks from the lightning symbolize how painful life events can leave scars behind. The marks fade into scars as a physical representation of the cranes being able to rebuild their home after reuniting with their lost baby.



Figure 11: Still image from *Storm* depicting the fallen oak tree. Source: Kirstin Hardin

The oak tree is cracked a third of the way up the trunk by the lightning strike. I chose to have the tree remain attached to the trunk and not completely disconnect as it falls. This is symbolic of the hope and strength of the family remaining unbroken despite their experience with the storm, losing a loved one, and the destruction of their nest.

Colour Palette



Figure 12: Colour palette created for *Storm*. Source: Kirstin Hardin

Colour is central to my narrative. The beginning of the film features a sunrise with warm oranges, pinks, and yellows as the main colour palette to portray the sense of love the family has for each other. In contrast, the storm consists of cooler, deeper colours for intensity. The purple and blue clouds roll onto screen, disturbing the warm light of the morning sun. After the storm, the colours are still cool, and more muted than the opening of the film. Some warmer colours begin to return the palette as the family looks for their lost baby, representing that they have not lost hope of finding him. The end of the film is golden and warm now that the family has been reunited.



Figure 13: Still image from *Storm* of the warm, golden colour palette in the final shot of the film, representing the joyful reunion of the family. Source: Kirstin Hardin

Music & Sound

Both diegetic and non-diegetic sound play an important part in the telling of my story. The soundtrack of my film is orchestral in style, featuring traditional Japanese flutes, taiko drums, and other classical instruments. I want the music to reflect the emotions and actions on screen. The music is slower paced in the beginning of the film to match the sleepiness of the babies. As the storm approaches the music becomes more ominous and percussive to build anticipation of the oncoming natural force. After the storm, the slower pace comes back as the cranes cautiously come out from their shelter to look for their missing little one. The ending features music that echoes the happy emotions the cranes feel when they are reunited.

PROCESS AND METHODOLOGY

Animating in Digital and Traditional Mediums

My method of animation is a combination of digital 2D animation within TV Paint for the non-storm sequences and traditional paint on glass animation for the storm. My process for animation begins with completing rough animation in TV Paint. Rough animation is completed this way for both the paint on glass animation and the digital 2D sequences. I completed final colour and painting in TV Paint for the non-storm sequences located at the beginning and ending of the film. Rather than using the more traditional animation technique of clean-up line work, I chose to go lineless in my final look, allowing for the brushstrokes to be further highlighted.

Completing all of the rough animation in TV Paint aided my workflow in that I could address any shot-to-shot issues in movement across the screen before branching off into the two types of final animation. A technical issue arose out of discovering an efficient and effective process in using the rough animation completed in TV Paint for creating the paint on glass animation.

For the digital 2D animation in TV Paint, I create a layer to paint on underneath the layer with the rough animation. This method worked well for the shots that did not involve paint on glass animation. By having the rough animation lines as a guide while painting digitally, it allowed for me to speed up the time spent on each of these shots. Once I finish painting the shot, I hide the rough animation on a layer to render the lineless final look for my film. With this in mind, I strived to recreate a similar workflow for completing the paint on glass animated shots.

Thus, in addition to the building of the paint on glass rig for my film, I had to plan a method of animating with paint that worked for my thesis goals. In order to efficiently use my production time, I wanted to maintain a similar process of using the rough animation from TV Paint as a guide for the paint on glass animation. I initially developed three potential options for utilizing the digital rough animation that I created in TV Paint. Each of the three options featured layering the rough animation either above or below the paint on glass animation.

The first of these methods would require a nearby screen and a computer with the stop-motion capturing software, Dragonframe, to help line up the paint to a guide layer with the rough animation. As Dragonframe was already a central part of my paint on glass animation workflow to reduce shifting and flickering between frames, it would be available to use in additional ways.

Both Alexander Petrov and Miyo Sato utilize a similar method to this first option. Alexander Petrov uses video reference for his paint on glass animation on a nearby screen while he paints each frame of animation (“Alexandre”). Miyo Sato makes use of Dragonframe on a computer near her animation stand to help line up her paint on glass animation to the reference (Luster). Sato maintains that she would “check the paintings against the video” as it was played in Dragonframe (Luster). I use Dragonframe as part of my paint on glass animation process to ensure alignment between frames.

The second option involved placing a Cintiq or a tablet under the layers of glass in the rig to show the rough animation as a guide in painting each frame. Additionally, the Cintiq or tablet could then be switched to displaying a blank white screen to work in place of a light table to backlight the finished frame of paint. The dual-purpose screen under the animation rig, in concept, appeared extremely useful. A major drawback became apparent after critically thinking

about this setup. The issue is that once the paint is added onto the glass layers, the rough animation being shown on the screen below can no longer be easily seen.

The third method for layering the rough animation into the paint on glass rig would involve using a projector. The projector would be mounted above the rig to downwards project the rough animation onto the glass for guiding the paint animation. By projecting the rough animation on top of the glass, the lines would remain visible to guide the traditional animation as paint is added. A lens cap would be placed over the projector to capture each frame of paint on glass animation with the digital camera connected to Dragonframe.

Through tests, and research, I created a paint on glass animation pipeline to finish the six traditionally animated shots in my film that remained similar to my digital animation process. My goal was to discover the most effective method for incorporating the rough animation that I created in TV Paint as a guide for the paint on glass animation. As a solution to this technical issue, I chose to use the guide layer tool in Dragonframe to layer my rough animation over the live feed from the camera of my paint on glass frames. This prevented errors in the animation lining up between shots, as well as, creating a more efficient workflow.

Building My Paint on Glass Rig

For the traditional paint on glass storm sequences, I used a glass camera rig in order to animate the paint on two layers while simultaneously creating depth, using a camera positioned directly above the rig. The stop-motion photo capturing program, Dragonframe, was used to capture each frame of painted animation to help minimize flickering and unwanted camera movement. The slow-drying paint is manipulated for each frame of paint on glass animation and

then captured using a Logitech 920s digital webcam. The planning and building of this rig for animating the paint on glass shots became a major technical issue in the production of my film.

Five of the twenty-two total shots in my film use paint on glass animation. The rig is used in creating these five shots. Three of the five are transitional shots between the two types of animation. The transition shots are shots 8, 10, and 12_OOP_001, which required compositing of the paint on glass animation on top of the digital 2D animation in Adobe After Effects.

Shots 10, 11, and 12 needed a more complex set up as they required two layers of glass for animation. The additional glass layer allows for full control in animating the background paintings, effects, and characters. Multiple glass layers correspondingly create depth within the paint on glass animated shots.

The technical issue was in the planning and building of a paint on glass rig that satisfied certain requirements for my production. It needed to have two layers of glass for animating on. The rig had to be completely stable to prevent shifting between frames. Paint on glass animation is shot with a downshooting camera, which meant that a sturdy camera mount was necessary to take digital pictures of the frames. Lastly, the paint on glass rig had to have room underneath the layers of glass for a light table to backlight the animation.

Knowing the requirements that I needed in the creation of my paint on glass rig, I looked to rigs used by the two animators having the greatest impact upon my thesis work for further inspiration: Aleksandr Petrov and Miyo Sato. Both of these artists, as previously mentioned, are current paint on glass animators. It was greatly beneficial to look at their paint on glass set ups as each one is tailored to the individual needs of the animator. This is in part due to how an

animator cannot purchase a factory-made paint on glass animation stand. Therefore, a crucial part of the process is to plan and create the animation rig.

Aleksandr Petrov has inspired my use of multiple layers of glass for the paint on glass animation. In *The Old Man and the Sea*, Petrov used an intricate multi-plane glass animation rig. He experimented in this film with completing his paint on glass animation on a larger scale than he would normally work with to accommodate the IMAX format. Petrov's usual size for his paint on glass animation is a field of nine by twelve inches (Carty). His animation stand was created so that he could animate each shot on multiple layers of glass in order to have more control over each level of the shot such as, backgrounds and characters.

In the creation of my paint on glass animation stand, I have researched and experimented with varying sizes of glass fields. Larger pieces of glass provide more room for painting each shot, while smaller fields of glass are less fragile and easier to move around while animating. I chose a medium size for the glass that would allow for enough room to comfortably animate, while still providing a sturdier surface to paint on. Similarly, to the stand that Aleksandr Petrov worked with for animating *The Old Man and the Sea*, I used multiple layers of glass (Carty).



Figure 14: An early paint on glass test for *Storm* completed before constructing the final animation rig. Source: Kirstin Hardin

Miyo Sato uses a more simplistic paint on glass set up for *Mob Psycho 100* than Petrov did for *The Old Man and the Sea*. Sato's animation rig includes a downshooting camera, a single plane of glass on top of a LED light table, and a nearby computer with Dragonframe (Luster). Her setup is much easier to replicate than one that would have multiple layers of glass for animation. It is made up of only the essential elements required for paint on glass animation. For *Mob Psycho 100*, having a single layer of glass worked in depicting the spirits and dream-like sequences.

For my thesis work, I sought to find a balance between the rigs used by Petrov and Sato. My rig is not as complex as Petrov's IMAX-capable paint on glass stand. It does, however,

feature multiple layers of glass. The paint on glass set up used by Miyo Sato has similarly played a part in my choices. I utilized several basic elements found in Sato's rig. These elements include a LED light table, a down shooting camera, and Dragonframe. The main change that I needed to make to her set up for my thesis film, was a way to animate on multiple levels. I did not want to animate the background, the effects, and the characters on a single layer of glass. This decision was made to allow for more efficient animating.

After careful planning, based on my animation needs and research, I created a rig for the paint on glass animated portion by using a table with two layers of glass. The stop-motion photo capturing program, Dragonframe, was utilized to capture each frame of painted animation to help minimize flickering and unwanted camera movement. The down shooting camera is held in place above the rig by a sturdy 42-inch Smith-Victor copy stand. On top of the copy stand and under the layers of glass, I placed an LED light table to backlight the paint on glass animation.

Paint on Glass Animation Process

The paint on glass animation setup fulfilled my personal requirements to produce my thesis film *Storm*. As my film uses both 2D digital animation and paint on glass animation, certain elements had to be incorporated into the rig. I planned and built the animation rig to allow for animation on a single layer to be composited on top of the digital 2D animation or for animation on both layers of glass for full control over a completely paint on glass shot.

Paint on glass animation has a uniqueness to the how the animator crafts each frame. I found that it should not be approached with the same methods used in painting on more typical surfaces, such as canvas. Paint on glass is a wet medium on a smooth surface without

absorbency or “tooth” for the paint to bind onto, unlike painting on canvas or paper. The smoothness of the glass aids the manipulation and movement of the paint between frames.

The method of animating above a backlight is distinctive from other painting processes in that the thicker the paint, the darker it will appear. Paint colours were correspondingly always mixed above the light table to have a better idea of how it would appear on camera. Animating with backlit paint on glass animation is painting to the light source. When I would turn the backlight off and turn the overhead light on, the painting on the glass looked completely different than how it looks in my film. I chose to backlight my paint on glass animation as I felt the richness of the colours and the texture of the brushstrokes came to life better with the light illuminating the paint from behind.

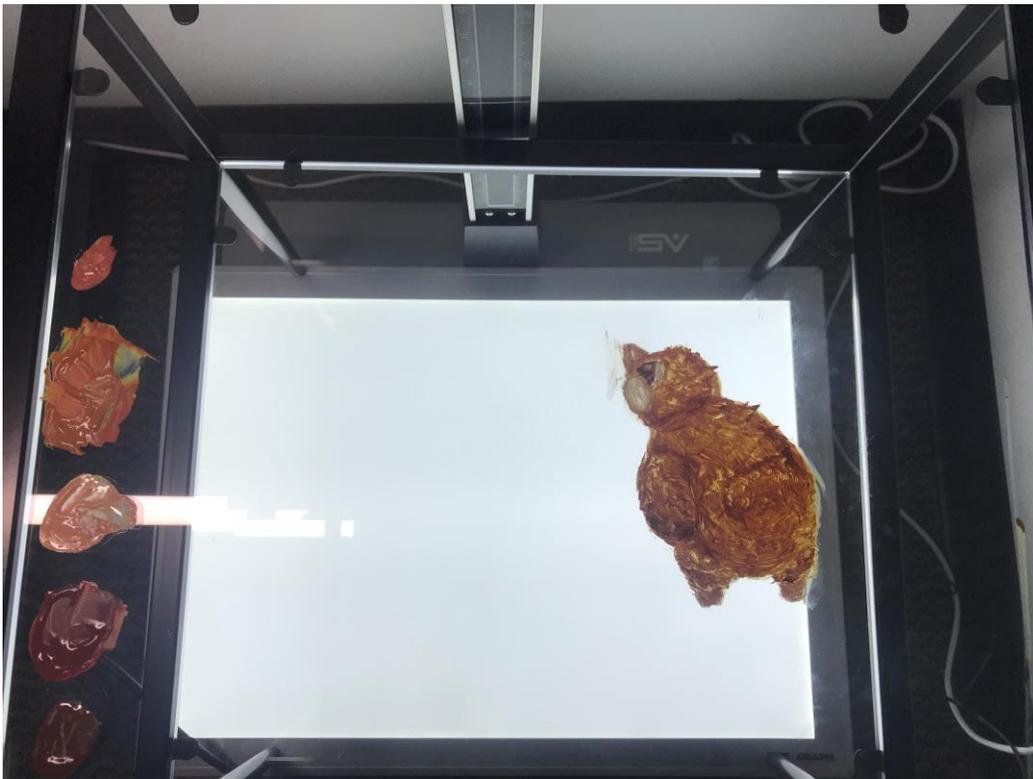


Figure 15: A work in progress picture of the paint on glass animation for shot 010. Source: Kirstin Hardin

I painted each frame of paint on glass animation using gouache paint mixed with glycerin. While oil paint is often used in paint on glass animation, I chose to use gouache paint as it is less harsh to work with in an enclosed space. The gouache paint is mixed with glycerin to lengthen the drying time. Too much glycerin in the paint resulted in bubbles, and too wet of a mixture to obtain the texture that I wanted in my shots. I found using a drop of glycerin in each of my paint colours for a shot was adequate in preventing the paint from drying out while I animated. My tools for paint on glass animation included brushes of varying sizes, a small sponge, a palette knife, and cotton swabs.

On a computer screen next to my paint on glass rig, I kept the Logitech Capture program open to switch the focus of the Logitech 920s webcam from auto focus to manual focus. Additionally, Dragonframe remained open to compare my rough animation to the live feed from the webcam. I lowered the opacity of the layer showing my rough animation in Dragonframe in order to follow the animation as I painted. After capturing a finished painted frame with the Dragonframe remote, I would use paint brushes to add more paint if needed for the next frame and to manipulate the paint that had been put down for the previous frame. Cotton swabs were used to clean away any paint that was outside the lines of animation for subsequent frames.

Compositing Paint on Glass Animation

One of the major technical issues that had to be solved in my work was discovering a method to effectively composite the paint on glass animation on top of the digital 2D animation for shots that contain both types of animation. There are three shots in my film that required

compositing of the paint on glass animation and digital 2D animation. The storm is represented by the paint on glass animation. This contrasts with the 2D digital animation that comprises the rest of the film. TV Paint is used to create the hand drawn 2D animation. The storm is painted onto planes of glass using slow-drying paint for a form of stop-motion animation. The technical issue lies within the three shots that are used as transitions between the two types of animation.

Shot 08 is the first time the paint on glass animation is shown on screen. The majority of the animation in this shot, including the background, is digitally 2D painted and animated except for the reflection of the storm clouds moving toward the two baby cranes from the bottom of the left side of the shot. The animated reflection of the dark storm clouds is the paint on glass portion that will need to be composited on top of the rest of the shot.

The second shot that required compositing of paint on glass animation and digital 2D animation is Shot 12_OOP_001. Shot 12_OOP_001 is the transition shot back from paint on glass animation to digital animation as the storm fades away revealing the aftermath of its destruction. This shot could have faded from one type of animation to the other using a crossfade created in Adobe Premiere or Adobe After Effects to represent the passing of time. This would have been a much faster solution to the transition that occurs in this shot. In striving to push the unique potential of combining traditional and digital animations, I viewed the transition from the storm as another opportunity to highlight the use of both kinds of animation within one shot as opposed to using a digitally created crossfade.

A key influence upon my work of compositing traditional animation on top of digital animation has been the aforementioned Japanese animated series entitled *Mob Psycho 100* (2016). The paint on glass animation is composited on top of the digital 2D animation in order

to depict spirits. I have been inspired by the show's use of both types of animation within a shot to create contrast between the spirits and the rest of the animation. The process that was used for compositing in *Mob Psycho 100* is not publicly known, therefore, I endeavored to find my own answer to this technical issue of combining paint on glass animation with digital 2D animation (2016).

Brazilian animated film entitled *Tito and the Birds* is another example of compositing paint on glass animation on top of digital animation (Hogg). *Tito and the Birds* deals with the concept of fear and how it might control a society (2018). The film is a fascinating blend of digital animation and the stylized brushstrokes found in Expressionism (Hogg). Gabriel Bitar, co-art director on the film, argues that the reason for the mixed media approach to the animation was to depict the film's subject of fear more accurately; when "the fear is more present, the imagery becomes crazier and distorted" (Hogg). This is similar to the use of paint on glass animation in my thesis film to capture the intensity of the storm in contrast to the digital animation of the non-storm sequences.

Bitar notes that he "used Photoshop, After Effects, Dragonframe, which is a stop-motion software, and painted real oil paint on glass over green screen" (Hogg). The paint on glass animation in *Tito and the Birds* is used for some smoke effects in certain shots (2018). The animators for *Tito and the Birds* created an animated digital effect layer of the smoke in Toon Boom to be used in Dragonframe as reference to create the paint on glass animation (Hogg). For *Tito and the Birds*, using a green screen works well as they front-lit their paint on glass animation and limited the colour of the smoke to a single colour (Hogg).

Initially, I explored the possibility of animating the paint on glass used for the transition shots on a plane of glass that would be captured with a sheet of green screen paper layered behind it. This green screen layer would be chroma-keyed out in Adobe After Effects for the paint on glass animation to be layered on top of the digital animation. Several technical problems can be identified with this method. Paint on glass animation is not solid. A certain level of transparency occurs with the paint that is used in this type of animation. This would result in problems in filtering out the green screen layer. Another problem with this method arose from the way that paint on glass animation is backlit. A light table is positioned below the painted layers of glass to fully illuminate the colours of paint. This would not be possible with a green screen layer positioned behind the animated glass layers.

My solution to this technical issue was to use an animated mask in Adobe After Effects. The process begins with layering the captured paint on glass animation on top of the 2D digital animation in Adobe After Effects. Next, I created an animated mask on the paint on glass animation layer that will only show the painted animation portion of each captured image. The animation for the paint on glass is completed using 4s, which aided in the time required to animate the mask on a frame-to-frame basis. The mask in Adobe After Effects allows for a slight softening of the edges to prevent harsh lines when compositing the two types of animation.

The second technique I incorporated into my compositing process is the use of a luma key. A luma key allowed for only the painted portions of the frame to show on top of the digital animation by removing, or keying out, the solid white backlight section of the image. In addition to using luma keying for compositing the two types of animation, it proved useful in adding digital effects to full paint on glass animated shots.



Figure 16: Still image from the rough animation of Shot 012 from my thesis film *Storm*. Rough animation for Shot 012 by Danny McCabe. Source: Kirstin Hardin

The luma matte was created by exporting a black and white version of the digital rough animation from Toon Boom. The motivation for this technique is to create digital effects for a traditionally animated shot without losing depth. For this specific shot in my film, shot 012, it required adding rain digitally behind and in front of a foreground tree as it falls. The animated background of the storm clouds moving is painted on a layer of glass below the layer with the tree. I chose not to add rain in the paint on glass animation for workflow and efficiency purposes.



Figure 17: Still image of the paint on glass animation for Shot 012 from my thesis film *Storm*. Source: Kirstin Hardin

In order to maintain the depth of the paint on glass animation for Shot 012 while adding digitally created effects, a matte needed to be incorporated to separate the foreground element of the tree from the background. By having followed the rough animation as I painted, it additionally made it possible to use the rough animation as a matte for the paint on glass animation. This was accomplished by rendering the rough animation in solid black and white from Toon Boom.



Figure 18: Still image showing the solid black and white render of the rough animation for Shot 012 of my thesis film *Storm*. Rough animation for Shot 012 by Danny McCabe. Source: Kirstin Hardin

The background of the rough animation is rendered as solid black, while the foreground tree is solid white. The solid black and white version of the shot is layered above a duplicate copy of the paint on glass animation in Adobe After Effects. The matte layer is linked to the duplicate copy as a luma matte through the TrkMat dropdown menu. This makes only the tree portion of the paint on glass animation visible for the duplicate copy.

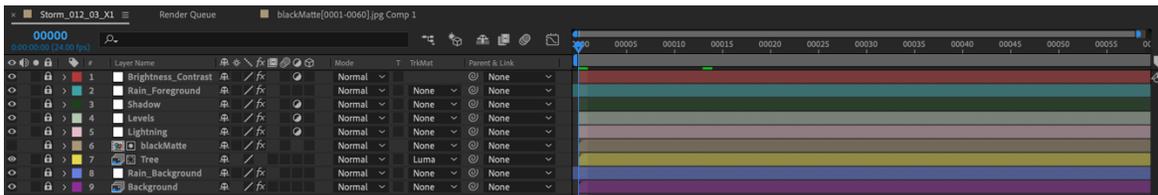


Figure 19: Layers in Adobe After Effects depicting the luma matte layer above the linked Tree layer. Source: Kirstin Hardin

The first copy of the paint on glass animation is layered below both of these layers. This is done in order for effects to be applied to the background separately from the tree. To create more depth between the sky and the tree, the background is darkened and blurred. In between the background layer and the tree layer, is an adjustment layer with a particle emitter to create a rain effect behind the tree.



Figure 20: Still Image of the background effects applied to Shot 012 from my thesis film *Storm*. Source: Kirstin Hardin

Using the luma matte on the duplicated paint on glass animation, the tree is layered on top of the background painting and effects without being blurred and darkened. An adjustment layer with a particle emitter is placed above the tree and the matte layers to simulate rain in the foreground. The particles are blurrier and larger than the ones in the particle emitter behind the tree layer to create depth.



Figure 21: Still Image of the final look for Shot 012 from my thesis film *Storm*. Source: Kirstin Hardin

The luma matte worked effectively in achieving a layered environment for Shot 012 from my thesis film *Storm*. As the rough animation was followed closely during the paint on glass animation process, the matte created from the roughs lined up well with the final animation. The close alignment between the two allowed for the luma matte to separate the background from the foreground in Adobe After Effects. Without the matte, all of the effects would have been applied on top of the entire shot, flattening the imagery.

My thesis work has explored the use of combining digital animation with traditional paint on glass animation as a way to emphasize specific story elements. By completing the rough animation digitally for the paint on glass portion of my film, it opened up the possibility of using roughs as mattes. This technique helps increase the efficiency of the traditional animation as it allows for laborious effects, such as rain, to be added digitally as opposed to hand painted on

multiple layers of glass. For future projects that involve traditional and digital animation processes, I will incorporate a similar technique of using digital roughs to produce mattes.

CONCLUSION

My thesis film, *Storm*, challenges the concept of home. Home is your loved ones who have always been with you, not the physical place. Due to the content of my animated film, the genre is Family. I want audiences of all ages to be able to relate to the story on multiple levels. My intent for *Storm* is to showcase how traditional and digital methods of animation can be utilized together to highlight specific elements within an animated story.

Building upon my intent for combining the two types of animation, I chose to animate using a painterly style of animation, which is befitting of a story featuring a natural environment and birds for the main characters. The medium or mediums chosen for an animated film are crucial in conveying an artistic vision. Traditional 2D animation methods are still relevant in the animation and visual effects industry to bring emphasis or stylistic contrast to a project when used in unison with digital animation. My thesis film, *Storm*, focuses on the combination of digital 2D animation and traditional paint on glass animation.

LIST OF REFERENCES

- “Alexandre Petrov’s - The Making Of ‘The Old Man & the Sea’ – Excerpt”. Pascal Blais Studio, 16 Sep. 2011. *Vimeo*, <https://vimeo.com/29157506>.
- Bambi*. Directed by David Hand, Walt Disney Pictures, 21 Aug. 1942.
- Barbagallo, Ron. “All in a Blade of Grass.” *Animation*, vol. 17, no. 11, Dec. 2003, pp. 18–20.
- Carty, Alyson. “The Old Man and The Sea: Hands Above The Rest?” *Animation World Network*, <https://www.awn.com/animationworld/old-man-and-sea-hands-above-rest>. Accessed 25 Feb. 2020.
- Cornell Lab of Ornithology. 2019. All About Birds. Cornell Lab of Ornithology, Ithaca, New York. https://www.allaboutbirds.org/guide/Sandhill_Crane/overview Accessed on 6 June 2021.
- Curtis, Scott, Susan Ohmer, Kevin Sandler, Alla Gadassik, Andrew Johnston. *Animation*. Rutgers University Press, 2019.
- “Eviction And Health: A Vicious Cycle Exacerbated By A Pandemic, ” Health Affairs Health Policy Brief, April 1, 2021. DOI: 10.1377/hpb20210315.747908
- Feeling from Mountain and Water*. Directed by Te Wei, Shanghai Animation Film Studio, 1988.
- Fox Fears*. Directed by Miyo Sato, Tokyo University of the Arts, 2015.
- “Ghibli Artist, Kazuo Oga, Painting Process.” *IAMAG*, <https://www.iamag.co/ghibli-artist-kazuo-oga-painting-process/>.
- Gossin, Pamela. "Animated Nature: Aesthetics, Ethics, and Empathy in Miyazaki Hayao’s Ecophilosophy." *Mechademia*, vol. 10, 2015, pp. 209-234. Project MUSE, muse.jhu.edu/article/664567.

- Haggart, Samantha. "Nature and Technological Innovation in the Films of Iurii Norshtein." 5 November 2015. *Animation Studies*. 10 January 2020.
- Hogg, Trevor. "Mixed Media Brings Out the Socio-Political Message in TITO AND THE BIRDS." 18 December 2018. VFX Voice – the magazine of the Visual Effects Society. 17 September 2020.
- Kim, Matt. "Stop-Motion Is Creepy Because It's Essentially Zombification: Stop-motion began by bringing the dead back to life." 22 August 2016. *Inverse*. 16 June 2021.
- Lasky, Jack. "Art Nouveau." Salem Press Encyclopedia, 2018.
- Luster, Joseph. "FEATURE: The Story Behind the "Mob Psycho 100" Ending Sequence: Miyo Sato and Paint-On-Glass Animation." 4 September 2016. *Crunchyroll*. 27 January 2020.
- Meine, C.D. and G.W. Archibald. *The Cranes: Status Survey and Conservation Action Plan*. ICUN, 1996.
- Mob Psycho 100*. Bones. Tokyo, Japan. 12 Jul. 2016. Television.
- Mushishi*. Artland. Japan. 23 Oct. 2005. Television.
- Nesbitt, S.A., and J.L. Hatchitt. Trends in habitat and population of Florida sandhill cranes. In: Folk, MJ and SA Nesbitt, eds. 2008. Proceedings of the Tenth North American Crane Workshop, Feb. 7-10, 2006, Zacatecas City, Zacatecas, Mexico: North American Crane Working Group. pp. 40-41.
- Odell, Colin and Michelle Le Blanc. *Studio Ghibli: The Films of Hayao Miyazaki and Isao Takahata*. Oldcastle Books, 2009. Print.
- Parks, Corrie Francis. *Fluid Frames: Experimental Animation with Sand, Clay, Paint, and Pixels*. CRC Press Taylor & Francis Group, 2016.

Santich, Kate. "Could these tiny shelters fix Central Florida's looming wave of homelessness?"

19 June 2021. *Orlando Sentinel*. 21 June 2021.

Snow White and the Seven Dwarfs. Directed by David Hand, Walt Disney Pictures, 21 Dec.

1937.

Solomon, Charles. "How Eyvind Earle's Stunning Art Made Sleeping Beauty a 'Moving

Illustration.'" D23, <https://d23.com/sleeping-beauty-stunning-art/>. Accessed 25 Feb.

2020.

"Storm". Kirstin Hardin, 2 Dec. 2021. *Vimeo*, <https://vimeo.com/652570180>.

Stys, Beth. "Ecology of the Florida sandhill crane." *Nongame technical report - Florida Game*

and Fresh Water Fish Commission, 1997, <https://ufdc.ufl.edu/UF00000132/00001/2>.

Accessed 22 Apr. 2020.

Tadpoles Searching for Mother. Directed by Te Wei, Shanghai Animation Film Studio, 1960.

The Lion King. Directed by Roger Allers and Rob Minkoff, Walt Disney Pictures, 15 Jun. 1994.

The Old Man and the Sea. Directed by Aleksandr Petrov, 3 Jul. 1999.

The Old Mill. Directed by Wilfred Jackson, Walt Disney, 5 Nov. 1937.

The Rescuers Down Under. Directed by Hendel Butoy and Mike Gabriel, Walt Disney Pictures,

16 Nov. 1990.

Tito and the Birds. Directed by Gabriel Bitar, André Catoto, Gustavo Steinberg. 2018.

Tyrus. Directed by Pamela Tom, 2015.

Wilson, Gary. "The Glass Canvas: Approaching Digital Direct Under Camera Animation." 28

May 2019. *Animation Studies*. 15 January 2020.