

The Handiwork Behind “Olaf’s Frozen Adventure”

Josh Staub

Walt Disney Animation Studios

Alessandro Jacomini

Walt Disney Animation Studios

Dan Lund

Walt Disney Animation Studios



Fig 1: Knitted scarf animated sequence

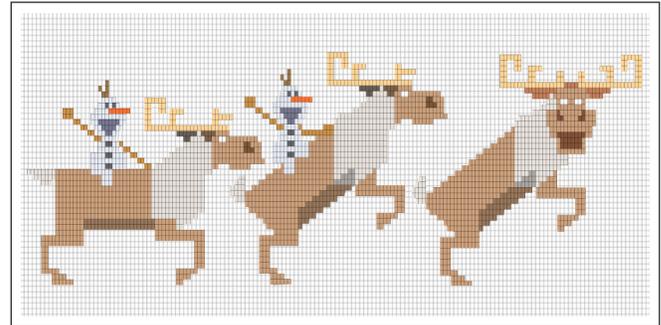


Fig 2: Each pose painted separately on a grid

ABSTRACT

This talk presents a behind-the-scenes look into some of the visual and technical challenges creating the roughly 22-minute featurette “Olaf’s Frozen Adventure,” and specifically how we often incorporate 2D animation techniques into our process. Though it may not be easily apparent on screen, 2D animation is still an important part of our legacy. We often utilize 2D techniques to solve unique visual production challenges, as well as during the design phase to provide clarity to art direction leadership for approvals, which in turn provides artistic direction to artists.

CCS CONCEPTS

• Applied computing → Arts and humanities → Media arts

KEYWORDS

Design, Animation, Short Film

ACM Reference format:

Josh Staub, Alessandro Jacomini, and Dan Lund. 2018. The Handiwork behind “Olaf’s Frozen Adventure.” In *Proceedings of SIGGRAPH ’18 Talks, Vancouver BC, Canada*, 2 pages. <https://doi.org/10.1145/3214745.3214817>

1 INTRODUCTION

From its inception, the goal for “Olaf’s Frozen Adventure” was clear: create a stunningly beautiful and ambitious television special which meets or exceeds the quality and innovation present in Frozen [DelVecho2013] and our other recent feature films. Of the show’s many challenges, the project required the creation of a 600 frame sequence of animation in which characters and vignettes animate as part of a wool scarf being knit in real time, and the development of new techniques to show how Elsa’s magical mastery over ice and snow has evolved since

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

Copyright is held by the owner/author(s).

SIGGRAPH ’18 Talks, August 12–16, 2018, Vancouver, BC, Canada

ACM 978-1-4503-5820-0/18/08.

<https://doi.org/10.1145/3214745.3214817>

the original Frozen film. To achieve these goals we leveraged 2D design techniques to inform our 3D approaches in ways both new and familiar to our studio.

2 KNITTING AN ANIMATED SEQUENCE

Perhaps the most unique technical and visual challenge in “Olaf’s Frozen Adventure” is the scarf animation sequence. For 25 seconds the entire screen is covered by a Christmas scarf (Figure 1), complete with stray threads and imperfections. The sequence is accompanied by a musical score, which meant careful collaboration between story, music, and animation to achieve the proper timing. All of the patterns and characters woven into the fabric are dynamic, i.e. a knit Olaf jumps across vignettes while singing in sync with the music. In order to create the over 600 frames of animation, every character pose and background was painted on a predefined grid pattern in Photoshop (Figure 2), each square of the grid corresponding to an individual thread of the knit scarf.



Fig 3: The assembled animated elements as seen in Nuke

These painted assets were then assembled and animated frame-by-frame via image swapping in Nuke (Figure 3), mimicking an almost stop-motion animation technique. These animated vignettes were then exported to a texture map as an image sequence, and finally applied to the scarf model.

3 DESIGNING ELSA'S MAGIC UTILIZING 2D

In the original *Frozen* film, Elsa begins the process of learning how to control her power over ice and snow, but in “*Olaf's Frozen Adventure*” we wanted to show the audience that her magical abilities have evolved since then. Because of this, the Effects team on the featurette developed ways to enhance their techniques used in the original film while staying faithful to her creative visual style.

This exploration required the team to present several ideas, so to quickly iterate on Elsa's magical effects during the design phase, we utilized more traditional 2D animation techniques for proof-of-concepts which then served as the target for the final CG versions seen in the film. The most dramatic example of this is during the climax when Elsa creates an ice sculpture tree which emerges from the surface of an ice pond. The animation of the construction of the tree was intentionally designed to resemble the growth of Elsa's stunning Ice Castle from the original film. The sculpture grows as each ice shard expands into the shape of a snowflake (Figure 4), the final sculpture forming a tree due to the series of stacked snowflake-shaped sheets of ice (Figure 5).



Fig 4: The ice tree sculpture forming



Fig 5: The completed ice tree sculpture created by Elsa's magic



Fig 6: Elsa adorning the tree with lanterns by creating an ice garland

Following the creation of the tree itself, Elsa magically adorns the tree with several lit lanterns via a garland of magical ice dust (Figure 6). Like the scarf sequence, the ice tree climax is accompanied by a musical score and therefore required dynamic and carefully choreographed camera movement, particle effects simulation, and lighting, to be visually and lyrically in sync with the music. This meant dozens of iterations by the Layout, Effects, and Lighting teams to achieve the proper pacing and optimal visual impact, so for many iterations we utilized 2D animation techniques to provide proof-of-concepts which could then be art directed and ultimately approved by the art direction leadership and green-lit for production. These rough 2D explorations can be done quickly by a single experienced 2D Effects Animator in two or three days, instead of a week or more using traditional CG Effects and Lighting methods. More importantly, while loose, the result actually provides a more accurate indication of how the performance of the final effects will appear in the film.

CONCLUSION

2D animation techniques have been a core part of the legacy of Walt Disney Animation Studios since the beginning, and we continue to utilize them. In “*Olaf's Frozen Adventure*,” this is evident in the case of exploring Elsa's magical mastery of snow and ice to provide efficiency when iterating on design, as well as for practical development of unique visual styles like the knit scarf animated sequence. It is a part of our heritage that continues to shape and impact our pipeline and process, even when not apparent to the audience on screen.

REFERENCES

- Del Vecho, Peter (Producer), Buck, Chris and Lee, Jennifer (Directors). (2013). *Frozen* [Motion Picture]. United States: Walt Disney Animation Studios.
- Conli, Roy (Producer), Deters, Kevin and Wermers-Skelton, Stevie (Directors). (2017). *Olaf's Frozen Adventure* [Motion Picture]. United States: Walt Disney Animation Studios.