

Karen Zipor

Miller Arts Scholars

Fourth Year Award Outcome

March 17, 2022

Researching New Ways to Integrate Technology into Theater

Project Outcome:

I'd like to thank the Miller Arts Scholars, as, without their funding, I would not have been able to dive further into the world of filmmaking, animation, and motion capture. My journey as a filmmaker started during my Third Year Award, and I've only continued to grow with each new opportunity from the Miller Arts Scholars. I'd also like to thank my faculty mentor, Mona Kasra, the Drama Department's Associate Professor of Digital Media Design. Her mentorship on many of my projects over the years, from a 360-degree short film to motion capture performance, especially pushed me out of my comfort zone. She always encouraged me to experiment with different innovative mediums for film and theater.

This past year, I heavily researched interactive technology in performance. As a double major in Drama and Computer Science, this research also applied to my Computer Science Distinguished Major thesis. My goal was to evaluate the current state of this art, its shortcomings, and how it could be improved. Over the summer, I attended [SIGGRAPH 2021](#) virtually. This is a conference where researchers, developers, and artists in computer graphics share their work with the public. I saw many presentations by major companies in animation, including the latest rendering and simulation techniques by the engineers at Disney/Pixar.

After a summer of watching and reading about other people's artistic and technological achievements, I knew I wanted to create something as well. In the Fall, Mona got exclusive access to a [Rokoko motion capture suit](#). This is the world's first consumer-based motion capture suit on the market – and there is nothing else like it at this price point. This was a huge opportunity, especially as the motion capture systems on Hollywood films are millions of dollars and require an entire room of cameras to operate. The Rokoko suit, however, only functions on the motion sensors embedded at key points all over the body, such as the hips, joints, and head. I knew right away I wanted to create a live demonstration employing this with the Drama Department and study the limitations of this interactive hardware system up-close.

Thankfully, the class of graduate actors was super excited by the opportunity to try out this mocap suit. They knew that learning how to act in a motion capture was a vital skill for their industry and a great continuation of the Delsarte “mask work” they were already learning in class. As seen in the figures below, Delsarte’s principles of the body easily ties into how animators draw and exaggerate body positions to convey emotions. So this motion capture workshop seemed like a natural progression and inclusion into their curriculum.

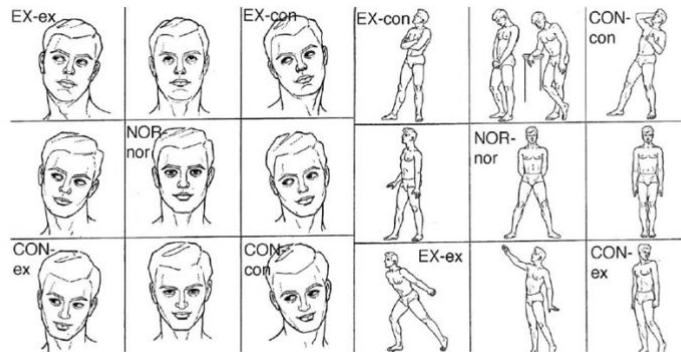
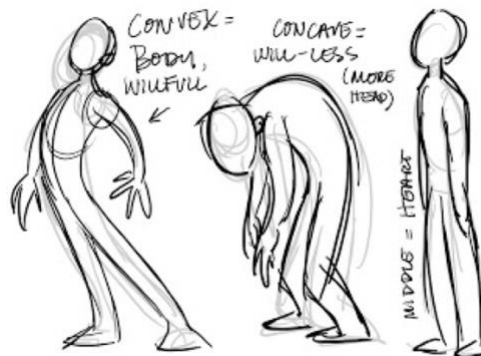


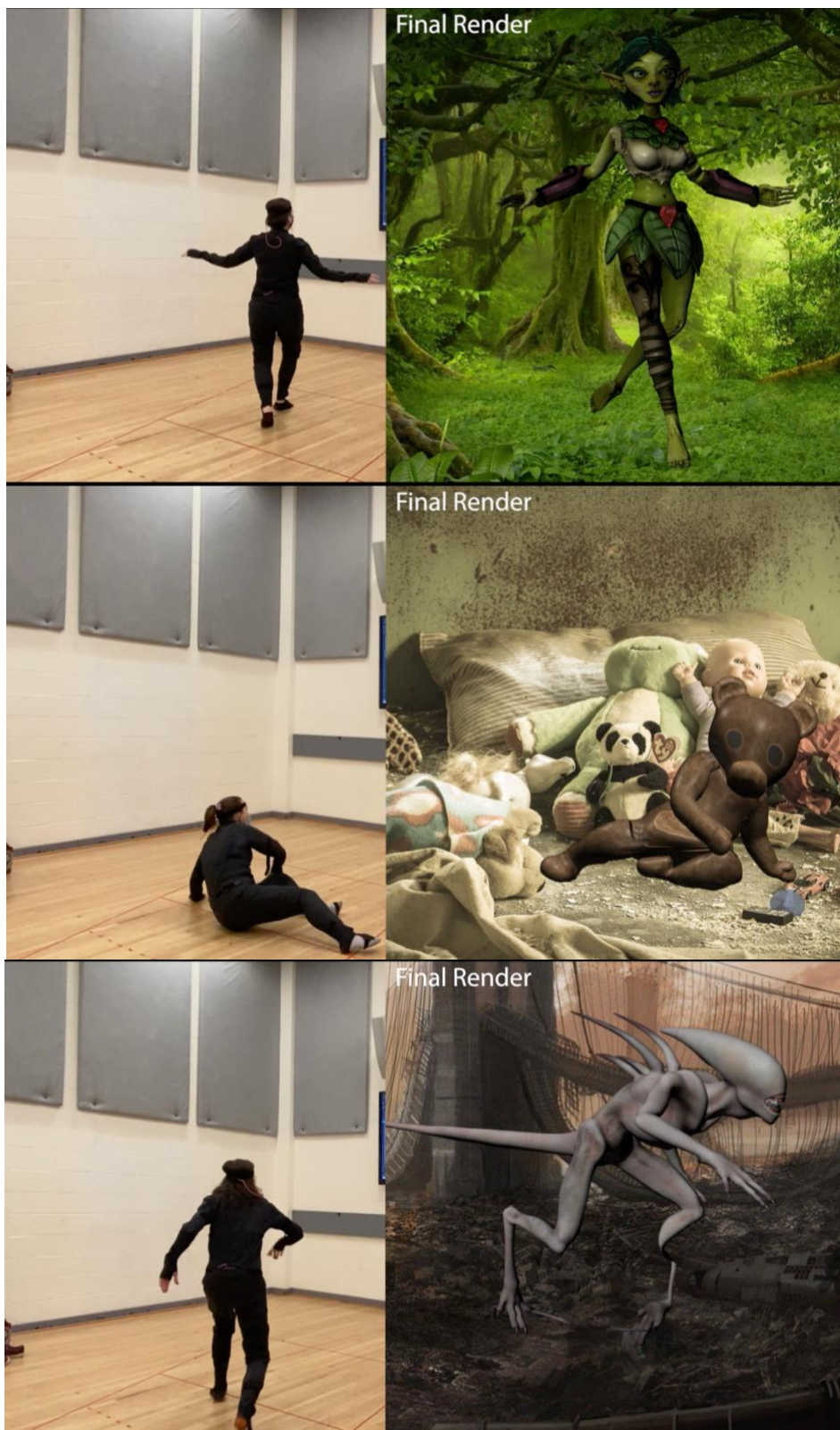
Fig. 1. Left: Delsarte’s nine poses for the head; Right: Delsarte’s nine poses for legs [15]



Over a week, I came into their class on three separate days, working in 2-hour sessions at a time. The actors and I quickly learned a lot about the Rokoko suit’s capabilities and limitations. Sometimes a foot sensor wouldn’t work or a hand wasn’t rigged, but that didn’t stop the graduate actors from fully committing to the characters I brought in. We made some great short, animated sketches with all the models I hand-rigged. Below is a link to the video of the final animated renderings, side-by-side with our workshop:

<https://youtu.be/RUpXrPHERPE>

As well, I’ve attached a few screenshots of my favorite characters and moments:



*TOP: Haydn Haring as a forest fairy.
MIDDLE: Christine Jacobs as a creepy teddy bear.
BOTTOM: Jack Clifford as an alien.*



James Stringer, Jr. did stage combat as a knight with a sword.

For the rest of the semester, I intend to shoot another standalone mocap scene with the MFA Actors. This will be fully rendered with a three-dimensional background, edited with moving camera shots, and online for viewing. I'd also like to create a video demonstration of the entire process to supplement my write-up for the Computer Science DMP thesis. As seen in

many SIGGRAPH conference papers, technological research usually needs a video component to truly demonstrate the artistry of the final product. This video supplement will capstone my research from the entire year. In addition, it will thoroughly explain my personal pipeline for hosting a motion capture acting workshop so educators at UVA Drama can use this workflow in the future. There is still much research to be done in this field, such as how a user could interact with virtual objects in real-time, how to incorporate a mocap character into the 3D world of a stage, and of course, making sure these technologies are accessible for artists and educators to use. Therefore, now is a critical time to research and enhance the usability of these tools for motion capture performance.

Budget Outcome:

Item	Description	Cost
Adobe Subscription (1 year)	Access to integral programs like Premiere Pro and After Effects.	\$359.88
ACM SIG Membership (1 year)	For access to SIGGRAPH 2021.	\$19
SIGGRAPH 2021 Ultimate Attendee Pass	Virtual conference on computer graphics & interactive techniques; access to all of the videos, research articles, Discord channels, and panels during the conference.	\$175
Computer Animation Festival Theater Ticket	An add-on to SIGGRAPH 2021 to view their festival of animated short films.	\$25
Isadora (1 year license)	Academic license to use this video projection software; designed for live theater and compatible with Rokoko suits.	\$75
Rokoko Monthly Plan	A little over 2 months of this subscription to access the “livestream” compatibility features with other programs, like Isadora and Maya.	\$51.82
Panasonic Lumix DC-S5 Mirrorless Camera with 20-60mm & 50mm lenses	Massive investment into a production-quality mirrorless camera. I will use this camera for my Overcranked short film, documenting my motion capture use, and for filmmaking projects in years to come.	\$2,380.74
36 Slot Memory Card Case	To organize all the storage of video, audio, and animations I created.	\$10.06
V-Ray	Necessary for rendering beautiful animations in Maya software.	\$99
Total Cost:		\$3,195.50 *

**NOTE:* I went over the amount of the award, but I anticipated this in my proposal. With all these worthy investments, I am okay with spending some of my own money to cover this total.