

Alienating the Familiar with CGI: A Recipe for Making a Full CGI Art House Animated Feature

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ABSTRACT

This paper is an exploration of the processes used and ideas behind an animated full CGI feature film project that attempts to reach blockbuster production values, while retaining Art House sensibilities. It examines methods used to achieve these production values in an academic production environment and ways costs can be minimized while high quality levels are retained. It also examines the film's status as an Art House project, by comparing its narrative design and use of symbolism to existing works of Art House cinema.

Making feature films is an expensive business, and making animated full computer-generated imagery (CGI) feature films is particularly so. Films that fall under the banner of "Art House" traditionally do not have the budget of their blockbuster counterparts. Our project is an ambitious attempt to make and finance a full CGI feature film that combines blockbuster production values with Art House sensibilities. It is an animated, motion-captured magical realist adventure that we hope takes CGI to a place it has never been before: CGI Art House cinema.

Our feature is called *Stina and the Wolf* and its accompanying short film is *Uncle Griot* (Figs 1–4). They are the result of a combined student and lecturer project at the University of Portsmouth in the U.K. The production has been carried out by our in-house studio, Foam Digital, which is a lecturer-run and student-staffed organization. It uses a traditional TD pipeline that allows students to work on a CGI-animated film project, learning valuable industry skills with the latest software and production methods. It uses staff mentorship to help establish a threshold industry quality, with the work integrated as an optional project across a number of degree courses. It also aspires to produce innovative and high quality content as part of lecturer research output. For the *Stina and the Wolf* project, we have now completed the screenplay, production design, storyboards and all of the performance-capture. We have raised over \$250K in software sponsorship, and \$100K in direct funding and have completed a five-minute short using data and assets created for the full feature production. Our next big challenge is to finish the whole feature, a daunting prospect, but one about which we are very excited.



Fig. 1. Stina's epiphany. Still from the *Stina and the Wolf* trailer. (© University of Portsmouth)

CGI as Art House

So why make a full CGI Art House feature film? Nobody, as yet, has made one, so its potential has yet to be explored. CGI has been used as an addition to conventional photography; examples include a brief cyber-sex scene in the French film *Holy Motors* [1] and in Art House/mainstream crossover films *The Life of Pi* [2] and *Pan's Labyrinth* [3], where CGI plays a role in recreating the imaginary world of the protagonists. However, full CGI is mainly used for cartoon-like mainstream features aimed at family audiences or for anime adaptations. The medium has yet to be used as the principal tool for more challenging and abstract works of feature-length cinema.

Blockbuster-level investment in Art House projects is rare. This is mainly due to the prohibitive cost of production versus box office returns, and is particularly relevant when considering full CGI animation production costs. (*Avatar* cost between \$237,000,000 [4] and \$425,000,000 [5] vs *Holy Motors* \$4,000,000 [6].) As our project was originally intended to rely purely on staff and student enthusiasm and expertise, equipment and software already available and a development cycle as long as our enthusiasm held out, we decided to make the Art House film we really wanted to, beyond the restrictions of mainstream box office expectations. This would involve researching methods of raising appropriate additional financing and sponsorship as needed, as well as concocting creative solutions to save money along the way.

Art house films that have influenced our project include *Mulholland Drive* [7], *Picnic at Hanging Rock* [8], *Don't Look Now* [9] and *The Company of Wolves* [10]. All of these share the eerie quality of magical realism that we want to capture. They all approach ideas of "Otherness": "the state of being different from and alien to the social identity of a person and to the identity of the Self" [11], and the characters often act as symbolic vehicles for another area we wanted to explore: the sublime, with all its notions of nature beyond human control, death and the infinite. As in Peter Weir's *Picnic at Hanging Rock*, our production exists very much in the English philosophical tradition of the sublime [12], with its veneration, awe and



Fig. 2. Above the clouds. Still from the *Stina and the Wolf* project. (© University of Portsmouth)



Fig. 3. Stina plays with Griot. Still from the film *Uncle Griot*. (© University of Portsmouth)



Fig. 4. Griot speaks. Still from the film *Uncle Griot*. (© University of Portsmouth)



Fig. 5. Stina's "Egg Head" rig. Image from the *Uncle Griot* previz. (© University of Portsmouth)

terror at the natural landscape and separation of humans' and nature's aesthetics. David Lynch's film *Mulholland Drive* has also been a particular influence, with dream logic playing a central part in our narrative design. Lynch's film uses a similar device to that at the beginning of the *The Company of Wolves*: the protagonist is put in crisis, then a world is built for her to inhabit and solve a mystery, a world created partially out of symbols made during their moment of crisis. Our film uses this narrative device and puts the crisis at the start of the film (unlike *Mulholland Drive* where it is placed in the middle between the two worlds of the symbolic and the literal, with the

powerful central dinner scene acting like a shopping list of ideas to abstract into dream-like neurosis.) As in the *Wizard of Oz* [13] our protagonist goes straight from crisis into a strange world of adventure. On entering this new world, she is, as in *Mulholland Drive*, both experiencing and subconsciously creating the stories she inhabits, as in a dream. At its core our film is rumination on these stories. They are the ones we tell ourselves to make sense of the world, particularly our need to make meaning and narrative sense out of death. *Stina and the Wolf* is an Art House film and also a horror story, a love story and a coming of age journey:

A teenage girl on a school holiday abroad is involved in a catastrophic coach crash. She is catapulted into a new world and a new life. It is a world she has unwittingly constructed out of symbols that represent her experiences on the coach, the real life predicament of lying badly injured in the crash site, her teenage hopes and fears about the future, and the excitement and danger of a new relationship. She finds herself in a world of impossibly high mountains, cloud-covered forests, strange militarised gypsy fairgrounds, surreally disabled relatives and frustrating new love. She embarks on a perilous journey to save the boy she loves and find some children kidnapped from the village by a mysterious and terrifying figure: the Pipe Catcher. As her quest unfolds, she slowly lifts the veil on her world and realises she is in the wrong place. She confronts her fears, finishes her story and returns home to face the truth. (*Stina and the Wolf* synopsis)

Production

As our production is at a stage where we are looking for financial investment to speed up the next stage of development, we have made a short film to act as an example for potential producers and distributors. This short film entitled *Uncle Griot* has been developed from a single scene in the film and taken from our motion-capture performances before being pushed through our entire production pipeline.



Fig. 6. Ice and snow on the mocap stage. (© University of Portsmouth)

Our protagonist "Stina" was motion captured and her facial performance was recorded through video using head-mounted camera rigs (made by the director in his shed) (Figs 5,6). The translation of the facial performance to the animation rig required a two-stage process of using one of our sponsor's software, FACEWARE, for the tracking, then a final clean-up of hand-keyed animation. This was then put onto our FACs-based blendshape facial rig. The shaders also needed to approach a high level of realism, so Arnold shaders were developed in Softimage,

which took the skin and eye shaders to the fidelity we thought would be sufficient for the effect. We stopped short of adding too much pore detail, as we wanted Stina to have an otherworldly idealized “Hollywood” quality. This was in contrast to the character of Griot, her uncle, whom we wanted to feel much more rough and ready (Fig. 7). This also reflected a thematic element in the film, with Stina acting as a symbol of idealized youth and beauty contrasting to



Fig. 7. Early Griot concept sketches by Chavdar Yordanov. (© University of Portsmouth)

Griot, who represents reality and aging, farts and all! (he does indeed fart off camera early on in the short film) (Fig. 8). The final level of realism we achieved we believe falls somewhere between *Beowulf* and *Avatar*.

As the effect we aspire to is intended to work on the subconscious level of the viewer, the process of making it has needed to be a very reactive one, and this extends to how it combines with the edit, the sound design and the music. This need to create a reactive cycle with the work as it's being produced reflects the methodology of one of our biggest influences, David Lynch:

A script is just words to remind you of the ideas. And you follow that, but always staying on guard, in case other ideas come in, because a thing isn't finished till it's finished. And one day, it's finished [14].

The planning involved in CGI work means that in order to reach this often more subconscious, reactive and transcendental way of working, we have had to find ways of reacting to the work as we make it beyond just storyboarding, concept art and previz. Often the work has been passed backwards and forwards between the different stages, with the ability to respond and react to apparent mistakes in the work being an invaluable tool in its development. The reactive element of producing good art can often get lost in the relentless march of the CGI planning stages, particularly in larger and more complex productions. We have a previz stage where we project the actor's face back onto a smooth representation of his head shape. This is done in combination with the body motion capture and allows us to get a good sense of the performance beats.



Fig. 8. Finding the right Griot. Shader and groom look-dev. (© University of Portsmouth)

This then allows us to be as reactive and experimental as possible with the camera placement. This process is counter-intuitive to many traditional filmmakers, as we have not blocked out and staged every scene beforehand for the camera. We used storyboards on set, but some were left very loose to be completed after the shoot. As we motion-captured in an environment with restricted space, our only concern for blocking was allowing enough room and props to amplify the honesty of the performances. We did all we could to recreate the physicality of the set for the actors. This involved a plethora of Heath-Robinson/A-Team style solutions: everything from polished boards and greased socks for ice; arm weights on the ankles for ocean drag; crash mats for snow and army webbing attached to a rope harness to simulate the buffeting wind of a blizzard.

The ability to go in and block the camera after the shoot has given us an incredible amount of freedom (too much in some cases, as we are left with infinite possibilities!). It has also allowed us to hone in on potential areas for development before committing to the full facial animation pipeline.

Although our protagonist Stina is a standard human character, her uncle Griot was inspired in part by the terrifying dog/tramp combination in the 1978 American science fiction horror film *Invasion of the Body Snatchers* [15]. This practical-effect combination of a realistic rubber mask of an old man worn by a real dog, who then licked said mask through the mouth slot, is uncanny. I wanted Griot to have the potential to be as downright terrifying as this, certainly at first, then eerie, then as the story develops the audience could finally warm to him, as they see his humanity and get used to his strangeness.

He is effectively the heart and truth at the center of our film, with his combination of all the weirdness and uncomfortableness that comes with aging, and bodies in general, as well as an illustration of the day-to-day realities of familial love. I wanted a character who could transition from a shocking monster to an adorable border collie to a slightly weird, physically exposed and disgusting uncle, and finally to a sage-like voice of wisdom. We settled on a goat body, the head of an old man and the locomotion of a border collie when moving slowly and of a bounding goat when moving quickly. We went through many look-dev stages to get what we felt was the right balance of human/animal, keeping a keen eye on the overall anatomical logic.

For timing and performance reference we used an actor (the director) crawling around on all fours (Fig. 9) captured on our mocap stage (with extra cameras thanks to sponsorship from VICON). This was essential in eliciting a genuine performance and interaction from our young actor who played Stina. It also allowed for a level of improvisation on set which we hope added to the authenticity of the performance. (It certainly made the crew laugh.)



Fig. 9. Motion-capture shoot for the film *Uncle Griot*. (© University of Portsmouth)

The character was then keyframe-animated based on the actor's reference as a performance guide, but with enough license to bring in the animalistic elements as required (using extensive goat and dog references). We used separate actors for facial animation reference for his animal and human states, to exaggerate the difference between them. Both of these states are presented to some extent in the short film (Fig. 10).



Fig. 10. Griot plays fetch. Still from the film *Uncle Griot*. (© University of Portsmouth)

Using a Game Engine Instead of a Traditional CGI Pipeline

As traditional shot-based pipelines are part of the reason CGI features are so expensive, we have been looking at cheaper alternatives. One alternative is a game engine. We are presently investigating the Unreal Engine for our previz stage. As well as potentially cutting production costs, this will help us get a closer representation of the final artifact earlier in the process. It will allow us both to see how light and atmospheric conditions affect our performances, and to make more informed and reactive choices regarding cinematography. Our ideal is to replicate the condition of being on a location shoot and add the ability to react to the vistas and action in real time. We are also looking at the options this will give us with regard to lens mimicry, allowing us to experiment with focus pull and other techniques. In addition to Previz, we are also investigating Unreal for use as our main rendering tool. With recent developments in its rendering and VFX capabilities, we feel it might be the ideal tool to knock our development costs down substantially, but still allow us to keep the fidelity we want. There is a precedent for cost-saving productions using Unreal, as seen in the recent animated feature rendered entirely in Unreal: *Allahyar and the Legend of Markhor* [16]. An initial budget for our feature, using Unreal and based on a breakdown of animation, modeling, rigging, VFX, tools, production, foley, mixing and grading that we made from our assemble of the film (a 110 minute long cut constructed from on-set reference footage, storyboards and concept art), came to \$2.5 million. This would pay for a small professional animation studio, staffed with junior- to mid-level artists and a few seniors working for two years. It would also allow us to formalize the student contribution, by running year-long paid placements as part of the degree program. This budget sits well in the indie horror market, which is a realistic genre to pitch to, given our content (*The Company of Wolves* was also marketed as a horror film, even though predominantly an Art House experiment). Film producers I have spoken to have stressed the importance of finding a realistic budget that matches the intended marketplace. The horror market in particular can accommodate films “budgeted between \$500K and \$3 million,” which can generate “at least \$10 million in Producer’s Net Profit” with “Income Streams: 28% from theatrical, 60% from home video and 11% from TV and other ancillary income” [17]. This also provides an indication of our distribution approach. Lessons from research into these lower budget films also tell us we should “look for good actors, not big stars, and do the same with all of the technical crew on a film” [18]. This is a fairly accurate description of our project: great performances and visuals, but absolutely no one famous involved.

Conclusion

Making an Art House film with blockbuster production values requires a balance between expectation and cost. A lot of effort is required on every level to find innovative cost-saving measures which can balance these factors favorably. Identifying a clear marketplace for the work, aligned to a target production cost, sets the template for realizing these ambitions. Much of the expense in CGI production resides in technology, but its costs are constantly becoming more manageable as solutions that are quicker, higher quality and cheaper emerge. The next few decades should, with any luck, see a lot more Art House filmmakers able to take risks and bring more innovative projects to the big screen. We hope that *Stina and the Wolf*, a full CGI film that sits comfortably in the Art House genre, will be one of them.

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Glossary

FACs—a system to measure discrete movements on the face developed by Carl-Herman Hjortsjö