

Support Statement for the Visual Effects of “Hotel Transylvania” for the BAFTA Awards

Hotel Transylvania is the 5th animated feature for Sony Pictures Animation and the first feature film for Emmy winning director Genndy Tartakovsky. Genndy, known for his unique animation style and story telling, pushed every aspect of our pipeline to match and support his distinctive vision. This especially impacted the Visual Effects in our film as these elements are normally based on real world physics but now had to integrate with physics of the cartoon world. The challenge facing the FX team was how to create both believable and impressive visual effects while providing the creative controls artists needed to direct the effects in a very stylized way. This art direction was critical in order to match Genndy's animation style, characterized by very dynamic poses and fast transitions.

Over 60% of the shots in the film contained visual effects. Major effects included water, fire, smoke and magical elements and the following are some examples:

Fire played a large role in the “Humanville” sequence. Here the hotel zombies are dressed up as humans in a fake town created by Dracula, all in an attempt to scare Mavis away from the human world. The sequence ends with an inferno as the zombies have all accidentally set themselves on fire with their torches. Each zombie in the mob required an individual fire simulation. Houdini was used to set up the fire system and the final fire simulations were created using Imageworks' proprietary volume fluid simulation system called SpFire, which utilizes Maya's fluid solver. The final fire pipeline resulted in a "push button" system in which artists could assign fire to virtually any object and animation ranging from a zombie on fire to a candle or torch. Each fire simulation was provided with a fire shader and lights (or locators) so that a fire element could be used in a lighting setup as a light source. Much of the practical lighting in the castle was done using candles and torches from this fire system.



A considerable amount of fluid dynamic effects were done for the **“Pool”** sequence in which the monsters are splashing and diving into the pool. These water simulations were particularly challenging because we needed to animate our water like a character. The direction of the splashes and the motion of the water were animated to allow the best read of the character action, yet water remained realistic and believable. The main water simulations were done with Naiad software. Additional splashes, ripples, and procedural foam patterns were created in Houdini. Foam patterns were created using both particle simulations and procedural shader patterns which were then rendered in Arnold. Though various parts of the water were simulated using different software, careful attention was paid to blend it all together for one seamless look. By taking this modular approach we were able to pick the best simulation passes and combine them into one water surface.



One of the important effects in the film involved the **transformation of Dracula and Mavis** between human and bat form. The characters transitioned through a colorful, gaseous state when changing forms. A system was built using Imageworks' proprietary implicit particle fluid solver (FLIP). This system was originally built to mimic reality and react to real world forces as used on many of our live action projects. Of course in our cartoon world we needed to augment the physical model to account for very un-realistic forces and accelerations while still looking graceful and believable.

This enhanced system was allowed a high degree of animation control in order to blend seamlessly with the highly stylized and pushed animation style of our characters. By creating a shaped trail behind Dracula, this effect was also used to aid in the visual read of extremely fast motion in which motion blur would not allow us to see the character action clearly. The final rendering of this fluid like effect was fully integrated into our global illumination renderer Arnold where it acted as a light source, creating subtle lighting effects on the surrounding environment.



Murray, the Mummy character, makes his grand entrance into the hotel with the swirling formation of a realistic, yet magical, **sand pile**. Animation provided a guide for the forming pile, along with rotating ribbons to help guide the airborne dust motion. The airborne dust was done with Imageworks' SpFire system, while the particulate sand was done using a combination of Houdini particle work, proprietary clustering algorithms, and procedural volumetric rasterization techniques.



In the "**Jet**" sequence, Dracula in bat form, is chasing the plane carrying Jonathan in an attempt to persuade him to return to the castle. Since Dracula cannot be in sunlight, he burns up, leaving a trail of smoke and embers as he flies. The smoke was created with the SpFire system using multiple volumetric simulations, while the embers were created with Houdini POP simulations. Everything finally rendered in Arnold. The great distance Dracula covered required multiple sections to be simulated and seamlessly combined.



In the “**Steam Room**” sequence, Houdini particle simulations were used to drip sweat off our characters. Individual beads of sweat were created as geometry and a particle history trail was provided for the streaks left behind by the beads of sweat. This streak or sweat bead path was then fed into our Arnold skin shader to provide a realistic streak pattern over our characters. This pattern reacted to our characters motion, dynamically adjusting the path of the sweat. The steam was created using the SpFire system.

There were other miscellaneous effects that played a supporting role. These included webs created by a procedural web system and an ODE based destruction system that was employed to destroy parts of the castle. Both of these were developed in Houdini.