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ALLEGIANT

Fusion CI Studios Designs Goo for Steamy Shower Scene

CASE STUDY

"But, for me, nothing beats the high-tech showers used to detoxify Tris and her pals that coat their bodies with jelly-fish-like goo and literally suck out all the icky contaminants..."   Roger Ebert

VFX sup, Stefen Fangmeier, tapped Fusion CI Studios' expertise to design a fluidy 'gel' to nearly suffocate Shailiene Woodley (Tris) in Allegiant's much tweeted-about decontamination #showerscene. Huge fans of the Divergent series, our team was thrilled! Given it's Shailiene Woodley in a shower, we had pretty sensitive material to work with, so security was tight. And wrapping her body in a realistic, but alien-like, goo that would behave organically, yet like nothing on earth, was the challenge.

Tris steps inside a high-tech decontamination chamber and an odd amber fluid descends in a sticky, coherent flow with a strangely fascinating beauty. But fascination transforms to terror as the gel adheres like slimy shrink-wrap to Tris' body, suffocating her.

Fusion worked with its long-time trusted teams to complete the shots - HardEdge Creative, Vancouver, for modeling/ match-moving/ digi-double work and Mr. Wolf, Culver City, for compositing. Fusion's in-house teams in Vancouver and LA handled the fluid simulations and lighting, texturing, rendering. The fluid simulations were done with Next Limit's RealFlow dynamics package, and all lighting/ rendering was done with Maxwell Render (also by Next Limit).

Alien-like gel descends around Tris in the shower

Custom Fluid Behaviors...

For two shots with the gel descending, Fusion created a custom fluid behavior within RealFlow so we could get a controllable, thin curtain of fluid that also had to feel thick while moving. After several versions of the fluid simulation and lighting we achieved just the right shape and drippy movement of the leading edge, as well as the right color and light absorption characteristics of the gel. The trick with the simulation was to apply a squeezing force to keep the curtain thin and cylindrical, but to vary the force around the circumference and apply some variable downward push to get drippy movement. We also used a key-framed framerate to control the speed of descent and make the leading edge timing of descent match to Tris' performance.

The third shot was the most technically challenging. HardEdge Creative made a digi-double of Tris that matched her perfectly. Often, digital doubles of actors are used for rapid action sequences and don't need to match perfectly, but in this case, we had no room whatsoever for error since Tris was in close-up and the CG gel had to shrink-wrap her, moving with every shudder and muscular twitch. Even the slightest mismatch would have been clearly visible as a slip between the liquid and Tris' skin. Alex Greenberg's team at HardEdge Creative did an amazing job on the modeling, character rigging and animation, providing Fusion with a rock-solid geometry to coat with their liquid.

Technical Innovations...

The liquid simulation itself was a technical feat involving significant innovations created specifically for this project. For the suction effect, we used a custom force field which would find the closest point on the Tris model to be attracted to. As the liquid sucks onto Tris, because it is bunching up on her, it would (if physically correct) create a thick layer over her skin due to conservation of volume. To counteract this, Fusion's liquid team designed a way of continuously and smoothly collapsing the liquid volume upon itself using a particle density threshold, leaving just a thin layer.

The magic happens as the liquid coats Tris. If we just attracted liquid to her, it behaved in a liquid way and shuddered, jiggled and flowed in response to her rapid movements. In another universe this would be

a great result, but in this case, we needed the coating to evolve to more of a hard shrink-wrap and away from a true fluid, until it gets washed off. So the challenge: it's a fluid, then it adheres to Tris and becomes a non-fluid, and then the shower turns on and it's a fluid again. Technically, ouch!

Tris, surrounded by strange goo descending from the ceiling

So, we developed a new technique. We start with a fluid, but when it makes contact with Tris we create a non-fluid "twin" particle. Every colliding liquid particle then had its own twin. The non-fluid twins start off life riding on top of their liquid counterpart, and then rapidly move to their idealized position of collision on Tris' surface. They then ride along on that spot no matter what Tris does. We then meshed all the particles together, but animate between the influence of the fluid and non-fluid twins. By the time the liquid is quite thin on Tris, in reality we are only meshing a non-liquid layer of particles evenly distributed on her surface. This technique gave us total control on the thickness of the coating since we could move the non-liquid particles along the geometry normals and did not have to worry about annoying solver issues like collision distance or inter-particle jostling, and the coating is then entirely free from liquid jiggling.

When the shower turns on and the coating must return to behaving like a liquid, we animate the non-liquid particles to move smoothly back to their liquid twin locations and begin releasing the liquid from the suction forces. As the liquid coating pours off Tris, the non-liquid particles simply follow the liquid off and we continue to mesh just the non-liquid.

During the thin coating stage, we had to take care in specific locations on her face. Over her eyes, we had to push the liquid layer outward ever so slightly to avoid weird interactions with her blinking eyelids. And over her nostrils and mouth, we had it shrink-wrap over the open spaces so we could animate internal pressures, having the liquid layer suck in and out with her breathing.

For the end stage when the shower is washing off the gel, we created a rain drop simulation that matched the look of the real shower in the next shot. Wherever CG shower droplets hit the gel coating, they generate tiny splashes but most of each droplet sticks where it hits. We then programmed in a sort of chemical reaction between the water and gel, so with time after colliding the gel becomes less viscous and less sticky, and starts to drip off Tris. This was done by detecting which particles of the coating were close to water drops, and selectively releasing just the nearby coating particles.   As more droplets hit and stick to the gel, the reaction speeds up and soon the gel washes off her completely.

The Lighting...

At the start of the shot, Tris is CG, and we used a camera-projected texture map of Tris taken from the plate. So for the most of the duration of this shot, Tris is CG, with Mr. Wolf transitioning to the real Tris in comp as the gel coating washes off.

The task of controlling that detailed look fell to Mr. Wolf. Fusion provided refraction and reflection lighting passes for 2 kinds of liquids: one amber, low-refraction, mostly opaque to provide the color and density; another completely clear and transparent to allow Danny Yoon to paint in more transparent areas over Tris' face and shoulders at the direction of the film's Director. Finally, Fusion provided a render of reflections for an opaque, black, highly reflective liquid to allow Danny Yoon (Mr. Wolf) to paint in sharp reflections of the environment, but avoid having these obscure Tris' face. He also comped in additional layers of shower droplets to add to the intensity of shower. for the final result!

Outstanding work by a tried & true team executing some very challenging fx!

Tools...
Maya, RealFlow, Maxwell, Nuke, Flame

Credits...
RELEASED: 2016
STUDIO: Lionsgate
DIRECTOR: Robert Schwentke
PRODUCERS: Lucy Fisher, Pouya Shahbazian, Douglas Wick
VFX SUPERVISOR: Stefen Fangmeier
VFX PRODUCER: Erika McKee

VFX SUPERVISOR: Mark Stasiuk, Fusion CI Studios
EXECUTIVE PRODUCER: Lauren Millar, Fusion CI Studios
VFX ARTIST: Chris Ferrari, Fusion CI Studios
VFX ASSISTANT: Stevie Max, Fusion CI Studios
CAMERA TRACKING/MATCH-MOVING: Aslan Zamaev, Fusion CI Studios

LEAD MODELING/MATCHMOVING/DIGIDOUBLE: Alex Greenberg, HardEdge Creative
ANIMATOR, MATCHMOVE ARTIST: Eugene Flormata, HardEdge Creative
MODELING ARTIST: Cleyton Jonnas, HardEdge Creative
RIGGING ARTIST: Sebastian Webber, HardEdge Creative

COMPOSITING SUPERVISOR: Danny Yoon, Mr. Wolf
COMPOSITING PRODUCER: Mike Pryor, Mr. Wolf

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Fusion Computer Imagery Studios (Fusion CIS) is committed to excelling at complex dynamic fx challenges. Realistic physical simulation is the core of our work - complex particle & fluid fx like smoke, fire, explosions and rigid/soft body dynamics at uncompromising, photo-real, feature-film quality.

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