Ooze Control: Procedural Shapeshifting FX in Pixar's *Elio*

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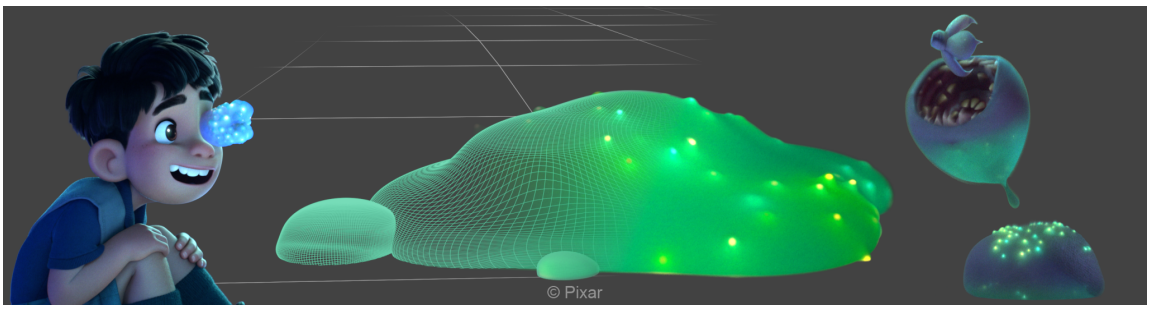

Cloning Clay, a space amoeba-like organic matter generating a variety of laughs, thrills, and clones throughout Pixar's *Elio* (2025), required a suite of technical and creative FX techniques to land each story beat with a satisfying performance. In regular collaboration with several departments, this method delivered a range of effects, including dynamic hero clay FX, secondary rippling, and full-character transformations. A lightweight Houdini-based workflow was developed to ensure these techniques scaled efficiently across multiple sequences while minimizing per-shot overhead. Most shots were delivered via this base setup, but full-body transformations required significant rig customizations to handle increased complexity.

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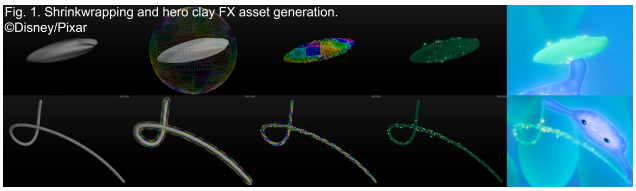
1 CLONING CLAY HERO FX PROCESS



A key technical challenge arose in adapting FX workflows to a new ShapeModel tool used in animation. This metaball-like SDF-based technology, developed in GLSL for viewport interactivity, enabled animators to create the organically meshed input shapes needed for the viscous nature of Cloning Clay. Due to its implicit surface nature, however, the output animation meshes lacked a consistent interframe topology, making it a challenge to apply typical FX techniques on top. The cloning clay hero FX workflow balanced stability with artistic flexibility while preserving animation intent. The first step involved devising a shrinkwrapping process to replace the raw topology with a stable set of points. In doing so, a primitive shape was iteratively projected onto each distinct surface using a raycasting/relaxation feedback loop, and rotational motion was approximated by animating the replacement primitive's orientation before shrinkwrapping.

Next, emissive subsurface nodules were generated with a toolset prioritizing proceduralism for rapid artist feedback and directability. These nodules, when activated, rose to the surface while dynamically adjusting their light intensity and were capable of behaviors such as ambient bubbling, directional waves, and high-intensity tearing effects. The final

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output consisted of three primary FX assets: a polygonal clay surface mesh, emissive nodules with automated mesh light contributions, and a low res volume used in path traced subsurface scattering to give the clay its signature murky look. Structuring this workflow around a generic multishot capable Houdini rig lent itself towards rapid iterating and minimized artist setup time per shot. This became especially valuable in the thick of production, reducing average per-shot turnaround time between final animation approval and first look rendered effects to less than a day.

2 RIPPLE FX PROCESS

In certain story moments, clones would undergo a visible reconfiguration with waves of emissive nodules rippling across the surface as the underlying clay finalized its form. To achieve this effect, a single watertight mesh was processed per character, with shot-specific masks defining wave directionality via a procedural growth system. Nodule points were again scattered and pinned or slid sub-dermally in close-up shots. A two-step displacement process first distorted the watertight mesh before propagating changes to the original animation meshes, minimizing point deformation artifacting.

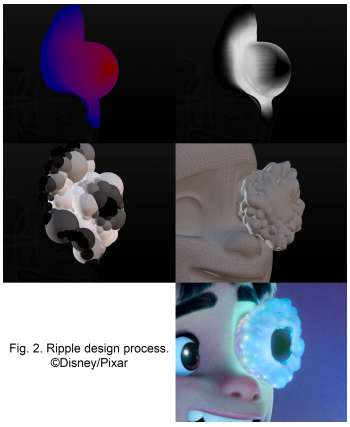

Fig. 2. Ripple design process. ©Disney/Pixar

3 GLORDON TRANSFORMATION FX PROCESS

While ripple effects refined existing clones, one sequence demanded a far more complex transformation: evolving a semi-formed cloning clay blob into a fully realized clone of one of the alien characters, Glordon. Final animation leveraged multiple ShapeModels to define body section transformations before merging with the clone's traditionally animated and shaded head and tail. With the real Glordon just feet away, any discrepancy in appearance would be self-evident, making accuracy critical. Shading support from other departments was available but limited, so we were encouraged to take major ownership in recreating Glordon's body and shading qualities entirely within the FX pipeline.

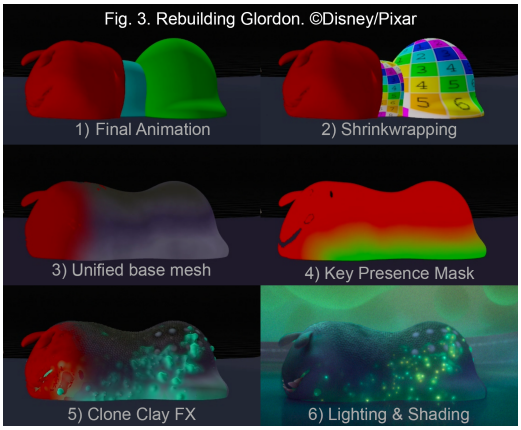

Fig. 3. Rebuilding Glordon. ©Disney/Pixar

ShapeModel meshes were shrinkwrapped individually to generate stability data before being recombined via VDBs into a single base mesh. While the topology was again temporally incoherent, the stable rest positions and UV data were transferred back to the unified base mesh to serve as an anchoring point for asset generation. A presence mask based on custom distance thresholds alongside custom paint strokes controlled where FX-driven assets and shading would blend into the character's standard materials. Glordon's distinctive features (bumpy displaced scales, emissive dots, and subtly textured body shading) were recreated with instancing techniques and procedural noises. Additional USD overlays smoothed out transitions between the FX-generated body and the original character's head and tail.

Directional ripples were utilized to visually connect with the base cloning clay language and emphasized key moments of transition. Taking timing cues from animation, ripple data was then fed back into geometric displacement/instancing, presence masking, and emissive nodules. Final adjustments from lighting, including targeted character light linking and Renderman LPE reflection controls, secured a seamless match to the hero character.