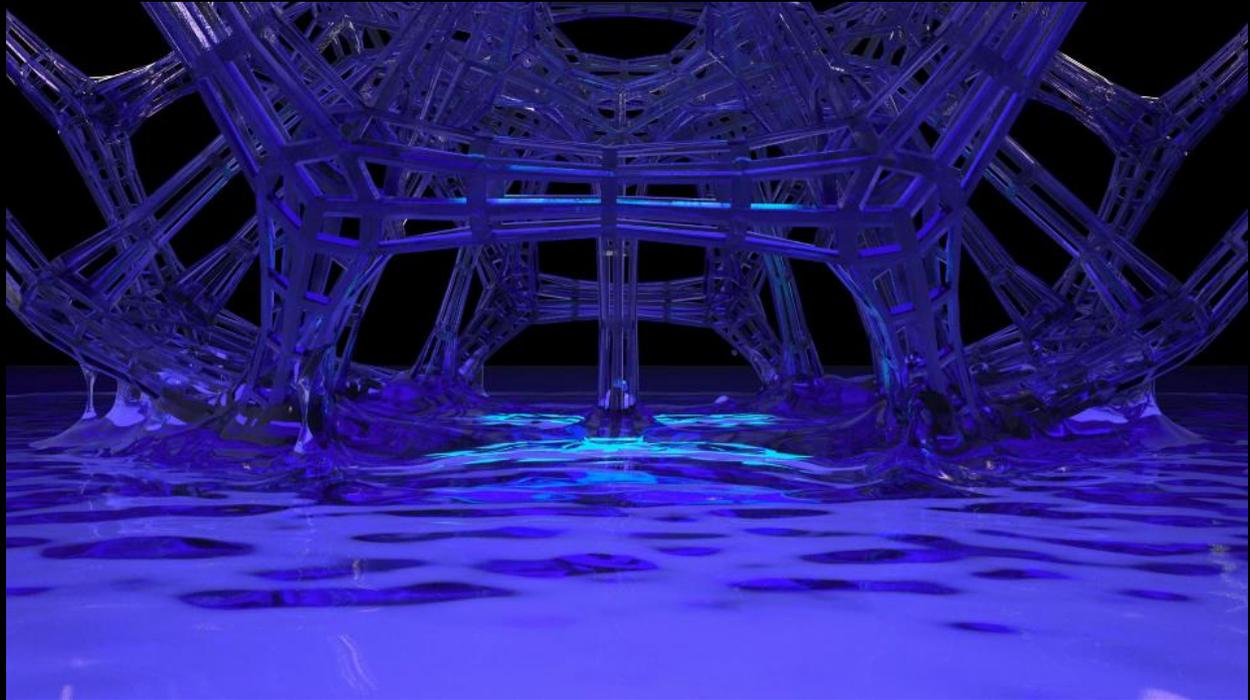


Fusion CI Studios

...incomparable fx

Preliminary Case Study: Carbon 3D

When Carbon 3D announced its groundbreaking 3D printing process, CLIP, at a recent TED talk, Fusion CIS partnered with Cinco Design to create an artistic depiction of how the printer works. As if by magic, the printer forms 3D objects 25x faster than typical printers via an interaction of laser and resin. The visuals had to artfully represent this phenomenon of light and liquid and the reaction generated. With only 3 weeks to create the sequence, it was a steep climb but the Cinco and Fusion teams worked closely together and managed to hit the creative target and concoct some amazing imagery. Here it is!

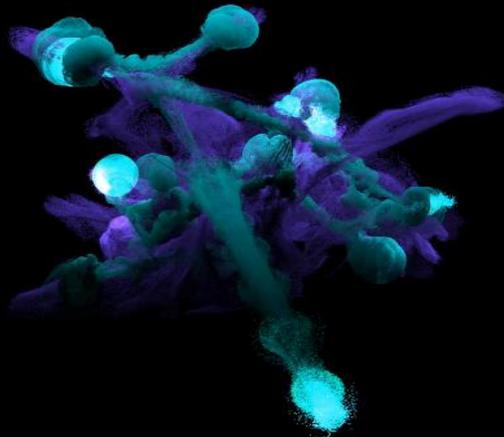


[Final Movie](#)

Cinco provided Fusion with previz maya scenes containing the rising animated 3D geometry (a complex "buckyball") along with camera for all shots above the surface of the resin bath. Fusion created the visuals for the outer space-like under the resin/laser chemical reactions, the simulation of the resin bath interacting with the buckyball, and the shading/lighting/rendering. Cinco composited & finished to complete the spot, adding lens flares, atmospheric fogs, and depth of field blur.

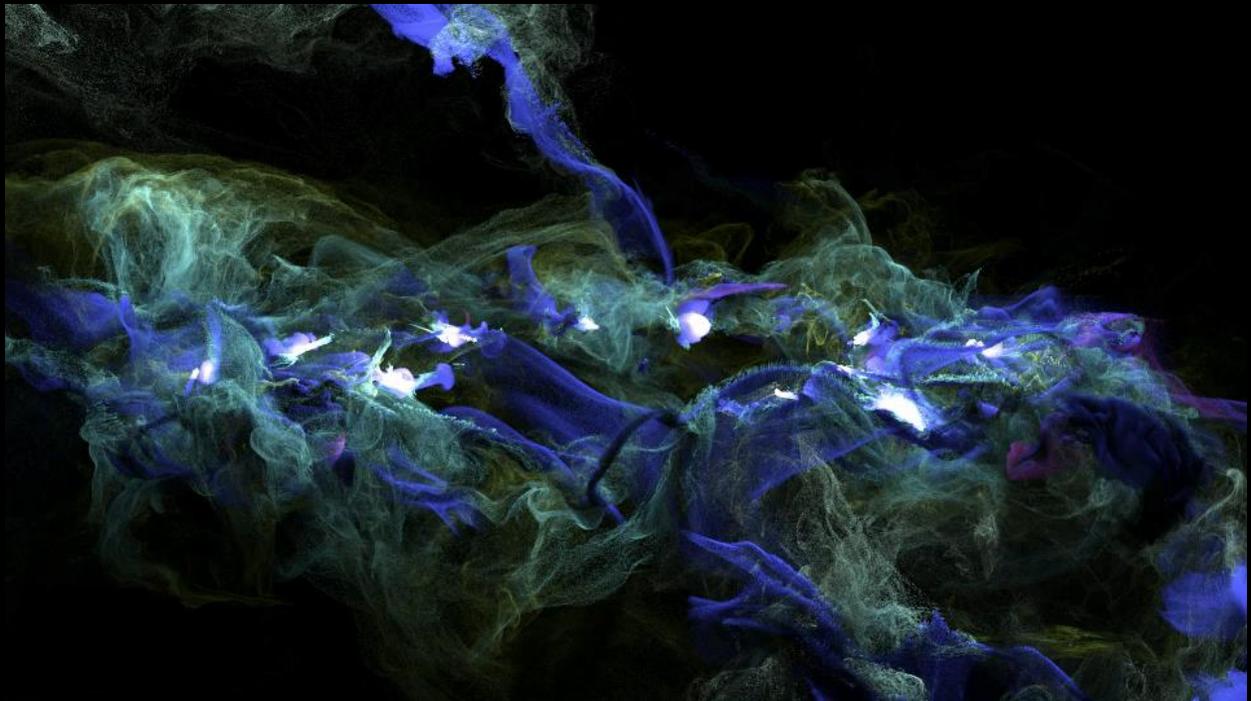
Below Surface Shots: Chemical Reaction Nebula

In the first few shots, Fusion created a nebula-like particle system using a combination of RealFlow, Fumefx and Krakatoa. Custom RealFlow particle simulations were created as the source chemical reactions, and used as the source for Fumefx sims, which were in turn given a Krakatoa treatment. The end results were rendered with Krakatoa. In the first shot, we are close up and see the ignition of the light and resin chemical reaction...



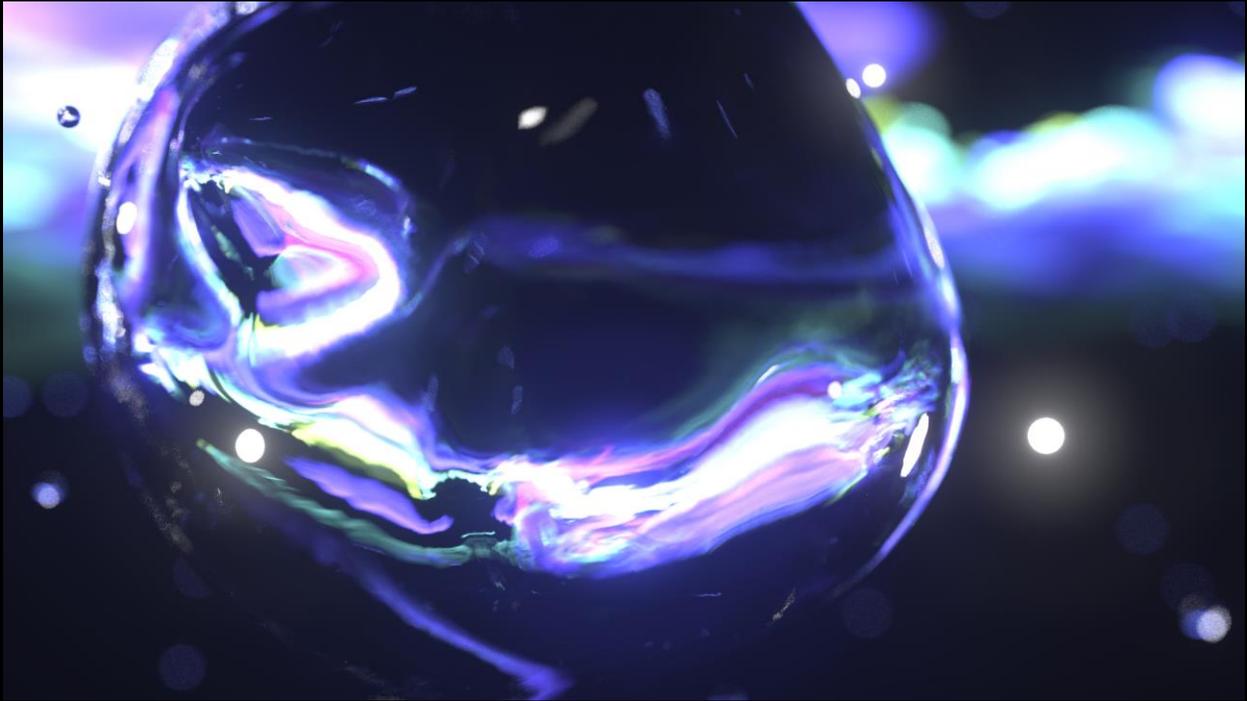
[See Genesis](#)

We then cut to a wide view of the chemical reaction (below) in a more progressed state, where additional points of light are igniting a complex chain reaction. This swirling mass of light & matter begins to form the 3D printed object. The entire system performs like the genesis of a galaxy.



[See Nebula forming](#)

For these first 2 shots, Fusion created a multi-stage particle system in RealFlow, driven by python scripts. These were then used as Fume fx sources. Multiple elements were combined to create the final look. Going super close-up now, we see that what is happening at the reaction center is that the fluid is building into something, accumulating the fluid material that will form our object.

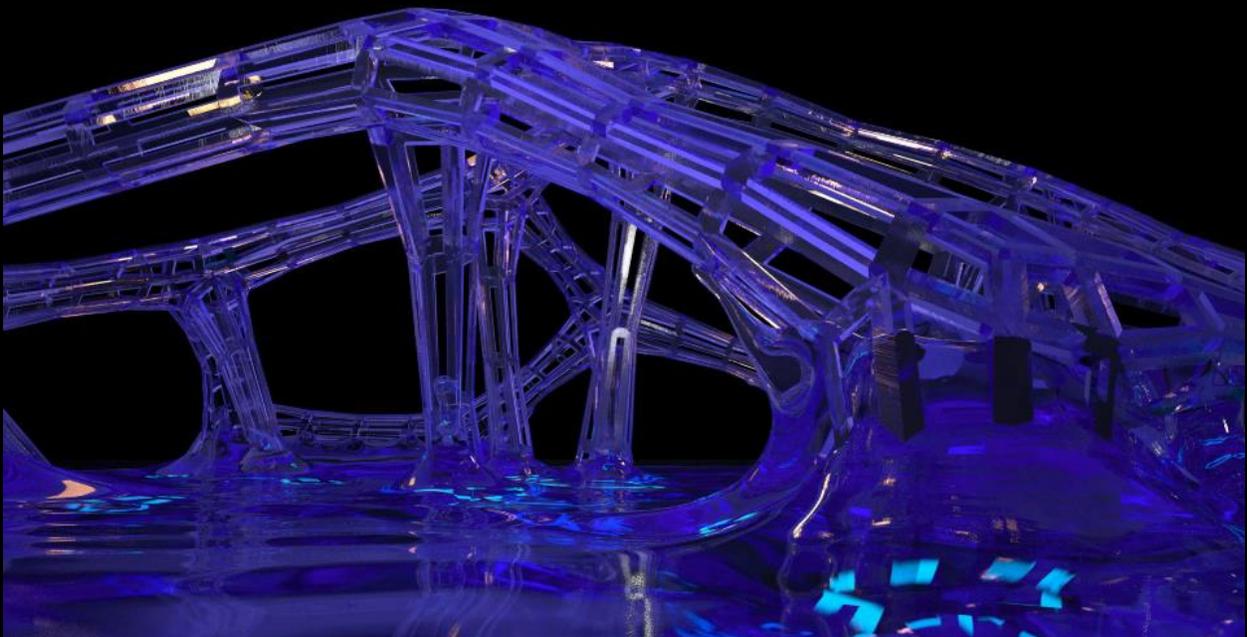


[See Droplet](#)

This shot consists of a RealFlow simulation of droplets, converging on a center point, all run at high FPS and rendered with shallow depth of field and some simlens lens flaring. In the next shot, the concept was that the camera was going to rise up from below the surface, but it turned out that the transition from the subsurface nebula world to the above surface world was challenging to do within the schedule. So for final, it was decided to just show the surface and start of formation of the buckyball object. We'll show the full nebula elements in the full case study coming out soon!

Above Surface Shots: Buckyball 'Printing'

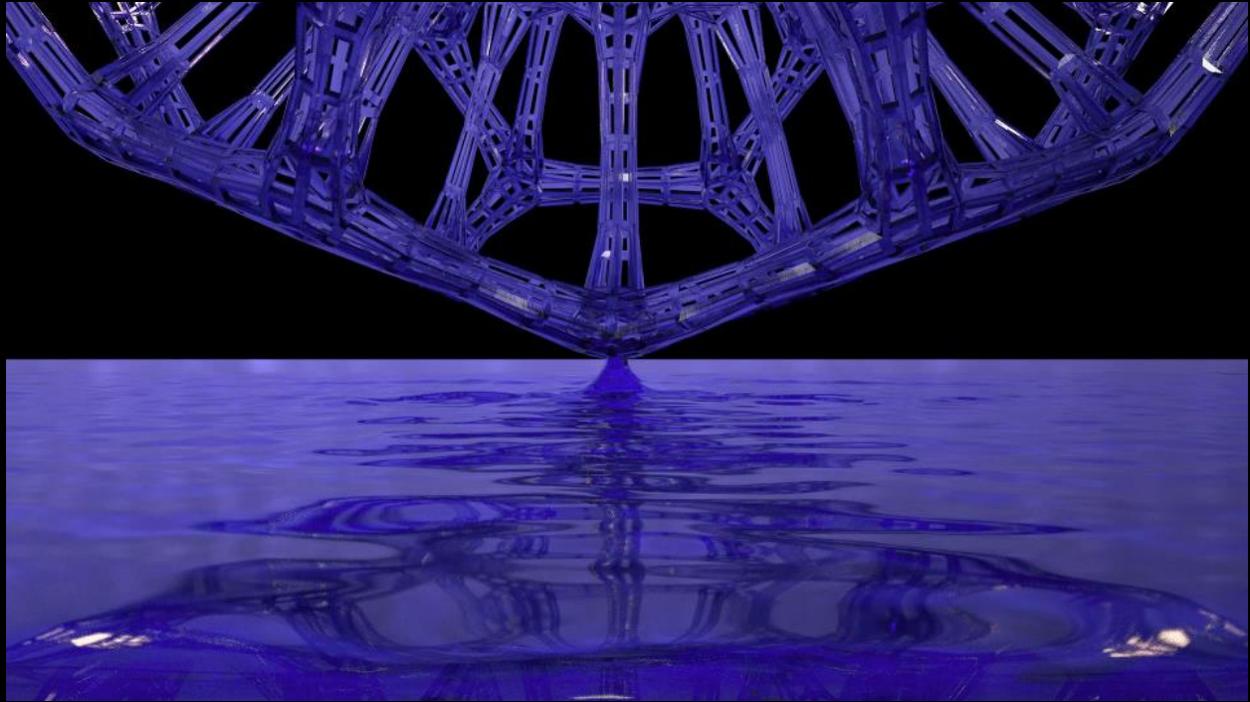
From here on, we watch in close-up as the buckyball rises from the resin, forming just below the surface via a light-driven interaction. Here's an example of one of the beauty pass renders...



[Buckyball Rising](#)

For these 'buckyball rising' shots, Fusion created a shallow bath of high res fluid and pulled the buckyball geometry up thru it. The fluid did its heroic best to stick to the complex geo for far longer than it was wanted, so we had to push it off with a custom force field. More to come in the full case study.

Finally the buckyball is fully formed, and leaves the resin bath, to complete the spot.



[Final Shot](#)

