

Carbon3D introduces CLIP, breakthrough technology for layerless 3D printing

Harnesses light + oxygen to grow commercial quality parts at game-changing speeds

Partners with Sequoia and Silver Lake Kraftwerk and raises \$41 million

Vancouver, CANADA - March 16, 2015 - Carbon3D today emerged from stealth on the main stage of the [TED conference](#) with an innovative approach to polymer-based 3D printing that promises to advance the industry beyond basic prototyping to 3D manufacturing. The new Continuous Liquid Interface Production technology (CLIP) harnesses light and oxygen to continuously grow objects from a pool of resin instead of printing them layer-by-layer. The technology was simultaneously introduced to the scientific community as the cover story in the journal *Science*. [Carbon3D's](#) CLIP technology raises the state-of-the-art in 3D printing in three ways:

- **GAME-CHANGING SPEED:** 25-100 times faster than conventional 3D printing
- **COMMERCIAL QUALITY:** produces objects with consistent mechanical properties
- **MATERIAL CHOICE:** enables a broad range of polymeric materials

“Current 3D printing technology has failed to deliver on its promise to revolutionize manufacturing,” said Dr. Joseph DeSimone, CEO and Co-Founder, Carbon3D. “Our CLIP technology offers the game-changing speed, consistent mechanical properties and choice of materials required for complex commercial quality parts.”

How CLIP Works

Existing 3D printing, or additive manufacturing, technology is really just 2D printing, over and over again. As a result, 3D printed parts take many hours, even days, to produce and are mechanically weak due to their shale-like layers. Using a tunable photochemical process instead of the traditional mechanical approach, Carbon3D's layerless continuous liquid interface production technology (CLIP) eliminates these shortcomings to rapidly transform 3D models into physical objects. By carefully balancing the interaction of UV light, which triggers photopolymerization, and oxygen, which inhibits the reaction, CLIP continuously grows objects from a pool of resin at speeds 25-100 times faster than traditional 3D printing.

At the heart of the CLIP process is a special window that is transparent to light and permeable to oxygen, much like a contact lens. By controlling the oxygen flux through the window, CLIP creates a “dead zone” in the resin pool just tens of microns thick (about 2-3 diameters of a red blood cell) where photopolymerization cannot occur. As a series of cross-sectional images of a 3D model is played like a movie into the resin pool from underneath, the physical object emerges continuously from just above the dead zone. Conventionally made 3D printed parts are notorious for having mechanical properties that vary depending on the direction the parts were printed because of the layer-by-layer approach. Much more like injection-molded parts, CLIP produces consistent and predictable mechanical properties, smooth on the outside and solid on the inside.

Venture Backing

Carbon3D also announced it had partnered with Sequoia Capital to lead the company's Series A round of financing in 2013 along with Northgate Partners, Piedmont Capital Partners and Wakefield Group. Silver Lake Kraftwerk led the Series B round of financing in 2014 with Northgate Capital and Sequoia Capital, for a total raise of \$41 million to commercialize the technology.

"If 3D printing hopes to break out of the prototyping niche it has been trapped in for decades, we need to find a disruptive technology that attacks the problem from a fresh perspective and addresses 3D printing's fundamental weaknesses," said Jim Goetz, Carbon3D board member and Sequoia partner. "When we met Joe and saw what his team had invented, it was immediately clear to us that 3D printing would never be the same."

"We had studied the additive manufacturing ecosystem comprehensively and had concluded that the promise far exceeded the current reality in the marketplace," said Adam Grosser, Carbon3D board member and Managing Director at Silver Lake Kraftwerk. "When we witnessed the CLIP process, we believed we had found a company that had invented a solution to speed, quality, and material selection. We are proud to work alongside Carbon3D to create a new category of 3D manufacturing."

To learn more visit: <http://carbon3d.com>

Media kit: <http://carbon3d.com/news>

About Carbon3D

Carbon3D, a Silicon Valley based company, was founded in 2013 in Chapel Hill, NC. Working at the intersection of hardware, software and molecular science, Carbon3D is delivering on the promise of 3D printing, allowing commercial customers to go beyond prototyping to achieve 3D manufacturing. The Continuous Liquid Interface Production technology (CLIP) was originally developed by Professor Joseph DeSimone, Professor Edward Samulski, and Dr. Alex Ermoshkin and introduced simultaneously at TED 2015 and to the scientific community (*Science*, 2015). Since its inception, Carbon3D has partnered with Sequoia Capital to lead the company's Series A round of financing in 2013 along with Northgate Partners, Piedmont Capital Partners and Wakefield Group. Silver Lake Kraftwerk led the Series B round of financing in 2014 with Northgate Capital and Sequoia Capital, for a total raise of \$41 million to date.

About Sequoia

The [Sequoia](#) team helps a small number of daring founders build legendary companies. We spur them to push the boundaries of what's possible. In partnering with Sequoia, companies benefit from our unmatched community and the lessons we've learned over 40 years working with Steve Jobs, Larry Ellison, John Morgridge, Jerry Yang, Elon Musk, Larry Page, Jan Koum, Brian Chesky, Drew Houston, Adi Tatarko and Jack Dorsey, among many others. In aggregate, Sequoia-backed companies account for more than 20% of NASDAQ's total value. We're proud

that their success also fuels great causes: since 2000 alone we have returned more than \$10 billion to non-profits like the Ford Foundation, Mayo Clinic and MIT.

About Silver Lake Kraftwerk

Silver Lake Kraftwerk is part of Silver Lake, the global leader in technology investing with over \$23 billion in combined assets under management and committed capital and a team of approximately 110 investment and value creation professionals located around the world. Silver Lake Kraftwerk focuses on providing growth capital to technology innovators with established business models in the energy and resource sectors. Silver Lake Kraftwerk targets companies globally that leverage technology and business model innovation to improve energy efficiency, reduce waste and emissions, harness renewable energy, and more efficiently use natural resources, among other applications. For more information about Silver Lake Kraftwerk and its entire portfolio, please visit www.silverlake.com.

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