

innovation works
CASE STUDY

Printing Life: Mimetic's Precision Additive Manufacturing Disrupts Preclinical Testing

Before biomedical scientists can begin new preclinical tests, they are often forced to spend days or weeks manually building custom tools, microfluidic chips, and tissue scaffolds needed to run their experiments. Many of these devices rely on silicone to safely culture human cells, but traditional silicone fabrication requires costly injection molds that can stall prototype production for weeks. Compounding this challenge, preclinical testing still relies heavily on animal models that can cost tens of thousands of dollars each, yet frequently fail to predict how a drug will actually perform in human bodies. Life sciences urgently need an automated platform that combines rapid benchtop microfabrication with human-relevant tissue models to bypass cleanroom delays, cut costs, and replace outdated animal testing.

Kevin Dai founded **Mimetic** in 2024 to eliminate these exact manufacturing and testing bottlenecks. A roboticist and materials scientist with a PhD from Carnegie Mellon University (CMU) specializing in soft robotics, Dai has been building things since his early days making DIY 3D printers. After studying mechanical engineering at Georgia Tech, he turned his focus to developing flexible materials and soft robotic parts at CMU, where he experienced firsthand how slow and costly traditional silicone injection molding was. Recognizing that high-precision silicone had historically resisted direct 3D printing, he leveraged CMU's Innovation Commercialization Fellowship to pioneer novel biocompatible material chemistries and printing hardware.

Today, Mimetic is rethinking how preclinical drug testing is constructed. The company is combining biocompatible 3D-printing materials, organ chips, and organoids into an automated platform designed to turn weeks of manual fabrication into a seamless, same-day workflow. The approach will give pharmaceutical developers a faster, lower-cost way to generate more human-relevant data.

Challenge

Before joining the Innovation Works support framework, Mimetic faced infrastructure and operational hurdles. Working out of a makeshift wet lab equipped with only an indoor fumehood, the team was strictly limited in the chemical reactions they could safely attempt. This constraint stalled their progress in polymer chemistry. At the same time, standard commercial 3D printers required pouring large volumes of resin per run, forcing the team to waste expensive, custom-synthesized materials during basic calibration tests.

Commercially, Mimetic struggled with a broad focus and an undefined target market. The emerging answer was to move further downstream, using Mimetic's unique materials and precision printing capabilities to tackle the much larger challenge of building realistic organ-on-a-chip models for drug development. Transitioning from a general material supplier to a focused life sciences platform required specialized chemical facilities, modified hardware, and strategic business guidance.

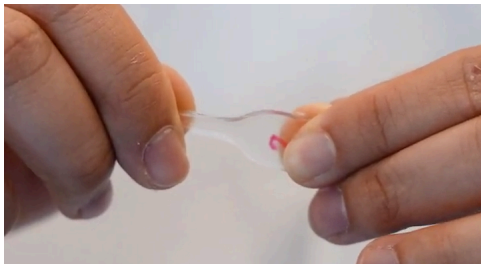
Project Details

Company:
Mimetic

Year Founded:
2024

Founder:
Kevin Dai, PhD

Programs Participated In (Year):
AlphaLab Health (2026)
Robotics Factory Scale Program (2025)
Robotics Factory Accelerate Program (2026)





AlphaLab and the Robotics Factory give us access to a fully fleshed-out prototyping facility with every tool we need to fabricate our hardware. Getting involved was a no-brainer."

--Kevin Dai
Founder, Mimetic

Solution

Innovation Works and Robotics Factory gave Mimetic the environment to push both sides of the problem forward. Access to lab space at AlphaLab Health was a major unlock. Gaining access to fully equipped chemical fume hoods allowed Dai's team to expand their chemistry research safely, leading to breakthroughs in novel silicone synthesis reactions and stronger material formulations over a six-month period. That work accelerated development of stronger, biocompatible materials that can support living cells, moving Mimetic closer to a commercially viable printing material.

Robotics Factory also gave the team access to manufacturing resources that helped Mimetic refine their physical hardware. Working alongside **Andrew Katon**, Innovation Works' electromechanical engineer with deep experience in 3D printing, Mimetic expanded its manufacturing capabilities and modified its 3D printers for low-volume fluid dispensing. These custom modifications enabled the team to run material characterization tests using just half a vial of resin rather than a standard cup-sized vat.

Beyond facility support, mentorship from AlphaLab Health's Program Manager **Kelsie LaBarbara**, and mock advisory boards helped Mimetic sharpen its market focus. Through structured customer discovery bootcamps, the company narrowed its aperture from general 3D printing materials toward high impact organ-on-a-chip microfluidic models, targeting lung cancer therapeutic efficacy as its initial beachhead. This refined focus transformed Mimetic from an open-ended materials vendor into a targeted life sciences partner positioned to demonstrate clear commercial value to pharmaceutical R&D leaders.

Moving forward, Mimetic is executing a phased commercialization strategy that pairs near term material sales with long term platform development. While working toward full platform validation targeted for 2028, the company is preparing to commercialize its finalized biocompatible 3D printing materials for academic and research markets. On the clinical front, Mimetic is advancing research collaborations, including a National Institutes of Health proposal partnered with Boston Children's Hospital to study microvascular capillary blood vessels. Additionally, the company is engaging prospective partners at institutions such as the University of Pittsburgh and Cedars-Sinai, while actively converting early biotech interest into formal Letters of Intent and pilots to support its upcoming pre-seed funding round.

Mimetic's iterative evolution demonstrates how deep tech engineering and regional ecosystem support can be combined to reshape complex industries. By transitioning from fundamental materials research to an automated preclinical testing platform, Kevin Dai and his team are dismantling traditional biomedical manufacturing barriers. As Mimetic expands its scientific leadership and advances its organ chip models, the company is positioned to lower drug discovery costs, reduce reliance on animal testing, and significantly accelerate the pace of life saving medical innovation.

Innovation Works and the Robotics Factory

Innovation Works is one of the most active early-stage investors in the country and the most active in Pennsylvania. Since its inception of the seed fund in 1999, Innovation Works has invested in over 800 companies that have gone on to raise $3.74 billion in follow-on funding. Innovation Works is part of the Ben Franklin Technology Partners network, which has catalyzed economic growth over the last 30 years by providing access to capital and networks that help foster innovation and technology-based economic development in Pennsylvania. The Robotics Factory is an array of robotics programs led by Innovation Works and the Pittsburgh Robotics Network. Learn more at **innovationworks.org** and **roboticsfactory.org**.