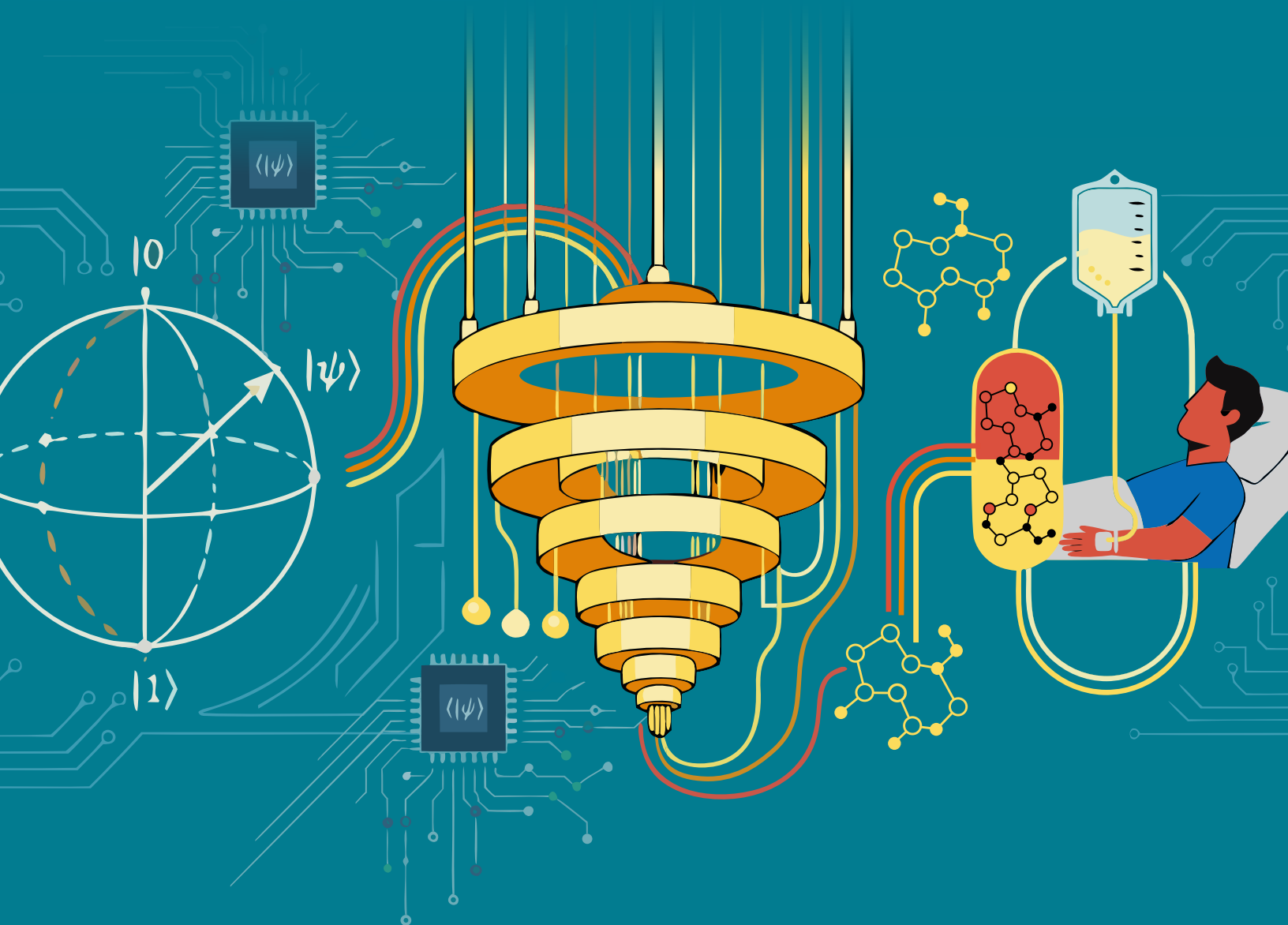


Stanford | Office of Technology Licensing

FY 2025 Annual Report

Qubits to Clinic



Contents

Welcome From the Associate Vice Provost	1
Year in Review	2
Two Rare Disease Treatments Bring Hope	4
Startup Highlights	8
Licensees Making Strides	10
Step Into the Quantum World	13
Strategic Alliances Bring New Ideas, Opportunities	14
HIT Fund Startup Spotlight	18
More Streamlined, Effective Industrial Collaborations	22

Welcome From the Associate Vice Provost

Hello, and welcome to Stanford OTL's FY 2025 Annual Report.

In this year's edition, you'll find compelling stories showing how Stanford inventions are uplifting and enlivening our world in areas ranging from quantum computing to treatments for devastating rare diseases. It contains glimpses of inventions to come, as well, for example from new research collaborations that might create powerful new MRI systems and other medical imaging technologies.

This year's report also touches on a number of strategic initiatives within OTL that are making our work supporting faculty and research more efficient, transparent, and impactful. As challenges and uncertainties swirl around U.S. universities, we are enacting processes that help Stanford faculty continue to innovate, while seeking ways to deepen that support.

One form that support took in 2025 was the finalization of Project Sancus initiatives at OTL to improve research contracting. New tools and processes like a comprehensive risk matrix and an expanded implementation of the Ironclad contract management software are helping to automate and streamline many aspects of our work. Industrial Contracts Office (ICO) and Licensing staff are also now working more collaboratively than ever before, thereby empowering goal-oriented management of research and IP portfolios through stronger relationships with our frequent faculty customers and more efficient negotiation and management of strategic research alliances. These improvements, along with concerted efforts to intelligently integrate AI into workflows across all of our teams, are freeing up staff time for more critical matters throughout the office.

These behind-the-scenes efforts are already galvanizing our ongoing work supporting Stanford science. In FY 2025 we saw three major strategic alliances come to fruition, each advancing unique aspects of medical technology, while OTL's High Impact Technology (HIT) Fund celebrated numerous teams receiving follow-on translational grant funding or startup funding of more than 10X our investment.

Stanford technologies continue to find success, with 541 new inventions disclosed in FY 2025, 28 startups formed, and 118 IP licenses and options executed. Licensing activity remains a strong source of support for research across the University, generating \$88 million in income this year, much of which will be reinvested in the next generation of groundbreaking technologies.

While we proudly stand by OTL's accomplishments, we look forward to continuing to innovate and improve the services we offer to Stanford faculty and the University as a whole. You can reach out to us at any time through our website: otl.stanford.edu.

Karin Immergluck,
Associate Vice Provost, OTL



Karin Immergluck,
Associate Vice Provost,
Office of Technology Licensing

Year in Review

Supporting technologies that benefit the world

Translating to Society

NEW TECHNOLOGIES

541 

FOUNDATIONAL STARTUPS

28 

OPTIONS & LICENSES

118 

Industry Engagement

EXECUTED SPONSORED RESEARCH AGREEMENTS & AMENDMENTS

419 

TOTAL AGREEMENTS

4,963 

INDUSTRY FUNDING

\$143M

AFFILIATE FUNDING

\$46M

SPONSORED RESEARCH FUNDING

\$97M

Sustaining Stanford's Innovation Cycle

TOTAL ROYALTY AND EQUITY INCOME

\$88M 

ROYALTIES

\$70M

EQUITY LIQUIDATED

\$18M

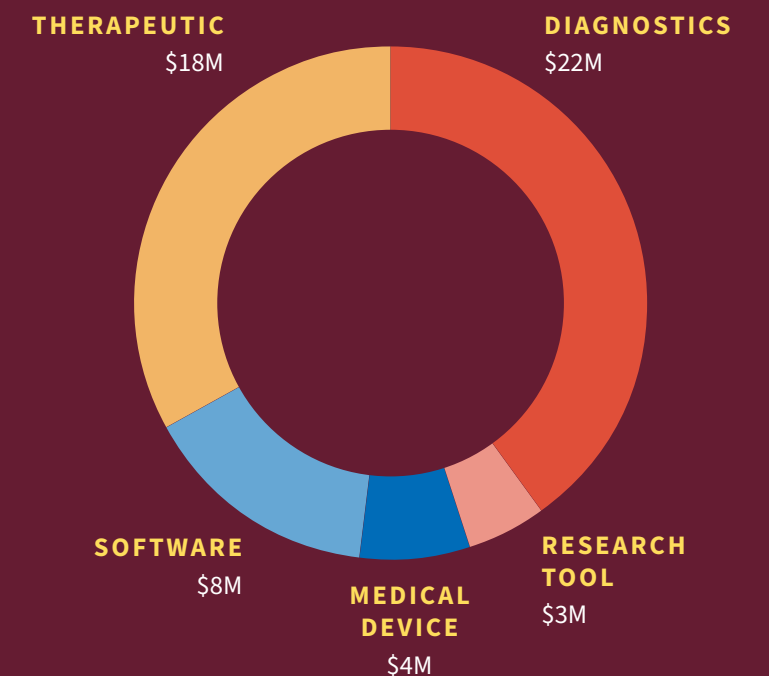
FY 2025 Royalty Distribution to Departments, Inventors, Schools & Third Parties



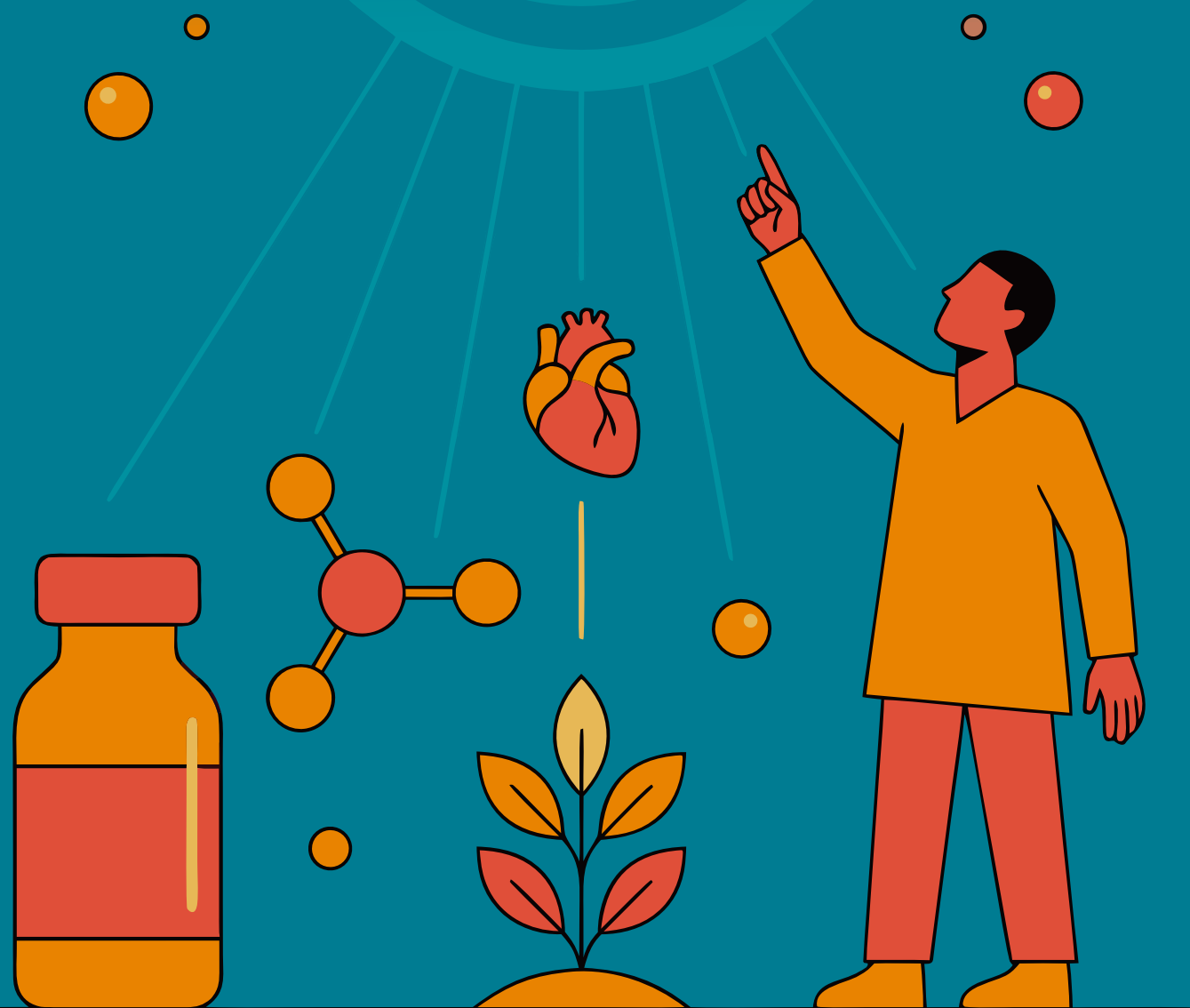
Top Ten Technologies Generated

\$55M

Sector Breakdown



Two Rare Disease Treatments Bring Hope



A Novel Gene Therapy Offers Hope for Epidermolysis Bullosa Patients

For patients with the rare disease recessive dystrophic epidermolysis bullosa (RDEB), even the slightest touch can mean agony. This variant of epidermolysis bullosa (EB), a genetic condition that affects around 500,000 people worldwide, leaves patients with skin so fragile that it blisters from even a light touch.

The cause is a mutated gene for type VII collagen, a skin protein that anchors layers of skin together. Those with the disease often spend their lives encased in bandages, slowly accumulating wounds that refuse to close.

“Many of these patients die because of unhealed wounds,” says Professor Jean Tang, one member of a Stanford team that spent decades researching ways to treat EB.

Those researchers’ combined efforts led in 2025 to the FDA approval of ZEVASKYN®, the first long-lasting treatment for RDEB in adults and children. The therapy involves taking samples of patients’ skin, isolating cells, inserting a corrected collagen gene, and then growing skin cells into sheets in the lab to be surgically applied over wounds. Patients treated during clinical trials of the therapy saw their wounds heal, and remain healed, in some cases for years after just a single application. Further, because the sheets are grown from patients’ own cells, there’s no need for immunosuppressive drugs, and no chance of rejection. ZEVASKYN is now available to RDEB patients at five clinics across the country, including Stanford.

Treatment recipients said they could do things never before possible, like dancing, says Michael Hund, the CEO of the EB Research Partnership (EBRP), a nonprofit that supports EB research and clinical trials at Stanford and elsewhere.

“It really was life-changing for many that were on those clinical trials,” Hund says.

“

It really was life-changing for many that were on those clinical trials.”

A Comprehensive Research Program

While EB research at Stanford dates back decades, ZEVASKYN’s genesis was in pioneering research in the mid-2000s by Zurab Siprashvili, PhD, a research scientist in the lab of Professor Paul Khavari. Brought on by then-chair of the dermatology department Professor Alfred Lane, and with the support of Prof. Khavari, Dr. Siprashvili created a retroviral vector that could carry the lengthy type VII collagen gene, at a time when gene therapy was unproven and even considered dangerous.

“Once I saw the patients, I think my path was set,” Dr. Siprashvili says. “They have a tremendous amount of pain that they have to overcome in everyday life. Their courage inspired me.”

Dr. Siprashvili’s efforts led in 2010 to Investigational New Drug (IND) authorization from the FDA for the therapy, setting up Phase I and II clinical trials led by Prof. Tang and Professor Peter Marinkovich, which began in 2013. Still, moving from a scientific victory to clinical translation meant navigating numerous obstacles, including constructing a sterile manufacturing facility for the grafts at Stanford and handling fragile patient samples. EBRP support, totaling more than \$10 million for EB research at Stanford, was crucial during this time, allowing Stanford researchers to continue studying the rare disease and refine the process of growing gene-edited skin grafts.

The work convinced Cleveland-based biopharmaceutical company Abeona Therapeutics to license the therapy in 2016 and carry out a larger Phase III trial, which intersected with the COVID-19 pandemic, adding another layer of risk and difficulty for patients. Following that trial’s success, ZEVASKYN was approved by the FDA in April 2025, allowing Abeona to bring the product to patients through a network of qualified treatment centers, including Stanford. Throughout the development process, the entire team, from surgeons to nurses to trial participants, was unwavering in its commitment.

“These kids are really soldiers going forward, perhaps even gladly letting us do experiments to help them because they know other kids with EB and they want to do something,” Prof. Lane says.

A Stanford-Wide Effort

ZEVASKYN's development was helped along by numerous groups within Stanford, including the SPARK program, the Center for Definitive and Curative Medicine (CDCM), and the Lucile Packard Children's Hospital. The therapy was the very first product made by the Laboratory for Cell and Gene Medicine (LCGM), an industry-grade drug manufacturing facility at the School of Medicine, whose researchers refined the processes that allowed Abeona to take over production of the treatment. OTL was involved throughout that process, handling the IP strategy, managing and structuring the licensing deal with Abeona, and ensuring the technology handoff proceeded smoothly so the researchers could focus on helping patients.

"We couldn't have done it without Stanford's infrastructure," Prof. Tang says.

ZEVASKYN joins another Stanford-led therapy for EB, VYJUVEK®, a topical gel that delivers a similar gene therapy. Other efforts could expand the kinds and range of treatments even further, like ongoing work at Stanford using gene-corrected induced pluripotent stem cells. ZEVASKYN has helped pave the way for future treatments, Tang says, by overcoming scientific and regulatory barriers.

"We've shown that this path can be walked," Dr. Siplashvili says. "If we can get it done, other people can do it too, and they might do it better than I did. And I will be very grateful if others will follow."

“Once I saw the patients, I think my path was set. Their courage inspired me.”

A Precise Molecule for Proteins That Misfold

The transthyretin protein displays an unusual symmetry for a biological molecule — four distinct lobes arrayed in a suggestion of a four-leaf clover, each one identical at the molecular level. As with most proteins, this shape is crucial for transthyretin, also called TTR, to function.

“We believed in AG10, but belief isn't enough — confidence is earned one dataset at a time.”

When the TTR tetramer becomes unstable, either through a disease-associated TTR mutation or through age-related destabilization of wild-type TTR, the protein can dissociate, lose its structure, and misfold. That causes TTR to build up, primarily in the heart, causing a disease called transthyretin amyloid cardiomyopathy (ATTR-CM). Due to the disease, the heart muscle gradually stiffens, robbing it of the ability to beat. Without treatment, ATTR-CM is a fatal disease that can ultimately necessitate heart transplantation.

A new drug called Attriby based on a molecule developed at Stanford is now improving those patients' odds by stabilizing TTR tetramers with a high degree of effectiveness, preventing their dissociation and reducing the misfolding and amyloid aggregation that damage the heart. In trials, Attriby improved patients' survival rate and led to a 50% decline in cardiovascular-related hospitalizations compared to a placebo and improved basic health measures like shortness of breath, all with fewer side effects than other drugs.

The drug molecule, called AG10, that became Attriby emerged from work by Isabella Graef, a former professor at the Stanford School of Medicine and now the CEO of Shenandoah Therapeutics, and Mamoun Alhamadsheh, a former research associate at Stanford University who is now a professor at the University of the Pacific.

Graef's path toward Attriby began 25 years ago, when she diagnosed her mother with Creutzfeldt–Jakob disease, a rare and rapidly fatal neurodegenerative protein-

folding disease. As both physician and daughter, she confronted the devastating reality of these disorders and how little medicine could offer. That experience focused her determination to make a difference for patients with protein-folding diseases.

For Alhamadsheh, too, the motivation was personal; he had lost his mother to Alzheimer's disease when she was only in her early sixties. Alhamadsheh says, "While I wasn't able to help in the context of Alzheimer's disease, it's meaningful to me to help address a related amyloid disease affecting the heart."

Years of Steady Science

The concept behind Attriby was grounded in human biology: an inherited stabilizing TTR variant, T119M, acts as a trans-suppressor and protects carriers from disease by tightening the TTR tetramer.

The team's key insight was that effective stabilization of TTR requires not just binding within the channel, but achieving strong enthalpic and selective interactions that engage the critical regions of the TTR binding pocket, including both the top and bottom sites that contribute to maintaining tetramer integrity. This represented a different way of thinking in the field at the time and led to the design of the first high-throughput screening strategy specifically aimed at identifying true stabilizers with the appropriate binding profile, not just molecules that bind.

That screen, performed at Stanford in the High-Throughput Screening (HTS) facility of the Department of Chemical and Systems Biology, identified the starting scaffold from which AG10 was ultimately developed.

Using one of the HTS-identified molecules as a chemical starting point, Alhamadsheh, a medicinal chemist, began a structure-guided optimization. Guided by X-ray crystallography, he designed and synthesized compounds to precisely fit the TTR binding pocket and mimic the stabilizing effect of the protective variant. Through iterative optimization of binding affinity and selectivity, AG10 (Alhamadsheh–Graef molecule 10) was discovered.

From Molecule to Therapeutic

Remarkably, the molecule remained unchanged through the entire path from discovery through clinical testing to FDA approval, an exceedingly rare outcome in drug development. "AG10 emerged already possessing the characteristics of a clinical candidate," Alhamadsheh says.

“One of the biggest challenges was simply getting the world to believe in AG10.”

"It was a precision-designed molecule that ultimately translated into meaningful clinical benefit."

Though AG10 benefited from strong science, no drug has an easy path to the clinic. To begin that process, Graef and Alhamadsheh co-founded Eidos Therapeutics in 2013 to help move AG10 through IND-enabling studies and clinical trials. Funding the effort proved challenging and required persistence and grit, but a turning point came in 2016, when BridgeBio, LLC invested in Eidos Therapeutics. That set AG10 on the clinical path that ultimately led to its FDA approval as Attriby.

Support for their work from the SPARK program at Stanford was crucial during this time, say both Graef and Alhamadsheh, helping the two with initial funding, advice, and providing a framework for clinical translation as they worked to take their molecule beyond the lab. Though Attriby's fate at times seemed uncertain, the two remained utterly committed to their creation.

"One of the biggest challenges was simply getting the world to believe in AG10 and to raise the funding needed to carry an academically discovered molecule into the clinic," Graef says. "At the time, ATTR-CM was widely viewed as a rare disease; today, although underdiagnosis remains an issue, the field has recognized ATTR-CM is far more common than once appreciated."

She continues: "We believed in AG10, but belief isn't enough — confidence is earned one dataset at a time. Though there were more rejections than I care to remember, what carried us through these years was my inability, as a physician, to walk away from patients who urgently needed a better treatment and Mamoun's conviction in the compound he had synthesized."

Startup Highlights

Achievements from Stanford licensees in FY 2025



AIRNA

The RNA-editing startup closed a \$155 million Series B funding round in April, bringing the total funding raised to \$245 million. The company, co-founded by Stanford Professor Jin Billy Li, will use the additional funds to launch a Phase 1/2 trial of an RNA-editing therapy for alpha-1 antitrypsin deficiency (AATD), a genetic disease that affects the lungs and liver.



Ceribell

Ceribell, which is developing an AI-powered platform that turns brain waves into sounds and images to help diagnose seizures, undertook a successful IPO in October 2024. The startup emerged from pioneering work by Professor Chris Chafe on the “musification” of complex datasets.



MapLight Therapeutics

MapLight is developing therapeutics for brain disorders that target individual neural circuits, improving efficacy and reducing side effects. The startup’s IPO raised more than \$250 million, helping to advance the clinical development of treatments for schizophrenia, Alzheimer’s disease, and more.



SiteOne Therapeutics

SiteOne is developing novel small-molecule sodium channel inhibitors that act on the nerves to treat pain and other conditions stemming from the peripheral nervous system. The biotech startup, which emerged from the lab of Professor Justin Du Bois, was acquired by Eli Lilly in May.



Clearnote Health

The cancer-detection startup received approval in the United Kingdom for two blood-based diagnostic tests: one for pancreatic cancer and one for multiple cancer types. Both tests use epigenomic and genomic markers to detect cancer early in its development.



Earli

Earli is developing ways to program cancer cells to produce compounds that cause them to identify and ultimately destroy themselves. The startup, which licensed foundational technology from the Gambhir lab, raised an additional \$44 million in funding.



Stellaromics

Stellaromics released its first product, a 3D imaging platform that will advance the field of spatial biology. The platform, called Pyxa®, can perform spatial transcriptomics in samples up to 100 micrometers thick, a significant advance over previous platforms that only worked in 2D.



UniRev

A payment platform that emerged from a project unifying Stripe payments across Stanford student groups, UniRev now lets hundreds of universities handle transactions securely and scalably. UniRev won the 2025 Pinnacle Awards Grant Prize from the Association for Financial Professionals.



Epicrispr Biotechnologies

Epicrispr announced the inauguration of its clinical trial for EPI-321, an epigenetic therapy for facioscapulohumeral muscular dystrophy (FSHD). The first-in-human trial tests the drug’s ability to silence the faulty gene expression that leads to progressive muscle degeneration.



Inflammatrix

The diagnostics startup from Professor Purvesh Khatri’s lab received FDA approval for its first-in-class molecular test for sepsis. The test uses AI algorithms to assess patient prognosis based on markers of infection and illness severity.



Vista AI

Vista AI secured \$29.5 million in Series B funding to advance its AI-powered MRI platform and expand use cases to include cardiovascular, brain, prostate, and spine imaging.



Zoox

Robotaxis from the autonomous vehicle maker, which took a foundational license from Stanford, drove their one-millionth driverless mile on public roads in late 2025. Riders can now hail an electric robotaxi from the company in San Francisco and Las Vegas.

Licenseses Making Strides

These companies are advancing big ideas
and tiny molecules



Wenxiao Huang, CEO and co-founder
of Feon Energy



Zhiao Yu, CTO and co-founder of
Feon Energy



A glimpse inside Feon's lab.

Better Electrolytes, Better Batteries

As a PhD student at Stanford, Zhiao Yu was in constant competition — with himself. The organic chemist had created new molecules for battery electrolytes, but never quite felt satisfied. The result was not one but multiple molecular creations, each better than the last.

Today, that work is the foundation of Stanford startup Feon Energy, which has created a library of electrolyte formulations that could power better batteries for future electric vehicles, energy-storage facilities, and consumer electronics.

Traditional approaches to electrolyte design based on mixing and matching existing ingredients were too slow to address the growing need for powerful, reliable, and safe batteries across industries today, says Wenxiao Huang, Feon's co-founder and CEO. Instead, with help from an AI-powered prediction model, Feon is creating new electrolyte molecules from scratch, allowing them to customize recipes for customers' needs, whether that's better tolerance for temperature extremes or longer cycle life.

It's an approach more familiar to the pharmaceutical industry, says Yu, now Feon's CTO. With careful manipulation at the atomic scale, the company can "design and synthesize derivative analogs of materials, finely tuned atom by atom," he says.

Feon signed multiple development agreements with major automakers in 2025 and is looking forward to the first commercial launch of a product using one of its electrolytes in the fall of 2026. In addition, Huang says the company is at a point where it can begin to address customers' specific needs with custom blends drawn from its library of molecular formulations. That cache of information on chemical formulas and battery performance is a powerful source of training data for Feon's predictive AI model, Huang adds, allowing the company to compress the R&D cycle from more than a year to just three or four months.

Yu credits Stanford programs, including OTL's High Impact Technology (HIT) Fund and the TomKat Center for Sustainable Energy, with helping Feon launch, saying that the seed money and connections each offered were crucial to its current success.

A New Generation of Weight-Loss Drugs

Weight-loss drugs like Ozempic and Wegovy are remarkably effective at helping people shed pounds, but these drugs come with side effects. Nausea, vomiting, and abdominal pain are common and can make sticking to a therapeutic regimen difficult.

Many of those side effects stem from the fact that GLP-1s target not only areas of the brain involved in appetite, but also tissues in the gut, pancreas, and elsewhere. But that's not the case for a new peptide found by Katrin Svensson, an associate professor in the Department of Pathology, and her colleagues. The molecule, called BRP, is made naturally by the human body and possesses the same appetite-dampening qualities as GLP-1s, Svensson says, with likely fewer side effects.

"What we found with this peptide is that it only acts on the brain," Prof. Svensson says. "We don't see any activity in any other organ."

That could make for an exceedingly targeted weight-loss drug, which Prof. Svensson is pursuing at a startup she helped found called Merrifield Therapeutics. With expanded resources and a larger team, she is refining, among other things, the optimal delivery strategy for her molecule — it could be either a weekly injectable or a pill — and preparing for the gauntlet of clinical trials.

Prof. Svensson says that process has been helped by the fact that the molecule is already produced in mammals, including humans. In mouse tests, her team was able to inject the compound directly, with no lab alterations required.

It's the first startup for Prof. Svensson, who says that BRP's properties inspired her to take a step into the unknown. "Given the promise of this molecule, I didn't want to just license it. I wanted to see this through."

That process is daunting, but Prof. Svensson credits OTL staff with helping her navigate early questions about IP and startup formation. "They have been pretty open with the process and what to expect in the different scenarios," she says.



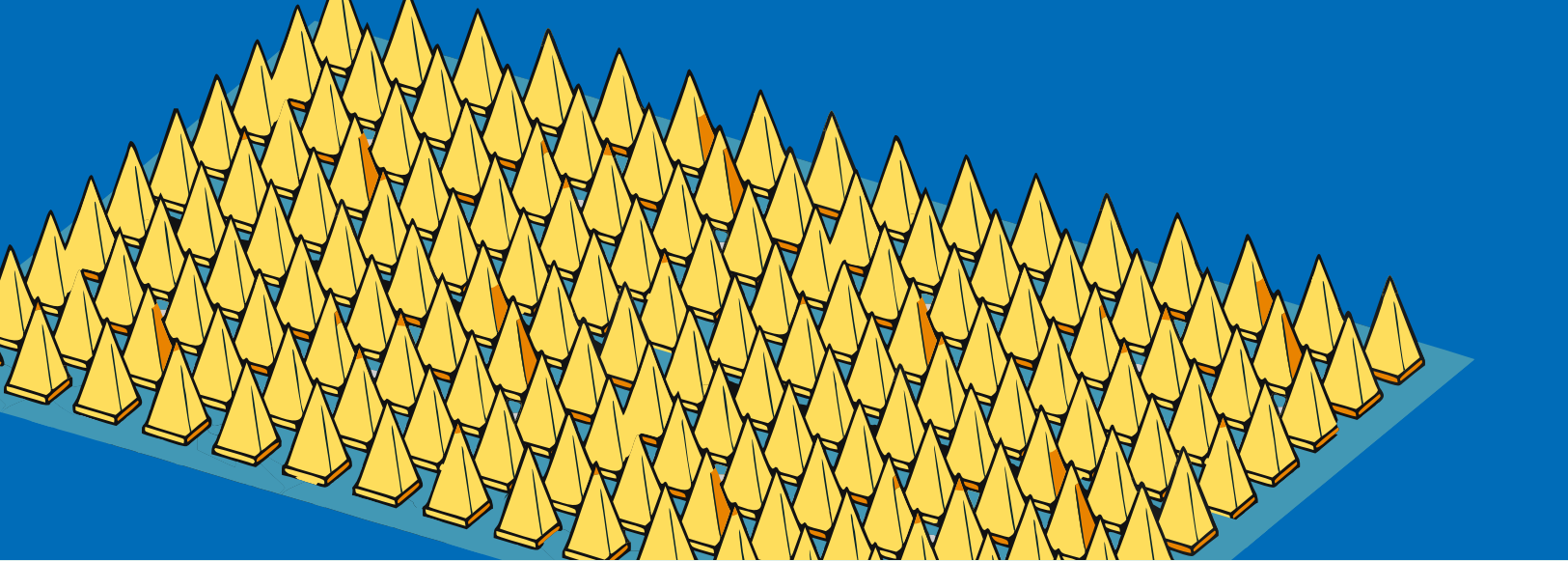
Prof. Svensson during initial testing of BRP.



Neil Padte, Chief Financial Officer of
Merrifield



Katrin Svensson, Associate Professor of
Pathology and Merrifield co-founder



Renee Ryan, CEO of PinPrint



Joseph DeSimone, Sanjiv Sam Gambhir Professor of Translational Medicine and Professor of Chemical Engineering

A Prickly Patch for Better Vaccine Delivery

Getting under your skin is normally not a good thing for a company — unless you're PinPrint. The Stanford startup makes patches studded with hollow microscopic needles made in shapes never before possible, with applications including delivering vaccines, collecting patient samples, and even upgrading your skincare regimen.

Key to PinPrint's designs is expertise in high-resolution 3D printing from professor of translational medicine and chemical engineering Joseph DeSimone's lab at Stanford, which is supported by the Gates Foundation, the NIH, and Wellcome Leap. 3D printing makes possible whole new categories of shapes, and brings the time to iterate on a design from months to just hours. "We can make things that few others can," says DeSimone, who is also a PinPrint co-founder. That includes things "unmakeable by traditional methods."

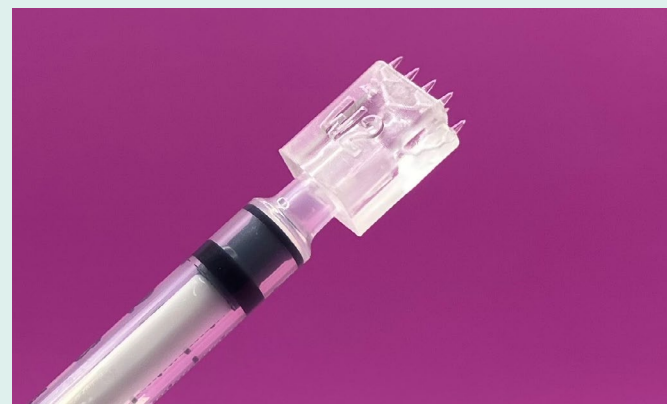
These new production methods have allowed PinPrint to imagine and test shapes for microneedles that can hold vaccines and other drugs safely and deliver them painlessly. The microneedles can perform that operation in reverse, too, sucking up small amounts of interstitial fluid filled with proteins and other potential biomarkers from beneath the skin.

The new approach to drug delivery — tiny needles filled with cargo, on a small patch — holds multiple benefits, says CEO Renee Ryan. PinPrint's patches cut down significantly on medical waste and allow vaccines and other drugs — like GLP-1s — to

be self-administered. The technology also allows payloads to be stored dry, cutting out the need for refrigeration.

Beyond individual applications, DeSimone and Ryan say they see PinPrint as a platform encompassing applications like topical anesthesia, skincare treatments, and noninvasive health tracking.

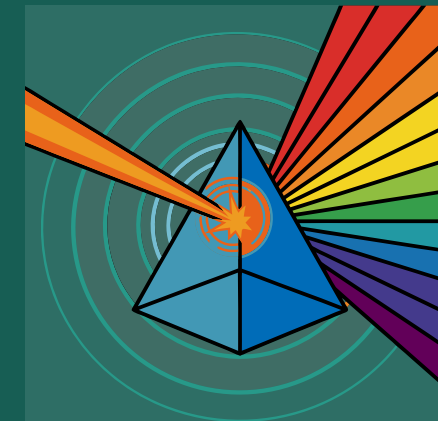
PinPrint recently moved into a new facility with two separate labs for formulation and printing and has already undergone the pre-submission process with the FDA for one product, Ryan says. Someday soon, getting your flu shot could be just about as simple as putting a sticker on your arm.



A microneedle patch from PinPrint.

Step Into the Quantum World

Quantum and photonics innovations from Stanford are setting up big advances in next-gen technology



Breakthrough Optical Frequency Processing for Quantum Computing and Beyond

PI: JON SIMON | DOCKET: S24-365

An extraordinarily selective prism for quantum computers

WHAT IT DOES One big challenge to making a working quantum computer is communicating with all of its quantum bits at the same time. This device, also called a wavelength multiplexer, helps solve that problem by separating or combining wavelengths of light that are very close together. By tuning each wavelength to a different atom, that ability could let it communicate simultaneously with more than 1,000 qubits inside a quantum computer.

APPLICATIONS Quantum computing, advanced optical sensing, next-generation optical communications

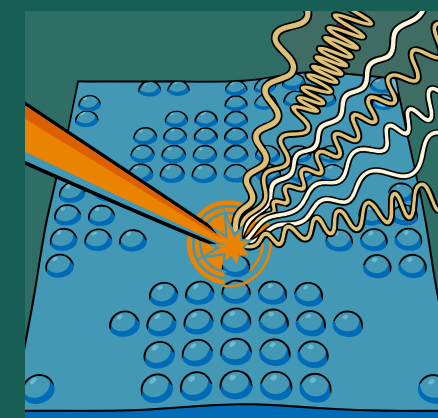
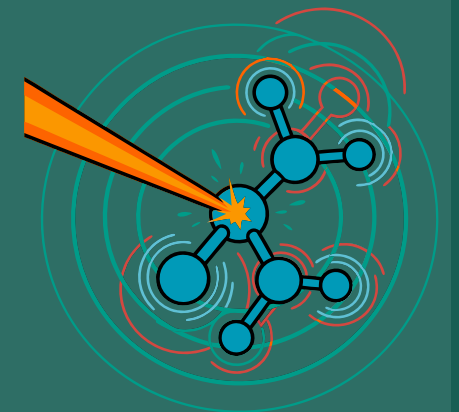
High-Throughput Single-Molecule Photoacoustic Absorption Spectroscopy with Nanomechanical Oscillators

PI: AMIR SAFAVI-NAEINI | DOCKET: S23-437

Turning light into vibrations to identify molecules

WHAT IT DOES This technology could let scientists detect individual molecules, a highly desired capability in fields such as biological diagnostics, using a novel approach grounded in light. Exquisitely sensitive nanomechanical resonators detect the unique vibrational fingerprint individual molecules give off when light is shone on them. That might reveal, for example, cancer biomarkers even very early on in tumor development.

APPLICATIONS Single molecule identification, drug discovery, biomolecular analysis



Manipulating Light with Nano-Actuated Electrically and Chemically Responsive Surfaces

PIs: MARK BRONGERSMA, NICHOLAS MELOSH | DOCKET: S23-481

A surface that swells to control light in new ways

WHAT IT DOES These polymers swell when exposed to electron beams, selectively revealing customized 3D surfaces that can bounce light back in specific ways to change properties like wavelength or polarization. That ability to tune how light is reflected could be used for a variety of applications, from detecting biomarkers to tunable lenses.

APPLICATIONS Flexible bio-interfaces, endoscopic light delivery, hyperspectral imagers, tunable nano-optics

Strategic Alliances Bring New Ideas, Opportunities

Three collaborations with leading industrial players are enhancing Stanford's impact



AstraZeneca

AI seems almost tailor-made for improving our ability to understand disease biology, given its capacity for uncovering subtle patterns in vast quantities of data. Fully integrating AI into the work of discovering and testing new therapeutics is not a straightforward proposition, however. Pushing the boundaries of what's possible with AI in drug discovery takes multifaceted expertise, determined effort, and a spirit of open inquiry. To support that work, Stanford's School of Medicine has established a strategic alliance with AstraZeneca, aimed at advancing innovation in therapeutics through AI.

"Combining Stanford's world-class academic research capabilities in AI and diverse scientific disciplines with AstraZeneca's focus on harnessing artificial intelligence to transform drug discovery and development makes this a powerful collaboration," says Jim Weatherall, vice president and head of enterprise data enablement at AstraZeneca.

The new alliance makes it easier for Stanford scientists like Professor Ron Dror, who is applying AI to drug discovery, and Professor Christina Curtis, who uses AI and computational modeling techniques for groundbreaking cancer research, to work together with AstraZeneca scientists at the earliest stages of research. Professor Euan Ashley, chair of the Department of Medicine at Stanford, says the early fruits of the collaboration are already evident: A recent joint publication demonstrates how AI-generated polygenic risk scores can be used to better select the right patients for clinical trials.

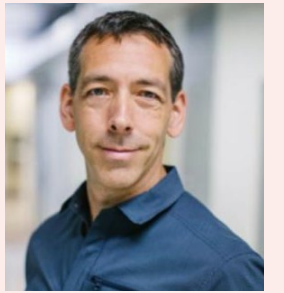
"AstraZeneca puts science at the center of everything that it does," Prof. Ashley says. "Like Stanford, they are focused on the future of medicine, which includes thinking about cutting-edge therapies that can make the biggest difference for our patients."

Collaborating through the new strategic alliance, as opposed to individual projects with a narrower focus, allows for the wide-ranging scope that will be necessary to realize the true potential of AI for medicine. The new alliance agreement will also make data sharing more efficient and comprehensive, speed the work of training and deploying AI solutions, and pair AstraZeneca's expertise in drug discovery and development with Stanford's excellence in computer science, engineering, and biomedical research, Prof. Ashley says.

"This alliance demonstrates the power of orthogonal thinking when academic and industry perspectives truly integrate," says Ezogelin Oflazoglu-Gruyters, vice president of external R&D and strategic alliances at AstraZeneca. "The trust-based relationship we've built enables both teams to tackle ambitious research questions that neither organization might have pursued independently."

Prof. Ashley notes the alliance also serves as a gateway to the broader Silicon Valley ecosystem. Stanford faculty have founded numerous startups focused on everything from treating rare diseases to applying AI to pressing problems like infant nutrition. An expanded, deepened collaboration with not only Stanford but its vast network of startups will amplify the potential of applying AI in novel ways to find treatments for disease never before possible.

"Like Stanford, AstraZeneca is focused on the future of medicine, which includes thinking about cutting-edge therapies that can make the biggest difference for our patients."



Euan Ashley, the Roger and Joelle Burnell Professor of Genomics and Precision Health, Arthur L. Bloomfield Professor of Medicine and Professor of Genetics and of Biomedical Data Science



Jim Weatherall, Vice President and Head of Enterprise Data Enablement at AstraZeneca



Erin Angel, PhD, Global Vice President for Research & Scientific Affairs at GE HealthCare



Kim Butts Pauly, Professor of Radiology (Radiological Sciences Lab) and Vice Chair for Research in the Department of Radiology

GE HealthCare

Gaining FDA clearance for a significant advancement in medical imaging takes not only engineering expertise, but also fundamental insights from physics, input from clinicians and patient volunteers, and more. As GE HealthCare advanced its Photonova™ Spectra photon-counting computed tomography (PCCT) solution, a collaboration with Stanford supplied the expertise in imaging, biomedicine, and more necessary to cross the finish line.

Stanford and GE HealthCare have together helped drive progress in PCCT, which is one of the most significant CT advances in decades. The Photonova Spectra, which received FDA clearance in March 2026, directly measures the energy of individual X-ray photons, and is powered by GE HealthCare’s novel Deep Silicon detector technology. Those capabilities allow PCCT to capture more fine-grained details and sharper images, as well as make precise visualizations of subtle tissue variations, small lesions, and vascular structures.

In January 2025, Stanford opened a second Cyclotron and Radiochemistry Facility with a GE PETtrace™ 890 cyclotron, underscoring the need for advanced radiology equipment to image and treat diseases like cancer. Now, the collaboration between Stanford and GE HealthCare is deepening with a new Center of Excellence for radiology, which will make it even easier to enable those exchanges of knowledge and inspiration.

“From the outset, Stanford has shared our focus on turning bold scientific ideas into real-world advances for patients. This kind of collaboration accelerates the journey from discovery to clinical care, helping ensure that new imaging technologies don’t just exist in the lab, but reach physicians and patients who need them,” says Erin Angel, PhD, GE HealthCare global vice president for research & scientific affairs.

The Center of Excellence draws on a wide range of Stanford expertise, and encompasses research topics where Stanford and GE HealthCare have jointly pushed the boundaries of discovery. That includes MRI innovation, AI initiatives to advance MRI and CT scan diagnostics, CT physics research, and clinical evaluations of advanced imaging technologies. Its goal is to make it easier for both organizations to collaborate, creating translational pipelines that allow

Stanford scientists to explore and test imaging technologies alongside industry scientists, expediting the journey from the lab to patients’ bedsides.

“Collaborations with industry leaders like GE HealthCare give the Department of Radiology access to sophisticated imaging platforms, advanced tools, and industry scientists, which help our researchers push scientific boundaries to develop innovations that address key clinical challenges,” says Professor Kim Butts Pauly, vice chair for research in the Department of Radiology.

The collaboration builds on 40+ years of cooperative science that has produced 184 peer-reviewed papers and more than 60 licensed patents, encompassing a broad swath of imaging technologies that can help support clinicians in diagnosing and treating cancer, brain diseases, cardiovascular disease, and more.

Future research collaborations fast-tracked through the Center of Excellence will ensure Stanford remains at the forefront of both investigating these technologies and giving patients access to innovative medical technology.

Siemens

A new generation of powerful imaging tools is supporting rapid progress in the fight to diagnose, understand, and treat a wide range of diseases. A master agreement between Stanford and Siemens Healthineers is putting both organizations at the forefront of that work, pairing expertise in scientific research and clinical translation on one side with next-generation technology on the other.

While Stanford and Siemens Healthineers are not new partners, the master agreement, signed in January 2025, is streamlining the process of launching new projects and accelerating research impact. Himanshu Bhat, the North American head of MRI R&D collaborations at Siemens Healthineers, says there are ten projects already underway, most involving collaborations with Stanford’s Radiology Department.

“Our collaboration with Siemens Healthineers and the resulting framework allows us to combine our academic expertise and research excellence with their technology platform and engineering capabilities,” says Prof. Butts Pauly. “The advanced imaging tools that we are developing will allow us to answer scientific questions that were completely out of reach just a few years ago.”

The work is aided by two new state-of-the-art MRI machines from Siemens Healthineers at the [Lucas Center for Imaging](#): a MAGNETOM 3T Cima.X and MAGNETOM 7T Terra.X (Impulse Edition). They will enable a new level of imaging for patients with neurodegenerative diseases and cancer, helping advance treatments at Stanford while also yielding new insights into MRI techniques and applications for Siemens Healthineers.

“Impacting patients’ lives through research is very important, as opposed to being isolated in technical, neuroscience, or clinical silos,” Bhat says. “Stanford really brings it all together very nicely.”

The new agreement also formalizes procedures for working with patient data while respecting privacy, setting up future close collaborations between Stanford researchers and Siemens Healthineers, says Neil Black, director of research, innovation, and strategic engagement at Siemens Healthineers.

“Stanford really understands the medical device manufacturing business, and certainly understands healthcare,” Black says. “The university has the business acumen to partner very effectively with device manufacturers such as Siemens Healthineers.”

These kinds of collaborations are more important than ever as the burden of noncommunicable diseases (NCDs) such as stroke, neurodegenerative disorders, and cancer continues to grow.

“NCDs have a significant impact on the world population, accounting for three-quarters of all deaths,” Black says. “That’s where our focus is going to be, which aligns quite well with Stanford’s research and clinical capabilities.”

“The advanced imaging tools that we are developing will allow us to answer scientific questions that were completely out of reach just a few years ago.”



Neil Black, Director of Research, Innovation, and Strategic Engagement at Siemens Healthineers



Himanshu Bhat, the North American Head of MRI R&D Collaborations at Siemens Healthineers

“Collaborations with industry leaders like GE HealthCare ... help our researchers push scientific boundaries to develop innovations that address key clinical challenges.”

HIT Fund Startup Spotlight

How HIT Fund teams are making the leap from idea to market

Stanford's entrepreneurial ecosystem is like no other in the world. Bold ideas from faculty, students, and postdocs here are often not only compelling science, but also the basis for dynamic startups that bring those technologies out of the lab.

Even world-class science and abundant connections to Silicon Valley don't ensure startup success, however. Moving from brilliant science to commercial translation is difficult, with many opportunities for missteps. The HIT Fund is a crucial partner on this journey, helping founders develop a business-centric mindset and connecting them to people and resources targeted to their needs. Teams typically spend 12 months with the HIT Fund, leaving with a solid value proposition, go-to-market plan, business model, and de-risked technologies that enable them to secure the funding they need to grow.

"There are many challenges on the road to startup success," says Nitin Parekh, the director of the HIT Fund. "Our innovators take this journey because they believe in the strength of their ideas, and we've been gratified to watch many of them grow to stand on their own."

To date, 25 HIT Fund teams have raised external capital for their startups or successfully licensed their technology to external companies, with more on the way. Their innovative products are already making a difference, whether that's moving the world toward sustainable energy solutions or addressing gaps in the global healthcare system. These are three examples, one from each past cohort — to learn more, visit the [HIT Fund Portfolio page](#).

Perseus

When most fledgling composite companies start out, they send small samples of their product to potential customers to show how strong, lightweight, or durable it is. Dan Lee, founder of composite fabrication company Perseus Materials, knew he needed a different approach.

"Nobody has ever been convinced by a 12-inch by 12-inch block," Lee says. "We decided internally that the minimum viable product that makes sense is something enormous."

Perseus' resins and manufacturing process let it make products faster, and on a much larger scale, than competitors. So, the team went big, fabricating a sheet of polymer composite six feet tall and four feet wide.

That first product set Perseus, a 2022-23 HIT Fund team, apart from other composite makers, Lee says. The company began with wind turbine blades and soon expanded to boat hulls, where its ability to produce large, seamless structures sets the company apart from other fabricators. Where other companies might take days to make something, Perseus' mold-less approach means it can make products in just hours and iterate very quickly on designs. Lee says Perseus is now exploring partnerships with other startups in the maritime space that might find it more efficient to offload some tasks to its streamlined production line.

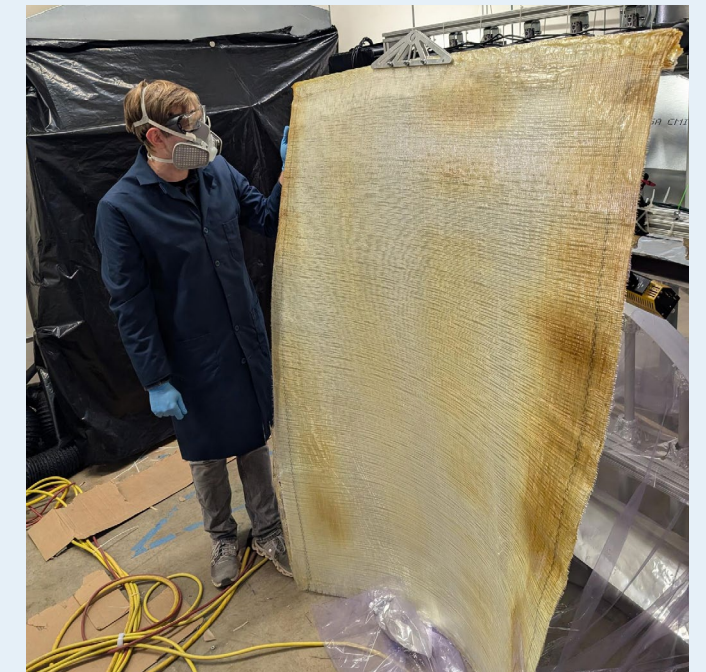
In just the past year, Lee says Perseus has more than doubled its staff and moved to a new 6,000-square-foot manufacturing facility, with plans to expand even further. The company recently closed its first venture round and now counts Lockheed Martin Ventures among its backers.

Lee says the initial conversations with the HIT Fund were vital to Perseus' current success. Meetings with venture capitalists and dedicated customer discovery work helped build the team's confidence in their product, and underlined their decision to swing for the fences with their MVP demonstration.

"How is the business model differentiated and possibly more systematic, more scalable?" Lee says. "These are all things that we didn't really have time or support to explore without the HIT Fund."



Dan Lee, founder and CEO of Perseus Materials



An early example of Perseus' composite.

"We decided that the minimum viable product that makes sense is something enormous."

Takeoff AI

Babies born prematurely often don't have a functioning gastrointestinal system, meaning they can't digest food even as they critically need nutrients. Neonatal intensive care units use total parenteral nutrition (TPN) — nutrients delivered through an IV, straight to the bloodstream — to support preterm babies until they can handle food themselves.

Takeoff AI's recent fundraising round was five times oversubscribed, with venture capital groups competing to lead it.

The technique prevents infants from starving, but there are numerous potential formulations for TPN, making the process complex and time-consuming. TPN is also prone to errors in prescription and compounding, says Professor Nima Aghaeepour, a machine learning scientist at Stanford, reducing the odds of infant survival. With software from Takeoff AI, a startup Prof. Aghaeepour cofounded alongside Thanaphong "Joe" Phongpreecha, who's now CEO of the company, that's changing.

Using machine learning, Takeoff AI analyzed a decade of TPN data and created a list of 15 formulations tuned to specific needs. The same approach also allowed it to train an AI model that can rapidly analyze an infant's nutritional status and suggest the best formulation to use. In a peer-reviewed paper, prescriptions made by its AI model outperformed TPN prescriptions made by humans and reduced the number of health complications in the NICU. Narrowing the list to 15 options also opens the door to mass-producing TPN formulations ahead of time, meaning the right nutrition can be delivered much faster.

Realizing that their product needed to be commercially viable to scale, Prof. Aghaeepour says the Takeoff AI team focused intently on de-risking their AI model and approach during their HIT Fund tenure, which began in 2023. Early questions included whether to sell the solution to hospitals or manufacture nutrition formulations themselves, as well as how to handle IP considerations for AI. At a HIT Fund-hosted session led by an IP lawyer, Prof. Aghaeepour remembers sitting in the front row and "taking notes as quickly as I could."

"There are so many things that a scientist doesn't think about," he says.

That work has paid off many times over for the team: Their 2025 Nature Medicine paper describing the approach has won numerous awards, and was named one of the ten best clinical research projects of 2025. In addition to the scientific accolades, Takeoff AI's recent fundraising round was five times oversubscribed, with venture capital groups competing to lead it. Prof. Aghaeepour, Phongpreecha, and their team have already launched a pilot study of Takeoff AI's software at the Lucile Packard Children's Hospital at Stanford and signed their first commercial customer.

Their approach shows promise beyond the NICU, too. Prof. Aghaeepour says Takeoff AI is now working to expand its approach to adults in the ICU with an ongoing trial delivering customized nutritional formulations for transplant patients.



Nima Aghaeepour, Professor of Anesthesiology, Perioperative, and Pain Medicine, of Pediatrics (Neonatology), and of Biomedical Data Science



Takeoff AI's software is already being tested in the NICU

Zero

After crops like wheat and corn are harvested, fields lie strewn with crop residue: stalks, leaves, and other organic matter that's typically burned or left to decompose. Divya Chalise, along with the rest of his team at Stanford startup Zero, realized those leftovers and the carbon they contain were more valuable than most people thought.

With a new, low-cost, thermodynamically efficient way of turning crop waste into biochar, Zero is producing net-zero-emission fuel for heavy industries ranging from power plants to steel mills.

"We have gotten, in our understanding, the cheapest way of stabilizing plant carbon," Chalise, now CTO of Zero, says. "Our approach completely changes the idea of renewable carbon in general."

Biochar from plant matter has long been used as fertilizer. But Zero's product, which emerged from work in the lab of Professor Yi Cui, is affordable and high quality enough to be a nearly drop-in replacement for coal. The startup, which also received support from the Sustainability Accelerator, has now spun out from Stanford and plans to develop and test a reactor capable of producing 10 tons of its biochar by the end of 2026. Chalise says that will put the company on a path to turning crop waste into carbon-neutral fuel at scale.

As a 2024-25 HIT Fund team, Zero worked to find the right product-market fit and go-to-market strategy, as well as explore various business models, a process that helped steer the team toward biochar as a product. The early work also let them de-risk the reactor technology for investors. Those efforts yielded a pilot reactor capable of making one ton of biochar fuel per day, setting the company up to take their technology beyond Stanford.

Chalise says the early momentum Zero gained by working with the HIT Fund set them on their current trajectory.

"The HIT Fund support gave us preliminary economics and preliminary estimates of energy that we could build upon when we launched Zero," he says. "That gave us a very solid demo to show investors that we could scale this process."



Divya Chalise, founder and CTO of Zero

"Our approach completely changes the idea of renewable carbon in general."



The Zero team in front of their pre-pilot reactor capable of making one ton of biochar per day. From left to right: Satish Kumar, Shalini Majumdar, Divya Chalise, Linh Nguyen, and Darshan Chalise.

More Streamlined, Effective Industrial Collaborations

Process improvements at every level of the Industrial Contracts Office are paying off

Targeted Changes Creating Big Impact

Companies in industries from pharmaceuticals to artificial intelligence to clean energy routinely reach out to Stanford scientists in the hope of working together. These collaborations can offer funding, access to equipment or data, and a mutual exchange of knowledge that help to move pioneering research forward. Strong contracts are at the core of these relationships, helping to establish expectations and protect intellectual property and data so that Stanford staff are supported and empowered to interact with industry counterparts.

The Industrial Contracts Office (ICO) within OTL manages nearly 5,000 active agreements and negotiates and updates hundreds of agreements each year. Now, a range of process improvements at ICO is helping to strengthen, speed, and clarify the work of managing incoming collaboration agreements and working with sister offices at Stanford.

These improvements come as funding changes are making ICO's role even more vital for Stanford faculty and staff. Despite recent uncertainties in federal support, industry collaborations remain a strong avenue for continued research funding at Stanford. Sponsored Research Agreements brought in \$97 million in FY 2025 for Stanford researchers, a more than 20% increase over the previous year.

One of the most impactful process updates at ICO is the creation of a range of risk matrices for common issues during negotiations, says ICO director Chris Haynes, who took on the role at the end of 2024. These documents allow contract officers to quickly assess common risks relating

to confidentiality, governing law, intellectual property, and more. Once risks are identified, the matrices suggest less-risky alternatives, outline deal-breakers, and state escalation points, giving contract officers a foundational guide that will speed negotiations and ensure Stanford's industry-facing agreements include appropriate terms.

Haynes is also overseeing an ongoing effort to establish closer ties with ICO's sister offices throughout Stanford. Contracts with outside organizations can involve multiple groups within Stanford, potentially creating redundancies and making it easier for information to fall through the cracks. In conversations with counterparts, Haynes says ICO staff have been able to offer greater visibility into the office's role in various agreements and help establish better methods of collaboration with Stanford's sister offices and departments.

"Strong working relationships with sister offices are an absolute necessity," Haynes says. "Active efforts to forge and maintain relationships support ICO's goal of enabling a frictionless experience for Stanford staff."

In 2025, ICO also continued to implement and explore the contract management software Ironclad. The solution will position the office to better manage high-volume transactions, enhance governance and institutional knowledge retention, and build a scalable infrastructure to support future growth and increasing contract complexity, Haynes says. Integrating Ironclad into ICO's workflows has not been without growing pains, but Haynes says much of the front-end work and workflow troubleshooting has been accomplished.

In the coming year, ICO will continue to explore using the software for Material Transfer Agreements (which

"My vision is to enable IAPs to quickly form, get up and running, and have best practice information available for quick reference."

accounted for 60% of all transactions processed by ICO in FY 2025), Non-Disclosure Agreements, and other contract types, Haynes says, and continue the process of updating internal templates to speed agreements to execution. As Stanford continues evolving to meet new challenges, ICO is better positioned than ever before to support staff and faculty as they interact with outside organizations.

A Renewed Vision for Industrial Affiliate Programs

Industrial Affiliates Programs (IAPs) at Stanford offer a forum for faculty, students, and member companies to have open discussions about industry priorities and research directions, and share new ideas in their field. It's a kind of "town square" that brings together many players in a pre-competitive space, and can be a jumping-off point for more formal sponsored research collaborations or projects. In FY 2025, there were 74 IAPs at Stanford covering everything from energy storage to wearable electronics, including seven new programs.

A recent review of the IAP ecosystem pointed to several ways to standardize and streamline IAP operations, including greater transparency and a revised approval process. ICO has begun a number of initiatives under Haynes' guidance to support these changes, including centralizing certain IAP operations within the office and hosting virtual monthly open office hours where IAP administrators can bring questions, share best practices, and voice challenges they are presently facing.

"ICO is committed to supporting a robust IAP ecosystem by enhancing infrastructure at Stanford," Haynes says. "My vision is to enable IAPs to quickly form, get up and running, and have best practice information available for quick reference."

One of the most important updates was to initiate an agreement requirement for all member companies. This step ensures IAP operations meet federal requirements around funding disclosures, helps set expectations regarding intellectual property rights and dissemination of results, and boosts operational efficiencies. Internal templates for IAP agreements will minimize negotiations, Haynes says, speeding the process of getting a new program off the ground.

Other improvements underway include investigating whether the Ironclad contract management system currently being piloted by ICO would be a good tool to manage, process, and store IAP agreements. Haynes says he sees opportunities for the software to make the IAP membership agreement process significantly more efficient. ICO is also creating a best practices guide for Stanford IAPs covering topics ranging from IAP formation to day-to-day operation.

ICO MANAGED

2,991 

Material Transfer Agreements (MTAs) in FY25,
60%

of the total number of Agreements signed

New IAPs in FY 2025

Energy Transition Analysis

Stanford Center for Innovation and Design Research

The Global Capital Allocation Project

Cell and Gene Therapy

Fuels of the Future

Stanford University Nuclear Project

AI for Mental Health

Explore technologies, commercialization options, and more at otl.stanford.edu

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