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20  YEAR IN REVIEW
The theme of Office of Technology Licensing (OTL) FY 2023 Annual Report, “Lab to Life: Advancing Innovation,” captures the spirit of what we at Stanford strive to achieve every day.

“Advancing Innovation”, when abbreviated as AI, is also a fitting double entendre, considering the significant strides made across the world and at Stanford in Artificial Intelligence (AI) technologies, which is the focus of our cover story. It reflects our unwavering commitment to fostering innovation across all disciplines, including those that are rapidly evolving.

We’ve divided the report into four sections:

1. The “Cover Story” explores the exciting world of AI, focusing on the advancements coming out of Stanford.

2. The “Technology Highlights” section brings to light inspiring stories: from life-saving medical breakthroughs to transforming diesel engines to run on clean energy.

3. The “Office Updates” section delves into the ongoing activities of OTL’s High Impact Technology (HIT) Fund and Strategic Alliances team.

4. The “Year in Review” section provides a data-driven perspective. We showcase key metrics from OTL illustrating the tangible impact of our activities.

We invite you to read on and discover the remarkable journey of these groundbreaking ideas. The visionary minds of Stanford’s researchers, and their dedication to pushing the boundaries of knowledge, fuels OTL’s mission. Our commitment to “Advancing Innovation” propels us towards a future where cutting-edge research moves from “Lab to Life” and transforms our world for the better.
Neural Networking: Translating Artificial Intelligence into Real World Impact
In 1988, one of the first Artificial Intelligence (AI) inventions disclosed to OTL emerged from PhD candidate Dorothy Mighall’s work in the Stanford Electrical Engineering Department Information Systems Lab.

This invention was a neural network application aimed to detect forged signatures, but the technology wasn’t mature enough for commercialization at the time. Today, the landscape has drastically transformed. Increased computational power has fueled the development of powerful AI tools, like large language models (LLM), that are revolutionizing various industries.

The numbers of AI inventions disclosed to OTL are growing rapidly, reflecting not only the growing interest in the field but also Stanford’s position as a flourishing hub for AI research. The percent of invention disclosures related to “artificial intelligence” or “machine learning” have nearly tripled in the past ten years, from 2.3% in 2013 to 6.7% in 2023. These inventions span departments from Computer Science to Political Science and more.

With applications so broad, Stanford’s thriving interdisciplinary research environment and excellence across every field of science and technology sets it apart. As its world-class experts work together to bring forward new AI-enabled solutions in every domain, OTL supports them by offering our own expertise in licensing, intellectual property (IP) strategy, and research commercialization. Additionally, we guide researchers in best practices for developing and deploying these new AI technologies, helping them navigate the complexities of industry collaborations through various strategic sponsored research programs.

The HIT Fund: From Invention to Impact

With the field of AI experiencing an influx in innovation OTL is uniquely positioned to help Stanford inventors navigate this exciting yet complex landscape. One of many resources that OTL offers to inventors is the High Impact Technology (HIT) Fund, which provides critical support that includes entrepreneurial mentorship, funding, and connections to advisors and industry executives to help bring high-potential inventions to market.

One project backed by the HIT Fund is Dr. Gege Wen’s deep learning model for subsurface carbon dioxide storage from the Benson Lab, led by Sally Benson, Professor of Energy Science and Engineering. The fund’s help was instrumental in bringing the technology, called CCSNet.ai, to market. “For me, working with the HIT Fund has been a game changer. As a life-long researcher, I didn’t know where to start with commercializing a new technology. We’ve come such a long way in a short time, thanks to the support and guidance from the HIT team,” said Prof. Benson.

“For me, working with the HIT Fund has been a game changer. As a life-long researcher, I didn’t know where to start with commercializing a new technology. We’ve come such a long way in a short time, thanks to the support and guidance from the HIT Fund team.”

— Sally Benson, Professor of Energy Science and Engineering

The HIT Fund further engaged seasoned industry executives and experts with extensive experience in leading and financing climate tech start-ups to act as advisors to the CCSNet.ai team. “Our advisors’ insights on ecosystem discovery were instrumental in guiding our early-stage outreach,” said Dr. Wen. The fund bolstered the team with a Graduate School of Business MBA student, Madison Freeman, to provide hands-on help with business strategy and planning.

Another key project supported by the HIT Fund is an AI-driven optimization of interventions in neonatal intensive care units, led by Nima Aghaeepour, Associate Professor of Anesthesiology in Perioperative and Pain Medicine, Pediatrics, and by courtesy, Biomedical Data Science. Prof. Aghaeepour developed an AI tool that analyzes the health data collected to monitor premature infants and personalizes the various interventions that doctors prescribe, balancing the risk and cost with the predicted benefits. “Preterm birth is the single largest cause of death in children
under 5 years of age,” said Prof. Aghaeepour. “We have an AI system that sits between the children’s hospital and the adult hospital, which we can use to predict what is going to happen to babies often before they are even born.”

To help preserve the lives of these most vulnerable children, Prof. Aghaeepour is advancing the technology via a startup with the support from the HIT Fund. He cited the HIT Fund team as critical to moving his venture forward, including their commercialization guidance from experts and their targeted entrepreneurial education programs about business and IP strategy for AI inventions. “The HIT [Fund] was incredibly helpful in connecting us with various stakeholders that take this beyond science.”

See our HIT Fund update later in this Report to learn more about the fund, including how it is supporting the next wave of AI-enabled technologies.

**Featured Stanford AI Success Stories**

OTL is positioned right in the heart of an innovation ecosystem, giving us a front-row seat to the groundbreaking work of our AI experts. Here are just a few of the many AI technologies that have launched from Stanford and made significant progress this year:

**Revolutionizing Drug Discovery**

In the drug discovery space, a startup called Genesis Therapeutics licensed foundational technology in 2019 from the Pande Lab, led by Vijay Pande, Professor of Chemistry, and by courtesy, Structural Biology and Computer Science. They raised $200 million in their Series B round in 2023. Under the leadership of founder and CEO Evan Feinberg, a former PhD student in Stanford Biophysics, the company has secured collaborations with Genentech and Eli Lilly for deploying their advanced drug discovery platform to generate the next generation of life-changing therapeutics.

**A Highly Versatile Natural Language Processing Tool Kit**

From Chris Manning, Professor of Computer Science and Linguistics, and the Stanford NLP group, the Stanford CoreNLP software, which provides a suite of natural language analysis tools for parsing raw text input, continues to have impact across a broad range of applications. The suite of tools has been licensed to 75 companies in a number of industries including aerospace, legal, consumer electronics, financial services, and social media.

**Aiding Heart Attack Risk Predictions**

In the medical imaging space, inventor Bhavik N. Patel’s coronary artery classification scoring algorithm was licensed by Bunkerhill Health as part of their platform for bringing AI tools from lab to clinic. The algorithm enables a key metric for predicting future heart attack risk to be measured on a routine chest CT.

**Boosting Medical Research with Access to AI Tools**

In a collaborative effort, OTL has teamed up with numerous Stanford groups and offices (Stanford Medicine Industry Relations, VPDOR Research Data Governance and Privacy Director, Office of Sponsored Research, Office of the General Counsel) to draft a custom, open-source, non-commercial license for an AI model and dataset led by research engineer Dr. Jason Fries and Professor Nigam Shah in the School of Medicine. The model generates representations of patients which can then be used for downstream prediction tasks. It is one of the first electronic health record (EHR) models capable of processing the rich, structured data within an EHR. “It is wonderful to work with such an innovative licensing department as [the] OTL. Without their support, Jason’s compelling vision to enable reproducible science for AI in healthcare would not happen,” shared Prof. Shah. This endeavor allows researchers to seamlessly integrate these tools into their workflows via a click-wrap license, and will undoubtedly enable further AI-powered medical research at Stanford and in the broader research community.

**Enabling Early Autism Diagnosis**

AI and machine learning have also found their place in autism research with the work of
Dennis Wall, Professor of Pediatrics, Biomedical Data Science, and by courtesy, Psychiatry and Behavioral Sciences. He develops machine learning tools that can diagnose autism spectrum disorder early to catch children in the critical window where interventions are most effective, even before they may have access to behavioral health resources. A key invention arising from this work is a mobile, charades-like game for kids called GuessWhat. “Stanford’s the only place that could have gotten this done,” shared Prof. Wall, praising OTL’s role in enabling his autism-therapy technology. The technology has been licensed to Cognoa, a pediatric behavioral health company that Prof. Wall co-founded in 2013.

“Stanford’s the only place that could have gotten this done.”

— Dennis Wall, Professor of Pediatrics and Biomedical Data Science, and by courtesy, of Psychiatry and Behavioral Sciences

Fostering AI Innovation through Interdisciplinary Research

OTL continues to work closely with other members of the vast Stanford AI ecosystem, helping to protect intellectual property and to promote and facilitate the commercialization of AI technologies arising from these translational research programs and institutions. For example, the Industrial Contracts Office (ICO) within OTL has worked closely with faculty who participate in Stanford Artificial Intelligence Laboratory (SAIL) to negotiate the research agreements on human-centered AI robotics with the Toyota Research Institute (TRI). This collaboration currently consists of 10 active sponsored research projects led by 20 PIs and co-PIs with applications including vehicle safety and advanced robotic manipulation. In terms of the Institute for Human-Centered Artificial Intelligence (HAI), the office has already received and evaluated more than a dozen inventions catalyzed by HAI funding, with many more expected in the years to come. The ICO is also a critical part of the Center for Artificial Intelligence & Medicine & Imaging (AIMI’s) dissemination process and collaborates with AIMI’s industry collaborators through the industrial affiliates programs. Through their work with these and other translational programs, OTL deepens its position within the vibrant AI ecosystem, playing a critical role in transforming cutting-edge research into practical solutions.

Looking Forward: Championing the Future of AI

With the support of Stanford’s world-class entrepreneurial and innovation network, including their core collaborators in commercialization, Stanford investigators have unparalleled opportunities to actualize AI-enabled solutions that can push their fields forward. OTL continues to support these Stanford innovators as they bridge disparate disciplines, solve complex problems, and ultimately translate their ideas into new inventions that make a real difference in the world.
The Target: Reversing Plaque Buildup with CD47 Blockade

Traditionally, medications for CVD focus on lowering cholesterol or blood pressure. Bitterroot Bio takes a different approach. Their target is CD47, a molecule found on the surface of plaque that essentially acts as a "don't eat me" signal, preventing the immune system from recognizing and removing it. "It almost serves as a cloaking device on the plaque that's building up in our arteries," said Prof. Leeper. "Using human genetics to guide us, we increasingly recognize the importance of inflammation and the immune system not doing its job. Either producing too much inflammation in the blood vessel or, in our case, not doing its job to clear out the plaque that builds up in our arteries before a heart attack or stroke." Bitterroot Bio's therapeutic strategy involves blocking CD47, essentially waking up the immune system to identify and eliminate the plaque buildup, potentially leading to plaque regression. This approach has the potential to be transformative, offering the possibility of not just managing CVD but actually reversing the underlying pathology.

Bitterroot Bio, a Stanford start-up, is poised to revolutionize the treatment of cardiovascular disease (CVD) with a novel approach that targets the immune system's ability to prevent or even clear plaque buildup in arteries. Professors Irving Weissman and Nick Leeper, and their colleagues invented the foundational technology, with its further development and commercialization now overseen by Dr. Pavan K. Cheruvu, President and CEO of Bitterroot Bio.
The Promise: A First Step Towards Eradicating CVD
Millions of people live with the risk of heart attack or stroke due to plaque buildup. Existing medications can help manage the condition but don’t directly address the plaque itself. Bitterroot Bio’s approach holds the promise of a more definitive solution. “With statins or PCSK9 inhibitors, the current standard of care, we can lower LDL cholesterol really well,” added Cheruvu, “but it doesn’t seem to alter the size or the composition of plaques in a meaningful way over time. With these agents, there’s still a 70 to 80% risk of having that future heart attack.” By enabling the immune system to remove plaque, Bitterroot Bio’s therapy has the potential to significantly reduce the risk of future cardiovascular events. The company’s ultimate goal is ambitious: to eradicate atherosclerotic CVD as a cause of heart attacks and strokes.

From Bench to Bedside: The Stanford Advantage
The research behind Bitterroot Bio’s pioneering new therapy originated from the joint efforts of Profs. Weissman and Leeper. Two major components of Stanford’s innovation ecosystem - interdisciplinary research and entrepreneurial spirit - fostered the further development of this technology. OTL also played a crucial role in supporting their commercialization pathway, according to Prof. Leeper. “I view OTL as being quite unique in academia in just how helpful they are,” he said. “They are great at providing coaching, making introductions, helping to advertise the technologies, finding partners for it, etc. They connect people across the university and the investor community to take those first steps in company formation and really help to launch the dream that many faculty members have.” OTL, as part of Stanford’s ecosystem of support, was thus instrumental in transforming Bitterroot Bio from a promising scientific concept into a viable company.

The Road Ahead: A Bright Future for Bitterroot Bio
Bitterroot Bio recently closed a successful Series A funding round of $145M and also initiated a Phase I clinical trial in Australia, both major milestones on the path towards transforming patient lives. Beyond the initial CD47 program, Bitterroot Bio is exploring additional therapeutic targets within the cardio-immunology field, demonstrating their commitment to a comprehensive approach to tackling CVD. “We’re starting our development efforts targeting the higher risk CVD population,” explained Cheruvu, “but moving into prevention over time.”

Bitterroot Bio’s story exemplifies the transformative power of scientific research and the crucial role universities like Stanford can play in translating innovative discoveries into therapies. In this case, it could improve and save the lives of millions of CVD patients at greatest risk and beyond.

“OTL is great at providing coaching, making introductions, helping to advertise the technologies, finding partners for it, and then connecting people across the university and the investor community to take those first steps in company formation and really helping to launch the dream that many faculty members have.”

— Nick Leeper, Professor of Surgery (Vascular Surgery) and of Medicine (Cardiovascular)

Pavan Cheruvu, President and CEO of Bitterroot Bio, Irving Weissman, Professor of Pathology and Developmental Biology, and Nick Leeper, Professor of Vascular Surgery and Cardiovascular Medicine
In the pursuit of innovative medical solutions, Stanford University research once again brings hope to those battling genetic diseases. Groundbreaking work on adeno-associated viruses (AAVs) spearheaded by Professor Mark Kay has laid the foundation for effective gene therapy delivery in patients suffering from Hemophilia A. It could be a potential game-changer for this rare and debilitating hereditary bleeding disorder.

Early Inspiration in Gene Therapy and The Rise of AAVs
Prof. Kay’s journey into gene therapy began early in his academic career. “I was interested in genetic diseases, especially inborn errors in metabolism,” Prof. Kay recalled. “But at the time, there really weren’t any options for small molecule [therapies].” Inspired by advancements in genetically modified mouse models, Prof. Kay saw the potential to apply similar principles to human genetics. Initially exploring various viral vectors for gene delivery, Prof. Kay and his team ventured into the realm of AAV vectors. “When I started, nobody really had thought about or tried to use AAVs as a gene transfer vector,” he explained. Despite initial challenges, a breakthrough came with using AAVs to treat factor IX deficiency, a form of hemophilia. The success of these early trials paved the way for further exploration into systemic AAV delivery in humans.
AAV-LK03 for Hemophilia A: Stanford’s Contribution and Recent Success

One of the key successes in the Kay Lab has been the development of AAV-LK03, a modified AAV vector engineered for enhanced transduction efficiency. Prof. Kay elucidated, “the advantage of LK03 is that it’s better at transducing humans than some of the vectors that have been used in clinical trials.” This innovation emerged from a technique called DNA shuffling, which enabled the development of libraries containing various viral capsids. By selecting promising capsid-containing vectors through experiments with humanized mouse models, Prof. Kay and his team identified AAV-LK03, a vector optimized for use in human applications.

The AAV-LK03 technology was licensed to Spark Therapeutics in 2016, a company specializing in gene therapies, and is now a key component of Spark’s gene therapy development for Hemophilia A, characterized by a deficiency in the factor VIII clotting protein. This deficiency can lead to prolonged and spontaneous bleeding episodes, including life-threatening internal bleeding. Enabling progress towards new treatments for Hemophilia A, OTL played a crucial role in facilitating the translation of Prof. Kay’s research. While the development of the technology was primarily funded by NIH grants, OTL negotiated and executed a license with Spark Therapeutics, paving the way for LK03’s clinical development and eventual commercialization of a Hemophilia A treatment.

F. Hoffmann-La Roche AG (Roche) acquired Spark in 2019, and now has a promising candidate in the pipeline: SPK-8011. This therapy, utilizing the AAV-LK03 technology for delivery, has demonstrated remarkable efficacy in Phase I/II clinical trials. SPK-8011 is now headed into Phase III trials, a significant milestone for any therapy seeking FDA approval. “The potential advantage of LK03 is, first of all, the dosing that they’re using is 50 to 100 times less than what others are using...And secondly, the idea is that if you’re hitting a larger number of cells, you don’t need to produce as much per cell to get the same level because it’s a secreted protein.”

— Mark Kay, Dennis Farrey Family Professor of Pediatrics and Professor of Genetics

Platform Advancements and Future Directions: Unveiling the Mystery of Species Specificity

Recently, Prof. Kay’s group has made a significant advancement with the LK03 platform by creating a variant called AAV-AM. This innovation unlocks the highly efficient, primate-specific LK03 serotype for use in crucial rodent preclinical studies. This AAV-AM technology is available for licensing, potentially accelerating gene therapy programs and significantly aiding drug development timelines.

Looking ahead, Prof. Kay and his team remain focused on unraveling the molecular mechanisms underlying AAV-mediated gene expression. Their efforts aim to address challenges such as inter-species variations and individual responses to gene therapy. By delving into epigenetic modifications and integration strategies, the team seeks to optimize gene therapy outcomes while minimizing potential toxicity.

The prospect of a more effective and accessible treatment for Hemophilia A demonstrates the transformative potential of gene therapy, and the journey of its underlying vector from laboratory discovery to clinical application exemplifies Stanford’s commitment to impactful research. In the realm of genetic medicine, the AAV-LK03 technology and future advancements shine as beacons of hope, illuminating the path towards a future where gene therapy can offer a durable solution for debilitating genetic disorders.
Diesel fuel emissions are a significant contributor to atmospheric carbon dioxide, and by extension climate change, accounting for approximately five out of the forty gigatons of anthropogenic CO₂ emissions released yearly. In response to this challenge, researchers in the Edwards research group, led by Christopher Edwards, Professor of Mechanical Engineering, Dr. Julie Blumreiter and Dr. BJ Johnson, pioneered an innovative solution. They invented a cleaner, more efficient diesel engine utilizing decarbonized liquid fuels, ultimately culminating in the co-founding and establishment of ClearFlame Engine Technologies.

From Stanford Lab to Applied Solution
Within Prof. Edward’s Lab, Johnson gained insight into sustainability, emphasizing the dual imperative of rapidly reducing carbon emissions while ensuring equitable energy access, essential for enhancing quality of life across the world. Armed with this understanding, he identified an opportunity to address this challenge through a solution that could offer cost effectiveness, high performance, and immediate benefits, particularly for developing countries lacking robust electricity grids.

A pivotal hurdle in leveraging decarbonized liquid fuels in diesel engines lies in achieving ignition. By adeptly modifying engine configurations and safely elevating temperatures beyond industry standards, the resultant technology can completely eliminate the need for diesel fuel and instead seamlessly operate on renewable fuels without compromising performance or cost efficiency. Currently, ClearFlame predominantly uses ethanol, yielding a commendable 50% reduction in greenhouse gas emissions relative to traditional diesel.
Stanford Support: Navigating the Launch of a Startup

Reflecting on ClearFlame’s journey, Johnson underscored the pivotal role of initial funding from the TomKat Center. “I was excited by the proof that someone cared and believed in us, which is honestly one of the hardest parts of being an early-stage founder,” explained Johnson. Moreover, he acknowledged the invaluable guidance provided by Stanford OTL, whose expertise proved instrumental in navigating the intricate landscape of entrepreneurship and supporting the team on their path to success.

Blumreiter also shared her experience: “Stanford’s commitment to energy sustainability armed us with the tools, context, and opportunities to take meaningful action toward a swift and equitable global energy transition. I’m proud to be a part of the development of this technology and commitment to change the world for the better.”

“Stanford’s commitment to energy sustainability armed us with the tools, context, and opportunities to take meaningful action toward a swift and equitable global energy transition. I’m proud to be a part of the development of this technology and commitment to change the world for the better.”

— Julie Blumreiter, PhD ’16, co-founder of ClearFlame

Offering advice to aspiring inventors, Johnson emphasized the importance of experimentation and resilience in the face of failure. He urged researchers to identify pressing societal issues and relentlessly pursue innovative solutions, recognizing that the lessons gleaned from entrepreneurial endeavors outweigh any setbacks. Moreover, he highlighted the supportive ecosystem fostered within Silicon Valley, which effectively incentivizes risk-taking and destigmatizes failure.

ClearFlame has made significant strides, with six trucks already operational and no additional costs incurred by their customers upon transition. Plans are underway to expand their fleet to 20 trucks by year-end and scale up to 200 units by 2025, indicative of their ambitious growth trajectory.

Beyond Trucks: A Holistic Clean Energy Application

ClearFlame’s impact extends far beyond diesel trucks alone. Johnson explained, “By partnering with the existing supply chain that knows how to utilize diesel engines today, we can transform the beating heart in the center of that equipment to be cleaner than diesel as its life blood, and then the entire ecosystem can take it and run with it across a whole lot of applications.” The forthcoming launch of power generator sets, capable of powering EV charging stations during electrical outages, underscores their ongoing commitment to innovation and resilience.

Looking ahead, ClearFlame remains poised to revolutionize various industries, including mining and agriculture, by optimizing the fuel landscape in tandem with broader decarbonization efforts. With a steadfast commitment to sustainability and innovation, ClearFlame epitomizes the potential for transformative change in combating climate change and advancing the global energy transition.
The High Impact Technology Fund: Accelerating the Commercialization of Stanford Innovations
When we launched the HIT Fund in 2022, we set out to accelerate the transition of Stanford technologies from the lab to the marketplace, through seed funding and advisory support. Our pilot program revealed that a dynamic exchange with seasoned industry professionals is crucial for expediting the journey to commercialization. Over the past year, we’ve strengthened the program by integrating MBA students as collaborators in crafting business strategies. The HIT Fund initiative is not just about funding; it’s about building bridges between knowledge and experience with Stanford researchers. And in the process nurturing a group of innovators poised to transform their ideas into tangible impacts.

The Pilot Cohort
The 13 awardees of the HIT Fund pilot cohort come from a broad range of disciplines, tackling important global challenges in areas such as clean energy, healthcare, and materials. They’ve made great strides towards commercialization, with some launching start-ups and securing investor backing, and others gaining government support.

- 13 AWARDED GRANTS ($1.1M)
- 8 TEAMS RAISED OVER $19M OF EQUITY/ NON-EQUITY FUNDING
- 7 START-UPS FORMED/ LICENSING DEALS EXECUTED

**Faculty Award Recipients**

**The Pilot Cohort**

- Huminly uses enzymes to recycle textile waste into good-as-new materials for clothing production.
- Feon Energy disruptive lithium battery technology unlocks higher energy density at lower costs.
- Perseus Materials is applying their innovative approach to composite fabrication to the manufacture of wind turbine blades.
The nineteen projects chosen for the 2023 HIT Fund Cohort showcase a diverse range of innovations from across the University. Each one tackles critical challenges, including carbon capture, autoimmune disease diagnosis, refugee placement, energy sustainability, and the development of life-saving changing devices and solutions. While varied in their focus, all these projects are poised to transition from the laboratory as real-world applications, and are preparing to make a significant impact on the world.

“I loved the fast-paced and structured environment provided by the HIT Program. The constant feedback and iteration, along with the weekly interaction with the MBA student, has been eye-opening in thinking about how to transfer technology for society’s use and benefit. This has constantly reminded me of the essence of why we are at Stanford.”

— Tiziana Vanorio, Associate Professor of Earth & Planetary Sciences and, by courtesy, of Civil and Environmental Engineering and Geophysics

Faculty Award Recipients

“OTL’s HIT team has been playing a role in our commercialization journey that I’d describe as a guiding “conscience” helping us mind our project’s potential and refining how that gets validated in the marketplace.”

— Chris Chafe, Professor of Music

“The HIT Fund’s commitment to becoming part of our team and their keen ability to identify risk areas have been instrumental in our commercialization journey. They excel at bringing in the right people, ensuring nuanced discussions. I found the didactic aspect of their support especially valuable; the lectures they hosted were some of the best I’ve attended, providing invaluable insights.”

— Nima Aghaeepour, Associate Professor of Anesthesiology, Perioperative and Pain medicine (Adult MSD), of Pediatrics (Neonatology), and by courtesy, of Biomedical Data Science
Advisor Program

Industry professionals play a crucial role in guiding the commercialization of HIT Fund technologies by offering invaluable expertise and practical knowledge. As advisors, they suggest and help validate project milestones, ensuring teams address the key critical technical and market risks. Their insights are essential for aligning new innovations with market and societal needs, accelerating their adoption. Through dynamic exchanges with technical teams, they impart critical knowledge that influences both current projects and future innovations.

HIT Fund advisors also help teams understand the ecosystem their innovations will enter, identifying the key upstream and downstream pieces needed for these innovations to thrive. They facilitate connections with potential customers and collaborators, enhancing the project’s chances of success. This collaborative effort fosters a vibrant community where industry and academia work together, transforming ideas into impactful realities.

MBA Internship Program

The HIT Fund MBA interns engage deeply with Stanford researchers, seasoned industry collaborators, and the HIT Fund team on groundbreaking projects in fields including climate tech, healthcare, and artificial intelligence. By leveraging their own expertise and skills, the interns drive customer discovery, develop business plans, and shape go-to-market strategies, playing a vital part in bringing new technologies to market.

Throughout the program, interns enhance their practical knowledge of entrepreneurship as they help to transform novel technologies into viable business ventures. Some are invited to join the award team to co-found startups after their internship, while others use their experience to launch their own entrepreneurial projects. For many, the internship is a pivotal experience that helps them determine the next steps in their careers.

“Stanford HIT Fund represents a unique opportunity to provide guidance and learn at the same time. I have been thoroughly impressed with the technical depth, the line of inquiry, and the quality of the thinking of the faculty and students. It is rewarding to collaborate and to become part of the effort to move an idea forward.”

— Richard Chow, former CEO and Board Member

“Through the HIT Fund MBA program, I got to work hand-in-hand with a highly technical team in the early stages of their company. A big highlight was feeling like I had a real impact while building my own experience in climate-tech commercialization.”

— Catherine Berner, MBA ’22

HIT MBA Interns:
Over the past year, OTL Strategic Alliances team has helped foster fruitful collaborations with industry and non-profit entities. Working in tandem with various stakeholders across Stanford, the team endeavors to translate these alliances into tangible benefits through structured contracts and strives to arrange for equitable terms for Stanford, Stanford researchers, and collaborators. OTL Strategic Alliances team's deep understanding of the life and physical sciences landscapes underscores the collaborative effort required to navigate the journey from laboratory discovery to marketplace. The Strategic Alliances team is also working closely with the Stanford Doerr School of Sustainability and their Strategic Corporate Alliances office to create new models of alliances for sustainability.

Strategic Alliances: Empowering Innovation Through Collaborations
The Strategic Alliances Team in Action

The team’s dedication has resulted in successful collaborations in FY 2023 that included a variety of external entities including small and large companies, non-profit institutions, foundations, and investment firms. Two prime examples in the life sciences field are outlined below and showcase the potential of these impactful collaborations.

Stanford Medicine and Northpond Ventures launch Northpond Laboratories

The Strategic Alliances team played a key role working alongside Stanford Medicine’s Industry Relations (SM-IR) team in the launch of a five-year program for research and innovation at Stanford Medicine with Northpond Ventures. This collaboration allows Stanford scientists to continue developing their research and prepare for the possible translation of promising discoveries in computational biology, diagnostics, and therapeutics into potential practical applications that directly benefit patients. “I’ve been impressed by Northpond Labs’ efforts to meet our faculty and deeply understand their research. They are building relationships that are much deeper than just research grants. I believe we’ll see amazing outcomes from this collaboration,” said Reed Sprague, Executive Director Stanford Medicine Industry Relations. This successful alliance exemplifies the Strategic Alliances team’s expertise in supporting lasting connections between industry leaders like Northpond Ventures and Stanford Medicine’s groundbreaking research.

Stanford and The Invus Group Join Forces to Combat Glioblastoma

In collaboration with the Stanford Innovative Medicines Accelerator (IMA), the Strategic Alliances team worked to crystallize an agreement with the investment firm The Invus Group. This relationship secured funding for two projects at IMA, both focused on developing a drug prototype to combat glioblastoma, an aggressive brain cancer. The Strategic Alliances team’s efforts paved the way for this critical funding, and the prototypes are expected to lead to the formation of new companies launched by Invus specifically targeting this devastating disease. This strategic alliance positions academic innovations for translation into industry-driven drug programs, ultimately aiming to benefit glioblastoma patients.

The Alliance Advantage: Building a Healthier, Sustainable Future Together

OTL Strategic Alliances is proud to be a part of the team at the forefront of medical innovation and sustainability. The team acts as a vital connector, facilitating multi-faceted collaborations that accelerate the transition of Stanford’s research into real-world applications and impact across many critical domains. By strategically engaging with investment firms alongside IR and IMA, the team has helped secure much needed funding for Stanford’s research endeavors. Their negotiation and alliance management skills ensure a mutually beneficial relationship between Stanford and its external collaborators. Importantly, these alliances remove financial hurdles for scientists, allowing them to focus on innovative discoveries with the potential to transform patient lives.

“Sunita Rajdev and her Strategic Alliance team’s engagement with the IMA and The Invus Group was critical to our ability to successfully launch an alliance with this partner. From the very beginning of this discussion, Sunita worked diligently and with incredible acumen to align interests of all parties and to craft an agreement that maximized mutual benefits.”

— Chaitan Khosla, Professor of Chemical Engineering, of Chemistry, and by courtesy, Biochemistry
FY 2023 Year In Review
LICENSING FACTS AND FIGURES

New Technologies Evaluated 568

Income:
- Over $1M
- $1M to $100K
- Under $100K

No. of Technologies: 988
Income: $10.4M

No. of Technologies: 6
Income: $28.6M

FY23 Total Royalty + Equity Income: $59.1M

Agreements:
- Exclusive Licenses
- Non-Exclusive Licenses
- Option Agreements

Total Agreements Signed
- 28
- 34

Royalty Distribution to Inventors, Departments, Schools & Third Parties:
- Inventors: $13.66M
- Departments: $13.33M
- Schools: $11.24M
- Joint IP Owners & Sponsors: $3.05M

Stanford's royalty-sharing policy provides for the distribution of cash net royalties (gross royalties less 15% for OTL's administrative expenses, minus direct expenses and third parties' royalty share) to inventors, their departments, and their schools.

Licenses with Equity 22
New Startups 27

Equity Liquidated $5.86M
13 Companies

OTL Held Equity As of Aug 31, 2023 198 Companies
The Industrial Contracts Office (ICO) is a group within OTL that specializes in negotiating research agreements with industry. In FY 2023, ICO finalized a total of 4,747 agreements, including: 3,290 Material Transfer Agreements (MTAs), 653 of which were unique; 114 Human Tissue Transfer Agreements; 107 Data Transfer Agreements; 80 Unfunded Collaborations; 26 Equipment Loans and a variety of other research-related agreements with companies.

**ICO Transactions Trend by Financial Year:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transactions</th>
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<tbody>
<tr>
<td>2019</td>
<td>1,321</td>
</tr>
<tr>
<td>2020</td>
<td>1,458</td>
</tr>
<tr>
<td>2021</td>
<td>1,512</td>
</tr>
<tr>
<td>2022</td>
<td>1,977</td>
</tr>
<tr>
<td>2023</td>
<td>2,110</td>
</tr>
</tbody>
</table>

ICO transactions over the past 5 financial years. This chart does not include standard MTAs.

**ICO Agreements Signed:**

4,747*

*This chart includes the 2,673 standard MTAs that were excluded from the Transactions Trend to the left.

**Executed Sponsored Research Agreements:**

<table>
<thead>
<tr>
<th>Type of SRA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>154</td>
</tr>
<tr>
<td>Amendment</td>
<td>89</td>
</tr>
<tr>
<td>Other School</td>
<td>52</td>
</tr>
</tbody>
</table>

**Industrial Affiliates Programs**

- 76 programs
- Received total funding of $40.1M

**New Affiliate Programs:**

- School of Engineering
- School of Medicine
- Doerr School of Sustainability

- AI for Structure-Based Drug Discovery
- Stanford Engineering Entrepreneurship Center Corporate Innovation & Leadership Affiliate Program
- Stanford Center at the Incheon Global Campus
- Dept of Biomedical Data Science External Engagement Program
- Stanford Neurodiversity Project - Corporate Membership Program
- Stanford Center for Digital Health Industry Affiliate Program

ICO handles Industrial Affiliates Program approvals, renewals, and related agreements.
“I like to think of ideas as potential energy. They’re really wonderful, but nothing will happen until we risk putting them into action.”

— Mae Jemison, American engineer, physician, and former NASA astronaut, ’77 BS in Chemical Engineering at Stanford