

2024

ANNUAL REPORT



Technology
Licensing Office

MASSACHUSETTS
77
AVENUE





TABLE OF CONTENTS

Hello, From Cambridge.....	6
Welcoming New Leadership.....	8
MIT News: MIT Tops in US Patents Granted.....	9
FY2024 Fact Sheet.....	10
FY2024 Tech Transfer Life Cycle.....	11
Deshpande Center: Driven MIT Faculty.....	12
The White House: New Climate Term Sheet.....	13
New Startup Licensees.....	14
Reaching New Milestones.....	16
Koch Institute: Progress & Potential.....	20
Technology Brief: Case #20911.....	21
A New Online Presence.....	22
Faculty Founder Initiative.....	24



In the spirit of MIT's mission to advance knowledge, the TLO moves innovations and discoveries from the lab to the marketplace for the benefit of the public and to amplify MIT's global impact.

We cultivate an inclusive environment of scientific and entrepreneurial excellence, and bridge connections from MIT's research community to industry and startups, by strategically evaluating, protecting, and licensing technology.

*Technology Licensing Office Mission
Updated 2023*



Technology Licensing Office staff photo taken at the TLO Annual Retreat event in May 2024. Joined by Anne White, Associate Vice President for Research Administration, School of Engineering Distinguished Professor of Engineering. Photo Credit: Robyn Bunch

HELLO, FROM CAMBRIDGE.



Lesley Millar-Nicholson
Executive Director
Office of Strategic Alliances & Technology
Transfer - Technology Licensing Office

It is hard to condense into just a few pages the work of the Technology Licensing Office during the 2024 fiscal year. We do hope, however, to provide you with a glimpse into the world of technology transfer, which supports the thriving MIT innovation ecosystem. From the launch of startup companies in FY2024 to the programs that fuel the entrepreneurial journeys of faculty and researchers, this report offers a snapshot of our efforts.

We are fortunate to be surrounded and supported by a well-established community of corporate and venture leaders, alumni, and businesses who contribute to and benefit from MIT's extraordinary research enterprise. Our collaboration with this community is reflected in the numbers for FY24: 679 new inventions disclosed, 24 startups formed, 139 licenses and options, 323 U.S. patents issued. These figures underscore the vibrancy of our ecosystem and the heart of MIT's entrepreneurial spirit.

For those who seek to know more about how this came to be, searching for that secret sauce, I offer a book recommendation: *From the Basement to the Dome: How MIT's Unique Culture Created a Thriving Entrepreneurial Community* by Jean-Jacques DeGroof. There is no better starting place than this.



MIT'S ENTREPRENEURIAL ECOSYSTEM

“The fact that entrepreneurial projects emerge even outside formal structures devoted to supporting entrepreneurship is a strong manifestation of MIT’s unique culture and its thriving entrepreneurial ecosystem.”¹

— JEAN-JACQUES DEGROOF
Author Q&A: Jean-Jacques Degroof, conducted and published by the Martin Trust Center.

Technology Licensing Office building facade at 255 Main St. Cambridge, MA.

WELCOMING NEW LEADERSHIP

“We are excited to welcome Ian Waitz as MIT’s new Vice President for Research. With over three decades of experience at MIT and a proven record of leadership, Ian brings a fresh perspective and deep commitment to driving innovation and research excellence. We also want to recognize the ongoing leadership of Anne White, Associate Vice President for Research Administration and School of Engineering Distinguished Professor of Engineering, whose guidance remains vital to our strategy and collaboration. With this strong leadership, we look forward to advancing MIT’s research mission and expanding our global impact.” — From the desk of Lesley Millar-Nicholson.



Ian A. Waitz

Vice President for Research (VPR)

Ian A. Waitz is the Jerome C. Hunsaker Professor of Aeronautics and Astronautics and Vice President for Research at MIT. Vice President Waitz is the Institute’s senior research officer and has overall responsibility for research administration and policy at the Institute. He sets MIT’s strategic research direction, fosters an outstanding research environment for faculty, students, and staff, and enables major multidisciplinary research initiatives.

The Vice President for Research is responsible for research integrity and compliance and plays a central role in the Institute’s research relationships with the federal government, industry, and other sponsors. Vice President Waitz oversees MIT Lincoln Laboratory and more than a dozen interdisciplinary research laboratories and centers.

Waitz has been on the faculty at MIT since 1991. He has served as head of the Department of Aeronautics and Astronautics, as dean of the School of Engineering, and most recently, from 2017 to 2024, as MIT’s Vice Chancellor for undergraduate and graduate education.²

“Ian brings a rare range and depth of understanding of MIT’s research and educational enterprise, our daily operations, our institutional challenges and opportunities, our history and our values — and an unmatched record of solving hard problems and getting big, high-stakes things done well.”³



Sally Kornbluth

MIT President

Letter from the Office of the President, published April 24, 2024

MIT A TOP UNIVERSITY FOR US PATENTS GRANTED

MIT NEWS

news.mit.edu

In an era defined by unprecedented challenges and opportunities, MIT remains at the forefront of pioneering research and innovation.

The Institute's relentless pursuit of knowledge has once again been recognized, with MIT securing 343 utility patents issued by the United States Patent and Trademark Office in 2023. This marks the 10th consecutive year that the National Academy of Inventors has both ranked worldwide colleges for number of U.S. patents issued and recognized MIT as the top single-campus university for patents granted. (The University of California system, which comprises 10 campuses and six academic health centers across the state, is No. 1 overall.)

Technology transfer is at the core of MIT's mission to advance knowledge for the benefit of the world, and the Technology Licensing Office (TLO) plays a transformative role in bridging the gap between groundbreaking research and societal impact. Impact is recognized in many ways through startups, small- to medium-sized companies, and large corporations. The TLO's efforts in patenting and licensing are vital for transforming academic discoveries into practical solutions that address societal needs, drive economic growth, and create new opportunities.

Lesley Millar-Nicholson, the executive director of the TLO, further underscores the importance of aligning efforts with President Sally Kornbluth's vision for MIT. "Our collaborative efforts ensure that the innovations born here at MIT make a difference across the globe, addressing some of the most pressing challenges of our time," Millar-Nicholson states. "This reflects a shared commitment to what Kornbluth described in her inaugural address about climate change, '... [this is] the kind of grand creative enterprise in which the energy you release together is greater than what you each put in. A nuclear fusion of problem-solving and possibility!'"

Each year, the TLO receives over 600 invention disclosures, resulting in a high volume of issued patents. The TLO's ongoing strategic licensing efforts bolster MIT's endeavors across six clear impact areas: healthy living, sustainable futures, connected worlds, advanced materials, climate stabilization, and the exploration of uncharted frontiers. These areas, intentionally curated to reflect the interests and priorities of MIT's faculty and research staff, drive meaningful change through translation and tech transfer.

As MIT continues to push the boundaries of what is possible, from deep space to quantum computing, the TLO remains a cornerstone of the Institute's strategy for impact.⁴



FY2024 FACT SHEET

Moving innovations and discoveries from the lab to the marketplace for the benefit of the public and to amplify MIT's global impact.

 Technology Licensing Office

608

All U.S.
Patents Filed



323

U.S. Patents
Issued

420

International
Patents Issued



\$429K

Trademark
Licensing



3,922

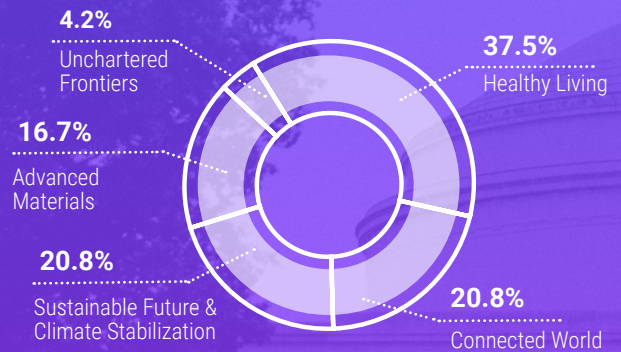
Active
U.S. Patents



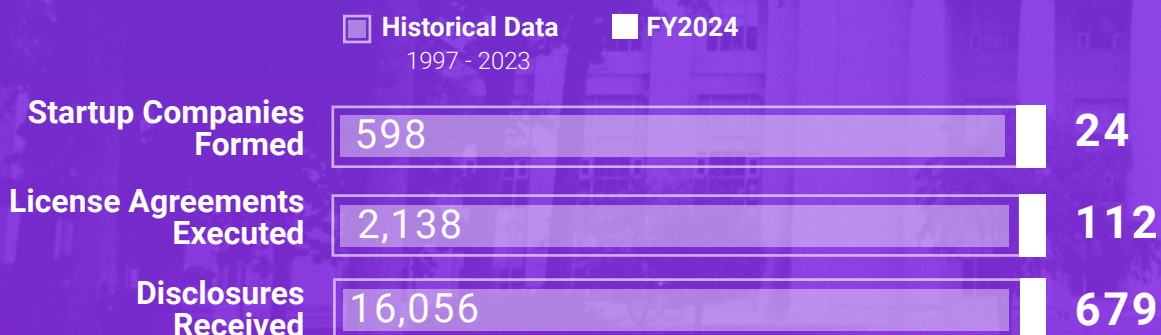
\$39.3

MILLION
Total Licensing &
Equity Revenue

Impact Area of Startup Companies



GROWTH THROUGH FY2024

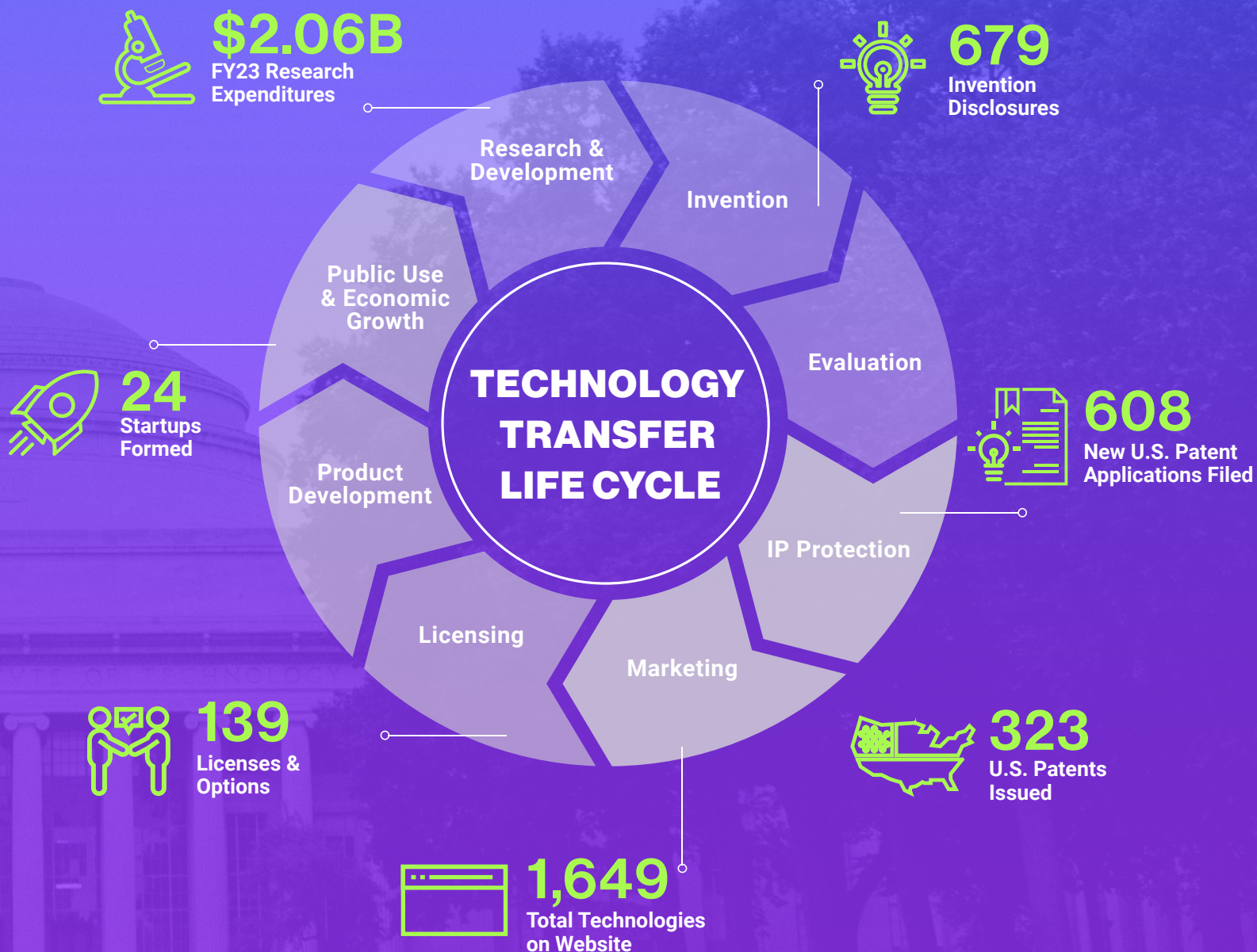


FY2024 TECHNOLOGY TRANSFER LIFE CYCLE

 Technology
Licensing Office

BENEFITING SOCIETY AND THE ECONOMY

Every year university research yields discoveries with commercial potential. Technology transfer professionals manage the complex process of shepherding ideas from the lab to the marketplace—from evaluating and protecting discoveries to commercializing the inventions through new and existing companies.



DRIVEN MIT FACULTY

DESHPANDE CENTER

deshpande.mit.edu

MIT's Technology Licensing Office (TLO) stands out among all U.S. universities in terms of the sheer number of new inventions received from its faculty. However, not all these inventions are immediately ready for licensing. Many require additional resources and investment to mature the ideas or mitigate risks to make them more attractive for licensing. Recognizing this need, the Deshpande Center for Technological Innovation was established in 2002 through the generosity of Gururaj "Desh" Deshpande and his wife, Jaishree. The center provides crucial research grants, mentorship, and education to MIT faculty and researchers. This year, the Deshpande Center welcomed Rana K. Gupta as its new Executive Director and MIT entrepreneur Angela Koehler as a faculty director. As with many other years, the Deshpande Center has supported exceptional projects aimed at driving innovation in both a carbon-free world and human health.

Canan Dagdeviren

Associate Professor,
Media Arts & Sciences



A conformable ultrasound breast patch that provides large-area, deep scanning, and multiangle breast tissue imaging capability.

Impact: Detection of early-stage tumors and increase patient survival rates.

TLO Case: #25168

Licensing Officer: Ben Rockney

Rohit Karnik

Professor, Mechanical
Engineering



A nanoporous, atomically thin membrane that separates the most commonly used industrial solvents for waste recycling.

Impact: Reduces energy consumption and carbon emissions.

TLO Case: #24437

Licensing Officer: Cordellia Sita

Katharina Ribbeck

Professor, Biological Engineering



Mucin-inspired technology that delivers infection-fighting sugars via a polymer to treat and prevent infectious vaginitis.

Impact: Treats, prevents and eases discomfort caused by vaginitis.

TLO Case: #24459

Licensing Officer: Jim Roberts

Ellen Roche

Associate Professor, Mechanical
Engineering, Institute for Medical
Engineering & Science



An endoscopically, self-deployable device to keep stomas open.

Impact: Helps neurosurgeons establish ETV stenting as the standard of care for patients with hydrocephalus.

TLO Case: #24977

Licensing Officer: Ben Rockney

Giovanni Traverso

Associate Professor, Mechanical
Engineering



A polymeric drug delivery platform for intratumoral immunoadjuvants.

Impact: Controls and extends drug release and enables clinician tracking of delivery.

TLO Case: #25565

Licensing Officer: Lauren Foster

SPURRING THE COMMERCIALIZATION OF CLIMATE & CLEAN ENERGY TECHNOLOGIES

THE WHITE HOUSE

In April, leadership at the White House Office of Science and Technology Policy, the White House National Economic Council, and the White House Climate Policy Office convened senior representatives from the Department of Energy (DOE), U.S. National Science Foundation (NSF), and venture capital organizations, universities, and law firms to announce a set of actions to spur innovation and accelerate progress in tackling the climate crisis. These actions are part the Biden-Harris Administration's commitment to unleashing a clean energy boom through the President's Investing in America agenda and Earth Week announcements in support of building a stronger, healthier future for all.

MIT's TLO was represented among the 15 major venture capital organizations, universities, and law firms which have published a new, open-source climate and clean energy model term sheet that provides several best practices and reasonable approaches to technology transfer negotiations. This non-binding term sheet serves as a representative template for initiating discussions between investors and academic institutions, aiming to balance and expedite negotiations and accelerate the entry of new climate, environmental, and sustainability products and services into the market months or years earlier. This effort is modeled off a previous approach to create an open-source model term sheet for life sciences startups.⁵

The US-BOLT Climate Term Sheet may be found on the Association of University Technology Managers' (AUTM's) website at autm.net.

"The experience of collaborating with other universities, venture capital firms, and law firms allowed MIT to share and gain perspectives around issues relating to licensing research institution created climate and clean-tech technologies. The collaboratively generated term sheet may be a resource enabling a shared vocabulary and reference for research institutions, companies, and their investors and law firms."



Deirdre Zammit
Associate Director of
Licensing

CELEBRATING NEW STARTUP LICENSEES

Every year, numerous startup companies license MIT technology and embark on a journey to create real-world impact. These startups are not just utilizing existing innovations; they are taking the cutting-edge technologies developed at MIT and pushing the boundaries of what's possible through further development and application. This year's showcase highlights the diverse array of startups that have harnessed MIT's intellectual property to create new products, services, and solutions that address pressing global challenges.

IMPACT

We believe in pioneering a brighter, more sustainable future through groundbreaking innovation. Our impact areas are carefully curated to reflect the pressing challenges and immense opportunities of our times.



Healthy Living

Research advancements for healthier and happier lives.



Sustainable Future

Green choices for a brighter future.



Climate Stabilization

Mitigation and adapting for the effects of climate change.



Advanced Materials

Transforming industry using substances with unique properties or capabilities.



Connected World

Enabling global connectivity and communication.



Uncharted Frontiers

Emerging technologies and unexplored frontiers.

Arculus Solutions



Arculus is developing technology to retrofit natural gas transmission pipelines so they may safely support the transport of hydrogen gas, mitigating the risks of hydrogen embrittlement and stress-induced cracking in the pipelines.

Area2.Ai



Area2.ai is developing an AI tool to analyze keyboard strokes to provide insight into a subject's neurological state and associated pathologies.

Artificial Axon Labs



By bringing together engineered biomaterials, 3D printing, and human cells, Artificial Axon Labs has developed a transformational biomimetic platform to discover medicines for neurodegenerative diseases.

Atlantic Quantum



Atlantic Quantum is focused on developing scalable quantum computers that may support solving complex computational problems.

Cartesian Systems



Cartesian Systems' mission is to map the physical world at unprecedented scale and precision and to transform materials handling and logistics.

Codomax



Codomax aims to enable highly efficient and low-cost production of difficult-to-express bio-industrial and cellular agriculture proteins using their Epi-MAX platform.

Eva Technology Corp.



Eva is developing high performance analog hardware and algorithms that may support energy efficient AI modeling and complex computing.

Kano Therapeutics



Kano Therapeutics is enabling the safe, effective, and flexible correction of gene-length stretches of DNA through a new class of biomaterial: circular single-stranded DNA.

Sesame Sustainability



Sesame offers an industrial decarbonization platform which combines emissions modeling, techno-economic analysis, and system optimization.

List only includes new startups who are licensees as of June, 2024.

CELEBRATING OUR LICENSEES

REACHING NEW MILESTONES

The journey from invention development to commercialization is fraught with pitfalls and challenges, making every step forward a noteworthy achievement. Transitioning from the lab to the marketplace requires persistence, innovation, and strategic vision. Join us in celebrating the remarkable progress and achievements our life science and physical science licensees have made over the past year, leveraging their MIT intellectual property to transform cutting-edge research into real-world solutions.

Aransi



Aransi, co-founded by Dr. Kripa Varanasi, announced the launch of its first FDA-registered biomedical product, 'Revel,' a lubricant designed to prevent clogging in ostomy pouches.

Celsius Therapeutics



Celsius Therapeutics was acquired by AbbVie to advance the development of treatments for inflammatory disease.

Cision Vision



Cision Vision, co-founded by Dr. Angela Belcher, made its first sale of the Cision InVision Imaging System, a shortwave infrared imaging device that enhances the efficiency and accuracy of lymph node searches for pathology practitioners. Its real-time, high-contrast depiction of lymph nodes marks a significant advancement, aiding the accurate staging of cancers and ultimately improving patient outcomes.

Concerto Biosciences



Concerto Biosciences received FDA clearance for its Investigational New Drug application, allowing the initiation of a Phase 1, first-in-human trial of Ensemble No. 2, an investigational live biotherapeutic product aimed at treating atopic dermatitis.

Cullinan Therapeutics



Cullinan Therapeutics, a biopharmaceutical company specializing in targeted oncology therapies, has begun dosing the first patient with CLN-617 in a Phase 1 clinical trial. A Phase 1 trial is significant as it represents the first step in testing a new therapy in humans, primarily focusing on safety and dosage, and if successful, it paves the way for Phase 2 and Phase 3 trials, which will further evaluate the therapy's efficacy, optimal dosing, and overall benefit in larger patient populations.

This initial human study, conducted across multiple centers, aims to assess the safety, pharmacokinetics, pharmacodynamics, and early efficacy of CLN-617, both as a standalone treatment and in combination with pembrolizumab, a PD-1 checkpoint inhibitor, in patients with advanced solid tumors. CLN-617 is a novel cytokine therapy that combines two powerful antitumor cytokines, IL-2 and IL-12, into a single molecule for direct injection into tumors. The therapy is designed to remain within the tumor to increase effectiveness and minimize side effects. The trial will explore the potential of CLN-617 to improve outcomes for patients with advanced cancers.

Cognito Therapeutics



Cognito Therapeutics, co-founded by Dr. Li-Huei Tsai and Dr. Ed Boyden, has developed a non-invasive, disease-modifying treatment for Alzheimer's patients using visual and auditory stimulation to evoke neuronal activity. After completing the Phase 2 'Overture' clinical study, the company is now recruiting for the pivotal 'Hope' study which should put the company in position to apply for FDA approval. Among other promising results from the 'Overture' study, researchers observed a 77% slowing in functional decline, a 76% reduction in memory and cognitive decline, and a 69% reduction of brain atrophy.

Editas Medicine



Editas Medicine entered a non-exclusive license with Vertex Pharmaceuticals for ex vivo gene editing medicines targeting the BCL11A gene in the fields of sickle cell disease and beta thalassemia, including CASGEVY™.

Einblick Analytics



Einblick Analytics, an AI-native collaboration platform, was acquired by Databricks. Databricks provides a cloud-based platform to help enterprises build, scale, and govern data and AI.

Ikigai Labs



Ikigai Labs has partnered with CustomerInsights.AI (CIAI) to explore the potential of pharma-specific enterprise-grade generative AI for structured data. This collaboration will focus on key areas in the pharmaceutical industry, such as sales forecasting, call routing, resource planning, pharmacy fraud detection, and large-scale data matching. The partnership highlights their dedication to using cutting-edge technology to create innovative AI solutions tailored for pharma. Ikigai's generative AI, based on award-winning MIT research, transforms tabular and time series data to provide predictive and actionable insights. Their Large Graphical Model (LGM) platform powers various AI solutions for data reconciliation, forecasting, and scenario planning, integrating seamlessly with over 200 data sources. With proven results like a 20% improvement in forecasting accuracy and a 70% reduction in data analysis time, Ikigai is revolutionizing industries with its efficiency and precision.

JetCool



JetCool, a startup spun out of Lincoln Laboratory, launched a liquid cooling module designed to integrate with NVIDIA H100 GPUs, demonstrating its technology's capability to support high-speed computing. The company has also announced global expansion through collaborations with Dell Technologies and UNICOM Engineering, Inc.

Kate Therapeutics



Kate Therapeutics entered a strategic collaboration with Capsida Biotherapeutics to manufacture KateTx's next-generation gene therapies.

Kelonia Therapeutics



Kelonia Therapeutics entered a strategic research and license agreement with Astellas Pharma to develop an off-the-shelf in vivo CAR-T cell therapies. Kelonia is leading a new frontier in genetic medicine with its proprietary in vivo gene placement system (iGPS®). This cutting-edge technology utilizes advanced lentiviral particles to precisely and efficiently deliver genetic cargo directly to target cells within the patient's body, offering a transformative approach to immuno-oncology treatment.

Liberty Defense



Liberty Defense began commercial sales of its 'Hexwave' product, which is a walkthrough, contactless screening system to detect concealed weapons and other suspect metallic and non-metallic materials on a person. Developed at Lincoln Laboratory, the Hexwave security system has received formal equipment authorization from the Federal Communications Commission (FCC) and began shipping systems this past year, including to a major airport.

Lightmatter



With the close of a \$155 million financing round and cumulative fundraising of more than \$420 million, Lightmatter achieved a \$1.2 billion valuation. The startup leverages light to link computer chips together supporting highspeed computing with reduced power consumption and has been supporting customer pilot programs.

Lyndra Therapeutics



Lyndra Therapeutics, co-founded by Dr. Bob Langer and Dr. Gio Traverso, raised \$101 million in Series E funding for its pipeline of long-acting oral medicines, and announced positive data from a pivotal Phase 3 study for oral weekly risperidone in treating schizophrenia.

Orna Therapeutics



Orna Therapeutics acquired ReNAGade Therapeutics to enhance its development of circular RNA therapies. Orna Therapeutics acquired ReNAGade Therapeutics and will combine Orna's circular RNA technology with ReNAGade's lipid nanoparticle-based delivery systems and editing programs.

PanTher Therapeutics



PanTher Therapeutics, a clinical-stage oncology company, presented promising results from a first-in-human study of PTM-101, a potent chemotherapy agent (paclitaxel) combined with an absorbable polymer in a flexible film. PTM-101 was placed directly on the pancreas over the tumor using standard laparoscopic tools and delivered a sustained dose of chemotherapy over four weeks. The study, conducted in Australia with three patients, demonstrated that PTM-101 successfully reduced the size of pancreatic tumors in all participants, with tumor thickness reduction ranging from 16% to 26% and overall tumor volume reductions of 40% and 70% in two patients. The treatment was well-tolerated, showing no serious side effects, and the chemotherapy remained localized to the pancreas with no systemic exposure. PTM-101 is designed to maximize the anti-tumor effects while minimizing side effects by delivering high-dose chemotherapy directly to the tumor site. Following this successful Phase 1 trial, PanTher is preparing for a Phase 1b trial to further evaluate the safety, tolerability, and effectiveness of PTM-101 at different doses.

Sarepta Therapeutics



Sarepta Therapeutics, a biopharmaceutical company, received FDA approval to expand the labeled indication for ELEVIDYS to include Duchenne Muscular Dystrophy patients ages four and above.

Sigilon Therapeutics



Sigilon Therapeutics was acquired and became a wholly owned subsidiary of Eli Lilly. Sigilon and Lilly had previously worked together to develop encapsulated cell therapies, including cell therapies for the treatment of type 1 diabetes.

Strand Therapeutics



Strand Therapeutics, a biotechnology company developing the first platform for creating programmable, long-acting mRNA therapeutics, has announced that the first patient has been dosed in their Phase 1, first-in-human trial of STX-001. This investigational therapy utilizes a multi-mechanistic, synthetic self-replicating mRNA technology to express the IL-12 cytokine for an extended period, delivering it directly into the tumor microenvironment.

Sublime Systems



Sublime Systems and WS Development have announced the first commercial use of low-carbon Sublime Cement™ in the indoor public space of One Boston Wharf, the largest net-zero-carbon office building in Boston's Seaport district. This sustainable cement will be featured in the building's primary public area, known as the Paseo. Sublime Systems is pioneering a method to eliminate CO2 emissions from cement production, which is responsible for 8% of global CO2 emissions. Their innovative "true-zero" technology avoids the major emissions sources in traditional cement production, such as limestone feedstock and fossil-fueled kilns, by using an electrochemical approach to extract reactive ingredients from non-carbonate feedstock. The process, which operates at ambient temperatures, has the potential to revolutionize the cement industry.

Syntis Bio



Syntis Bio emerged from stealth mode, unveiling its first three development programs: SYNT-101, a once-daily pill aimed at replacing gastric bypass surgeries for obesity, and SYNT-202 and SYNT-203 for the rare diseases homocystinuria and maple syrup urine disease, respectively, for which there are currently no approved therapies. The company was co-founded by Dr. Bob Langer and Dr. Gio Traverso.

TISSIUM



TISSIUM announced the first clinical use of its biodegradable light-activated surgical adhesive technology for hernia repair. The company, co-founded by Dr. Bob Langer, is developing biomorphic polymers for atraumatic tissue repair.

Tomorrow.io



This year, The Tomorrow Companies obtained a commercial license to MIT technology directed to Time Resolved Observations of Precipitation structure and storm Intensity with Constellation of Smallsats (TROPICS) which is a constellation of small satellites that support weather forecasting. Supported by NASA, MIT Lincoln Laboratory developed the TROPICS technology that was demonstrated in a NASA mission launch. The Tomorrow Companies and MIT pursued collaboration to further the technology, and The Tomorrow Companies is planning its build of eighteen satellites incorporating the technology. The Tomorrow Companies' business model includes selling weather data to customers including airlines, energy companies, and businesses that support logistics and transportation.

List reflects a selection of licensees that are publicly available.

PROGRESS & POTENTIAL

KOCH INSTITUTE

ki.mit.edu

A women's cancers research initiative has been established at MIT with the ambitious goal of developing transformational, engineering solutions to the early diagnosis, detection, and interception of hard-to-detect cancers. The new initiative is led by professors Angela Belcher, Sangeeta Bhatia, and Paula Hammond, all faculty members of MIT's Koch Institute for Integrative Cancer Research.

At the outset, the initiative will support the creation of an array of technologies that will improve ovarian cancer screening and diagnosis for both at-risk populations, such as people with BRCA gene mutations, and global populations, as well as enhance treatment approaches and help guide patient decisions about prophylactic surgeries, fertility preservation, and other important considerations. Both detection and treatment remain key challenges in ovarian cancer, since the disease is usually not detected until advanced stages, when tumors—and tiny metastases—have already spread throughout the abdomen. In the future, the team plans to expand their focus to other hard-to-treat women's cancers.

Several of the team's suite of tools will be designed around STIC lesions, tiny clusters of precancerous cells that form in the fallopian tubes. Because they appear several years before the onset of ovarian cancer, STIC lesions could make excellent targets for early detection, as well as for imaging and treatment approaches. In this regard, the researchers' early diagnosis efforts leverage new understandings of ovarian cancers origins in the fallopian tubes, rather than the ovaries themselves.

A foundational component of the team's arsenal is a [powerful imaging platform](#) developed by the Belcher Lab. This sensitive, radiation-free technology can look deep within the body to visualize fallopian tubes and other tissues that are 'invisible' to current imaging methods, supporting both detection and treatment approaches.⁶

As of August 2024, this powerful imaging technology and many others are available for licensing with the TLO at [patents.mit.edu](#). Case: [#20911](#)

"We have embraced the audacious goal of developing an accessible detection and diagnostic technology for ovarian cancer in the next five to ten years."



Angela Belcher
James Mason Crafts
Professor and Professor of
Biological Engineering

Koch Institute professors Paula Hammond, Sangeeta Bhatia and Angela Belcher, and MIT alumna Parul Somani at the Koch Institute's "Intercepting Ovarian Cancer" event in November 2023.



Synthesis of Fluorescent Quantum Defects on Carbon Nanotubes

CASE NUMBER: #20911



Applications

This technology is a fast, efficient, and scalable method for synthesizing fluorescent quantum defects on single-walled carbon nanotubes (SWCNTs). This invention is useful for applications that require the emission of infrared light from a single-photon source, including quantum communication, cryptography, and medical imaging.

Technology

This technology is a method for synthesizing fluorescent defects on SWCNTs through oxygen doping. To introduce fluorescent defects on SWCNTs, the inventors utilize UV radiation with hypochlorite ions and a surfactant, generating oxygen atoms that then attach onto the SWCNT wall. Production of oxygen-doped SWCNTs using this strategy occurs at least 24 times faster than existing methods while minimizing the generation of non-fluorescent defects. Furthermore, the low cost of reagents in this invention enables scalable production of oxygen-doped SWCNTs. This invention is useful for applications that require infrared excitation/emission wavelengths or room-temperature single-photon sources, such as medical imaging and quantum communication.

Problem Addressed

SWCNTs are useful, particularly in the imaging fields, for their ability to emit light over a broad range of wavelengths. The optical properties of SWCNTs can be adjusted through chemical modifications of the nanotube surface. In particular, synthesis of fluorescent quantum defects on SWCNTs, such as through oxygen doping, can enable the generation of short-wave infrared light. Production of light within this wavelength range is especially useful for medical imaging, as it allows for higher resolution imaging. Furthermore, SWCNTs with quantum defects can serve as room-temperature single-photon sources for quantum communication. However, current methods to introduce fluorescent quantum defects on SWCNTs are slow, expensive, and not scalable.



[PATENTS.MIT.EDU](https://patents.mit.edu)

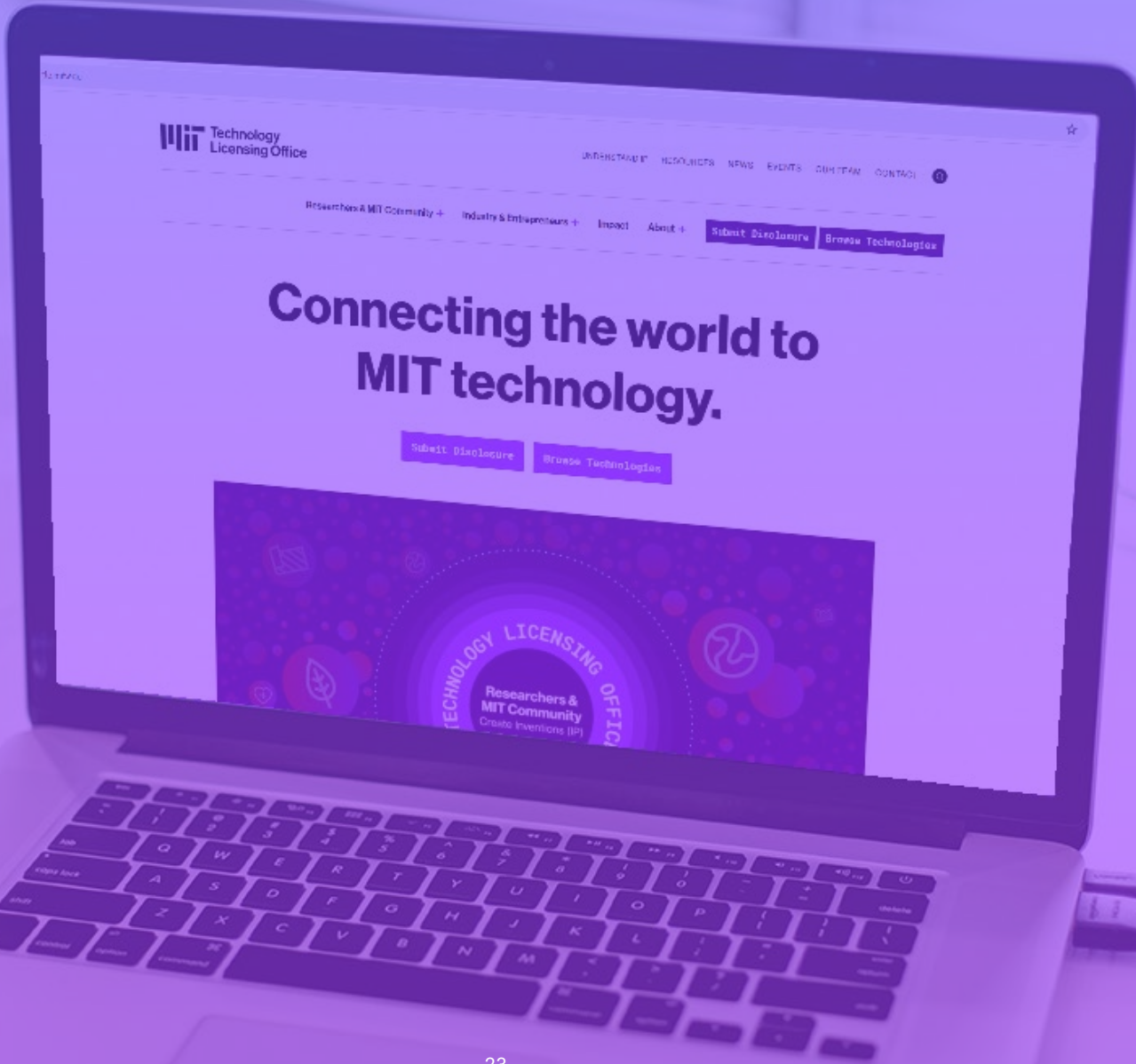
View this technology and many others available for licensing.

A NEW ONLINE PRESENCE

tlo.mit.edu

The launch of MIT's Technology Licensing Office (TLO) new website marks an important milestone in connecting the world to MIT technologies. The revamped platform prioritizes user experience and offers enhanced visibility into technologies available for licensing. Some of the exciting features include:

- **[Advanced Filtering of Technologies](#)**: Easily explore MIT's cutting-edge innovations with the improved filtering system.
- **[Researcher Profiles](#)**: Get to know the brilliant minds behind MIT's innovations through our new researcher profiles.
- **[Updated Technology Update Email Functionality](#)**: Stay up-to-date with the latest technological developments with our enhanced email update service.
- **[New Learning Hub](#)**: Dive into the world of Intellectual Property (IP) with our Understand IP hub, featuring insightful articles designed to expand your knowledge and understanding of IP.
- **[Dedicated Location for Resources and Events](#)**: Access a wealth of resources and stay informed about upcoming events.



CLOSING THE GENDER GAP

FACULTY FOUNDER INITIATIVE

entrepreneurship.mit.edu/faculty-founder-initiative

For many years, reports have shown that women remain underrepresented in STEM entrepreneurial activities, despite growing numbers of women pursuing studies in this area. Research has been done to explore why this disparity exists, with common findings pointing to women's limited access to venture capital (VC) funding networks. This lack of access not only restricts women from important professional opportunities but also hinders their ability to commercialize their discoveries for public benefit. The gender gap in entrepreneurship and innovation has long been a concern, as highlighted by numerous studies including those from the United States Patent and Trademark Office (USPTO) and research conducted by MIT professors Sangeeta Bhatia, Susan Hockfield, and Nancy Hopkins in 2019. These studies have highlighted the slow integration of women and underrepresented communities into the patenting process. However, recent research shows promising developments. According to a recent USPTO study published in January 2024, women's involvement in patenting is on the rise. The study finds that gender balance positively impacts patent value, with biotechnology patents featuring equal numbers of male and female inventors being worth \$3.24 million more than those with all-male teams. This difference is even more pronounced in biotech AI, where patents with balanced teams are valued \$11.53 million higher.⁷



Dr. Sangeeta Bhatia
Founder, Faculty Founder Initiative & MIT Professor



Kit Hickey
Executive Director, Faculty Founder Initiative

Since 2020, the MIT's Faculty Founder Initiative has led the effort to boost female faculty participation in the innovation ecosystem, ultimately striving to tackle global challenges through increased representation.

The MIT Faculty Founder Initiative Prize Competition, launched in 2021, is organized as a learning cohort, where participants receive support in commercializing their existing inventions. They are guided through market assessments, fundraising, business capitalization, and other relevant areas. The program, a collaboration between the MIT School of Engineering and the Martin Trust Center for MIT Entrepreneurship, offers hands-on learning opportunities from industry leaders, covering topics like technology licensing and early startup creation. At the program's conclusion, cohort members pitch their ideas to a selection committee made up of MIT faculty, biotech founders, and venture capitalists, with winners receiving discretionary funds. In 2024, Brown University faculty were also invited to participate.

"MIT has always been a leader in entrepreneurship. Part of leading is sharing with the world. The collaboration with Brown University for this cohort shows that MIT can share our approach with the world, allowing other universities to follow our model of supporting academic entrepreneurship."⁸



Susan Hockfield
Professor of Neuroscience and President Emerita

AWARD RECIPIENTS



**Anne
Carpenter**

*Senior Director of
the Imaging Platform,
Institute Scientist at
Broad Institute*

GRAND PRIZE RECIPIENT

Anne Carpenter specializes in using microscopic imaging of cells combined with computational techniques like machine learning to speed up the discovery of chemical compounds with the potential to shrink tumors. These compounds are then put through biological tests that mimic the tumor environment to evaluate their effectiveness against actual tumors.

In April, Carpenter launched her company, SyzOnc, which she credits to the support from the MIT Faculty Founder Initiative. SyzOnc will leverage cutting-edge biological and computational technologies to develop new treatments for cancers with low survival rates, including sarcoma, pancreatic cancer, and glioblastoma.



**Betar
Gallant**

*Associate Professor
of Engineering*

COMPETITION BREAKTHROUGH PRIZE RECIPIENT

Betar Gallant, the founder of the startup Halogen, is an expert on cutting-edge battery technologies. She and her team have created high-density battery storage solutions designed to enhance the lifespan and performance of medical devices like pacemakers.

During her time as an MIT researcher, Betar pioneered the use of electrochemical strategies to separate carbon dioxide from amine, the sorbent molecule used in carbon capture and storage. She showed that by separating the carbon dioxide and the amine, it was possible to extend the reaction, eventually making a stable solid form of carbon dioxide that was easy to separate.



**Frederike
Petzchner**

*Assistant Professor
of Psychiatry and
Human Behavior*

RUNNER-UP PRIZE RECIPIENT

Frederike Petzchner, an assistant professor at the Carney Institute for Brain Science at Brown University, was awarded for the innovative work of her startup, SOMA, which has developed a digital pain management system to help people manage and alleviate chronic pain.

Besides her academic interest, Frederike is a member of the national council for digital ecology in Germany (Rat für digitale Ökologie), an alumna of the WEF Global Shapers in Zurich and a council on several scientific advisory boards.



Content courtesy of MIT News article "MIT Faculty Founder Initiative announces three winners of entrepreneurship awards" by Michaela Jarvis, June 10, 2024.

Top prizes went to researchers and biotech entrepreneurs Betar Gallant (left), Frederike Petzchner (middle); and Anne Carpenter. Photo credit: Veera Panova.





BIBLIOGRAPHY

¹“Author Q&A: Jean-Jacques Degroof.” Martin Trust Center for MIT Entrepreneurship June 17, 2021. <https://entrepreneurship.mit.edu/author-qa-jean-jacques-degroof/>

²Waitz, Ian A. “MIT AeroAstro Department.” Massachusetts Institute of Technology, accessed May 10, 2024. <https://aeroastro.mit.edu/people/ian-a-waitz/>

³Kornbluth, Sally. “New Vice President for Research Ian Waitz.” Office of the President, MIT, April 24, 2024. <https://president.mit.edu/writing-speeches/new-vice-president-research-ian-waitz>

⁴“MIT tops among single-campus universities in US patents granted.” MIT News, April 11, 2024. <https://news.mit.edu/2024/mit-tops-among-single-campus-universities-us-patents-granted-0411>

⁵“White House Office of Science and Technology Policy Announces Actions to Spur the Commercialization of Climate & Clean Energy Technologies.” White House Office of Science and Technology Policy, April 25, 2024. <https://www.whitehouse.gov/ostp/news-updates/2024/04/25/white-house-office-of-science-and-technology-policy-announces-actions-to-spur-the-commercialization-climate-clean-energy-technologies/>

⁶“New Initiative Takes Aim at Women’s Cancers.” Koch Institute for Integrative Cancer Research at MIT, February 7, 2024. <https://ki.mit.edu/news/2024/new-initiative-takes-aim-at-womens-cancers>

⁷Giczy, A.V., Pairolero, N.A. & Toole, A.A. Discovering value: women’s participation in university and commercial AI invention. *Nat Biotechnol* 42, 26–29 (2024). <https://doi.org/10.1038/s41587-023-02075-1>

⁸Jarvis, Michaela. “MIT Faculty Founder Initiative Announces Three Winners of Entrepreneurship Awards.” MIT News, June 10, 2024. <https://news.mit.edu/2024/mit-faculty-founder-initiative-announces-three-winners-entrepreneurship-awards-0610>

CONTACT US

bit.ly/TLOFY24

UPCOMING EVENTS

tlo.mit.edu/resources/news-events

EXPERIENCE OUR IAP 2024

youtube.com/@mit_tlo



Technology Licensing Office | 255 Main St. | NE18-501 | Cambridge, MA 02142 | 617-253-6966 | tlo@mit.edu

© Massachusetts Institute of Technology