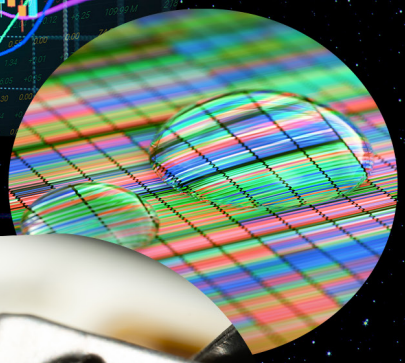
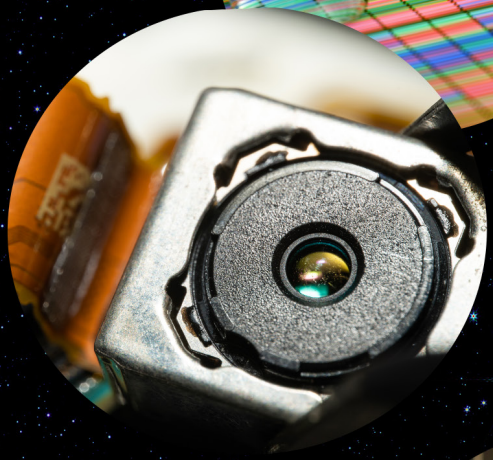
Caltech Technology Transfer & Corporate Partnerships

COLLABORATION
INNOVATION
ENTREPRENEURSHIP

Anniversary Edition: Celebrating 30 Years of Tech Transfer at Caltech





2025 Impact Report

A Conversation Sparks a Powerful New Drug Technology

OTTCP's mission to bring paradigm-shifting technologies out into the world is accomplished through licensing activities, partnerships with companies, and internal funding mechanisms. In the case of Dr. Raymond Deshaies, Professor Emeritus of Biology, his pioneering work in harnessing protein machinery for treating disease now underpins the work of multiple biotech and pharmaceutical companies. His story is a prime example of the way in which a fundamental Caltech technology can find a path to translation and ultimately long-term human impact. In Ray's own words:

You can never tell what is going to happen at a poster session. This one happened to be at the Semi-Ah-Moo resort in Blaine, Washington, in 1998. I was attending a retreat for recipients of the Burroughs-Wellcome Early Career Investigator Award in the Basic Pharmacological Sciences. We were required to show a poster. Sigh. Making posters has never been my thing. With my last name starting with D, it was not surprising that my poster neighbor was Craig Crews from Yale. That was one fortuitous placement.

At the time, my lab had just discovered the first member of a large family of ubiquitin ligase enzymes now known as cullin–RING ubiquitin ligases (CRLs). The natural function of most CRLs is to tag specific proteins for destruction, thereby managing protein levels in the cell. We were studying different aspects of CRL biological function, regulation, and mechanism of action when, contemporaneously, a lab in France had shown that human immunodeficiency virus (HIV) hijacks a particular CRL which actually facilitates successful viral infection. This remarkable co-opting of cellular regulatory machinery by the virus piqued my interest.

Craig's poster described an approach his lab had developed to detect non-natural protein-protein interactions induced by organic compounds. The idea was to make bifunctional molecules in which one part bound protein X and the other part bound protein Y, such that when X was joined to Y, a readily detectable signal was produced. This is essentially what the tiny HIV protein described above does, but with the important distinction that Craig was trying to do it with organic molecules that could in theory be starting points for drugs that could be taken as pills. The two of us got to talking, and before long, an intriguing idea percolated to the fore, which was to use his technology to recruit a disease-causing protein to a CRL, causing its degradation. Excited, we both resolved on the spot to collaborate to test this idea.

The next day, I returned to Caltech, Craig to Yale. On the flight back, I began to write a grant proposal, which I submitted to Caltech's Office of Technology Transfer to see if it could qualify for a new funding mechanism – the Gates Grubstake Awards – which had been launched to support commercializable projects at Caltech.

We received the award, and I recruited a student, Dr. Kathleen Sakamoto, to work on the project. About three years later, we published the first in a series of 4 joint papers with Craig's group, showing proof-of-principle work, with some help from Akiko Kumagai in Bill Dunphy's lab, on molecules that induce degradation of disease-causing proteins, which we christened 'PROTACs', for PROteolysis-TArgeting Chimeric molecules.

Deshaies in 2023, receiving the Jacob and Louise Gabbay Award with Crews for their work on PROTACS. | Photo courtesy of Amgen.

The discovery and subsequent optimization of PROTACs, along with the discovery made by other groups that an important marketed drug has a PROTAC-like mechanism of action, fueled the growth of the burgeoning field of what is now referred to as 'Targeted Protein Degradation' (TPD). Last year, Beacon Intelligence did a market survey of TPD technologies at my request. They found that there are now over 100 biotech companies with TPD-related programs, and there are over 80 ongoing clinical trials of TPD drug candidates that collectively target over 35 different disease-causing proteins. The first prospectively developed PROTAC drug was submitted for FDA approval on September 5 [2025]. It is still early days, but signs point to TPD drugs becoming an important part of a physician's armamentarium.

—Raymond J. Deshaies, Professor of Biology, Emeritus

Celebrating 30 Years of Tech Transfer at Caltech

In 1995, 15 years after the Bayh-Dole Act was passed by Congress, allowing US universities to retain title to federally funded inventions, Caltech opened its technology transfer office. Well, perhaps 'office' is a generous term—really, the tech transfer function started as one man: Larry Gilbert.

Due to its focus on fundamental research, Caltech was later than its peer institutions like Stanford and MIT to establish a tech transfer office. It was initially believed that, because Caltech professors pursued research mostly out of sheer love of science and learning—curiosity-driven research—they wouldn't necessarily be interested in patenting or commercializing their technologies. So for a little while, the idea of a tech transfer office was pushed to the back burner.

However, in the mid-1990's, Caltech's patent attorney, Mike Keller, and Vice Provost Dr. David Goodstein initiated the push to pursue technology patenting and commercialization on campus. After a thorough national search, in 1994, the Institute recruited its first-choice candidate, Gilbert, to gauge the interest in tech transfer on campus.

Gilbert was one of the originators of the tech transfer field. He established Boston University's tech transfer office in 1976, having been at MIT when they had established theirs. Furthermore, he was one of the co-founders of the Association of University Technology Managers (AUTM), an organization that still exists today and now includes members from more than 800 universities, research centers, hospitals, businesses, and government organizations.

Some things change, some things stay the same: a photo from the 1995 Caltech yearbook of the iconic Caltech Hall fountain.

In those first few months after Gilbert arrived at Caltech, he systematically went from professor to professor, lab to lab, to discuss the technology transfer process and how it could allow professors' findings in their labs to become products and services available to everyday Americans—and the world. While some doubted whether technology transfer would succeed on campus, Dr. Goodstein said of Gilbert in 2002, "He made it work in the first instance by walking around and talking to everybody. He got to know personally all of the professors in the areas where this stuff is done."[1] Contrary to Caltech's initial concern that faculty may not be interested in seeing their discoveries commercialized, Gilbert found that faculty members were sincerely enthusiastic about the endeavor. Gilbert's relationship-oriented approach to working with Caltech researchers continues to be foundational to how tech transfer at Caltech operates today.

Gilbert established an aggressive patenting strategy of filing a provisional patent application on every invention disclosure. This strategy was extremely effective, helping Caltech jump quickly into the top tier of US universities by number of patents, despite starting technology transfer in earnest well after many of its counterparts, and despite its relatively small number of faculty, staff, postdoc, and student researchers.

Read the rest of the story on our website: https://innovation.caltech.edu/ottcp-news/celebrating-30-years-of-tech-transfer-at-caltech

[1] *David Louis Goodstein Oral History Interview, interviewed by Charlotte E. (Shelley) Erwin, Caltech Archives Oral History Project, November 11, 2002, December 2, 2002, http://resolver.caltech.edu/CaltechOH:OH_Goodstein_D*

The Caltech Seed Fund

The Caltech Seed Fund invests in startups based on all areas of technology from Caltech and JPL. The investments follow research where strong comercialization opportunities exist. Current investments include:

Asymptote Genetic Medicines is a therapeutics company with technology stemming from the Caltech labs of Michael Elowitz, the Roscoe Gilkey Dickinson Professor of Biology and Bioengineering; Investigator, Howard Hughes Medical Institute and Viviana Gradinaru, Lois and Victor Troendle Professor of Neuroscience and Biological Engineering; Investigator, Howard Hughes Medical Institute; Allen V. C. Davis and Lenabelle Davis Leadership Chair, Richard N. Merkin Institute for Translational Research; Director, Richard N. Merkin Institute for Translational Research. Asymptote is developing gene therapies focused on curing rare neurological diseases using a combination of gene circuits and delivery technology licensed from Caltech. Asymptote launched with CEO Jay Chiang, with seed funding from the Caltech Seed Fund, Wilson Hill Ventures, and Madrona Venture Group as the lead investor. The company is on track to deliver two preclinical candidates by the end of 2026.

HEPT Lab is a photonics 3D sensing company from the Caltech Holistic Integrated Circuit Lab of Ali Hajimiri, Caltech's Bren Professor of Electrical and Medical Engineering. The company develops solid-state silicon photonics 3D sensors for autonomous systems in agriculture, manufacturing, transportation, and defense. HEPT Lab's intelligent, adaptive sensors are built for the emerging generation of intelligent robotic systems. HEPT Lab launched with CEO Aroutin Khachaturian (BS '13, PhD '20) with seed funding from the Caltech Seed Fund, Wilson Hill Ventures, Freeflow, Silicon Catalyst Angels, and Silicon Catalyst Ventures.

PINC Technologies Inc. is a photonics company founded on advancements from the Nonlinear Photonics Laboratory at Caltech, led by Alireza Marandi, Professor of Electrical Engineering and Applied Physics. The company is pioneering a scalable nonlinear photonics platform aimed at addressing some of the most challenging problems in the photonics industry. By making nonlinear photonics practical for real-world deployment, PINC enables applications spanning industrial and biomedical sensing, quantum information processing, and advanced communications. PINC Technologies launched with Farzaneh Afshinmanesh as CEO and is supported by the Caltech Seed Fund, Quantonation, Wilson Hill Ventures, Freeflow Ventures, Hamamatsu Ventures, Santec, and Qubits Ventures.

Receptive Bio is a therapeutics company from the Caltech lab of Viviana Gradinaru, Lois and Victor Troendle Professor of Neuroscience and Biological Engineering; Allen V. C. Davis and Lenabelle Davis Leadership Chair, Richard N. Merkin Institute for Translational Research; Director, Richard N. Merkin Institute for Translational Research. The company is developing non-viral, receptor-mediated shuttles to unlock therapeutic delivery to the brain and beyond. Receptive launched with CEO Mert Aktar with seed funding from the Caltech Seed Fund, Wilson Hill Ventures, along with other investors.

Innovation.
Entrepreneurship.
Collaboration.

Our mission is to drive the transfer of scientific and engineering knowledge created by our researchers to maximize societal impact by developing partnerships with industry through the creation of new ventures, collaborations with corporations, and transfer of intellectual property while nurturing an entrepreneurial environment.

FY2025 By the Numbers

132
Invention Disclosures
(campus only)

135
U.S. Patents Issued

2,058
Active U.S. Patents

58
Licenses Granted
(including options)

8
Startup Companies

41
Companies
Sponsoring Research

53
Companies Giving Gifts

$66M
Corporate Contracts & Gifts

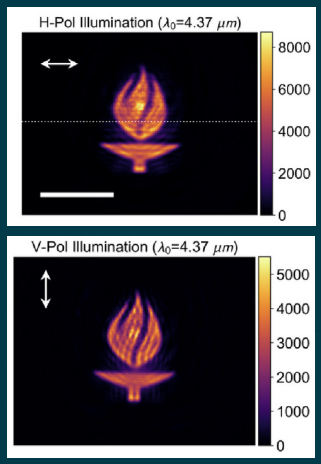
CAST Gains New Director

Caltech's Center for Autonomous Systems and Technologies (CAST) launched on October 24, 2017 and has quickly become a hub for advancing autonomous systems research. Since its founding, CAST has supported more than 130 projects—including work by 30 summer research fellowships and over 40 Caltech faculty members—made possible through strategic corporate partnerships and generous philanthropic support.

After nearly a decade of visionary leadership by Professor Mory Gharib, who established CAST as a global leader in autonomy research, the center enters a new chapter. Professor Aaron Ames has assumed the role of director and Booth-Kresa Leadership Chair, building on CAST's legacy while driving innovation at the intersection of AI and robotics. This transition marks a continued commitment to shaping the future of autonomous technologies.

Ideas in the Lab

Rothenberg Innovation Initiative (RI^2) 2025 Awards



Measured images of a Caltech logo for H- and V-polarized light with a wavelength of 4.37 µm from the Faraon Lab

A gift from Caltech Trustee James F. Rothenberg and his wife Anne launched the Caltech Innovation Initiative (CI^2) in 2009 to provide essential seed funding for early-stage research that addresses pressing problems and could lead to marketable technologies that benefit society. Each RI^2 award provides up to two years of support, with up to $125,000 in funding per year, to help Caltech professors, students, and post-docs mature their research beyond the conceptual stage to the point that the innovations are attractive to outside investors for further development of the technologies. Bolstered by an additional $15M gift in 2017 and renamed the Rothenberg Innovation Initiative (RI^2), the program funded six new projects and two renewal projects in 2025.

Low-Cost High-Pressure Hydrogen Generation and Compression for Direct-Use Applications (new)
Harry Atwater, Otis Booth Leadership Chair, Division of Engineering and Applied Science; Howard Hughes Professor of Applied Physics and Materials Science; Director, Liquid Sunlight Alliance

Biological Circuits for Specific Delivery in mRNA Gene Therapy (renewal)
Michael Elowitz, Roscoe Gilkey Dickinson Professor of Biology and Bioengineering; Investigator, Howard Hughes Medical Institute

Quantum Optical Interconnects for Future Superconducting Quantum Computers (new)
Andrei Faraon, William L. Valentine Professor of Applied Physics and Electrical Engineering; Fletcher Jones Foundation Director of the Kavli Nanoscience Institute

Ultrasound Shape Sensing for Surgical Navigation (new)
Morteza Gharib, Hans W. Liepmann Professor of Aeronautics and Medical Engineering

Increasing the Safety and Sensitivity of Cancer Therapy with Vesicle Protein Co-Display and Chemically Induced Dimerization (new)
Stephen L. Mayo, Bren Professor of Biology and Chemistry; Merkin Institute Professor

Novel Formulations and Strategies to Treat Chronic Wound Infections with Chlorate (renewal)
Dianne Newman, Gordon M. Binder/Amgen Professor of Biology and Geobiology; Merkin Institute Professor

Development of a Portable Parallel Ultraviolet Photoacoustic Microscopy (PUV-PAM) Device for Rapid Intraoperative Histology (new)
Lihong Wang, Bren Professor of Medical Engineering and Electrical Engineering; Andrew and Peggy Cherng Medical Engineering Leadership Chair; Executive Officer for Medical Engineering

Semantic Tokenization: The Cornerstone of Next-Generation Systems (new)
Yisong Yue, Professor of Computing and Mathematical Sciences

Caltech Technology Transfer & Corporate Partnerships
1200 East California Boulevard | MC 6-32 | Pasadena, California 91125 | (626)395-3066

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