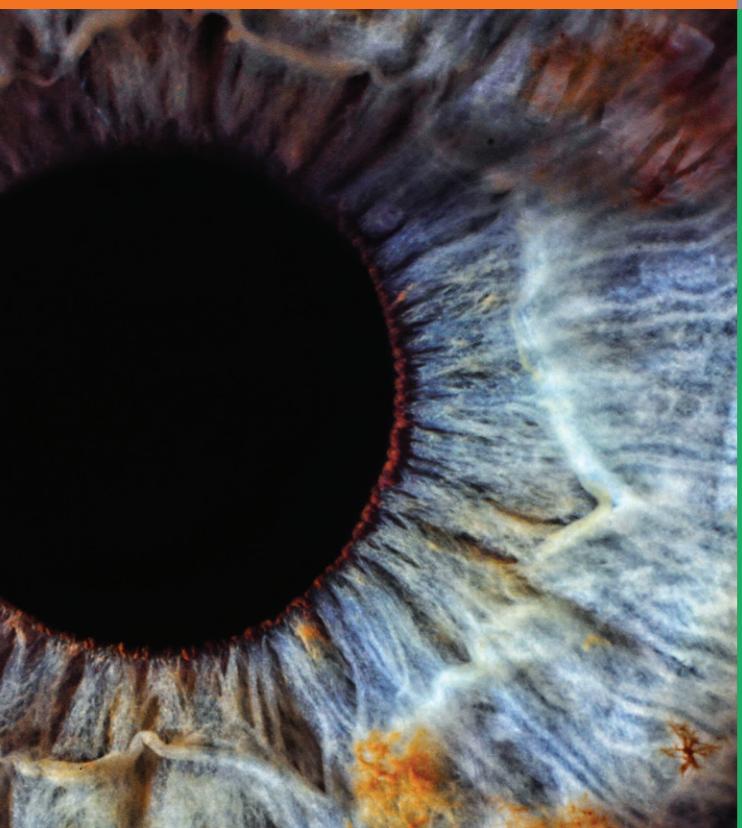
2015 Impact Report

Caltech Technology Transfer & Corporate Partnerships



CELEBRATING 20 YEARS

COLLABORATION
INNOVATION
ENTREPRENEURSHIP

invention of breakthrough technologies

$$\int (\textit{change the world})\, dt$$

relentless pursuit of the fundamental understanding of nature

FY 2015

228
Invention Disclosures
(campus only)

192
U.S. Patents Issued

1,820
Active U.S. Patents

55
Licenses Granted
(including options)

12
Startup Companies

44
Companies Sponsoring Research

95
Companies Giving Gifts

$20.1M
Corporate Contracts & Gifts

WE'RE 20

The Office of Technology Transfer was first established in 1995—a relative latecomer to university technology transfer. Since then, Caltech has become widely recognized for its ability to efficiently transfer the fruits of its research to the commercial sector for maximum societal impact. Our philosophy is built on four pillars:

- **build trust-based relationships with faculty and other researchers;**
- **aggressively pursue intellectual property protection;**
- **work effectively with industry; and**
- **foster startup creation and entrepreneurship.**

It has been an innovative and productive 20 years:

FY1995–FY2015

2,503 U.S. Patents Issued

998 Licenses

164 Startups

$376.3M Total Revenue

Including:

$64.2M Distributions to Inventors

$341.2M Royalties

$35.1M Equity

FY 2015

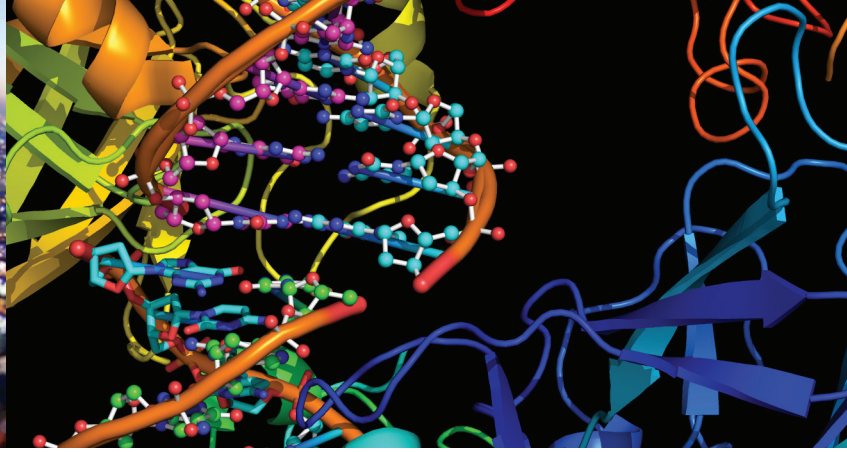
Nurturing New Ventures

In March of 2015, the office appointed its first ever Entrepreneur-in-Residence (EIR), Dave Licata. Dave has extensive startup experience, most recently serving as the CEO of a Caltech medical device startup that went from founding to acquisition in under two years. Working closely with other OTTCP staff, Dave's responsibilities include facilitating startup formation in order to increase both the quality and quantity of Caltech startups. Dave also serves as a general on-campus resource for faculty and students who have questions about entrepreneurship. The EIR position is generously supported by the Ronald and Maxine Linde Institute of Economic and Management Sciences and the President's Office.

Grand Challenges with Bill and Melinda Gates

With a total of over $13 million in funding from the Bill & Melinda Gates Foundation (BMGF), three different Caltech professors are working to address a variety of Grand Challenges in Global Health. Under the "Grand Challenges in Point-of-Care Diagnostics", Professor Axel Scherer is developing a low cost, low-power, portable, rapid and easy-to-use quantitative PCR machine for a wide range of disease diagnostics in the developing world. Professor Jim Heath has developed synthetically-created peptides that are as sensitive as antibodies but are much more stably transported, stored, and used in diagnostic tests in developing world settings. Professor Mike Hoffman's solar-powered toilet won the BMGF's "Reinventing the Toilet Challenge" with a self-contained waste system that requires no sewer or power connections and can treat wastewater in under four hours. Professor Hoffman (pictured) is continuing to develop his award-winning toilet in collaboration with both BMGF and Kohler and testing has already begun in areas of the world where sanitation is a major public health issue.

FY	1995	1996	1997	1998	1999	2000	2001
Number of Startups	6	2	10	5	9	15	11



LA's Innovation Node

In late 2014, Caltech, in partnership with the University of Southern California and the University of California, Los Angeles, was awarded a three year, $3.5 million grant from the National Science Foundation to establish an innovation node in Los Angeles. The National Science Foundation's Innovation Corps (NSF I-Corps) program was created to help commercialize academic research, and focuses on developing entrepreneurial skills and knowledge in scientists and engineers by leading them through a curriculum based on the Lean Startup methodology. Caltech will offer I-Corps workshops throughout the year for interested students, post-docs, and faculty.

SEE MORE:
lanode.org

Amgen and Caltech Establish Partnership in Health Sciences

Caltech and Amgen have entered into a collaboration for fundamental exploration in the life sciences through a strategic partnership that includes funding for research, training grants for graduate students, scientist exchanges, and an annual joint research symposium.

The collaboration with Amgen highlights Caltech's increased focus on engaging with industrial partners to help solve problems for the benefit society. Partnerships with corporations such as Amgen ensure the flow of technologies from Caltech to industry to ultimately improve quality of life by bringing new therapies and devices to medical professionals and patients in need.

2002	2003	2004	2005	2006	2007	2008
8	3	5	9	6	7	5

Space-Based Solar Power Project Funded

The Northrop Grumman Corporation is partnering with Caltech to develop a space-based solar photovoltaics array that ultimately will be able to produce electric power as cheaply as fossil fuels. Under the Space Solar Power Initiative (SSPI) collaboration, Northrop Grumman will provide Caltech up to $17.5 million over three years to perform the research necessary to create a prototype system—including ultralight, high-efficiency photovoltaics optimized for space conditions, a phased-array system to distribute power dynamically, and ultralight deployable and stable space structures.

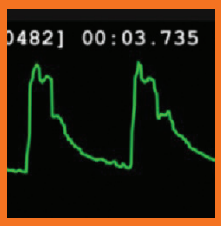
Caltech professors Harry Atwater, Ali Hajimiri, and Sergio Pellegrino will lead the work in close collaboration with Northrop Grumman scientists and engineers through funded research and visiting scientist exchanges.

Saving Lives with FINDER

A new Caltech/Jet Propulsion Laboratory (JPL) technology called FINDER (Finding Individuals for Disaster and Emergency Response) received its first real-world test when a 7.8 magnitude earthquake hit Nepal on April 25, 2015. Prototype FINDER units were deployed by Caltech licensee R4, Inc. as part of the search-and-rescue effort, successfully detecting four men trapped under 10 feet of mud, brick, wood and other debris and leading to their rescue. Developed at JPL by a team led by James Lux with funding from the Department of Homeland Security's Science and Technology Directorate, the suitcase-sized FINDER works by sending a low-powered microwave signal through rubble and looking for changes in the reflection of the signal caused by minute movements due to a victim's breathing and heartbeat. FINDER can identify victims even if unconscious, can distinguish between humans and animals, and has detected heartbeats through 30 feet of rubble and 20 feet of solid concrete.

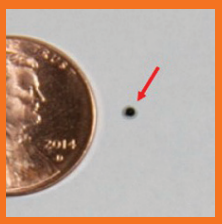
2009	2010	2011	2012	2013	2014	2015
7	10	6	7	11	10	12

Focus on a few areas of excellence



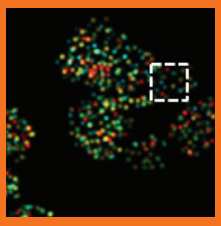
Digital Stethoscope

Mory Gharib, Vice Provost for Research and Hans W. Liepmann Professor of Aeronautics and Professor of Bioinspired Engineering, has developed a wireless “digital stethoscope” that can obtain cardiac parameters such as ejection fraction that were previously only available using expensive diagnostic tools such as echocardiogram or MRI. This device has the potential to lower cost and streamline medical care by empowering clinicians to obtain and act on important cardiac parameters immediately in their office rather waiting up to two weeks for the results of an echocardiogram or MRI.



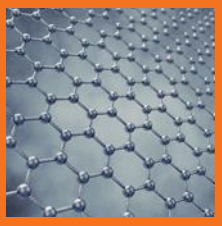
Glaucoma Implant

Hyuck Choo, Assistant Professor of Electrical Engineering, has developed an intra-ocular pressure sensor implant for the real-time measurement of eye pressure in glaucoma patients. This implant, which is currently 1mm in diameter and is planned to be less than 1/2mm in diameter, will allow glaucoma patients to track intra-ocular measurements at home for the better management of a disease that is the leading cause of irreversible blindness worldwide.



Fluorescent Genomics

Long Cai, Assistant Professor of Chemistry, has developed a fluorescent biological tool that can detect over 10,000 genes simultaneously in their native spatial context at the single-cell level. This revolutionary tool has the potential to replace RNA sequencing as a way to profile gene expression in cells and tissues and will allow researchers a better understanding of the complex interactions of genes in diseases like cancer and diabetes.



One Atom Thick

David A. Boyd, Staff Scientist in Condensed Matter Physics, has developed a groundbreaking technique for creating high performance graphene, a single atom thick layer of carbon that is transparent, has a tensile strength 200 times that of steel, and better conductivity than silicon. This method for creating graphene at room temperature will allow for the ubiquitous use of graphene industrially to make corrosion proof coatings on metal and wires, more efficient solar cells and higher performance displays.

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COLLABORATION INNOVATION ENTREPRENEURSHIP

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