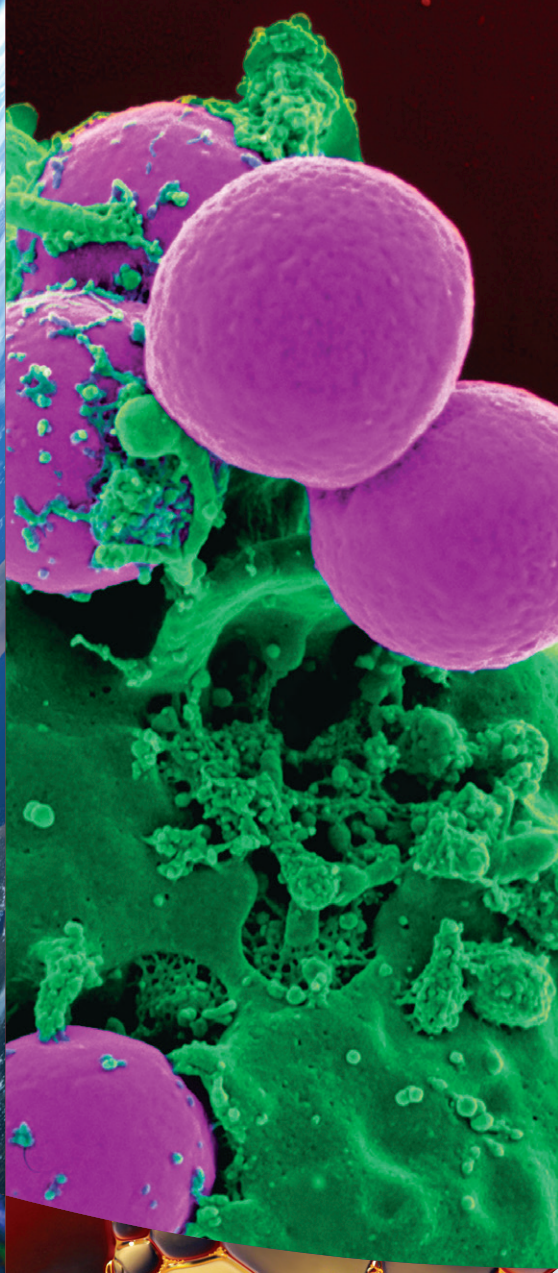
2017 Impact Report



Caltech Technology Transfer & Corporate Partnerships

COLLABORATION
INNOVATION
ENTREPRENEURSHIP

Recent Launches

Virtualitics

Virtualitics, Inc. is a data visualization company in Pasadena, CA founded by S. George Djorgovski, Professor of Astronomy at Caltech. Virtualitics merges artificial intelligence, big data, virtual reality and augmented reality to gain insights from complex data sets and allows users to focus on data analysis and visualization. The company has raised over $4M in Series A funding led by The Venture Reality Fund. (virtualitics.com)

PACT Pharma

PACT Pharma is a bio-pharmaceutical company in Pasadena, CA and Hayward, CA founded by James Heath, Elizabeth W. Gilloon Professor of Chemistry at Caltech, and David Baltimore, Caltech President Emeritus and Robert Andrews Millikan Professor of Biology (Nobel Prize in Physiology or Medicine, 1975). The company is developing personalized T-cell therapies for cancer treatments by obtaining T-cell receptor sequences from neo-antigen-reactive cells from a patient's blood to engineer targeted T-cells that recognize and attack that patient's cancer cells. (pactpharma.com)

Axial Biotherapeutics

Focused on treating diseases and disorders of the central nervous system (CNS) through the gut microbiome, Axial Biotherapeutics was founded by Sarkis K. Masmanian, Caltech's Luis B. & Nelly Soux Professor of Microbiology. The company aims to develop microbiome-based therapeutics for Autism Spectrum Disorder (ASD), Parkinson's, Alzheimer's diseases, among other diseases that affect the CNS. Axial Biotherapeutics is located in Boston, MA and has raised over $19M in Series A financing led by Longwood Fund and Domain Associates. In September 2017, Axial was named a "Fierce 15" biotech company of 2017 by FiericeBiotech, an honor awarded to the top 15 biotechnology companies annually. (axialbiotherapeutics.com)

Gene Sciences

Gene Sciences Inc. is a biotechnology company in San Diego, CA and founded in 2016 based on technology developed in the lab of Peter Dervan, the Bren Professor of Chemistry at Caltech. Gene Sciences is developing novel DNA targeted therapeutics that modulate gene expression for the treatment of human disease and primarily focused in the area of oncology. The company has raised $8M in equity funding from Domain Associates, Kairos Ventures and The Heritage Group. (genesciencesinc.com)

FY 2017

197
Invention Disclosures
(campus only)

190
U.S. Patents Issued

1,928
Active U.S. Patents

47
Licenses Granted
(including options)

16
Startup Companies

45
Companies
Sponsoring Research

110
Companies Giving Gifts

$36M
Corporate Contracts & Gifts

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.

FY 2017

Caltech's Entrepreneur in Residence

The office appointed its second Entrepreneur-in-Residence (EIR), Alice A. Jacobs, M.D. in July, 2017. Dr. Jacobs is a physician entrepreneur who has served as an advisor to Third Rock Ventures, GE Healthcare Ventures, Greybird Ventures and Essex Management and has assisted in raising over $100M in financings for businesses. She co-founded IMDx, an industry leader in the development and manufacturing of molecular diagnostic tests, and served as Chair and CEO. Under her leadership, IMDx cleared six FDA approved products which have been launched on five continents. Dr. Jacobs holds a B.A. in Art History and a B.S. in Biological Sciences from Stanford University with Honors in Developmental Neurobiology, and an M.D. from Harvard Medical School. Among many honors, she has been recognized by Scientific American as one of the top 50 innovators.

AT&T's Alliance for Quantum Technologies

The AT&T Foundry innovation center in Palo Alto, CA and Caltech have partnered to form the Alliance for Quantum Technologies (AQT). The AQT will focus on linking quantum computers and devices together to enable fast and secure networks that are far superior to the traditional processors that we have today. Quantum technologies are aimed to enable exponentially more powerful computing and draw from multidisciplinary studies including physics, engineering, computer science and applied mathematics. Maria Spiropulu, the Shang-Yi Ch'en Professor of Physics at Caltech, studies advanced data technologies and will be partnered with the AQT. Together with the AT&T foundries, the AQT will provide a foundation to startups and a bridge between new discoveries resulting from research and the commercial world.

Caltech— A History of Innovation and Entrepreneurship

pH Meter

Arnold O. Beckman revolutionized chemical instruments with the invention of the "acidometer" in 1934 for the citrus industry in Southern California. Now known as the pH meter, it was the first instrument commercialized by Beckman Instruments.

Rothenberg Innovation Initiative

Trustee James F. Rothenberg and his wife Anne have generously given $15M for graduate support and research innovation as a way to invest in the country's future. The gift bolsters previous support from the Rothenbergs which launched the Caltech Innovation Initiative (CI^2) in 2009 to provide essential seed funding for early stage, high-risk, high-reward research focused on technologies that address significant challenges in the world at large, with commercial potential to address an unmet need in the marketplace. These internal grants spur creativity by giving Caltech faculty more freedom to develop bold ideas, bridging the gap between initial work and the proof-of-concept often required for government support or venture capital. The Institute has already applied for more than 100 patents as a result of the CI^2 Program which will now be known as the Rothenberg Innovation Initiative (RI^2) Program.

Facebook Agreement Enables Rapid Innovation

In late 2016, Caltech was one of 17 universities to enter into a Sponsored Academic Research Agreement ("SARA") with Facebook's Building 8, focused on breakthrough R&D for consumer hardware projects. The new head of Facebook's Building 8, Dr. Regina Dugan (PhD, '93), structured the agreement based on her experiences as the Director of DARPA, where projects could quickly be put in place to allow for rapid development and deployment. Caltech's first project funded under this agreement is based in Professor of Mechanical Engineering and Applied Physics, Chiara Daraio's laboratory and is focused on acoustic metasurfaces. Caltech expects to receive future requests for proposals from Facebook.

Photocopier

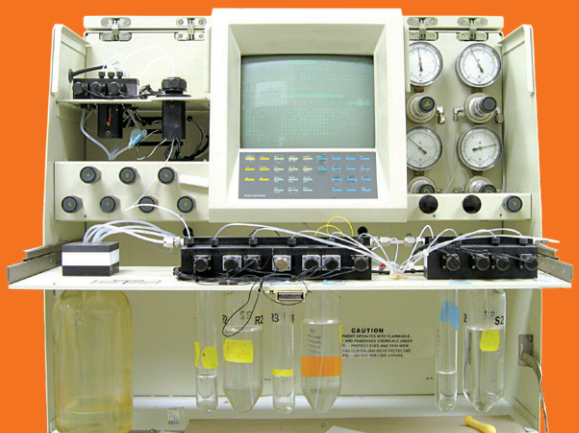
Chester F. Carlson invented electrophotography in 1938, a technology which uses dry powders to print patterns on a surface that remains electrically charged after being exposed to light. Later known as Xerography, the invention was commercialized by the Xerox Corporation.

Assisting In Disaster Relief

FINDER™ (Finding Individuals for Disaster and Emergency Response) technology was deployed in the 7.1 magnitude Mexican earthquake that occurred on September 19, 2017, to aid search and rescue teams in finding human beings that have been buried and hidden under rubble. This life saving technology was originally developed at NASA's Jet Propulsion Laboratory (JPL) by Caltech with funding from the Department of Homeland Security's Science and Technology Directorate. FINDER™ works by sending microwave radar signals through rubble with sophisticated algorithms to detect the minute displacement of human tissue due to heartbeat and breathing. The technology functions even if the victim is unconscious, and at a distance of up to 90 meters away to avoid potentially dangerous or unstable structures for the rescuer. Caltech licensees, R4 Inc. and SpecOps Group Inc., each deployed FINDER™ units immediately after news of the earthquake. In the Nepalese earthquake of 2015, four lives were saved using this same technology.

Disney Collaboration Facilitates Social Robots

Caltech and Disney Research have entered into a joint research agreement to collaborate on advanced robotics and machine learning research. Under the agreement, which began in August 2017, Caltech researchers will work with engineers from Disney Research on two projects: one in the laboratory of Caltech's Aaron Ames, the Bren Professor of Mechanical and Civil Engineering to develop a robot with new movement capabilities, and another in the laboratory of Pietro Perona, the Allan E. Puckett Professor of Electrical Engineering and Computation and Neural Systems to improve machine vision in crowds. The Caltech—Disney agreement allows for additional projects to be implemented based on mutual interest.



DNA and Protein Sequencer

Leroy E. Hood invented the automated DNA and protein sequencers for determining the identity and sequence of amino acids and nucleic acids in proteins and DNA. He co-founded Applied Biosystems, Inc. to commercialize the technology.

Spotlight on Entrepreneurial Alumnus

Dr. Aditya Rajagopal is the Founder & CTO of ChromaCode, Inc, and a Visiting Associate in Electrical Engineering at Caltech. He completed his education at Caltech (B.S., M.S., and Ph.D.) and has fifteen years of experience in medical engineering, microfluidics, nanotechnology and bioengineering. Dr. Rajagopal's research has resulted in innovative technology developments and he has authored over 50 patents and publications. He is the recipient of numerous honors including a Caltech Grubstake Award in 2017 and Caltech Innovation Initiative Awards (CI^2) in 2014 and 2015.

When Dr. Rajagopal was a graduate student, he built a pocket-size and low-cost qPCR instrument. While it was a simple and inexpensive instrument, it could only detect one nucleic acid product at a time. To address the need to make his pocketPCR more useful, he founded ChromaCode, Inc. in 2012 with Caltech's Dr. Axel Scherer, the Bernard Neches Professor of Electrical Engineering, Applied Physics and Physics, and Dr. Alex Dickenson, Chromacode's Executive Chairman. Dr. Rajagopal, CTO of ChromaCode, developed a chemical coding method to increase the multiplexing capability of any qPCR instrument, including the pocketPCR, by 5–10x without modifying the instrument, PCR protocol, or the PCR assay design. ChromaCode's mission is to bring low-cost precision medicine diagnostics to the masses. The company has recruited an experienced executive team led by CEO, Gregory Gosch and has raised $15M in venture financing from Domain Associates, New Enterprise Associates, and Okapi Venture Capital.

Caltech Technology Transfer & Corporate Partnerships

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COLLABORATION INNOVATION ENTREPRENEURSHIP