



UNIVERSITY
OF
CALIFORNIA

Technology Commercialization Report

2017



This report documents University of California technology commercialization activity for fiscal year 2017. Through a collaborative management approach, UC's Office of the President (UCOP), all 10 UC campuses and the Lawrence Berkeley National Laboratory (LBNL) share responsibility for these activities. The extraordinary innovations generated by our researchers originate at the campuses, affiliated medical centers and LBNL. As such, each campus or lab actively manages its invention portfolio, fosters relationships between inventors and industry, and nurtures entrepreneurs through its technology commercialization office.

LBNL is a DOE national laboratory managed by UC. Its operations differ from those on the campuses in certain respects. LBNL's fiscal year runs from October to September; UC's fiscal year runs from July to June. UC campus offices contract with attorneys at outside law firms for all patent prosecution activity; LBNL manages most U.S. patent filings internally through its own legal department and contracts out only for selected matters, such as foreign prosecution. LBNL maintains proprietary databases that track its technology commercialization operations. This report includes LBNL data in systemwide totals whenever possible, and notes those metrics where LBNL data is not available for inclusion.

UCOP manages a small portfolio of laboratory inventions from LBNL and Lawrence Livermore National Laboratory (LLNL). Most of these cases involve UC co-inventors. The metrics derived from these inventions are not displayed separately, but are included in the systemwide totals.

UC startups counted in this report meet the following criteria: a legally organized and/or incorporated company that acquired rights to UC technology under a license, option or letter of intent; this agreement was essential to the startup's formation; the startup was founded to develop products and services based on UC technology; the startup operates independently of any pre-existing company when formed; the startup's operations are not integrated into the operations of another company.

INSIDE COVER:

UC Irvine engineering professor David Reinkensmeyer, seated above in the "BONES" arm exoskeleton, researches neuromuscular control, motor learning, robotics and rehabilitation. His goal is to develop physically interacting robotic and mechatronic devices to help the nervous system recover arm, hand and leg movement ability after neurological injuries such as stroke and spinal cord injury. UC Irvine has licensed his technology for the development of robotic and sensor-based devices for functional movement therapy.

Letter from the Chief Innovation Officer

This year, we are celebrating the 150th anniversary of the University of California. From our beginnings as a small college in Oakland, the University of California has grown to 10 campuses, five medical centers and three affiliated national laboratories. Over the years, UC has been at the forefront of research and technology development, helping drive California's rise as one of the world's largest economies. With labs and research facilities across the state, UC has been instrumental to the foundational breakthroughs that have launched some of the state's most important industries, from aerospace, agriculture and biotechnology to semiconductors and telecommunications. The university continues to lead in the development of new and emerging fields today.

Research is a key building block of innovation, and commercializing this research is an important next step. Private and public sector partnerships and collaborations will enable UC campuses to build even stronger innovation ecosystems that encourage, fund and commercialize these technologies. We are already seeing positive, early results from the state's \$22 million investment funded by Assembly Bill 2664, which has led to additional capacity for incubators, accelerators and research laboratory facilities, along with mentorship and internship opportunities for budding entrepreneurs. Commercialization — through patenting and licensing inventions and forming startups based on these inventions — is enabling these products and technologies to be used by physicians, engineers, patients and consumers, improving the lives of people around the world.

We're proud of UC's contributions to California and many of the world's most innovative industries over the last 150 years and look forward to continuing that success over the next 150. This year's report documents the results of UC's technology commercialization activities for fiscal year 2017, along with trends in recent years.

Sincerely,



Christine Gulbranson, Ph.D, M.B.A.
Senior Vice President and Chief Innovation Officer



“UC has been at the forefront of research and technology development, helping drive California's rise as one of the world's largest economies.”

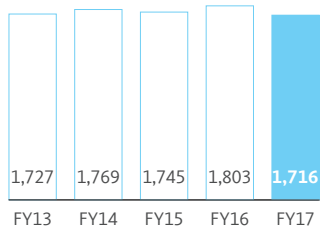
All charts indicate systemwide figures, unless otherwise noted.

Inventions

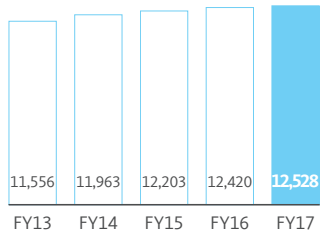
Patents

Licensing

INVENTIONS DISCLOSED

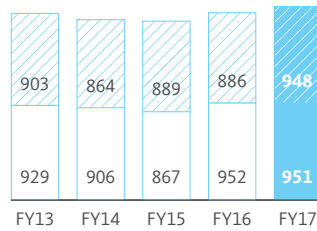


TOTAL ACTIVE INVENTIONS



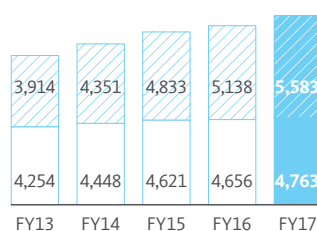
Figures do not include LBNL

U.S. PATENT APPLICATIONS FILED



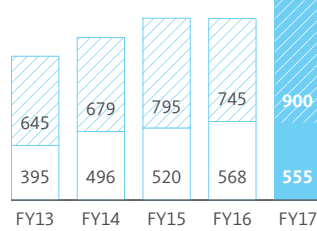
Applications - Secondary Filings
 Applications - First Filings

TOTAL ACTIVE PATENTS



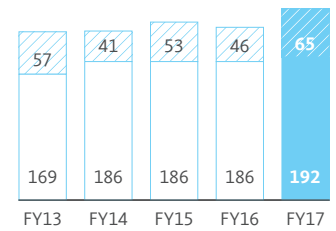
Total Active Foreign Patents
 Total Active U.S. Patents
 Figures do not include LBNL

PATENTS ISSUED



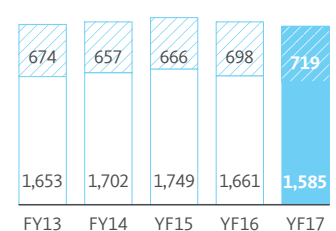
Foreign Patents Issued
 U.S. Patents Issued

LICENSES ISSUED



Plant Licenses
 Utility Licenses

TOTAL ACTIVE LICENSES



Plant Licenses
 Utility Licenses

1,716

New inventions disclosed by UC researchers in 2017

12,528*

Active inventions in UC's portfolio

1,899

U.S. patent applications filed based on UC inventions in 2017

555

U.S. patents issued for UC inventions in 2017

4,763*

Active U.S. patents covering UC inventions

192

New licenses for UC's utility inventions in 2017

65

New licenses for plant cultivars in 2017

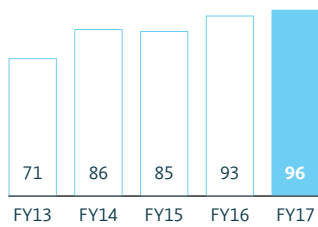
*These statistics are not available for LBNL-managed inventions for FY17 and are excluded from systemwide totals.

Startups

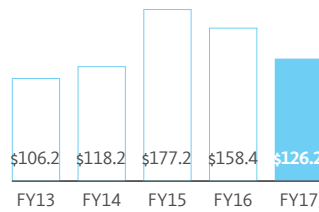
Royalty and fees

Top-earning inventions

STARTUP COMPANIES FORMED



PATENT ROYALTY AND FEE INCOME (in millions)

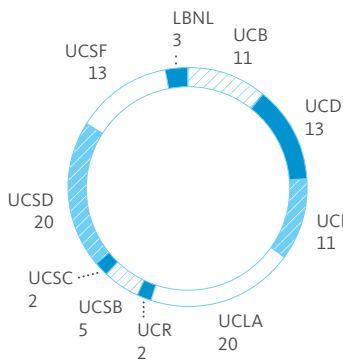


INVENTIONS FY 2016 (campus, year disclosed)

ROYALTY & FEE INCOME (in thousands)

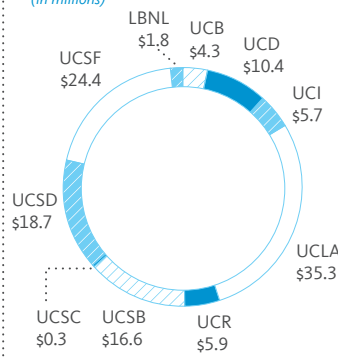
Prostate cancer drug (UCLA, 2003, 2004, 2005, 2006, 2007)	\$29,500
Cellular libraries for peptide sequences (UCSB, 2003, 2006, 2007)	\$9,720
Hepatitis B vaccine (UCSF, 1979, 1981)	\$7,790
Nephropathic cystinosis treatment (UCSD, 2006)	\$7,447
Bovine growth hormone (UCSF, 1980)	\$5,530
Subtotal (top 5 inventions)	\$59,987

STARTUP COMPANIES FORMED (BY CAMPUS), 2017



Campus numbers may include startups formed by more than one campus.

PATENT ROYALTY AND FEE INCOME BY CAMPUS, 2017 (in millions)



Does not include \$2.7 million from previous national laboratory inventions and income credited to UCOP.

Ablation device for treating atrial fibrillation (UCSF, 1998)	\$4,737
Tango mandarin (UCR, 2005)	\$4,681
Micro implant to treat glaucoma (UCI, 2000)	\$3,732
Recombinant human lubricin (UCSD, 2007)	\$3,010
Chromosome painting (LLNL, 1985, 1995)	\$2,651

Golden Hills pistachio (UCD, 2004)	\$1,649
EGF receptor antibodies (UCSD, 1983)	\$1,561
Tear osmometer for dry eye disease diagnosis (UCSD, 2002)	\$1,519
San Andreas strawberry (UCD, 2008)	\$1,446
Macromolecules for drug/diagnostic delivery (UCSD, 1998)	\$1,320

Gene-editing tools and reagents (UCB, 2012)	\$1,099
Monterey strawberry (UCD, 2008)	\$1,052
Albion strawberry (UCD, 2004)	\$934
Portola strawberry (UCD, 2008)	\$920
Cellular immunotherapies (UCSF, 2013, 2015, 2016)	\$890

Dynamic skin cooling device (UCI, 1993)	\$822
Gold Nugget mandarin (UCR, 1999)	\$773
Aesthetic medicine (UCLA, 2005)	\$669
Plasmonic semiconductor laser (UCB, 2010)	\$500
Blood cooling device (UCLA, 1999)	\$471

Subtotal (top 25 inventions)	\$94,423
Total (all inventions)	\$120,984
% of total from top 5 inventions	49.6%
% of total from top 25 inventions	78.0%

96

New startup companies formed in 2017 from UC inventions

1,125

Startups founded on UC patents since 1980

\$126.2M

Patent royalty and fee income to UC in 2017

This list is limited to revenue-generating inventions that have been commercialized.

UC Technology Commercialization Program – FY2017

Summary Table

	UCB	UCD	UCI	UCLA	UCM	UCR	UCSB	UCSC	UCSD	UCSF	LBNL	UC system	% change from FY16
Inventions*													
Inventions Disclosed	192	296	123	318	4	72	87	52	362	203	130	1,716	-4.8%
Total Active Inventions (FY end)	1,542	1,511	986	2,230	35	556	525	377	3,089	1,890	**	12,528**	0.9%
Patent Prosecution*													
U.S. Applications Filed													
First Filings	109	71	75	227	1	62	50	31	168	84	88	951	-0.1%
Secondary Filings	79	89	108	296	5	59	51	19	97	84	84	948	7.0%
U.S. Filings	188	160	183	523	6	121	101	50	265	168	172	1,899	3.3%
First Foreign Filings	96	61	23	143	3	30	3	9	84	73	6	517	4.9%
Patents Issued													
U.S. Patents Issued	71	48	50	137	2	27	24	16	103	58	34	555	-2.3%
Total Active U.S. Patents	696	407	508	1,046	10	159	460	143	897	530	**	4,763**	2.3%
Foreign Patents Issued	136	44	103	308	1	44	26	19	159	119	17	900	20.8%
Total Active Foreign Patents	719	515	594	1,319	4	237	260	77	1,094	814	**	5,583**	8.7%
Licensing*													
Letters of Intent (LOI) Issued	30	28	20	57	0	1	12	0	25	39	2	204	6.3%
Options Issued	8	4	7	15	0	0	4	4	2	3	8	60	25.0%
Total Active Options	48	8	8	23	0	2	11	5	6	9	4	123	-8.9%
Utility Licenses Issued	15	20	13	36	0	6	5	0	51	48	8	192	3.2%
Total Active Utility Licenses	261	149	106	269	3	29	58	21	334	353	57	1,585	-4.6%
Plant Licenses Issued	0	65	0	0	0	1	0	0	0	0	0	65	41.3%
Total Active Plant Licenses	0	544	0	0	0	205	0	0	0	0	0	719	3.0%
Startup Companies													
Startup Companies Formed	11	13	11	20	0	2	5	2	20	13	3	96	3.2%
Royalty & Fee Income (in thousands)†													
Running Royalties	\$723	\$9,231	\$3,133	\$1,787	\$0	\$5,851	\$849	\$42	\$13,534	\$11,769	\$768	\$49,684	-55.4%
Equity Income	\$0	\$0	\$0	\$250	\$0	\$0	\$1,476	\$0	\$51	\$0	\$0	\$1,777	-12.0%
Other Royalty and Fee Income	\$3,610	\$1,160	\$2,559	\$33,303	\$0	\$65	\$14,287	\$254	\$5,077	\$12,617	\$1,054	\$74,780	66.8%
Total Royalty and Fee Income	\$4,333	\$10,391	\$5,692	\$35,336	\$0	\$5,916	\$16,612	\$296	\$18,662	\$24,386	\$1,822	\$126,241	-20.3%
Distributions (in thousands)													
Inventor Shares Distributed	\$3,297	\$5,054	\$3,087	\$32,435	\$0	\$2,084	\$1,392	\$82	\$5,720	\$10,644	\$687	\$65,845	4.7%

This table only reports technology commercialization activity governed by the UC patent policy for inventions managed by all UC technology commercialization offices, including LBNL. It does not include copyright and material transfer agreement activity that is also carried out by the campus and laboratory offices.

* Technology commercialization activity related to inventions having one or more inventors at each campus/lab. A number of inventions involve inventors from multiple UC campuses and/or LBNL. Activity statistics for these inventions are reported multiple times, once for each campus/lab involved. Thus, for any given measure of activity, the sum of individual campus numbers may be greater than the systemwide totals reported in the right-hand column.

** These statistics are not available for LBNL-managed inventions for FY 2017, and are excluded from systemwide totals.

† Financial activity related to inventions having one or more inventors at each campus/lab. A number of inventions involve inventors from multiple UC campuses and/or LBNL. Financial activity statistics for these inventions are prorated among the campuses and LBNL according to the number of inventors each campus/lab has. Since some financial activity reported here is credited to UC inventors who are not currently associated with a campus or with LBNL (including staff at other DOE laboratories), the sum of individual campus numbers may not equal the systemwide totals reported in the right-hand column.

UC Technology Commercialization Sites

Available Technologies	Website
Systemwide	techtransfer.universityofcalifornia.edu

Technology Commercialization Offices	Websites
UC Berkeley (UCB) Intellectual Property & Industrial Research Alliances (IPIRA)	ipira.berkeley.edu
UC Davis (UCD) InnovationAccess	research.ucdavis.edu/industry/ia/
UC Irvine (UCI) Invention Transfer Group (ITG)	ota.uci.edu
UC Los Angeles (UCLA) Technology Development Group (TDG)	tdg.ucla.edu
UC Merced (UCM) Office of Business Development (OBD)	bd.ucmerced.edu
UC Office of the President (UCOP) Office of Innovation & Entrepreneurship (I&E)	ucop.edu/innovation-entrepreneurship
UC Riverside (UCR) Office of Technology Partnerships (OTP)	ucroduotp.net
UC San Diego (UCSD) Office of Innovation and Commercialization (OIC)	innovation.ucsd.edu
UC San Francisco (UCSF) Office of Technology Management (OTM)	innovation.ucsf.edu/venture/office-technology-management
UC Santa Barbara (UCSB) Office of Technology & Industry Alliances (TIA)	tia.ucsb.edu
UC Santa Cruz (UCSC) Industry Alliances & Technology Commercialization (IATC)	officeofresearch.ucsc.edu/iatc
Lawrence Berkeley National Laboratory (LBNL) Innovation and Partnerships Office (IPO)	ipo.lbl.gov

A laboratory setting featuring several racks of microcentrifuge tubes. The tubes are arranged in rows, with some having blue caps and others yellow. One tube in the foreground has a white label with the number '40'. To the right, a white box contains yellow pipette tips. In the bottom right corner, a portion of a multi-well plate is visible, containing a yellow liquid. The background is a dark surface, possibly a lab bench.

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