



UNIVERSITY
OF
CALIFORNIA

Technology Commercialization Report

2016



This report documents University of California technology commercialization activity for fiscal year 2016. Through a collaborative management approach, UC's Office of the President (UCOP), all ten 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 efforts.

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 US 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.

OUTSIDE COVER:

UC Santa Barbara graduate student Santosh Raghavan loads new substrate wafers into a molecular beam epitaxy growth system to deposit nanostructures by molecular depositions onto the wafers. This technology has potential commercial applications in photonics and high performance electronic devices.

INSIDE COVER:

UCSF's Professor Wendell Lim studies collective robots (kilobots) to prototype ways in which his lab can engineer therapeutic immune cells that search for and kill tumors. His inventions in cell engineering have been licensed to the UC startup company Cell Design Labs. This biotherapeutics company, employing 37 people and backed by \$27 million in venture funding, is developing disruptive cell-based therapies for cancer and other diseases.

Message from the Senior Vice President

University of California (UC) technology pioneers have created and advanced entire industries based on fundamental research from the UC campuses and our affiliated Labs. These advances in electronics, data science, biotechnology, and agriculture occur by educating the next generation, by publishing research results so that others can build on them, and by patenting and licensing inventions to create products, services and companies.

Now we are looking to educate and advance the next generation of entrepreneurs as well as help shine the spotlight on our UC alumni entrepreneurs. California is known for entrepreneurs looking for new opportunities to create disruptive change and drive economic success. What better place to look than UC with its wealth of ongoing innovation? What better place to build a team than with our engaged students, faculty and staff? Increasingly, UC entrepreneurs are taking these innovations to the marketplace, and forming companies that stimulate economic and job growth in California.

A \$22 million investment from the state, Assembly Bill 2664, will strengthen innovation and entrepreneurship at each UC campus. Programs enabled by this investment include startup and technology seed funding, lab and incubator space, opportunities in networking, mentoring, internship and entrepreneurship education. UC's technology commercialization offices will serve an important role in leveraging these programs into private sector partnerships, products, services and startups for the benefit of local communities and beyond.

This year's report documents the results of UC's technology commercialization activities for fiscal year 2016, along with trends in recent years. It's an important part in building UC's success story in innovation and entrepreneurship.

Sincerely,



Christine Gulbranson, Ph.D, M.B.A.
Senior Vice President



“UC entrepreneurs are taking these innovations to the marketplace, and forming companies that stimulate economic and job growth in California.”

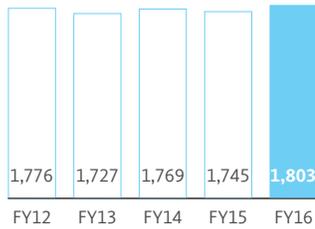
All charts indicate systemwide figures, unless otherwise noted.

Inventions

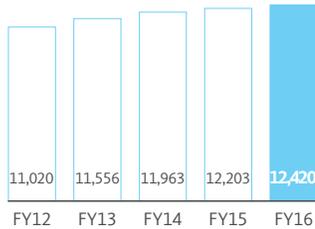
Patents

Licensing

INVENTIONS DISCLOSED

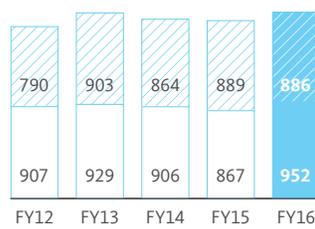


TOTAL ACTIVE INVENTIONS



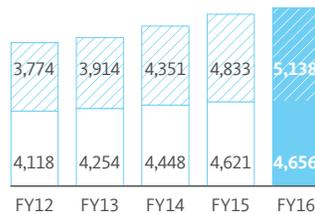
Figures do not include LBNL

U.S. PATENT APPLICATIONS FILED



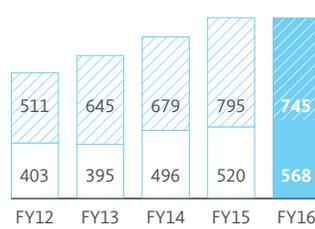
Applications - Secondary Filings
 Applications - First Filings

TOTAL ACTIVE PATENTS



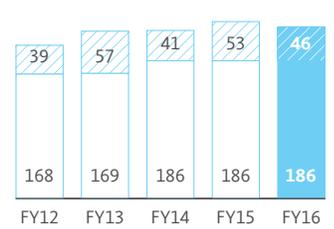
Total Active Foreign Patents
 Total Active U.S. Patents
 Figures do not include LBNL

PATENTS ISSUED



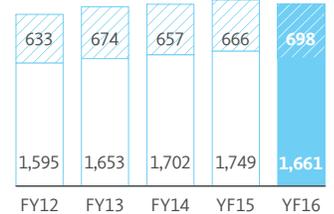
Foreign Patents Issued
 U.S. Patents Issued

LICENSES ISSUED



Plant Licenses
 Utility Licenses

TOTAL ACTIVE LICENSES



Plant Licenses
 Utility Licenses

1,803

New inventions disclosed by UC researchers in 2016

12,420

Active inventions in UC's portfolio

1,838

U.S. patent applications filed based on UC inventions in 2016

568

U.S. patents issued for UC inventions in 2016

4,656

Active U.S. patents covering UC inventions

186

New licenses for UC's utility inventions in 2016

46

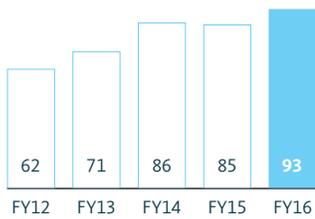
New licenses for food plant cultivars in 2016

Startups

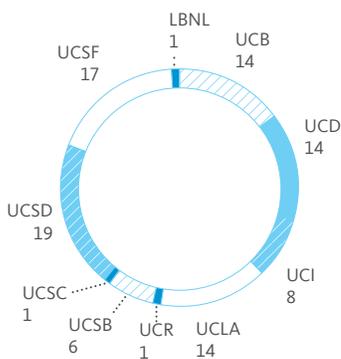
Royalty and fees

Top-earning inventions

STARTUP COMPANIES FORMED



STARTUP COMPANIES FORMED – BY CAMPUS, 2016



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

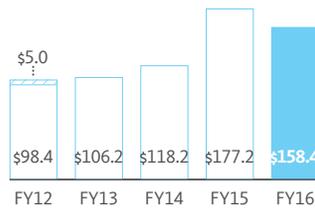
93

New startup companies formed in 2016 from UC inventions

1,029

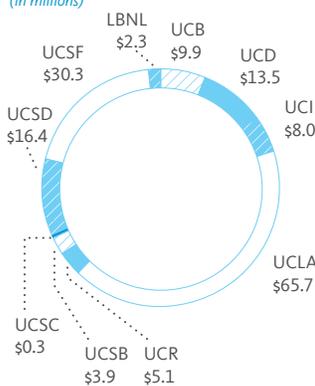
Startups founded on UC patents since 1980

PATENT ROYALTY AND FEE INCOME (in millions)



Extraordinary Income*
 Ordinary Royalty and Fee Income
 * Extraordinary income includes income from the prepayment of future royalty income in FY11 and income from legal settlements in FY12.

PATENT ROYALTY AND FEE INCOME – BY CAMPUS, 2016 (in millions)



Does not include \$3.2 million from previous National Laboratory inventions and income credited to UCOP.

\$158M

Patent royalty and fee income to UC in 2016

INVENTIONS FY16 (Campus, Year Disclosed)

ROYALTY & FEE INCOME (in thousands)

Prostate Cancer Drug (LA, 2003, 2004, 2005, 2006 & 2007)	\$59,383
Hepatitis-B Vaccine (SF, 1979 & 1981)	\$7,526
Bovine Growth Hormone (SF, 1980)	\$6,266
Nephropathic Cystinosis Treatment (SD, 2006)	\$5,590
Ablation Device for the Treatment of Atrial Fibrillation (SF, 1997 & 1998)	\$4,649
Subtotal (Top 5 Inventions)	\$83,414
Tango Mandarin (RV, 2005)	\$4,051
Micro Implant to treat Glaucoma (IR, 2000)	\$3,107
Chromosome Painting (LLNL, 1985, 1989 & 1995)	\$2,826
Detection of Mycoplasma (IR, 1984)	\$2,309
Golden Hills Pistachio (DA, 2004)	\$2,220
EGF Receptor Antibodies (SD, 1983)	\$2,002
San Andreas Strawberry (DA, 2008)	\$2,001
Dynamic Skin Cooling Device (IR, 1993)	\$1,731
Monterey Strawberry (DA, 2008)	\$1,603
Albion Strawberry (DA, 2004)	\$1,556
Tear Osmometer for Dry Eye Disease Diagnosis (SD, 2002)	\$1,076
Portola Strawberry (DA, 2008)	\$825
Yeast Expression Vector (SF, 1982)	\$792
Energy Transfer Primers (BK, 1994)	\$789
Camarosa Strawberry (DA, 1992)	\$701
Ventana Strawberry (DA, 2001)	\$515
Macromolecules for Drug/Diagnostic Delivery (SD, 1998)	\$475
Blood Cooling Device (LA, 1999)	\$468
Treatment of Intracranial Aneurysms (LA, 1989)	\$444
Super-Resolution Microscopy (SF, 1995)	\$401
Subtotal (Top 25 Inventions)	\$113,308
Total (All Inventions)	\$156,907
% of Total from Top 5 Inventions	53.2%
% of Total from Top 25 Inventions	72.2%

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

UC Technology Commercialization Program–FY2016

Summary Table

	UCB	UCD	UCI	UCLA	UCM	UCR	UCSB	UCSC	UCSD	UCSF	LBNL	UC System	% change from FY15
Inventions*													
Inventions Disclosed	187	231	137	378	8	80	83	44	344	213	124	1,803	3.3%
Total Active Inventions (FY end)	1,625	1,362	995	2,331	37	553	536	361	2,959	1,821	**	12,420**	1.8%
Patent Prosecution*													
US Applications Filed													
First Filings	130	100	71	218	4	38	68	17	152	82	92	952	9.8%
Secondary Filings	91	101	83	263	3	47	57	31	108	95	30	886	0.0%
U.S. Filings	221	201	154	481	7	85	125	48	260	177	122	1,838	4.7%
First Foreign Filings	78	52	22	112	2	20	24	15	87	62	24	493	17.9%
Patents Issued													
U.S. Patents Issued	57	39	61	124	1	19	49	21	92	57	66	568	9.2%
Total Active U.S. Patents	689	378	465	981	9	135	474	125	886	578	**	4,656**	0.8%
Foreign Patents Issued	61	42	93	199	1	19	43	17	147	119	20	745	-6.3%
Total Active Foreign Patents	677	555	475	1,150	3	213	238	55	1,020	787	**	5,138**	6.3%
Licensing*													
Letters of Intent (LOI) Issued	27	33	19	42	0	3	22	0	26	22	1	192	-10.7%
Options Issued	6	10	2	15	0	2	6	2	1	4	2	48	-9.4%
Total Active Options	47	14	7	28	0	7	10	2	6	9	4	135	-10.6%
Utility Licenses Issued	11	8	11	35	0	1	11	2	68	32	14	186	0.0%
Total Active Utility Licenses	295	147	97	276	3	38	69	21	349	358	60	1,661	-5.0%
Plant Licenses Issued	0	44	0	0	0	2	0	0	0	0	0	46	-13.2%
Total Active Plant Licenses	0	516	0	0	0	210	0	0	0	0	0	698	4.8%
Startup companies													
Startup Companies Formed	14	14	8	14	0	1	6	1	19	17	1	93	9.4%
Royalty & Fee Income (in thousands)†													
Running Royalties	\$634	\$11,712	\$2,901	\$60,691	\$0	\$4,905	\$899	\$3	\$10,856	\$15,863	\$528	\$111,517	6.0%
Equity Income	\$155	\$30	\$0	\$887	\$0	\$3	\$334	\$0	\$210	\$0	\$400	\$2,020	-68.0%
Other Royalty and Fee Income	\$9,083	\$1,771	\$5,093	\$4,122	\$0	\$222	\$2,658	\$264	\$5,295	\$14,434	\$1352	\$44,845	-31.7%
Total Royalty & Fee Income	\$9,873	\$13,513	\$7,994	\$65,700	\$0	\$5,130	\$3,891	\$267	\$16,361	\$30,297	\$2280	\$158,381	-10.6%
Distributions (in thousands)													
Inventor Shares Distributed	\$2,326	\$4,593	\$2,637	\$25,686	\$0	\$1,630	\$1,310	\$61	\$7,410	\$14,983	\$891	\$62,863	44.8%

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 FY2016, 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) Office of Intellectual Property & Industry Research Alliances (IPIRA)	ipira.berkeley.edu
UC Davis (UCD) Office of Research 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/research-innovation-entrepreneurship
UC Riverside (UCR) Office of Technology Commercialization (OTC)	ucr.edu/research/otc.html
UC San Diego (UCSD) Office of Innovation and Commercialization (OIC)	invent.ucsd.edu
UC San Francisco (UCSF) Office of Technology Management	ita.ucsf.edu
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/about/initiatives/iatc.html
Lawrence Berkeley National Laboratory (LBNL) Innovation and Partnerships Office (IPO)	ipo.lbl.gov



University of California
Office of Innovation
& Entrepreneurship
1111 Franklin Street
Oakland, CA 94607-5200