

UNIVERSITY
OF
CALIFORNIA

Technology Commercialization Report

2020

UCSF
RICARDO DIAZ
Student Pharmacist

UCSF Health



OUTSIDE FRONT AND BACK COVER:

Richardo Díaz, a UCSF PharmaD candidate, prepares a COVID-19 vaccine dose at the Parnassus campus. University of California Health (UCH) has administered more than one million doses system-wide. This was accomplished while simultaneously treating more than 8,200 people hospitalized with COVID-19 across the UCH system. UCSF Biophysics PhD candidate Bryan Faust examines a 3D representation of a COVID-19 spike particle, created using a cryo-electron microscope pictured here. UC researchers contribute to the pandemic mobilization effort through their work on rapid COVID diagnostics and results testing, vaccine and antibody development, personal protection equipment, and school alert systems.

INSIDE FRONT AND BACK COVERS:

Susie Kocher, a Forestry Advisor for UC's Agricultural and Natural Resources (ANR) Division, studies post-fire effects. ANR assists government agencies and property owners in California with wildfire prevention, mitigation and recovery. UC is a core partner of ALERTWildfire, a camera network that monitors fire-prone regions statewide. It's built on the backbone of UC's networking technology for earthquake detection systems. UC San Diego Scripps personnel Ernest Aaron, Colby Nicholson and Bryan Hoban are pictured installing a new network camera in the hills above Santa Monica. Researchers at UC Irvine, Riverside, Berkeley and ANR received a UC Multicampus-National Lab Collaborative Research award to develop models and technologies for combatting wildfire by prescribed burn practices.

Message from the Vice President



This past year, the ability of the University of California to carry out its education and research missions was challenged like no other time in its history. The COVID-19 pandemic, along with one of the worst wildfire seasons on record revealed the extraordinary ingenuity of our campus leaders, faculty, staff and students. Their resilience and can-do mindset in facing these challenges are a testament to the strength and creativity of our institution. Although the UC community was hampered, they worked tirelessly with local communities and the State of California in their response and recovery from these unprecedented crises.

From the onset of the pandemic, the Office of Research and Innovation worked with the campus Vice Chancellors for Research, the UC-affiliated national laboratories, Agriculture and Natural Resources, UC Health, state and federal agencies, and partner institutions to keep UC's vital research facilities operational. UC daily life was reshaped in every way. Interactions were limited, and the public health crisis required new approaches to meeting our research mission while ensuring everyone's safety. UC researchers and labs quickly pivoted to meet the ever-growing needs of students, staff, and the general public, offering new technologies, testing innovations and services, large-scale surveillance systems, novel therapeutics, and prevention strategies.

As we adapted to a remote work and learning world, UC campuses and startups provided free access to distance learning software and resources. These resources added to the toolkits of teachers nationwide in their efforts to provide integrated learning options for students. Emerging from a post-COVID world, UC is contributing to a more equitable and greener future and fortifying emergency response systems to prepare for climate change and future public health crises.

Through it all, campuses maintained their progress in the knowledge transfer of UC research, commercialization of its intellectual property, and promotion of campus-born entrepreneurial activities. The metrics compiled in this report are evidence of that progress. Campus technology transfer offices and innovation programs adapted to a remote work and education model while maintaining their high level of achievement.

We look forward to sharing lessons learned from these recent challenges. We are applying them to advance UC's innovation capabilities, to catalyze economic growth, and to promote public health, prosperity and wellbeing.

Sincerely,

Theresa A. Maldonado, Ph.D., P.E.
Vice President, Research & Innovation

This report documents University of California technology commercialization activity for fiscal year 2020. 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 innovation 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 system-wide 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-inventions. The metrics derived from these inventions are not displayed separately, but are included in the system-wide totals.

Startups counted for 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/or services based on UC technology; the startup operated independently of any pre-existing company when formed; the startup's operations are not integrated into the operations of another company.

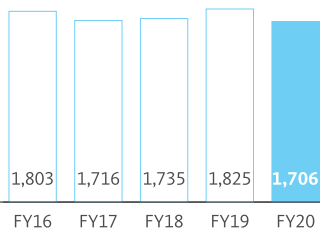
All charts indicate systemwide figures, unless otherwise noted.

Inventions

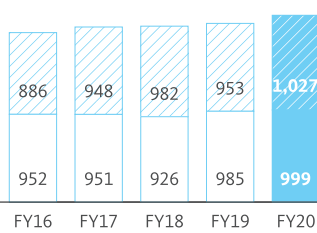
Patents

Licensing

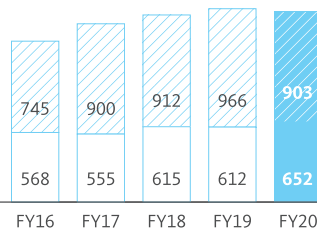
INVENTIONS DISCLOSED



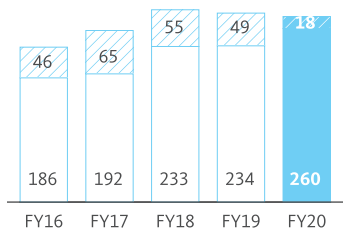
U.S. PATENT APPLICATIONS FILED



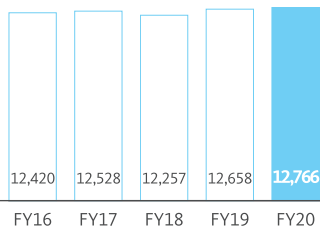
PATENTS ISSUED



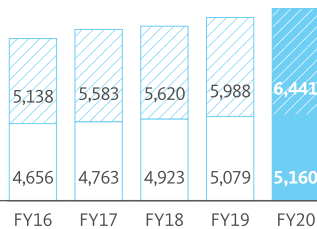
LICENSES ISSUED



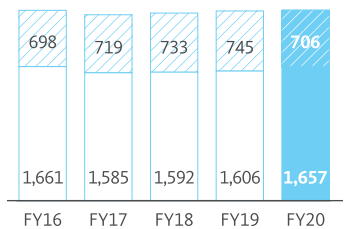
TOTAL ACTIVE INVENTIONS



TOTAL ACTIVE PATENTS



TOTAL ACTIVE LICENSES



Does not include LBNL active inventions.

Does not include LBNL active patents.

1,706

New inventions disclosed by UC researchers in 2020

12,766*

Active inventions in UC's portfolio

2,026

U.S. patent applications filed based on UC inventions in 2020

652

U.S. patents issued for UC inventions in 2020

5,160*

Active U.S. patents covering UC inventions

260

New licenses for UC's utility inventions in 2020

18

New licenses for plant cultivars in 2020

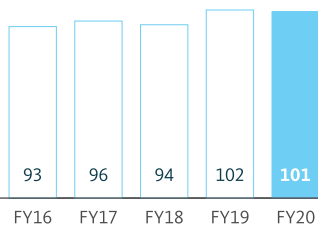
*These statistics are not available for LBNL-managed inventions for FY2020 and are excluded from systemwide totals.

Top-earning inventions

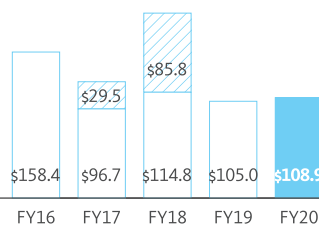
Startups

Income

STARTUP COMPANIES FORMED

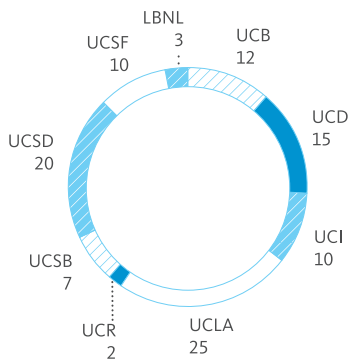


ROYALTIES, FEES & OTHER INCOME (in millions)



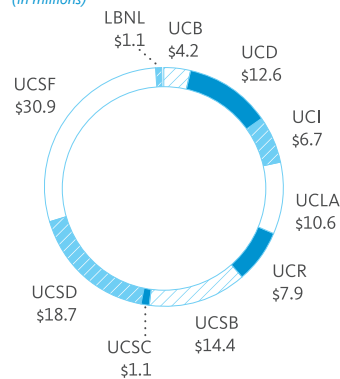
■ Extraordinary income in FY2017 and FY2018 comes from a legal settlement
■ Ordinary income

STARTUP COMPANIES FORMED (BY CAMPUS), FY 2020



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

ROYALTIES, FEES & OTHER INCOME BY CAMPUS, FY 2020 (in millions)



Campus totals do not include \$0.6 million from previous National Laboratory inventions and other income credited to UCOP.

INVENTIONS FY 2020 (campus, year disclosed)

TOTAL INCOME (in thousands)

Hepatitis-B Vaccine (UCSF, 1979, 1981)	\$10,522
Cellular Libraries fo Peptide Sequences (UCSB, 2003, 2006, 2007)	\$10,156
Nephropathic Cystinosis Treatment (UCSD, 2006, 2017)	\$9,839
Tango Mandarin (UCR, 2005)	\$6,764
Micro Implant to treat Glaucoma (UCI, 2000)	\$5,473
Subtotal (Top 5 Inventions)	\$42,755
Bovine Growth Hormone (UCSF, 1980)	\$5,000
Macromolecules for Drug/Diagnostic Delivery (UCSD, 1998)	\$3,460
Monterey Strawberry (UCD, 2008)	\$2,505
Golden Hills Pistachio (UCD, 2004)	\$2,039
Prostate Cancer Drug (UCLA, 2006)	\$1,780
San Andreas Strawberry (UCD, 2008)	\$1,628
Single/Multiple Field Gates for Transistors (UCSB, 2004)	\$1,590
Fronteras Strawberry (UCD, 2014)	\$1,384
Shatterproof Seed Pods (UCSD, 1998, 1999, 2004)	\$1,295
Tunable Fluorescent Polymers (UCSB 2002, 2003, 2004, 2005)	\$1,102
Albion Strawberry (UCD, 2004)	\$950
Gene-editing Tools and Reagents (UCB, 2012)	\$919
Portola Strawberry (UCD, 2008)	\$718
Nanopore Sequencer (UCSC, 2004)	\$676
Tear Osmometer for Dry Eye Disease Diagnosis (UCSD, 2002)	\$634
Chromosome Painting (LLNL, 1985, 1995)	\$600
Irreversible Electroporation for Soft Tissue Ablation (UCB, 1999, 2004)	\$438
Dynamic Skin Cooling Device (UCI, 1993)	\$325
Cabrillo Strawberry (UCD, 2015)	\$308
Walnut Rootstock (UCD, 2007)	\$294
Subtotal (Top 25 Inventions)	\$70,400
Total (All Inventions)	\$108,909
% of Total from Top 5 Inventions	39.3%
% of Total from Top 25 Inventions	64.6%

101

New startup companies formed in 2020 from UC inventions

1,422

Startups founded on UC inventions since 1980

\$109M

Total technology commercialization income to UC in 2020

UC Technology Commercialization Program – FY2020

Summary Table

	UCB	UCD	UCI	UCLA	UCM	UCR	UCSB	UCSC	UCSD	UCSF	LBNL	UC system	% change from FY19
Inventions¹													
Inventions Disclosed	159	108	123	392	7	51	71	39	442	260	82	1,706	(6.5%)
Total Active Inventions (FY end)	1,524	1,580	1,107	2,610	47	418	537	319	2,857	2,011	N/A²	12,766²	0.9%
Patent Prosecution¹													
U.S. Applications Filed													
First Filings	115	73	76	256	6	39	63	30	166	125	52	999	1.4%
Secondary Filings	116	89	85	264	3	38	43	35	151	130	61	1,027	7.8%
Total U.S. Filings	231	162	161	520	9	77	106	65	317	255	113	2,026	4.5%
First Foreign Filings	87	50	40	168	7	16	34	7	104	85	15	600	14.5%
Patents Issued													
U.S. Patents Issued	109	63	52	131	2	20	37	15	96	83	62	652	6.5%
Total Active U.S. Patents	783	467	597	1,081	16	208	492	180	901	551	N/A²	5,160²	1.6%
Foreign Patents Issued	173	75	56	123	7	33	54	23	75	255	31	903	(6.5%)
Total Active Foreign Patents	948	638	535	1,593	14	285	336	126	1,078	1,053	N/A²	6,441²	7.6%
Licensing¹													
Letters of Intent (LOI) Issued	27	18	19	30	0	1	11	0	16	13	1	133	(12.5%)
Options Issued	8	7	3	11	0	5	5	0	0	7	10	56	(30.0%)
Total Active Options	57	15	11	17	0	5	19	1	6	11	20	162	(5.3%)
Utility Licenses Issued	29	20	9	51	0	5	22	0	93	29	3	260	11.1%
Total Active Utility Licenses	275	138	95	315	4	27	64	23	395	316	49	1,657	3.2%
Plant Licenses Issued	0	18	0	0	0	2	0	0	0	0	0	18	(63.3%)
Total Active Plant Licenses	0	527	0	0	0	200	0	0	0	0	0	706	(5.2%)
Startup Companies¹													
Startup Companies Formed	12	15	10	25	0	2	7	0	20	10	3	101	(1.0%)
Royalties, Fees & Other Income (in thousands)³													
Extraordinary Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	N/A
Earned Royalties (above minimum)	\$855	\$11,850	\$5,797	\$849	\$0	\$7,708	\$2,573	\$434	\$15,523	\$10,618	\$142	\$56,371	0.2%
Equity Income	\$3	\$2	\$0	\$199	\$0	\$0	\$0	\$169	\$0	\$0	\$0	\$373	(61.2%)
Other Income (royalties, fees, misc)	\$3,390	\$758	\$872	\$9,538	\$1	\$208	\$11,849	\$523	\$3,196	\$20,311	\$954	\$52,166	9.3%
Total Income	\$4,248	\$12,609	\$6,670	\$10,585	\$1	\$7,917	\$14,423	\$1,126	\$18,719	\$30,929	\$1,097	\$108,909	3.8%
Distributions (in thousands)³													
Inventor Shares Distributed	\$988	\$4,754	\$2,339	\$1,438	\$0	\$2,762	\$2,555	\$82	\$7,910	\$8,222	\$343	\$32,242	(66.1%)

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, trademark and material transfer agreement activity that is also carried out by the campus and laboratory offices.

1 Technology commercialization activity related to inventions and startups having one 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.

2 These statistics are not available for LBNL-managed inventions for FY2020, and are excluded from systemwide totals.

3 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 pro-rated 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 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

Systemwide

Website

techtransfer.universityofcalifornia.edu

Technology Commercialization Offices

Websites

UC Berkeley

Intellectual Property & Industry Research Alliances (IPIRA)

ipira.berkeley.edu

UC Davis

Innovation and Technology Commercialization (ITC)

itc.ucdavis.edu

UC Irvine

Research Translation Group (RTG)

innovation.uci.edu/about/research-translation

UC Los Angeles (UCLA)

Technology Development Group (TDG)

tdg.ucla.edu

UC Merced

Office of Technology, Innovation, and Industry Relations

otii.ucmerced.edu

UC Office of the President

Knowledge Transfer Office (KTO)

ucop.edu/knowledge-transfer-office

UC Riverside

Office of Technology Partnerships (OTP)

techpartnerships.ucr.edu

UC San Diego

Office of Innovation and Commercialization (OIC)

innovation.ucsd.edu

UC San Francisco (UCSF)

Office of Technology Management and Advancement (OTMA)

innovation.ucsf.edu/venture/office-technology-management-and-advancement

UC Santa Barbara

Technology & Industry Alliances (TIA)

tia.ucsb.edu

UC Santa Cruz

Industry Alliances & Technology Commercialization (IATC)

officeofresearch.ucsc.edu/iatc

Lawrence Berkeley National Laboratory

Intellectual Property Office (IPO)

ipo.lbl.gov



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