The Research Grants Program Office: Ten Years in Review

The California of today – the fifth largest economy in the world – is a product of the educational and research investments of yesterday. Our ability to preserve and expand upon this legacy for future generations depends upon the effectiveness with which we address research challenges in areas important to California, its people, environment and economy.

The Research Grants Program Office (RGPO) at the University of California, Office of the President, supports and advances research activities across all ten UC campuses, the UC-affiliated national laboratories, and the state. Formed in 2009, RGPO includes many distinct grant-making programs, each targeting a different set of critical research needs. These programs fund research ranging from climate change, solar and renewable energy, water quality and resources, artificial intelligence and cognitive science, to biomedical topics including complex human health issues, stem cell and cancer research – and more. These programs join forces to ensure that rigorous, world-class standards are maintained in the selection and monitoring of awards. A matrixed organizational structure makes it possible for the programs to share the cost of support services, reducing operational expenses and maximizing the funds available for research grants.

Over the last 10 years, RGPO funds have supported California researchers studying issues that are of special importance to Californians, which in turn stimulates the economy and attracts leading scholars and innovators to the state. RGPO research has contributed to start-ups, inventions and patents, has enabled California to be at the forefront of new and emerging research challenges, and has improved the health and well-being of Californians. This report highlights the impact over the past decade of investments in California's future.

$875M

In research awards to all UC campuses and 132 California-based institutions (2009–2019)

3500+

Researchers have worked on RGPO-funded projects

Case Study in California Impact: UC Addresses Water Security

Water supplies in California are facing unprecedented stresses from climate change and extreme weather events. Our water management systems are struggling to meet environmental and human needs and achieve water security. The state's policymakers are in need of salient, credible and legitimate information. UC Water is a UC systemwide-funded collaboration that helps produce integrated California water management data, which helps state and local agencies ensure the security of the water supply for decades to come.

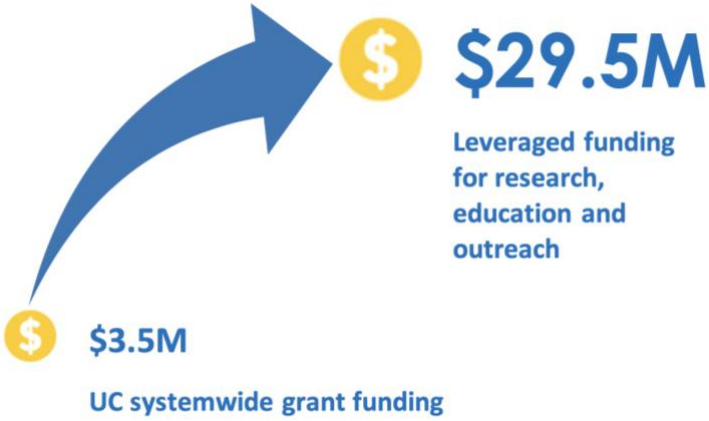
The UC Water project has had significant impacts, including:

- Partnerships with key state water agencies, including the Department of Water Resources, to provide data to support California's efforts to:
  - Inform the development of modern water data systems
  - Take key steps on groundwater sustainability
  - Improve our stream flow monitoring system
- Creation of the "UC Water Academy," an online and field course for undergraduate and graduate students, focused on water resources management

Project Snapshot

- UC Water: Security and Sustainability Research Initiative
- $3.5M UC systemwide funding
- PI: Roger Bales (UCM)
- Collaborating campuses: UCD, UCSC, UCB, UCSD
- Dates: 1/2015–12/2018

Since 2015, UC Water has grown to over 50 researchers who study California's three stores of water: snow, reservoirs and groundwater aquifers. Together they have brought the power of UC to address water resource challenges in the state. UC Water is developing innovative, quantitative water accounting and analysis methods. They weave together studies by a multidisciplinary team, including legal and policy researchers, to improve our understanding of how water is extracted, conveyed and stored in human-built and natural infrastructure.



Case Study in California Impact: Making Homeless Programs More Effective

About one quarter of the nation's homeless population lives in California. In Los Angeles County alone, 76,000 single adults are at high risk of becoming homeless in any given year. Preventing and addressing homelessness is one of the most important issues we face. While local and state agencies provide significant funding for homelessness programs, data needed to measure their effectiveness is fragmented across multiple agencies covering health, substance abuse, housing and criminal justice. Improving data integration and analysis can inform government services that both combat homelessness and better serve homeless individuals.

Project Snapshot

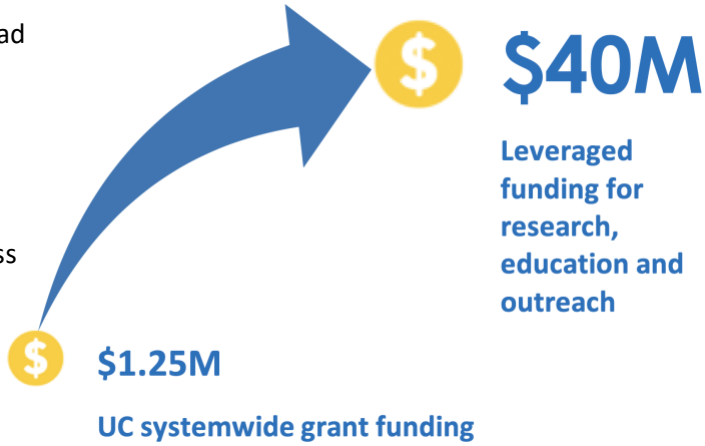
- California Policy Lab: Studying Inequality and Homelessness
- $1.25M UC systemwide funding
- PI: Jesse Rothstein (UCB)
- Collaborating campuses: UCLA, UCSF, UCD, UCI
- Dates: 1/2019–12/2020

This two-year project brings together researchers from throughout UC to help the state align resources more effectively with the needs of at-risk individuals and families. The researchers aim to identify those most at risk of becoming homeless, identify and test prevention strategies, and evaluate interventions designed to help people avoid or exit homelessness. They are closely working with agencies on the front lines of addressing this crisis, including those in Los Angeles, Sonoma and San Francisco counties.

Though still underway, this project has already had significant impacts, including:

- An analysis of the health conditions of unsheltered individuals in a report that has attracted national attention
- A prediction of adults at risk of homelessness in LA, which inspired LA County's $3 million investment in new prevention efforts

This initial work has also led to substantial investments to help state agencies address this critical need.



RGPO Systemwide Research Programs

Program	Acronym	Established	Funded Research	Key Funding Sources
Cancer Research Coordinating Committee	CRCC	1947	All aspects of cancer, including its origins, detection, prevention and cure	Bequests and voluntary contributions on tax returns
UC Discovery Grant*	UCDG	1995	UC / industry partnerships for cutting-edge technologies	State general funds and industry sponsor matching contributions
Multicampus Research Programs & Initiatives	MRPI	2008	Outstanding research collaborations between UC campuses in all fields of scholarship	State general funds
Proof of Concept Program: Commercialization Gap Grants*	POC	2011	Innovations and discoveries at the cusp of commercialization	State general funds
UC National Laboratory Fees Research Program	LFRP	2008	Strategically targeted topics aligned with the missions of UC and the national labs	National laboratory management fees

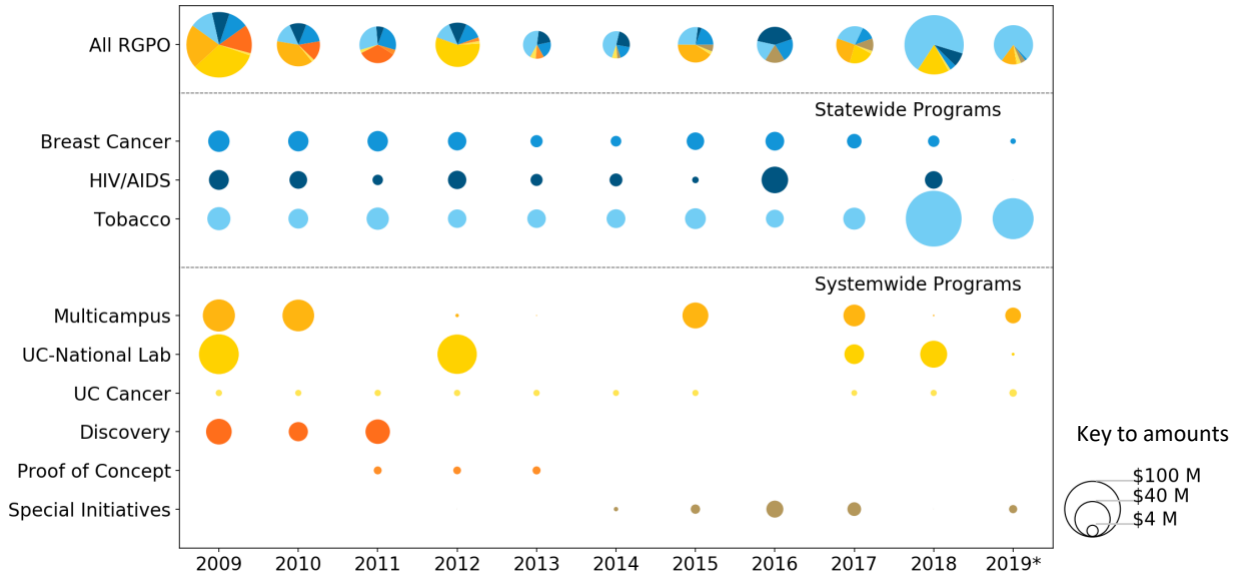
*Discontinued

RGPO Statewide Research Programs

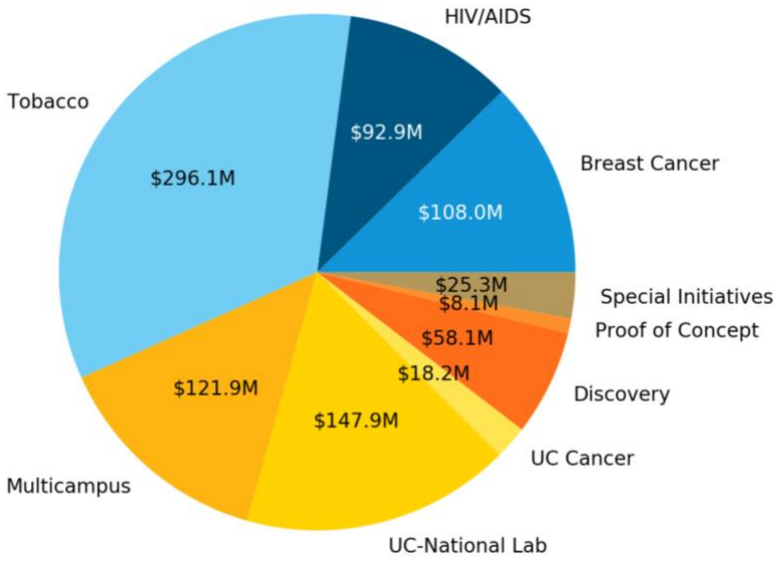
Program	Acronym	Established	Funded Research	Key Funding Sources
California Breast Cancer Research Program	CBCRP	1993	The cause, cure, treatment, detection and prevention of breast cancer	Tobacco taxes, voluntary contributions on tax forms
California HIV/AIDS Program	CHRP	1983	The prevention, education, care, treatment, and a cure for HIV/AIDS	State general funds
Tobacco-Related Disease Research Program	TRDRP	1988	Tobacco-related diseases in California	Tobacco taxes

Since 2009, RGPO has awarded nearly $900 million in research grants to improve the quality of life for California's citizens[1]

1. Total dollars awarded by grant start year and program



2. Total dollars awarded by program for grants that started 2009–2019



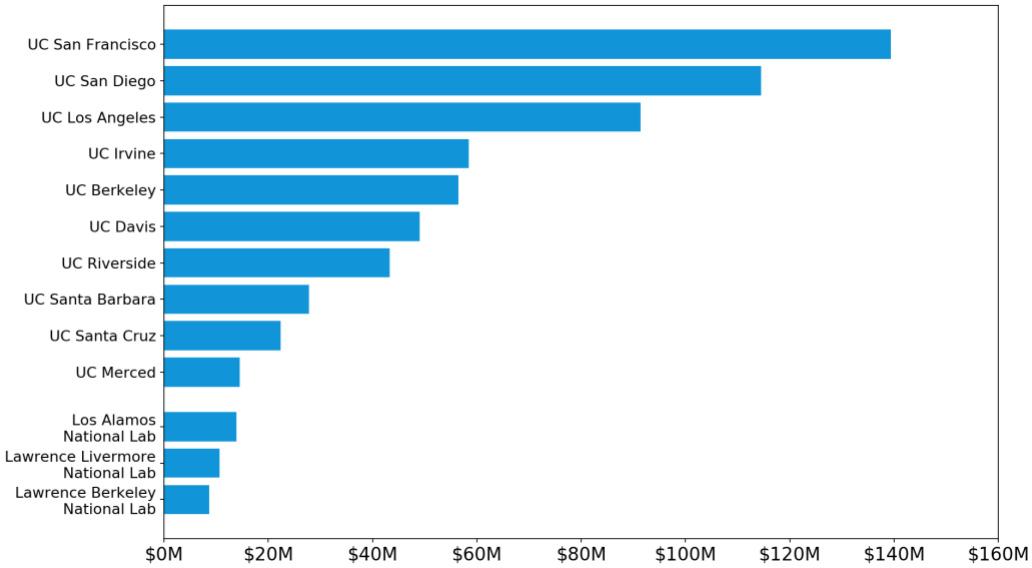
RGPO has consistently made substantial investments for vital research year over year, having awarded over $80 million each year on average.

The statewide programs are represented in the blue-shaded portion of the above charts, and the UC systemwide programs in the yellow-and orange-shaded areas. Notably, the proportion of systemwide funding has decreased significantly over the past 10 years.

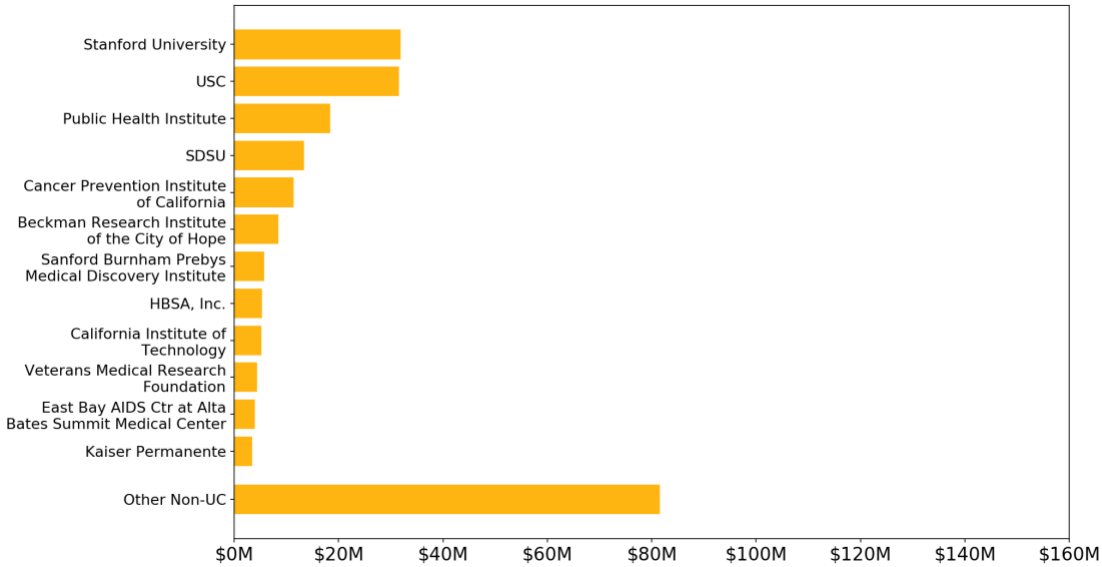
[1] Grant data is current through August 2019

RGPO grants are an investment in California institutions, with funds distributed to both UC institutions and non-UC research partners within the state

3. Total awarded funds by grant host, UC institutions, 2009–2019



4. Total awarded funds by grant host, non-UC organizations, 2009–2019 (only top 12 of 138 displayed)

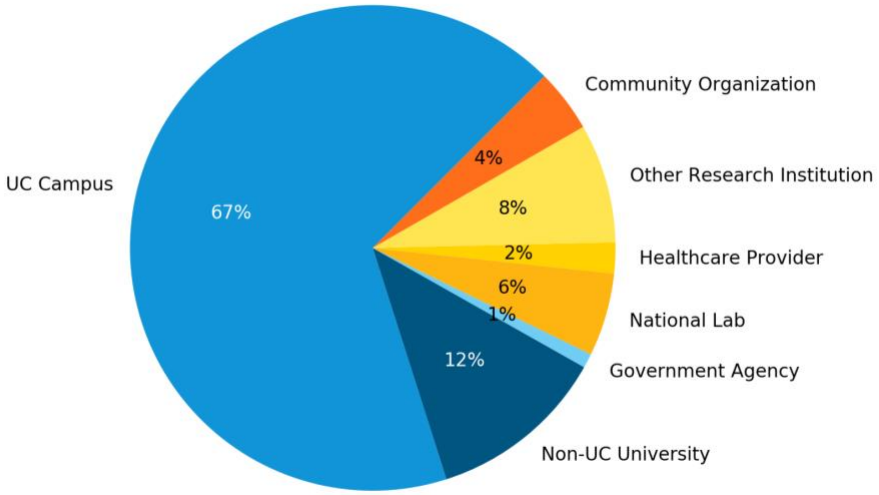


RGPO funding builds capacity for discoveries within not only the UC system but also other research organizations within the state, to include a variety of research institutions, health providers, community service organizations, and universities.

From 2009–2019, RGPO awarded $651 million for research hosted by the 10 UC campuses and UC-affiliated national laboratories, and $224 million to research hosted by 138 other organizations. The preponderance of grant funding in recent years is earmarked for health-related research; thus, campuses with medical schools top the lists in the graphs above.

RGPO grants are an investment in California researchers, made across sectors

5. Affiliated researchers by institution type



Through a competitive proposal review process, RGPO grants ensure that thousands of the most highly qualified California experts are able to research solutions to critical issues facing the state, both within and outside of UC.

A portion of RGPO grant funding is directed towards early career awards for California researchers, encouraging new and innovative research and cultivating opportunities for them to compete successfully for federal grant awards.

In some research areas, it is particularly important to ensure that research is informed by the real-world experiences of impacted communities, and portions of grant funding are reserved for awards to community-based advocacy organizations.

150+

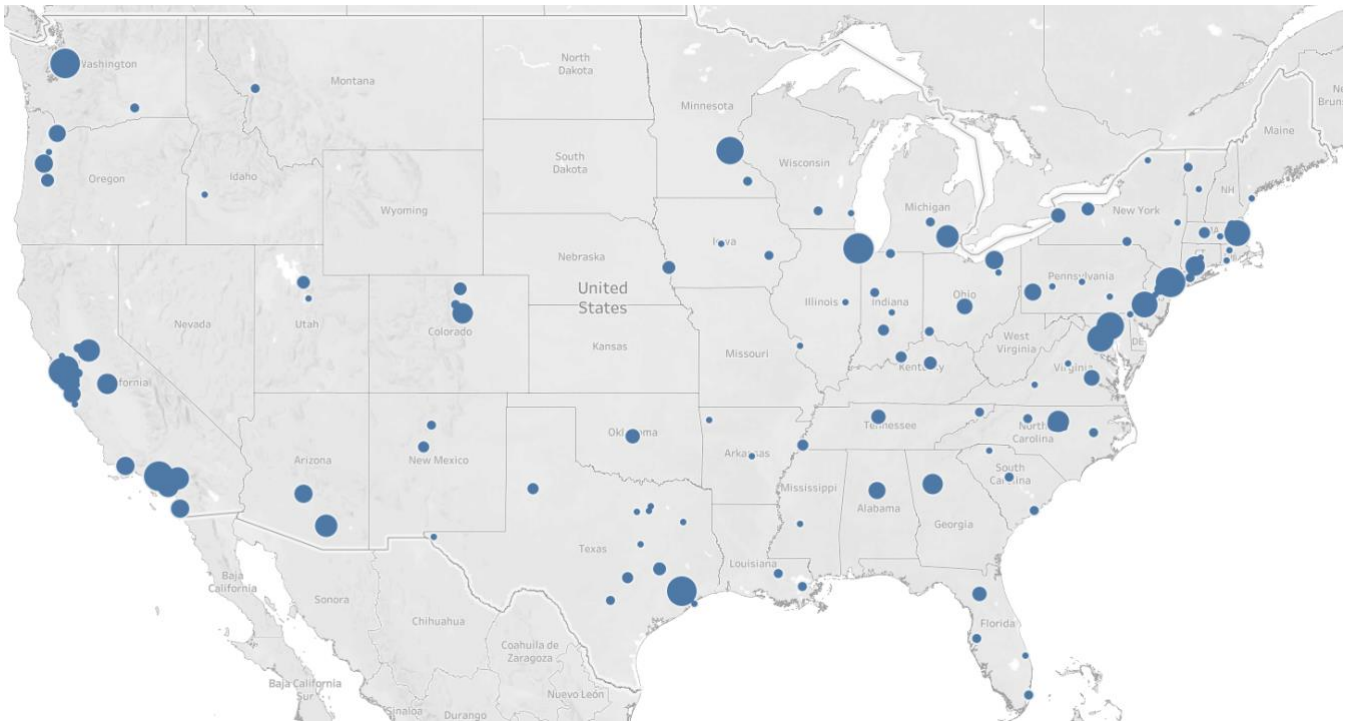
Number of California researchers who receive RGPO funding for the first time each year

3,737

Cumulative number of researchers who participated on an RGPO grant-funded project from 2009–2019

Grant selection is informed by peer reviewers drawn from universities and research institutions not only within California, but across the U.S. as well as Canada

6. Geographic distribution of RGPO reviewers, 2014–2019



Selection of RGPO grants is a meticulous, time-intensive process requiring the combined efforts of accomplished researchers from a range of scientific and policy disciplines. It also includes members of the UC Academic Senate, community advocates, health voluntary members, educators, and research grant program directors.

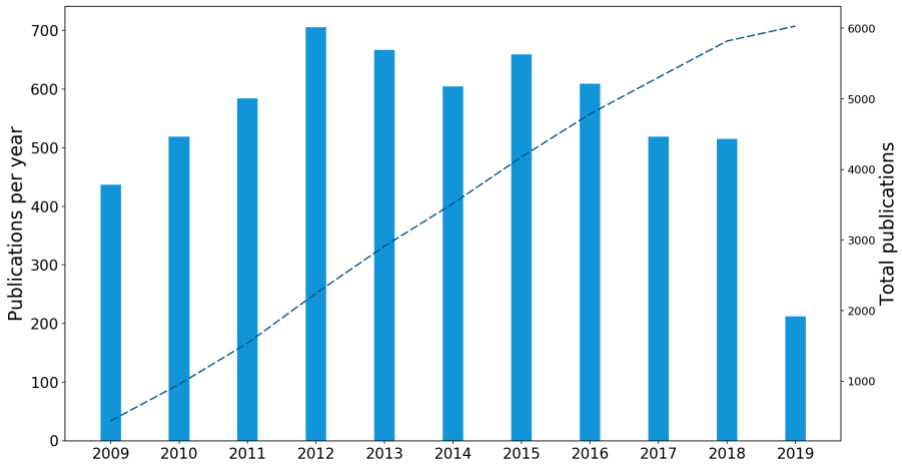
While program *funding* is concentrated in research within the state of California, the *expertise* needed to analyze grant proposals is tapped nationwide. RGPO has engaged over 700 experts from across the nation to help select the most innovative and impactful projects.

Grant applications submitted to RGPO undergo an intensely competitive review process. On average, available grant funding is only sufficient to support the top 20% of all applications received.

Selection of the most meritorious proposals requires many long hours of multi-layered analysis throughout a comprehensive process involving preliminary application review, peer review by subject matter experts (e.g., professors and research scientists), and advisory committee consultation.

RGPO funding supports over 500 research publications each year, covering all areas of scholarly investigation[1]

7. Number of academic publications by year and total since 2009



RGPO-funded researchers are enormously productive, generating more than one academic publication each day of the past ten years, on average.

To ensure that critical research discoveries are broadly available, RGPO-funded research publications are required to be accessible to the public free of charge on open access websites.

RGPO's rate of 6.7 publications for every $1 million in research investment is well above the national average of 4.5 publications per $1 million

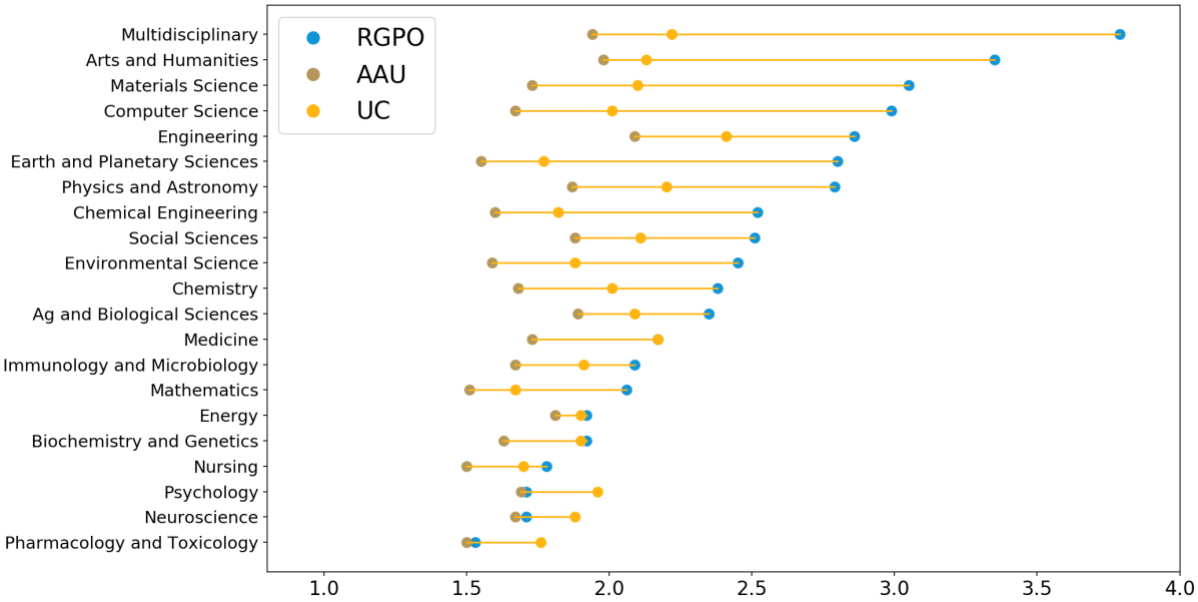
Percentage of RGPO publications by field (Source: SciVal, Oct. 2019)

Medicine	19.6%
Biochemistry and Genetics	16.7%
Physics and Astronomy	10.4%
Materials Science	5.3%
Chemistry	5.0%
Engineering	4.6%
Earth and Planetary Sciences	4.3%
Social Sciences	4.0%
Ag and Biological Sciences	3.8%
Environmental Science	3.0%
Immunology and Microbiology	2.9%
Pharmacology and Toxicology	2.9%
Computer Science	2.7%
Chemical Engineering	2.4%
Psychology	2.2%
Neuroscience	2.2%
Multidisciplinary	2.0%
Mathematics	1.6%
Other Health Areas	1.4%
Arts and Humanities	1.0%
Energy	1.0%
Other Areas	1.2%

[1] Publication data is current through October 2019

RGPO research publications have significant impact within their fields

8. Field-weighted citation impact of RGPO publications, in comparison to average papers produced by UC and institutions of the American Association of Universities. (Source: SciVal, Oct. 2019)



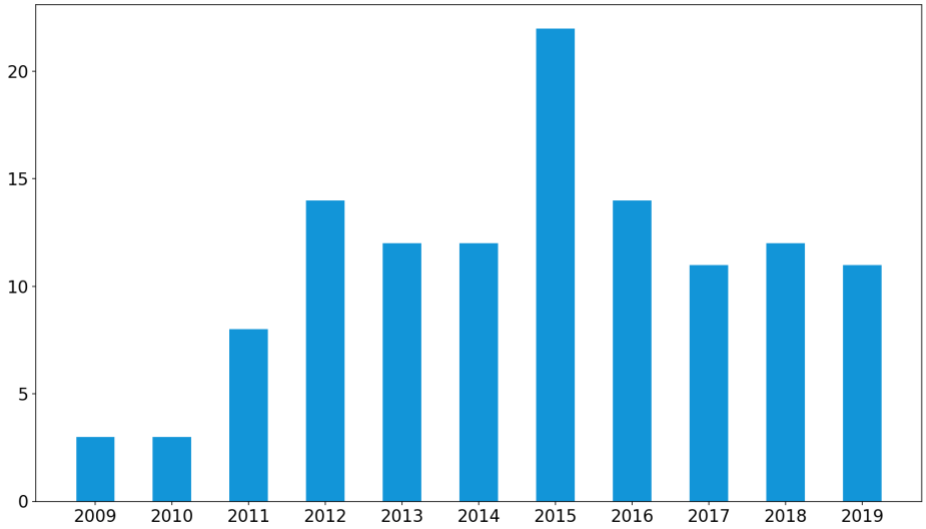
By focusing on emerging research areas and impactful collaborations that often combine distinct disciplines, RGPO excels at identifying projects that yield high-impact results. An average paper in a given area has a field-weighted citation impact (FWCI) of 1. An FWCI of 2, for instance, indicates twice the average number of citations.

The impact of RGPO-funded research publications exceeds those of the Association of American Universities (an elite group of the leading research universities in the U.S. and Canada), as well as average papers with UC authorship, in all areas where RGPO has at least 50 publications.

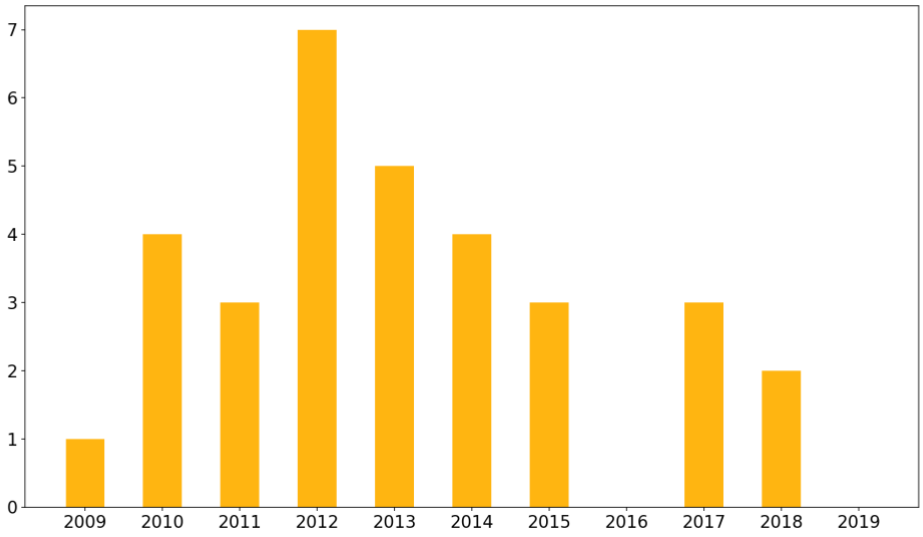
Photo courtesy of Max & Jules Photography

During the last decade, RGPO-funded research has led to 130 technologies and 30 commercial licenses at UC[1]

9. UC-assigned patents based on RGPO research



10. UC licenses for technologies based on RGPO research



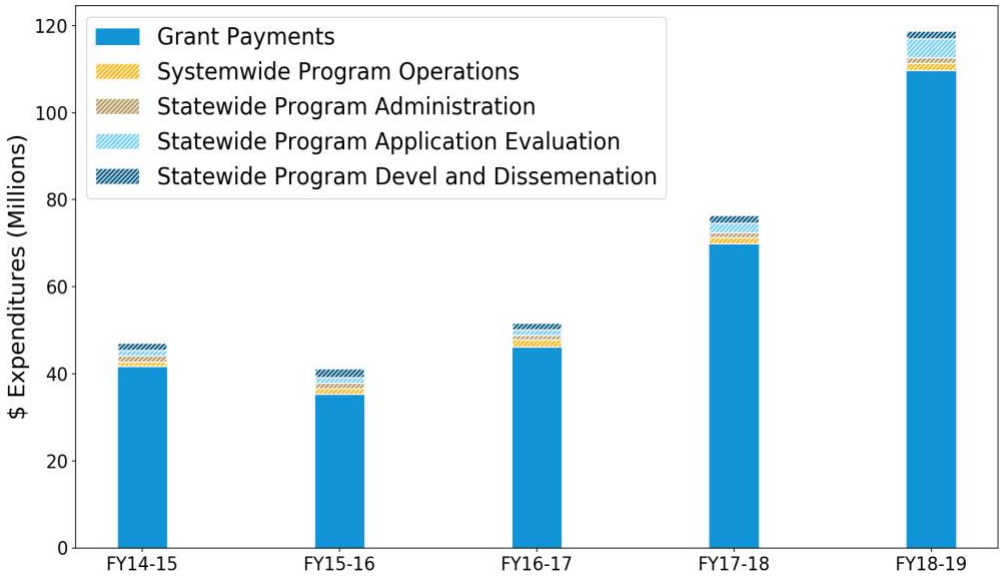
Due to past investments in research, the state has a wealth of innovative ideas and the world-class talent needed to address critical challenges. RGPO funding has helped create 134 patents, an average rate of one patent per $7 million of research funding.

This compares favorably to UC's recent overall rate of one patent per $9 million of research funding. These technologies led to 32 commercial license agreements. Research investments cultivate ideas and knowledge, enriching the California economy with the development of new technologies and jobs.

[1] Patent and license data is current as of October 2019

The consolidation of research grant programs under RGPO ensures a rigorous selection and monitoring of awards and lower operational costs due to cost sharing

11. Operational costs



Over 90% of RGPO's budget has gone directly to research. RGPO takes advantage of economies of scale by sharing systems and support services across multiple funding programs.

RGPO's operational costs of 9.6% on average over the past 5 years are well below the industry average of 15%. Categories of operational costs are defined in the table below.

Total Operational Costs	A combination of administrative, application evaluation, and development and dissemination expenses
• **Administrative Costs**	Expenses in support of activities related to the management of research grants programs, including (but not limited to) general staff meetings, trainings, personnel management, infrastructure unrelated to defined non-administrative expenses, and fundraising (capped at 5% for statewide programs)
• **Application and Evaluation**	Amounts expended within RGPO for activities related to the solicitation of contract and grant applications, the peer review of contract and grant applications, and the monitoring of contract and grant progress and award expenditures
• **Development and Dissemination**	Expenses in support of the dissemination of research findings, the development of new strategic research initiatives, and the holding of conferences and legislative briefings

RGPO upholds the highest standards of grant review and monitoring while keeping operational costs well below the industry average

Program expenditures in the last five fiscal years

	Expenditure Type	14-15	15-16	16-17	17-18	18-19	5-Year Total
Statewide Research Programs	**Grant Payments**	$ 25,315,457	$ 24,609,559	$ 29,269,361	$46,197,120	$ 86,928,063	**$ 212,319,561**
	Administration	$ 1,341,846	$ 1,277,528	$ 1,037,616	$ 1,162,688	$ 1,373,290	**$ 6,192,969**
	(% of statewide expenditures)	*4.5%*	*4.4%*	*3.1%*	*2.3%*	*1.5%*	***2.6%***
	Application Evaluation	$ 1,238,056	$ 1,225,875	$ 1,304,865	$ 2,109,245	$ 4,293,478	**$ 10,171,519**
	(% of statewide expenditures)	*4.2%*	*4.2%*	*3.9%*	*4.1%*	*4.6%*	***4.3%***
	Development & Dissemination	$ 1,746,276	$ 2,070,249	$ 1,573,870	$ 1,768,923	$ 1,723,491	**$ 8,882,810**
	(% of statewide expenditures)	*5.9%*	*7.1%*	*4.7%*	*3.5%*	*1.8%*	***3.7%***
Systemwide Research Programs	**Grant Payments**	$ 16,338,577	$ 10,678,444	$ 16,888,894	$23,661,520	$ 22,786,564	**$ 90,353,999**
	Operations	$ 1,066,840	$ 1,267,619	$ 1,569,301	$ 1,399,950	$ 1,574,295	**$ 6,878,005**
	(% of systemwide expenditures)	*6.1%*	*10.6%*	*8.5%*	*5.6%*	*6.5%*	*7.1%*
RGPO Total Expenditures		**$ 47,047,052**	**$ 41,129,274**	**$ 51,643,908**	**$76,299,447**	**$ 118,679,181**	**$ 334,798,862**