

# University of California, Berkeley

The University of California, Berkeley (UC Berkeley, Berkeley, Cal, or California), [11][12] is a public land-grant research university in Berkeley, California. It was established in 1868 and is the state's first land-grant university. It is a founding member of the Association of American Universities and is the founding campus of the University of California system. Berkeley has the most top-ranked departments nationally and is one of the highest-ranked universities worldwide. [13][14]

Berkeley is <u>classified</u> among "R1: Doctoral Universities—Very high research activity" and hosts multiple research institutes. It played a major role in the <u>Manhattan Project</u> and the discovery of sixteen chemical elements. It also has three national laboratories for the <u>U.S. Department of Energy</u> (Lawrence Berkeley National Laboratory, <u>Lawrence Livermore National Laboratory</u>, and <u>Los Alamos National Laboratory</u>). Berkeley's athletic teams (the <u>California Golden Bears</u>) have won 107 national championships and 223 Olympic medals (including 121 gold medals). [17][18]

Among Berkeley's <u>alumni</u>, <u>faculty</u>, and <u>researchers</u> are 260 American Academy of Arts and Sciences Fellows, [19] 190 recipients of the <u>MacArthur Fellowship</u>, [20] 144 members of the <u>National Academy of Sciences</u>, [21] 139 <u>Guggenheim Fellows</u>, 107 Nobel laureates, [22] 75 members of the <u>National Academy of Engineering</u>, [23] 68 recipients of the <u>National Medal of Science</u>, 34 <u>Pulitzer Prize</u> winners, 25 <u>Turing Award</u> winners, 22 <u>cabinet members</u>, 19 <u>Academy Award</u> winners, 14 <u>Fields Medalists</u>, 10 state governors, 7 heads of state or government, 6 chief justices, [24] and 25 living billionaires. [25]

# History

# Founding

Made possible by <u>President Lincoln</u>'s signing of the <u>Morrill Act</u> in 1862, the University of California was founded in 1868 as the state's first land-grant university, inheriting the land and facilities of the private <u>College of California</u> and the federal-funding eligibility of a public agricultural, mining, and mechanical arts college. [26] The Organic Act states that the "University shall have for its design, to provide instruction and thorough and complete education

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in all departments of science, literature and art, industrial and professional pursuits, and general education, and also special courses of instruction in preparation for the professions". [27][28]

Ten faculty members and forty male students made up the fledgling university when it opened in Oakland in 1869. Frederick Billings, a trustee of the College of California, suggested that a new campus site north of Oakland be named in honor of Anglo-Irish philosopher George Berkeley. The university began admitting women the following year. In 1870, Henry Durant, founder of the College of California, became its first president. With the completion of North and South Halls in 1873, the university relocated to its Berkeley location with 167 male and 22 female students. The first female student to graduate was in 1874, admitted in the first class to include women in 1870. [34]

Beginning in 1891, <u>Phoebe Apperson Hearst</u> funded several programs and new buildings and, in 1898, sponsored an international competition in <u>Antwerp</u>, where French architect <u>Émile Bénard</u> submitted the winning design for a campus master plan. Although the University of California system does not have an official <u>flagship campus</u>, many scholars and experts consider Berkeley to be its unofficial flagship. It shares this unofficial status with the University of California, Los Angeles. [35]

# 20th century

In 1905, the University Farm was established near Sacramento, ultimately becoming the University of California, Davis. [36] In 1919, Los Angeles State Normal School became the southern branch of the university, which ultimately became the University of California, Los Angeles. [37] By the 1920s, the number of campus buildings in Berkeley had grown substantially and included twenty structures designed by architect John Galen Howard. [38] In 1917, one of the nation's first ROTC programs was established at Berkeley and its School of Military Aeronautics began training pilots, including Jimmy Doolittle. In 1926, future Fleet Admiral Chester W. Nimitz established the first Naval ROTC unit at Berkeley. [40] Berkeley ROTC alumni include former Secretary of Defense Robert McNamara, Army Chief of Staff Frederick C. Weyand, sixteen other general officers, ten Navy flag officers, and AFROTC alumna Captain Theresa Claiborne. [41]

In the 1930s, <u>Ernest Orlando Lawrence</u> helped establish the Radiation Laboratory (now <u>Lawrence Berkeley National Laboratory</u>) and invented the <u>cyclotron</u>, which won him the Nobel physics prize in 1939. Using the cyclotron, Berkeley professors

Postgraduates	12,828 (Fall 2022) <sup>[6]</sup>				
Location	Berkeley, California, United States 37.8728°N 122.2602°W <sup>[7]</sup>				
Campus	Core Campus: 178-acre (72- hectare) <sup>[8][9]</sup> Total: 8,164- acre (3,304- hectare) <sup>[3]</sup>				
Newspaper	The Daily Californian				
Colors	Berkeley Blue California Gold [10]				
Nickname	Golden Bears				
Sporting affiliations	NCAA Division I FBS – Pac-12 • MPSF • America East • IRA				
Mascot	Oski the Bear				
Website	berkeley.edu (h ttp://berkeley.ed u)				
Berkeley UNIVERSITY OF CALIFORNIA					



View from Memorial Glade of <u>Sather</u> <u>Tower</u> (the Campanile), the center of Berkeley

and Berkeley Lab researchers went on to discover sixteen chemical elements—more than any other university in the world. [43][44] In particular, during World War II and following Glenn Seaborg's then-secret discovery of plutonium, Lawrence's Radiation Laboratory began to contract with the U.S. Army to develop the atomic bomb. Physics professor J. Robert Oppenheimer was named scientific head of the Manhattan Project in 1942. [45][46] Along with the Lawrence Berkeley National Laboratory, Berkeley founded and was then a partner in managing two other labs, Los Alamos National Laboratory (1943) and Lawrence Livermore National Laboratory (1952).

In 1952, the <u>University of California</u> reorganized itself into a system of semi-autonomous campuses, with each campus given a chancellor, and <u>Clark Kerr</u> became Berkeley's first Chancellor, while <u>Robert Sproul</u> remained in place as the President of the University of California. Berkeley gained a worldwide reputation for <u>political activism</u> in the 1960s. In 1964, the <u>Free Speech Movement</u> organized student resistance to the university's



Sather Tower (the Campanile) looking out over <u>San Francisco Bay</u> and Mount Tamalpais

restrictions on political activities on campus—most conspicuously, student activities related to the  $\underline{\text{Civil}}$  Rights Movement. [48][49]

The arrest in Sproul Plaza of <u>Jack Weinberg</u>, a recent Berkeley alumnus and chair of Campus <u>CORE</u>, prompted a series of student-led acts of formal remonstrance and civil disobedience that ultimately gave rise to the Free Speech Movement, which movement would prevail and serve as a precedent for student <u>opposition</u> to America's involvement in the Vietnam War. <u>[50][51][52]</u> In 1982, the <u>Mathematical Sciences Research Institute</u> (MSRI) was established on campus with support from the <u>National Science Foundation</u> and at the request of three Berkeley mathematicians—<u>Shiing-Shen Chern</u>, <u>Calvin Moore</u>, and <u>Isadore M. Singer</u>. The institute is now widely regarded as a leading center for collaborative mathematical research, drawing thousands of visiting researchers from around the world each year. <u>[53][54][55]</u>

# 21st century

In the current century, Berkeley has become less politically active, although more liberal. [56][57] Democrats outnumber Republicans on the faculty by a ratio of nine to one, which is a ratio similar to that of American academia generally. The school has become more focused on STEM disciplines and fundraising. In 2007, the Energy Biosciences Institute was established with funding from BP and Stanley Hall, a research facility and headquarters for the California Institute for Quantitative Biosciences, opened. Supported by a grant from alumnus James Simons, the Simons Institute for the Theory of Computing was established in 2012. In 2015, Berkeley and its sister campus, UCSF, established the Innovative Genomics Institute to develop CRISPR gene editing, and, in 2020, an anonymous donor

pledged \$252 million to help fund a new center for computing and data science. For the 2020 fiscal year, Berkeley set a fundraising record, receiving over \$1 billion in gifts and pledges, and two years later, it broke that record, raising over \$1.2 billion. [62][59][63][64]

### Controversies

- Various research ethics, human rights, and animal rights advocates have been in conflict with Berkeley. Native Americans contended with the school over repatriation of remains from the Phoebe A. Hearst Museum of Anthropology. Student activists have urged the university to cut financial ties with Tyson Foods and PepsiCo. Faculty member Ignacio Chapela prominently criticized the university's financial ties to Novartis. PETA has challenged the university's use of animals for research and argued that it may violate the Animal Welfare Act. [70][71]
- Cal's Memorial Stadium reopened in September 2012 after renovations. The university incurred a controversial \$445 million of debt for the stadium and a new \$153 million student athletic center, which it financed with the sale of special stadium endowment seats. The roughly \$18 million interest-only annual payments on the debt consumes 20 percent of Cal's athletics' budget; principal repayment begins in 2032 and is scheduled to conclude in 2113.
- On May 1, 2014, Berkeley was named one of fifty-five higher education institutions under investigation by the U.S. Department of Education's Office of Civil Rights "for possible violations of federal law over the handling of sexual violence and harassment complaints" by the White House Task Force to Protect Students from Sexual Assault. [74] Investigations continued into 2016, with hundreds of pages of records released in April 2016, showing a pattern of documented sexual harassment and firings of non-tenured staff. [75]
- On July 25, 2019, Berkeley was removed from the <u>U.S. News</u> Best Colleges Ranking for misreporting statistics. Berkeley had originally reported that its two-year average alumni giving rate for fiscal years 2017 and 2016 was 11.6 percent, <u>U.S. News</u> said. The school later told <u>U.S. News</u> the correct average alumni giving rate for the 2016 fiscal year was just 7.9 percent. The school incorrectly overstated its alumni giving data to <u>U.S. News</u> since at least 2014. The alumni giving rate accounts for five percent of the Best Colleges ranking. [76]
- Berkeley community members have criticized UC Berkeley's increasing enrollment. Berkeley residents filed a lawsuit alleging that the university's expanding enrollment violated California Environmental Quality Act and that the area lacked the infrastructure to support more students. [77] Critics of the lawsuit accused these community members of NIMBYism. [78][79][80] In August 2021, a judge from the Superior Court of Alameda County ruled in favor of the residents, and on March 3, 2022, the California Supreme Court also ruled in favor of the residents, saying that the university needed to freeze its admission rates at 2020–2021 levels. [81] On March 11, 2022, state legislators released a proposal to change CEQA to exempt the university from its restrictions. [82] On March 14, Gavin Newsom signed the bill into law. [83] Berkeley has continued to face a housing shortage. [84]

# Organization and administration

#### Name

Officially named the "University of California, Berkeley" it is often shortened to "Berkeley" in general reference or in an academic context (Berkeley Law, Berkeley Engineering, Berkeley Haas, Berkeley Public Health) and to "California" or "Cal" particularly when referring to its athletic teams (California Golden

<u>Bears</u>). [11][12][85] In August 2022, a university task force was formed which recommended renaming the athletic identity to "Cal Berkeley" to further tie the athletic brand to academic prestige, and reduce public confusion. [86]

#### Governance

The University of California is governed by a twenty-six member <u>Board of Regents</u>, eighteen of whom are appointed by the <u>Governor of California</u> to 12-year terms. The board also has seven <u>ex officio</u> members, a student regent, and a non-voting student regent-designate. Prior to 1952, Berkeley was the University of California, so the university president was also Berkeley's chief executive. In 1952, the university reorganized itself into a system of semi-autonomous campuses, with each campus having its own chief executive, a chancellor, who would, in turn, report to the president of the university system. Twelve vice-chancellors report directly to Berkeley's chancellor, and the deans of the fifteen colleges and schools report to the executive vice chancellor and provost, Berkeley's chief academic officer. Twenty-three presidents and chancellors have led Berkeley since its founding. [89][47]

#### Presidents

- 1868–1869 Henry Durant
- 1869–1870 John LeConte
- 1870–1872 Henry Durant
- 1872–1875 Daniel Coit Gilman
- 1875–1881 John LeConte
- 1881–1885 W.T. Reid
- 1885–1888 Edward S. Holden
- 1888–1890 Horace Davis
- 1890–1899 Martin Kellogg
- 1899–1919 Benjamin Ide Wheeler
- 1919–1923 David Prescott Barrows
- 1923–1930 William Wallace Campbell
- 1930–1952 Robert Gordon Sproul

### Chancellors

- 1952–1958 Clark Kerr
- 1958–1961 Glenn T. Seaborg
- 1961–1965 Edward W. Strong
- 1965–1965 Martin E. Meyerson (acting)
- 1965–1971 Roger Heyns
- 1971–1980 Albert H. Bowker
- 1980–1990 Ira Michael Heyman
- 1990–1997 Chang-Lin Tien
- 1997–2004 Robert M. Berdahl
- 2004–2013 Robert J. Birgeneau
- 2013–2017 Nicholas B. Dirks
- 2017–present: Carol T. Christ

# **Funding**

With the exception of government contracts, public support is apportioned to Berkeley and the other campuses of the University of California system through the UC Office of the President and accounts for 12 percent of Berkeley's total revenues. Berkeley has long benefited from private philanthropy and more recently, alumni and their foundations have given to the university for operations and capital expenditures. Berkeley has benefited from benefactors beyond its alumni ranks, notable among which are Mark Zuckerberg and Priscilla Chan; Vitalik Buterin, Patrick Collison, John Collison, the Ron Conway family, Crankstart, Elad Gil and Jennifer Huang Gil, Daniel Gross, Dustin Moskovitz and Cari Tuna, and Hemant and Jessica Taneja, along with Jane Street principals Matt Berger, Craig Falls, Rob Granieri, James McClave, and Adam Winkel; BP; the Bill and Melinda Gates Foundation, billionaire Sir Li Ka-Shing, Israeli-Russian billionaire Yuri Milner, Thomas and Stacey Siebel, Sanford and Joan Weill, and professor

<u>Gordon Rausser</u> (\$50 million gift in 2020). Hundreds of millions of dollars have been given anonymously. The 2008–13 "Campaign for Berkeley" raised \$3.13 billion from 281,855 donors, and the "Light the Way" campaign, which concluded at the end of 2023, has raised over \$6.2 billion.

### **Academics**

### Faculty and departments

Berkeley is a large, primarily residential research university with a majority of its enrolment in undergraduate programs but also offering a comprehensive doctoral program. The university has been accredited by the Western Association of Schools and Colleges Senior College and University Commission since 1949. The university operates on a semester calendar and awarded 8,725 bachelor's, 3,286 master's or professional and 1,272 doctoral degrees in 2018–2019. In 2021, Berkeley's funding for research and development exceeded \$1 billion.

There are 1,789 full-time and 886 part-time faculty members among the university's academic enterprise which is organized into fifteen colleges and schools that comprise 180 departments and 80 interdisciplinary units offering over 350 degree programs. Colleges serve both undergraduate and graduate students, while schools are generally graduate only, though some offer undergraduate majors or minors:

- College of Chemistry
- College of Computing, Data Science, and Society
- College of Engineering
- College of Environmental Design
- College of Letters and Science
- Goldman School of Public Policy
- Graduate School of Journalism
- Haas School of Business
- Rausser College of Natural Resources
- School of Information
- School of Education
- School of Law
- School of Public Health
- School of Social Welfare
- Wertheim School of Optometry
- UC Berkeley Extension (in downtown Berkeley and downtown San Francisco)



Wheeler Hall, home to Berkeley's largest lecture hall, was the location of a Nobel Prize conferral during WWII.



The interior of the Hearst Mining
Building, dedicated by Phoebe
Hearst in honor of her late husband,
George.

# **Undergraduate programs**

The four-year, full-time undergraduate program offers 107 bachelor's degrees across the Haas School of Business (1), College of Chemistry (5), College of Engineering (20), College of Environmental Design (4), College of Letters and Science (67), Rausser College of Natural Resources (10), and individual majors (2). [97] The most popular majors are electrical engineering and computer sciences, political science, molecular and cell biology, environmental science, and economics.



Doe Memorial Library

Requirements for undergraduate degrees are set by four authorities: the University of California system, the Berkeley campus, the

college or school, and the department. These requirements include an entry-level writing requirement before enrollment (typically fulfilled by minimum scores on standardized admissions exams such as the SAT or ACT), completing coursework on "American History and Institutions" before or after enrollment by taking an introductory class, passing an "American Cultures Breadth" class at Berkeley, as well as requirements for reading and composition and specific requirements declared by the department and school. [99]

### Graduate and professional programs

Berkeley has a "comprehensive" graduate program, with high coexistence with the programs offered to undergraduates, and offers interdisciplinary graduate programs with the medical schools at the University of California, San Francisco and Stanford University. The university offers Master of Arts, Master of Science, Master of Fine Arts, and PhD degrees in addition to professional degrees such as the Juris Doctor, Master of Business Administration, Master of Public Health, and Master of Design. [15][100] The university awarded 963 doctoral degrees and 3,531 master's degrees in 2017. [101] Admission to graduate programs is decentralized; applicants apply directly to the department or degree program. Most



Haas School of Business

graduate students are supported by fellowships, teaching assistantships, or research assistantships. [101]

# Library system

Berkeley's thirty-two libraries together contain more than 13 million volumes and cover over 12-acre (4.9-hectare) of land, forming the fourth largest collegiate library system in the nation. [102][103][104] Doe Library serves as the library system's reference, periodical, and administrative center, while most of the main collections reside in the subterranean Gardner Main Stacks and Moffitt Undergraduate Library. The Bancroft Library, which has over 400,000 printed volumes and 70 million manuscripts, pictures, and maps, maintains special collections that document the history of the western part of North America, with an emphasis on California, Mexico and



The on-campus <u>University of</u>
<u>California Museum of Paleontology</u>
hosts a life-size replica of a T-rex.

Central America. The Bancroft Library also houses the Mark Twain Papers, [105] the Oral History Center, [106] the Center for the Tebtunis Papyri and the University Archives. [108]

### Rankings

#### National

- The 2013 *Top American Research Universities* report by the Center for Measuring University Performance ranked Berkeley 8th overall, 5th in resources, faculty, and education, 9th in resources and education, and 1st in education. [117]
- For 2015 <u>Kiplinger</u> ranked Berkeley the 4th best-value public university in the nation for in-state students, and 6th for out-of-state students. [118]
- The *Money Magazine* Best Colleges ranking for 2015 ranked Berkeley 9th in the United States, based on educational quality, affordability and alumni earnings. [119]
- The 2018–19 <u>Center for World University Rankings</u> (CWUR) rated Berkeley the top public university in the nation and 4th overall based on quality of education, alumni employment, quality of faculty, publications, influence, and citations. [120]

Academic rankings					
National					
ARWU <sup>[109]</sup>	4				
Forbes <sup>[110]</sup>	2				
U.S. News & World Report <sup>[111]</sup>	15				
Washington Monthly <sup>[112]</sup>					
Global					
<u>ARWU<sup>[113]</sup></u>	5				
<b>QS</b> <sup>[114]</sup>	10				
<b>THE</b> <sup>[115]</sup>	8				
U.S. News & World Report [116]	4				

- For 2021, <u>QS</u> "World University Rankings: USA" placed Berkeley 4th among all US universities and 1st among publics. [121]
- In its 2022 list of <u>America's top colleges</u>, <u>Forbes</u> rated Berkeley the best public school and 2nd overall. [122]
- In the 2023–2024 <u>U.S. News & World Report</u> national university rankings, Berkeley was the top public school and 15th overall. [123]

#### Global

- In 2017, the <u>Nature Index</u> ranked the university the 9th largest contributor to papers published in 82 leading journals. [124][125]
- For 2020–21, the *Center for World University Rankings (CWUR)* ranked the university 12th in the world based on quality of education, alumni employment, quality of faculty, and research performance. [126]

### Past rankings

In his memoirs, Clark Kerr records Berkeley's rise in the rankings (according to the <u>National Academies</u>) during the 20th century. The school's first ranking in 1906 placed it among the top six schools ("Big Six") in the nation. In 1934, it ranked second, tied with <u>Columbia</u> and the <u>University of Chicago</u>, behind only <u>Harvard</u>; in 1957, it was ranked as the only school second to Harvard. In 1964, Berkeley was named the "best balanced distinguished university", meaning the school had not only the most top departments but also the highest percentage of top ranking departments in its school. The school in 1993 was the only remaining member of the original 1906 "Big Six", along with Harvard; in that year Berkeley ranked first. [127]

The American Council on Education, a private non-profit association, ranked Berkeley tenth in 1934. However, by 1942, private funding had helped Berkeley rise to second place, behind only Harvard, based on the number of distinguished departments. Since its inaugural 1990 reputational survey, *Times Higher Education* has considered Berkeley to be one of the world's "six super brands" along with the <u>University of Oxford and the University of Cambridge</u>, <u>Harvard University</u>, <u>MIT</u>, and <u>Stanford University</u>. Berkeley was the No. 1 recipient of <u>National Science Foundation</u> Graduate Research Fellowships between 2001 and 2010, with 1,333 awards.

The 2010 <u>United States National Research Council Rankings</u> identified Berkeley as having the highest number of top-ranked doctoral programs in the nation. Berkeley doctoral programs that received a #1 ranking included English, German, Political Science, Geography, Agricultural and Resource Economics, Mathematics, Physics, Chemistry, Biochemistry, Molecular Biology, Genetics, Genomics, Epidemiology, Plant Biology, Computer Science, Electrical Engineering, Mechanical Engineering, and Civil and Environmental Engineering. [133]

### **Admissions and enrollment**

For Fall 2022, Berkeley's total enrollment was 45,745: 32,831 undergraduate and 12,914 graduate students, with women accounting for 56% of undergraduates and 49% of graduate and professional students. It had 128,226 freshman applicants and accepted 14,614 (11.4%). Among enrolled freshman, the average unweighted GPA was 3.90. [135]

Berkeley's enrollment of <u>National Merit</u> <u>Scholars</u> was third in the nation until 2002, when participation in the National Merit program was discontinued. [136] For 2019, Berkeley ranked fourth in enrollment of

Undergraduate demographics as of Fall 2020

Race and ethnicity $^{[134]}$	Total				
Asian	35%				
White	22%				
Hispanic	19%				
Foreign national	13%				
Other <sup>[a]</sup>	9%				
Black	2%	I			
Economic diversity					
Low-income <sup>[b]</sup>	22%				
Affluent or middle class <sup>[c]</sup>	78%				

recipients of the National Merit \$2,500 Scholarship (132 scholars). [137][138] 27% of admitted students receive federal Pell grants. [139]

Berkeley students are eligible for a variety of public and private financial aid. Inquiries are processed through the Financial Aid and Scholarships Office, although schools such as the Haas School of Business $^{[140]}$  and Berkeley Law, $^{[141]}$  have their own financial aid offices.

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Applicants	128,226	109,597	88,076	87,398	89,621	85,057	82,571	78,923	73,794
Admits	14,614	15,852	15,448	14,676	13,308	14,552	14,429	13,332	13,338
Admit rate	11.4%	14.5%	17.5%	16.8%	14.8%	17.1%	17.5%	16.9%	18.1%
Enrolled	6,726	6,809	6,052	6,454	6,012	6,379	6,253	5,832	5,813
SAT (mid- 50%)	N/A*	N/A*	1300– 1520	1330– 1520	1300– 1530	1300– 1540	1930– 2290	1870– 2250	1840– 2230
ACT (average)	N/A*	N/A*	31	31	31	32	32	32	31
GPA (unweighted)	3.90	3.87	3.86	3.89	3.89	3.91	3.86	3.87	3.85

<sup>\*</sup> Berkeley began test-blind admissions in 2021.

### **Discoveries and innovation**

A number of significant inventions and discoveries have been made by Berkeley faculty members and researchers:<sup>[142]</sup>

#### **Natural sciences**

- Atomic bomb Physics professor J. Robert
   Oppenheimer was wartime director of Los Alamos
   National Laboratory and the Manhattan Project.
- Carbon 14 and photosynthesis Martin Kamen and Sam

  Ruben first discovered carbon 14 in 1940, and Nobel

  laureate Melvin Calvin and his colleagues used carbon 14 as a molecular tracer to reveal the carbon assimilation path in photosynthesis, known as Calvin cycle.

  [143]
- <u>Carcinogens</u> Identified chemicals that damage DNA. The <u>Ames test</u> was described in a series of papers in 1973 by <u>Bruce Ames</u> and his group at the university.
- Chemical elements Sixteen elements have been discovered at Berkeley (technetium, astatine, neptunium, plutonium, americium, curium, berkelium, californium, einsteinium, fermium, mendelevium, nobelium, lawrencium, rutherfordium, dubnium, and seaborgium). [144][145]
- Covalent bond Gilbert N. Lewis in 1916 described the sharing of electron pairs between atoms, and invented the Lewis notation to describe the mechanisms.
- CRISPR gene editing Nobel laureate Jennifer Doudna discovered a precise and inexpensive way for manipulating DNA in human cells. [146]
- Cyclotron Ernest O. Lawrence created a particle accelerator in 1934, and was awarded the Nobel Physics Prize in 1939. [147]
- Dark energy Saul Perlmutter and many others in the Supernova Cosmology Project discover the universe is expanding because of dark energy 1998.
- Flu vaccine Wendell M. Stanley and colleagues discovered the vaccine in the 1940s.
- Hydrogen bomb Edward Teller, the father of hydrogen bomb, was a professor at Berkeley and a researcher at the <u>Lawrence Livermore National Laboratory</u> and the <u>Los Alamos</u> National Laboratory.



Simplified evolution of  $\underline{\text{Unix}}$  systems and BSD forks

- Immunotherapy of cancer James P. Allison discovers and develops monoclonal antibody therapy that uses the immune system to combat cancer 1992–1995.
- Molecular clock Allan Wilson discovery in 1967.
- Neuroplasticity Marian Diamond discovers structural, biochemical, and synaptic changes in brain caused by environmental enrichment 1964
- Oncogene Peter Duesberg discovers first cancer causing gene in a virus 1970s.
- <u>Telomerase</u> <u>Elizabeth H. Blackburn, Carol Greider</u>, and <u>Jack Szostak</u> discover enzyme that promotes cell division and growth 1985.
- Vitamin E Gladys Anderson Emerson isolates Vitamin E in a pure form in 1952. [148]

### Computer and applied sciences

- Berkeley RISC <u>David Patterson</u> leads <u>ARPA</u>'s <u>VLSI project</u> of <u>microprocessor</u> design 1980–1984. [149]
- Berkeley UNIX/Berkeley Software Distribution (BSD) The Computer Systems Research Group was a research group at Berkeley that was dedicated to enhancing AT&T Unix operating system and funded by Defense Advanced Research Projects Agency. Bill Joy modified the code and released it in 1977 under the open source BSD license, starting an open-source revolution.
- Deep sea diving Joel Henry Hildebrand used helium with oxygen to mitigate decompression sickness. [150]
- <u>GIMP</u> In 1995, <u>Spencer Kimball</u> and <u>Peter Mattis</u> began developing GIMP as a semesterlong project at Berkeley.
- Polygraph invented by John Augustus Larson and a police officer from the Berkeley Police Department in 1921. [151]
- <u>Project Genie</u> <u>DARPA</u> funded project. It produced an early <u>time-sharing</u> system including the <u>Berkeley Timesharing System</u>, which was then commercialized as the <u>SDS 940</u>. Concepts from Project Genie influenced the development of the <u>TENEX</u> operating system for the <u>PDP-10</u>, and <u>Unix</u>, which inherited the concept of <u>process forking</u> from it. [152] Unix cocreator Ken Thompson worked on Project Genie while at Berkeley.
- <u>SPICE</u> <u>Donald O. Pederson</u> develops the Simulation Program with Integrated Circuit Emphasis (SPICE) 1972. [153]
- <u>Tcl programming language</u> developed by <u>John Ousterhout</u> in 1988. [154]
- Three-dimensional <u>Transistor</u> <u>Chenming Hu</u> won the 2014 <u>National Medal of Technology</u> for developing the "first 3-dimensional transistors, which radically advanced semiconductor technology". [155]
- Vi text editor Bill Joy created the first Vi editor in 1976. [156]
- Wetsuit Hugh Bradner invents first wetsuit 1952. [157]

# **Companies and entrepreneurship**

- Activision Blizzard, 1979 (as Activision), co-founder Alan Miller (BS) and Larry Kaplan (BA)
- AIG, 1919, founder Cornelius Vander Starr (Attended)
- Apple, 1976, co-founder Steve Wozniak (BS)
- Chernin Entertainment, 2009, founder Peter Chernin (BA)[158][159]
- Coursera, 2012, co-founder Andrew Ng (PhD)

- <u>Databricks</u>, 2013 founders <u>Ali Ghodsi</u> (PhD), <u>Matei Zaharia</u> (PhD), <u>Ion Stoica</u> (Professor), <u>Reynold Xin</u> (PhD), Andy Konwinski (PhD), Arsalan Tavakoli-Shiraji (PhD), and Patrick Wendell (PhD)
- eBay, 1995, founder Pierre Omidyar (Attended)<sup>[160][161]</sup>
- Gap Inc., 1969, co-founder Donald Fisher (BS)
- HTC Corporation, 1997, co-founder Cher Wang (BA)
- Intel, 1968, co-founders Gordon Moore (BS) and Andy Grove (PhD)
- Marvell Technology Group, 1995, co-founders Sehat Sutardja (MS, PhD) and Weili Dai (BA)
- Morgan Stanley, 1924 (as Dean Witter & Co.), co-founder Dean G. Witter (BA)
- Mozilla Corporation, 2005, co-founder Mitchell Baker (BA, JD)
- Myspace, 2003, co-founder Tom Anderson (BA)
- Renaissance Technologies, 1982, founder James Simons (PhD)
- Rotten Tomatoes, 1998, founders Senh Duong (BA), Patrick Y. Lee (BA) and Stephen Wang (BA)
- SanDisk, 1988, co-founder Sanjay Mehrotra (BS, MS)
- Softbank, 1981, founder Masayoshi Son (BA)
- Sun Microsystems, 1982, co-founder Bill Joy (MS)
- Tesla, 2003, co-founder Marc Tarpenning (BS)
- VMware, 1998, co-founders Diane Greene (MS) and Mendel Rosenblum (PhD)

# **Campus**

Much of the UC Berkeley campus, including the major landmarks, is in the city limits of Berkeley. A portion of the UC Berkeley property extends into Oakland. [162] The Berkeley campus encompasses approximately 1,232-acre (499-hectare), though the "central campus" occupies only the low-lying western 178-acre (72-hectare) of this area. Of the remaining acres, approximately 200-acre (81-hectare) are occupied by the Lawrence Berkeley National Laboratory; other facilities above the main campus include the Lawrence Hall of Science and several research units, notably the Space Sciences Laboratory, the Mathematical Sciences Research Institute, an 800-acre (320-hectare) ecological preserve, the University of California Botanical Garden and a recreation



Sather Gate, connecting Sproul Plaza to the inner campus, was a center of the Free Speech Movement.

center in Strawberry Canyon. Portions of the mostly undeveloped, eastern area of the campus are actually within the <u>City of Oakland</u>; these portions extend from the <u>Claremont Resort</u> north through the <u>Panoramic</u> Hill neighborhood to Tilden Park. [163]

To the west of the central campus is the <u>downtown business district of Berkeley</u>; to the northwest is the neighborhood of North Berkeley, including the so-called <u>Gourmet Ghetto</u>, a commercial district known for high quality dining due to the presence of such world-renowned restaurants as <u>Chez Panisse</u>. Immediately to the north is a quiet residential neighborhood known as <u>Northside</u> with a large graduate student population; <u>[164]</u> situated north of that are the upscale residential neighborhoods of the <u>Berkeley Hills</u>. Immediately southeast of campus lies fraternity row and beyond that the <u>Clark Kerr Campus</u> and an upscale residential area named <u>Claremont</u>. The <u>area south of the university</u> includes student housing and <u>Telegraph</u> Avenue, one of Berkeley's main shopping districts with stores, street vendors and restaurants catering to

college students and tourists. In addition, the university also owns land to the northwest of the main campus, a married student housing complex in the nearby town of Albany ("Albany Village" and the "Gill Tract"), and a field research station several miles to the north in Richmond, California.

The campus is home to several museums including the <u>University</u> of California Museum of Paleontology, the <u>Berkeley Art Museum</u> and Pacific Film Archive, and the <u>Lawrence Hall of Science</u>. The Museum of Paleontology, found in the lobby of the Valley Life Sciences Building, showcases a variety of dinosaur fossils including a complete cast of a Tyrannosaurus Rex. The campus also offers resources for innovation and entrepreneurship, such as the Big Ideas Competition, the Sutardja Center for Entrepreneurship and Technology, and the Berkeley Haas Innovation Lab. [165] The campus is also home to the <u>University of California Botanical Garden</u>, with more than 12,000 individual species. Outside of the Bay Area, the university also owns various research laboratories and research forests in both northern and southern Sierra Nevada.





Bancroft Library



The UC Botanical Garden, located in the Berkeley Hills and by the Lawrence Berkeley National Laboratory.

### **Architecture**

What is considered the historic campus today was the result of the 1898 "International Competition for the <u>Phoebe Hearst</u> Architectural Plan for the University of California", funded by William Randolph Hearst's mother and initially held in the Belgian city of <u>Antwerp</u>; eleven finalists were judged again in San Francisco in 1899. [166] The winner was Frenchman <u>Émile Bénard</u>, who refused to personally supervise the implementation of his plan and the task was subsequently given to architecture professor <u>John Galen Howard</u>. Howard designed over twenty buildings, which set the tone for the campus up until its expansion in the 1950s and 1960s.



South Hall (1873), one of the two original buildings of the University of California, still stands on the Berkeley campus.

The structures forming the "classical core" of the campus were built in the <u>Beaux-Arts</u> Classical style, and include <u>Hearst Greek Theatre</u>, <u>Hearst Memorial Mining Building</u>, <u>Doe Memorial Library</u>, California Hall, <u>Wheeler Hall</u>, Le Conte Hall, Gilman Hall, Haviland Hall, Wellman Hall, <u>Sather Gate</u>, and the <u>Sather Tower</u> (nicknamed "the Campanile" after its architectural inspiration, <u>St Mark's Campanile</u> in Venice), the tallest university clock tower in the United States. [167] Buildings he regarded as temporary and non-

academic were designed in shingle or <u>Collegiate Gothic</u> styles; examples of these are North Gate Hall, Dwinelle Annex, and Stephens Hall. Many of Howard's designs are recognized <u>California Historical</u> Landmarks<sup>[168]</sup> and are listed on the National Register of Historic Places.

Built in 1873 in a <u>Victorian Second-Empire-style</u>, South Hall, designed by David Farquharson, is the oldest university building in California. It, and the <u>Frederick Law Olmsted</u>-designed <u>Piedmont Avenue</u> east of the main campus, are two of the only surviving examples of the nineteenth-century campus. Other notable architects and firms whose work can be found in the campus and surrounding area are <u>Bernard Maybeck<sup>[169]</sup></u> (Faculty Club); <u>Julia Morgan</u> (Hearst Women's Gymnasium and <u>Julia Morgan Hall</u>); <u>William Wurster</u> (Stern Hall); Moore Ruble Yudell (Haas School of Business); <u>Tod Williams Billie Tsien Architects</u> (C.V. Starr East Asian Library), and <u>Diller Scofidio + Renfro</u> (Berkeley Art Museum and Pacific Film Archive).

### **Natural features**

Flowing into the main campus are two branches of <u>Strawberry Creek</u>. The south fork enters a culvert upstream of the recreational complex at the mouth of Strawberry Canyon and passes beneath <u>California Memorial Stadium</u> before appearing again in Faculty Glade. It then runs through the center of the campus before disappearing underground at the west end of campus. The north fork appears just east of <u>University House</u> and runs through the glade north of the Valley Life Sciences Building, the original site of the Campus Arboretum.

Trees in the area date from the founding of the university. The campus features numerous wooded areas, including: <u>Founders' Rock</u>, Faculty Glade, Grinnell Natural Area, and the <u>Eucalyptus</u> Grove, which is both the tallest stand of such trees in the world and the tallest stand of hardwood trees in North America. [170] The campus sits on the <u>Hayward Fault</u>, which runs directly through California Memorial Stadium.



The south fork of <u>Strawberry Creek</u>, as seen between Dwinelle Hall and Lower Sproul Plaza.

# Student life and traditions

The official university mascot is <u>Oski the Bear</u>, who debuted in 1941. Previously, live bear cubs were used as mascots at Memorial Stadium until it was decided in 1940 that a costumed mascot would be a better alternative. Named after the <u>Oski-wow-wow</u> yell, he is cared for by the Oski Committee, whose members have exclusive knowledge of the identity of the costume-wearer. The <u>University of California Marching Band</u>, which has served the university since 1891, performs at every home football game and at select road games as well. A smaller subset of the Cal Band, the Straw Hat Band, performs at basketball games, volleyball games, and other campus and community events. [173]

The UC Rally Committee, formed in 1901, is the official guardian of California's Spirit and Traditions. Wearing their traditional blue and gold rugbies, Rally Committee members can be seen at all major sporting and spirit events. Committee members are charged with the maintenance of the six Cal flags, the large

California banner overhanging the Memorial Stadium Student Section and <u>Haas Pavilion</u>, the California Victory Cannon, Card Stunts and <u>The Big "C"</u> among other duties. The Rally Committee is also responsible for safekeeping of the <u>Stanford Axe</u> when it is in Cal's possession. [174]

Overlooking the main Berkeley campus from the foothills in the east, The Big "C" is an important symbol of California school spirit. The Big "C" has its roots in an early 20th-century campus event called "Rush", which pitted the freshman and sophomore classes against each other in a race up Charter Hill that often developed into a wrestling match. It was eventually decided to discontinue Rush and, in 1905, the freshman and sophomore classes banded together in a show of unity to build "the Big C".[175]

Cal students invented the college football tradition of <u>card stunts</u>. Then known as Bleacher Stunts, they were first performed during the 1910 <u>Big Game</u> and consisted of two stunts: a picture of the Stanford Axe and a large blue "C" on a white background. The tradition is continued today by the Rally Committee in the Cal student section and incorporates complicated motions, for example



Fans atop <u>Tightwad Hill</u> watch the <u>Cal Band</u>, with views of the <u>stadium</u> and the San Francisco Bay.

tracing the Cal script logo on a blue background with an imaginary yellow pen. [176]

The California Victory Cannon, placed on <u>Tightwad Hill</u> overlooking the stadium, is fired before every football home game, after every score, and after every Cal victory. First used in the 1963 Big Game, it was originally placed on the sidelines before moving to Tightwad Hill in 1971. The only time the cannon ran out of ammunition was during a game against <u>Pacific</u> in 1991, when Cal scored 12 touchdowns. [177] The Cal Mic Men, a standard at home football games, has recently expanded to involve basketball and volleyball. The traditional role comes from students holding megaphones and yelling, but now includes microphones, a dedicated platform during games, and the direction of the entire student section. [178]

# **Student housing**

Berkeley students are offered a variety of housing options, including university-owned or affiliated residences, private residences, fraternities and sororities, and cooperative housing (co-ops). Berkeley students, and those of other local schools, have the option of living in one of the twenty cooperative houses participating in the Berkeley Student Cooperative (BSC), a <u>nonprofit</u> <u>housing cooperative</u> network consisting of 20 residences and 1250 member-owners. [179]

### Fraternities and sororities

About three percent of undergraduate men and nine percent of undergraduate women—or 3,400 of total undergraduates—are active in Berkeley's Greek system. [180] University-sanctioned fraternities and sororities comprise over 60 houses affiliated with four Greek councils. [181][182]

### **Student-run organizations**

### **Associated Students of the University of California (ASUC)**

The <u>Associated Students of the University of California</u> (ASUC) is the official <u>student association</u> that controls funding for student groups and organizes on-campus student events. The two main political parties are "Student Action" and "CalSERVE". [184] The organization was founded in 1887 and has an annual operating budget of \$1.7 million (excluding the budget of the Graduate Assembly of the ASUC), in addition to various investment assets. Its alumni include multiple State Senators, Assemblymembers, and White House Administration officials. [185]



Wellness Room sleep pods: part of a program created by the ASUC, UC Berkeley's official student association.

### Media and publications

Berkeley's student-run online television station, <u>CalTV</u>, was formed in 2005 and broadcasts online. It is run by students with a variety of backgrounds and majors. Since the mid-2010s, it has been a program of the <u>ASUC</u>. Berkeley's independent student-run newspaper is <u>The Daily Californian</u>. Founded in 1871, <u>The Daily Cal</u> became independent in 1971 after the campus administration fired three senior editors for encouraging readers to take back <u>People's Park</u>. The Daily Californian has both a print and online edition. Berkeley's FM <u>Student radio station</u>, <u>KALX</u>, broadcasts on 90.7 MHz. It is run largely by volunteers, including both students and community members. Berkeley also features an assortment of student-run publications:

- California Law Review, law journal published by Berkeley Law, est. 1912.
- Berkeley Poetry Review, national poetry journal, est. 1974.
- Berkeley Fiction Review, American literary magazine, est. 1981.
- Heuristic Squelch, satirical newspaper, est. 1991.
- California Patriot, conservative political magazine, est. 2000.
- Berkeley Political Review, nonpartisan political magazine, est. 2001.
- Caliber Magazine, an "everything magazine", featuring articles and blogs on a wide range of topics, est. 2008.
- *B-Side*, music magazine, est. 2013.
- *Smart Ass*, liberal magazine, est. 2015.
- Berkeley Economic Review, economics journal, est. 2016.
- Business Berkeley, Haas undergraduate journal.

#### Student groups

There are ninety-four political student groups on campus, including MEChXA de UC Berkeley, Berkeley ACLU, Berkeley Students for Life, Campus Greens, The Sustainability Team (STEAM), the Berkeley Student Food Collective, Students for Sensible Drug Policy, Cal Berkeley Democrats, and the Berkeley

College Republicans. [187] The Residence Hall Assembly (RHA) is the student-led umbrella organization that oversees event planning, legislation, sponsorships and other activities for over 7,2000 oncampus undergraduate residents. [188]

Berkeley students also run a number of consulting groups, including the Berkeley Group, founded in 2003 and affiliated with the Haas School. Students from various concentrations are recruited and trained to work on pro-bono consulting engagements with actual nonprofit clients. Berkeley Consulting, founded in 1996, has served over 140 companies across the high-tech, retail, banking, and non-profit sectors. [190]

ImagiCal<sup>[191]</sup> has been the college chapter of the American Advertising Federation at Berkeley since the late 1980s. The team competes annually in the National Student Advertising Competition, with students from disparate majors working together on a marketing case underwritten by a corporate sponsor. The Berkeley Forum is a nonpartisan student organization that hosts panels, debates, and speeches across a variety of fields. Past speakers include Senator Rand Paul, entrepreneur and venture capitalist Peter Thiel, and Khan Academy founder Salman Khan.

Democratic Education at Cal, or DeCal, is a program that promotes the creation of professor-sponsored, student-facilitated classes. DeCal arose out of the 1960s Free Speech movement and was officially established in 1981. The program offers around 150 courses on a vast range of subjects that appeal to the student community, including classes on the Rubik's Cube, blockchain, web design, metamodernism, cooking, Jewish art, 3D animation, and bioprinting. [194]

The campus is home to several <u>a cappella</u> groups, including Drawn to Scale, Artists in Resonance, Berkeley Dil Se, the UC Men's





Zellerbach Hall, home of the Cal Performances theater group



UC Berkeley Symphony Orchestra

Octet, the California Golden Overtones, DeCadence, and Noteworthy. The University of California Men's Octet was founded in 1948. Since 1967, students and staff jazz musicians have had an opportunity to perform and study with the University of California Jazz Ensembles. For several decades it hosted the Pacific Coast Collegiate Jazz Festival, part of the American Collegiate Jazz Festival, a competitive forum for student musicians. PCCJF brought jazz artists including Hubert Laws, Sonny Rollins, Freddie Hubbard, and Ed Shaughnessy to the Berkeley campus as performers. Berkeley also hosts other performing arts groups in comedy, dance, acting and instrumental music.

#### **Engineering Student Teams**

Given UC Berkeley's <u>STEM</u> education and its proximity to Silicon Valley, there are a variety of student-run engineering teams that focus on winning design and engineering competitions. Berkeley has two prominent <u>amateur rocketry</u> teams: Space Enterprise at Berkeley (SEB)[195] and Space Technologies and Rocketry (STAR).[196] Both have launched solid-fuel <u>sounding rockets</u> and are currently developing <u>liquid propellant</u>

rockets. The university also has two <u>Formula SAE</u> teams: Berkeley Formula Racing<sup>[197]</sup> and Formula Electric Berkeley. Both of these teams participate in Formula SAE–run competitions, with the former focusing on internal combustion engines and the latter on electric motors. Berkeley has a number of other vehicle teams, including CalSol, CalSMV, CalSMV, and Human Powered Vehicle.

### **Athletics**

The university's athletic teams are known as the <u>California Golden</u> <u>Bears</u>, often shortened to "Cal Bears" or just "Cal", and were historically members of the <u>NCAA Division I Pac-12 Conference</u> (Pac-12). Cal is also a member of the <u>Mountain Pacific Sports Federation</u> in several sports not sponsored by the Pac-12 and the <u>America East Conference</u> in women's <u>field hockey</u>. In 2024, Cal joined the <u>Atlantic Coast Conference</u> (ACC). The first school colors, established in 1873 by a committee of students, were <u>Yale Blue</u> and gold. Yale Blue was originally chosen because many of the university's inaugural faculty were Yale graduates, including Henry Durant, its first president. Blue and gold were specified and made the official colors of the university and the state colors of California in 1955. [203][205] In 2014, the athletic department specified a darker blue.

The California Golden Bears have won national titles in football, men's basketball, baseball, softball, men's and women's crew, men's gymnastics, men's tennis, men's and women's swimming, men's water polo, men's Judo, men's track, and men's rugby. In addition, Cal athletes have won individual NCAA titles in track, gymnastics, swimming and tennis. Berkeley teams have won national



The base of the <u>California Memorial</u> Stadium



The interior of <u>Haas Pavilion</u> during a Cal Basketball game.

championships in baseball (2), men's basketball (2), men's crew (15), women's crew (3), football (5), men's golf (1), men's gymnastics (4), men's lacrosse (1), men's rugby (26), softball (1), men's swimming & diving (4), women's swimming & diving (3), men's tennis (1), men's track & field (1), and men's water polo (13).

Cal students and alumni have also won 207 Olympic medals. [208] California finished in first place [209] in the 2007–08 Fall U.S. Sports Academy Directors' Cup standings (Now the NACDA Directors' Cup), a competition measuring the best overall collegiate athletic programs in the country, with points awarded for national finishes in NCAA sports. Cal finished the 2007–08 competition in seventh place with 1119 points. [210] Most recently, California finished in third place in the 2010–11 NACDA Directors' Cup with 1219.50 points, finishing behind Stanford and Ohio State. This is California's highest ever finish in the Director's Cup. [211] The Golden Bears' traditional arch-rival is the Stanford Cardinal, and the most anticipated sporting event between the two universities is the annual football match dubbed the Big Game,

celebrated with spirit events on both campuses. Since 1933, the winner of the Big Game has been awarded custody of the Stanford Axe. Other sporting games between these rivals have related names such as the Big Splash (water polo) or the Big Kick (soccer). [212]

# Notable alumni, faculty, and staff



Earl Warren, BA 1912, LLB 1914, 14th Chief Justice of the United States, 30th Governor of California



Steven Chu, PhD
1976, Nobel
laureate, 12th
United States
Secretary of
Energy



Jennifer Granholm, BA 1984, 16th United States Secretary of Energy, 47th Governor of Michigan



Zulfikar Ali Bhutto, BA 1950, [213] 4th President of Pakistan, 9th Prime Minister of Pakistan



Robert Reich,
Professor of
Public Policy,
22nd United
States Secretary
of Labor



Christina Romer,
Professor of
Economics, 25th
Chairperson of
the President's
Council of
Economic
Advisers



Steve Wozniak, BS 1986, cofounder of Apple Inc.



Gordon Moore, BS 1950, cofounder of semiconductor company Intel



Eric Schmidt, MS 1979, PhD 1982, Executive Chairman of Alphabet



Edmund Gerald "Jerry" Brown Jr., BA 1961, 34th & 39th Governor of California



Blake R. Van Leer, MS 1920, inventor, civil rights advocate, president of Georgia Tech



Gregory Peck, BA 1939, Academy Award winning actor



Natalie Coughlin, BA 2005, multiple gold medalwinning Olympic swimmer



Pedro Nel Ospina
Vázquez, BA
1878, President
of Colombia
1922–1926



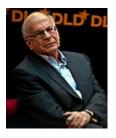
Haakon, Crown Prince of Norway, heir apparent to the throne of Norway, BA 1999<sup>[214]</sup>



Robert
McNamara, BA
1937, 5th
President of
World Bank, 8th
United States
Secretary of
Defense,
President of Ford
Motor Company



Ed Meese, LL.B. 1958, 75th United States Attorney General



Daniel
Kahneman, PhD
1961, awarded
the 2002 Nobel
Memorial Prize in
Economics for
his work in
Prospect theory



Harold Urey, PhD 1923, Nobel laureate and discoverer of deuterium

# Faculty and staff

- Shiing-Shen Chern, a leading geometer of the 20th century, co-founded the renowned <u>Mathematical</u>
   Sciences Research Institute and served as its founding Director until 1984. [215][53]
- Physicist J. Robert Oppenheimer was scientific director of the Manhattan Project and was the founder of the Berkeley Center for Theoretical Physics. [216]
- Faculty member <u>Edward Teller</u> was (together with <u>Stanislaw Ulam</u>) the "father of the <u>hydrogen bomb</u>", who laid important foundations for the establishment of <u>Space</u> <u>Sciences Laboratory</u> at Berkeley.
- Ernest Lawrence, a Nobel laureate in physics who invented the <u>cyclotron</u> at Berkeley, and founded the Radiation Laboratory on campus, which later became the <u>Lawrence Berkeley National Laboratory</u>.
- Gilbert N. Lewis, former Dean of the College of Chemistry, was nominated 41 times for Nobel Prize in



University of California Radiation
Laboratory staff on the magnet yoke
for the 60-inch cyclotron, 1938;
Nobel prizewinners <u>Ernest Lawrence</u>,
<u>Edwin McMillan</u>, and <u>Luis Alvarez</u>
are shown, in addition to <u>J. Robert</u>
Oppenheimer and Robert R. Wilson.

<u>Chemistry</u>. [219][220] He mentored and influenced numerous Berkeley Nobel laureates, including <u>Harold Urey</u> (1934 Nobel Prize), <u>William F. Giauque</u> (1949 Nobel Prize), <u>Glenn T. Seaborg</u> (1951 Nobel Prize), <u>Willard Libby</u> (1960 Nobel Prize), and <u>Melvin Calvin</u> (1961 Nobel Prize). [221][222]

- Glenn T. Seaborg, a Nobel laureate in chemistry who discovered or co-discovered ten chemical elements at Berkeley and served as Chancellor from 1958 to 1961. [223][224]
- Hans Albert Einstein, the first son of Albert Einstein and a world's leading scholar in hydraulic engineering, was a long-time faculty member at Berkeley. [225]
- Steven Chu (PhD 1976), the 12th <u>United States Secretary of Energy</u> and Nobel laureate in physics, was Director of Berkeley Lab from 2004 to 2009.
- Janet Yellen, 78th <u>United States Secretary of Treasury</u> and the 15th <u>Chair of the Federal</u> <u>Reserve</u>, is a professor emeritus at Berkeley <u>Haas School of Business</u> and the Department of Economics. [226][227]

### Alumni

#### Government

Berkeley alumni have served in a range of prominent government offices, both domestic and foreign, including Chief Justice of the United States Supreme Court (Earl Warren, BA, JD); United States Attorney General (Edwin Meese III, JD); United States Secretary of State (Dean Rusk, LLB); United States Secretary of the Treasury (W. Michael Blumenthal, BA, and G. William Miller, JD); United States Secretary of Defense (Robert McNamara, BS); United States Secretary of the Interior (Franklin Knight Lane, 1887); United States Secretary of Transportation and United States Secretary of Commerce (Norman Mineta, BS); United States Secretary of Agriculture (Ann Veneman, MPP); National Security Advisor (Robert C. O'Brien, JD); scores of federal judges and members of the United States Congress (10 currently serving) and United States Foreign Service; governors of California (George C. Pardee; Hiram W. Johnson; Earl Warren, BA and LLB; Jerry Brown, BA; and Pete Wilson, JD), Michigan (Jennifer Granholm, BA), and the United States Virgin Islands (Walter A. Gordon, BA); Chief of Staff of the United States Army (Frederick C. Weyand, Class of 1938); Lieutenant General of the United States Army (Jimmy Doolittle); Vice Admiral of the United States Navy (Murry L. Royar, Class of 1916); Major General of the United States Marine Corps (Oliver Prince Smith); Brigadier General of the United States Marine Corps (Bertram A. Bone); Director of the Central Intelligence Agency and Chairman of the Atomic Energy Commission (John A. McCone, BS); chair and members of the Council of Economic Advisers (Michael Boskin, BA, PhD.; Sandra Black, BA; Jesse Rothstein, PhD; Robert Seamans, PhD; Jay Shambaugh, PhD; James Stock, MA, PhD); Governor of the Federal Reserve System (H. Robert Heller, PhD) and President and CEO of the Federal Reserve Bank of New York (William C. Dudley, PhD); Commissioners of the SEC (Troy A. Paredes, BA) and the FCC (Rachelle Chong, BA); and United States Surgeon General (Kenneth P. Moritsugu, MPH).

Foreign alumni include the <u>President of Colombia</u> 1922–1926, (<u>Pedro Nel Ospina Vázquez</u>, BA, Mining Engineering); the <u>President of Mexico</u> (<u>Francisco I. Madero</u>, attended 1892–93); the <u>President and Prime Minister of Pakistan</u>; the <u>Premier of the Republic of China (Sun Fo</u>, BA); the <u>President of Costa Rica (Miguel Angel Rodriguez</u>, MA, PhD); and members of parliament of the United Kingdom (<u>House of Lords</u>, <u>Lydia Dunn</u>, <u>Baroness Dunn</u>, BS), India (<u>Rajya Sabha</u>, the upper house, <u>Prithviraj Chavan</u>, MS); Iran (<u>Mohammad Javad Larijani</u>, PhD); Nigerian Minister of Science and Technology and first Executive Governor of Abia State (Ogbonnaya Onu, PhD Chemical Engineering); Barbados' Ambassador to Brazil

(Tonika Sealy-Thompson). Alumni have also served in many supranational posts, notable among which are President of the World Bank (Robert McNamara, BS); Deputy Prime Minister of Spain and managing director of the International Monetary Fund (Rodrigo Rato, MBA); executive director of UNICEF (Ann Veneman, MPP); member of the European Parliament (Bruno Megret, MS); and judge of the World Court (Joan Donoghue, JD).

### Science

Alumni have made important contributions to science. Some have concentrated their studies on the very small universe of atoms and molecules. Nobel laureate William F. Giauque (BS 1920, PhD 1922) investigated chemical thermodynamics, Nobel laureate Willard Libby (BS 1931, PhD 1933) pioneered radiocarbon dating, Nobel laureate Willis Lamb (BS 1934, PhD 1938) examined the hydrogen spectrum, Nobel laureate Hamilton O. Smith (BA 1952) applied restriction enzymes to molecular genetics, Nobel laureate Robert Laughlin (BA math 1972) explored the fractional quantum Hall effect, and Nobel laureate Andrew Fire (BA math 1978) helped to discover RNA interference-gene silencing by double-stranded RNA. Nobel laureate Glenn T. Seaborg (PhD 1937) collaborated with Albert Ghiorso (BS 1913) to discover 12 chemical elements, such as americium, berkelium, and californium. David Bohm (PhD 1943) discovered Bohm diffusion. Nobel laureate Yuan T. Lee (PhD 1965) developed the crossed molecular beam technique for studying chemical reactions. Carol Greider (PhD 1987), professor of molecular biology and genetics at Johns Hopkins University School of Medicine, was awarded the 2009 Nobel Prize in medicine for discovering a key mechanism in the genetic operations of cells, an insight that has inspired new lines of research into cancer. Harvey Itano (BS 1942) conducted breakthrough work on sickle cell anemia that marked the first time a disease was linked to a molecular origin. [228] While he was valedictorian of Berkeley's class of 1942, he was unable to attend commencement exercises due to internment. [228]

Narendra Karmarkar (PhD 1983) is known for the interior point method, a polynomial algorithm for linear programming known as Karmarkar's algorithm. [229] National Medal of Science laureate Chien-Shiung Wu (PhD 1940), often known as the "Chinese Madame Curie", disproved the Law of Conservation of Parity for which she was awarded the inaugural Wolf Prize in Physics. [230] Kary Mullis (PhD 1973) was awarded the 1993 Nobel Prize in Chemistry for his role in developing the polymerase chain reaction, [231] a method for amplifying DNA sequences. Olga Hartman (Master's 1933, PhD 1936) was a zoologist who described hundreds of species of polychaete worms. [232][233][234] Daniel Kahneman was awarded the 2002 Nobel Memorial Prize in Economics for his work in Prospect theory. Richard O. Buckius, engineer, Bachelor's in Mechanical Engineering '72, Masters '73, PhD '75, currently Chief Operating Officer of the National Science Foundation. Edward P. Tryon (PhD 1967) is the physicist who first said our universe originated from a quantum fluctuation of the vacuum. [235][236][237] John N. Bahcall (BS 1956) worked on the Standard Solar Model and the Hubble Space Telescope, [238] resulting in a National Medal of Science. [238] Peter Smith (BS 1969) was the principal investigator and project leader for the NASA robotic explorer *Phoenix*, [239] which physically confirmed the presence of water on the planet Mars for the first time. [240] Astronauts James van Hoften (BS 1966), Margaret Rhea Seddon (BA 1970), Leroy Chiao (BS 1983), and Rex Walheim (BS 1984) have orbited the Earth in NASA's fleet of Space Shuttles.

#### **Business**

Undergraduate alumni have founded or cofounded such companies as <u>Apple Computer</u>, <u>Intel</u>, <u>Intel</u>, <u>Intel</u>, <u>ISI</u> <u>Logic</u>, <u>Intel</u>, <u>Int</u>

Panisse, [249] GrandCentral (known now as Google Voice), [250] HTC Corporation, [251] VIA Technologies, [251] Marvell Technology Group, [252] MoveOn.org, [247] Opsware, [253] RedOctane, [254] Rimon Law P.C., [255] SanDisk, [256] Scharffen Berger Chocolate Maker, [257] VMware and Zilog, [259] while graduate school alumni have cofounded companies such as DHL, [260] KeyHole Inc (known now as Google Earth), [261] Sun Microsystems, [262] and The Learning Company. [263] Berkeley alumni have also led various technology companies such as Electronic Arts, [264] Google, [265] Adobe Systems, Softbank (Masayoshi Son) and Qualcomm. [266]

### Computers

Berkeley alumni have developed a number of key technologies associated with the personal computer and the Internet. [267] Unix was created by alumnus Ken Thompson (BS 1965, MS 1966) along with colleague Dennis Ritchie. Alumni such as L. Peter Deutsch [268][269][270] (PhD 1973), Butler Lampson (PhD 1967), and Charles P. Thacker (BS 1967) worked with Ken Thompson on Project Genie and then formed the ill-fated US Department of Defense-funded Berkeley Computer Corporation (BCC), which was scattered throughout the Berkeley campus in non-descript offices to avoid anti-war protestors. [272] After BCC failed, Deutsch, Lampson, and Thacker joined Xerox PARC, where they developed a number of pioneering computer technologies, culminating in the Xerox Alto that inspired the Apple Macintosh. In particular, the Alto used a computer mouse, which had been invented by Doug Engelbart (BEng 1952, PhD 1955). Thompson, Lampson, Engelbart, and Thacker [273] all later received a Turing Award. Also at Xerox PARC was Ronald Schmidt (BS 1966, MS 1968, PhD 1971), who became known as "the man who brought Ethernet to the masses". [274] Another Xerox PARC researcher, Charles Simonyi (BS 1972), pioneered the first WYSIWIG word processor program and was recruited personally by Bill Gates to join the fledgling company known as Microsoft to create Microsoft Word. Simonyi later became the first repeat space tourist, blasting off on Russian Soyuz rockets to work at the International Space Station orbiting the Earth.

In 1977, a graduate student in the computer science department named Bill Joy (MS 1982) assembled the original Berkeley Software Distribution, commonly known as BSD Unix. Joy, who went on to cofound Sun Microsystems, also developed the original version of the terminal console editor vi, while Ken Arnold (BA 1985) created Curses, a terminal control library for Unix-like systems that enables the construction of text user interface (TUI) applications. Working alongside Joy at Berkeley were undergraduates William Jolitz (BS 1997) and his future wife Lynne Jolitz (BA 1989), who together created 386BSD, a version of BSD Unix that runs on Intel CPUs and evolved into the BSD family of free operating systems and the Darwin operating system underlying Apple Mac OS X. [276] Eric Allman (BS 1977, MS 1980) created SendMail, a Unix mail transfer agent that delivers about 12 percent of the email in the world. [277]

The XCF, an undergraduate research group located in Soda Hall, has been responsible for a number of notable software projects, including GTK+ (created by Peter Mattis, BS 1997), The GIMP (Spencer Kimball, BS 1996), and the initial diagnosis of the Morris worm. [278] In 1992, Pei-Yuan Wei, [279] an undergraduate at the XCF, created ViolaWWW, one of the first graphical web browsers. ViolaWWW was the first browser to have embedded scriptable objects, stylesheets, and tables. In the spirit of Open Source, he donated the code to Sun Microsystems, inspiring Java applets. ViolaWWW also inspired researchers at the National Center for Supercomputing Applications to create the Mosaic web browser, [280] a pioneering web browser that became Microsoft Internet Explorer.

### **Pulitzer Prize winners**

Alumni collectively have won at least twenty-five Pulitzer Prizes. Pulitzer Prize—winning journalist Marguerite Higgins (BA 1941) was a pioneering female war correspondent who covered World War II, the Korean War, and the Vietnam War. Novelist Robert Penn Warren (MA 1927) won three Pulitzer Prizes, novel Margin including one for his novel All the King's Men, which was later made into an Academy Award-winning movie. Pulitzer Prize—winning cartoonist Rube Goldberg (BS 1904) invented the comically complex—yet ultimately trivial—contraptions known as Rube Goldberg machines. Journalist Alexandra Berzon (MA 2006) won a Pulitzer Prize in 2009, and journalist Matt Richtel (BA 1989), who also coauthors the comic strip Rudy Park under the pen name of "Theron Heir", won the 2010 Pulitzer Prize for National Reporting. Pulitzer Prize—winning historian Leon Litwack (BA [289] 1951, PhD 1958) taught as a professor at UC Berkeley for 43 years; three other UC Berkeley professors have also received the Pulitzer Prize. Alumna and professor Susan Rasky won the Polk Award for journalism in 1991. USC Professor and Berkeley alumnus Viet Thanh Nguyen's (PhD 1997) first novel The Sympathizer won the 2016 Pulitzer Prize for Fiction.

### Fiction and screenwriters

Alumni have also written novels and screenplays that have attracted Oscar-caliber talent, including *The Call of the Wild* author Jack London. Irving Stone (BA 1923) wrote the novel *Lust for Life*, which was later made into an Academy Award-winning film of the same name starring Kirk Douglas as Vincent van Gogh. Stone also wrote *The Agony and the Ecstasy*, which was later made into a film of the same name starring Oscar winner Charlton Heston as Michelangelo. Mona Simpson (BA 1979) wrote the novel *Anywhere But Here*, which was later made into a film of the same name starring Oscar-winning actress Susan Sarandon. Terry McMillan (BA 1986) wrote *How Stella Got Her Groove Back*, which was later made into a film of the same name starring Oscar-nominated actress Angela Bassett. Randi Mayem Singer (BA 1979) wrote the screenplay for *Mrs. Doubtfire*, which starred Oscar-winning actor Robin Williams and Oscar-winning actress Sally Field. Audrey Wells (BA 1981) wrote the screenplay *The Truth About Cats & Dogs*, which starred Oscar-nominated actress Uma Thurman. James Schamus (BA 1982, MA 1987, PhD 2003) has collaborated on screenplays with Oscar-winning director Ang Lee on the Academy Award-winning movies *Crouching Tiger*, *Hidden Dragon* and *Brokeback Mountain*.

#### **Academy Award winners**

Collectively, alumni have won at least twenty <u>Academy Awards</u>. <u>Gregory Peck</u> (BA 1939), nominated for four Oscars during his career, won an Oscar for acting in <u>To Kill a Mockingbird</u>. <u>Chris Innis</u> (BA 1991) won the 2010 Oscar for film editing for her work on best picture winner, <u>The Hurt Locker</u>. <u>Walter Plunkett</u> (BA 1923) won an Oscar for costume design (for <u>An American in Paris</u>). <u>Freida Lee Mock</u> (BA 1961) and <u>Charles H. Ferguson</u> (BA 1978) have each <u>[292][293]</u> won an Oscar for documentary filmmaking. Mark Berger (BA 1964) has won four Oscars for sound mixing and is an adjunct professor at UC Berkeley. <u>[294]</u> <u>Edith Head</u> (BA 1918), who was nominated for 34 Oscars during her career, won eight Oscars for costume design. <u>Joe Letteri</u> (BA 1981 <u>[295]</u>) has won four Oscars for Best Visual Effects in the <u>James Cameron</u> film <u>Avatar</u> and the Peter Jackson films <u>King Kong</u>, <u>The Two Towers</u>, and <u>The Return of the King</u>.

#### **Emmy Award winners**

Alumni have collectively won at least twenty-five Emmy Awards: Jon Else (BA 1968) for cinematography; Andrew Schneider (BA 1973) for screenwriting; Linda Schacht (BA 1966, MA 1981), two for broadcast journalism; [297][298] Christine Chen (dual BA's 1990), two for broadcast journalism; [299] Kristen Sze (BA),

two for broadcast journalism; [300] <u>Kathy Baker</u> (BA 1977), three for acting; Ken Milnes (BS 1977), four for broadcasting technology; and <u>Leroy Sievers</u> (BA), [301] twelve for production. <u>Elisabeth Leamy</u> is the recipient of thirteen Emmy awards.

#### Television

Alumni have acted in classic television series that are still broadcast on TV today. <u>Karen Grassle</u> (BA 1965) played <u>Caroline Ingalls</u> in <u>Little House on the Prairie</u>, <u>Jerry Mathers</u> (BA 1974) starred in <u>Leave it to</u> *Beaver*, and Roxann Dawson (BA 1980) portrayed B'Elanna Torres on *Star Trek: Voyager*.

### **Music and entertainment**

Former undergraduates have participated in the contemporary music industry, such as <u>Grateful Dead</u> bass guitarist <u>Phil Lesh</u>, the <u>Police</u> drummer <u>Stewart Copeland</u>, <u>Rolling Stone Magazine</u> founder <u>Jann Wenner</u>, the <u>Bangles</u> lead singer <u>Susanna Hoffs</u> (BA 1980), <u>Counting Crows</u> lead singer <u>Adam Duritz</u>, electronic music producer <u>Giraffage</u>, <u>MTV</u> correspondent <u>Suchin Pak</u> (BA 1997), <u>AFI</u> musicians <u>Davey Havok</u> and <u>Jade Puget</u> (BA 1996), and solo artist <u>Marié Digby</u> ("Say It Again"). <u>People Magazine</u> included <u>Third Eye Blind</u> lead singer and songwriter <u>Stephan Jenkins</u> (BA 1987) in the magazine's list of 50 Most Beautiful People. <u>[307]</u>

Kendall Ross Bean became a master piano rebuilder and concert pianist, Bean first performed on a piano he rebuilt in one of the first classical music videos to be broadcast across the United States on the A&E Network which in 1985 had 18 million cable viewers. This broadcast coincided with MTV emerging as a medium for record production companies to use music videos to promote the albums of Rock and Pop stars. The novelty of a classical music video featuring a solo pianist and the inside view of piano hammers hitting strings, contrasted to the high production rock music videos caught media attention from coast to coast. The video was titled: Kendall Ross Bean: Chopin Polonaise in A Flat. Karen Earle Lile, niece of Tony Terran became the Art Director/Executive Producer for the USPS Building Bridges Special Postal Cancellation Series and a Talk Show host for Sail Sport Talk on Sports Byline USA, a record producer [308][309] at Fantasy Studios and the historian who discovered the provenance of the Lost Lennon piano, afterwards known as the Lennon-Ono-Green-Warhol piano.

### **Sports**

Alumni have also participated in the world of sports. Tennis athlete Helen Wills Moody (BA 1925) won 31 Grand Slam titles, including eight singles titles at Wimbledon. Tarik Glenn (BA 1999) is a Super Bowl XLI champion. Michele Tafoya (BA 1988) is a sports television reporter for ABC Sports and ESPN. Sports agent Leigh Steinberg (BA 1970, JD 1973) has represented professional athletes such as Steve Young, Troy Aikman, and Oscar De La Hoya; Steinberg has been called the real-life inspiration for the title character in the Oscar-winning film *Jerry Maguire* (portrayed by Tom Cruise). Matt Biondi (BA 1988) won eight Olympic gold medals during his swimming career, in which he participated in three different Olympics. At the Beijing Olympics in 2008, Natalie Coughlin (BA 2005) became the first American female athlete in modern Olympic history to win six medals in one Olympics.

#### **Patrons**

Berkeley alumni have long been among the billionaire ranks, their largess giving rise to many of the campus' eponymous schools, pavilions, centers, institutes, and halls, and with the more prominent being J. Paul Getty, Ann Getty, Sanford Diller and Helen Diller, Donald Fisher, Flora Lamson Hewlett, David Schwartz (Bio-Rad) and members of the Haas (Walter A. Haas, Rhoda Haas Goldman, Walter A. Haas Jr., Peter E. Haas, Bob Haas) family. There are at least twenty-five living alumni billionaires: Gordon Moore (Intel founder), James Harris Simons (Renaissance Technologies), Masayoshi Son (SoftBank), [316] Jon Stryker (Stryker Medical Equipment), Eric Schmidt (former Google Chairman) and Wendy Schmidt, Michael Milken, Bassam Alghanim, Kutayba Alghanim, [318] Charles Simonyi (Microsoft), Cher Wang (HTC), Robert Haas (Levi Strauss & Co.), Carlos Rodriguez-Pastor (Interbank, Peru), [319] Fayez Sarofim, Daniel S. Loeb, Paul Merage, David Hindawi, Orion Hindawi, Bill Joy (Sun Microsystems founder), Victor Koo, Tony Xu (DoorDash), Lowell Milken, Nathaniel Simons and Laura Baxter-Simons, Elizabeth Simons and Mark Heising, [320] Oleg Tinkov, Liong Tek Kwee (BS 1968), Liong Seen Kwee (BS 1974) and Alice Schwartz (BS 1947).

### See also



- Blockeley
- Higher Education Recruitment Consortium
- Tsinghua-Berkeley Shenzhen Institute
- World Community Grid

### Notes

- a. Other consists of Multiracial Americans & those who prefer to not say.
- b. The percentage of students who received an income-based federal <u>Pell grant</u> intended for low-income students.
- c. The percentage of students who are a part of the <u>American middle class</u> at the bare minimum.

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