

The facts: UC graduate research

In a century and a half of public university research, UC has generated new technologies, new industries and the skilled workforce that fuel California's economy.

UC graduate students are central to these achievements.

Through its graduate programs, the University of California trains and supports more than 26,000 graduate researchers and 6,400 postdoctoral fellows who are engaged in original research.

UC graduate students tackle issues critical to California, such as identifying sustainable sources of energy, reducing greenhouse gas emissions, protecting against earthquakes, advancing computer technology and improving public health. They shape ideas about our world and cultures, break new ground in the arts, and strengthen the economic and social infrastructure of our communities.

Collectively, UC graduate research produces the breakthroughs that advance medicine, create startup companies and lead to the development of entire industries, creating opportunity for millions of Californians — not only those with graduate degrees.

The state must do its share to support graduate education if California is to remain a leader in innovation and workforce development.

UC RESEARCH BENEFITS THE STATE AND BEYOND

UC graduate students advance the theories, pursue the new avenues of inquiry and do the hands-on work that move discovery forward. They are critical to the research that improves our quality of life and brings millions of dollars of investment to the state.

- UC investigators received \$4.2 billion in research funding in the 2012–13 fiscal year. For every \$1 in research funding provided by the state of California, UC secures \$7 more in federal and private dollars.
- UC researchers produced 1,727 new inventions in 2013, an average of nearly five a day.
- Many of UC's 4,254 active patents have led to the creation of today's leading industries. They also have improved our health, changed the way we do business and enriched our lives: UC patents include vaccines for hepatitis B, drugs to treat prostate cancer, mobility bionics that enable paraplegics to walk, varieties of strawberries, grapes and citrus, and the nicotine patch, to name just a few.
- UC research hatched 71 start-up companies in 2013. To date, some 640 startup companies have been formed with UC inventions or by UC researchers, many based on innovations that UC graduate students helped pioneer. Among these are multinational biotechnology firms Genentech and Chiron,

wireless technology leaders Qualcomm and Broadcom, agrochemical company AgraQuest, and hundreds of others.

- Many start-ups have been launched by graduate students, or emerged directly from their discoveries. Technology start-up Nanosys, based on a technique developed by Ph.D. students on four UC campuses, employs tiny, man-made crystals to boost the color vibrancy of digital displays. Imprint Energy, co-founded by UC doctoral student Christine Ho, creates ultra-thin, flexible batteries that can be screen printed at virtually any shape and size. Redwood Biosciences, launched by UC doctoral student David Rabuka, employs precision bioengineering to enable new means of treating disease. These are just some recent examples.
- UC graduate research helped create and grow the biotechnology industry; former UC graduate students were pivotal in the development of industries such as electronics, pharmaceuticals, telecommunications, nanotechnology and the special effects film industry, among others. These industries have produced millions of jobs for workers at all levels.

AN UNMATCHED INCUBATOR FOR IDEAS AND INNOVATION

UC advanced degree programs are among the most highly regarded in the nation, attracting top students from the U.S. and around the world.

- UC offers nearly 700 master's, doctoral and professional degree programs at its 10 campuses. These range from aerospace engineering to world cultures and history, from bioinformatics to visual arts.
- UC awards more than 4,000 Ph.D.s a year, 8 percent of the nation's Ph.D.s.
- In California, UC awards 65 percent of all doctorates, and 70 percent of those awarded in science, technology, engineering and mathematics.
- More than 20 UC doctoral students have gone on to win a Nobel Prize.
- UC graduate and professional programs rate highly in numerous surveys and rankings, including the U.S. News and World Report's annual rankings. In the National Research Council's assessment of Ph.D. programs, 142 UC programs ranked in the top 20 percent of programs nationally.

BUILDING THE BRAIN TRUST TO SUCCEED IN THE 21ST CENTURY

As mentors and teaching assistants, UC graduate researchers give undergraduates first-hand exposure to the process of unearthing new ideas. Many of our doctoral candidates go on to become the professors who inspire the next generation of students to think critically, explore, discover and lead.

UNIVERSITY OF CALIFORNIA

- One quarter of all UC and California State University faculty received their Ph.D.s from a UC graduate program.
- UC Ph.D. earners also are strongly represented in the workforce in fields outside of academia. Among UC graduate degree recipients working in California in 2012, approximately half went into sectors other than higher education, including government, medicine, business and manufacturing, engineering and K-12 education.
- The U.S. Bureau of Labor Statistics estimates that the number of jobs requiring advanced degrees will grow by 2.6 million by 2020. UC's role in educating these students ensures that California will be an important source of this talent.

MAINTAINING RESEARCH AND EDUCATIONAL EXCELLENCE

Reduced funding greatly threatens the health of graduate programs. However, state investment in graduate education is not a matter of dollars alone. It also involves a continued commitment to supporting the resources that enable these students to flourish, such as the faculty time required to mentor and train graduate students.

Graduate research is an investment that pays off.

It enables the life-changing discoveries that emerge from the collaboration of dozens of researchers and scholars building off each other's ideas.

It develops the mentors and future university professors central to maintaining California's visionary leadership in higher education. And it promotes the development of the workforce that will help our economy grow, attracting industry and investment from around the world.