



**The nucleus
of new ideas.**

UC graduate students
are at the core of
discoveries that drive
our knowledge and
economy forward.

UNIVERSITY
OF
CALIFORNIA

A low-angle shot of a graduate student in a light blue hoodie working on a complex scientific instrument inside a dome. The instrument is white and black with various cables and components. The student is looking up at the equipment. The dome's interior is visible in the background, showing a grid of structural beams and a light fixture.

From mending weak hearts to exploring the cosmos, UC graduate researchers ask:
How can we do better, work faster, know more?

The answers result in discoveries that transform the way we do business, protect our planet, improve our health and enrich our lives.

Curiosity that makes the ingenious possible.

Improving wind turbines, scouring historical sites, searching the skies and sub-atomic particles, UC graduate students work to advance what we know. They bring intellectual firepower, leading the nation in National Science Foundation Fellowships and earning top awards in arts and humanities.

These prestigious scholars select UC for the unrivaled opportunities it offers to work on scientific and technological solutions to vexing problems in the world. And they deliver – authoring papers, developing medical treatments, starting new businesses, influencing the art world and mentoring the next generation of researchers and educators.

Their work creates jobs and has also spawned entire industries – in biotechnology, nanotechnology and film industry special effects, to name a few.

With 26,000 of the world's most promising new researchers tackling the toughest problems head on, this is just the start of what is possible.

Building the brain trust

Graduate education is central to creating the intellectual capital necessary for California and the nation to maintain a robust, globally competitive economy. Together, the 10 campuses of the UC system comprise the strongest graduate enterprise of any university in the U.S.

Awarding 4,000 doctoral degrees a year – 8 percent of the nation’s Ph.D.s – UC’s graduate programs ensure California will be the place to find the talent needed for tens of thousands of new jobs expected to require advanced degrees.

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 will inspire the next generation of students to think critically, explore, discover and lead.

They also become legislators and business executives, start-up directors and art luminaries, community leaders and social entrepreneurs.

UC graduate students and researchers make discoveries and produce the workforce that will help our economy grow, and attract industry, and human and capital investment from around the world.

Berkeley

Investigating a link between plastics and obesity — Paul Yousefi

Following the children of farmworkers in the Salinas Valley, Yousefi’s team is investigating whether early life exposure to certain chemicals can increase youngsters’ risk of obesity. Yousefi’s work looks at how early exposure to compounds in plastics can affect the body’s endocrine system – and potentially even alter the way genes function to impact health for generations.

Blurring boundaries between man and machine — Margaret Rhee

As machines become more human and humans become increasingly reliant upon them (e.g., prostheses and synthetic body parts), the boundaries between the two are blurring, according to Rhee’s scholarship. As a sideline, her interest in technology and the digital divide has taken her to the San Francisco County Jail, where she works with female inmates to use video and digital storytelling to raise awareness about HIV.

Davis

Avoiding alien marine invaders — Eliot Crafton

Crafton is creating a tool that identifies where new invasive marine species are most likely to be introduced and threaten coastal ecosystems. Coming in as stowaways on container ships or escaping from controlled aquaculture environments, non-native species can quickly cover hundreds of miles of coastline. Crafton’s tool, which also could be adapted to other environments, produces a map of hotspots that officials can use in order to prevent the threat – and potentially save billions of dollars in eradicating a species once it has gained hold.

Connecting people to care — Susan Perez

Perez is studying how people use the Internet to make health decisions. By investigating how those with limited access to health care – including low literacy populations – currently access health information online, her research seeks to shed light on how the Internet can be used as a better resource in connecting people with critical information they need to make decisions about their health.

Irvine

How traffic jams affect heart health — Sharine Wittkopp

Clogged interstates, it turns out, contribute to clogged arteries. Wittkopp’s research looks at how the increased air pollution caused by vehicle congestion increases risk of heart attack and stroke by causing blood pressure to rise and arteries to constrict. Wittkopp says her data can provide policy-makers and the public with a fuller picture of the true impact and cost of traffic congestion and vehicle emissions.

Tailoring cancer treatment to minimize side effects — George Johnson

Proteins have right or left orientations similar to the way we have right and left hands – and the molecules in medicines aimed at those proteins need to have a similar orientation to work. Johnson’s work focuses on tailoring the molecules used in treatments for breast, prostate and kidney cancer to fit the shape of the target protein and minimize devastating side-effects.

UCLA

Engineering a sustainable alternative to fossil fuel — David Wernick

Wernick is researching whether rare bacteria can take something the world is expected to have in excess — human and livestock waste – and turn it into something increasingly threatened: fossil fuel. The bacteria eat the nitrogen-rich material, break it down, and turn it into a substance that that can go straight into an existing gas tank to power a vehicle. According to Wernick, this technology (or one similar to it) could be ready for commercial use within a decade.

Designing smarter systems for disaster relief — Michael Stajura

After a disaster, an area may be flooded with workers and financial aid, but there are few systems for managing the influx. The result: Too often, aid meant to help actually ends up hampering recovery. Stajura is developing a system to classify aid organizations according to their function and capacity to help. The system would help officials more efficiently manage emergency aid, and channel it toward the services that are needed most.

Merced

Addressing cultural barriers to cancer care — Roberto Corona

A high school dropout who was motivated to change his life after a debilitating car accident, Corona is now working to help other Latino men confront life-threatening health challenges. Through his work at a health clinic in the Central Valley, Corona seeks to understand how the culture of “machismo” affects men in coping with a cancer diagnosis and influences their attitudes toward treatment. Understanding social and cultural factors can help health care providers better communicate with their patients to help them make critical decisions about their health.

Identifying a long-term impact of Sierra drought — Chelsea Arnold

Dry years such as the one we’re having may have an irreversible effect on the ability of high mountain meadows to collect and store snowmelt, according to Arnold’s research. She has found that just a bit too little – or too much – snow in a season shrinks the soil, permanently affecting its ability to soak up moisture and increasing risk of flooding and runoff. As dry and wet years become more common, a better understanding of these impacts is critical to helping officials manage the state’s water supply.

Riverside

Uncovering a lost part of literary history — Alicia Contreras

Tracking down lost and unpublished manuscripts from the turn of the 20th century, Contreras is unearthing a lost part of literary history to better speak to the Mexican-American immigrant experience. By studying previously obscure and unknown works by Latino authors, Contreras looks to bring new voices to the realism movement, an influential chapter in American writing that generally has focused on a white, male perspective.

Unlocking a dark chapter in California justice — Christina Jogoleff

Jogoleff is looking at how prevailing beliefs about women, race and criminal behavior combined to influence a particularly dark chapter in California’s history: the eugenics movement, in which thousands of women were forcibly sterilized in the early part of the 1900s. Tracing the origins of this discredited practice, which once was supported by powerful voices in science and politics, can offer a valuable perspective as we confront issues in the prison system today, Jogoleff says.

San Diego

Spotting the early signs of autism — Elizabeth Bacon

Bacon is looking for subtle markers of autism that can help health care providers more accurately diagnose the condition in children under 2, a critical window for intervention and treatment. Her work is focused on identifying subtle cues that have been overlooked in cases where diagnoses were missed. Facial expressions and displays of emotion, eye contact with parents and how infants engage with toys all offer potential clues.

How shifting demographics influence state policy — Michael Rivera

Undocumented immigrants may not have the right to vote, but they can wield influence on the policies that directly impact their lives, according to Rivera’s research. His work looks at what it takes to shift the tide of public opinion and how that drives changes in state law. It shows that early waves of immigration tend to cause a backlash that results in more restrictive legislation, but the tide reverses as the population reaches a critical mass.

San Francisco

Scrutinizing a cell that's both culprit and hero — Laura Simpson

Simpson is investigating the behavior of a type of T-cell associated with both contributing to asthma and providing protection from parasitic disease. A better understanding of what's at work within the cell can provide insights valuable to managing both its positive and negative effects.

How aging cells contribute to cancer — Florie Charles

Charles's research looks at so-called senescent cells, a type of cell that is more prevalent as we age and is implicated in the growth of certain tumors. Rather than dividing the way younger cells do, senescent cells create "recycling centers" that break down and reform new proteins. Charles seeks a better understanding of how these recycling centers work, to discover potential ways for shutting them down in diseased cells that wouldn't disrupt their functioning in healthy cells.

Santa Barbara

How indie gaming drives the industry — John Vanderhoef

Vanderhoef plays video games all day in the name of research: His work looks at how the rise of small and independent creators is driving innovation in the Internet game industry. With advances in digital technology making it possible for anyone to reach a global audience, the experimental offerings of indie game-makers are creating a more diverse array of characters, experiences, features and business models that are shaping trends in the industry as a whole.

Developing more efficient lighting technologies — Cyrus Dreyer

Dreyer is exploring new materials that can light our homes and offices more efficiently. He is working to improve the technology for light-emitting diodes (LED) – currently effective at low wattages – so they can provide much brighter light. The technology could cut in half the amount of electricity it takes to light up an operating theater or a sporting event, with significant cost and resource savings.

Santa Cruz

How wildfires contribute to lead exposure — Kingsley Odigie

Following wildfires in Santa Barbara and Los Angeles, Odigie found that the presence of lead in local water systems increased by as much as a hundredfold. His research shows that, during wildfires, lead and other pollutants that have been locked in the soil are stirred up again as sediment and ash, which is then flushed into the water supply where it can enter the food chain and harm human health. Understanding these impacts can help officials better manage the risk.

Testing our notions of race and class — David Palter

Palter is studying how I.Q. testing in the early 20th century was employed, in part, to advance theories that sought to establish a link between intelligence and race. Understanding the evolution of ideas on race and ethnicity provide a context for examining cultural stereotypes and our assumptions today, says Palter.





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