



# UC SANTA CRUZ

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## THE ANNUAL IMPACTS OF UNIVERSITY OF CALIFORNIA SANTA CRUZ IN 2017 AND OVER THE LAST 50 YEARS

Prepared by:

**Tripp  
Umbach**

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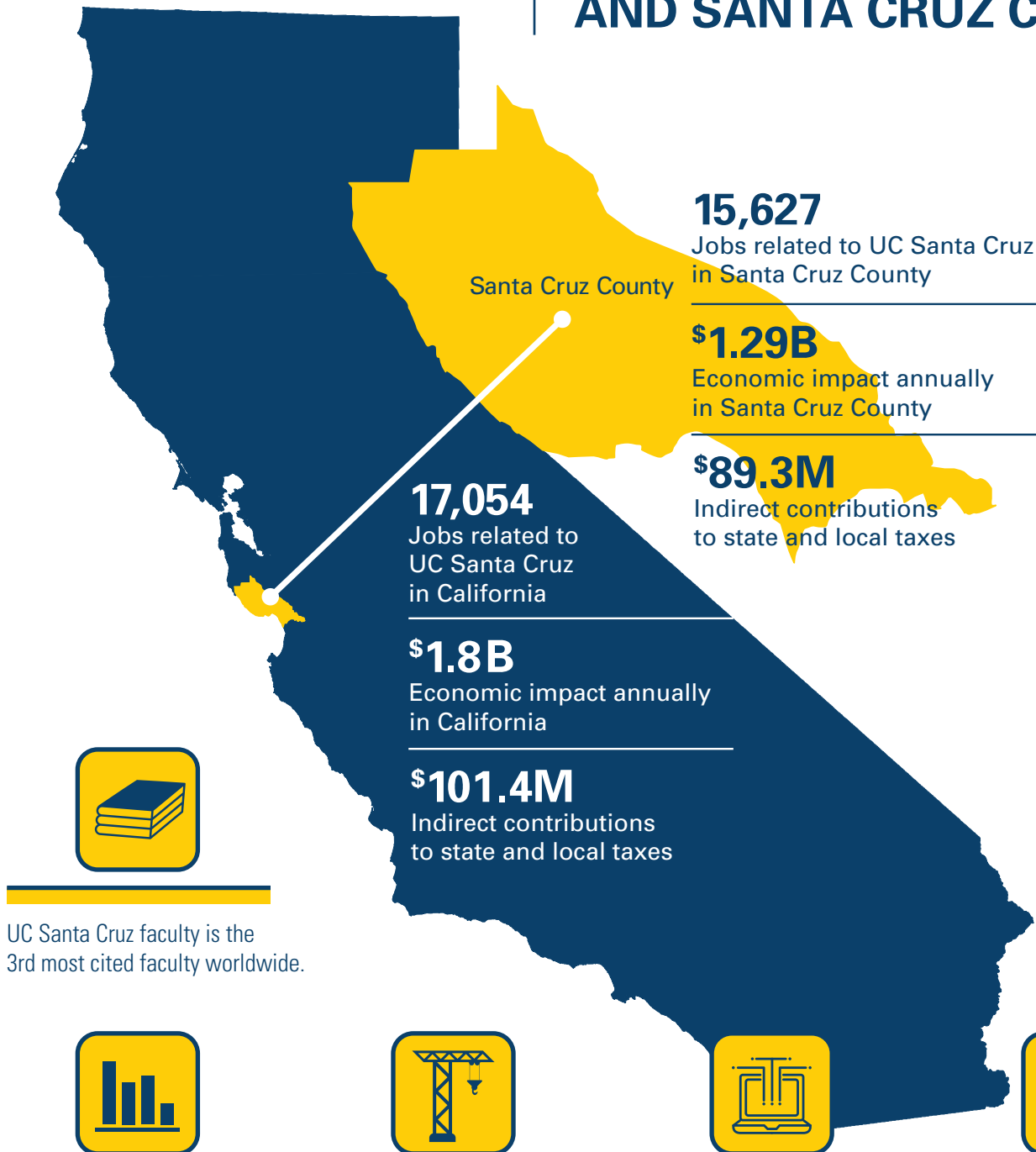
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# UC SANTA CRUZ

## 2017 ANNUAL IMPACT ON CALIFORNIA AND SANTA CRUZ COUNTY



UC Santa Cruz faculty is the 3rd most cited faculty worldwide.



Statewide research impacts of over **\$173.1M** and **792 jobs**.



University construction over the last five years has supported on average **799 jobs** and **\$149.2M** in statewide business volume.



Known for offering hands-on education to graduates and undergraduate students through programs like the UC Santa Cruz Center for Research in Storage Systems (CRSS) where students are partnered with industry to explore and advance new technologies in data storage systems.



UCSC Ranks fourth among Universities whose recent grads work with City Year, a national organization that partners with schools to provide tutoring, mentoring, and behavior assistance for more than 150,000 students, helping reduce dropout rates and increase test scores.

## Project Background

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In March 2018, Tripp Umbach was retained by the University of California, Santa Cruz (UCSC) to provide comprehensive analysis on the economic, employment, government revenue, and community benefits that arise from university operations. Impact analysis was conducted to measure these effects throughout the state of California as well as in Santa Cruz County from the time the University opened its doors in the fall of 1965. This report will look at the impact this University has had from that date until 2017, as well as two additional points in time to demonstrate the dramatic growth in the value the University has provided in economic vitality, job creation, government revenue locally and on the state level, the research growth and development, the community involvement of the students and staff, as well as so many other benefits the University provides to Santa Cruz County and the state of California.

The influence that UCSC has on the vitality of the economy in the region and state includes the following elements:

- Economic impact of the university
  - Business volume impacts (UCSC capital expenditures, operational expenditures, and payroll)
- Direct, indirect, and induced employment impacts
- Government revenue impacts at the local and state levels
- The impact of spending by employees in the local economy on goods and services
- The impact of visitor spending on the economy (wage premiums, job creation, etc.)
- The impact of student spending in the region (retail/merchandise, hospitality, etc.)
- The impact of the attraction of external research dollars, the commercialization of research discoveries, and the impacts on economic development throughout the region
- The impact of the alumni who attend the University and stay in Santa Cruz or the state because of their educational experiences at UCSC
- The impact that employees and students have on the community through donations and volunteer work, alongside contributions through service-learning, community-based research projects, and internships

This economic impact analysis measures the effect of direct, indirect, and induced economic, employment, and government revenue impacts for the University throughout California and Santa Cruz County.

## University of California Santa Cruz

University of California Santa Cruz (UCSC) is one of 10 campuses within the University of California system. As a public research institution, UCSC prides itself on high-impact research along with a commitment to environmental stewardship and community engagement: core values that permeate all 65 academic disciplines. Since its establishment in 1965, UCSC has made its home in the city of Santa Cruz, California, a mid-sized town along the Pacific coast just 75 miles south of San Francisco and close to Silicon Valley. The campus is renowned for its excellent programs and magnificent scenery within the foothills of the Santa Cruz Mountains. Over the years, student enrollment has grown to approximately 18,000 undergraduate and graduate students. The University is composed of four academic divisions and one school (Arts, Humanities, Physical & Biological Sciences, Social Sciences, and the Jack Baskin School of Engineering). University of California Santa Cruz has developed a reputation of excellence from highly awarded faculty to successful and impactful alumni found throughout the country.

## History

As early as the 1930s, original founders of UCSC had already begun to envision an academic institution in Santa Cruz. By the mid-1950s, the city made a formal bid to the University of California Regents, in competition with another proposal in San Jose, the center of the region's population hub. Even though a campus near San Jose may have made more practical sense, Santa Cruz won out because of its scenic surroundings: conducive to a more private and residential-focused college experience. After years of formal planning, the Long Range Development Plan of 1963 was developed and by 1964 construction had begun. The original campus layout was planned by architect John Carl Warnecke and landscape architect Thomas Church. Embedded in nature, academic buildings are interwoven among acres of dense redwood forest and buffered from the town by the "Great Meadow." The vision of UCSC's founders was to establish an institution that combines the resources of a major research university with the feel of a small college campus.

## Methodology Employed in the Economic Impact Study

Tripp Umbach's economic impact analysis measures the direct, indirect, and induced business volume and government revenue impact of UCSC's operations throughout the state of California and Santa Cruz County for FY66, FY87, FY07 and FY17.<sup>1</sup> UCSC provided Tripp Umbach with the following primary data used to conduct the analysis: capital expenditures, operational expenditures, number of employees, number of students, number of graduates, number of alumni, research expenditures, construction expenditures, events hosted and attendee estimates when exact numbers were not available, payroll and benefits, and taxes paid to local and state governments by the years requested.

Tripp Umbach analyzed the economic impact of the University using the IMPLAN input-outcome model.<sup>2</sup> Economic impact begins when an organization spends money. Studies measuring economic impact capture the direct economic impact of an organization's spending, plus additional indirect and induced spending in the economy as a result of direct spending. Visitor and student spending in the region is also a substantial component of the economic impact of an organization. Visitors and students spend money for retail purchases, lodging, restaurants, and other goods and services; these expenditures filter through the economy and support local jobs.<sup>3</sup>



<sup>1</sup> Each Fiscal Year (1966, 1987, 2007, and 2017) represents the period of time from July 1 to June 30 as reported by the University.

<sup>2</sup> Minnesota IMPLAN Group Inc. (MIG) is the corporation that is responsible for the production of IMPLAN (IMPact analysis for PLANning) data and software. IMPLAN is a micro-computer-based, input-output modeling system. With IMPLAN, one can estimate Input-Output models of up to 536 sectors for any region consisting of one or more counties. IMPLAN includes procedures for generating multipliers and estimating impacts by applying final demand changes to the model.

<sup>3</sup> To remain conservative while calculating visitor spending throughout the state, Tripp Umbach utilized federal per diem rates for the state and local area as provided by <https://www.gsa.gov/travel/plan-book/per-diem-rates>

UCSC's total economic impact for each of the periods represented here includes the University's spending on goods and services with a variety of vendors; the spending of UCSC's faculty, staff, students and visitors; and the business volume generated by organizations within the regions and the state. Not all dollars spent by an institution remain in the institution's home state. Dollars that go out of the state through spending with out-of-state organizations or people are not included in the University's economic impact. The economic impact values presented in this report are generated by direct, indirect, and induced operational spending; capital spending; payroll; visitor spending; and student spending within the state of California and Santa Cruz County in the time intervals demonstrated.

The University's overall impact to the state goes beyond the economic outcomes analysis that is this report's primary focus. As a globally engaged research and teaching institution with a mission built on social and environmental responsibility, the University through its research, teaching, and outreach is a catalyst for innovation and collaboration benefiting the diverse social and environmental community. Its impact also extends to the development of human capital, promotion of civic values, and other significant impacts of value to the state.

## UCSC is Integral to California and Santa Cruz

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The University of California Santa Cruz has earned a national reputation for challenging the status quo through its research, teaching, and public service, which are routinely cast through a lens of environmental stewardship and social justice. Reflecting California's diverse culture, 16,000 undergraduate and 1,600 graduate students are drawn by the opportunity to pursue new ideas in world-class facilities nestled in a redwood forest with sweeping views of the Pacific Ocean and less than an hour from Silicon Valley. UC Santa Cruz has more than 120,000 Banana Slug alumni who embody the progressive and bold spirit of the campus.<sup>4</sup>

### Economic Impact on California (Past and Present)

UCSC provides important economic activity throughout California. Direct spending by the university system to vendors and employees helps to generate additional spending in the areas of each campus as well as economic activity important throughout the state. The mission-based activities supported by these expenditures affect Californians each day as UCSC works to improve life for all. At the time of the inaugural class in the fall of 1965, the University generated more than **\$91.2 million** in economic impact for the state of California. This total represents the direct impact of spending in the state (**\$43.7 million**), as well as the indirect and induced spending that occurs as a result of the development and presence of UCSC (**\$47.5 million**) in California.

The University has continued to see increases in the impacts that it has on the economic vitality in the state and local county area. By 1987, the total economic impact of UCSC on California was at \$480.8 million. This showed the increase in the class sizes, the academic programs, the focus that began on research, and the additional faculty and staff that were recruited to keep the University growing and realizing its vision.

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#### TOTAL ECONOMIC IMPACT OF UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1966-2017 (IN MILLIONS)

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**1966: \$91.2**

**1987: \$480.8**

**2007: \$1,391.8**

**2017: \$1,826.4**

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<sup>4</sup> [www.ucsc.edu](http://www.ucsc.edu)



By the year 2007 the University of California Santa Cruz had reached a \$1.4 billion total economic impact in the state of California. A mere decade later the impact of the campus had grown to \$1.8 billion in total economic impact for the state. This means that over the last 50 years the state has seen a 20-fold increase in the economic activity generated in the state and local area. This is due to a dramatic increase in campus operations over the period of months and the growth of the academic programs, research programs, and the programming of activities on campus bringing in high numbers of visitors from in and out of the area.

## Economic Value to Santa Cruz

In the fall of 1965, when the University had just opened its doors to students, UCSC generated nearly \$74.3 million within the economy of Santa Cruz County, including \$37.2 million in direct spending by the University in the county. The ripple effect in turn supported more than \$20.4 million of additional economic activity generated by the development, operations, tourism, spending of other organizations, businesses, visitors, and vendors in the county that support UCSC locally.

Through the development of the campus and programs at UCSC, this economic activity generated by the operations, students, staff, faculty, and tourism continued to increase the economic impact of the campus in Santa Cruz County. By 1987 the total economic impact had grown to \$379.7 million. Progressing 20 years to 2007, that total economic impact had increased to more than \$953 million.

In the most recent year of 2017, the economic impact of the UCSC campus on the Santa Cruz County area has grown to nearly \$1.29 billion overall. That includes the direct spending of the University of \$411.4 million as well as the additional indirect and induced economic impact of \$879.0 million.

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### TOTAL ECONOMIC IMPACT OF UC SANTA CRUZ ON SANTA CRUZ COUNTY, 1966-2017 (IN MILLIONS)

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**1966: \$74.3**



**1987: \$379.7**



**2007: \$953.0**



**2017: \$1,290.4**

# UCSC Employment Impacts

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## California Employment

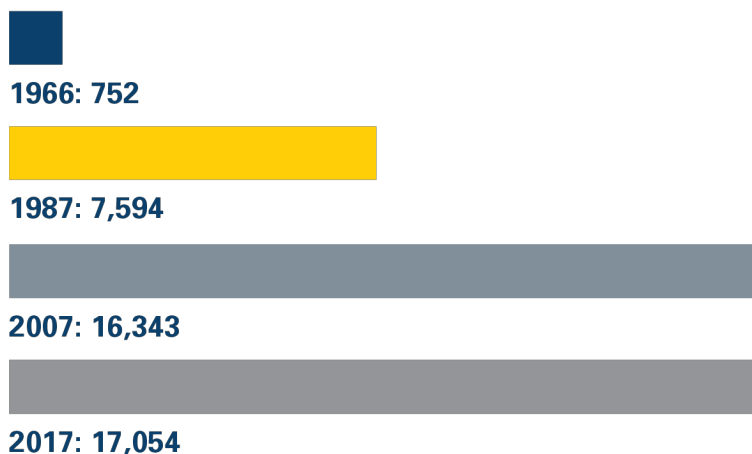
Looking back to the initial year of operations at UCSC, the school had 268 full- and part-time direct employees in the state, which through employment and spending generated another 484 employees in California. This brings the 1966 total employment impact to 752 jobs.

Through the next 20 years of operations the employment grew dramatically to a total employment impact of 7,594 jobs in 1987. Then in the next 20 years that impact grew to 16,343 jobs in California. If we look at the year 2017, UCSC is a part of one of the largest state system employers in California, and the campus supports or sustains 17,054 jobs. This employment makes a direct contribution to the overall workforce vitality of the state and bolsters the economy. Those directly employed spend dollars in the state and, therefore, support additional employment throughout the state. UCSC spending on capital projects, development and planning projects, and suppliers supports additional indirect jobs throughout California. In total, the presence of UCSC supports employment and growth beyond direct employment on campus.

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### TOTAL EMPLOYMENT IMPACT OF UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1966-2017 (IN JOBS)

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## A Large Employer in Santa Cruz County

At the inception of the University in the fall of 1965, UCSC directly employed 228 full- and part-time employees in Santa Cruz County. These jobs indirectly supported an additional 465 full- and part-time jobs throughout the county, totaling 693 jobs.

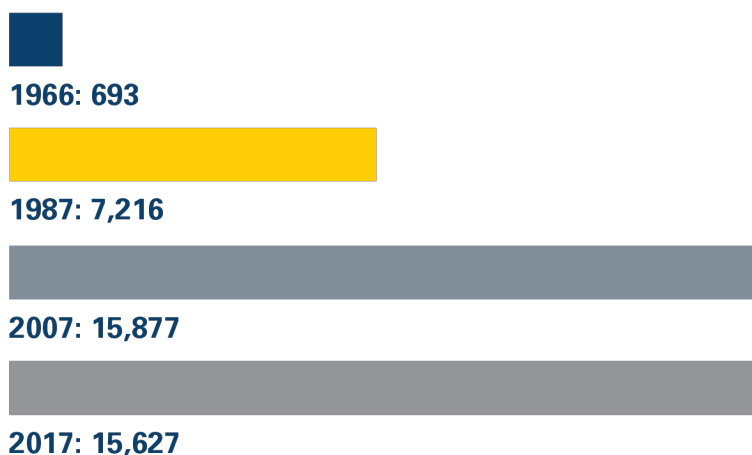
As the University grew and expanded, the school increased the direct employment as well as the jobs that the direct employment and spending supported in the county. By 1987 the University had a total employment impact of 7,216 jobs in Santa Cruz County, and in 2007 this impact had grown to 15,877 employees in Santa Cruz County.

In 2017, UCSC supported 15,627 jobs in the county. This marks a slight decrease in the jobs in Santa Cruz County but not overall in the state. It is possible that over this period of time there are fewer people who work in some of the supporting industries who live in Santa Cruz County. These jobs included not only direct employment by the University, but also indirect and induced full- and part-time jobs created for supply and equipment vendors, contractors, and laborers for the construction and renovation of facilities and jobs created in the community at hotels, restaurants, and retail stores in support of UCSC's workforce and its visitors. This total employment impact includes more than 7,005 jobs that were directly employed by UCSC in 2017 throughout the county.

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#### **TOTAL EMPLOYMENT IMPACT OF UC SANTA CRUZ ON SANTA CRUZ COUNTY, 1966-2017 (IN JOBS)**

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## UCSC State and Local Tax Impacts

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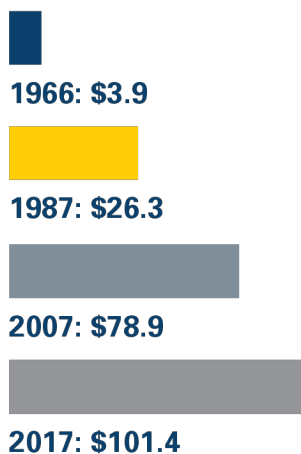
A major misconception held by business leaders, elected officials, and the public is that public educational institutions do not generate government revenue. While many of the nation's public universities are not-for-profit institutions, governments still receive substantial revenues as a result of the direct and indirect influence of these organizations. In addition, the substantial spending with local business generates large-scale revenues for the state and local coffers in the form of sales, corporate net income, and capital stock/franchise taxes. The Tripp Umbach model calculated the indirect and induced revenue benefits accruing to the state and local government from these sources as well as the direct amounts of taxes paid by the University.

The operations of UCSC in FY '66 generated more than \$3.9 million in state and local tax revenues. These values to the state and local tax coffers have continued to grow over the years, hitting \$26.3 million in state and local tax revenues in 1987, and then nearly \$78.9 million in 2007. Finally, as measured in 2017, this number reached nearly \$101.4 million with the operations in California and, as seen in the chart below, the numbers are impressive.

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### TOTAL STATE AND LOCAL TAX GENERATED BY UC SANTA CRUZ 1966-2017 (IN MILLIONS)

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# UCSC Research Transforms

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## Impact of Research

Since its founding, UC Santa Cruz researchers have made significant contributions to the body of research that has made the University of California the foremost public university system in the world. In an analysis of the world's top universities published by Times Higher Education in 2017, the Santa Cruz campus ranked third in research influence as measured by the average number of times work published by the faculty is cited by scholars around the world.

The quality and quantity of research activities at UC Santa Cruz have received steadily increasing public and private support. In the past five years, the campus has received \$680 million in research grants and contracts. In 2015-16, the campus received private gifts valued at more than \$75 million, much of which was in support of campus research activities.

UCSC researchers work across disciplines to address the most pressing scientific, social, and political issues of the day. In pursuit of that knowledge, they are blazing a trail of bold, progressive, and fearless inquiry. UCSC embodies a spirit of discovery that advances knowledge, solves real-world problems, and drives economic development.

In FY17, UCSC directly spent more than \$85 million on research activity. The research activity of UCSC generates local as well as statewide economic impacts through the spending of UCSC and the employment of research faculty, staff, and students.

## Generating Economic Activity

In FY17, the direct spending of UCSC Research in combination with the indirect and induced impacts of dollars being re-spent throughout the economy generated \$173.1 million in overall economic impact to the state of California. Over the years as the research awards and investments at UCSC have grown, so would the impact. You will notice a slight decline from 2007 to 2017 resulting from the lower amount of research funding.

## Providing and Supporting Jobs

In FY17, UCSC Research employed 792 researchers (full-time or part-time positions). While not all of these employees are directly on the UCSC payroll, the direct employment of research activities at UCSC generates additional spending throughout the region and

state that in turn supports additional indirect and induced jobs created when UCSC Research, its employees, and visitors spend in the region and state.

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## **TOTAL ECONOMIC IMPACT OF RESEARCH BY UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1987-2017**

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### **ECONOMIC IMPACT**

**1987: \$38.6 Million  
2007: \$190.3 Million  
2017: \$173.1 Million**

### **EMPLOYMENT IMPACT**

**1987: 245 Jobs  
2007: 1,015 Jobs  
2017: 792 Jobs**



### **GOVERNMENT REVENUE**

**1987: \$1.5 Million  
2007: \$7.9 Million  
2017: \$7.1 Million**

## **Generating State and Local Government Income**

State and local government revenues attributable to the presence of UCSC Research totaled approximately \$7.1 million in FY17 alone.

## **Research Outcomes**

UC Santa Cruz has always been an incubator for new ways of thinking, new ways of learning, and new ways of taking action in the world. UC Santa Cruz has earned national and international recognition for quality research and world-class teaching.

The core strengths at UC Santa Cruz are cross-disciplinary cooperation, commitment to social and environmental responsibility, and an unparalleled record of innovation. UC Santa Cruz researchers are leaving their unique mark on a rapidly changing world.

Some examples of the areas of excellence for UCSC would be space sciences, genomics, and innovation and technology with the Silicon Valley Campus.

**Space Sciences:** From Earth to the edge of the universe, UC Santa Cruz makes giant impacts in astronomy, astrophysics, and planetary science. UC Santa Cruz has pioneered new technologies for giant telescopes, adaptive optics, and gamma-ray astrophysics; discovered planets beyond our solar system and the most distant galaxies in the universe; and reshaped paradigms in cosmology, astrophysics, and particle physics.

**Genomics:** UC Santa Cruz has been a key player in the Human Genome Project and subsequent breakthroughs in genomics research. The UC Santa Cruz Genomics Institute brings together researchers in a variety of disciplines who are deeply involved in efforts to use the information encoded in genome sequences to transform the practice of medicine and our understanding of biology.

**Innovation:** The UC Santa Cruz Silicon Valley Campus is a multi-disciplinary teaching and research hub that is home to a master's degree program in games and playable media, engineering faculty, the new office of industry alliances and technology commercialization, UCSC Silicon Valley Extension, UC Scout, and soon a great deal more.

Overall, the vision and goals include creating a portal for championing, catalyzing, and fostering new UC research partnerships and accelerating the pace of innovation and impact through basic research and knowledge transfer.

## **UCSC Renovations Drive Jobs and Economic Value**

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### **Construction Impacts**

Since the opening of the campus and the first class of students in 1965, the University has been growing and changing. From the bricks being laid for the first structure, the construction impacts of UCSC over the last 50 years have been substantial.

The capital projects for the UCSC campuses have been diverse, and every building has different needs and structures, from housing for students, new classrooms, and labs to improved amenities. With the ebbs and flows of the changing need of the campus and the expansion of programs or developments of new ones, the campus has brought a great deal of construction work to Santa Cruz and California over the past 50 years.

During the initial capital phase of the University building the campus in the fall of 1965, Tripp Umbach estimates that UCSC provided an annual economic impact to the state of more than \$44.2 million. This construction supported 381 annual jobs and generated \$2 million in state and local tax revenues directly and indirectly. It is important to note that construction projects are not normally completed within a year, so the analysis conducted by Tripp Umbach looked at a five-year period around the year of the analysis and used the average to generate annual impact numbers to account for highs and lows over time.

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## TOTAL ECONOMIC IMPACT OF CONSTRUCTION BY UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1987-2017

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### ECONOMIC IMPACT

**1967: \$44.2 Million**  
**1987: \$38.3 Million**  
**2007: \$129.2 Million**  
**2017: \$149.2 Million**

### EMPLOYMENT IMPACT

**1967: 381 Jobs**  
**1987: 330 Jobs**  
**2007: 829 Jobs**  
**2017: 799 Jobs**



### GOVERNMENT REVENUE

**1967: 2.0 Million**  
**1987: \$1.7 Million**  
**2007: \$5.5 Million**  
**2017: \$6.1 Million**

In 1987, the construction of UCSC buildings was generating \$38.3 million annually on the California economy and supporting more than 330 jobs. This also in turn generated \$1.75 million in state and local taxes because of these construction projects and the spending by UCSC.

By the year 2007, the annual construction spending for facilities and modernizing the campus had grown. During this period UCSC was generating \$129 million in total economic impact from the construction going on around the campus. Additionally, 829 jobs were supported on an annual basis, and all of this activity generated \$5.5 million in state and local tax revenues.



In 2017, the impacts continued at a very equally impressive speed. The statewide impact of construction activity by UCSC was \$149.2 million and supported or sustained 799 jobs annually and generates more than \$6.1 million in state and local taxes.

## UCSC Community Outreach Strengthens Santa Cruz and California

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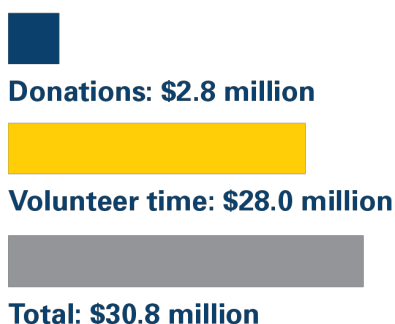
### Supporting the Community

In addition to the community outreach conducted by the institution itself, employees and students engaged with the community through volunteer work or by making donations to local organizations. Tripp Umbach estimates that UCSC employees and students generate more than **\$30.8 million** annually in charitable donations and volunteer services across the state of California.<sup>5</sup> These benefits are in addition to the economic impacts that UCSC brings to the state.

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#### COMMUNITY IMPACT OF UC SANTA CRUZ ON THE STATE OF CALIFORNIA, FY17

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Source: Tripp Umbach findings using data obtained by The University of California, Santa Cruz

#### Donations to Local Organizations

- **\$2.8 million** donated to local charitable organizations by UCSC employees and students in FY17.<sup>6</sup>

#### Volunteer Activities of Employees and Students

- **\$28 million** in value of volunteer time provided to area communities by UCSC employees and students in FY17.<sup>7</sup>

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<sup>5</sup> Total community benefit of employees is calculated by Tripp Umbach from the combined impacts of employees and students making monetary donations to organizations and the value of a volunteer hour.

<sup>6</sup> Secondary data collected via survey research by Tripp Umbach with an extensive pool of colleges and universities where faculty, staff, and students provide estimates on spending patterns, including information on the number of volunteer hours and charitable donations in which they provide to the community is used as a benchmark.

<sup>7</sup> The rate of \$23.56 per hour was used to calculate the value of volunteer services. This amount was calculated independently by Independent Sector. [https://www.independentsector.org/volunteer\\_time](https://www.independentsector.org/volunteer_time)

UCSC employees and students engage with a wide range of volunteer opportunities regionally on their own personal time as well. Some of the external organizations that employees and students volunteer with locally include:

**Support to Agriculture** Working with farmers, UCSC researchers at the Center for Agroecology & Sustainable Food Systems have been at the forefront of sustainable agriculture for years, developing alternatives to costly synthetic chemical fertilizers and pesticides. Success with some of the most chemically intensive crops — including artichokes, strawberries, apples, and cotton — has shown that alternative pest-management strategies can be effective. Stephen Gliessman, Alfred E. Heller professor of agroecology, conducts research at local farms. The Center for Tropical Research in Ecology, Agriculture and Development (CentTREAD) is preparing undergraduate and graduate students to integrate human needs into research that addresses complicated environmental problems in the tropics.

**Arts and Culture** UCSC contributes to the cultural life of Santa Cruz through performances, exhibitions, films, and lectures by UCSC faculty, visiting lecturers, students, and others. Theater, art, music, and dance programs are offered to the public throughout the school year by the Division of the Arts, and the Arts & Lectures series presents a variety of entertainers and speakers. Campus galleries present exhibitions by emerging and established artists. The annual Dickens Universe brings together community members and university, college, and high school teachers to study the works of the novelist and his contemporaries. Endowments in East Indian studies support programs in the arts and culture of India.

**Sustainability** Improving educational opportunities and operational performance in environmental sustainability is not just a priority for the campus, it intersects directly with the values of the local community. Shared concerns include resource usage such as water and energy; the production of waste, recycling, and compost; and greenhouse gas emissions. In striving toward collaborative solutions, the campus has developed a formal partnership with the Central Coast Climate Coalition. UCSC was also a founding partner of the Monterey Bay Regional Climate Action Compact, an action network of government agencies, educational institutions, private businesses, non-profit, and non-governmental organizations who are committed to working collaboratively to address the causes and effects of global climate change through local initiatives that focus on economic vitality and reduce environmental impacts for the region.

Collaborative partnerships have also been key in addressing environmental crises that arise as the realities of climate change continue to impact both our global and local communities. At the height of the drought in 2014 and 2015, UCSC students, staff, and faculty worked diligently with the City of Santa Cruz water conservation office to

successfully achieve the 25 percent water usage reduction target through proactive education, enhanced real-time use data, and fixture retrofits and upgrades. This partnership with the city led to longer-term volunteer and employment opportunities for UCSC students and graduates.

**Health and Safety** Researchers at UCSC are working with investigators from across the state and nation to tackle subjects ranging from the mystery of earthquakes to the secrets of life at the molecular level. Jin Zhang, professor of chemistry and biochemistry, was honored in 2007 as a fellow of the American Association for the Advancement of Science (AAAS). In making Zhang a fellow, AAAS recognized his "distinguished contributions to the field of nanoscience and nanotechnology, particularly ultrafast studies of nanomaterials and their optical applications in energy conversion and biomedical detection." In 2008, the American Society of Pharmacognosy (ASP) awarded Phil Crews, also a professor of chemistry and biochemistry, the ASP Research Achievement Award, recognizing Crews for "outstanding contributions to research on natural products." He and his research team have spent decades exploring the pharmacological potential of compounds derived from marine sponges. And research that originated in the lab of Bakthan Singaram, also a professor of chemistry and biochemistry, offers a promising route toward a continuous glucose monitor to replace the finger pricks that are a part of daily life for many diabetics. Harry Noller, the Robert L. Sinsheimer professor of molecular biology; Professor Manuel Ares; and others at the Center for Molecular Biology of RNA study the structure and function of RNA molecules, shedding light on the workings of antibiotics and the regulation of gene expression. In psychology, Professor Dominic Massaro is investigating the link between vision and hearing in language comprehension. A "virtual white cane" is one of several tools for the visually impaired developed by Roberto Manduchi, associate professor of computer engineering, and his students. And electrical engineer Wentai Liu is working on an artificial retina to restore sight to the blind. In environmental toxicology, Professor Donald Smith studies the health effects of toxic metals such as lead and manganese in the environment.

**Monterey Bay Research** UCSC's Institute of Marine Sciences, home to one of the premier marine-science research groups in the country, is a hub of activity for research focused on the Monterey Bay National Marine Sanctuary. A branch of the National Marine Fisheries Service established its offices and laboratories next to UCSC's Joseph M. Long Marine Laboratory. In addition, the California Department of Fish and Game opened its Marine Wildlife Veterinary Care and Research Center next to Long Marine Lab to rescue and rehabilitate sea otters, seabirds, and other animals in the event of an oil spill. The \$6.25 million Seymour Marine Discovery Center (named in recognition of a generous gift from H. Boyd Seymour Jr.) opened in 2000 to serve more school groups and attract additional tourists to the area. In 1998, the David and Lucile Packard Foundation made a \$5 million award to UCSC to fund a Center for Ocean Health, which was completed at

Long Marine Lab in spring 2001. The Monterey Bay Crescent Ocean Research Consortium (MBCORC) was created in 1998 by UCSC and other institutions to provide a framework and mechanism for collaborative educational, research, and operational ocean-related activities. In December 2007, the California Coastal Commission approved UCSC's Coastal Long Range Development Plan (CLRDP), a land-use blueprint for future development at the site of Long Marine Laboratory. The CLRDP enables UCSC's marine science center to continue its role as a model of integrated research and public education activities, facilitating the creation of informed policies and science-based solutions to address the complex environmental challenges facing California's coastline, oceans, and marine life. The University recently opened the doors to the new Coastal Biology building at UCSC's Coastal Science Campus.

**Information Technology** UCSC faculty, students, and staff are applying advanced technology to the area's business and research interests. For example, researchers at UCSC's Baskin School of Engineering are developing the complex data-handling and computer-graphics tools needed to better understand the flood of data coming from orbiting satellites, remote weather buoys, and sensors operating along the coast and on the deep sea floor. The extensive network will allow the region's burgeoning marine research community to gain a more detailed understanding of the Monterey Bay environment. In the arts, advanced research and production in animation and rendering, music composition, graphics, and web development take place in two Arts Instructional Computing Laboratories.

Additionally, UCSC provides students both graduate and undergraduate with opportunities to get both tangible work experience in the field as well as to bring young minds to the industry to help to problem-solve. The University has been recognized for the important work scientists are doing with data storage and management, resulting in industry leaders partnering with the campus to form the UC Santa Cruz Center for Research in Storage Systems (CRSS). Established in 2013, the CRSS partners academia and industry to explore and progress new technologies and techniques to advance all aspects of storage systems. CRSS performs research in a variety of storage-related fields, including archival storage, scalable distributed indexing and non-hierarchical file systems, large-scale distributed storage systems, file systems for next-generation storage devices, and data deduplication. Inheriting a history of innovative storage research from the Storage Systems Research Center in the Jack Baskin School of Engineering, the CRSS also focuses on evolving the next generation of scientists and engineers with a valuable technical background and industry interaction.

**Fort Ord Development** At the former Fort Ord military base, UCSC is developing the Monterey Bay Education, Science and Technology (MBEST) Center. Drawing on the scientific expertise already assembled near Monterey Bay and in Silicon Valley, the



MBEST Center focuses on issues of environmental science and technology, biotechnology and bioresources, information science and technology, and multimedia. MBEST houses several startup enterprises in a technology-related, small-business incubator, hosts a 175-acre certified organic farm, and is home to the 606-acre Fort Ord National Reserve.

**Volunteers in the Community** According to a June 2005 survey (the most recent data available), 29 percent of UCSC students volunteered or completed an unpaid internship — for charities, public schools, and other nonprofits in Santa Cruz County — contributing more than 550,000 hours to the community. During 2004-05, students were matched with local agencies by the Student Volunteer Connection, including Beach Flats After-School Tutors and Community Center, Big Brothers/Big Sisters, Boys and Girls Club, Familia Center, Salvation Army, Santa Cruz Parks and Recreation, and Santa Cruz Libraries. In addition, 54 percent of faculty and staff volunteered locally — for nonprofits, charities, public schools, and religious organizations — contributing more than 270,000 hours annually; 15 percent of faculty and staff reported that they held a leadership position in a community group during 2004-05. The total value of the 820,000 hours of student, faculty, and staff service to the community was worth well more than \$6.5 million during the 2004-05 academic year. (Source: Economic Impact Report for 2004-05, Office of Planning and Budget, University of California, Santa Cruz.)

**Partners in Education** With dozens of collaborative projects with public schools, UCSC is a leader in the effort to improve K-12 education by reaching out and forming partnerships with local and regional schools. UCSC has a strong record of designing research projects in collaboration with schools that are addressing critical issues. UCSC students tutor youngsters in classrooms throughout the Monterey Bay Area. UCSC's Educational Partnership Center coordinates activities with public schools in the Silicon Valley and Monterey Bay Area to increase the number of underrepresented students attending four-year colleges and universities. UCSC is a partner in the Center for Informal Learning and Schools (CILS), an international effort to improve science education by integrating the best of the informal learning that takes place in zoos, aquaria, and science centers with the formal instruction that takes place in schools. The Karl S. Pister Leadership Opportunity Awards Program supports transfer-eligible community college students who enroll at UCSC.

## **UCSC Enriches the Current and Future Workforce**

UCSC's total impact on the state of California goes beyond its annual operational expenditures. Economic impact studies often capture only the impact that can be assigned a quantitative number, but the qualitative value and impact of the University goes far beyond its annual multi-billion-dollar economic impact. Through its academic

programs, UCSC is helping to grow the state of California by educating the highly skilled workforce that will be needed to compete in a global economy, providing the next generation of innovators with a firm foundation upon which to grow their own ideas and helping to build the next generation of scholars. Moreover, UCSC provides the larger community with access to faculty experts, adds richness and diversity to the region's cultural offerings, imports culture from outside of the country with international students, and contributes research expertise. It is challenging to assign an exact dollar amount to the outreach and community activities of a public research university such as UCSC, but on a daily basis, the lives of those in the surrounding communities are significantly enhanced by its presence in a multitude of ways.

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### **SALARY COMPARISON BY DEGREE TYPE**

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**High School Diploma: \$35,400**



**Bachelor's Degree: \$56,500**



**Master's Degree: \$70,000**

Source: CollegeBoard. Education Pays 2013.

## **UCSC Educates the Future Workforce of Santa Cruz and California**

UCSC educates the workforce that California needs to successfully compete in the 21st century global economy as well as retain them in the state. Nearly 4,500 students graduate every year from UCSC and are essential to meeting the state's human capital and workforce needs. In FY17, the University conferred 4,447 degrees. About 76 percent of graduates will stay in California and contribute to the state economy. Additionally, about 16 percent of all graduates stay in Santa Cruz County to work, to potentially develop companies, and to live.

The contributions of UCSC graduates are critically important to the economic vitality of the state. The University's alumni total more than 100,000 and reside in all of the United States, the District of Columbia, and foreign territories. More than three-quarters of the alumni of UCSC live in California. UCSC is a global talent magnet, attracting top students in a wide range of disciplines — many of whom stay in the state upon graduation.

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## ANNUAL SALARY IMPACTS OF UCSC GRADUATES FROM FY 2017 ON THE STATE OF CALIFORNIA

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**Undergraduate: \$62.6 Million**



**Graduate: \$5.6 Million**



**Total: \$68.2 Million**

Source: Tripp Umbach findings using data obtained by UCSC

### UCSC Alumni Play a Vital Role in the California Economy

By educating students, UCSC adds to the talent pool of human capital in California. A UCSC degree increases a graduate's value, productivity, and earning potential in the job market. Based on data on median annual earnings for university graduates in 2013 from College Board, a bachelor's degree earned at a university increases a graduate's salary by an average of \$21,100 a year compared with a high school graduate's salary (from \$35,400 to \$56,500), while a graduate degree earned at a university increases a graduate's salary, when compared to a bachelor's degree, by an average of \$13,500 a year (from \$56,500 to \$70,000). Considering the average individual's work life is roughly 40 years, the benefit of earning a college degree provides about \$829,920 more in total lifetime wages over an individual whose education stopped after earning a high school diploma.

The nearly 4,000 undergraduate degrees UCSC awarded in academic year 2016-2017 equates to the creation of \$62.6 million of future value over 40 years (counting only the graduates from a single year). A similar analysis applied to the advanced degrees awarded in academic year 2016-17 equates to another \$5.6 million of value created. Therefore, on an annual basis, UCSC creates \$68.2 million (\$62.6 million + \$5.6 million) of incremental lifetime earnings for members of each graduating class. This impact is above and beyond the impact of the University's operations.

To calculate the economic impact of UCSC alumni on a continuing basis in California, the study assembled figures on the distribution of the alumni for whom UCSC has current address information and used this distribution for the body of more than 85,179 alumni who have graduated in the past 40 years and are living in California. Based on an average of 40 years in the workforce, it is estimated that UCSC alumni support \$55.5 billion in additional income in the state's economy annually.

The other area of alumni not often recognized is that many times the alumni come to Santa Cruz or even California and decide to stay and start a business of their own or to stay and join the local workforce. At least 237 alumni from UCSC have begun their own businesses and nearly half of those are in Santa Cruz County or the surrounding areas. This is additional economic value that is not calculated in the overall operational impacts and another important highlight to the UCSC value to California but also Santa Cruz County.

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## **THE SALARY IMPACTS OF ALL UCSC ALUMNI ON THE STATE OF CALIFORNIA**

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**Undergraduate: \$51.4 Billion**



**Graduate: \$4.1 Billion**



**Total: \$55.5 Billion**

Source: Tripp Umbach findings using data obtained by UCSC



## Appendix A: Table of Impacts by Year and Geography

### Santa Cruz County Impacts

#### TOTAL ECONOMIC IMPACT OF UC SANTA CRUZ ON SANTA CRUZ COUNTY, 1966-2017

	1966	1987	2007	2017
Direct	\$37,200,760	\$111,180,085	\$260,886,000	\$411,428,000
Indirect/Induced	\$37,105,631	\$268,492,893	\$692,116,175	\$879,013,851
Total	\$74,306,391	\$379,672,978	\$953,002,175	\$1,290,441,851

#### TOTAL EMPLOYMENT IMPACT OF UC SANTA CRUZ ON SANTA CRUZ COUNTY, 1966-2017 (IN JOBS)

	1966	1987	2007	2017
Direct	228	3,227	6,724	7,005
Indirect/Induced	465	3,989	9,153	8,622
Total	693	7,216	15,877	15,627

#### TOTAL LOCAL AND STATE TAX IMPACT OF UC SANTA CRUZ ON SANTA CRUZ COUNTY, 1966-2017

	1966	1987	2007	2017
Total	\$3,409,487	\$25,848,872	\$67,960,652	\$89,301,549

## State of California Impacts

### TOTAL ECONOMIC IMPACT OF UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1966-2017

	1966	1987	2007	2017
Direct	\$43,765,600	\$130,800,099	\$459,691,991	\$666,637,991
Indirect/Induced	\$47,458,229	\$350,020,215	\$932,079,624	\$1,159,744,203
Total	\$91,223,829	\$480,820,314	\$1,391,771,615	\$1,826,382,194

### TOTAL EMPLOYMENT IMPACT OF UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1966-2017

	1966	1987	2007	2017
Direct	268	3,796	8,499	8,689
Indirect/Induced	484	3,798	7,844	8,365
Total	752	7,594	16,343	17,054

### TOTAL LOCAL AND STATE TAX IMPACT OF UC SANTA CRUZ ON THE STATE OF CALIFORNIA, 1966-2017

	1966	1987	2007	2017
Total	\$3,930,562	\$26,257,159	\$78,943,783	\$101,386,298

## Appendix B: Definition of Terms

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<b>Study Year</b>	<p>Fiscal year is defined as July 1-June 30.</p> <p>The initial year of the operations of UCSC was 1965-1966.</p> <p>The other years of study were 1987, 2007, and 2017.</p>
<b>Total Industry Output</b>	<p>The total impact of an organization includes the spending of the organization, the labor income expenditures, and the value-added to the economy as a result of the organizational spending; this is described as the total industry output.</p>
<b>Total Economic Impact</b>	<p>The total impact of an organization is a compilation of the direct impact, the indirect impact, and the induced impact generated in the economy as a result of the organization.</p>
<b>Direct Economic Impact</b>	<p>Direct impact includes all direct effects the organization has on the region caused by the organization's operations. These include direct employees, organizational spending, employee spending, and spending by students and visitors to the organization.</p>
<b>Indirect Economic Impact</b>	<p>The indirect impact includes the impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all money is spent outside of the local economy through imports or by payments to value added.</p>

<b>Induced Economic Impact</b>	The response by an economy to an initial change (direct effect) that occurs through re-spending of income received by a component of value added. IMPLAN's default multiplier recognizes that labor income (employee compensation and proprietor income components of value added) is not lost to the regional economy. This money is recirculated through household spending patterns, causing additional local economic activity.
<b>Multiplier Effect</b>	The multiplier effect is the additional economic impact created as a result of the organization's direct economic impact. Local companies that provide goods and services to an organization increase their purchasing by creating a multiplier.
<b>Government Revenue</b>	Government revenue that is collected by governmental units in addition to those paid directly by an organization, including taxes paid directly by employees of the organization, visitors to the organization, and vendors who sell products to the organization.
<b>Direct Employment</b>	Total number of employees full-time and part-time at the organization based on total jobs.
<b>Indirect Employment</b>	Indirect employment is the additional jobs created as a result of the organization's economic impact. Local companies that provide goods and services to an organization increase their number of employees as purchasing increases, thus creating an employment multiplier.

## Appendix C: Technical Appendix

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### IMPLAN Methodology Definitions

The economic impact of UCSC was estimated using IMPLAN (IMpact Analysis for PLANning), an econometric modeling system developed by applied economists at the University of Minnesota and the U.S. Forest Service. The IMPLAN modeling system has been in use since 1979 and is currently used by more than 500 private consulting firms, university research centers, and government agencies. The IMPLAN modeling system combines the U.S. Bureau of Economic Analysis' Input-Output Benchmarks with other data to construct quantitative models of trade flow relationships between businesses and between businesses and final consumers. From this data, one can examine the effects of a change in one or several economic activities to predict its effect on a specific state, regional, or local economy (impact analysis). The IMPLAN input-output accounts capture all monetary market transactions for consumption in a given time period. The IMPLAN input-output accounts are based on industry survey data collected periodically by the U.S. Bureau of Economic Analysis and follow a balanced account format recommended by the United Nations.

IMPLAN's Regional Economic Accounts and the Social Accounting Matrices were used to construct state- and regional-level multipliers, which describe the response of the economy to a change in demand or production as a result of the activities and expenditures of UCSC. Each industry that produces goods or services generates demand for other goods and services, and this demand is multiplied through a particular economy until it dissipates through "leakage" to economies outside the specified area. IMPLAN models discern and calculate leakage from local, regional, and state economic areas based on workforce configuration, the inputs required by specific types of businesses, and the availability of both inputs in the economic area. Consequently, economic impacts that accrue to other regions or states as a consequence of a change in demand are not counted as impacts within the economic area.

The model accounts for substitution and displacement effects by deflating industry-specific multipliers to levels well below those recommended by the U.S. BEA. In addition, multipliers are applied only to personal disposable income to obtain a more realistic estimate of the multiplier effects from increased demand. Importantly, IMPLAN's Regional Economic Accounts exclude imports to an economic area, so the calculation of economic impacts identifies only those impacts specific to the economic impact area. IMPLAN calculates this distinction by applying Regional Purchase Coefficients (RPC) to predict regional purchases based on an economic area's particular characteristics. The RPC represents the proportion of goods and services that will be purchased regionally under normal circumstances, based on the area's economic characteristics described in terms of actual trade flows within the area.

### Employment Definitions

IMPLAN analysis is conducted to measure jobs/positions (part-time or full-time), not full-time equivalents (FTEs). Full-time and part-time employees generate impact in the economy and support additional indirect and induced employment throughout the state of California. Employment data for UCSC was provided as an output of all individuals who receive a paycheck from the institution. This includes all full-time and part-time employed faculty, staff, and students.

## **Government Revenue Impact Definition**

Government revenue impacts generated in the current study included all taxes paid to the state of California and Santa Cruz County (i.e., payroll, property, sales, unemployment, income, and any other taxes paid to the state and local government) due to operations and indirect spending of those associated with UCSC. Any federal taxes paid by UCSC were not included in the government revenue impacts (i.e., FICA payments).

## **Visitor Definitions**

Impact analysis looks to quantify the impact of the attraction of “fresh” dollars to a region. Therefore, when including visitor spending in the impact analysis of a university, the analysis will include only those visitors coming to a region from outside of said region. Visitors to events who also live in the region would have spent their dollar in that region otherwise; therefore, this dollar was not attracted to the region as a result of the organization being analyzed.

For UCSC, the impact analysis looked at impacts to the state of California and Santa Cruz County. Visitors to UCSC were counted only if they were from outside of the region being analyzed.

## **Community Benefits**

Community benefits provided in this report outline two forms of impact — monetary donations made by employees and students to local nonprofits as well as volunteer hours that are valued at a monetary value.

- Tripp Umbach has conducted survey research to estimate the amount of monetary donations a student, staff, and faculty will make in a year. This amount differs per individual but ranges from \$500 to \$700. Tripp Umbach also understands that not all individuals donate; therefore, this is adjusted as well.
- The value of a volunteer hour has been quantified by Independent Sector to be \$26.40 per individual per hour. Tripp Umbach utilized this value with the understanding (also from survey research) of the average number of hours faculty, staff, and students engage in volunteer activities (estimated 100 hours per year for 50 percent of the employees and students).



## Appendix D: FAQs Regarding Economic Impact Assessment

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### What is economic impact?

Economic impact begins when an organization spends money. Economic impact studies measure the direct economic impact of an organization's spending, plus additional indirect spending in the economy as a result of direct spending. Economic impact has nothing to do with dollars collected by institutions, their profitability, or even their sustainability because all operating organizations have a positive economic impact when they spend money and attract spending from outside sources.

Direct economic impact measures the dollars that are generated within a geographic region because of the presence of an institution. This includes not only spending on goods and services with a variety of vendors within the region, and the spending of its employees and visitors, but also the economic impact generated by businesses within the region that benefit from the spending of the institution. It is important to remember that not all dollars spent by an institution stay in a geographic region of study. Dollars that “leak” out of the region in the form of purchases from out-of-area vendors are not included in the economic impact that an institution has on the region.

The total economic impact includes the “multiplier” of spending from companies that do business with an institution. Support businesses may include lodging establishments, restaurants, construction firms, vendors, temporary agencies, etc. Spending multipliers attempt to estimate the ripple effect in the economy where the spending occurs. For example: Spending by an institution with local vendors provides these vendors with additional dollars that they re-spend in the local economy, causing a “multiplier effect.”

### What is the multiplier effect?

Multipliers are a numeric way of describing the secondary impacts stemming from the operations of an organization. For example, an employment multiplier of 1.8 would suggest that for every 10 employees hired in the given industry, eight additional jobs would be created in other industries, such that 18 total jobs would be added to the given economic region. The multipliers used in this study range from 1.8 to 2.0.

The Multiplier Model is derived mathematically using the input-output model and Social Accounting formats. The Social Accounting System provides the framework for the predictive Multiplier Model used in economic impact studies. Purchases for final use drive the model. Industries that produce goods and services for consumer consumption must purchase products, raw materials, and services from other companies to create their product. These vendors must also procure goods and services. This cycle continues until all the money is leaked from the region's economy. Three types of effects are measured with a multiplier: the direct, the indirect, and the induced effects. The direct effect is the known or predicted change in the local economy that is to be studied. The indirect effect is the business-to-business transactions required to satisfy the direct effect. Finally, the induced effect is derived from local spending on goods and services by people working to satisfy the direct and indirect effects.

- **Direct effects** take place only in the industry immediately being studied.
- **Indirect effects** concern inter-industry transactions: Because an institution is in business, it has a demand for locally produced materials needed to operate.
- **Induced effects** measure the effects of the changes in household income: Employees of an institution and suppliers purchase from local retailers and restaurants.

- **Total Economic Impacts** are the total changes to the original economy as the result of the operations of an institution, i.e., Direct effects + Indirect effects + Induced effects = Total Economic Impacts.

### **What methodology was used in this study?**

IMPLAN (IMpact analysis for PLANning) data and software. Using classic input-output analysis in combination with regional specific Social Accounting Matrices and Multiplier Models, IMPLAN provides a highly accurate and adaptable model for its users. The IMPLAN database contains county, state, ZIP code, and federal economic statistics that are specialized by region, not estimated from national averages, and can be used to measure the effect on a regional or local economy of a given change or event in the economy's activity.

### **What is employment impact?**

Employment impact measures the direct employment (employees, staff, faculty, administration) plus additional employment created in the economy as a result of the operations of an institution.

Indirect and induced employment impact refers to other employees throughout the region who exist because of an institution's economic impact. In other words, jobs related to the population — city services (police, fire, EMS, etc.), employees at local hotels and restaurants, clerks at local retail establishments, and residents employed by vendors used by the institution.

### **What is the difference between direct and indirect taxes?**

Direct tax dollars include sales taxes and net corporate income taxes paid directly by the institution to the state, while indirect taxes include taxes paid to the state by vendors that do business with an institution and individuals.

### **Is this a one-time impact or does the impact repeat each year?**

The results presented in this economic impact study are generated on an annual basis. The economic impact in future years can be higher or lower based on number of employees, students, capital expansion, increases in external research, and state appropriations.

### **What are Tripp Umbach's qualifications to perform economic impact analysis?**

Tripp Umbach is the national leader in providing economic impact analysis to leading healthcare organizations, universities, and academic medical centers. Since 1990, Tripp Umbach has completed more than 300 economic impact studies for such clients as Boston University, Indiana University, Michigan State University, The Pennsylvania State University, The Ohio State University, the University of Connecticut, the University at Buffalo, University of Arizona, University of Michigan, University of California, The University of Pittsburgh, the University of Vermont, the University of Virginia, The University of Washington, and The University of Alabama at Birmingham.