

**A Study of the Economic Impact and
Benefits of UC San Diego**

Fiscal Year 2006-07

Prepared for:

UC SAN DIEGO

CBRE CONSULTING, INC.

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Re: UC San Diego Economic Impact Report, FY 2006-07

Dear Mr. Xavier:

CBRE Consulting, Inc. is pleased to present this report of the economic impacts and benefits of UC San Diego. The study estimates the quantitative economic impacts, in terms of spending, employment and personal income, of the University on the economies of San Diego, San Diego County, and the State of California. The report also describes in detail additional impacts, including student, visitor, and retiree spending impacts as well as the University's contributions to workforce development, research in the public interest, community outreach, and cultural and recreational programs.

The Summary of Findings Chapter of the report highlights key information and conclusions, fully documented in the body of the report. Please be aware that all of our analysis and conclusions are subject to the Assumptions and General Limiting Conditions included at the end of this report.

It has been a pleasure working with you on this project.

Sincerely,



Amy L. Herman, AICP
Senior Managing Director



Courtney Pash
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Justin Bain
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I. INTRODUCTION

BACKGROUND

CBRE Consulting, Inc. ("CBRE Consulting") was retained by the San Diego Campus of the University of California to conduct a study of the economic impacts of UC San Diego on the following geographies: the City of San Diego; San Diego County; and the State of California. This study focuses on the quantifiable economic impacts of UC San Diego during the 2006-07 fiscal year (FY) as well as select qualitative impacts and contributions of the University. The purpose of this study is to provide the University with a better understanding of its impact on the local, regional, and state economies.

UC San Diego is a comprehensive, Ph.D. granting, research institution located in La Jolla, California. Founded in 1960 on a commitment to provide strong educational programs in all fields, UC San Diego has become one of the finest public universities in the country, with many world-renowned graduate programs and an outstanding undergraduate program. It is particularly impressive that UC San Diego has achieved this level of excellence in less than 50 years, and has gained increasing momentum in the last 20 years.

UC San Diego is part of the ten-campus University of California system, which educates more than 220,000 students, and includes more than 170,000 faculty and staff. The UC San Diego campus is located on 1,200 acres along the coast of the Pacific Ocean, and total campus enrollment for Fall 2007 was 27,500 students. The National Science Foundation ranks UC San Diego 7th in the nation in federal research and development expenditures, and total research funding for 2005-2006 was approximately \$733.3 million. The University also ranks 7th in the nation in National Academy of Sciences membership. The National Research Council (NRC) ranks UC San Diego 10th in the nation in the quality of its faculty and graduate programs, and also ranks oceanography and neurosciences at UC San Diego as first in the nation.

UC San Diego's graduate and professional schools include the Scripps Institution of Oceanography; the School of Medicine; School of International Relations and Pacific Studies; Skaggs School of Pharmacy; Jacobs School of Engineering; and the Rady School of Management. The campus is also home to the UC San Diego Medical Center, the San Diego Supercomputer Center, and the Center for U.S.-Mexican Studies.

Undergraduate education at UC San Diego is organized around the six colleges, led by college provosts, who have responsibility for the general education curricula; undergraduate majors and degree programs are overseen by divisional deans and department chairs.

SCOPE OF WORK

In undertaking this assignment, CBRE Consulting obtained information from the University, conducted independent research, and analyzed the impact of University operations and related University activities. UC San Diego's academic programs, alumni, faculty, research, employment, spending, students, and visitors were all examined in detail to create an overall picture of the University's economic impacts. Financial data were gathered, including the University's payroll and purchasing as well as student spending. In addition, non-financial data were analyzed and integrated into the report, including UC San Diego's contribution to the regional workforce, business creation, research, and community development efforts. Finally, CBRE Consulting, with input from the economic consulting firm Applied Economics, used the

IMPLAN input-output model to calculate the indirect and induced economic impacts of UC San Diego's spending.

To the extent possible, all data were gathered for three geographic regions: the City of San Diego, San Diego County, and the State of California. The most recent fiscal year for which data were generally available was 2006-07. Therefore, to the extent possible, all data collected and analyzed pertain to this period.

ORGANIZATION OF THE REPORT

Following Chapter II, Summary of Findings, the report begins with a brief overview of the Southern California, San Diego County, and San Diego economies. Next, the report examines the role of UC San Diego in developing the workforce of these economies through its academic mission and programs. The following two chapters analyze and discuss the overall economic impact of UC San Diego in terms of spending, employment, and income. These impacts include direct as well as indirect and induced impacts, as estimated by the IMPLAN input-output model. The report then considers the economic impact of UC San Diego students, visitors, and retirees. Following this, the report considers other, less tangible ways that UC San Diego affects the economy and community through its research and technology transfer, its outreach and community service programs, and its cultural and recreational offerings.

Rounding Standards

Unless otherwise noted, figures in this report are rounded according to the following protocol:

- Billions: to three decimal places;
- Millions: to four significant digits;
- Hundreds of thousands: to the nearest multiple of 100;
- Tens of thousands: to the nearest multiple of ten; and
- Thousands: to the nearest multiple of ten.

As an exception to these rules, all percentages are expressed to one decimal place and all IMPLAN multipliers are expressed to two decimal places, in order to reflect their inherent level of precision.

II. SUMMARY OF FINDINGS

REPORT HIGHLIGHTS

The following bullet points highlight major findings from the body of this report.

Regional Framework

- Approximately 3.098 million people currently reside in San Diego County, and by 2020 the population is projected to grow by 822,020 people.
- There are approximately 1.510 million jobs in San Diego County with an additional 356,400 jobs projected to be added by 2020, for an annual growth rate of 1.2 percent.
- San Diego's unemployment rate of 5.0 percent is lower than California's unemployment rate of 5.9 percent.
- UC San Diego is the third largest employer in San Diego County.
- The median household income in San Diego in 2007 was \$69,530 (in constant 2007 dollars) and is expected to grow by approximately 4.1 percent per year through 2010.
- The median home price in San Diego is \$399,000, and home prices are projected to decline for the next two years before stabilizing in 2010.
- Defense, technology, manufacturing and tourism sectors are the most prominent industries in the region.

UC San Diego contributions to the Regional Workforce

- The US News and World Report ranked UC San Diego 8th in the United States among public universities.
- During FY 2006-07, UC San Diego conferred 6,500 degrees, including many in math, computer science, biology and engineering.
- Nearly one-third of UC San Diego alumni currently reside in San Diego County.
- UC San Diego Extension offers 2,000 continuing education courses to working professionals and other adult residents in the region.
- UC San Diego faculty and alumni have started hundreds of successful companies in San Diego, California, and around the world.

UC San Diego Contributions to the Medical and Health Sectors

- Approximately 650 School of Medicine alumni live in San Diego County, many serving patients throughout the wide spectrum of medical specialties.
- Several major organizations on campus specialize in medical research including the Rebecca and John Moores Cancer Center.
- The UC San Diego Medical Center serves 21,000 inpatients and 476,000 outpatients annually.
- Enrollment in the Skaggs School of Pharmacy and Pharmaceutical Sciences has stabilized at 60 students per class.

University Purchasing and Payroll

- UC San Diego is a major employer as well as a significant purchaser of goods and services in San Diego County.
- UC San Diego's revenues totaled approximately \$2.306 billion in FY 2006-07.
- An estimated \$1.710 billion in salaries and wages, goods and services, and construction were spent by UC San Diego in the County of San Diego.
- In FY 2006-07 UC San Diego paid more than \$1.137 billion in salaries and wages.
- UC San Diego purchased \$1.015 billion worth of goods and services and spent \$340.7 million on capital expenditures in FY 2006-07.
- UC San Diego spent \$625.3 million on goods, services, and construction in San Diego County.
- Annually, \$800.0 million is spent by UC San Diego Medical Center.

Direct, Indirect and Induced Economic Impacts

- The impact of spending by UC San Diego in the City of San Diego was \$2.275 billion in total spending, 20,790 jobs, and \$1.228 billion in personal income.
- The impact of spending by UC San Diego in the County of San Diego was \$917.3 million in total spending, 8,360 jobs, and \$482.9 million in personal income.
- The impact of spending by UC San Diego elsewhere in the State of California was \$829.9 million in total spending, 5,090 jobs, and \$613.2 million in personal income.
- The total impact of spending by UC San Diego in the State was \$4.022 billion in total spending, 34,230 full-time equivalent jobs, and \$2.324 billion in personal income.

University Student, Visitor and Retiree Impacts

- In FY 2006-07 approximately 26,880 undergraduate and graduate students spent \$242.6 million throughout San Diego County.
- 13,800 University Extension students and 2,200 international students spent a combined total of \$8.486 million in San Diego County.
- The 1.431 million visitors to UC San Diego spent \$6.266 million in San Diego County in FY 2006-07.
- The 3,560 retired employees living in San Diego County spent \$111.1 million in the County.

Research at UC San Diego

- A wide variety of research is conducted at UC San Diego which in turn is a significant generator of jobs and income.
- UC San Diego "imports" grants and contracts awards from outside San Diego County, which in turn provide considerable economic value to the region.
- In FY 2006-07 UC San Diego spent approximately \$714.3 million on research.
- During FY 2006-07, 85 license agreements were formulated, 373 new inventions were disclosed, and 64 patents were added to the University's patent portfolio. UC San Diego currently holds over 500 active patents, ranking third among all UC campuses.
- At least 193 companies have been founded by UC San Diego faculty or alumni.
- At least \$10.248 billion in annual sales were generated by UC San Diego start up companies in California alone.

UC San Diego Community Outreach, Service and Partnerships

- A host of community outreach and academic enrichment programs attest to the efforts by UC San Diego to support economically disadvantaged and at risk students, with The Pruess School serving as just one example.
- UC San Diego has over 70 volunteer student service organizations.
- UCSD-TV, CONNECT and ATHENA are some examples of the many partnerships between UC San Diego and the community.

Cultural and Recreational Programs

- The Stuart Collection, University Art Gallery, Music, Theatre and Dance performances, Art Power!, and La Jolla Playhouse are just five examples of the many cultural and art offerings at UC San Diego.
- Approximately 400,000 people visit the Birch Aquarium annually.
- 19 different athletic teams compete in over 180 events.
- 228 fitness classes are offered by Campus Recreation and are open to the public.

THE REGIONAL FRAMEWORK

The main campus of UC San Diego is located within the City of San Diego, the seat of San Diego County and the largest city within the County. The San Diego region, comprised of 18 cities and the County government, is served by the San Diego Association of Governments (SANDAG). In 2007, San Diego County's population was nearly 3.098 million people, ranking as the second most-populated County in California. Between 2000 and 2020 population in the County is projected to grow at an average annual rate of 1.1 percent, adding 822,000 people by 2020.

San Diego County is a job hub in Southern California with 1.510 million jobs and growth projected to remain strong. Job growth is expected to exceed household growth through 2020. Approximately 252,800 new homes are projected with 356,000 additional jobs. This strong average annual growth rate of 1.2 percent demonstrates the resilience of the local economy even during the state's economic downturn of the early 2000s.

Traditionally, the San Diego County economy has been dominated by the defense, technology, manufacturing, and tourism sectors. The current employment growth leaders are software and technology-based industries, including biotechnology. These industries have helped carry the defense and manufacturing industries as these industries, particularly their presence in the San Diego economy, currently rely more heavily on technological innovations than in the past. The financial services industry is also compensating for the recent housing crisis by gravitating towards entrepreneurial investment and investing in the technology industries as opposed to residential development.

Institutions of higher education have traditionally been major regional industry sectors as well. In 2007, four of the top 20 employers in San Diego County were institutions of higher education. These four institutions contributed 19.4 percent of all jobs within the top 20 employers.¹ Aside from contributing a significant number of jobs, institutions of higher

¹ See Table 3 on page 19. The four institutions are UC San Diego, San Diego State University, San Diego Community College District, and University of San Diego. Collectively, these institutions contributed 47,090 jobs in 2007.

education provide the local economy with a revenue stream that is relatively impervious to economic downturns.

CONTRIBUTIONS TO THE REGIONAL WORKFORCE

UC San Diego's undergraduate program is organized around six residential colleges, each complete with their own campus, residences, offices, and general education courses and specialty courses. Students belong to each college but can focus their study within any of the following six divisions: Arts and Humanities, Biological Sciences, Physical Sciences, Social Sciences, and the Jacobs School of Engineering. Also Graduate students play an integral role in UC San Diego campus life. There are several graduate and professional schools at UC San Diego including the Graduate School of International Relations and Pacific Studies (IR/PS), Rady School of Management, UC San Diego School of Medicine, and Skaggs School of Pharmacy and Pharmaceutical Sciences. The University offers 114 undergraduate and graduate degree programs throughout its various departments and schools. In FY 2006-07, enrollment was approximately 26,880 students comprised of 21,370 undergraduate and 5,510 graduate students.

Degree Programs and Graduates

The highly skilled graduates of UC San Diego's colleges and schools are perhaps the University's most significant contribution to the San Diego County and California economies. Of the alumni for which there are available data, approximately 78.4 percent live in the State of California in 2007.² Of these alumni, approximately 33.3 percent of the total live in San Diego County.

Each year, UC San Diego graduates add to the pool of skilled labor in the region and throughout the state. In the 2006-07 Fiscal Year, UC San Diego conferred approximately 6,500 degrees, including 5,060 bachelor's, 901 master's, and 535 doctoral degrees.

The tourism, manufacturing, transportation, defense, biotechnology, technology, and construction sectors have traditionally driven the San Diego County economy. While the construction sector has slowed in recent months due to the downturn in the housing industry, the professional sectors have remained stable in San Diego. These industries rely on a more highly-educated workforce to operate the sophisticated technology that is ever more critical to doing business in the "new economy." In particular, San Diego's economy relies heavily on jobs requiring at least a bachelor's degree as the minimum level of education.³

UC San Diego plays a major role in supporting the growth of the San Diego County economy by providing a steady stream of bachelor's, master's, and doctoral degree recipients to the local workforce each year. In FY 2006-07 UC San Diego graduated 233 B.S. degrees and 58 M.S. degrees in Math and Computer Science, and 155 B.S. degrees, 34 M.S. degrees, and 20 Ph.D.'s in Bioengineering, which supported the expansion of the skilled labor pool for high-tech businesses and biotech businesses in San Diego. There were also: 139 B.S. degrees, 33 M.S. degrees, and 12 Ph.D.'s awarded in Mechanical Engineering; 81 B.S. degrees, 23 M.S.

² For the purposes of determining alumni residence, alumni are defined as all persons who have enrolled in UC San Diego undergraduate or graduate programs for at least six months.

³ "Occupational Employment Projections," California State Employment Development Department (EDD), <http://www.labormarketinfo.edd.ca.gov>

degrees, and 9 Ph.D.'s awarded in Structural Engineering; and 59 B.S. degrees, 16 M.S. degrees, and 12 Ph.D.'s awarded in other engineering majors. These degree programs provided the manufacturing, transportation, defense, and construction industries with a deep pool of skilled labor.

UC San Diego Extension

In addition to graduates of UC San Diego's degree programs, the University contributes to the development of the regional workforce through its UC San Diego Extension continuing education programs. These programs help enhance and develop the skills of working professionals and other adult residents in the region. UC San Diego Extension offers specialized studies, certificate programs, and professional degrees in partnership with campus departments. Approximately 100 certificate programs and twelve specialized study programs are offered at UC San Diego Extension. In 2006-07, there were a total of approximately 20,000 enrollments in some 2,000 UC San Diego Extension courses.⁴

Businesses Founded by UC San Diego Alumni and Faculty

In addition to providing skilled workers to the region, UC San Diego faculty and alumni have started hundreds of successful companies in San Diego, California and around the world. These companies range from very small startups to the Fortune 500, Qualcomm Incorporated. The companies contribute to the local economy by attracting revenue dollars from outside the region, employing local residents, and making expenditures that generate further economic impacts.

UC San Diego personnel and CBRE Consulting identified at least 193 companies founded by UC San Diego faculty and alumni.⁵ Of these, CBRE Consulting identified operational information for 67 of the businesses located in California and found that 28 companies have been acquired by other companies. The 67 businesses currently operating in California for which data were available achieved an estimated \$10.239 billion in revenue in 2007 and had combined employment of approximately 17,260.⁶ These high revenue and employment levels are strong indicators of local economic impacts, attributable to company expenditures on personnel (salaries and wages) and goods and services. In addition, these businesses support the local real estate industry through their real estate operations. Please note, these impacts are in large part due to Qualcomm's revenue. The list of companies, their annual sales, number of employees, and year started are listed in Appendix C.

⁴ Total enrollments include 2,200 international students and 4,000 on-line students. Estimates of enrollment and number of programs are approximate figures provided by UC San Diego Extension.

⁵ UC San Diego Tech TIPS and Office of Alumni Relations personnel acknowledge that the actual list of companies founded by UC San Diego faculty and alumni exceeds 193 names, but not all of the companies are actively tracked by those offices.

⁶ These figures are considered underestimates based on CBRE's understanding that there are other companies affiliated with UC San Diego faculty and alumni, that are not tracked by UC San Diego offices.

QUANTITATIVE ECONOMIC IMPACTS

University Purchasing and Payroll

In addition to its contributions to workforce development, UC San Diego is a significant economic force in the San Diego region by virtue of its position as a major employer and a major purchaser of goods and services.

Sources of Revenue. The impact of the University on the local economy can be measured to some degree by the amount of revenue it collects from outside the region, revenue that is then used to finance spending on salaries and goods within the region. In FY 2006-07, University revenues totaled \$2.306 billion, of which approximately 45.9 percent came from sources outside of San Diego County.

UC San Diego Spending. The majority of UC San Diego's spending was concentrated in San Diego County. During FY 2006-07, the University spent nearly \$2.492 billion on salaries and wages, goods and services, and construction, of which an estimated \$1.710 billion, or 68.6 percent, was spent in San Diego County. Since approximately \$1.247 billion of the University's revenue came from sources within the County, this means that UC San Diego made a net contribution of approximately \$463.1 million to the local economy.

Employment and Payroll. UC San Diego is the third major employer in the San Diego Region Behind the State of California (40,600 employees) and the Federal Government (39,900 employees). In FY 2006-07, UC San Diego paid \$1.137 billion in salaries and wages to 1,260 student and 15,500 non-student employees.

Purchasing and Construction. In FY 2006-07, UC San Diego purchased more than \$1.015 billion worth of goods and services and spent nearly \$340.7 million on capital expenditures. Over \$625.3 million, or 46.1 percent, of UC San Diego's total purchasing on goods, services, and construction was collectively spent in San Diego County during FY 2006-07.

Direct, Indirect, and Induced Economic Impacts of UC San Diego Spending

The impact of UC San Diego on the economy is greater than the total of the University's direct spending on salaries and wages, goods and services, and construction. This is because money spent by the University is spent again by the recipient employees and local businesses. Employees use their salaries and wages to purchase from other businesses. Businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local, regional, and state economies. A chain reaction of indirect and induced spending continues, with subsequent rounds of additional spending gradually diminished through savings, taxes, and expenditures made outside the state.

Using the IMPLAN input-output Model, and with the assistance of Applied Economics, CBRE Consulting estimated the "total" economic impacts – including direct, indirect, and induced economic impacts – of University purchases of goods and services, payroll expenditures, and spending on capital projects during the 2006-07 fiscal year. The analysis estimates total impacts in three distinct ways – spending, full-time equivalent employment, and personal income – at the city, county, and state levels. Findings from this analysis include the following:

- The impact of spending by UC San Diego in the City of San Diego was approximately \$2.275 billion in total spending, 20,790 jobs, and \$1.228 billion in personal income.
- UC San Diego's spending generated an additional impact elsewhere in San Diego County of approximately \$917.3 million in total spending, 8,360 jobs, and \$482.9 million in personal income.
- UC San Diego's spending contributed elsewhere in California another \$829.9 million in total spending, 5,090 jobs, and \$613.2 million in personal income.
- In all, UC San Diego's total economic impact in California was approximately \$4.022 billion in total spending, 34,230 full-time equivalent jobs, and \$2.324 billion in personal income statewide in the 2006-07 fiscal year.

University Students, Visitors, and Retiree Impacts

In addition to the impact of UC San Diego as an institution, the presence of the University anchors students, visitors, and UC San Diego retirees to the local area; their presence in turn supports the local, regional, and state economies.

- Total UC San Diego student enrollment in 2006-07 was 26,880 students, approximately 93.1 percent of whom lived in the City of San Diego. A conservative estimate of student spending suggests that students spent \$207.3 million in the City of San Diego, an additional \$35.26 million elsewhere in San Diego County, and an additional \$13.89 million in the rest of California.
- Enrollment in the University Extension's Continuing Education courses (excluding 4,000 on-line students and 2,200 international students) totaled approximately 13,800 in FY 2006-07, with a direct spending impact to the City of San Diego conservatively estimated at \$399,400.⁷
- Approximately 2,200 international students came to UC San Diego in FY 2006-07 through the International Student office. Based on conservatively estimated capture rates and the data on average student spending provided by campus departments and other sources, it is estimated that UC San Diego international students spent nearly \$7.004 million in the City of San Diego, an additional \$1.082 million elsewhere in San Diego County, and another \$2.272 million in the rest of California.
- Combined, University Extension students (both continuing education and international students) spent nearly \$7.404 million in the City of San Diego, an additional \$1.082 million elsewhere in San Diego County, and another \$2.272 million in the rest of California during the 2006-07 fiscal year.
- Each year, UC San Diego attracts thousands of visitors to commencement ceremonies, academic programs, libraries, museums, performances, athletic events, summer camps and workshops, and other special events. More than 1.431 million visitors came to the

⁷ International students are excluded from this figure because they are accounted for separately. On-line students are excluded because on-line students are not required to travel to the UC San Diego campus for classes, and therefore do not generate spending impacts.

UC San Diego campus during FY 2006-07. Based on information regarding the nature of the various events, CBRE Consulting estimated that visitors to UC San Diego campus events spent \$5.710 million in San Diego during the 2006-07 fiscal year, and another \$555,600 elsewhere in the County.

- According to data from the UC Office of the President, in January 2008 there were 4,750 retired employees from UC San Diego, 3,910 of whom live in the State of California. Of the California residents, 1,870 live in the City of San Diego and 1,690 live elsewhere in San Diego County. Total annual retirement benefit payments to UC San Diego retirees in California during the 2006-07 fiscal year were nearly \$116.7 million.

Using the IMPLAN input-output model, CBRE Consulting estimated that the spending associated with UC San Diego students, extension students, international students, visitors, and retirees in FY 2006-07 generated the following direct, indirect, and induced spending, employment, and income impacts:⁸

- In the City of San Diego, \$388.0 million in total spending, 3,440 jobs, and \$163.0 million in personal income.
- An additional impact of approximately \$138.5 million in total spending, 1,040 jobs, and \$92.95 million in personal income elsewhere in San Diego County.
- An additional impact of approximately \$73.44 million in total spending, 297 jobs, and \$31.77 million in personal income elsewhere in the State.
- In all, students, visitors, and retirees at UC San Diego had a total economic impact in California of \$599.9 million in total spending, 4,770 full-time equivalent jobs, and \$287.8 million in personal income statewide in the 2006-07 fiscal year.

Total University Economic Impacts

Table 1 summarizes estimated overall impacts for the 2006-07 fiscal year. In all, the combined impacts of the University, its students, campus visitors, and UC San Diego retirees were as follows:

⁸ All employment impacts are measured on a full-time equivalent (FTE) basis.

Table 1: Summary of Economic Impacts in California, 2006-07

<u>Geography/Category</u>	<u>Total University Impacts</u>	<u>Total Student, Visitor, and Retiree Spending Impacts</u>	<u>Combined Impacts</u>
City of San Diego			
Total Spending	\$2,274,994,174	\$388,035,613	\$2,663,029,787
Total Jobs	20,786	3,437	24,224
Total Personal Income	\$1,227,596,635	\$163,038,810	\$1,390,635,445
Other San Diego County			
Total Spending	\$917,320,512	\$138,470,050	\$1,055,790,562
Total Jobs	8,355	1,036	9,391
Total Personal Income	\$482,917,747	\$92,946,914	\$575,864,661
Other California			
Total Spending	\$829,888,301	\$73,438,674	\$903,326,975
Total Jobs	5,087	297	5,384
Total Personal Income	\$613,177,728	\$31,774,418	\$644,952,147
Total UC San Diego Impacts			
Total Spending	\$4,022,202,987	\$599,944,337	\$4,622,147,323
Total Jobs	34,229	4,771	38,999
Total Personal Income	\$2,323,692,111	\$287,760,142	\$2,611,452,253

Sources: UC San Diego; and CBRE Consulting.

Notes: Figures may not add due to rounding. Geographies are independent of one another.

- In the City of San Diego, \$2.663 billion in total spending, 24,220 total jobs, and \$1.391 billion in personal income.
- An additional impact of approximately \$1.056 billion in total spending, 9,390 jobs, and \$575.9 million in personal income elsewhere in San Diego County.
- An additional impact of approximately \$903.3 million in total spending, 5,380 jobs, and \$645.0 million in personal income elsewhere in the state.
- The combined economic impacts in California were \$4.622 billion in total spending, 39,000 full-time equivalent jobs, and \$2.611 billion in personal income.

RESEARCH AND MEDICAL CONTRIBUTIONS

Contributions to the Medical and Health Sector

UC San Diego plays a critical role in supporting the medical and health sector in San Diego County. The School of Medicine and Skaggs School of Pharmacy and Pharmaceutical Sciences train the next generation of physicians. The research institutions and centers focus on a combination of medical education, research, and patient care, thus benefiting the San Diego community and beyond. In addition, the UC San Diego Medical Center offers healthcare services to the region-wide population with many services aimed at addressing the healthcare needs of underserved communities in the region.

Research Contributions

As an engine of knowledge creation, UC San Diego contributes to the economy of San Diego County and the State of California in several important ways. First, because most research

funding is sponsored by the Federal government, with a lesser amount from foundations and major corporations, University research is a significant generator of jobs and income. It is, in effect, a major export industry, bringing into San Diego County millions of dollars from sources outside the region. Second, the products of University research have potential commercial applications and provide the basis for creation of new enterprises or the expansion of existing ones. Finally, the presence of a large academic research complex in the region serves as a magnet for corporate research and development centers and related enterprises.

Equally important, the research conducted at the numerous centers and institutions at UC San Diego helps to advance the knowledge and understanding of issues of great importance in today's society and contributes to the development of technologies that improve the quality of life in countless ways. This research focuses on concerns related to a wide variety of issues such as engineering, biology, health science, the environment, and international relations.

University Research as an Export Industry. The National Science Foundation ranks UC San Diego 7th in the nation in federal research and development expenditures.⁹ Spending associated with sponsored research projects at UC San Diego during Fiscal Year 2006-07 totaled \$716.1 million.¹⁰ The Federal government provided approximately 71.1 percent of the funding for the University's research expenditures during the year. Total research funding has increased significantly at UC San Diego, with total research awards reaching nearly \$714.3 million in the 2006-07 fiscal year, up 13.9 percent from 2002-2003.

Contributions of Key Research Programs at UC San Diego. UC San Diego has many research centers, programs, and institutions. These research centers span the fields of engineering, natural and agricultural sciences, humanities, social sciences, education, and international relations. Some of the key UC San Diego research projects, centers, and institutions, and their contributions locally and beyond, include the following:

- **The Scripps Institution of Oceanography.** Scripps Institution of Oceanography is one of the oldest, largest, and most important centers for marine science research, graduate training, and public service in the world, and currently operates more than 300 research programs in 65 countries, on every continent, and in every ocean worldwide.¹¹ UC San Diego scientists at Scripps Institution of Oceanography are pioneers in climate change science and the first to precisely measure greenhouse gases in the atmosphere. The Scripps Institution of Oceanography also operates Birch Aquarium in La Jolla as a public forum for its research findings.
- **California Institute for Telecommunications and Information Technology (Calit2).** Calit2 focuses on innovation in technologies related to the life sciences, telecommunication, information technology, and nanotechnology. Calit2 plays an influential role in the local knowledge community by developing and deploying prototype infrastructure and devices to be used by other research departments in real-world contexts.
- **Whitaker Institute of Biomedical Engineering (WIBE).** The Whitaker Institute of Biomedical Engineering (WIBE) aims to advance knowledge in biomedical engineering by promoting

⁹ Ucsdnews.ucsd.edu/new/html-prototypes/about/index.html

¹⁰ These impacts of UC San Diego research spending are included in the estimated economic impacts discussed in Chapter VI.

¹¹ Figures are estimates provided by the Scripps Institution of Oceanography.

interdisciplinary research and training among engineering, biology, and medicine, with the ultimate goal of improving the health and quality of human life. This coordination between engineering and biomedical research allows the unique generation of quantitative research in the biomedical field and leads to innovative investigative approaches.

- ***Institute on Global Conflict and Cooperation (IGCC)***. The Institute on Global Conflict and Cooperation (IGCC) is a multi-campus research unit (MRU) serving all ten UC campuses and the Los Alamos and Lawrence Livermore National Laboratories. Through its many research programs, the IGCC provides opportunities for UC faculty and students to collaborate with government officials domestically and internationally, to establish effective international policy.
- ***The Center for Comparative Immigration Studies (CCIS)***. A campus-wide research unit of UC San Diego established in 1999 as part of the Division of Social Sciences, CCIS conducts basic and policy-oriented research projects on international migration and refugee flows throughout the world. These studies seek to illuminate the U.S. immigration experience through systematic comparison with other countries of immigration, especially in Europe and the Asia-Pacific region.
- ***Graduate School of International Relations and Pacific Studies (IR/PS)***. IR/PS operates a number of research centers and affiliated programs that aim to mold the forces of economic growth, technological innovation, and environmental and security challenges into positive instruments of peace, prosperity, and democracy. For example, the **Center on Pacific Economies (CPE)** examines why countries in the Pacific region, the Americas, and Asia differ in their ability to maintain sustainable growth, financial stability, technological innovation, and economic equity. The **Center for U.S.-Mexican Studies** supports research relevant to current policy issues between Mexico and the United States, which is a growing area of interest for the government of both countries.

From the Laboratory to the Marketplace

UC San Diego policy encourages the practical application of research for the public benefit. To this end, UC San Diego's Office of Technology Transfer and Intellectual Property Services (TechTIPS) assists in the disclosure and development of campus researchers' invention properties and encourages their further development through licensing or business start-ups. In FY 2006-07, UC San Diego faculty and staff disclosed 373 new inventions, 64 U.S. patents were added to the University's patent portfolio, and 85 license agreements were formulated.

The **William J. von Liebig Center** also provides support for UC San Diego research projects approaching commercialization. The von Liebig Center catalyzes the commercialization of early stage technologies specifically out of the Jacobs School of Engineering. In five years since its founding on campus in 2001, the von Liebig Center has funded 66 early-stage technologies with grants of up to \$50,000. These projects have resulted in 19 licenses and helped to launch 15 start-up companies, which have attracted more than \$71.00 million in subsequent capital from the private sector.¹²

¹² Information provided by Rex Graham, Communications Director for Jacobs School of Engineering, May 28 2008. The start-up companies that received assistance from the von Liebig Center were included in the analysis of start-up companies in Appendix C, Table 31 and Table 32.

The technologies developed through research at UC San Diego offer strong promise for commercial application. The commercialization of these technologies could over time yield significant economic benefits to the San Diego County region, the State of California, and the nation. A few examples of the University's research achievements and their applications include the following.

- **Tinnitus Otosound Products.** Three collaborating UC San Diego researchers theorized that generating external auditory stimuli to match the exact frequency of the sound in a patient's brain could mitigate the ringing within their brain. The result of their research is Customized Sound Therapy, which mitigates the ringing experienced by over 30 million Americans. Since the company was formed in 2003, Tinnitus Otosound Products has operated on roughly \$550,000 in grants, refining its technology and conducting trials for the Food and Drug Administration so that the therapy may be classified as a medical treatment as opposed to only a mitigation device.¹³
- **App2You.** App2you builds database-driven web applications based on user-provided sketches that describe the page structure and the flow of information on the page in simple, non-technical terms. Sophisticated algorithms are applied to the back-end database design based on the options chosen by the user.¹⁴ In this way, sophisticated web database applications may be easily created by users without web design experience.
- **Traversa Therapeutics, Inc.** Traversa Therapeutics, Inc. was founded by researchers at the Howard Hughes Medical Institute at UC San Diego in mid-2006 and has secured worldwide exclusive licenses to intellectual property. The company engages in two core tasks: the discovery, development, and commercialization of an RNAi delivery platform that can be utilized by therapeutic companies to treat acute, chronic, and infectious human diseases; and the advancement of the company's own therapeutic programs for the specific treatment of Leukemia and Glioblastoma.

UC San Diego's direct, indirect, and induced economic impacts associated with start-up companies like Tinnitus Otosound Products, App2You, and Traversa Therapeutics, Inc. were estimated using multipliers provided by the IMPLAN input-output model. Of the 193 company names on record with UC San Diego offices, CBRE Consulting identified 67 companies that remained independent and operational in the State of California.¹⁵ The direct, indirect, and induced economic impacts associated with these 67 companies are estimated as follows:

- \$22.621 billion in spending, 85,100 jobs, and \$5.875 billion in personal income generated within the City of San Diego,
- \$2.834 billion in spending, 29,400 jobs, and \$736.7 million in personal income generated in other areas of San Diego County,

¹³ The operating budget for Tinnitus Otosound Products is based on information provided in an article published by the New York Times on January 18, 2007 titled "The Route from Research to Start-Up."

¹⁴ Jacobs School of Engineering, Pulse newsletter, spring 2007.

¹⁵ UC San Diego personnel acknowledge that the original list of 193 companies is not comprehensive, and therefore the economic impacts estimated for the 67 identified companies are conservative.

- Another \$3.832 billion in spending, 15,080 jobs, and \$1.539 billion in personal income generated in the State of California excluding San Diego County.
- Total statewide impacts are \$29.287 billion in spending, 129,570 total jobs, and \$8.150 billion in personal income generated.

COMMUNITY OUTREACH, SERVICE, AND PARTNERSHIPS

In addition to its commitment to high quality education and research, it is the University's vision to "be a vital part of the fabric of San Diego's diverse communities."¹⁶ UC San Diego accomplishes this in a wide variety of ways, including community outreach programs, partnerships with local and regional governments and non-profits, academic service-learning, and UC San Diego student, staff and faculty volunteerism.

UC San Diego Community Outreach Programs

Many of the University's community outreach programs focus primarily on efforts to improve the quality of education in San Diego County and to enhance the educational opportunities and achievement of local students. These outreach efforts include programs targeted at economically disadvantaged and at-risk students, academic enrichment for local students, and programs that provide teacher training and other support for local educators.

Community Partnerships

UC San Diego participates in several ongoing partnership initiatives with local, regional, and state government agencies, as well as community service organizations and non-profits. Examples of these partnership initiatives include UCSD-TV, and the Lesbian Gay Bisexual Transgender Resource Center (LGBT). UC San Diego also helped to establish CONNECT, a local organization that collaborates with scientists, engineers, innovators, and the venture capital community to commercialize technology and build successful companies.¹⁷

Academic Service-Learning

In addition to outreach and partnership initiatives, the University incorporates community service directly into the curriculum of its graduate and undergraduate programs and encourages students to become involved. Many graduate and undergraduate course internships include paid and unpaid work at public service and community-minded organizations. Some examples of other service-learning and community involvement opportunities include Partners at Learning (PAL) and Teams in Engineering Service (TIES).

Student, Staff, and Faculty Volunteer Programs

The contributions of the UC San Diego community extend beyond formal initiatives, programs, and courses. UC San Diego students, staff, and faculty are also very active in community service through individual and group volunteerism. There are more than 70 student volunteer service organizations at UC San Diego. Through UC San Diego's Volunteer Connection, students are connected to various volunteer opportunities in the community. Students dedicate thousands of

¹⁶ *UCSD and You* publication, Department of Government and Community Relations.

¹⁷ <http://www.connect.org/about>

hours of service each year to organizations including Best Buddies, Eyes on the Elderly, Active Students for Teens, and Community Outreach Effort (CORE).

CULTURAL AND RECREATIONAL PROGRAMS

UC San Diego provides a wide range of cultural programs that are open to local residents along with students, faculty, and staff. Cultural offerings include programming in the visual and performing arts, hosting prominent artists who put on performances and exhibitions, and providing venues for local artists to display their talents. A few examples of UC San Diego's cultural offerings include The Stuart Collection, University Art Gallery, Musical Performances, Theatre and Dance Performances, and ArtPower.

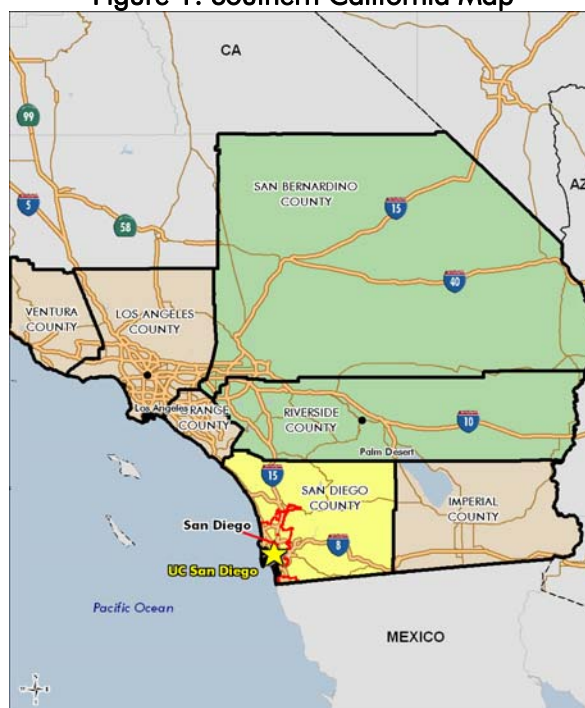
Through collegiate sporting events, athletic facilities, gardens and public spaces, UC San Diego provides a wide variety of recreational opportunities to the local community. A sampling of these offerings include: Intercollegiate Athletics, Recreational Facilities Program, and the Birch Aquarium at Scripps Institution of Oceanography.

III. THE REGIONAL FRAMEWORK

THE SAN DIEGO REGIONAL ECONOMY

The San Diego region, comprised solely of San Diego County, is one of California’s most dynamic regions. The efforts of the University within the region are increasingly critical in supporting and shaping it. The region, comprised of 18 cities and the County government, is covered by the San Diego Association of Governments (SANDAG). In 2007 San Diego’s population was 3.098 million people, ranking as the second most-populated County in California. The County’s population as a whole grew by an annual average rate of 1.4 percent between 2000 and 2007, adding 284,400 people. Between 2000 and 2020 the rate of population growth is projected to stabilize at an annual average rate of 1.3 percent, adding 822,000 people by 2020.

Figure 1: Southern California Map



Employment in San Diego County grew modestly between 2000 and 2007, adding 125,600 jobs for a total employment of 1.510 million. Job growth is expected to increase approximately 1.2 percent annually between 2000 and 2020, with a projected increase of approximately 356,400 jobs. Median household income in San Diego County was estimated at approximately \$69,500 in 2007 (in constant 2000 dollars).

Table 2 highlights some key measures of economic growth for California, San Diego County, and the City of San Diego between 2000 and 2020.

Table 2: San Diego Regional Economic Growth

	2000	2007	2010	2020	Aggregate Change		Compound Average Annual Growth	
					2000 - 2010	2010 - 2020	2000 - 2010	2010 - 2020
Population								
City of San Diego	1,223,400	1,316,837	1,365,130	1,514,336	141,730	149,206	1.1%	1.0%
San Diego County	2,813,833	3,098,269	3,245,279	3,635,855	431,446	390,576	1.4%	1.1%
California	34,105,437	37,771,431	39,135,676	44,135,923	5,030,239	5,000,247	1.4%	1.2%
Households								
City of San Diego	450,691	483,992	496,747	546,835	46,056	50,088	1.0%	1.0%
San Diego County	994,677	1,081,234	1,125,611	1,247,522	130,934	121,911	1.2%	1.0%
California	11,502,870	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Employment								
City of San Diego	777,600	848,159	880,326	956,165	102,726	75,839	1.2%	0.8%
San Diego County	1,384,676	1,510,265	1,573,742	1,741,033	189,066	167,291	1.3%	1.0%
California	15,829,202	17,314,600	N/A	N/A	N/A	N/A	N/A	N/A
Median Household Income (1)								
City of San Diego	\$48,526	\$66,325	\$72,036	\$103,339	23,510	31,304	4.0%	3.7%
San Diego County	\$50,101	\$69,527	\$75,057	\$108,489	24,957	33,431	4.1%	3.8%
California	\$50,241	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sources: State of California Department of Finance (DOF) Race/Ethnic Population Tables, February 2008; State of California Employment Development Department (EDD) Employment by Industry Data Tables; San Diego Association of Governments (SANDAG) 2030 Regional Growth Forecast Updates, and Population and Housing Estimates; and CBRE Consulting.

Notes: Median household income is expressed in constant 2007 dollars for the baseline year of this report, which is Fiscal Year 2006-07.

San Diego County is the 17th largest region in the Country, and continues to grow. The rate of growth for the County is in line with California’s growth as a whole. San Diego County has net negative migration with many residents moving to the less expensive Inland Empire region of Southern California.¹⁸ San Diego will, however remain a strong job center.

San Diego County is a job hub with 1.510 million jobs and growth projected to remain strong. Job growth is expected to exceed household growth over the 20-year period presented. 252,800 new homes are projected compared to 356,400 additional jobs. This strong average annual growth of 1.2 percent demonstrates the resilience of the local economy even during the state’s economic downturn of the early 2000s. Additionally, the unemployment rate in San Diego County was 5.0 percent as of December 2007, significantly less than the statewide average of 5.9 percent. The unemployment rate in San Diego County increased just slightly to 5.3 percent in March 2008, with statewide unemployment increasing more rapidly, reaching 6.4 percent in the same time period.¹⁹

Major San Diego County Employers

As depicted in Table 3, government is one of the largest employment sectors in the area, with the Federal government (39,900 employees) and the State of California government (40,600 employees) employing a total of 80,500 people combined. As a premier institution of higher

¹⁸ Net Migration and migration flows provided by Moody’s Economy.com, San Diego County December 2007 report.

¹⁹ California Employment Development Department, *Historical Data for Unemployment Rate and Labor Force, San Diego County*, April 2008

education in San Diego County, UC San Diego is the next largest employer in the region, employing 26,920 people in the area.²⁰

Table 3: Top San Diego County Employers, 2007

<u>Rank</u>	<u>Employer</u>	<u>Employees</u>	<u>Industry</u>
1	State of California	40,600	State Government Administration
2	Federal Government	39,900	Federal Government Administration
3	UC San Diego	26,920	Higher Education
4	County of San Diego	16,150	County Government Administration
5	San Diego Unified School District	14,560	Public Education
6	Sharp Healthcare	13,870	Healthcare Service Provider
7	Scripps Health	12,200	Hospitals
8	San Diego State University	11,250	Higher Education
9	City of San Diego	11,200	Municipal Government Administration
10	Qualcomm Inc.	8,010	Digital Wireless Communication
11	Kaiser Permanente	7,330	Healthcare, Hospitals
12	U.S. Postal Service, SD District	6,950	Postal Service
13	San Diego Community College District	5,720	Education
14	Sempra Energy	5,260	Energy Services and Infrastructure
15	General Dynamics Nassco	4,680	Ship Design and Construction
16	SAIC	4,590	Engineering
17	Northrop Grumman Corp.	4,170	Command, Control, and Communication
18	Barona Valley Ranch Resort and Casino	3,450	Gaming and Hospitality
19	Rady Children's Hospital, San Diego	3,260	Childrens' Healthcare
20	University of San Diego	3,200	Private University
Total Top 20 Employment		243,250	

Sources: San Diego Business Journal Book of Lists, 2008.

Notes: Figures may not total due to rounding. Employee figures reflect total headcount, not full time equivalent employment, and include part-time employees.

Traditionally, the San Diego County economy has been dominated by the defense, technology, manufacturing, and tourism sectors. San Diego County is home to three major Universities making higher education a prominent business sector. The current employment growth leaders are software and technology-based industries, including biotechnology. These industries have helped carry the defense and manufacturing industries as these industries, particularly their presence in the San Diego economy, currently rely more heavily on technological innovations than in the past. The financial services industry is also compensating for the recent housing crisis by gravitating towards entrepreneurial investment and investing in the technology industries as opposed to residential development.

Institutions of higher education have traditionally been major regional industry sectors as well. In 2007, four of the top 20 employers in San Diego County were institutions of higher education. These four institutions contributed 19.4 percent of all jobs within the top 20 employers.²¹ Aside from contributing a significant number of jobs, institutions of higher education provide the local economy with a revenue stream that is relatively impervious to economic downturns.

²⁰ Employment figure reflects total headcount, not full time equivalent employment, and includes part-time employees.

²¹ See Table 3 on page 19. The four institutions are UC San Diego, San Diego State University, San Diego Community College District, and University of San Diego. Collectively, these institutions contributed 47,090 jobs in 2007.

The growth in the high tech industries is evidenced by the growth trends projected by the California Employment Development Department. Four of the top five occupations with the fastest job growth in San Diego County are technology-related. They include Network Systems and Data Communications, Computer Software Engineers, Applications and Systems Software, and Biomedical Engineers. High-tech occupations such as computer engineers, systems analysts, and computer programmers require workers with a high degree of education and training and tend to reward workers with above average salaries. As of 2007, these four high-tech, high growth occupations in San Diego County paid an average annual salary of approximately \$81,000.²²

Housing and Income in San Diego County

The rising cost of living in the coastal counties of the Southern California region has inspired price-sensitive homebuyers to move outside San Diego County. Many people moved to Riverside County, Baja California, and Imperial County as housing prices rose through early 2007. Despite the recent downturn in the housing market, the limited supply of developable land in San Diego County suggests that the housing market will recover. The median sales price fell through December 2007, down to \$465,000 and continued to fall to \$399,000 in March 2008. It is expected to continue to drop steadily for the next two years, not rising again until 2010.²³ The lack of affordability and oversupply of housing results in an imbalanced housing economy. The less expensive, lower end housing market is faltering considerably more than the high-end market.

Incomes are on the rise in San Diego County, and are higher than those in the remainder of California. In 2007, the estimated median household income was \$69,530 in constant 2007 dollars, a 38.8 percent increase over 2000. Incomes are projected to continue increasing at an annual average real growth rate of 4.1 percent through 2010, reaching over \$75,060 in that year in constant 2007 dollars.

In the long term, San Diego County should continue to be a job hub in the Southern California region. San Diego County will remain a center for high-tech industries, in particular biotechnology and wireless communications. Tourism is predicted to remain strong. Over 2,000 new hotel rooms are expected to be added to the existing inventory in 2008.²⁴

CITY OF SAN DIEGO ECONOMY

The main campus of UC San Diego is located within the City of San Diego, the seat of San Diego County and the largest city within the County. Founded in 1769, with the establishment of the Presidio of San Diego, San Diego has a strong military presence. The U.S. Navy located a station in San Diego, thus further solidifying its prominence in the defense sector. However, the downturn in defense spending in the 1980's affected the city. The government reacted by creating the Centre City Development Corporation (CCDC), the redevelopment agency charged

²² Data regarding employment and average wages by occupation in San Diego County provided by California Employment Development Department.

²³ Median home prices provided by Dataquick Information Systems, *San Diego Union Tribune Zip Code Chart for Home Sales Recorded in December 2007 and March 2008* and median sale price trends provided by Moody's Economy.com, December 2007 San Diego County Report.

²⁴ Estimate provided by Moody's Economy.com, *San Diego County Report*, December 2007 and verified by CBRE Consulting.

with leading Downtown San Diego's redevelopment. The waterfront has transformed into a vibrant downtown with new skyscrapers, entertainment venues, and hotels.

Growth trends in the City of San Diego are similar to those of San Diego County, with a slightly slower growth rate in the first decade of this century. The city added approximately 93,440 residents between 2000 and 2007 to reach an estimated population of 1.317 million. Between 2000 and 2030, the City of San Diego is expected to absorb 35.0 percent of the County's gain in population for a total of 433,400 people. While Carlsbad, Chula Vista, San Marcos, and Unincorporated San Diego County will grow at a rate more rapid than the City of San Diego, the city will absorb the greatest number of people.²⁵

Employment growth in the City was strong, adding 70,560 jobs from 2000 to 2007, to reach a total of 848,160 jobs. This reflects an annual average growth rate of 1.3 percent. Employment is projected to increase in the next three years, with the forecasted addition of 32,170 jobs. Growth in the high-tech sector is expected to increase, thanks in part to the increased nationwide recognition of San Diego as a prominent biotechnology cluster.

Incomes in the City of San Diego are also on the rise, though not as rapidly as income growth in San Diego County. In 2007, the city's median household income was \$66,330 in constant 2007 dollars, up 36.7 percent from 2000. This rate of median income growth is expected to continue on a real basis, with median income estimated to be \$72,040 in 2010.

²⁵ Population, employment, and income projections provided by San Diego Association of Governments (SANDAG) 2030 Regional Growth Forecast Updates, and Population and Housing Estimates.

IV. UC SAN DIEGO CONTRIBUTIONS TO THE REGIONAL WORKFORCE

A LEADER IN HIGHER EDUCATION

The most fundamental mission of any University is to educate, a public University is further charged with providing its students with the knowledge and skills required to make a positive contribution to society. For more than four decades, UC San Diego has fulfilled this mission by educating tens of thousands of Californians and preparing them to contribute to the local, regional, and state economies.

UC San Diego's roots date back to 1912 when the Scripps Institution of Oceanography, comprising 170 acres of land, became part of the University of California. By the 1950's, the Institution had become the largest center of oceanographic research in the world, with instructional programs focusing exclusively on graduate studies. In 1960, The Regents of the University established UC San Diego as a comprehensive general campus and set in place a plan to develop instructional and research programs at both the undergraduate and graduate levels. Since then, UC San Diego has grown to encompass more than 1,150 acres and has become a national leader in higher education.²⁶

UC San Diego's undergraduate program is organized around six residential colleges, each complete with their own campus, residences, offices, and general education courses and specialty courses. Students belong to each college but can focus their study within any of the following six divisions: Arts and Humanities, Biological Sciences, Physical Sciences, Social Sciences, and the Jacobs School of Engineering. Graduate students play an integral role in UC San Diego campus life. There are several graduate and professional schools at UC San Diego including the Graduate School of International Relations and Pacific Studies (IR/PS), Rady School of Management, UC San Diego School of Medicine, and Skaggs School of Pharmacy and Pharmaceutical Sciences. The University offers 114 undergraduate and graduate degree programs throughout its various departments and schools. In fiscal year (FY) 2006-07, total enrollment was approximately 26,880 students, including 21,370 undergraduates and 5,510 graduate students.

U.S. News and World Report rated UC San Diego 8th among public institutions in the nation and 38th among all higher education institutions in the United States. Faculty of the University have also been the recipients of numerous academic distinctions, including 8 Nobel Prize winners, memberships in the prestigious National Academy of Sciences, Fields Medal, and MacArthur Foundation Awards, among others. Several distinguished faculty and alumni include are discussed later in this chapter.

UC SAN DIEGO GRADUATES AND THE REGION'S SKILLED LABOR FORCE

UC San Diego's highly skilled graduates are perhaps the University's most significant contribution to the state and regional economies. In the 2006-07 fiscal year, UC San Diego conferred 6,500 degrees, including 5,060 bachelor's, 900 master's, and 540 doctorate degrees. Table 4 illustrates total degrees awarded and highlights select degree programs.

²⁶ Historical information provided by UC San Diego Office of Institutional Research.

Table 4: Select Degree Programs By Number of Degrees Conferred, FY 2007

<u>Field of Study</u>	<u>Bachelors Degree</u>	<u>Certificate Degree</u>	<u>Masters Degree</u>	<u>Doctorate</u>	<u>Total</u>
All Degree Programs	5,061	185	901	535	6,497
Select Degree Programs					
Biology	511	0	50	52	613
Biochemistry	313	0	0	0	313
Bioengineering	155	14	34	20	223
Other Biological Sciences	0	0	25	37	62
Chemistry and Chemical Engineering	105	1	73	31	210
Electrical Engineering	125	48	80	45	298
Mechanical Engineering	139	9	33	12	193
Structural Engineering	81	11	23	9	124
Other Engineering	59	3	16	12	90
Environmental/Earth Sciences	18	0	2	10	30
Math and Computer Sciences	233	28	58	0	319
Medicine	0	0	0	101	101
Pharmacy	0	0	0	47	47
Physics	32	8	12	15	67
Psychology	406	0	0	39	445
Cognitive and Neurosciences	84	0	1	13	98

Sources: UC San Diego Student Research and Information Office; and CBRE Consulting.

As discussed in the previous chapter, the tourism, manufacturing, transportation, defense, biotechnology, technology, and construction sectors have driven the San Diego County economy. While the construction sector has slowed in recent months due to the downturn in the housing industry, the professional sectors have remained stable in San Diego. These industries rely on a more highly-educated workforce to operate the sophisticated technology that is ever more critical to doing business in the “new economy.” In particular, San Diego’s economy relies heavily on jobs requiring at least a bachelor’s degree as the minimum level of education.²⁷

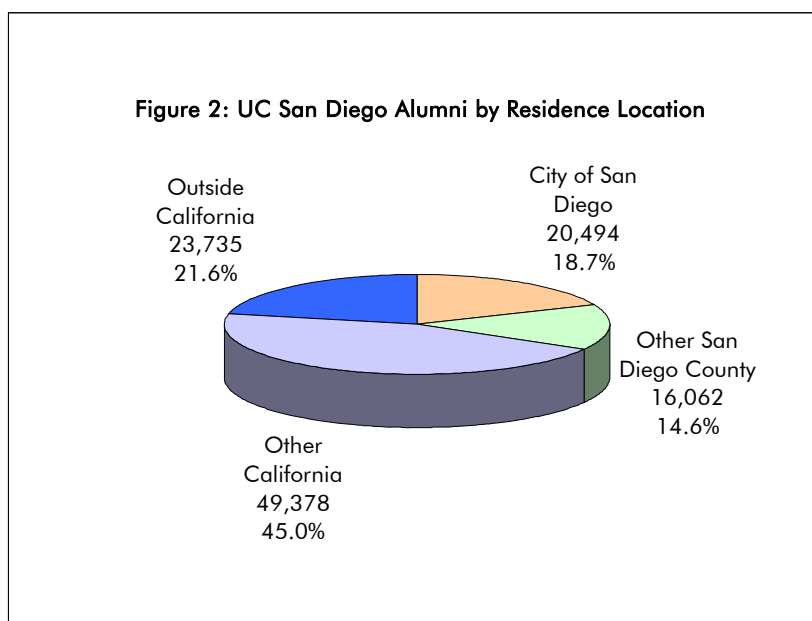
UC San Diego plays a major role in supporting the growth of the San Diego County economy by providing a steady stream of bachelor’s, master’s, and doctoral degree recipients to the local workforce each year. In particular, in FY 2006-07 UC San Diego graduated 233 B.S. degrees, 28 certificate degrees, and 58 M.S. degrees in Math and Computer Science, and 155 B.S. degrees, 34 M.S. degrees, and 20 Ph.D.’s in Bioengineering, which supported the expansion of the skilled labor pool for high-tech businesses and biotech businesses in San Diego. As discussed in the previous chapter, the high-tech industry is a critical component of the San Diego economy as it helps support the development and growth of the manufacturing, defense, and financial services industries. These jobs also provide high wages. UC San Diego also yielded a significant number of degrees in other technical fields, which contribute to the employment base for the manufacturing, transportation, defense, and construction industries. These include: 139 B.S. degrees, 33 M.S. degrees, and 12 Ph.D.’s in Mechanical Engineering; 81 B.S. degrees, 23 M.S. degrees, and 9 Ph.D.’s in Structural Engineering. Finally, the fields of Chemistry and Chemical Engineering, Mechanical Engineering, Physics, Structural Engineering, and Cognitive and Neurosciences collectively comprised 566 B.S. degrees, 77 certificates, 222 M.S. degrees, and 125 Ph.D.’s in 2007.

²⁷ “Occupational Employment Projections,” California State Employment Development Department (EDD), <http://www.labormarketinfo.edd.ca.gov>

The future expansion of other knowledge-based industries in San Diego County – such as the defense and aerospace industries and medical products and pharmaceuticals sectors – requires access to an educated labor force, and UC San Diego plays a critical role in meeting this need. In the 2006-07 fiscal year, UC San Diego graduated 3,230 bachelor’s, master’s, and doctoral students in the biological sciences, chemistry, engineering, mathematics, physics, and health sciences. In fact, approximately 44.7 percent of all Bachelor’s degrees awarded in FY 2006-07 were in engineering, science/math, or biology. A summary of select science, engineering, and other high tech-related degree awards is provided in Table 4.

UC SAN DIEGO GRADUATES IN SAN DIEGO COUNTY

Of the 116,800 members of the UC San Diego alumni association who have graduated from UC San Diego since 1965, accurate data on location of residence is available for 111,000 alumni. As shown in Figure 2, 85,930, or 78.4 percent, lived in the State of California in 2007.²⁸ Of these alumni, 36,560, or about 33.3 percent of the total, lived in San Diego County. Of the remaining alumni, 23,740, or 21.6 percent, lived outside California but within the United States and 1,380, representing less than 1.0 percent, lived outside the United States.



As the data in Table 5 indicate, from 2004 to 2006 between 84.6 and 87.8 percent of new freshmen came to UC San Diego from outside San Diego County. Upon graduation, many of these students choose to reside in the area. As of 2007, the percentage of total graduates residing in San Diego County was 33.3 percent, while the percentage of entering freshmen from within San Diego County that year was only 12.2 percent. These figures demonstrate that the University acts as a magnet that draws talented people to the region.

²⁸ For the purposes of determining alumni residence, alumni are defined as all persons who have received graduate or undergraduate degrees from UC San Diego.

Table 5: New Freshmen Registrants By Home Location, 2004-2006

<u>Geography</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
San Diego County	595	477	560
Imperial County	33	26	31
Los Angeles County	1,806	1,736	2,089
San Francisco Bay Area	806	820	1,101
Other California	439	413	477
Out of State	111	156	211
Foreign	84	92	120
Total	3,874	3,720	4,589

Sources: UC San Diego Institutional Research; and CBRE Consulting.

Notes: Year of registration represents the beginning of each fiscal year. For example, freshmen registrants for 2006 represent data for FY 2006-07.

ON-CAMPUS RECRUITING AT UC SAN DIEGO

In 2006-07, a total of 21,800 off-campus career jobs were posted with the UC San Diego Career Center. All of the full-time jobs require baccalaureate degrees. Approximately half of the postings were for part-time or internship positions. The UC San Diego Career Center database does not sort by location of an individual position, but positions were listed by organizations in California as well as throughout the United States. During the 2006-07 fiscal year, the On-Campus Recruiting Program scheduled approximately 1,330 student interviews and hosted a number of job fairs in which approximately 500 employers participated.²⁹ The top ten companies that conducted on-campus interviews at UC San Diego are listed in Table 6.

Table 6: Top Ten Companies Interviewing On Campus, 2006-07

<u>Company Name</u>	<u>Company Location</u>
Qualcomm	San Diego, CA
Pfizer	La Jolla, CA
Northrop Grumman	El Segundo, CA
SAIC	San Diego, CA
Hewlett Packard	Palo Alto, CA
Google	Mountain View, CA
The Capital Group	Brea, CA
Broadcom	Irvine, CA
Scripps Research Institute	La Jolla, CA
The Salk Institute	La Jolla, CA

Sources: UC San Diego Career Center; UC San Diego Jacobs School of Engineering; and CBRE Consulting.

Additionally, the Rady School of Management at UC San Diego conducts recruiting services and an internship program through its own Career Services Center. Recruiting services for full-time positions for the graduating class of 2007 resulted in placement rates of 84.0 percent of students three months after graduation. Table 7 provides a summary of key statistics for career placement of Rady’s graduating class of 2007.

²⁹ Estimates were provided by UC San Diego Career Services.

Table 7: Rady School of Management at UC San Diego Class of 2007 Placement by Industry	
<u>Industry</u>	<u>Percentage</u>
Healthcare/Biotech/Pharmaceutical	35.0%
Financial Services	22.0%
Technology & High Tech	22.0%
Consulting Services	8.0%
Energy & Petroleum	5.0%
Consumer Products	3.0%
Manufacturing	2.5%
Real Estate	2.5%

Sources: UC San Diego Rady School of Management; and CBRE Consulting.

Note: Figures may not total due to rounding.

Internships are not a requirement for Rady students, but they are highly encouraged and 100 percent of MBA candidates participate in internships.³⁰ Many are employed in summer managerial positions that allow them to apply skills they have learned in the first-year core curriculum. Through these internships, students make key connections in the industry or functional area of particular interest to them. These internships often lead to job offers upon graduation.

UC SAN DIEGO EXTENSION CONTINUING EDUCATION PROGRAMS

In addition to graduates of UC San Diego’s degree programs, the University contributes to the development of the regional workforce through its UC San Diego Extension continuing education programs. Continuing education and extension programs are designed to train and re-train adult learners through both classroom and workplace training programs. Many continuing education students already have college degrees and look to continuing education to aid them in career advancement or in seeking an entirely new career. This reflects the need for life-long learning that is increasingly important as workers find that the skills they learned in bachelor’s or even master’s programs are often not enough to equip them to meet the rapidly evolving demands of the workplace.

The need for life-long learning was documented in a 2001 report by the U.S. Department of Labor, titled “Report on the American Workforce.” This report notes that the U.S. economy’s expansion is increasingly dependent on high-skilled, information-based industries. “This has created a disconnect between the jobs that are being created and the current skills of many workers.”³¹ This so-called “skills gap” highlights the need for continuing education programs that aim to enhance the skills of workers already in the workforce, allowing those workers to grow and develop new skills as they encounter new demands on the job.

UC San Diego Extension offers specialized studies, certificate programs, and professional degrees in partnership with campus departments. Approximately 100 certificate programs and twelve specialized study programs are offered at UC San Diego Extension.³² Table 8 highlights

³⁰ 100.0 percent estimate provided by Rady School of Management staff.

³¹ “Report on the American Workforce,” U.S. Department of Labor, 2001, page 1.

³² Estimates were provided by UC San Diego Extension.

the areas of study covered by the Continuing Education Curriculum. Extension program courses are offered in a variety of formats including courses taught in the daytime, evening, and during weekends, and through online education courses.

Art, Photography, and Music	Humanities and Writing
Business	Information Technology and Software Engineering
Digital Arts	Law
Education	Leadership and Management Development
Engineering and Defense Technology	Life Sciences
English Language Studies	Occupational and Environmental Safety and Health
Foreign Languages	Public Service and Social Responsibility
Healthcare and Behavioral Sciences	

Sources: Office of Alumni and Constituent Relations, UC San Diego; and CBRE Consulting.

The annual budget for Extension is approximately \$30.00 million and is funded solely by fees, contracts, grants, sponsors, and donors with no State support. In 2006-07, there were a total of 20,000 enrollments in some 2,000 UC San Diego Extension courses. Extension offers a number of specific programs that directly benefit the community. One such program is the OSHA Training Institute, which trains employers from around the world in enforcing workplace health and safety standards. Another program that directly benefits the unique biomedical- and pharmaceutical-focused market of San Diego is the Clinical Trials and Research Programs. This program offers specialized certificates in clinical trials administration and clinical trials design and management.³³

In addition, UC San Diego Extension has a significant international program that attracts 2,200 students to the U.S. from overseas each year.³⁴ Through participation in week-, month-, and semester-long courses of study, these students enhance the education they are acquiring back home with the unique learning experiences – both in and out of the classroom – offered at UC San Diego. The cultural exchange also enhances the experience of UC San Diego students who interact with thousands of foreign students each year.

UC San Diego Extension courses are offered at a variety of locations, including the UC San Diego main campus, as well as the Sorrento Mesa Center, the Extension Rancho Bernardo Center, and the Extension Mission Valley Center. In addition, Extension conducts special on-site programs at locations including company headquarters, partner schools, and overseas locations. UC San Diego Extension has conducted customized training for large-scale companies including Sony, Sempra Energy, Northrup-Grumman, Sea World, Disney, and Pfizer, among many others. Extension also offers an on-line learning program with annual enrollment of approximately 4,000 students in a variety of courses.

ENTREPRENEURIAL SUCCESSES OF UC SAN DIEGO ACADEMICS AND ALUMNI

In addition to providing skilled workers to the region, UC San Diego faculty and alumni have started hundreds of successful companies in San Diego, California, and around the world. These companies range from very small startups to Fortune 500 companies such as

³³ Information on enrollments, courses, and budget for UC San Diego Extension was provided by the Extension office.

³⁴ Information provided by UC San Diego International Students Office.

Qualcomm, Incorporated. The companies contribute to the local economy by attracting revenue dollars from outside the region, employing local residents, and making expenditures that generate further economic impacts. Table 9 provides a list of some of the well-known companies founded by UC San Diego alumni. The quantitative economic impacts of some of these companies are identified in Chapter IX, Research at UC San Diego.

Table 9: Sample of Companies Founded by UC San Diego Alumni and Faculty

<u>Company</u>	<u>Location</u>	<u>Description/Industry</u>
AnalgesiX Inc.	San Diego, California	Pharmaceutical
Aurora Biosciences	San Diego, California	Pharmaceutical
Clinical Micro Sensors	Pasadena, California	DNA Detection
CryoGen	San Diego, California	Biotechnology
Cymer, Inc.	San Diego, California	Laser Systems and Equipment
Eilean Technologies	Las Vegas, Nevada	Imaging Technologies
Fastrack Design, Inc.	San Jose, California	Computer Systems Design
Genoptix Medical Laboratory	Carlsbad, California	Physical Research
GetActive Software	Berkeley, California	Communications
Innercool Therapies	San Diego, California	Clinical Research
Linspire, Inc.	San Diego, California	Computer Operating System
Nereus Pharmaceuticals, Inc.	San Diego, California	Pharmaceutical
Qualcomm	San Diego, California	Communications
Rusty Surfboards, Inc.	San Diego, California	Surfboard Manufacturer
Senomyx, Inc.	San Diego, California	Physical Research
SigAlert	San Diego, California	Traffic Reporting Website
Signal Pharmaceuticals	San Diego, California	Pharmaceutical
Viasat, Inc.	Carlsbad, California	Communications Equipment

Sources: UC San Diego Office of Alumni Relations; and CBRE Consulting.
 Notes: Aurora Biosciences was acquired by Vertex Pharmaceuticals; Signal Pharmaceuticals was acquired by Celgene; Clinical Micro Sensors is now a division of Motorola; Cryogen was acquired by American Medical Systems Holdings.

The following profiles highlight some of the entrepreneurial endeavors of UC San Diego academics and alumni. These UC San Diego-affiliated entrepreneurs have developed successful businesses that have contributed to the San Diego County, the State of California, the U.S., and in some cases, across global economies.

Faculty and Researcher Entrepreneurs

UC San Diego has numerous faculty members who began successful commercial endeavors. A few of the notable faculty are as follows.

Dr. Irwin Jacobs, UC San Diego Department of Computer Science and Engineering. Dr. Jacobs, who was a member of the UC San Diego faculty from 1966 through 1972, may be the most well-known faculty entrepreneur from UC San Diego. Dr. Jacobs is co-founder of Qualcomm Incorporated, a San Diego based firm specializing in wireless communications.

Qualcomm has grown from a small start-up in 1985 contracting research and development services to a multi-billion dollar company creating new and innovative technologies in the wireless industry. Qualcomm has approximately 6,100 patents, including the Code Division Multiple Access (CDMA) technology that revolutionized wireless communications.

Qualcomm's economic impact and presence in San Diego is undeniable. In Fiscal Year 2007 Qualcomm had gross revenues totaling nearly \$8.871 billion and net income of \$3.303 billion. Qualcomm employs over 10,000 people in the U.S. and 12,800 people worldwide. In 1997 they purchased the naming rights to the San Diego Chargers' NFL football stadium in San Diego.

Dr. Sujit Dey, UC San Diego Jacobs School of Engineering. Dr. Dey joined the Electrical and Computer Engineering Department at UC San Diego in 1997 and in 2004 he founded Ortiva Wireless, a company dedicated to developing software for wireless data communication. Ortiva Wireless is located in close proximity to the Jacobs School of Engineering and several of its 10 employees are graduates of UC San Diego.

Dr. Sujit Dey holds many other distinctions including holding 12 patents (with 8 pending) and publishing over 150 papers in technical journals and conference proceedings. While at UC San Diego, Dr. Dey was affiliated with the California Institute of Telecommunication and Information Technology (Cal-IT2) and the UC San Diego Center for Wireless Communications.

George Varghese, Computer Science and Engineering Department. George Varghese, a UC San Diego Professor in the Computer Science and Engineering Department, is responsible for a number of inventions in the fields of computer networks and the Internet. A few important inventions to note include the Procket Router, Netsift, and the "timing wheel". The Procket Router was developed along with Tony Li. Varghese created the forwarding engine for the Procket Router, which was the fastest router in the world in 2003 and was later sold to Cisco Systems. Varghese, Stefan Savage (another UC San Diego Computer Science and Engineering Professor) and a group of graduate students developed Netsift, a computer security technology used to identify attacks on computer networks. Netsift was sold to Cisco Systems in 2005. The "timing wheel" uses an algorithm to stop an operating system from frequently testing for false-alarm events that are not occurring. The "timing wheel" was integrated into the Linux kernel, FreeBSD, and more. Varghese has written several guide books presenting his research and findings and is currently researching Internet security and traffic measurement.

Judith Dolan, Arts and Humanities Department. Ms. Dolan's costume designs are seen in numerous productions on Broadway, throughout the United States, and abroad. In 1997 she received a Tony Award for her work on *Candide*. Recently, Ms. Dolan's work on the 2007 production *LoveMusik* attracted Best Costume nominations from Drama Desk and Outer Critics.

Roger Revelle, Scripps Institution of Oceanography, and Professor of Science and Public Policy. Mr. Revelle served as the Director of Scripps Institution of Oceanography from 1950 to 1964, during which time he was the main force in establishing the UC San Diego campus in 1960. Academically, Mr. Revelle is best known for co-authoring the first authoritative paper in which carbon dioxide from fossil fuels was recognized as a potential global problem. The findings of this paper provided a premise for the modern day understanding of global warming.

Subsequently Mr. Revelle served on scores of academic, scientific, and government committees advising on a wide spectrum of topics. He was Science Advisor to the Secretary of the Interior, President of the American Association for the Advancement of Science, and a member of the NASA Advisory Council. In 1974 Mr. Revelle returned to UC San Diego as a Professor of Science and Public Policy, during which time he focused on applying science and technology to

combat world hunger. In November 1990, Mr. Revelle received the National Medal of Science from President George H.W. Bush.³⁵

Alumni Entrepreneurs

A few notable alumni entrepreneurs and a description of their endeavors are highlighted below.

Garrett Gruener, UC San Diego Class of '76 and David Warthen, UC San Diego Class of '71. Garrett Gruener and David Warthen are the co-founders of Ask.com. Graduating from UC San Diego's Muir College five years apart, Mr. Gruener and Mr. Warthen worked for the same small communications software company during the early 1990s, a time when the Internet was still extremely fresh and not widely accessed by the general public. Gruener developed a concept to make the Internet more user-friendly. He wanted Internet users to be able to search for and locate information using natural language and through a pleasant context; similar to a question and answer session. Over time, prototypes were cultivated and by mid-1996 a prototype was developed that was strong enough to start a company.

In April 1997 Ask Jeeves went live, an Internet search engine with the knowledgeable and amiable butler, Jeeves, always ready and willing to answer questions. The company was renamed in 2005 to Ask.com. Today millions of people use Ask.com every day.³⁶

Dr. J. Craig Venter, UC San Diego Class of '72, Ph.D '75. Dr. Venter received his bachelor's degree in biochemistry and his Ph.D. in physiology and pharmacology from UC San Diego in 1972 and 1975, respectively. While at the National Institute of Health in 1991, Dr. Venter and his team developed an innovative method to quickly discover genes, called Expressed Sequence Tags (ESTs). In 1995, after establishing The Institute of Genomic Research, a non-profit research institute, Dr. Venter and his team utilized the new DNA sequencing technology to sequence the first free living organism, *Haemophilus influenzae*. Following this exceptional advancement and after sequencing and analyzing more than 50 microbial genomes, Dr. Venter and his team progressed into mammalian genomics. This is the time when Dr. Venter caught the eye of the world by sequencing and analyzing the human genome, which was published in 2001 by Dr. Venter and Celera Genomics. Venter announced his discovery at the White House alongside President Bill Clinton, who declared the completed genome to be "the most important, most wondrous map ever produced."³⁷

Rusty Preisendorfer, UC San Diego Class of '78. Mr. Preisendorfer graduated from UC San Diego with a bachelor's degree in visual arts. Combining his knowledge of the arts and his love of surfing, Mr. Preisendorfer founded Rusty surfboards and apparel. While attending UC San Diego, Mr. Preisendorfer began his career in the surfboard industry as a shaper for Gordon and Smith. He then went on to work for a San Diego-based manufacturer called Canyon Surfboard and continued to build a notable reputation.

In 1985 Rusty surfboards was founded. Mr. Preisendorfer is credited with perfecting the modern thruster, a shortboard used to perform quick maneuvers on waves and is now the most popular type of surfboard.³⁸ Mr. Preisendorfer opened shops in La Jolla and Del Mar to have local retail

³⁵ Earthobservatory.nasa.gov/Library/Grants/Revelle

³⁶ http://about.ask.com/en/docs/about/company_overview.shtml

³⁷ <http://www.time.com/time/health/article/0,8599,1706552-3,00.html>

³⁸ <http://www.surfing-waves.com/surfboard.htm>

space for his boards. Rusty International surfboards are sold around the world, with production load of 15,000 surfboards annually and apparel sales exceeding \$40.00 million.³⁹

Michael Robertson, UC San Diego Class of '90. Michael Robertson received his bachelor's degree in cognitive science from UC San Diego in 1990. Mr. Robertson is the founder of several innovative companies including MP3.com, Linspire, Inc., and SIPphone.com. Before any of these companies transpired, Mr. Robertson ran a number of websites whose function was the merging of search technologies with commerce. MP3.com was created in 1997, a website boasting the largest collection of free digital music in the world. Robertson sold MP3.com to Vivendi Universal in 2001 for \$372.0 million in stock and cash. Robertson's next move was the development of Linspire, Inc. A competitor to Microsoft's Windows operating system, Linspire, Inc. is an affordable, license-free desktop Linux operating system. In 2003 SIPphone.com was founded by Robertson, a company that utilizes the Internet to make free long distance phone calls based on a VoIP platform and directory except that it offers digital music without digital rights management, which means it does not limit the use of the songs by the customers.⁴⁰ Twice Robertson has been on the Fortune 40 under 40 list, which names the 40 richest people under the age of 40 and once on Forbes 400 list which lists the 400 richest people in America. He continues to reside in San Diego.

Susumu Tonegawa, UC San Diego Class of '68. Mr. Tonegawa received a Ph.D. from UC San Diego in 1968. In 1987 he received the Nobel Prize in Medicine for the discovery of the genetic principle for generation of antibody diversity. Later in his career, he researched the molecular and cellular basis of memory formation at the Massachusetts Institute of Technology's Department of Biology, where he served as Professor of Biology and Investigator in the Howard Hughes Medical Institute until 2006.

Dr. Eleanor "Connie" Mariano, UC San Diego Class of '77. Ms. Mariano was the first Filipino-American to reach the rank of Admiral in the United States Navy, and the first female Director of the White House Medical Unit. She served as personal physician to Presidents George H.W. Bush and Bill Clinton during their respective terms of office.

Bud Tribble, UC San Diego '75 and Bill Atkinson, UC San Diego '74. Together these prominent alumni managed the development teams for the first Macintosh computer and Mac OS operating system. Mr. Tribble managed the original Macintosh software development team while Mr. Atkinson created countless Macintosh software applications, the most notable of which are MacPaint, Quickdraw, and Hypercard.

Robert Akins, UC San Diego '74 and Richard Sandstrom, UC San Diego '72. Mr. Akins and Mr. Sandstrom co-founded Cymer, Inc. in 1986. As the world's leading supplier of excimer light sources, which are essential to the semiconductor industry, Cymer, Inc. has annual revenues of approximately \$543.9 million and has worldwide employment of 975 people. Since co-founding Cymer, Inc., Akin received the Ernst & Young Entrepreneur of the Year award for San Diego County in 1997. He also sits on the Board of Directors for Semiconductor Equipment and Materials International (SEMI) and is on the Council of Advisors to the Jacobs School of

³⁹ <http://www.rusty.com/index.cfm?page=2&brand=1>

⁴⁰ <http://www.michaelrobertson.com/about.php>

Engineering at UC San Diego. Together, Mr. Akin and Mr. Sandstrom received the prestigious SEMI award for North America in 1996.⁴¹

Ancel Keys, Scripps Institution of Oceanography Class of '30. Ancel Keys received his Ph.D. in oceanography from the Scripps Institution of Oceanography in 1930 and is one of the University's most notable alumni. While at Scripps Institution of Oceanography, Mr. Keys studied fish biology and physiology, then earned a second doctorate degree in physiology from Cambridge University. He was a pioneer in studying the relationship between the human diet and blood. During World War II Mr. Keys developed "K-rations," high-calorie, lightweight meals that were used by troops during wartime when no other food options were available. In the years following, he led landmark studies on the effects of diet on blood cholesterol, earning the nickname "Mr. Cholesterol." Ancel Keys' many accomplishments landed him on the cover of Time Magazine in 1961.

⁴¹ Information about Cymer, Inc. is from www.cymer.com, and Dun & Bradstreet.

V. UC SAN DIEGO CONTRIBUTIONS TO THE MEDICAL AND HEALTH SECTORS

MEDICAL TRAINING

UC San Diego plays a critical role in supporting the medical and health sector in San Diego County. As discussed in the previous chapter, numerous degree programs offered at the main campus relate to the health sciences. This chapter focuses on the School of Medicine and Skaggs School of Pharmacy and Pharmaceutical Sciences as UC San Diego graduate schools that train highly skilled professionals to enter the workforce as practitioners and scientists. During Fiscal Year 2006-07, the UC San Diego Medical Center had total revenues of \$659.5 million. The quantitative impacts of these schools are included in the discussion of the economic impacts of the campus as a whole in Chapters VI through VIII.

UC San Diego School of Medicine

UC San Diego plays a critical role in training the next generation of medical professionals to serve the health and medical needs of San Diego County as well as the nation as a whole. According to the U.S. News and World Report, the UC San Diego Medical School is rated 14th among all research medical schools in the nation. As one of the top research institutions, the UC San Diego School of Medicine attracts outstanding medical students and professionals to the region.

The Medical School was started in 1968 and has grown to over 900 faculty members, over 550 medical students including over 70 M.D. /Ph.D. students, 492 post-doctoral fellows, 300 graduate students and over 600 interns and residents. Entering class size is 134.

Of the nearly 3,700 total alumni who have graduated from the School of Medicine, accurate data on location is available for 3,670 alumni. Approximately 65.4 percent of these alumni currently reside in California. Of these, 19.3 percent reside in the City of San Diego and 8.8 percent reside in other parts of San Diego County. The primary fields of medicine practiced by UC San Diego School of Medicine alumni include general medicine (22.1 percent), pediatrics (12.9 percent), surgery (12.6 percent), and family medicine (11.8 percent).

Alumni are involved in patient care, research, and/or academia. Notable accomplishments by some UC San Diego School of Medicine alumni range from the creation of ground-breaking medical inventions to powerful positions in top hospitals. For example, John Dobak, M.D. is a UC San Diego alumni who founded the JAKK Group. The JAKK Group develops early stage medical technologies and is responsible for creating several successful start-up companies including Leptos Biomedical, Innercool Therapies, and CryoGen. Another example is Dr. Lisa Diller, who was recently named the chief medical officer at the largest pediatric cancer program in New England. An alumni of the School of Medicine, Dr. John Spinosa, was recently named Chief of Staff at Scripps Memorial Hospital in San Diego.

UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences

The first class entered the Skaggs School of Pharmacy and Pharmaceutical Sciences (SPPS) in 2002. In FY 2006-07 SPPS graduated its second class, consisting of 23 students, with the third class of 32 students graduating in June 2008. Enrollment at SPPS has now reached steady state of 60 students per entering class.

All students at SPPS are enrolled in the full-time, four-year professional program leading to the doctor of Pharmacy Degree (Pharm. D.). A component of the training is the devotion of an entire year to practical clinical experience during which students apply their training in a patient care setting. Many of the students hold internships at the UC San Diego Medical Center serving the San Diego population.

MEDICAL RESEARCH

UC San Diego is known as a top research campus and the Health Sciences faculty account for a significant amount of the research activity, with the School of Medicine ranking 14th in the nation in funding from the National Institute of Health (NIH), and the School of Medicine faculty ranked 2nd in the nation in total research funding per faculty member.

Research Institutions and Centers

Major Health Sciences research centers include the region's only National Cancer Institute-designated Comprehensive Cancer Center (the Moores UCSD Cancer Center), the Stein Institute for Research on Aging, the AIDS Research Institute, a National Institute on Aging Alzheimer's Disease Research Center, an NIH Autism Center of Excellence, a Huntington's Disease Center of Excellence, and a major NIH Digestive Disease Research Center.

Health Sciences faculty collaborate with colleagues throughout the UC San Diego campus, as well as with the affiliated Veterans Affairs San Diego Medical Center and Rady Children's Hospital, which includes an alliance with St. Jude's Children's Research Center to bring promising clinical trials to children in San Diego and research collaborations with the nation's largest pediatric research center.

The Center for Community Health. The Center for Community Health is a sponsored research center focusing on improving the health needs of the community through integration of the work done at UC San Diego and the interests and needs of the community. The Center incorporates the various medical disciplines and provides services such as prenatal care and family planning, medical science education, and psychiatric advice for counselors, case workers and home visitors associated with public assistance programs. Some of the specific research services are detailed below with select public health programs detailed in the final section of this chapter.

- Huntington's Disease Research Clinical Research Program (HDCRP): The HDCRP's objective is to provide care, services, and education to HD patients, their families, and to professionals in the community. The HDCRP also strives to increase awareness and conducts research on treatments and future cures.
- Comprehensive Research Center of Excellence in Minority Health and Health Disparities (CRCHD): The Comprehensive Research Center of Excellence in Minority Health and Health Disparities was developed after UC San Diego, San Diego State University, the San Diego Council of Community Clinics, and the San Diego County Health and Human Service Agency received a five-year grant of over \$6.000 million in 2002 to start a center. Since then CRCHD has strived to achieve the Federal Department of Health and Human Services Healthy People 2010 goals for the nation in HIV, cardiovascular disease, and other diseases that disproportionately affect various communities.

Shiley-Marcos Alzheimer's Disease Research Center (ADRC). ADRC was established as one of the first National Institute on Aging-designated centers in 1984 to investigate Alzheimer's and its effects. The Center conducts numerous clinical studies with hundreds of volunteers in an effort to further understand the disease. Since its inception the Center has helped the scientific community with its advancement of treatments.

AIDS Research Institute (ARI). The ARI was established by UC San Diego to coordinate the efforts of the other research centers on campus focusing on AIDS/HIV related issues. The Institute also serves as a community resource offering patient care and educating the general population. The Center for AIDS Research (CFAR) is the primary component of ARI. CFAR strives to develop vaccines and therapies for HIV infection.

Rebecca and John Moores Cancer Center. The Rebecca and John Moores Cancer Center is one of only 39 National Cancer Institute-designated centers that combines patient care, research and education to provide leading edge care and clinical trials to prevent, diagnose, and treat cancer. The center draws from UC San Diego's vast resources of intellectual capital. In addition to the scientific breakthroughs and clinical trials that are part of the Center's commitment to improving treatment, the Cancer Center has an active outreach program to bring education and services to patients and the community. The Rebecca and John Moores Cancer Center offers free public seminars focusing on cancer awareness, prevention, and screening.

Medical Innovations and Discoveries

Students and faculty of the School of Medicine and Skaggs School of Pharmacy dedicate much of their time to basic, translational and clinical research to improve patient care. Innovations from medical researchers at UC San Diego provide a significant benefit to the region and beyond. Some of the key innovations are as follows.

Interstitial Cystitis Drug, Elmiron. Dr. Lowell Parsons, a faculty member in the surgery/urology department at UC San Diego, specializes in Interstitial Cystitis (IC), which is an inflammatory medical condition of the bladder resulting in pain in the bladder. Dr. Parsons' efforts over the past 25 years in treating people with this condition and researching possible therapies produced novel treatments that eventually led to the discovery of the drug Elmiron. Nearly 61.0 percent of patients experience improvement of symptoms in three months.⁴²

New Anti-Cancer Drug, Somocystinamide A (ScA). An innovative new anti-cancer drug was identified through collaboration between the UC San Diego School of Medicine, SPPS, Moores UCSD Cancer Center, and the Scripps Institution of Oceanography. ScA was found in a toxic algae gathered off the coast of Fiji by researchers from the Scripps Institution of Oceanography. The drug is still in the early stages of development, but the researchers envision that it will be useful in non-toxic treatment of cancerous tumors.

A unique partnership between industry and academia has led to human clinical trials of a new drug for a rare class of blood diseases called myeloproliferative disorders (MPD), which can evolve into leukemia. In just one year, collaborative discoveries by stem cell researchers from UC San Diego, Dana-Farber Cancer Institute, the Mayo Clinic and a San Diego pharmaceutical company moved from identification of the most promising drug candidate to clinical trials for a new drug to fight this degenerative blood disorder, which affects more than 100,000

⁴² www.orthoelmiron.com/aboutelmiron.html

Americans. A study headed by Catriona H.M. Jamieson, M.D./Ph.D., assistant professor of medicine and Director for Stem Cell Research at Moores UCSD Cancer Center, found an inhibitor that can stop the over-proliferation of blood cells that results in problems with blood clotting, heart attacks and, in some cases, leukemia. With collaborators at Stanford University and the Mayo Clinic, the findings led to development of the inhibitor by TargeGen, based in San Diego. That drug is currently being tested in human clinical trials.

In March 2008, surgeons at UC San Diego Medical Center were the first in the country to remove an inflamed appendix through a patient's vagina. Removal of diseased organs through the body's natural openings offers patients a rapid recovery, minimal pain, and no scarring. Key to these surgical clinical trials is collaboration with medical device companies to develop new minimally-invasive tools. The procedure, called Natural Orifice Translumenal Endoscopic Surgery (NOTES), involves passing surgical instruments through a natural orifice, such as the mouth or vagina, to remove a diseased organ such as an appendix or gall bladder. Only one incision is made through the belly button for the purpose of inserting a two millimeter camera into the abdominal cavity so that surgeons can safely access the surgical site.

ASF/SF2 Protein. In research funded by the National Institutes of Health (NIH), researchers at the UC San Diego School of Medicine identified a molecular sequence in mice that could grow a juvenile heart into an adult heart through a process called alternative splicing. According to Xiang-Dong Fu, Ph.D., the report author and a UC San Diego professor of Cellular and Molecular Medicine, the discovery is "directly relevant to understanding heart physiology during development, and may provide insights into mechanisms that directly contribute to heart attacks in humans."⁴³

HEALTHCARE NETWORK

UC San Diego Medical Center⁴⁴

The UC San Diego Medical Center is San Diego's only academic medical center. The UC San Diego Medical Center operates two hospitals in the region: UC San Diego Medical Center in Hillcrest and the John M. and Sally B. Thornton Hospital in La Jolla. Together the hospitals have 540 beds, with approximately 21,000 discharges annually. There are an additional 476,000 outpatient visits annually. The daily census has increased by 36.0 percent over the past 10 years. The Medical Center leads the nation in several specialties ranked in the annual U.S. News and World Report "Best Hospitals" and "Best Graduate Schools" issues, including Respiratory Care, Rheumatology, Kidney Disease, Gynecology, Cancer, Endocrinology, Urology, AIDS, and Drug and Alcohol Abuse. The UC San Diego Medical Center operates a regional Trauma and Burn Center, Stroke Center, high risk pregnancy program and neonatal intensive care unit, and other specialized clinical programs serving San Diego and Imperial counties and beyond.

The Medical Center operates a positive bottom line with revenue totaling approximately \$650.0 to \$750.0 million annually, which covers the hospital operating expenses and investment in construction and other costs. The economic impacts of these expenditures, including payroll,

⁴³ http://www.innovations-report.com/html/reports/life_sciences/report-38839.html

⁴⁴ Figures are provided by the UC San Diego Medical Center website "Facts and Figures," at www.health.ucsd.edu.

purchasing and construction, generated by the Medical Center are included in the overall analysis in Chapters VI through VIII.

The UC San Diego Medical Center has partnerships with other local hospitals and clinics including Sharp Hospital, which is co-director of the joint Bone Marrow Transplant Program.

Medical Center Outreach and Public Health Programs

UC San Diego Health Sciences is a major contributor to the health of the community through outreach programs operated by faculty, staff, medical students, and pharmacy students. The education, research, and services affiliated with UC San Diego provide the community with direct healthcare benefits. A few of these programs include:

UC San Diego Center for Community Health. As mentioned above, the UC San Diego Center for Community Health focuses on improving the health needs of the community through integration of the work done at UC San Diego and the interests and needs of the community. Partnered with various government and community organizations, the UC San Diego Center for Community Health provides numerous public health programs and services devoted to bettering the health of the community. Some of the programs and services include:

- Southern California Border HIV/AIDS Project: This program was created for high-risk Latino's working or residing in the U.S./Mexico border region to help progress the methods of HIV outreach, testing, and services.
- Community Pediatrics Center for Community Health. Through numerous outreach programs, the Community Pediatrics Center for Community Health targets at-risk and underserved populations in San Diego. The services offered range from providing employers culturally appropriate family health insurance information to examination of school programs and their effect on student health. The San Diego Kids Health Assurance Network (SD-KHAN) offers care for families living below the poverty line in San Diego County.

Border Health Education Network. This network is a partnership between UC San Diego, the Universidad Autónoma de Baja California (UABC), and the Border Health Initiative of Project Concern International. The mission of the network is to develop cross-border connections between healthcare professionals, to share information and resources, and to improve skills and capabilities. Working off the basic concept that disease does not recognize geographical boundaries, the Border Health Education Network addresses diseases such as AIDS, measles, hepatitis A and B, and tuberculosis.⁴⁵

The UC San Diego Student-Run Free Clinic Project. This community partnered clinic offers easily accessible, quality healthcare, education, and access to social services. It is operated by medical students, pharmacy students, and undergraduates under the supervision of UC San Diego faculty physicians and community volunteers. This project is also a way for students, staff, patients, health professionals, and community members to gain knowledge and connections. Types of services offered through the UC San Diego Student-Run Free Clinic Project include:

⁴⁵ <http://meded.ucsd.edu/hetc/index.html>.

- Health counseling and education on subjects such as drug and alcohol addiction, nutrition, first aid, hepatitis, diabetes management, and eye disease;
- Social and community service referrals to help those who cannot afford health insurance and do not qualify for county or government programs to access other resources;
- Limited medical outpatient care and prevention services comprising neurology, diabetes, psychiatry, ophthalmology, podiatry, dermatology, cardiology, and hepatitis;
- Education and training for medical and pharmacy students; and
- Affiliated acupuncture and dental clinics where students partner with local professionals and provide their services.

The UC San Diego Student-Run Free Clinic is a non-profit organization funded by individuals, organizations, and local businesses through in-kind donations and grants. There are three site locations as well as occasional specialty clinics ⁴⁶

Lifesharing Community Organ and Tissue Donation. Lifesharing is a designated Organ Procurement Organization (OPO) dedicated to providing organ and tissue to support transplant programs in San Diego and beyond. Operated by the UC San Diego Medical Center, Lifesharing has afforded approximately 3.000 million people in San Diego and Imperial counties organ recovery, donor family support, and educational services. 26 donor hospitals and four local transplant centers are supplied with transplantable organs through Lifesharing tissue and organ procurement, helping the continuously growing waiting list of 1,600 San Diego patients.⁴⁷

Teratogen (Pregnancy Risk) Information Services. Primarily funded by California's Department of Education, this program is based out of the UC San Diego School of Medicine and has been in service for about 27 years. The Teratogen Pregnancy Risk Information Line offers free information over the telephone to the general public about medications, chemicals, infectious diseases, and other factors that can be harmful to an unborn baby. The objective is to avoid preventable birth defects and support healthy pregnancies through education and research. The public can access the information over the phone, the Internet, or through e-mail.

⁴⁶ <http://meded.ucsd.edu/freeclinic/>.

⁴⁷ <http://lifesharing.org/>.

VI. UNIVERSITY PURCHASING AND PAYROLL

SOURCES OF UNIVERSITY REVENUE

UC San Diego is a significant economic force in San Diego County by virtue of its position as a major employer and a major purchaser of goods and services. The impact of the University on the local economy can be measured to some degree by the amount of revenue it collects from outside the region, revenue that is then used to finance spending on payroll and goods and services within the region. The more revenue UC San Diego collects from outside San Diego County, the greater the net contribution to the local and regional economies. Similarly, the more revenue UC San Diego collects from outside the state, the greater the net contribution to the California economy.

In FY 2006-07, University revenues totaled \$2.306 billion, of which approximately 45.9 percent came from sources outside of San Diego County. Approximately \$546.5 million in revenues from the Federal government accounted for the largest share of UC San Diego’s revenues from outside the County.

Table 10: UC San Diego Sources of Revenue, 2006-07

<u>Revenue Source</u>	<u>Total Revenue</u>	<u>Revenue from Outside San</u>	
		<u>Diego County</u>	<u>San Diego County</u>
State Appropriations	\$301,598,000	\$301,598,000	100.0%
Tuition and Fees	\$202,465,000	\$181,203,250	89.5%
Grants and Contracts			
<i>From Federal Government</i>	\$546,545,500	\$546,545,500	100.0%
<i>From State Government</i>	\$29,543,000	\$29,543,000	100.0%
<i>From Local Government</i>	\$147,715,000	\$0	0.0%
<i>From Private Sector</i>	\$14,771,500	\$0	N/A
Medical Center	\$659,469,000	\$0	0.0%
Educational Activities	\$204,164,000	\$0	0.0%
Auxiliary Enterprises	\$120,610,000	\$0	0.0%
Investment Income	\$22,384,000	\$0	N/A
Other Revenue Sources	\$56,930,000	\$0	0.0%
Total	\$2,306,195,000	\$1,058,889,750	45.9%

Notes: 87.8 percent of undergraduate and graduate students are from outside San Diego County; figures may not add due to rounding.

Sources: UC San Diego Annual Financial Report 2007, Financial Overview; and CBRE Consulting.

Other revenue sources originating from outside the County include State Financial and Educational Appropriations totaling \$301.6 million, \$29.54 million in State government grants and contracts, and \$181.2 million in tuition and fees. A vast majority of UC San Diego students originally come from outside San Diego County and a portion pay out-of-state tuition. A summary of UC San Diego’s revenues for FY 2006-2007 is included in Table 10, along with the estimated percentage share of each source of revenue generated from outside San Diego County.⁴⁸

⁴⁸ The share of tuition and fees from outside San Diego County was estimated using data on the home county of 2006 freshman registrants (their residence location before attending UC San Diego). The percentage of students with homes in California counties outside of San Diego was applied to the total in-state tuition revenue and was then added to total out-of-state tuition to get the estimated total share of tuition and fees from outside San Diego County.

UC SAN DIEGO SPENDING

The majority of the University’s spending is concentrated in San Diego County. In FY 2006-07, UC San Diego spent approximately \$2.492 billion on payroll, goods and services, and construction.⁴⁹ This total reflects expenditures made both in California as well as across the country. Approximately \$1.710 billion, or 68.6 percent, of this total was spent in San Diego County, as shown in Table 11. Since approximately 54.1 percent or \$1.247 billion, of the University’s revenue came from sources within the County, this means that UC San Diego made a net contribution of approximately \$469.0 million to the local economy. Put another way, the University spent \$1.37 in San Diego County for every dollar in revenue received from within the County.⁵⁰

Table 11: UC San Diego Spending, 2006-07

<u>Source</u>	<u>Total Spending</u>	<u>Spending Within San Diego County</u>	<u>Percent Spent in San Diego County</u>
Salaries & Wages	\$1,136,557,935	\$1,085,053,749	95.5%
Goods & Services	\$1,014,918,798	\$347,177,660	34.2%
Construction	\$340,658,118	\$278,127,035	81.6%
Total	\$2,492,134,851	\$1,710,358,444	68.6%

Sources: UC San Diego Campus Accounting, Medical Center Accounting, Office of Disbursements, Office of Academic Planning and Budget, BFS Payroll, and Office of Design and Construction; and CBRE Consulting.

Notes: Figures may not add due to rounding. Salaries and Wages exclude payments made to former UC San Diego employees.

EMPLOYMENT AND PAYROLL

Total Employment and Payroll

In FY 2006-07, UC San Diego paid \$1.137 billion in salaries, wages, and other pay to 26,920 employees.⁵¹ The payroll expenditures include salaries, wages, stipends, payouts of accumulated vacation time, and other forms of direct monetary compensation. In addition to the payroll expenditures cited in Tables 11 and 13, UC San Diego spent approximately \$116.7 million on retirement and health benefits in FY 2006-07, which is equal to 10.3 percent of all salary and wage payments.⁵² The indirect and induced economic impacts associated with these payments, including employment, personal income, and spending impacts, are discussed in detail in Chapter VII, Direct, Indirect, and Induced Impacts of UC San Diego.

⁴⁹ For the purposes of this analysis, payroll includes salaries, wages and irregular pay, such as stipends and pay-outs of accrued vacation and sick time. Payroll does not include employee health care, retirement, or other benefits.

⁵⁰ The amount of UC San Diego *spending* within San Diego County divided by the amount of *revenue* received from within San Diego County yields \$1.38. The numerator, \$1,710,358,444, is shown in Table 11. The denominator, \$1,247,305,250, is calculated from Table 10 (\$2,306,195,000 minus \$1,058,889,750).

⁵¹ Total UC San Diego employment of 26,920 represents the total payroll headcount including UC San Diego students employed by the university. Average monthly employment for Fiscal Year 2006-07 was 16,750, comprising an average of 15,500 non-student employees and 1,260 student employees. Full Time Equivalent (FTE) is used for the IMPLAN model rather than headcount.

⁵² Total payroll expenditures in Tables 11 and 13 are different because Table 13 excludes UC San Diego students who are employed by the university, whereas Table 11 accounts for the total payroll amount paid by UC San Diego, including student employees.

UC San Diego is the third largest employer in the City of San Diego, behind only the State and Federal governments. As shown in Table 12, the top ten employers in the City of San Diego in 2007 had a total of approximately 194,640 employees. UC San Diego accounted for 13.8 percent of total employment among the top ten City employers.

<u>Rank</u>	<u>Employer</u>	<u>Employees</u>	<u>Industry</u>
1.	State of California	40,600	State Government Administration
2.	Federal Government	39,900	Federal Government Administration
3.	UC San Diego	26,920	Higher Education
4.	County of San Diego	16,150	County Government Administration
5.	San Diego Unified School District	14,560	Public Education
6.	Sharp Healthcare	13,870	Healthcare Service Provider
7.	Scripps Health	12,200	Hospitals
8.	San Diego State University	11,250	Higher Education
9.	City of San Diego	11,200	Municipal Government Administration
10.	Qualcomm Inc.	8,010	Digital Wireless Communication
Total Top 10 City Employment:		194,640	

Source: San Diego Business Journal Book of Lists 2008.

Notes: Figures may not total due to rounding. Employee figures reflect total headcount, not full time equivalent employment, and include part-time employees. Figures are rounded to the nearest multiple of ten.

As shown previously, the University is also the third largest employer in San Diego County. The University's role as a major employer provides economic stability, as employment at UC San Diego is somewhat buffered from downturns in the local economy because most of the jobs are funded from non-local revenue sources that are not market-dependent.

Employment and Payroll by Area

In Fiscal Year 2006-07, UC San Diego employed an average of 15,500 non-student employees on a monthly basis. Table 13 shows the residence location of these employees in FY 2006-07, grouped by income range. A total of 10,390 employees, or about 67.1 percent, lived in the City of San Diego. A total of 4,410 University employees, comprising 28.4 percent, lived elsewhere in San Diego County, and another 580 employees, or 3.7 percent, lived elsewhere in California.

<u>Employees by Income Range</u>	<u>City of San Diego</u>	<u>Other San Diego County</u>	<u>Other California</u>	<u>Other U.S./ International</u>	<u>Total</u>
Less than \$35,000	2,296	1,026	166	22	3,510
\$35,000 - \$50,000	3,021	1,075	167	42	4,305
\$50,000 - \$75,000	2,492	1,084	138	31	3,745
\$75,000 - \$100,000	1,409	690	70	7	2,176
\$100,000 - \$150,000	780	368	29	10	1,187
\$150,000 or more	396	162	10	5	573
Total Employment	10,394	4,405	580	117	15,496
Total Payroll (Millions)	\$723.3	\$311.1	\$36.7	\$9.3	\$1,080.4

Source: UC San Diego Payroll Office.

Notes: Employment and payroll figures exclude UC San Diego students. Figures may not total due to rounding. Employment figures reflect full time equivalents. In addition to City of San Diego, Other San Diego County, and Other California, total employment summary statistics also include payroll of those living in Other U.S. areas.

Approximately 95.5 percent of payroll paid by UC San Diego in FY 2006-07 to non-student employees went to San Diego County residents. Of that, approximately \$723.3 million, or 67.1 percent, went to employees living in the City of San Diego. Approximately \$36.74 million, or 3.7 percent, was paid to employees living outside of the San Diego County region but within California. Only 0.8 percent of payroll went to employees living outside of California.

GOODS AND SERVICES PURCHASING AND CONSTRUCTION EXPENDITURES

In FY 2006-07, UC San Diego purchased \$1.015 billion worth of goods and services and spent roughly \$340.7 million on capital expenditures. Table 14 lists some examples of City of San Diego, San Diego County, and other California suppliers, vendors, and contractors to the University.

Table 14: Examples of Major UC San Diego Suppliers, 2006-07

<u>Supplier</u>	<u>FY Contract Amount</u>	<u>Service</u>	<u>Headquarters or Office Location</u>
Goods and Service Providers			
Department of General Services	\$21,054,989	Federal Government	Sacramento
Renaissance Agencies	\$12,767,326	Health Insurance Provider	Los Angeles
Apple Computer	\$10,664,138	Computer Equipment	Silicon Valley
San Diego Gas & Electric	\$7,110,666	Utilities Provider	San Diego
Fisher Scientific	\$6,207,668	Laboratory Supplies and Services	San Diego
Scripps Research Institute	\$5,473,684	Biomedical Research	San Diego
City of San Diego	\$4,421,998	Municipal Government	San Diego
Sysco Food Services	\$4,263,773	Food Services	San Diego
USE Credit Union	\$4,078,043	Credit Union	San Diego
La Jolla Village Professional Center	\$3,411,247	Office Space	San Diego
Construction-Related Service Providers			
Sundt Construction	\$42,724,140	General Contractor	San Diego
PCL Construction Services	\$25,512,281	General Contractor	San Diego
Swinerton Builders	\$25,414,558	General Contractor	San Diego
Douglas Barnhart Inc.	\$23,078,556	General Contractor	San Diego
McCarthy Building Companies	\$12,038,319	General Contractor	San Diego
RTKL Associates	\$4,811,322	Architecture & Engineering	Los Angeles
Turner Construction	\$4,217,031	General Contractor	San Diego
Marcotte & Hearne Builders	\$4,066,534	General Contractor	San Diego
Soltek Pacific	\$3,894,074	General Contractor	San Diego
Rudolph & Sletten	\$2,659,117	General Contractor	San Diego

Source: UC San Diego Accounting Services.

For the purposes of estimating economic impacts, UC San Diego spending related to capital improvements is broken into hard costs and soft costs. Hard costs refer to construction-related expenditures for labor, materials, and general contracting. Soft costs are payments to consultants for architectural, engineering, geotechnical, or other related services. A small percentage of soft costs are internal UC San Diego fees associated with the management of capital improvements.⁵³

Given the geographic specificity of construction projects, all hard construction costs were assumed to be spent within the City of San Diego. As seen in Chapter VII, Direct, Indirect, and Induced Impacts of UC San Diego, the IMPLAN multipliers used to assess the direct, indirect,

⁵³ According to the UC San Diego Office of Design and Construction, individual project soft construction costs for Fiscal Year 2006-07 are comprised of roughly 4.0 to 6.0 percent internal fees. The remaining costs represent consultant fees.

and induced impacts of construction spending take into account some geographic dispersion of hard and soft capital expenditures.

Soft costs associated with design consultants, which make up roughly 94.0 to 96.0 percent of all soft construction costs, are dispersed more widely since many of the consultants used for UC San Diego capital projects are located outside of San Diego County. Working with UC San Diego Design and Construction staff, it was estimated that 30.0 percent of construction soft costs were local to San Diego County. Of this 30.0 percent, 35.0 percent of consultants were found to be in the City and 65.0 percent were found to be within other areas of the County. Stated differently, 10.5 percent of all consultant costs were incurred within the City, and 19.5 percent were incurred in other areas of the County. Another 53.0 percent were found to occur in other California counties, while 18.0 percent were found to occur outside of the State.⁵⁴

Accounting for combined hard and soft construction spending, UC San Diego spent approximately \$340.7 million on capital expenditures in FY 2006-07. Table 15 summarizes the University’s spending on nine selected capital projects during the Fiscal Year, while the following paragraphs provide details on three of the projects currently underway or recently completed.

<u>Project</u>	<u>2006-07 Expenditures</u>
East Campus Graduate Housing	\$67,495,605
Price Center Expansion	\$40,427,509
Rady School of Management Facility Phase 1	\$40,362,913
Mayer Hall Renovations	\$29,643,657
Hopkins Parking Structure	\$27,810,435
San Diego Supercomputer Expansion	\$22,452,542
Cardio Center/Thornton Expansion	\$12,054,851
Music Building	\$10,240,174
Scripps Institution of Oceanography Storm Water Management	\$6,741,707
All Other Projects	\$83,428,725
Total	\$340,658,118

Sources: UC San Diego Office of Design and Construction; and CBRE Consulting.

UC San Diego Student Academic Services Building. This five-story, 101,000-square-foot facility with a 300-seat auditorium, conference facilities, retail space, and café was completed in August of 2007 by the local office of McCarthy Building Companies. The builder’s contract totaled \$30.00 million. The building was designed by renowned local architect Rob Wellington Quigley.

Completion of the Academic Services Building allowed several campus departments previously operating within severely outdated buildings to relocate to modern facilities. More importantly,

⁵⁴ The actual allocation of soft cost spending between other California counties (outside San Diego County) and other areas of the US (outside of California) were unavailable for this study. To allocate the 70.0 percent of soft costs spent between other California counties and areas outside of California, soft construction spending patterns from other UC campuses were analyzed and the proportions found were applied to the total spending dollars associated with UC San Diego soft costs.

the new facility addressed the need for these departments to be housed under one roof. Now that campus offices such as Admissions, Financial Aid, the Registrar, and the Office of Graduate Studies and Research are centrally located on campus, the speed and quality of student services is greatly improved.

UC San Diego Music Building. The 87,000-square-foot Conrad Prebys Music Center is scheduled to be complete in December of 2008. Its showcase will be a 400-seat recital hall designed by world renowned acoustic designer Cyril Harris. The facility will also boast a smaller, flexible auditorium for multimedia and music, a 150-seat lecture hall, and rehearsal rooms for chamber, choral, orchestral, and percussion music. The building will feature the newest technologies in student recording suites, computer music labs, practice rooms, and offices.

The local office of PCL Construction Services was awarded the \$44.80 million contract to build the facility. Their contract currently ranks 21st among the largest construction contracts in the City.⁵⁵ When the facility opens in 2009, it will present a range of concerts from classical music to innovative new works incorporating cutting-edge technologies. It will also be an education center, as budding musicians from San Diego schools will visit to attend concerts, clinics, and classes.

Rady School of Management. The June 1, 2007 dedication of Otterson Hall marked the end of Phase I of UC San Diego's graduate business management school construction. The 83,330-square-foot facility is comprised of roughly 50,000 square feet of classrooms, study rooms, faculty offices, executive education facilities, a career services office, and student support areas. The \$36.40 million construction contract was completed by PCL Construction Services of San Diego, while Ellerbe Becket was the architect. The University is currently working on designs for an 80,000-square-foot, \$30.00 million Phase II addition to Otterson Hall that will accommodate the growing enrollment at Rady School of Management.

Price Center Expansion. The 180,000-gross-square-foot Price Center Expansion endeavors to create a more communal neighborhood for the burgeoning campus population. The existing student center will expand by 100,500 net square feet expected to open in Fall 2008. This new space includes 63,800 square feet made up of a 24-hour lounge with computer lab and group study areas, food venues, retail service with indoor and outdoor seating areas, a ballroom, meeting spaces, offices for student organizations, and a student resource center. Additional program elements include a 22,700-square-foot bookstore expansion and grocery store, a 6,600-square-foot Cross Cultural Center, a 4,600-square-foot Alumni and Visitors Center, and a 2,800-square-foot Student Services Center. Finally, 54,000 square feet of existing space will be renovated. The project was designed by Cannon Design and construction is being undertaken by M.A. Mortenson. The budget is \$65.00 million.⁵⁶

East Campus Graduate Housing. The new 374,000-square-foot housing complex provided 800 new beds for the Mesa Housing area of East Campus. All units are two-bedroom units of approximately 740 square feet. The 8-acre site also includes 800 parking spaces. Studio E Architects of San Diego teamed with MVE Architects, a national architecture firm, to design the

⁵⁵ San Diego Business Journal Book of Lists 2008, December 31, 2007.

⁵⁶ Fdc.ucsd.edu/projects

residences. The San Diego office of Sundt Construction completed the \$66.00 million construction project, which opened in Fall 2007.⁵⁷

⁵⁷ Fdc.ucsd.edu/projects

VII. DIRECT, INDIRECT, AND INDUCED ECONOMIC IMPACTS OF UC SAN DIEGO

THE CONCEPT OF INDIRECT AND INDUCED ECONOMIC IMPACTS

The impact of UC San Diego on the local, regional, and state economies is greater than the total of the University's direct spending on payroll, goods and services, and construction. This is because money spent by the University is spent again by the recipient employees and local businesses. Employees use their salaries and wages to purchase goods and services from other businesses. Businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local, regional, and state economies. A chain reaction of indirect and induced spending continues, with subsequent rounds of additional spending gradually diminished through savings, taxes, and expenditures made outside the state. This economic ripple effect is measured by what is known as an "Input-Output" economic model, which uses a series of "multipliers" to provide estimates of the number of times each dollar of "input," or direct spending, cycles through the economy in terms of "indirect and induced output," or additional spending, personal income, and employment.⁵⁸ The mechanics of the input-output model are described in more detail in Appendix A.

IMPLAN Model

There are several input-output models commonly used by economists to estimate multiplier effects. With the assistance of the economic consulting firm Applied Economics, CBRE Consulting employed the IMPLAN input-output model in developing the estimates of UC San Diego's spending, income, and employment impacts. This model, initially developed by the U.S. Department of Agriculture, is described in more detail in Appendix A. The IMPLAN model examines inter-industry relationships in the local, regional, and national economies. Through Applied Economics, CBRE Consulting relied on IMPLAN to provide estimates of indirect and induced output, income, and employment impacts based on multipliers for the City of San Diego, San Diego County, and the State of California.

Multipliers and Spending, Employment, and Income Impacts

IMPLAN multipliers indicate the ratio of direct impacts to indirect and induced impacts. For example, a spending multiplier of 0.25 indicates that one dollar of direct spending generates an additional \$0.25 in indirect and induced spending.⁵⁹ Put differently, a spending multiplier of 0.25 can also be interpreted as indicating that \$1 of direct spending generates total spending of \$1.25. In the case of employment impacts, the multipliers measure the number of full-time equivalent (FTE) jobs supported by \$1.000 million in direct spending; for example, an employment multiplier of 10 indicates that \$1.000 million in spending generates 10 indirect and induced FTE jobs.

⁵⁸ Indirect impacts are the changes in inter-industry purchases as they respond to new demands of directly affected industries. Induced impacts typically reflect changes in spending from households as income increases or decreases due to changes in production. For more explanation of indirect and induced impacts, see Appendix A.

⁵⁹ Multipliers are rounded to two decimal places, throughout this report, to reflect their high level of precision.

Unless otherwise indicated, the reader should interpret the multipliers and impacts described in the following sections, and provided in Tables 16, 17, and 18 and Figures 3, 4, and 5, as cumulative – as multipliers and impacts attributed to larger geographies are inclusive of the multipliers and impacts found in smaller or subordinate geographies. For example, the impact of the University’s spending in San Diego County includes the impact of the University’s spending in the City of San Diego. Instances where tables and figures present non-cumulative impacts are labeled as such, with geographies labeled “Other San Diego County,” and “Other California.”

DIRECT, INDIRECT, AND INDUCED SPENDING IMPACTS

This chapter discusses the “total” economic impacts – including direct, indirect, and induced economic impacts – of University purchases of goods and services, payroll expenditures, and spending on construction projects. The analysis estimates total impacts in three distinct ways – spending, employment, and income. These spending, employment, and income impacts are estimated at the state, county, and city levels.

The methodology of estimating indirect and induced economic impacts is based on estimates of direct University spending in particular geographic areas. In order to estimate direct University spending in this way, UC San Diego staff identified the addresses of all vendors and employees who received payments from the University during the 2006-07 fiscal year. Appendix A provides further detail on the assumptions and methodology used in deriving these estimates.

Table 16: Total UC San Diego Spending in California, 2006-07

Geography	Direct Spending	Multiplier	Indirect and Induced Spending	Total Direct, Indirect, and Induced Spending	Percentage of Total Impacts
City of San Diego	\$1,240,202,608	0.83	\$1,034,791,566	\$2,274,994,174	56.6%
All San Diego County	\$1,659,648,328	0.92	\$1,532,666,358	\$3,192,314,686	79.4%
All California	\$1,968,739,244	1.04	\$2,053,463,743	\$4,022,202,987	100.0%
TOTAL	\$1,968,739,244	1.04	\$2,053,463,743	\$4,022,202,987	

Sources: UC San Diego Office of Design and Construction, General Accounting Services, and Payroll; Applied Economics; and CBRE Consulting.

Notes: Total does not account for spending that occurred outside of California. Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies.

In FY 2006-07, direct spending by UC San Diego on goods and services purchases, payroll, and construction projects in the State of California totaled \$1.969 billion.⁶⁰ This direct spending led to an estimated \$2.053 billion in indirect and induced spending throughout the state, for an estimated \$4.022 billion in total spending impact by UC San Diego during the fiscal year.

San Diego County benefited from the lion’s share of the University’s direct spending in California, with approximately \$1.660 billion, or 84.3 percent of the University’s statewide direct spending occurring within the county. This spending generated an additional \$1.533 billion in indirect and induced spending in San Diego County, for a total spending impact of

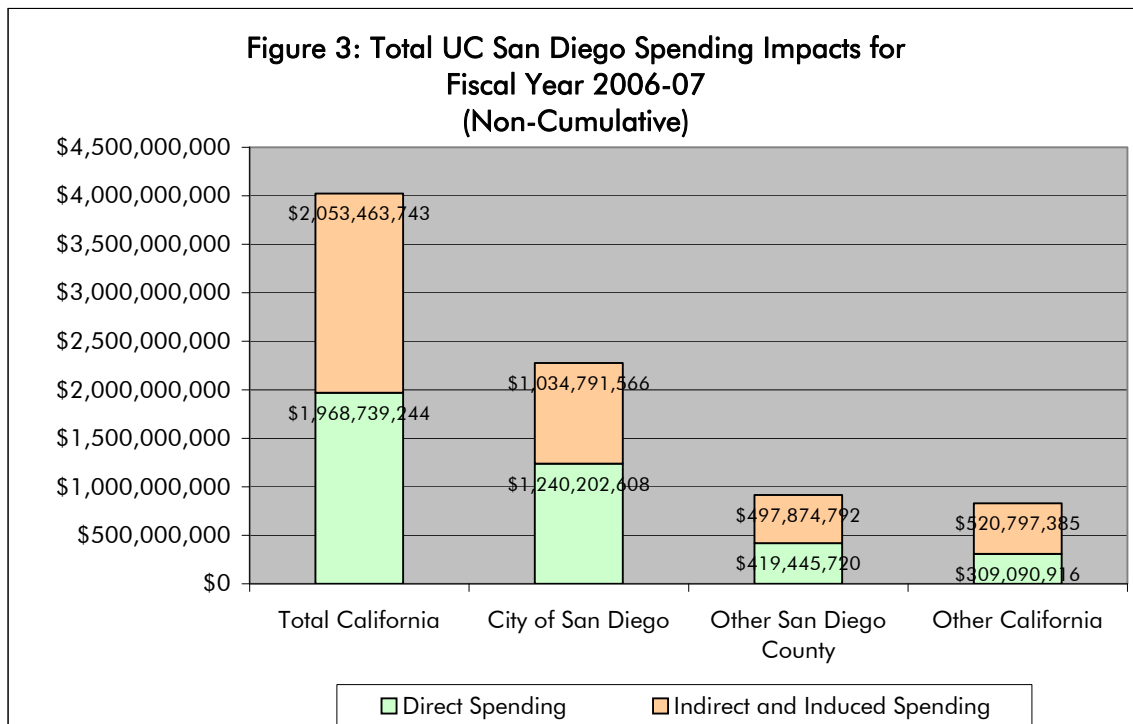
⁶⁰ For the purposes of the analysis of total economic impacts, the University direct payroll number excludes the payroll received by student employees. CBRE Consulting measures the impact of student spending in a separate analysis; therefore, to avoid double counting, students’ share of the total payroll is excluded from the analysis of University payroll impacts.

\$3.192 billion. This indicates that 79.4 percent of the University’s total spending impact was concentrated within San Diego County.

Within the City of San Diego, direct University spending in FY 2006-07 totaled approximately \$1.240 billion, and indirect and induced spending impacts are estimated at approximately \$1.035 billion. This indicates that the University generated \$2.275 billion in total spending impacts within the City of San Diego in FY 2006-07, which is approximately 56.6 percent of the University’s total spending impact statewide.

The estimates of indirect and induced spending reflect multipliers for the University’s spending at the state, county, and city level. Table 16 shows that the average state-level multiplier for UC San Diego’s direct spending is 1.04, which indicates that for every \$1.00 of UC San Diego direct spending in the state there is an estimated additional \$1.04 in indirect and induced spending throughout the state. The spending multipliers for San Diego County and the City of San Diego indicate that \$1.00 of direct University spending generates \$0.92 in indirect and induced spending in San Diego County, with the City of San Diego capturing approximately \$0.83 of that indirect and induced spending impact.

Figure 3 shows the spending impacts disaggregated by geography, indicating the discrete share of impacts for the City of San Diego, other San Diego County, and other California.



Sources: UC San Diego Accounting Services; Applied Economics; and CBRE Consulting.

EMPLOYMENT IMPACTS

Employment impacts and multipliers for UC San Diego are summarized in Table 17 and Figure 4. Based on IMPLAN multiplier estimates, spending by UC San Diego in FY 2006-07

supported a total of 34,230 full-time equivalent (FTE) jobs in the State of California. Approximately 55.1 percent, or 18,850 of these jobs, were indirect and induced jobs – or jobs in addition to the direct employment of University faculty, staff, and students. This reflects an average indirect and induced jobs multiplier of 9.57, which indicates that \$1.000 million in University spending supports approximately 9.57 jobs statewide *in addition to* the direct employment of the University. Looking at this information another way, UC San Diego supported approximately 1.23 indirect and induced jobs (FTE) for every direct University job (FTE).

Table 17: Total FTE Jobs in California Produced by UC San Diego Spending, 2006-07

<u>Geography</u>	<u>Direct Jobs (UCSD Employment)</u>	<u>Direct Spending</u>	<u>Multiplier</u>	<u>Indirect and Induced Jobs (FTE)</u>	<u>Total Direct & Indirect Jobs</u>	<u>Percent of Total California Jobs</u>
City of San Diego	10,394	\$1,240,202,608	8.38	10,392	20,786	60.7%
Other San Diego County	4,405	\$419,445,720	9.42	3,950	8,355	24.4%
Other California	580	\$309,090,916	14.58	4,507	5,087	14.9%
TOTAL	15,379	\$1,968,739,244	9.57	18,850	34,229	

Sources: UC San Diego Office of Student Research, Design and Construction, General Accounting Services, and Medical Center Accounting Services; Applied Economics; and CBRE Consulting.

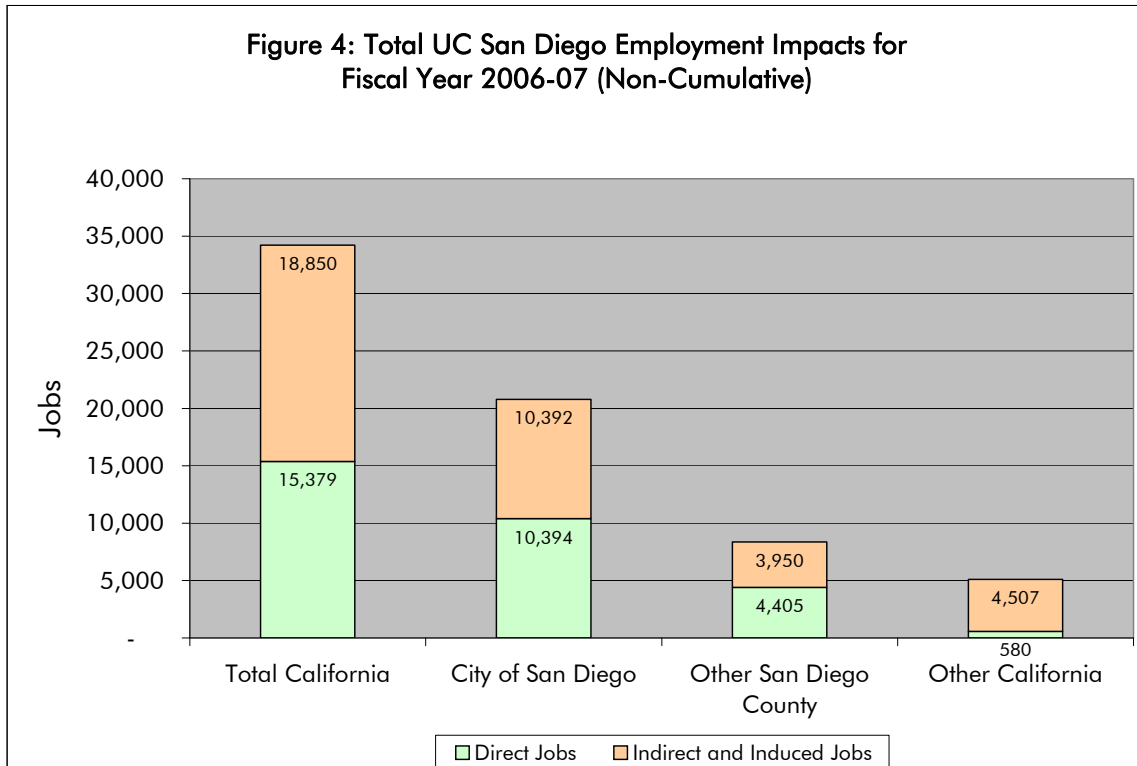
Notes: Figures may not add due to rounding. Spending and multiplier calculations are geographically non-cumulative. Job multipliers are calculated per \$1 million of output.

University spending supported 20,790 total FTE jobs in the City of San Diego, 10,390 of which were indirect and induced jobs. This reflects an employment multiplier of 8.38 indirect and induced jobs per \$1.000 million in University spending within the city’s economy. Within the City of San Diego, the University supports 1.00 indirect and induced job for every direct University job.

UC San Diego supported an additional 8,360 FTE jobs in San Diego County, of which 3,950, or 47.3 percent, were indirect and induced jobs. This reflects an average employment multiplier of 9.42 indirect and induced jobs per \$1.000 million of University spending in the unincorporated county.

Outside San Diego County but within California, University spending generated another 5,090 FTE jobs, of which 4,510 were indirect and induced jobs. This reflects an average employment multiplier of 14.58 indirect and induced jobs per \$1.000 million of University spending in California outside of San Diego County.

While the employment multipliers are greater at the state level than at the local level, the City of San Diego received a considerable share of the overall employment impacts. Of the total jobs generated by University spending in FY 2006-07, 60.7 percent were located within the City of San Diego. Excluding direct University employment, the City of San Diego benefited from 55.1 percent of the indirect and induced jobs generated by University spending statewide.



Sources: UC San Diego Payroll Office; Applied Economics; and CBRE Consulting.

PERSONAL INCOME IMPACTS

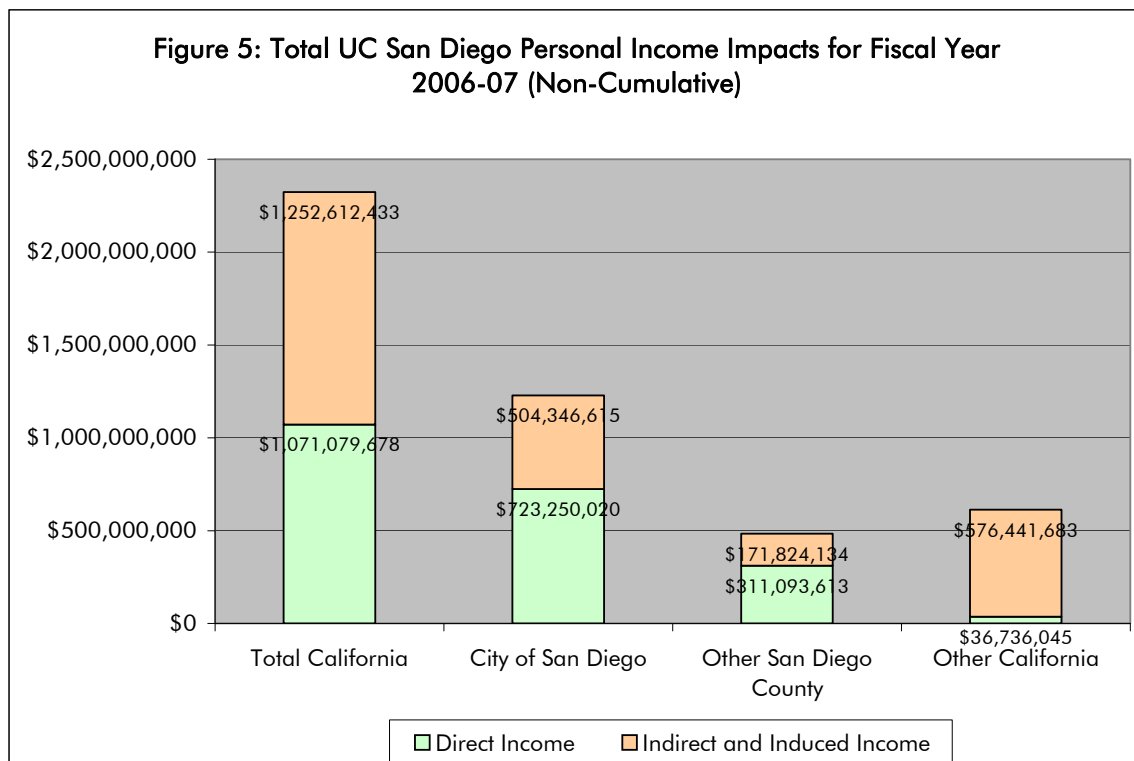
Personal income impacts and multipliers are shown in Table 18 and Figure 5. Spending by UC San Diego in FY 2006-07 generated total personal income of approximately \$2.324 billion in the State of California. This total includes approximately \$1.071 billion in direct UC San Diego payroll as well as \$1.253 billion in indirect and induced personal income – or income in addition to the direct payroll of University faculty and staff. The indirect and induced personal income impacts are generated by the spending associated with UC San Diego payroll as well as goods and services purchases and capital expenditures. The estimated personal income multiplier associated with the University’s total spending statewide was 0.64 in FY 2006-07, which indicates that \$1.00 of University spending generated \$0.64 in personal income throughout the state.

Of UC San Diego’s total impact on personal income statewide, approximately 73.6 percent, or \$1.711 billion, was generated within San Diego County. This includes \$1.034 billion in direct University payroll and an additional \$676.2 million in indirect and induced personal income generated by University spending in the area. The estimated personal income multiplier for UC San Diego spending in San Diego County was 0.41, which indicates that \$1.00 of University spending generated an estimated \$0.41 in personal income in San Diego County.

Table 18: Total Personal Income Produced in California From UC San Diego Spending, 2006-07						
Geography	Direct Income (UCSD Payroll)	Direct Spending	Multiplier	Indirect and Induced Income	Total Personal Income Generated	Percent of Total California
City of San Diego	\$723,250,020	\$1,240,202,608	0.41	\$504,346,615	\$1,227,596,635	52.8%
Other San Diego County	\$1,034,343,633	\$1,659,648,328	0.41	\$676,170,750	\$1,710,514,383	73.6%
All California	\$1,071,079,678	\$1,968,739,244	0.64	\$1,252,612,433	\$2,323,692,111	100.0%
TOTAL	\$1,071,079,678	\$1,968,739,244	0.64	\$1,252,612,433	\$2,323,692,111	

Sources: UC San Diego Office of Student Research and Information, Design and Construction, General Accounting Services, Medical Center Accounting Services; Applied Economics; and CBRE Consulting.
 Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies.

Finally, UC San Diego spending within the City of San Diego contributed to \$1.228 billion in personal income for San Diego residents. This includes approximately \$723.3 million in direct University payroll and an additional \$504.3 million in indirect and induced personal income. The total income impacts reflect an estimated average income multiplier of 0.41, which indicates that \$1.00 of UC San Diego spending generated \$0.41 in personal income. The total personal income impact of University spending in the City of San Diego was approximately 52.8 percent of the total impact of University spending statewide.



Sources: UC San Diego Accounting Services; Applied Economics; and CBRE Consulting.

SUMMARY OF SPENDING, EMPLOYMENT, AND PERSONAL INCOME IMPACTS BY GEOGRAPHY

The estimated spending, employment, and personal income impacts of UC San Diego spending in the City of San Diego, San Diego County, and the State of California are summarized in Table 19.

	<u>City of San Diego</u>	<u>Other San Diego County</u>	<u>Other California</u>	<u>Total Statewide</u>
Spending				
Direct	\$1,240,202,608	\$419,445,720	\$309,090,916	\$1,968,739,244
Indirect	\$1,034,791,566	\$497,874,792	\$520,797,385	\$2,053,463,743
Total Spending	\$2,274,994,174	\$917,320,512	\$829,888,301	\$4,022,202,987
Employment (FTE)				
Direct	10,394	4,405	580	15,379
Indirect	10,392	3,950	4,507	18,850
Total Jobs	20,786	8,355	5,087	34,229
Income				
Direct	\$723,250,020	\$311,093,613	\$36,736,045	\$1,071,079,678
Indirect	\$504,346,615	\$171,824,134	\$576,441,683	\$1,252,612,433
Total Income	\$1,227,596,635	\$482,917,747	\$613,177,728	\$2,323,692,111

Sources: UC San Diego Office of Student Research and Information, Design and Construction, General Accounting Services, and Medical Center Accounting Services; Applied Economics; and CBRE Consulting.

Note: Figures may not add due to rounding.

- Overall, in Fiscal Year 2006-07, the impact of spending by UC San Diego in the City of San Diego was \$2.275 billion in total spending, 20,790 jobs, and \$1.228 billion in personal income, excluding UC San Diego employees.
- UC San Diego’s spending generated an additional impact of approximately \$917.3 million in total spending, 8,360 jobs, and \$482.9 million in personal income, excluding UC San Diego employees, elsewhere in San Diego County.
- UC San Diego spending contributed another \$829.9 million in total spending, 5,090 jobs, and \$613.2 million in personal income, excluding UC San Diego employees, elsewhere in the state.
- In all, UC San Diego’s total economic impact in California was \$4.022 billion in total spending, 34,230 full time equivalent jobs, and \$2.324 billion in personal income, excluding UC San Diego employees, in the 2006-07 Fiscal Year.

VIII. UNIVERSITY STUDENT, VISITOR, AND RETIREE IMPACTS

In addition to the direct spending of UC San Diego itself, the presence of the University attracts students and visitors and also anchors UC San Diego retirees to the local area. Their presence in turn also supports the local, regional, and state economies.

STUDENT EXPENDITURE IMPACTS

UC San Diego students fuel the local economy through their spending.⁶¹ The approximate location and amount of spending by UC San Diego students may be determined using residential data from the Offices of the Registrar and Student Information, as well as spending estimates from the Financial Aid Office. As shown in Table 20, approximately 24,580 undergraduate and graduate students lived in the City of San Diego in FY 2006-07, representing 93.1 percent of total enrollment. About 1,830 students, or 6.9 percent, lived elsewhere in San Diego County.

Table 20 also shows that UC San Diego provided approximately 33.3 percent of all students with housing during FY 2006-07.⁶² More specifically, 34.0 percent of all undergraduate students and 30.4 percent of all graduate students lived in campus housing. In the fall of 2007, 800 beds were added by the East Campus Graduate Housing that opened on campus. With these new beds, UC San Diego has the capacity to house approximately 45.4 percent of its graduate students.

<u>Student Category</u>	<u>City of San Diego</u>	<u>Other San Diego County</u>	<u>Other California</u>	<u>Total</u>
Undergraduate:				
UC San Diego-Owned Housing	7,165	N/A	N/A	7,165
Unaffiliated Off-Campus Housing	12,440	1,459	0	13,899
Total Undergraduate	19,605	1,459	0	21,064
Graduate:				
UC San Diego-Owned Housing	1,627	N/A	N/A	1,627
Unaffiliated Off-Campus Housing	3,351	372	0	3,723
Total Graduate	4,978	372	0	5,350
Grand Total:	24,582	1,832	0	26,414

Sources: UC San Diego Office of the Registrar and Office of Student Research and Information.

Table 21 presents student budget estimates provided by the UC San Diego Financial Aid Office. The data show a fairly economical pattern of annual student spending, suggesting that the estimates are a conservative approximation of actual student spending. The average spending for each student includes rent, food, books and supplies, and transportation during FY 2006-07. Spending for campus provided housing, meal plans, tuition, registration fees, books, and

⁶¹ This first discussion focuses on student impacts of “regular” UC San Diego students, as opposed to students enrolled in UC San Diego’s Extension Programs. The impacts of Extension students are discussed separately later in this chapter.

⁶² $(7,165 + 1,627) / 26,414 = 33.3$ percent.

supplies are not included in this analysis – as these items represent University revenues rather than contributions to the local economy.⁶³

	<u>Rent</u>	<u>Food</u>	<u>Books & Supplies</u>	<u>Transportation</u>	<u>Total</u>
Undergraduate Students:					
UC San Diego On-Campus Housing	N/A	\$2,853	\$1,504	\$1,097	\$5,454
UC San Diego Off-Campus Housing	N/A	\$2,331	\$1,504	\$1,925	\$5,760
Unaffiliated Off-Campus Housing	\$6,170	\$2,331	\$1,504	\$1,925	\$11,930
Living with Parents	\$1,321	\$1,310	\$1,504	\$1,965	\$6,100
Graduate Students:					
UC San Diego On-Campus Housing	N/A	\$2,331	\$1,504	\$1,097	\$4,932
UC San Diego Off-Campus Housing	N/A	\$2,331	\$1,504	\$1,097	\$4,932
Unaffiliated Off-Campus Housing	\$7,022	\$2,331	\$1,504	\$1,925	\$12,782
Living with Parents	\$1,321	\$1,310	\$1,504	\$1,965	\$6,100

Sources: UC San Diego Office of Financial Aid; and CBRE Consulting.

Table 22 estimates total spending of undergraduate and graduate students based on their residence location. CBRE Consulting and UC San Diego staff developed assumptions about student spending patterns in the City of San Diego and the surrounding areas. These estimated “capture rates” are based on several factors, such as students’ residential locations, the distribution of retail and entertainment venues, and the expectation that students who do not live in San Diego make expenditures there because of time spent on and around campus.⁶⁴ Based on these capture rates and the data on average student spending provided by the Financial Aid Office, it is estimated that for FY 2006-07 UC San Diego undergraduate and graduate students spent \$207.3 million in the City of San Diego, an additional \$35.26 million elsewhere in San Diego County, and \$13.89 million in the rest of California.

<u>Student Category</u>	<u>Total Number of Students</u>	<u>Estimated Annual Direct Spending In:</u>			<u>Total</u>
		<u>City of San Diego</u>	<u>Other San Diego County</u>	<u>Other California</u>	
Undergraduate:	21,064	\$162,421,055	\$27,554,968	\$10,872,437	\$200,848,460
Graduate:	5,350	\$44,891,479	\$7,702,801	\$3,018,590	\$55,612,870
Total:	26,414	\$207,312,534	\$35,257,769	\$13,891,026	\$256,461,329

Sources: UC San Diego Office of Financial Aid, Student Research and Information, and Registrar; and CBRE Consulting

Notes: Figures may not add due to rounding. Total spending excludes on-campus housing and meal plans, registration and fees, books and supplies, and non-resident tuition.

The \$256.5 million in UC San Diego student spending generated additional sales and wages to other businesses and employees within the City of San Diego, San Diego County, and the State of California. Table 23 shows the total direct, indirect, and induced spending, income, and employment within these geographic areas attributable to UC San Diego student spending.

⁶³ To be conservative, this analysis assumes that all books and supplies are purchased at on-campus bookstores.

⁶⁴ Full details on the capture rate estimates and all other background calculations related to student spending are provided in Appendix B.

Table 23: UC San Diego Student Spending Impacts in California, 2006-07

	<u>City of San Diego</u>	<u>All San Diego County</u>	<u>All California</u>
Student Spending	\$207,312,534	\$242,570,303	\$256,461,329
Spending			
Multiplier	0.54	0.61	0.70
Indirect/Induced Spending	\$112,461,114	\$148,543,092	\$179,012,905
Total Direct, Indirect, and Induced Spending	\$319,773,648	\$391,113,395	\$435,474,235
Jobs			
Multiplier	14.03	14.53	14.17
Indirect and Induced Jobs (FTE)	2,909	3,524	3,635
Income			
Multiplier	0.50	0.52	0.54
Personal Income Generated	\$102,625,158	\$125,087,285	\$139,474,934

Sources: UC San Diego Office of Financial Aid, Student Research and Information, and Registrar; Applied Economics; and CBRE Consulting.

Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies. Employment multipliers are calculated per \$1.000 million of output.

Total direct, indirect, and induced UC San Diego student spending in San Diego County was estimated at \$391.1 million, approximately \$148.5 million of which was indirect and induced spending. Direct student spending also supported 3,520 jobs and generated \$125.1 million in personal income in the County.

The City of San Diego received a considerable share of the impacts within San Diego County. Nearly \$319.8 million of direct, indirect, and induced spending occurred in the City of San Diego as a result of UC San Diego student spending. This represents approximately 81.8 percent of total student spending impacts in San Diego County. This spending also resulted in an additional \$102.6 million in earned wages and 2,910 jobs within the city.

UC SAN DIEGO EXTENSION STUDENTS AND INTERNATIONAL STUDENT EXPENDITURE IMPACTS

UC San Diego Extension is the continuing education branch of UC San Diego, which is focused on the professional and continuing education needs of adult learners in San Diego County and other nearby areas of southern California. The International Student program attracts foreign students to week-, month- and semester-long educational opportunities at UC San Diego. Because continuing education and international students differ significantly in their spending habits, this analysis assesses the spending impacts of these two groups of students separately.

Continuing Education Students

As discussed previously in Chapter IV, UC San Diego Contributions to the Regional Workforce, UC San Diego’s Continuing Education program offers approximately 2,000 courses in a wide variety of academic fields. During FY 2006-07, there were an estimated 17,800 enrollments in continuing education courses (excluding 2,200 international students, whose impacts are assessed separately).⁶⁵ The vast majority of UC San Diego’s continuing education students are

⁶⁵ The number of enrollments is equivalent to the number of people taking courses each year. While individual continuing education students may be enrolled in more than one course during the year, this analysis treats each enrollment separately, as the enrollments provide the basis for estimates of student spending impacts. Estimated enrollments and courses are provided by UC San Diego Extension.

working adults who attend courses in the late afternoon or evening, with individual courses meeting an average of 9 times each. UC San Diego Extension officials estimate that approximately 40.0 percent of the enrollments are generated by students who live outside of the City of San Diego.

	<u>City of San Diego</u>	<u>All San Diego County</u>	<u>All California</u>
Continuing Education Student Spending	\$399,427	N/A	N/A
Spending			
Multiplier	0.53	0.63	0.89
Indirect/Induced Spending	\$211,735	\$249,670	\$354,928
Total Direct, Indirect, and Induced Spending	\$611,163	\$649,097	\$754,355
Jobs			
Multiplier	22.12	22.82	23.80
Indirect and Induced Jobs (FTE)	9	9	10
Income			
Multiplier	0.53	0.56	0.63
Total Personal Income Generated	\$213,030	\$224,113	\$250,754

Sources: UC San Diego Office of Financial Aid, University Extension, and International Student Office; Applied Economics; and CBRE Consulting.

Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies. Employment multipliers are calculated per \$1.000 million of output.

Based on this information, CBRE Consulting estimated the potential direct spending impacts of continuing education students on the City of San Diego. Assuming two out of every three visits to campus generate average spending of \$12 per visit, and setting aside the spending of the estimated share of students assumed to live in the City of San Diego, CBRE Consulting estimates that in FY 2006-07, continuing education students generated approximately \$399,400 in annual spending in the City of San Diego that otherwise would not have occurred in the city.⁶⁶

This direct spending of continuing education students in San Diego generated additional spending, income, and employment within the City of San Diego as well as elsewhere throughout the county, region, and state, as depicted in Table 24. It was estimated that this direct spending supported an additional \$211,700 in indirect and induced spending in the City of San Diego, as well as 9 jobs and \$213,000 in personal income.

UC San Diego International Students

Approximately 2,200 international students attended UC San Diego for periods ranging from four weeks to a full school year, which equates to 585 students on a FTE basis. International students have several housing options, including on-campus UC San Diego housing, off-campus apartment rentals, and home-stay (living with a local family). Off-campus and home stay students generally live in the City of San Diego, although some live elsewhere in San Diego County. Because students' expenditures on rent, food, and transportation differ based on where students live, estimates of international student spending impacts reflect these differences.

⁶⁶ The \$12 figure is the estimated cost of a light dinner; the CBRE Consulting estimate of \$399,400 reflects the following calculations and assumptions = 13,800 (number of enrollments excluding international students and on-line students) x 9 (average campus visits per enrollment) x 40.0 percent (share of enrollments by non-San Diego residents) x 66.7 percent (share of visits assumed to generate spending) x \$12 (estimated cost of a light dinner).

Estimates of international student spending were based in part on the Financial Aid Office survey of regular UC San Diego undergraduate students, with refinements made by CBRE Consulting and the International Student office staff to reflect the unique experiences of international students. CBRE Consulting also interviewed a representative from San Diego Homestay, a San Diego agency that places UC San Diego international students with local host families. The one major way in which the spending of international students differs from that of regular UC San Diego students is with respect to personal expenditures. For the vast majority of international students, the journey to the U.S. to attend classes at UC San Diego also provides an opportunity for vacation and further travel – and their spending reflects the habits of both students and tourists. It was estimated that each international student spends an average of approximately \$3,160 per visit to the U.S.

Based on these spending estimates, CBRE Consulting found that UC San Diego international students’ direct spending totaled approximately \$7.004 million in the City of San Diego, an additional \$1.082 million elsewhere in San Diego County, and another \$2.272 million in the rest of California.⁶⁷ Including indirect and induced impacts, international student spending generated a total of \$18.46 million in spending, 186 jobs, and \$6.580 million in personal income throughout the State of California.

Table 25: UC San Diego International Student Spending Impacts in California, 2006-07

	<u>City of San Diego</u>	<u>All San Diego County</u>	<u>All California</u>
International Student Spending	\$7,004,197	\$8,086,684	\$10,358,903
Spending			
Multiplier	0.58	0.66	0.78
Indirect/Induced Spending	\$4,093,756	\$5,376,049	\$8,101,155
Total Direct, Indirect, and Induced Spending	\$11,097,953	\$13,462,733	\$18,460,058
Jobs			
Multiplier	16.74	17.18	17.97
Indirect and Induced Jobs (FTE)	117	139	186
Income			
Multiplier	0.56	0.58	0.64
Personal Income Generated	\$3,924,959	\$4,704,122	\$6,580,096

Sources: UC San Diego Office of Financial Aid, and International Student Office; San Diego Homestay; Applied Economics; and CBRE Consulting.

Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies. Employment multipliers are calculated per \$1.000 million of output.

Cumulative Extension and International Student Impacts

As shown in Table 26, total direct, indirect, and induced impacts of spending by UC San Diego’s continuing education and international students in the State of California in FY 2006-07 was estimated at \$19.21 million; approximately \$8.456 million was indirect and induced spending. Direct student spending also supported 196 jobs and generated \$6.831 million in personal income in the State of California.

Based on these statewide figures, total international and extension student spending impacts in San Diego County were estimated at approximately \$14.11 million. This represents 73.4 percent of total student spending impacts in the State of California. Direct extension

⁶⁷ Full details on international student budget estimates in Appendix B.

student spending also supported 148 jobs and generated \$4.928 million in personal income in San Diego County.

The City of San Diego received a considerable share of extension student spending impacts. Approximately \$11.71 million, or 60.9 percent, of the statewide direct, indirect, and induced spending impacts occurred in the City of San Diego. This spending also resulted in an additional \$4.138 million in earned wages and 126 jobs within the city.

Table 26: Total UC San Diego Extension Student Spending Impacts in California 2006-07

	<u>City of San Diego</u>	<u>All San Diego Co.</u>	<u>All California</u>
Total Extension Student Spending	\$7,403,624	\$8,486,111	\$10,758,331
Spending			
Multiplier	0.58	0.66	0.79
Indirect/Induced Spending	\$4,305,491	\$5,625,719	\$8,456,083
Total Direct, Indirect, and Induced Spending	\$11,709,115	\$14,111,830	\$19,214,413
Jobs			
Multiplier	17.03	17.44	18.19
Indirect and Induced Jobs (FTE)	126	148	196
Income			
Multiplier	0.56	0.58	0.63
Personal Income Generated	\$4,137,990	\$4,928,235	\$6,830,849

Sources: UC San Diego Office of Financial Aid; UC San Diego Extension; Applied Economics; and CBRE Consulting.

Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies. Employment multipliers are calculated per \$1.000 million of output.

CAMPUS VISITOR EXPENDITURE IMPACTS

Each year, UC San Diego attracts visitors to its conferences, libraries, museums, performances, athletic events, and other special events. While no comprehensive source of data exists to measure the total number of visitors to the UC San Diego campus, the University does keep records of attendance at certain campus events that give an estimate of the number of annual visitors. According to various campus departments including Housing and Dining Services, Conference Services, the Office of Special Events and Protocol, Career Services, Campus Libraries, Admissions, the Registrar, and the Athletic Department, a total of 1.431 million visitors came to the UC San Diego campus during FY 2006-07 for a variety of events that ranged from a few hours to many weeks in duration.

It should be noted that the estimates of event attendance were gathered with great effort to estimate only visitor attendance and to exclude UC San Diego students, staff, and faculty. Therefore, the economic impacts attributed to attendance can be interpreted as being in addition to the impacts of student, staff, and faculty, which were estimated separately and discussed previously in this report.

Many UC San Diego visitors spend their entire stay on the campus and therefore are not likely to make any expenditures in the City of San Diego or elsewhere in the San Diego region. However, it is also likely that many visitors shop and eat outside of the campus, and some stay in local hotels.

Based on information regarding the nature of the various events – including a profile of attendees, length of stay, and activities conducted – CBRE Consulting sorted campus visitors into five categories: short day visitors; long day visitors; overnight visitors; short multi-night visitors; and long multi-night visitors. A conservative estimate of average per-visitor spending was developed for each of the spending categories. For short day visitors, it was assumed that 75.0 percent incurred no local spending. The remaining 25.0 percent were estimated to spend \$5 per person, to reflect the fact that some short day visitors might have purchased a cup of coffee and a snack while on their trip to campus. For long day visitors, 50.0 percent were assumed to incur no local expenditures and the remaining 50.0 percent were estimated to spend \$25 per person, to reflect the likelihood that some long day visitors might have purchased a meal and incidentals during their day on campus. For overnight visitors, it was assumed that 20.0 percent made no purchases, while it was assumed that the remaining 80.0 percent spent on average \$100 per day, to reflect the cost of hotel accommodations and one meal.⁶⁸

Campus visitors who stayed for more than one night predominantly comprise visitors to summer camps and workshops hosted by HD&S Conference Services (although there are other departments that host multi-night visitors as well). Based on estimates provided to CBRE Consulting by that department, roughly 3.0 percent of all multi-night visitors stayed for an average of 3 nights, while the remaining 97.0 percent of multi-night visitors were on campus for an average of 10 nights. Multi-night visitor spending was estimated differently from other visitor spending because these visitors tend to stay on campus, where lodging and meals are provided to them by their host program. Their expenses are mostly accounted for in University revenues, although HD&S Conference Services estimates that 10.0 percent of short multi-night visitors and 30.0 percent of long multi-night visitors did incur some expenses off campus, in the amount of \$30 per day.

Based on the proceeding methodology, CBRE Consulting estimated that visitors to UC San Diego campus events generated \$6.266 million in total spending in San Diego County during the 2006-07 fiscal year, \$5.710 million of which was spent within the City of San Diego. This UC San Diego visitor spending in San Diego City and County generated additional sales, wages, and jobs within the county and beyond. It was estimated that this direct spending supported an additional \$3.068 million in indirect and induced spending in the City of San Diego as well as 121 total jobs and \$3.071 million in personal income. Table 27 shows the additional indirect and induced spending, income, and jobs within the city, county, and state geographies.

⁶⁸ For the \$100 daily travel expense assumption, CBRE Consulting referenced a 2005 study commissioned by the California Travel and Tourism Commission titled “California Travel Impacts by County,” March 2007 by Dean Runyan Associates. The figures in this report were inflated to 2007 dollars and substantiate that average daily visitor spending in San Diego County is roughly \$100.

Table 27: UC San Diego Visitor Spending Impacts in California 2006-07

	<u>City of San Diego</u>	<u>All San Diego Co.</u>	<u>All California</u>
Visitor Spending	\$5,709,713	\$6,266,336	N/A
Spending			
Multiplier	0.54	0.63	0.88
Indirect/Induced Spending	\$3,068,379	\$3,957,308	\$5,496,801
Total Direct, Indirect, and Induced Spending	\$8,778,092	\$10,223,645	\$11,763,137
Jobs			
Multiplier	21.26	22.03	22.93
Indirect and Induced Jobs (FTE)	121	138	144
Income			
Multiplier	0.54	0.57	0.63
Total Personal Income Generated	\$3,070,510	\$3,542,364	\$3,937,169

Sources: UC San Diego Housing and Dining Services, Conference Services, Athletic Department, Office of Special Events and Protocol, Career Services, Libraries, Admissions, Registrar, Extension, and Music Department; ArtPower; La Jolla Playhouse; Mandeville Center; UC San Diego Bookstore; Student Life Annual Report 2007; Scripps Institution of Oceanography; Applied Economics; and CBRE Consulting.

Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies. Job multipliers are calculated per \$1.00 million of output.

UC SAN DIEGO RETIREES IN SAN DIEGO COUNTY

According to data from the UC Office of the President, in January 2008 there were approximately 4,750 retired employees from UC San Diego, 3,910 of whom lived in the State of California.⁶⁹ Of these California retirees, 1,870, or 48.0 percent, lived in the City of San Diego and 1,690, or about 43.3 percent, lived elsewhere in San Diego County. Total annual payments to retirees in San Diego County during the fiscal year were \$94.80 million, with \$41.26 million received by retirees in the City of San Diego and \$53.54 million received by retirees elsewhere in San Diego County.

Table 28: Retirement Payment Impacts from UC San Diego 2006-07

	<u>City of San Diego</u>	<u>All San Diego County</u>	<u>All California</u>
Retiree Payments	\$41,262,509	\$94,797,562	\$101,577,720
Spending			
Multiplier	1.16	1.17	1.31
Indirect and Induced Spending	\$47,774,758	\$111,056,793	\$133,492,551
Jobs			
Multiplier	6.82	7.00	7.84
Indirect Jobs	281	663	796
Income			
Multiplier	1.29	1.29	1.35
Indirect and Induced Personal Income Generated	\$11,942,643	\$27,630,277	\$35,939,470
Total Direct, Indirect, and Induced Personal Income Generated	\$53,205,152	\$122,427,839	\$137,517,190

Sources: UC Office of the President; Applied Economics; and CBRE Consulting.

Notes: Figures may not add due to rounding. Retirement payments and multiplier calculations are cumulative of all inclusive geographies. Job multipliers are calculated per \$1.00 million of output.

⁶⁹ Figure also includes the beneficiaries of deceased UC San Diego retirees.

Total direct, indirect, and induced spending generated by payments received by UC San Diego retirees in California was approximately \$133.5 million. Direct retiree payments also supported 796 jobs and generated \$137.5 million in personal income in California.

Of this impact in California, UC San Diego retirees generated approximately \$111.1 million of total spending in San Diego County. In addition, retiree spending supported 663 jobs in San Diego County and generated \$122.4 million in personal income.

It is estimated that \$47.77 million, or 35.8 percent, of direct, indirect, and induced spending occurred in the City of San Diego as a result of retirees' spending. This spending also resulted in \$53.21 million in earned wages and 281 jobs within the city.

IX. RESEARCH AT UC SAN DIEGO

THE SIGNIFICANCE OF UNIVERSITY RESEARCH

UC San Diego research contributes to the local, regional, and State economy in several important ways. First, most research funding is sponsored by the Federal government, which means that most research funding flows into UC San Diego from a non-local source, University research is a significant generator of local jobs and income. It is, in effect, a major export industry, bringing hundreds of millions of dollars into San Diego County from sources outside the region. Second, many products of University research have commercial applications and provide the basis for the creation of new enterprises or the expansion of existing ones. Finally, the presence of a large academic research complex in the region serves as a magnet for corporate research and development centers and related enterprises that demand highly skilled University graduates.

Equally important, the research conducted at the numerous centers and institutions at UC San Diego helps to advance the knowledge and understanding of important issues in today's society and contributes to the development of technologies that improve the quality of life locally, nationally, and internationally. UC San Diego research focuses on a wide variety of important and timely issues such as healthcare, computer sciences, biotechnology, and engineering. Examples of some of the groundbreaking research conducted at the University are discussed in this chapter.

UNIVERSITY RESEARCH AS AN EXPORT INDUSTRY

Spending associated with sponsored research projects at UC San Diego during Fiscal Year 2006-07 totaled \$714.3 million.⁷⁰ As Table 29 shows, the Federal government provided approximately 71.1 percent of the funding for the University's research expenditures during the year, with the Department of Health and Human Services, National Science Foundation, and Department of Defense accounting for the majority of federal funding sources.

⁷⁰ These impacts of UC San Diego research spending are included in the estimated economic impacts discussed in Chapter VI.

**Table 29: Sources of Funding for UC San Diego Sponsored Research Expenditures
FY 2007**

<u>Source</u>	<u>Amount</u>	<u>Percent of Total</u>
Federal Government		
Health and Human Services	\$332,117,048	46.5%
National Science Foundation	\$86,112,584	12.1%
Department of Defense	\$44,666,950	6.3%
Department of Energy	\$10,241,718	1.4%
NASA	\$4,864,700	0.7%
All Other Federal Agencies	<u>\$29,766,379</u>	<u>4.2%</u>
Subtotal	\$507,769,379	71.1%
Non-Federal Government		
Foundations and Other Non-Profits	\$112,196,675	15.7%
Industry	\$72,244,095	10.1%
State, Local, and Foreign Governments	<u>\$22,095,795</u>	<u>3.1%</u>
Subtotal	\$206,536,565	28.9%
Total	\$714,305,944	100.0%

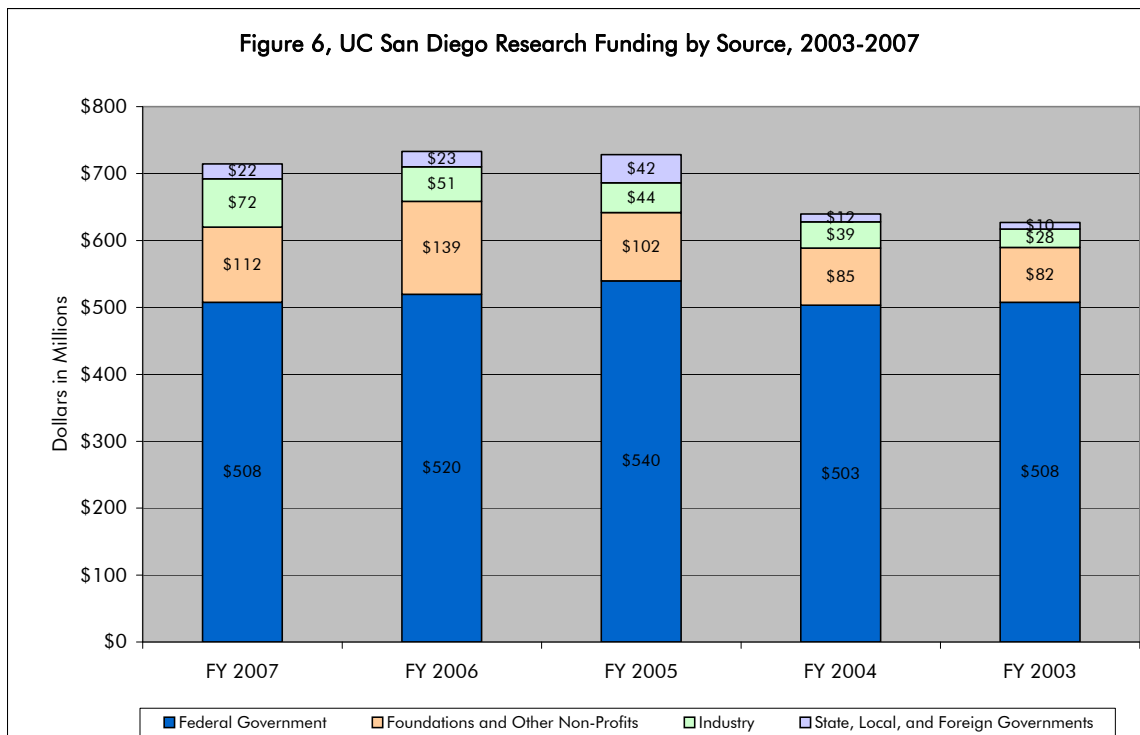
Sources: UC San Diego Office of Contract and Grant Administration Annual Financial Report 2007; and CBRE Consulting.

Notes: Total in Table 29 does not equal total in Table 30 because of approximately \$1.788 million in Contracts and Grants Administration not accounted for in Table 29.

Figure 6 shows that the proportion of research funding from the Federal government has remained relatively constant over the past five fiscal years, ranging from a low of \$503.3 million in FY 2004 to a high of \$539.8 million in FY 2005. There was a slight drop of 2.5 percent in total research funding dollars between FY 2005-06 and FY 2006-07. While funding from foundations and non-profits decreased between FY 2005-06 and FY 2006-07 by approximately \$26.82 million, funding from industry increased substantially from \$51.45 million to \$72.24 million. Industry grants have more than doubled since FY 2003-04.

Industry grants are particularly noteworthy because they represent the direct investment of commercial enterprises in the transfer of UC San Diego research into the marketplace. The primary mission of industry is the commercialization of marketable technologies for financial gain, and therefore industry is most supportive of relatively mature technologies on the brink of marketability. Earlier research for these technologies is usually funded by Federal or other agencies. Industry funding is then introduced if the technology is consistent with the current commercial interests of the company. Thus, the project performance expectations of the industrial sector are more focused and result-specific than other funding sources. The fact that industry funding increased so dramatically is a testament to the University's growing role as a generator of commercial products and applications that generate economic activity.

The influx of industry research funding is mostly attributable to a general increase in the amount of funding granted per award rather than an increase in the volume of awards. FY 2006-07 was marked by a 40.4 percent total increase (or \$20.80 million) in funding dollars from industry partners, while the total number of industry research grants increased only 10.3 percent (from 788 to 869). A surge in the volume of very large industry research grants contributed to the trend; whereas in FY 2005-06 only one grant was awarded over \$1.000 million, there were seven such grants awarded by the industrial sector during FY 2006-07.



Sources: UC San Diego Annual Financial Report 2007; and CBRE Consulting.

Funds from all research sponsors – particularly the Federal government and other non-local sponsorships – provide considerable economic value to the region, with the funds turning over multiple times through employment of personnel and purchase of goods, as reflected in the University-wide multipliers, discussed in Chapter VII, Direct, Indirect, and Induced Economic Impacts of UC San Diego. A primary added value is in the knowledge transfer within the San Diego region and the nation.

During Fiscal Year 2006-07, UC San Diego sponsored research funding was spent according to the distribution shown in Table 30.

Table 30: Sponsored Research Spending by UC San Diego Unit, FY 2007

<u>Department</u>	<u>Amount</u>	<u>Percent of Total</u>
School of Medicine	\$274,832,000	38.4%
Campus-Wide Departments	\$186,604,000	26.1%
UC San Diego Medical Center	\$145,700,000	20.3%
Scripps Institution of Oceanography	\$101,791,000	14.2%
Skaggs School of Pharmacy	\$6,478,000	0.9%
Graduate School of International Relations and Pacific Studies	\$631,000	0.1%
Rady School of Management	\$57,000	0.0%
Total	\$716,093,000	100.0%

Source: UC San Diego Annual Financial Report 2007.

Notes: Total in Table 30 is greater than total in Table 29 due to approximately \$1.788 million that are spent on Contracts and Grants Administration expenses.

Not surprisingly, a significant amount of sponsored research dollars were spent by health and medical-related departments. As discussed in Chapter VI, University Purchasing and Payroll, the Medical Center was responsible for generating more Fiscal Year revenue than any other major source. At 38.4 percent and 20.3 percent, respectively, the School of Medicine and UC San Diego Medical Center were two of the largest beneficiaries of research sponsorship. Together these two departments contributed \$420.5 million to the local economy in the form of health and medical research. Also related to the health sciences were the \$101.8 million in research dollars spent by the Scripps Institution of Oceanography. Finally, \$186.6 million in research spending were spread across the various campus departments while the University's newest professional school, Rady School of Management, was allocated \$57,000 in research spending.

CONTRIBUTIONS OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH PROGRAMS AT UC SAN DIEGO

Research is one of the primary missions of the University of California and each campus has distinctive research foci. UC San Diego research programs span the fields of engineering, health and biological sciences, marine sciences, physics, and the social sciences. The programs implemented by these research centers contribute to the technical, social, and economic development of San Diego County and far beyond. In addition, UC San Diego research helps to inform policy-makers at the local, state, and national levels, contributing to standards and regulations that help protect public health and safety and promote general well-being. The following summaries highlight some of the key UC San Diego research projects, centers, and institutions and their contributions locally and elsewhere.

The Scripps Institution of Oceanography

The Scripps Institution of Oceanography is one of the oldest, largest, and most important centers for marine science research, graduate training, and public service in the world, and currently operates more than 300 research programs in 65 countries, on every continent, and in every ocean worldwide. Specific current research topics include The Oceans and Global Change, Earthquakes and Geology, Marine Biotechnology and Biomedicine, Marine Biodiversity and Conservation, Coastal Resources, and Technology and Support of Ocean and Atmospheric Research. UC San Diego scientists at Scripps Institution of Oceanography are pioneers in climate change science and the first to precisely measure greenhouse gases in the atmosphere. The Scripps Institution of Oceanography also operates Birch Aquarium in La Jolla as a public forum for its research findings. The aquarium's mission is to increase the public's understanding of the oceans, to interpret scientific endeavors, and to promote ocean conservation. Over 400,000 people visit Birch Aquarium every year.

Environmental conservation, alternative energy sources, and global climate change are among the world's fastest growing industries. By virtue of their expertise and prestige among marine science research institutions, scientists from the Scripps Institution of Oceanography ensure that San Diego is considered an international hub for climate change research. For example, four researchers from the Scripps Institution of Oceanography received a Joint Nobel Peace Prize in 2007 for their work as authors or reviewers of the Fourth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC). The first component of this United Nations-sponsored report was released in February of 2007. Also of note is Project Atmospheric Brown Clouds (ABC), another United Nations-sponsored program based at the Scripps Institution of Oceanography that investigates the climate changes associated with the transcontinental travel of dust and pollution particles.

Although many current research endeavors have international implications, they are often implemented directly on San Diego or California soil. The activity associated with a research institution of international prominence is invaluable to the local San Diego knowledge base. Scripps Institution of Oceanography is currently collaborating with the City of San Diego, for example, to assess which areas of the city are most prone to flooding under a variety of climate change scenarios. Another current initiative is studying the effects of black carbon particles such as soot that travel from Asia across the Pacific Ocean to the West Coast. The research will ultimately assess how these pollutants might influence snow pack in the Sierra Nevada Mountains and in turn, the State of California's future water supply.

One of the many outreach programs for teachers, undergraduate students, and high school students that rely on research from the Scripps Institution of Oceanography is a new education initiative called Exploring the Science of our Oceans and Earth, led by Birch Aquarium. The program introduces K-12 teachers and students to new developments in scientific research at Scripps Institution of Oceanography through the "Planet Earth Express," a specially equipped van that transports environmental education programs and live marine animals to local schools.

California Institute for Telecommunications and Information Technology (Calit2)⁷¹

Calit2 provides an institutional home for cross-disciplinary projects developed by faculty at UC San Diego and UC Irvine. Calit2 focuses on building integrated systems built from newly emerging bioinformatics, telecommunication, information technology, and nanotechnology. Specific application research areas of these new digital infrastructures include: digitally-enabled medicine; education; environment and civil infrastructure; intelligent transportation; interfaces and software; materials and devices; network infrastructure; new media arts; and policy and society.

Like many research programs at UC San Diego, Calit2 plays an influential role in the local knowledge community by developing and deploying prototype infrastructure and devices to be used by other research departments in real-world contexts. For example, Calit2 strives to provide the main UC San Diego campus with cutting edge telecommunications concepts and infrastructure to promote research and education across multiple disciplines through effective communication.

These technologies are then used to study local and regional social issues such as: traffic congestion; environmental problems (water and air pollution, shortage of water, earthquakes, rising sea level, declining snow-pack); insufficient energy sources; emergency management; homeland security; healthcare; and the struggling entertainment industry.

Calit2 engages over 100 companies and has over 300 Federal grants associated with its faculty. Calit2 also reaches well beyond local boundaries to Greater California and the global marketplace. For example, the recent Calit2-hosted "U.S.-India Summit on Education, Research and Technology" triggered a series of high-level meetings that culminated in the "Calit2 for India" concept. The proposed public-private partnership for research and education would develop technologies for 700.0 million people in rural India. The Indian government has indicated its willingness to fund up to 49.0 percent of the research provided that Indian and U.S. corporations also sponsor the program.

⁷¹ www.calit2.net

San Diego Supercomputer Center (SDSC)

SDSC provides data intensive cyberinfrastructure services to UC San Diego, national researchers, and industry partners. While most scientists and engineers work from a home research laboratory, academic department, or local environment, their research projects are meant to contribute to the national and/or global research community. When a project's technological needs outgrow the capabilities of its home environment, cyberinfrastructure provided by SDSC can extend the project's reach by providing scalable database, computational, storage, and other resources remotely. SDSC enables industry partners with access to these resources and collaborations in technology research and development, extending the impact of research methodologies in solving parallel commercial problems.⁷²

Aside from its role as a data center for the University's core research undertakings, SDSC's Education Group implements outreach programs such as TeacherTECH. This award-winning program helps local San Diego educators bring new technology tools and technology-enabled science concepts into K-12 curriculum. Participating teachers learn about topics ranging from biodiversity in California to DNA extraction to 3-dimensional visualization in geology. They are also introduced to the latest technological advances – smart boards, podcasting, and iMovies for example – that can be applied to their own classroom settings. In 2007, TeacherTECH drew over 1,400 teachers from over 150 schools, who in turn reach up to 200,000 local students annually.⁷³ Because of local success, the program is being adopted by other supercomputer centers in the TeraGrid, a national network of nine National Science Foundation centers (including SDSC) that form the world's largest distributed cyberinfrastructure for open scientific research.

Center for Magnetic Recording Research (CMRR)

The mission of the CMRR is to excel in research, education, and transfer of innovative ideas in the field of information storage technology and systems, particularly advanced data storage based on magnetic recording.

The CMRR program is a collaborative approach by an interdisciplinary group of researchers to develop significant advances in ultra-high density storage and ultra-high data rates, particularly for disk and tape recording systems. Research is conducted in collaboration with UC San Diego Physics, Engineering, and the Graduate School of International Relations and Pacific Studies (IR/PS). IR/PS complements the technology studies by examining the business aspects of the data storage industry, and also collaborates with the Information Storage Industry Center (ISIC). The ISIC was established in 1998 as an independent academic research program that collaborates with industry partners based on research conducted by the CMRR and, to some extent, IR/PS. The ISIC studies the management issues faced by all segments of the data storage industry and works directly with the producers and consumers of advanced storage systems to develop and conduct observation-based research projects that increase storage industry knowledge.⁷⁴

⁷² San Diego Supercomputer Center, www.sdsc.edu.

⁷³ UC San Diego Annual Financial Report, 2006-07, page 24.

⁷⁴ UC San Diego, International Relations and Pacific Studies (IR/PS).

Whitaker Institute of Biomedical Engineering (WIBE)

The Whitaker Institute of Biomedical Engineering (WIBE) aims to advance knowledge in biomedical engineering by promoting interdisciplinary research and training among engineering, biology, and medicine, with the ultimate goal of improving the health and quality of human life. This coordination between engineering and biomedical research allows the unique generation of quantitative research in the biomedical field, and leads to innovative investigative approaches. The WIBE enhances research in molecular and cellular bioengineering, molecular biomechanics, and targeted molecular delivery based on engineering principles. The overarching theme is integrative bioengineering, spanning the spectrum from molecular to organismal levels and integrating engineering and biomedical sciences.

The WIBE has identified "tissue engineering science" as a major research thrust, using the principles and methods of engineering and life sciences to understand the structural and functional relationships inherent in human tissues, then develop biological substitutes that restore, maintain, or improve tissue functions. WIBE research in body tissues is meant to prevent, diagnose, and treat diseases, conditions, and injuries on those tissues.

One example of the interdisciplinary nature of WIBE is the Project on Glucose Monitoring and Control. Its goal is to develop and evaluate new approaches, both natural and engineered, to achieve ideal blood glucose control and metabolic management in diabetes and related diseases. The Project serves as a forum for information exchange and works to develop new medication delivery approaches and evaluation of control strategies.

The WIBE facilitates academia-industry cooperation and holds regular research seminars, workshops, and symposia to promote information exchange, generate new ideas and projects, and foster interdisciplinary training of graduate students and postdoctoral fellows.

UC SAN DIEGO CENTERS FOR RESEARCH IN THE PUBLIC INTEREST

In addition to the research in cutting edge science and technology, UC San Diego hosts numerous other research centers that address issues of social importance. These centers, a sampling of which are discussed below, focus on a variety of topics including climate change, environmental conservation, international relations, social and economic policy, education, and arts and culture.

Graduate School of International Relations and Pacific Studies (IR/PS)

Collectively, the nations of the Pacific Rim include the largest population and economic centers and the largest concentration of natural resources and agriculture in the world. Guided by the premise that the 21st Century will be driven by the dynamics of these exploding societies and governments, IR/PS aims to mold the forces of economic growth, technological innovation, and environmental and security challenges into positive instruments of peace, prosperity, and democracy and to help build a Pacific community by creating ideas, training leaders and

providing networks. To that end, IR/PS operates a number of research centers and affiliated programs as follows:⁷⁵

The **Center on Pacific Economies (CPE)** examines why countries in the Pacific region, the Americas, and Asia differ in their ability to maintain sustainable growth, financial stability, technological innovation, and economic equity. This center and its programs are contributing to San Diego's growing reputation as a leader in U.S. – Pacific international affairs.

The **Center for U.S.-Mexican Studies** supports research relevant to current policy issues between Mexico and the United States. San Diego is home to the most active border crossing between the United States and Mexico, and understanding the complexities of U.S.-Mexico relations, particularly as it relates to immigration, is a growing concern within the U.S. government. The Center for U.S.-Mexican Studies provides a local base from which to study this relationship.

A number of student-run organizations operating out of the IR/PS school at UC San Diego contribute directly to local industry through their research. **Strategic Community Consulting (SCC)** is a student-run organization that provides consulting services to nonprofit and public sector clients in San Diego. An ongoing project called "Coastkeepers," for example, rates the San Diego Board of Supervisors according to their voting record on a variety of environmental issues. A global market research group called **Export Access** promotes international trade for San Diego businesses. Local consulting projects include the expansion of San Diego International Airport and estimating the value of the military to the local economy. Finally, **The Environment Society** is an IR/PS student-run organization that facilitates discussions between students interested in the environment and local professionals working in this field.

Based on research conducted for the above programs and a host of others, IR/PS professors edit and write for a number of prominent research journals. Among them are the *Journal of the Japanese and International Economies*, the *Journal of East Asian Studies*, the *Journal of Environment & Development*, the *Journal of Financial Markets*, and the *Journal of International Policy Solutions*.

Throughout the academic year, students and researchers also contribute to the local economy through internships. San Diego employers hire the expertise of IR/PS students to research, market, and evaluate local programs at the San Diego Foundation, Tijuana Estuary, San Diego County Taxpayers Association, and Bainbridge Consulting, to name a few. IR/PS alumni continue to work and contribute to the local economy after graduation.

Institute on Global Conflict and Cooperation (IGCC)

The Institute on Global Conflict and Cooperation (IGCC) is a multi-campus research unit (MRU) serving all ten UC campuses and the Los Alamos and Lawrence Livermore National Laboratories. The institute is based at UC San Diego, and facilitates research and training related to the causes of international conflict and prevention or resolution of those issues. Through its many research programs, the IGCC provides opportunities for UC faculty and students to collaborate with government officials domestically and internationally, to establish effective international policy. Research programs include National Security Policy, International

⁷⁵ Information on the mission of UC San Diego's Graduate School of International Relations and Pacific Studies was provided directly by IR/PS personnel.

Environmental Policy, Public Policy and Nuclear Threats, Public Policy and Biological Threats, and Regional Relations. A few of these are discussed below.

The **International Environmental Policy** research initiative studies the economic effects of climate change and identifies how the environmental stresses of pollution and global warming may lead to international conflict. Through this research, the IGCC aims to promote cooperation between countries that share common environmental problems. Examples of shared environmental imperatives may be the establishment of joint management policies for marine resources in order to preserve fish habitats, or the restoration of basic agricultural, environmental, and health services following military conflict in war-torn areas like Afghanistan or Iraq.⁷⁶

The program for **Public Policy and Nuclear Threats** was organized to train doctorate-level Public Policy and Nuclear Threats Fellows throughout the UC system to replace the aging population of international policymakers on this subject. The program is backed by a six-year, \$3.100 million grant from the National Science Foundation. Researchers work closely with Los Alamos and Lawrence Livermore National Laboratories to understand the technical aspects of nuclear weapons and with the UC Washington D.C. office, which was established to promote the interaction between IGCC researchers and Washington policymakers.

The Center for Comparative Immigration Studies (CCIS)

A campus-wide research unit of UC San Diego established in 1999 as part of the Division of Social Sciences, CCIS conducts basic and policy-oriented research projects on international migration and refugee flows throughout the world. These studies seek to illuminate the U.S. immigration experience through systematic comparison with other countries of immigration, especially in Europe and the Asia-Pacific region. Each year, the Visiting Fellowship Program brings together a multidisciplinary, multinational community of researchers sharing these interests. Through the global network of research associates, the Publications program, and the Media Information program, the CCIS strives to disseminate the results of academic research to a broad array of users.⁷⁷

CCIS is currently implementing two important research programs related to U.S.-Mexico immigration policy. The first study investigates the process of Mexican-American integration into the U.S. political system. The second initiative studies the consequences and effectiveness of United States immigration control measures enacted by the Federal government during the past ten years. Both research programs will provide important information for future immigration law reforms.

FROM THE LABORATORY TO THE MARKETPLACE

Research can lead to fortuitous inventions that the University can develop under U.S. patent law. The UC campus-wide patent policy encourages the practical application of research for public benefit, by nurturing the development and transfer of innovations from campus to the marketplace for the benefit of society at large. To this end, UC San Diego's Office of Technology Transfer and Intellectual Property Services (TechTIPS) assists in the disclosure and development of campus researchers' invention properties and encourages their further

⁷⁶ IGCC NewsWired Annual Review, 2003-2004, page 9.

⁷⁷ www.ccis-ucsd.org

development through licensing or business start-ups. TechTIPS also coordinates with other agencies to promote research based on UC San Diego technologies. The University has an obligation to seek fair compensation for the use of public funds, and seeks contractual collaboration with companies that will foster the most active and rapid implementation of its technology. This may be with a national business or a local company.

The **William J. von Liebig Center** also provides support for UC San Diego research projects approaching commercialization. The von Liebig Center catalyzes the commercialization of early stage technologies specifically out of the Jacobs School of Engineering. In five years since its founding on campus in 2001, the von Liebig Center has funded 66 early-stage technologies with grants of up to \$50,000. These projects have resulted in 19 licenses and helped to launch 15 start-up companies, which have attracted more than \$71.00 million in subsequent capital from the private sector.⁷⁸

By virtue of its historical performance, UC San Diego is established as one of the top UC campuses for the transfer of research into the marketplace. As of June 2006, UC San Diego held the largest invention portfolio of any UC campus with a total cumulative portfolio of approximately 1,750, followed by UC San Francisco with 1,330 and UCLA with 1,290. Total U.S. patents held by UC San Diego ranked third among UC campuses with 506 active patents.⁷⁹ During FY 2006-07, UC San Diego continued its research prominence among UC campuses. Faculty and staff disclosed 373 new inventions, 64 U.S. patents were added to the University's patent portfolio, and 85 license agreements were formulated.

License agreements generated by UC San Diego research translate into direct revenue for the University. Each license agreement grants access to a University invention provided that the licensee agrees to commercialize and further develop the invention. Typically the right to commercialize is granted in return for fee payments made to the University, including reimbursement of patent expenses and royalty payments when products reach the marketplace. During Fiscal Year 2005-06, new licenses from UC San Diego TechTIPS ranked number one among all UC campuses and generated \$26.70 million. UC San Diego was also responsible for two of the University of California's top five revenue-generating inventions for that year.⁸⁰

While the University's interest is for wide development of new technology, participation of the inventor in the product's development sometimes leads to private business activity. The commercialization of technologies developed by UC San Diego research yields significant economic benefits to the San Diego region, the State of California, and the nation. Since 2001, 67 new start-ups have formed using licensed UC San Diego technology. During Fiscal Year 2006-07, nine start-up businesses were formed including: App2You; GcFree, Inc.; ICSX, Inc.; La Jolla Medical Devices, Inc.; ProBio, LLC; SomTherapeutics, Inc.; Tinnitus Otosound Products; and Traversa Therapeutics, Inc. Examples of a few of these research achievements and their commercial applications follow.

⁷⁸ Information provided by Rex Graham, Communications Director for Jacobs School of Engineering, May 28 2008. The start-up companies that received assistance from the von Liebig Center were included in the analysis of start-up companies in Appendix C, Table 31 and Table 32.

⁷⁹ At the time of this report, information on UC system-wide technology transfer was not yet available for Fiscal Year 2006-07.

⁸⁰ UC Technology Transfer Annual Report 2006, page 10. At the time of this study, official information for Fiscal Year 2006-07 was not yet available.

Tinnitus Otosound Products

Tinnitus, a medical condition characterized by a ringing in the ears, occurs within the brain as a person loses their hearing. The auditory cortex of the brain seeks to compensate for the loss of hearing by generating more nerve activity, which causes the ringing. Three collaborating UC San Diego researchers theorized that generating external auditory stimuli to match the exact frequency of the sound in a patient's brain could mitigate the ringing within their brain. The result of their research is Customized Sound Therapy, which mitigates the ringing experienced by over 30 million Americans. Since the company was formed in 2003, Tinnitus Otosound Products has operated on roughly \$550,000 in grants, refining its technology and conducting trials for the Food and Drug Administration so that the therapy may be classified as a medical treatment as opposed to only a mitigation device. If Tinnitus Otosound Products succeeds, UC San Diego will receive a royalty of approximately 5.0 percent of the company's revenue, which will go towards financing additional research.⁸¹

App2You

Seed funding from the Jacobs School of Engineering as well as collaboration from TechTIPS and the San Diego Supercomputer Center assisted in the 2006 incorporation of App2you, a start-up web application currently in testing stages. App2you builds database-driven web applications based on user-provided sketches that describe the page structure and the flow of information on the page in simple, non-technical terms. Sophisticated algorithms are applied to the back-end database design based on the options chosen by the user.⁸² In this way, sophisticated web database applications may be easily created by users without web design experience. A variety of UC San Diego student groups are currently utilizing the application and providing feedback to the company.

Traversa Therapeutics, Inc.

RNA Interference (RNAi) is a recently discovered natural biological process whereby intervention blocks the body's production of disease-causing proteins. Since undesired proteins are the cause of most human disease, and proteins are produced by RNA, RNAi has enormous therapeutic potential. Delivery of the therapy is the one significant remaining problem to be solved before RNAi can achieve success as a drug class, potentially providing treatment for 60 percent of all human disease.

Traversa Therapeutics, Inc. was founded by researchers at the Howard Hughes Medical Institute at UC San Diego in mid-2006 and has secured worldwide exclusive licenses to intellectual property. The company engages in two core tasks: the discovery, development, and commercialization of an RNAi delivery platform that can be utilized by therapeutic companies to treat acute, chronic, and infectious human diseases; and the advancement of the company's own therapeutic programs for the specific treatment of Leukemia and Glioblastoma.

As discussed throughout this chapter, the research undertaken by UC San Diego students and faculty provide the local community with an on-going supply of positive economic impacts. First, the stream of research funding that originates from outside San Diego County supplies

⁸¹ Information about Tinnitus Otosound Products originated from an article titled "The Route from Research to Start-Up" published by the New York Times on January 18, 2007.

⁸² Jacobs School of Engineering, Pulse newsletter, spring 2007.

economic stimuli within the region. Furthermore, UC San Diego research projects generate innovative policies, technologies, and products that may be marketed commercially. Industry research grants have grown over the past five years in recognition that quality research undertaken by UC San Diego will result in future financial rewards. This trend is a testament to the fact that the various research institutions provide valuable knowledge that can be converted directly into financial gain. Finally, each research institution does its part to ensure that the global knowledge base profits from its findings, by implementing outreach programs, publishing scholarly journals, or making recommendations to government entities. These efforts ensure that the positive effects of UC San Diego research will continue for years to come.

QUANTIFYING THE ECONOMIC IMPACTS OF UC SAN DIEGO-AFFILIATED START-UP COMPANIES

Revenue and Job Contributions

The transfer of UC San Diego research, technology, and intellectual property into the marketplace provides direct and quantifiable economic impacts to the local, statewide, and national economies, most notably in the form of sales revenues and local employment opportunities. Multiple UC San Diego offices including TechTIPS and the Office of Alumni Relations track start-up companies that were founded by UC San Diego alumni or faculty. For the purposes of estimating the economic impacts of these companies – which would not have been possible without the direct involvement of UC San Diego – CBRE Consulting compiled a list of 193 companies based on the records of the various UC San Diego offices.⁸³

Research was conducted regarding each of these companies to determine their location, industry, revenues, employment, and other relevant data. Because of the relatively volatile nature of most start-up companies, some of the companies on the UC San Diego-provided lists were found to have been acquired by other companies, had changed their name, or were no longer in business. Others are now located outside of the State of California and were not further researched for the purposes of this report.

A complete list of UC San Diego-affiliated start-up companies found to be operational in California is provided in Appendix C of this report.⁸⁴ Included in this list are data on 67 of the 193 companies that were provided by UC San Diego staff. The remaining 126 companies fall into one of the following categories:

- 87 companies for which no information was found. Note that the search was limited to the State of California. These companies are therefore assumed to have ceased operating or are now located outside of the state.

⁸³ UC San Diego personnel acknowledge that this list of companies is not comprehensive, but represents the most complete list of companies that is available at this time.

⁸⁴ Several of the companies included in Appendix C and discussed in this section are also mentioned in other areas of this report. Table 9, within Chapter IV “Research at UC San Diego,” provides a sample of companies founded by UC San Diego alumni and faculty. Some of the companies shown in Table 9 have unknown sales revenues and employment. These companies are: AnalgesiX, Inc.; Aurora Biosciences; Clinical Micro Sensors; and CryoGen. Eilean Technologies is located in Las Vegas, NV so its economic contributions are excluded from this report. Data was unavailable for Celera Genomics, which was also mentioned in Chapter IV, and Tinnitus Otosound Products, which was mentioned in Chapter II, “Introduction.”

- 33 companies with confirmed operations in California, but no detailed company information available from dependable sources; and
- 28 companies that were acquired by other companies. Note that these companies continue to contribute economically, but their impacts cannot be isolated by virtue of their incorporation into a larger company infrastructure.

The 67 companies shown in Appendix C had combined estimated 2007 annual revenues of approximately \$10.239 billion and employment of 17,260.⁸⁵ Companies located in San Diego County accounted for 95.0 percent of employment in all 67 California companies. While not measured, these high levels of revenue and employment are strong indicators of local economic impacts, attributable to company expenditures on personnel (salaries and wages) and goods and services. In addition, they are helping to support the local real estate industry through their real estate operations.

Table 31: UC San Diego Start-Up Companies Located in California, 2007

<u>Industry Classification</u>	<u>Number of Companies</u>	<u>2007 Annual Sales</u>	<u>Total Employees</u>
Communications and Electrical Equipment	5	\$9,932,700,000	14,831
Health Care Services	2	\$129,698,000	520
Drugs and Pharmaceutical Products	2	\$49,100,000	169
Scientific Research Services	15	\$46,293,000	554
Software and Computer Services	10	\$26,975,000	213
Biological Products	2	\$25,168,000	217
Consulting Services	6	\$5,366,000	71
Medical and Optical Instruments	7	\$8,100,000	78
Pharmaceutical Preparations	5	\$5,672,000	455
Miscellaneous Retail	4	\$3,845,000	60
Other	5	\$2,719,000	33
Social Services	2	\$2,260,000	56
Investment Services	1	\$880,000	3
Aircraft Equipment	1	\$83,000	1
Grand Total	67	\$10,238,859,000	17,261

Sources: UC San Diego office of Alumni Relations, Tech TIPS; Dun & Bradstreet; company websites; and CBRE Consulting.

Notes: This table excludes start-up companies founded by UC San Diego faculty or alumni, that were subsequently acquired by other companies. Data for the Communications and Electrical Equipment category includes Qualcomm, which employs 12,800 people and had 2007 revenues of approximately \$8.871 billion.

Table 31 sorts the 67 known California companies by industry. Revenues are greatest for the Communications and Electrical Equipment group because Qualcomm Inc. accounts for \$8.871 billion in revenues, which comprises 89.3 percent of that group. In general, the table demonstrates UC San Diego’s strength in transferring technological, life sciences, and research endeavors into the local marketplace.

⁸⁵ Note that Qualcomm, Inc. employed 12,800 people and had 2007 revenues of approximately \$8.871 billion.

Direct, Indirect, and Induced Economic Impacts of Start-Up Companies Affiliated with UC San Diego

As discussed in Chapter VII, Direct, Indirect, and Induced Economic Impacts of UC San Diego, the indirect and induced economic impacts associated with direct output can be estimated using multipliers provided by the IMPLAN input-output model. Table 32 provides an estimate of the direct, indirect, and induced impacts associated with the 67 start-up companies listed in Appendix C.

	<u>City of San Diego</u>	<u>Other San Diego County</u>	<u>Other California</u>	<u>Total Statewide</u>
Output				
Direct	\$11,505,375,602	\$897,699,677	\$1,025,781,172	\$13,428,856,450
Indirect/Induced	\$11,115,403,220	\$1,936,339,711	\$2,806,259,394	\$15,858,002,325
Total Output	\$22,620,778,822	\$2,834,039,388	\$3,832,040,565	\$29,286,858,775
Employment				
Direct	14,832	1,561	868	17,261
Indirect/Induced	70,264	27,834	14,208	112,306
Total Employment	85,096	29,395	15,076	129,567
Personal Income				
Direct	\$1,880,707,513	\$203,208,110	\$502,942,767	\$2,586,858,390
Indirect/Induced	\$3,994,008,931	\$533,520,087	\$1,035,580,550	\$5,563,109,568
Total Income	\$5,874,716,443	\$736,728,198	\$1,538,523,317	\$8,149,967,958

Sources: UC San Diego Tech TIPS and Office of Alumni Relations; Applied Economics; start-up company websites; Dun & Bradstreet; and CBRE Consulting.

In order to generate these estimates, each of the 67 start-up companies was assigned a set of multipliers based on its Standard Industry Classification (SIC) code. The multipliers assume that each company has spending, employment, and payroll characteristics that are “average” for its industry. For example, a pharmaceutical company was assigned multipliers that describe the pharmaceutical industry in general.

Each company’s direct output was calculated based on its direct employment as shown in Appendix C. Direct output, in millions of dollars, is calculated by dividing a company’s direct employment by its direct jobs multiplier. For example, a company with 30 direct employees and a direct jobs multiplier of 3.00 jobs per \$1.000 million of output has total direct output of \$10.00 million. All indirect and induced impacts were calculated based on the company’s direct output, consistent with the methodology described in Chapter VII and Appendix C. The impacts are as follows:

- Total direct, indirect, and induced impacts in the State of California were \$29.287 billion in spending, 129,600 jobs, and \$8.150 billion in personal income generated.
- The vast majority of the impacts were realized in the City of San Diego: \$22.621 billion, or 77.2 percent of spending; 85,100 or 65.7 percent of jobs; and \$5.875 billion or 72.1 percent of all personal income generated within the state of California.
- Impacts outside of San Diego but within San Diego County were \$2.834 billion in spending, 29,400 jobs, and \$736.7 million in personal income generated.

- Finally, the impacts to other areas of California outside of San Diego County were \$3.832 billion in spending, 15,100 jobs, and \$1.539 billion in personal income generated.

These impacts are driven in a large part by the economic contributions of Qualcomm, Inc., undoubtedly the most economically significant contemporary company to have roots in UC San Diego. Within the City of San Diego, Qualcomm had total direct and indirect output of \$21.544 billion, total employment impacts of 80,150 jobs, and contributed to \$5.550 billion of direct, indirect and induced personal income generated within the City of San Diego.

The findings suggest that start-up companies based on UC San Diego technologies and innovations contribute an overwhelming share of their economic impacts to the local and regional San Diego economies. Moreover, the economic impacts are likely understated because of the limited amount of data available on these types of companies. The list of companies that found their roots in UC San Diego research is likely to be much longer than 193 names. Furthermore, start-up companies are relatively new by definition, so detailed information on their operations is relatively limited compared to more established companies.

X. UC SAN DIEGO COMMUNITY OUTREACH, SERVICE, AND PARTNERSHIPS

The University's mission emphasizes the importance of public service in addition to the fundamentals of teaching and research. The stated vision declares, "UC San Diego is proud to be a vital part of the fabric of San Diego's diverse communities. We are committed to strengthening our leadership role in sustaining the vitality and quality of our common living environment."⁸⁶ UC San Diego accomplishes this mission in a variety of ways, including community outreach programs, partnerships with local and regional governments and non-profits, academic service-learning, and the volunteer efforts of UC San Diego students, staff, and faculty.

UC SAN DIEGO COMMUNITY OUTREACH PROGRAMS

The University's community outreach programs described herein focus primarily on efforts to improve the quality of education in San Diego County and to enhance the educational opportunities and achievement of local students. This section summarizes a host of UC San Diego outreach programs targeted at economically disadvantaged and at-risk students, academic enrichment for local students, and at programs to provide teacher training and other support for local educators.⁸⁷

Early Academic Development Programs

Early Academic Outreach Program (EAOP). Since 1976, EAOP has been implemented on every major University of California campus administered by the UC Office of the President. The objective of the program is to expand the number of low-income and ethnically underrepresented students on UC Campuses. EAOP has successfully increased college preparedness through academic support, monitoring students in their educational pursuits, and distributing pertinent information to participants, their parents, and school staff. The program works with high schools, as well as community agencies, to keep students and their parents informed of the advantages of a college education and the requirements for admission. Since the start of EAOP at UC San Diego, the program has provided assistance to over 80,000 students in San Diego County; 95.0 percent of those students continue to pursue education after high school and 80.0 percent attend a four-year university.⁸⁸ Services provided through the program include:

- **Academic Guidance:** University mentors provide one-on-one or group guidance to students to reinforce the efforts of teachers, counselors, and parents. The academic progress of participants is monitored throughout the year, as mentors assist students in choosing a course plan best suited to their future college choice.
- **Campus Tours:** A visit to the University of California is provided each year for selected high schools.

⁸⁶ *UCSD and You* publication, Department of Government and Community Relations.

⁸⁷ Much of the following Information is from the Department of Government and Community Relations, *UCSD and You* Report and www.ucsd.edu.

⁸⁸ <http://eaop.ucsd.edu>.

- Parent Conference: Parents/Guardians are invited to attend a conference on topics such as college requirements and admission timelines, financial aid, post-secondary education, and career planning.
- Specialized Workshops: Various workshops are provided throughout the year. Some of the topics include the University of California admission application, financial aid, and the ACT/SAT admissions tests.⁸⁹

California Student Opportunity and Access Program San Diego and Imperial Counties (Cal-SOAP). The Cal-SOAP program is a statewide consortium working in partnership with the University of California system, the California State University system, public school districts, and local non-profit agencies. The focus is supporting and educating K-12th grade students who come from any of the following backgrounds: low-income families, who would be the first one in their family to attend college, and who attend schools or live in areas with documented low college eligibility or participation rates. The Cal-SOAP mission is to inform these students about post-secondary education and financial assistance as well as improving their academic achievements. The San Diego and Imperial Counties Cal-SOAP Consortium carries out this mission by establishing a program built around four central components:

- College Advisement: Trained College Peer Advisors (CPAs) serve as role models and provide assistance along the application process, from the college and scholarship search to writing the essay and understanding financial aid options.
- Academic Enrichment: CPA tutors provide dynamic, one-on-one academic advancement sessions to students in K-12th grade to assist them in their literacy and other academic skills.
- Community Resource: Provides as much information about post-secondary education to as many members of the community as possible by making home visits, disseminating newsletters, and conducting informative parent retreats.
- Community College: Informs high school students and their parents on how to actively pursue post-secondary education at the community college level as well giving community college students the knowledge about transferring to a four-year university.⁹⁰

Mathematics Engineering Science Achievement School Programs (MESA). Mathematics, Engineering, Science Achievement (MESA) is an academic enrichment program available throughout the University of California system that helps educationally disadvantaged students excel in math and science and graduate from college with degrees in math-based fields. Founded in 1970, the program serves pre-college, community college, and University students at more than 90 sites throughout California. MESA serves schools and students that can benefit from math, engineering, and science enrichment. Schools are selected based on the economic and cultural diversity of the student population, as well as district and local school administrative support in coordinating the program. Students are selected based on their interest in preparing for college and minimum grade point average requirements.

The core services of MESA include classroom learning facilitated by highly-qualified and trained UC San Diego students with strong math and science backgrounds; hands-on projects to apply classroom learning to real-world examples; the MESA Day Project Competition; academic

⁸⁹ Information on Early Academic Development found at <http://sea.ucsd.edu/> and from "UCSD and You", Department of Government and Community Relations.

⁹⁰ <http://www.sandiegocalsoap.com/star/index.php>.

excellence workshops designed to strengthen and advance core math knowledge; individual academic plans to aid the student in his or her path to higher education; career and college exploration via tours and presentations in various universities and industries; and services to aid parents in preparing for their child's academic future.⁹¹

UC San Diego TRIO Programs. The Office of UC San Diego TRIO Programs is home to several initiatives aimed at recruiting and assisting underrepresented secondary school students in attaining a post-secondary education. All TRIO programs are made possible via federal grants. The key initiatives of this office include:

- **Upward Bound Classic:** The objective is to motivate and prepare high school students to pursue a post-secondary education by providing eighty area high school students year-round activities including activities such as a summer residential experience at the UC San Diego campus, monthly field trips and or seminars, school-year tutoring, and mentorship.
- **Upward Bound Math and Science:** Fifty students with an interest in pursuing math, science, computer science, and engineering as a college major or career receive support from the Upward Bound Math/Science Program.
- **Education Talent Search:** Identifies and assists individuals from disadvantaged backgrounds that have the ability to strive in higher education by providing pre-admissions advisement, academic enrichment activities, and motivational experiences. The program is currently aiding 600, 6-12th grade students.⁹²

Community Outreach Partnership Center (COPC). The Community Outreach Partnership Center (COPC) is an outreach program developed to support students' understanding of science. UC San Diego was the first medical school in the country to receive this grant from the U.S. Department of Housing and Urban Development. Currently the COPC program is funded by the University of California, San Diego School of Medicine, the Howard Hughes Mentor Institute (HHMI), and the Health Resources Services Administration's Health Careers Opportunity Program. COPC utilizes the National Science Education Standards for their curriculum, which is aimed toward 7-12th grade students to support and extend their scientific knowledge and develop a background for a career in a science or health related field.

This is a year-round program that provides in-class and after-school instruction as well as hosting different activities such as Doctor for a Day, sponsored by the School of Medicine, and Expanding Your Horizons, which is sponsored by General Atomics and is an event that targets 6-12th grade girls. Students involved in this program are also encouraged to participate in the Greater San Diego Science and Engineering Fair (GSDSEF), local district science fairs, as well as the California State Science Fair (CSSF).⁹³

Consortium of High Schools, Undergraduate, and Medical Schools (CHUM). Linked to the UC San Diego School of Medicine, CHUM is science-based program designed to heighten local disadvantaged middle and high school students' interest and involvement in the sciences to prepare them for college. The program works with six local public schools during both the academic year and the summer providing events that include university visits, after school and

⁹¹ <http://mesa.ucop.edu>.

⁹² Information obtained from the main UC San Diego website information area for current students' community involvement, www.ucsd.edu/portal/site/ucsd.

⁹³ <http://meded.ucsd.edu/diversity/copc/>.

weekend science fair workshops at the school sites, PSAT/SAT training, the Winter Break Science Fair Mini-Camp at UC San Diego, teacher training, equipment sharing, lectures and curriculum modeling, and several summer experiences. This program also attends to the need to advance teacher education through curricular and laboratory support by offering courses to teachers of CHUM affiliated schools.

The Preuss School UC San Diego. The Preuss School is a public school located on the UC San Diego La Jolla campus chartered by the San Diego Unified School District. Preuss was established in 1998 with the mission to provide tuition-free, college preparatory education to economically disadvantaged, 6-12th grade students who will be the first in their families to achieve post-secondary education. Preuss' objective is to be a demanding college preparatory program aimed to prepare its students academically for the competitive admissions process into UC campuses and other intensive four-year universities. To achieve this goal The Preuss School focuses on the following principles:

- Personalization of instruction;
- Use of University resources to enhance teaching and learning;
- Providing a climate of high expectations and a strong academic culture;
- Tutoring to ensure student achievement;
- An innovative traditional liberal arts curriculum that emphasizes student understanding and literacy; and
- Weekly staff development and team meetings for teachers focused on teaching and learning using analysis of lessons and student work.

In 2008, The Preuss School made national news when they were rated the sixth best high school in the United States in Newsweek magazine's assessment of the top 100 schools.⁹⁴

Summer Bridge Program. The Summer Bridge Program, operated out of the Office of Academic Support and Instructional Services (OASIS), is a free four-week program for approximately 150 selected incoming UC San Diego freshmen. Students accepted into the Summer Bridge Program travel to one of the on-campus residence halls where they live for four weeks while taking two college-level courses earning a total of eight units towards their college degree. The students enjoy a myriad of social activities with a diverse peer group and have direct exposure to UC San Diego faculty. Program participants are also provided with support services during their first year of college through the Academic Transition Program (ATP), which provides services such as a peer mentor and quarterly social activities.

Academic Enrichment

The following UC San Diego-sponsored activities and events are meant to enrich the academic experience of local students. These programs show a strong commitment to stimulating students' interest in math and science.

Academic Connections. Through a combination of summer residential programs, year round academies, and distance education courses, Academic Connections gives high school students access to the extensive resources of UC San Diego. The program allows students to learn about the various fields of study, experiment with different disciplines, and prepare themselves for higher education. Eligible students must have a certain GPA, to enter this program as it is

⁹⁴ UC San Diego Institutional Research.

aimed at outstanding students who want to get a head start on their college experience. A few benefits of attending this program include: recognition for program participation on UC admission application, UC San Diego admission advising, and the opportunity to explore a specific academic field.

Asian and Pacific-Islander Student Alliance Annual High School Conference. Each year, nearly 500 high school students attend the free APSA Conference on the UC San Diego campus. This conference provides motivational speakers, workshops, and performances to encourage post-secondary education and the concerns Asian and Pacific-Islander youth in San Diego may have.

Balboa Elementary Math Technology Pilot Project. This program was developed for 4th-6th graders at Balboa Elementary School to encourage and produce an interest in mathematics. At the San Diego Supercomputer Center, students develop creative problem solving skills through building robots, managing their own virtual companies, and adventuring on survivor trips.

CalSpace Forum: Earth and Space Education. Primarily for high school and community college students, this program utilizes information shared by UC researchers on space related research on topics such as the view of Earth from space, solar systems, space engineering, and deep space. Student teams are formed around specific projects and mentored by experts at UC San Diego.

Center for Energy Research-Fusion Outreach Program. Focusing on plasma science and fusion energy, this program presents activities such as tours of fusion research facilities on the UC San Diego campus, a three-week summer course, visits to area schools, and booths at fairs and expositions in San Diego. This program is offered to middle and high school students and teachers.

COSMOS. Through UC San Diego's Jacobs School of Engineering, 8th – 12th grade students attend a four-week residential program that concentrates on technology and engineering, in addition to mathematics and science. Having the opportunity to work alongside university researchers and faculty, students receive an advanced academic experience through intensive classroom, laboratory, and design experience in subjects such as plant genetics, prescription drug discovery, robotics, earthquake engineering, and computer visualization.

EarthKAM. Based at UC San Diego, this NASA-sponsored project is aimed at middle school students around the world. Directed by Dr. Sally Ride (the first American woman in space) and Dr. Karen Flammer, UC San Diego undergraduates work alongside the students to utilize a web-based interface that manipulates a digital camera located on the International Space Station to photograph the earth.

The Internet Ambassador Program. This program is a resource developed to assist the community with the UC San Diego admissions process. Student interviews are published on the Admissions website and prospective students can ask questions through e-mail.

"I'm Going to College". Aimed at 4th grade students, this program is a collaboration between the UC San Diego Office of Admissions and Outreach and partner elementary schools to promote attending college by having students spend a morning at UC San Diego touring the campus and attending mock classes.

Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP). UC San Diego partners with a number of local high schools in GEAR UP, which utilizes a variety of programs to point students and their families in the proper direction to be fully prepared for college. The types of programs used include campus tours, college fairs, tutoring, counseling, Saturday sessions, after-school academic enrichment activities, family involvement training, parent presentations, and staff development.

La Clase Mágica. This program was created for children, adolescents, and adults in predominantly Mexican communities. Employing computer-based activities, staff development and scholarships, this program helps students prepare both academically and socially to achieve in school.

Math and Reading Tutor. UC San Diego students provide individual tutoring and other types of learning experiences to local schools, community organizations, and literacy programs to help develop a strong background for advanced mathematics courses as well as to develop and strengthen literacy amongst children and families. This program is designed to involve the family and caregivers.

Public Health Organization at Helix High School. UC San Diego School of Medicine collaborates with Helix High School to supervise the development of a peer teaching model by creating educational materials for other schools. This program's objective is to increase the students' knowledge and interest in health-related fields of study and careers.

SD Math Circle. This program is aimed toward 6-12th grade students to give opportunities to experience challenging areas in math focusing on understanding and helping students succeed in mathematics competitions. Instructors, including UC San Diego mathematics faculty, provide an extensive curriculum and problems for the students to discuss and solve.

Scientific Research and the Brain. Created by the Scientists from the Laboratory of Cognitive Imaging at UC San Diego, this program presents information on the brain, including neuroimaging research, Alzheimer's disease, substance abuse, and other brain afflictions. Different levels of information are presented depending on the classrooms (ranging from 3rd – 12th grade).

Society of Women Engineers. This program is designed to encourage young girls to pursue education and careers in engineering by having members from the Society of Women Engineers act as role models through activities such middle school seminars performed once per week throughout the school year. Every fall 100-200 elementary school girls come to the UC San Diego campus to be a part of science and engineering events such as Lego MindStorms, spaghetti tension bridges, and egg-dropping competitions.

UC San Diego/GSDMC High School Honors Mathematics Contest. Cosponsored by the Greater San Diego Mathematics Council and UC San Diego, this contest was established in 1948. Each year more than 100 students from more than 20 high schools throughout the county come to UC San Diego to compete in a two-part mathematics competition. This contest was designed to give acknowledgment as well as to encourage students that are mathematically talented.

University Link. This program was developed to help community college students planning on transferring to UC San Diego by providing support, services, and admissions counseling. Partnerships exist with a number of local community colleges as well as high schools.

UC San Diego Education Studies Department and UC San Diego Extension – Support for Local Educators

UC San Diego Education Studies Department and the Education Department at UC San Diego Extension offer extensive programs aimed at improving the skills of local teachers and other educational workers. Some of these programs are UC San Diego-sponsored initiatives, while others are partnerships with local institutions.

UC San Diego Education Studies Department. The Education Studies Department offers several different types of degree programs for people interested in entering the field of education and those who want to further their education. All credentials provide preparation for teaching English language learners in a regular classroom setting.

- Undergraduate Degree: The opportunity to obtain a minor in Education is offered to undergraduate students within all majors.
- Master of Education (M.Ed.) Degree/Credential Programs: A M.Ed. degree/Multiple Subject Credential Program is offered at UC San Diego for people looking to obtain the California Preliminary Multiple Subject Teaching Credential for elementary school teachers. A M.Ed./Single Subject Credential is offered for people looking to obtain the California Preliminary Single Subject Credential in Biology, Chemistry, Geosciences, English, Mathematics, English, and Physics for secondary school teachers.
- Master of Arts Degree (M.A.): The M.A. Degree in Teaching and Learning: Research in Curriculum Design provides elementary and secondary school educators an extensive education in the principles of educational research and curriculum design. Students in the program can continue teaching full time while obtaining this degree, this is an important aspect of this program, overlapping and integrating research and practice so they can design, implement, and critically evaluate what they learn, into their own classrooms. The M.A. Degree in Teaching and Learning: ASL-English Bilingual Education is offered at UC San Diego with an emphasis in American Sign Language. Completion of this program will also qualify the teacher for the California Deaf and Hard of Hearing Specialist Teaching Credential and the Multiple Subject Teaching Credential for elementary school teachers.
- Doctor of Education: The Doctor of Education Degree in Teaching and Learning is developed to give professional educators the opportunity to gain research-based leadership skills in curriculum design, teaching, academic assessment, professional development, and educational reform. This is a four-year program. The Doctor of Education Degree in Educational Leadership is a program aimed toward educational administrators to support and extend their knowledge of effective school management and leadership through their own experiences and research on important issues. This is a three-year program. Both programs offer evening and weekend courses.⁹⁵

Center for Research in Educational Equity, Assessment, and Teaching Excellence (CREATE). The main objective of CREATE is to boost the number of underrepresented students at UC San Diego and other universities. This is done by forming partnerships between UC San Diego and local schools to provide professional development to teachers, conducting research to improve education opportunities for the students and offering the highest quality education to students at The Preuss School. Some of the professional development opportunities offered include:

⁹⁵ <http://www-tep.ucsd.edu/intro.shtm>.

- American History in the Schools (American HITS): American history elementary and middle school teachers are provided professional development opportunities through a partnership between UC San Diego, the San Diego County Office of Education, and several local organizations. Activities comprise summer institutes, monthly symposia, peer coaching, study groups, and online sessions. Concentrating on the following four themes, justice and liberty, citizenship/civic responsibility, developing nations, and significant people, the program was created to improve the knowledge of the participating teachers and their students.
- Science Education Association of San Diego (SEASAND): Taught by scientists, public school science teachers, and English Language learning specialists, this program focuses on science content and effective classroom strategies. Offered to middle school science teachers through summer institutes and school year sessions, participants receive resources for classroom use, effective strategies for science instruction to English language learners, understanding of relevant state standards, and university credit.
- California Reading and Literature Project (CRLP): Professional development in reading and language instruction for PreK-12 to ensure that students are receiving high quality, standards-based instruction.
- San Diego Area Writing Project: Established in 1977, this program is one of 17 California Writing Project sites and 170 National Writing Projects. Professional development is provided to teachers and instructors to improve the quality of their students' writing. By sharing expert practices the teachers develop a range of strategies to improve their own classrooms and those of other teachers. Examples of the programs offered include special workshops for teachers of English Language Learner (ELL) students, and preparing students for academic writing at the college level.
- UC San Diego History-Social Science Project: Professional development offered to teachers and instructors, to increase understanding of history and teaching, improve educational settings, promote different perspectives, and emphasize collaboration.⁹⁶

Principals Executive Program. Offered to outstanding and motivated K-12 public and private school leaders, the UC San Diego Principals Executive Program provides seminars that are geared to be experimental, purposeful, and team-centered. These give time for critical reflection, in addition to planning and action with colleagues from other schools, non-profit and government organizations, local businesses, and others.

The San Diego Science Alliance. This program concentrates on improving science literacy in education through networking and by connecting needed resources to educators. This is a nonprofit consortium of leaders from business, K-12 education, higher education, and scientific institutions in San Diego County. This group also initiates, conducts, and supports K-12 science education programs for students and teachers.

Science, Culture, History, and English Language Development (SCHLED). Social studies, science, and language arts are the subjects on which this professional development program focuses. Participating elementary school teachers receive content guidance from UC San Diego faculty, on-site support for teaching throughout the year, effective strategies for English language learners, and training in academic coaching in order to help colleagues.

⁹⁶ <http://create.ucsd.edu/>.

Teacher Recognition Program. This is an annual event put on by UC San Diego to show gratitude to high school teachers. Students accepting admission to UC San Diego nominate one of their teachers who have had a positive effect on their learning experience and who instill a lifelong devotion to learning. Teachers with the most nominations will receive a Teacher of the Year award.

University of California Professional Development Institute.⁹⁷ Based out of UC San Diego, this program offers partnerships with urban and rural school districts to provide professional development for teachers and administrators through publications, online courses, web tools, professional learning communities, and summer and academic year institutes.

University Extension Continuing Education for Educators

The University Extension Education Department offers a variety of courses, certificate programs, and state approved credentials that provide opportunities for integrated professional development for school communities and educational institutions. Courses that are provided include Cross Cultural Language and Academic Development, a new academic requirement by the California's Commission on Teacher Credentialing (CCTC) for teachers of English language learners, E-Learning and Instructional Technology, K-12 Professional Development, Special Populations and Exceptional Students, State Credentials and Requirements, Teaching Adult Learners, English as a Second Language, and Language Arts. Certificate programs that are offered include College Counseling, Community College Instruction, Gifted and Talented Education, Reading Instruction, Teaching English to Speakers of Other Languages, and Teaching Online. The CCTC Approved Programs offered are California Clear Credential and Reading Instruction: From Research to Practice.

UC San Diego Library Resources

Ten separate libraries make up the UC San Diego Libraries system, with services and programs designed to support the academic and programmatic pursuits of the UC San Diego faculty, students, and staff. This group of libraries consists of the Biomedical & Medical Center Libraries, CLICS: Center for Library & Instructional Computing Services, the Geisel Library Building (which houses the Arts Libraries, Art & Architecture Library, Music, Film, & Video Library, Mandeville Special Collections Library, Science & Engineering Library, Social Sciences & Humanities Library, Social Sciences Data Collection, Government and Geographic Information Services), International Relations and Pacific Studies Library, and the Scripps Institution of Oceanography Library.

Serving as the primary information commons and intellectual centers within the University, the UC San Diego libraries provide access to more than 3.200 million volumes, 257,000 electronic books, 33,640 serial subscriptions, 97,720 pamphlets, 14,050 linear feet of manuscripts and archives, 114,100 maps, 122,700 audio materials, 396,100 slides and other pictorials, and 17,980 video materials. Collectively, the UC San Diego library system is the second largest research library in Southern California. The mission of the UC San Diego Libraries is to be leaders in providing and promoting information resources and services to the UC San Diego community when, where, and how users want them. The libraries also actively support the University's public service mission by providing community, statewide, and national access to its resources.

⁹⁷ <http://ucpdi.ucsd.edu/index.cfm>.

The UC San Diego libraries are a key partner in several collaborative initiatives and activities, and the following is a brief sampling of these efforts.

Digital Library Program. The Digital Library Program (DLP) is the major component of the execution, management, support, collaborative conception, and long-term preservation of digital assets in support of the Libraries' mission and goals. There are many different people and jobs that facilitate the operation of the DLP including local public librarians who provide feedback on the usability of the program.

California Digital Library. The California Digital Library provides a single point of online access for digital collections produced or managed by the University of California. This site offers a broad range of scholarly and popular content, and the digital collections reflect the diverse interests and scholarship of the University of California. This website is a first step toward bringing together publicly accessible digital collections that are created and managed by the University of California. The California Digital Library supports the assembly and creative use of the world's scholarship and knowledge for the University of California libraries and the communities they serve.⁹⁸

Academic and Athletic Camps

UC San Diego offers a wide variety of academic and athletic camps open to middle school and high school youth, both during the academic year and during the summer months.

Intercollegiate Athletics. Various specialized athletic camps are provided by UC San Diego to participants ages five to 18. Camps that are offered include: baseball, men's and women's basketball, crew, softball, swimming and diving, tennis, women's volleyball, and women's water polo. The University also offers a general Athletic Performance Camp that allows athletes of all sports the opportunity to learn principles and applications, improve on strength training techniques, and gain knowledge of other aspects of sport specific speed.

UC San Diego Jazz Camp. Offered to intermediate to advanced level musicians ages 14 and up, this five-day program provides group courses and workshops, private lessons, ensemble participation, demonstrations, and faculty concerts. Instructed by leading jazz improvisers and educators, the objective of the camp is to, "work to break down the boundaries between 'inside' and 'outside,' sharpening performance skills, and enriching the experience of jazz as a broad spectrum of options for musical expression."⁹⁹

UC San Diego Recreation. The department of recreation offers numerous youth summer camps. In the Knock Around Camps offered to ages five to 11, children are introduced to a wide variety of activities designed to promote teamwork, self-esteem, leadership, cultural awareness, and friendship. Different types of Knock Around Camps are provided such as day camp, sports camp, and beach camp. Leadership Camps are for youth entering grades 7 through 9 and host a number of different sessions to satisfy the interest of each individual. Sessions include topics such as theatre, sports, food, photography, wilderness orientations, and more. UC San Diego Recreation also provides quarterly youth classes and activities including swimming, dance, martial arts, and more.

⁹⁸ <http://www.ucsd.edu/portal/site/Libraries>.

⁹⁹ "About Jazz Camp", <http://jazzcamp.ucsd.edu/>.

Summer Discovery at UC San Diego. This camp experience is designed as a portal for college-bound high school students to sample college in a real setting. For five weeks students live in on-campus residences, attend one or two classes along with undergraduate college students, and have the opportunity to earn course credit on an official UC transcript.

Other Outreach Initiatives

Osher Lifelong Learning Institute. UC San Diego's Osher Lifelong Learning Institute (OLLI), offered through the University Extension, is an educational program for people ages 50 and above. Boasting more than 600 members, the program offers noncredit classes, lectures, study tours, and other activities for those who want to learn for the pure enjoyment of learning. There are no tests or grades and classes are open only to OLLI members, so learning takes place in a peer environment. The UC San Diego Osher Lifelong Learning Institute is committed to creating a productive outlet for the energies of semi-retired or retired persons by encouraging involvement in University life through a curriculum of unique and intellectually stimulating learning opportunities consistent with the high standards of the University of California.

The programs are offered in San Diego and courses are taught by members of the Institute, as well as current UC San Diego faculty. Course topics vary each quarter and are modified based on student evaluations and feedback.

COMMUNITY PARTNERSHIPS

UC San Diego participates in several ongoing partnership initiatives with local, regional, and state government agencies, as well as community service organizations and non-profits. These partnership initiatives have a variety of goals, including enhancing awareness, encouraging business development, improving public health, and reducing traffic congestion.

Disability Awareness Month

Disability Awareness Month is an annual celebration held every October. This event showcases the abilities and talents of people with disabilities. This collaboration between UC San Diego and the San Diego community helps develop knowledge and awareness.

The Lesbian Gay Bisexual Transgender Resource Center (LGBT)

The Lesbian Gay Bisexual Transgender Center (LGBT) is open to the extended UC San Diego community. The center is a public space devoted to exploring issues relating to sexual and gender identities, practices, and politics. The Center offers a space to spend time and study, academic resources, educational and cultural events, and a Speakers Bureau. The LGBT provides resources to other LGBT organizations at UC San Diego and in the community.

UCSD-TV

UCSD-TV is the only broadcast television station administered by the University of California. It provides commercial-free programming that gives the San Diego community comprehensive television programs that are educational and diverse. The Emmy Award-winning station has been broadcasting for more than a decade. As stated in their mission, "UCSD-TV believes that enlightenment and entertainment need not be mutually exclusive." UCSD-TV has access to affairs within the campus community as well as the San Diego region and other UC Campuses.

Intellectual shows reach topics on science, medicine and health, the arts and music, public affairs, and humanities. Samples of the different types of shows include:

- A month long environmentally concentrated series of programs created to help celebrate Earth Day;
- A half-hour long story told through dance, poetry, and music with the purpose of educating youth about HIV/AIDS;
- A program that focuses on the activities and developments at all of the UC campuses;
- A series of shows on cancer awareness, prevention, treatment, and research; and
- Spotlights on the San Diego Opera.

UCSD-TV programming has been bestowed numerous prestigious awards including multiple Emmy's, Telly's, Remi's, Aurora Awards, and honors from the International Film and Video Festival.¹⁰⁰

Athena

Athena is an organization that is part of the Rady School of Management. It was created for women in the San Diego technology and business communities to help develop professional and personal growth. Athena focuses on inclusion, risk-taking, education, recognition, and diversity of thought, thereby increasing competitiveness and opportunity in the San Diego business community. This is cultivated through a set of educational and motivational programs in addition to professional and social networking opportunities. Athena also provides five annual scholarships to local high school seniors to help them achieve their goal of postsecondary education.

CONNECT

CONNECT is a successful organization created in part by UC San Diego, that encourages entrepreneurship in the San Diego region. CONNECT has been directly involved with more than 900 companies and focuses on supporting the growth of technology and life science businesses. This organization is highly regarded as a thriving relationship between high-tech entrepreneurs and University resources. Although CONNECT is now an independent organization, UC San Diego's School of Medicine, Scripps Institution of Oceanography, Jacobs School of Engineering, and San Diego Super Computer Center continue to collaborate with CONNECT.¹⁰¹

Transportation Efforts

UC San Diego also offers numerous programs to students and staff to help reduce traffic congestion and pollution. The CityShuttles program at UC San Diego provides public transportation for students, faculty, and staff to commercial areas and neighborhoods proximate to the main campus. The *Nobel* and *Arriba* shuttles operate between 7 a.m. and 12:15 a.m. daily, with buses departing from Mandeville Center on campus every 8 to 15 minutes depending on time of day. Together the two bus routes service six bus stops located both on campus, and in the off-campus areas of Nobel Drive, La Jolla Village Center, and the Regents Road area of La Jolla. Over 6,000 faculty, students, and staff enter campus via bus,

¹⁰⁰ <http://www.ucsd.tv/>.

¹⁰¹ "UCSD CONNECT", UCSD and You Report and www.connect.org/about

shuttle, and carpool on a daily basis. This ridership has increased by approximately 19.0 percent over the previous year, reducing UC San Diego's carbon emissions by providing an alternative to automobile dependency.

A number of the UC San Diego transportation programs are partnerships with the County of San Diego, Metropolitan Transit System, and businesses. The Transit/Coaster Club is a program that offers benefits to participants that commit to riding public transportation daily. In addition to the standard UC San Diego transit discount offered to students and staff, members receive two months free ridership, enjoy discount passes, gain free access to Flexcar (a car sharing program offered in numerous states), and receive up to three courtesy rides per year through the Guaranteed Ride Home Program as well as an Occasional Use parking permit. Another program is the Pedal Club for students and staff who cycle every day. The benefits are similar to those of the Transit/Coaster Club only instead of discounts on public transit, members receive discounts at the UC San Diego Bike Shop. Other programs offered include carpooling, vanpooling, and the Flexcar service mentioned above.¹⁰²

ACADEMIC SERVICE-LEARNING

In addition to outreach and partnership initiatives, the University incorporates community service directly into the curriculum of its undergraduate programs as well as encouraging students to become involved. Some of these service-learning and community involvement opportunities are described below.

Partners at Learning (PAL)

This program gives undergraduate students the ability to obtain experience working directly in a K-12 education environment. PAL partner schools are typically in lower-income neighborhoods. Provided in the PAL course structure, UC San Diego students are given a background of theoretical and practical information in K-12 education through academic work and fieldwork. The UC San Diego undergraduate students provide one-on-one tutoring and small group interaction that not only challenge students but help encourage and motivate the pursuit of higher education. PAL is open to all colleges and all academic majors; these courses fulfill some general education and writing requirements as well as some of the requirements for an Education Studies minor.

Public Service Minor

The Public Service Minor is for students who want gain knowledge on the history and practices of public service and want to develop civic skills. To achieve a Public Service Minor students are required to participate in a three-quarter, 12-unit internship in a non-profit or government sector. This gives students the opportunity to learn through hands-on experience, develop connections, and achieve an in-depth understanding of methods and practices in addressing social issues.

¹⁰² Transportation and Parking Services,
<http://blink.ucsd.edu/Blink/External/Topics/Sponsor/0,1362,13952,00.html>.

UC San Diego Teams in Engineering Service (TIES)

The Jacobs School of Engineering Teams in Engineering Service (TIES) is a partnership between engineering students and non-profit organizations in the local community developed through an academic program. This program not only helps give students the opportunity to apply the knowledge and skills they have learned at UC San Diego and gain real-world experience, but it assists non-profit organizations by working to recognize, tackle, and solve engineering issues. TIES was developed after the proven success of the Engineering Projects in Community Service (EPICS) Program at Purdue University and is still the only program of its nature in the western U.S. Some of TIES community partnerships include:

- Lakeside's River Park Conservancy: Lakeside's River Park Conservancy's objective is to preserve and restore natural integrity to the San Diego River while incorporating community activities and education. Samples of TIES work include creating an educational kiosk to provide information about the River Park to visitors and building mobile overlooks for restoration projects.
- Save Our Children's Sight: Save Our Children's Sights is a partnership between the San Diego Unified School District, Head Start, and the Abraham Ratner Children's Eye Center at UC San Diego's Shiley Eye Center. TIES' goal is to upgrade the current screening system using an up-to-date, high-resolution digital camera and specialized lens model and to develop new screening software.¹⁰³

Academic Internship Programs

UC San Diego's Academic Internship Program (AIP) gives students the chance to utilize their academic knowledge and skills in various corporate and community settings while earning academic credit. This program was established in 1976 and offers the students counselor guidance in choosing appropriate internships, resume preparation, and placement facilitation. Students can choose from an internship through AIP, can develop their own internships, incorporate an internship they found on their own into the program, and be a part of Out-of-Town internships. Some examples of such opportunities include internships in the following settings: Law Firms, Television and Radio Stations, Governmental Agencies, Advertising Agencies, International Organizations, Human Services Agencies, Schools, Medical Research Labs, Publishers, High-Tech Organizations, Elected Officials, and Non-Profits.¹⁰⁴

STUDENT, STAFF, AND FACULTY VOLUNTEER PROGRAMS

The contributions of the UC San Diego community extend beyond formal initiatives, programs, and courses. UC San Diego students, staff, and faculty are also very active in community service through individual and group volunteerism.

Student Volunteer Programs

UC San Diego's student population has proven dedicated to community service and volunteer activities. There are over 70 student volunteer service organizations, including every campus fraternity and sorority organization, each of which requires some form of community service as a condition of membership.

¹⁰³ <http://ties.ucsd.edu>.

¹⁰⁴ <http://aip.ucsd.edu/students>.

As part of the UC San Diego experience, students are encouraged to volunteer in efforts that enhance the community. Students donate their time and efforts to a wide variety of service activities. Some examples of service organizations in which students have been involved include the following:

- **UCSD Cares:** UC San Diego students and staff participate in this week-long community service campaign. It is a collaboration of more than 50 campus organizations, involving over 1,000 students in the form of service activity. These activities range from a donation drive, signing up for future volunteer opportunities, fundraisers, and more. Charities that benefit include the American Cancer Society, United Way, and San Diego Rescue Mission.
- **Best Buddies:** Best Buddies is a community service organization that works to socially integrate people with intellectual disabilities by providing opportunities for one-to-one friendships. This program matches up UC San Diego students with developmentally disabled peers and sponsors regular group outings, field trips, and the annual Best Buddies Ball.
- **Eyes on the Elderly:** UC San Diego students visit a local convalescent home to spend time with neglected members of the elderly community. They lead games, assist staff, visit different rooms, and try to develop a fun and positive atmosphere.
- **Active Students for Teens:** UC San Diego students work as mentors and tutors to help guide students from a local high school. The program brings the high school students to the UC San Diego campus to encourage and introduce them to the University life.
- **Community Outreach Effort (CORE):** This program offers one-time and on-going service projects. Examples of CORE projects include beach cleanups, working for a food delivery service for AIDS patients, working at a homeless shelter, and tutoring K-12 students.

Volunteer Connection. Run by students, this organization helps connect students to over 200 volunteer opportunities in San Diego County. The various opportunities include working with the Peace Corps, Teach for America, San Diego Reads, Thanksgiving Adopt-A-Family, a holiday toy drive, and “Hands of San Diego Program”. The opportunities for volunteering through the Volunteer Connection usually focus on programs involving at-risk youth, the elderly, the economically disadvantaged, and the disabled.¹⁰⁵

Staff and Faculty Volunteer Programs

Though hours of community service contributed by UC San Diego staff and faculty members are not tracked by the University, it is well known that both staff and faculty are very dedicated to the campus and the local community and frequently donate their time and efforts to a variety of events and activities. Some examples of the various volunteer efforts performed by UC San Diego staff and faculty members include the following:

- **Rady School of Management:** Faculty and staff from the Rady School of Management use their Staff Development Day to volunteer in the community.
- **UC San Diego Staff Association:** The UC San Diego Staff Association holds an annual Toy Drive benefiting children from the UC San Diego Medical Center Burn Unit, UC San

¹⁰⁵ “UCSD and the Community”, UCSD Cares Report.

Diego Infant Care Center, Kaiser Permanente Pediatric Unit, UC San Diego Mother, Child, and Adolescent Care, and National City Boys and Girls Club.

The already extensive list of volunteer opportunities provided through UC San Diego, continues to expand, helping students, staff, and faculty develop leadership skills and cultivate their involvement as well as benefit the community.

XI. CULTURAL AND RECREATIONAL PROGRAMS

CULTURAL PROGRAMS

UC San Diego provides a wide range of cultural programs that are open to the community in addition to students and staff. Events, programs, and visual and performing arts include the works of both UC San Diego students as well as permanent collections of established artists. In addition, UC San Diego hosts prominent artists who put on performances and exhibitions open to the general public. Finally, UC San Diego provides venues for local artists and others to display their talents.

Visual Arts

The Stuart Collection. The Stuart Collection is a series of sculptures that are incorporated into the campus buildings and landscape creating juxtaposition between art and the University. The Collection continues to add pieces to the series as the campus itself continues to grow. The mission of the Stuart Collection is to enhance the artistic, cultural, and intellectual life on campus. A partnership between UC San Diego and The Stuart Foundation was established in 1982; the Collection has also received cooperation and financial support from many organizations such as the UC San Diego Department of Visual Arts, the National Endowment for the Arts, the Russell Foundation, the Lannan Foundation, the California Arts Council, and the Stuart Collection Colleagues. Campus tours have been created around the Stuart Collection as well as a book documenting its history. As of Fiscal Year 2006-07, the Stuart Collection contains sixteen unique pieces. Examples from the Collection include:

- **Sun God:** The first piece of the Stuart Collection created was the Sun God. The Sun God is a 14-foot statue of a multi-colored bird, placed upon a 15-foot concrete arch. This piece is located near the Faculty Club and Mandeville Auditorium and was created by Niki de Saint Phalle. The Sun God has become a major landmark on the UC San Diego campus.
- **The Snake Path:** A winding, 560-foot long, 10-foot wide tiled snake that serves as a pathway leading up to the Geisel Library Building. The snake encircles a small garden representing the Garden of Eden, as well a large granite book with a quote from *Paradise Lost*. The Snake Path was created by Alexis Smith.
- **Trees:** Created by Terry Allen, this sculpture consists of three salvaged eucalyptus trees from a grove that was removed to make way for new campus buildings. These trees are encased in skins of lead; one tree plays music, one recites literature, and one tree perseveres in silence.¹⁰⁶

University Art Gallery. Located on campus, the University Art Gallery offers free admission to the public. The Gallery was shuttered in 2006 for renovation and reorganization. Before the revitalization of the Gallery three to four exhibitions were displayed per year; once reopened they are planning five gallery exhibitions per year — three seven-week shows and one 10-week show, along with an annual four-week showcase of graduating UC San Diego Master in Fine Arts students. Every show will be accompanied by a series of related events: lectures, panel discussions and artists' talks. The objective of the University Art Gallery is to display, research,

¹⁰⁶ <http://stuartcollection.ucsd.edu/StuartCollection/About%20Us.htm>.

and interpret the works of contemporary artists with diverse cultural backgrounds as well as training students in curatorial practices for museum and gallery careers.¹⁰⁷

Musical Performances

UC San Diego is host to a diverse array of musical programs ranging from free concerts to major groups, including the Kronos Quartet and Los Lobos. The Music Department also hosts an annual spring festival of music that is organized and performed by graduate students.

The UC San Diego Music Department offers over 150 public concerts each academic year offering a wide range of musical ensembles. The ensembles are composed mostly of students and faculty but invite community members to participate as well. Some of these ensembles include: a collaboration of the San Diego Symphony and UC San Diego Quartet Gospel Choir; red fish blue fish, which is a highly regarded resident ensemble of percussionists; and many other resident ensembles such as Improvisation Ensemble, Concert Choir, Symphonic Chorus, Gospel Choir, Section A: Jazz Ensemble, Chamber Singers, Wind Ensemble, and World Music Ensembles: Sitar and Tabla.¹⁰⁸

Theatre and Dance

UC San Diego's Department of Theatre presents plays and performances throughout the year and all are open to the public. UC San Diego students are part of nearly every aspect of the productions and performances. Performances during the 2006-07 season included *The Love of the Nightingale*, *The Labyrinth of Desire*, *Heart of a Dog*, *Twelfth Night*, among others.

Among the Department of Dance performances during the 2006-07 season were *danceALIVE!*, a piece choreographed by faculty and performed by students and *We Dance/Our Dances*, a collection of diverse pieces highlighting the performance and choreography of UC San Diego's top dance students.

Second Sites: Tales of Alternative Routes was a 2006 performance showcasing students from both theatre and dance.¹⁰⁹

La Jolla Playhouse

The La Jolla Playhouse is located on the campus of UC San Diego. Since its inception, the Playhouse and UC San Diego have collaborated, creating an integrated environment for the exciting and nationally visible theatre produced by the Playhouse and the nationally respected theatre training program offered by the Department of Theatre and Dance. Though the two entities are completely separate financially and legally, they have entered into an accord that states that the two organizations will collaborate by sharing facilities and technical production staff as well as the training of theatre artists. At times, members of the UC San Diego faculty contribute to Playhouse productions in various forms such as directors, designers, actors, choreographers, voice and movement coaches, and stage managers. Members of The Playhouse staff often teach in the graduate theatre programs at UC San Diego.

¹⁰⁷ University Art Gallery to Reopen its Doors", http://ucsdnews.ucsd.edu/thisweek/2008/01/14_university_art_gallery.asp

¹⁰⁸ <http://music.ucsd.edu/home/>.

¹⁰⁹ <http://www-theatre.ucsd.edu/season/archives/season0607/>.

The La Jolla Playhouse has produced numerous award winning shows. The Playhouse presented the world premiers of the multiple Tony Award winners, *Jersey Boys* and *Thoroughly Modern Millie*. The Playhouse has also shown Tony Award winners, *700 Sundays...Billy Crystal...A Life in Progress*, *The Who's Tommy*, and *I Am My Own Wife* which also won a Pulitzer Prize. All of the above productions went on to be produced on Broadway. The Playhouse itself earned a Tony Award for America's Outstanding Regional Theatre in 1993.

In addition to its' many productions, The Playhouse also provides patrons with various opportunities to enrich their theatre experience. These include events such as "Talkback Tuesdays", which allows the audience to interact with the actors and artistic staff after the show and "Insider Events", a tour that lets the patrons see aspects of the production not usually visible to the audience. The Playhouse also provides various community outreach programs and performances developed for youth. Types of outreach programs provided by The Playhouse include a four-week workshop to develop theatre skills for grades 2-12, guest speakers who visit classrooms, and internships for high school, undergraduate, and graduate students. The youth performance, called Performance Outreach Program (POP), is a production that goes on tour to schools, libraries, and community centers in San Diego County presenting a new production annually. In addition, POP provides the schools with pre- and post-performance material, a Playhouse teaching artist goes to the classroom before the show to commence discussions on the play, and the actors and artistic staff answer questions after the performance.

The Playhouse holds auditions for local actors as well as accepts play submissions from literary agents and Southern California residents. The La Jolla Playhouse provides a range of productions, educational opportunities, and theatre participation to the community and to the University.¹¹⁰

ArtPower!

UC San Diego's ArtPower! is an organization created to encourage students and the community to participate in the arts on campus. This organization gives artists, students, scholars and audiences the opportunity to research, participate, and create. ArtPower! offers exciting, challenging, multi-disciplinary performances by emerging and renowned international artists. Performances have included Cesaria Evora, David Sedaris, Twyla Tharp, and the Emerson String Quartet.

Attracting Cultural Events to San Diego County

The University provides a venue for nationally renowned artists to perform for both the University and the local community. There is an annual student-produced concert event called the Sun God Festival that hosts approximately 8,000 students as well as 5,000 student guests.¹¹¹ The Sun God Festival has presented numerous famous bands and musicians such as No Doubt, Cake, Xzibit, Blur, and Cypress Hill. Other performers include comedians Bobby Lee and Jeff Hodge, as well as the touring lectures by former Vice President, Al Gore and TV Host, Katie Couric.

¹¹⁰ <http://www.lajollaplayhouse.org/>.

¹¹¹ Figures provided by UC San Diego University Events Office.

The UC San Diego Library also hosts annual birthday celebrations in honor of Dr. Seuss. In 1995 the central library was renamed the Geisel Library in honor of Audrey and Theodore Geisel (Dr. Seuss) for their generous contributions.

Opportunities for Local Artists

In addition to the performances of University and nationally famous talent, UC San Diego offers locally based artists opportunities to perform on campus. Some examples include:

- Roma Nights: Live acoustic music every Monday night at Espresso Roma in the Price Center.
- Pub After Dark: Free concerts on select Wednesday and Friday nights at the Pub After Dark.
- Poetry Slamm: A lyrical battle where students can share poetry, spoken word, rap, etc. on select nights at the Price Center.
- Open Mic Night: A chance to show off various talents, offered several times a year.¹¹²

RECREATIONAL PROGRAMS

Through collegiate sporting events, athletic facilities, and public spaces, UC San Diego provides a wide variety of sports and recreational opportunities to the local community. A sampling of these offerings is described below.

Intercollegiate Athletics

"A Proud Tradition of Academic and Athletic Excellence," is the adage declared by the UC San Diego Athletic Department. The UC San Diego Tritons have been a member of the National Collegiate Athletic Association (NCAA) Division II since the year 2000; previously they were a part of the NCAA Division III. Some of the achievements that Triton teams have won include 29 national championships in seven different sports such as women's volleyball and men's soccer. They have been national runners-up 35 times in more than ten sports, and they have finished third in the country 38 times.

UC San Diego was awarded the 1997-98 Directors' Cup, signifying the nation's top overall athletic program at the NCAA Division III level. In the eight years of the Cup's existence, UC San Diego has never finished lower than 12th and has been in the top five of its division six times. Individual national championships have been won by 117 Triton student-athletes and more than 875 have been named All-Americans in their sport.

At UC San Diego student-athletes not only excel in their sports, they excel in their academics. More than 60.0 percent of the more than 550 student-athletes have cumulative GPAs of 3.00 or above and the average GPA of that group is higher than the average of the UC San Diego student body at-large. NCAA Post-Graduate Scholarships have been offered to 23 UC San Diego alumni athletes and 130 Tritons have been recognized as Academic All-Americans.

¹¹² <http://theuniversitycenters.ucsd.edu/root/index.html>.

These student athlete achievements have been attained at one of the most rigorous academic institutions in the United States.¹¹³

Recreational Facilities and Programs¹¹⁴

The Recreation, IntraMural, Athletic Complex (RIMAC) facility is the major component of the UC San Diego sports and recreational facilities. While primarily serving as a recreation center for the University community, RIMAC is a multi-use facility capable of accommodating a wide variety of activities ranging from large spectator events including ceremonies and concerts to athletic competitions and tournaments. It also plays host to the UC San Diego Student Recreation Center. The Recreation Center offers many classes that are open to the larger community including fitness, dance, martial arts, squash, meditation, self-defense, first aid/CPR classes, and many more. The Aquatics programs provide two pools and a variety of classes in swimming, water aerobics, and scuba.

The Student Recreation Center also offers an Outback Program of trips, classes, and clinics. The Outback Program provides a variety of programs and services emphasizing safety, skill development, environmental awareness and community. The Outback Program recreational activities and trips include rock climbing, kayaking, horseback riding, surfing, backpacking, mountain biking, and day trips. A Ropes Challenge Course is another activity option through the Outback programs. They also rent out outdoor activity equipment to the community.

Other RIMAC activities and opportunities include:

- Intramural sports with 1,200 teams and over 10,000 participants annually.
- Masters sports programs include swimming, running, and triathlon and are open to anyone over age 18.
- The Mission Bay Aquatic Center (MBAC) is one of the largest instructional waterfront facilities in the country, offering instruction in sailing, windsurfing, kayaking, waterskiing, surfing, wakeboarding, rowing, and kite boarding.
- The weight rooms and personal wellness program provide nutritional counseling, personal training, and private massage.

Birch Aquarium at Scripps Institution of Oceanography

As discussed in Chapter IX, Research at UC San Diego, The Birch Aquarium at Scripps Institution of Oceanography is open to the general public to provide ocean science education. The Aquarium also aims to interpret the research from Scripps Institution of Oceanography to the visitors and promote ocean conservation. The Aquarium provides many public activities, teacher workshops, group tours, and on-site school programs in addition to a specially-equipped outreach van that transports live animals and instructors to schools, senior centers, and community fairs. The Aquarium exhibits a display of live marine organisms anchored by a two-story kelp forest tank and one of the country's largest oceanographic museums. Examples of the discovery activities offered by the Aquarium include: overnight visits offered to families that provide an education experience; snorkeling, whale watching, tide pooling, grunion runs,

¹¹³ <http://www.ucsdtritons.com/>.

¹¹⁴ <http://recreation.ucsd.edu/inf/>.

and pier walk trips; adult lectures; summer learning adventure camps; and the Green Flash summer concert series.¹¹⁵ Over 400,000 people visit Birch Aquarium each year.

¹¹⁵ UCSD and You” and http://aquarium.ucsd.edu/About_Us/.

ASSUMPTIONS AND GENERAL LIMITING CONDITIONS

CBRE Consulting has made extensive efforts to confirm the accuracy and timeliness of the information contained in this study. Such information was compiled from a variety of sources, including interviews with UC San Diego officials, review of UC San Diego documents, websites and other third parties deemed to be reliable. Although CBRE Consulting believes all information in this study is correct, it does not warrant the accuracy of such information and assumes no responsibility for inaccuracies in the information by third parties. We have no responsibility to update this report for events and circumstances occurring after the date of this report.

The accompanying analyses are based on estimates and assumptions developed in connection with the study. In turn, these assumptions, and their relation to the projections, were developed using currently available economic data and other relevant information. Economic impacts discussed in this report are estimates; CBRE Consulting does not represent these data to be actual measures of the economic impact of UC San Diego. Instead, economic impacts are estimated based on spending data provided by UC San Diego, reasonable assumptions regarding spending patterns and habits of employees, students, visitors and retirees, and the multiplier estimates of the IMPLAN input-output model. Actual UC San Diego economic impact may vary from the estimates provided herein.

APPENDIX A: ECONOMIC IMPACTS METHODOLOGY

The Mechanics of the Input-Output Model

Economic multipliers are generated through the use of input-output models. These are statistical models that quantify relationships among industries. They examine the pattern of purchases by industries and the associated distribution of jobs and wages by industry. Input-output models identify, for example, all the industries from which a construction contractor purchases its supplies and in what proportion. In turn, the model then identifies the industries that are suppliers to these suppliers, or “second generation” suppliers. This continues until all major purchases are accounted for contributing to the construction contractor’s original purchases. These original purchases are called the “direct sales.” All other associated sales from within the supply chain are considered “indirect and induced sales.” There are other indirect and induced effects associated with the contractor purchases. These include retail and other expenditures made by the construction workers paid to use the materials purchased by the construction contractor.

The size of these indirect and induced effects depends upon the definition of the region being looked at as well as the nature of the economy within the region. A large region with a closed economy, which means that most needs are being met by industries located within the region, would keep many of the sales, earnings, and jobs impacts within the region. In a region like this, the multiplier effects would be relatively large, with a large share of the effects captured within the region. In contrast, a small region with an open economy, which means an economy with a limited array of producers providing goods and services, would leak sales to other regions. Because many purchases would be made from industries outside the local economy, the multiplier impacts on the local economy would be minimized.

Indirect and Induced Impacts Defined

Input-output models measure output, or impacts, in two different ways – “indirect” impacts and “induced” impacts. “Indirect” impacts are the changes in inter-industry purchases as they respond to new demands of directly affected industries. In the case of UC San Diego, indirect impacts reflect the spending that UC San Diego’s suppliers make when purchasing goods and services from second, third and fourth generation suppliers in order to meet the demand generated by UC San Diego. Indirect impacts of UC San Diego spending also include the share of suppliers’ payroll (or employees wages) that is supported by UC San Diego spending. For example, when UC San Diego constructs a new library building, the general contractor purchases lumber, rents construction equipment, hires engineers and employs construction workers to build the library. The spending on the raw materials, equipment rentals, engineer fees and employee payroll that is generated by the UC San Diego contract reflects the indirect impacts of UC San Diego construction spending. UC San Diego construction spending also supports a certain number of jobs and generates a share of the personal income of the employees of these suppliers – and this represents the indirect employment and personal income impacts of UC San Diego construction spending.

On the other hand, “induced” impacts typically reflect changes in spending from households as income increases due to additional production. In the case of UC San Diego, induced impacts reflect the additional spending by the employees of UC San Diego suppliers. Using the UC San Diego construction example, the additional wages received by the employees of the general contractor, lumberyard, equipment rental company and engineering firm “induce” spending at the

grocery store, movie theater and clothing store. The jobs and income that result from these consumer purchases are considered induced employment and personal income impacts.

The IMPLAN Input-Output Model

There are several input-output models commonly used by economists to estimate indirect and induced economic impacts. Because of the difficulty of measuring these effects, all of the models have limitations. Still, economists generally agree that the models can provide an approximate measure of the indirect and induced spending, jobs, and personal income generated by a given amount of direct spending in a particular geographic area. To calculate the multiplier effects of UC San Diego's spending, CBRE Consulting used an input-output model developed by the U.S. Department of Agriculture known as IMPLAN (IMpact Analysis for PLANning).

The IMPLAN model organizes the economy into 505 separate industries and has comprehensive data on every area of the United States. CBRE Consulting organized all University purchasing and payroll into the IMPLAN industry classifications and used the 2006 IMPLAN tables of multipliers for the City of San Diego, San Diego County, and the State of California to calculate the total effect of UC San Diego's spending for 2006-07. The IMPLAN model is based on incorporating regional purchase coefficients, which measure trade flows, i.e., the proportion of local demand purchased from local producers.

Methodology for Estimating Direct, Indirect, and Induced Economic Impacts

In conducting this analysis of UC San Diego's total spending impacts, CBRE Consulting worked with the University to limit the estimates of direct spending to those expenditures that could be identified as having occurred in a specific location. For example, the spending associated with a catered event on the UC San Diego campus is counted as direct spending in the location of the vendor providing the catering. On the other hand, the estimates of direct University spending do not include spending that cannot be attributed to the location where the actual purchase or expenditure occurred. For example, the estimate of direct University spending for the City of San Diego does not include the University's reimbursement of a faculty member for a journal subscription, since the reimbursement itself does not reflect the actual location where the journal purchase took place. Because of this, the estimates of total spending, employment, and income impacts associated with University spending likely underestimate the total economic impact of the University on the state, regional, county, and local economies, albeit modestly.

Another important note regarding the assumptions for the geography of impacts is that jobs are counted in the location of the employer, while payroll is assumed to reflect the address of the employee. For example, for the 2006-07 fiscal year, all direct employment by UC San Diego occurs in the City of San Diego, yet direct University payroll is broken down based on whether the employees live in the City of San Diego, San Diego County, or elsewhere in California.

The impact of University payroll is analyzed differently than the impact of the University's goods and services purchasing and capital expenditures. This is because the University's payroll is a direct expenditure of the University, but is also direct income to the residents who are UC San Diego employees. The full amount of UC San Diego's payroll is counted as direct income, based on employees' places of residence. However, the indirect spending, employment and income impacts of UC San Diego's payroll are based on the spending of UC San Diego employees. Employee spending reflects an assumption, provided by the Bureau of Labor Statistics' Consumer Expenditure

Survey 2006, that employee disposable income is equal to 85.0 percent of earned income. However, this disposable income is not all spent within the location in which the employee lives. Therefore, it was necessary for CBRE Consulting to create assumptions for employee household spending patterns in the City of San Diego and the surrounding geographies. These estimated “capture rates” are based on several factors, such as the distribution of retail and entertainment venues, the expectation that employees who do not live in San Diego make expenditures there because of time spent at the University, and a baseline assumption that 30.0 percent of disposable household income is spent on housing (both rent and mortgage payments) within the employees’ home geography. These geographically-specific capture rates were then applied to total disposable income and aggregated within their respective geographies to arrive at a total of indirect impacts of University payroll expenditures. Induced spending, employment and income multipliers were then applied to the calculated indirect spending estimates in the same way that they were applied to goods and services purchasing and capital expenditures.

Expenditures Excluded from Baseline Estimates of UC San Diego Spending

In addition to reimbursements and other expenditures for which the location of purchasing could not be determined, this analysis excludes several other categories of University expenditures from the direct expenditure estimates that form the basis for measuring the indirect and induced economic impacts. These categories include accounting expense items such as the depreciation of physical property, as well as financing costs including interest payments, insurance costs, and employee benefits.

Benefits contributions are excluded because they do not contribute to economic demand the same way payroll expenditures do. Rather than contributing directly to income, retirement benefits made in the 2006-07 fiscal year contribute to wealth accumulation, since these benefit contributions will be spent sometime in future years. Instead, this study includes the impact of the spending by UC San Diego retirement beneficiaries who received and presumably spent their retirement income during FY 2006-07. The estimate of indirect and induced impacts from retiree payments reflects the same methodology as was used to calculate the impact of UC San Diego payroll.

UC San Diego expenditures for healthcare benefits are not considered in the analysis because the amount of the health benefit contribution is not necessarily equal to the value of the healthcare-related goods and services purchased by UC San Diego employees. Furthermore, the location of the actual purchase of healthcare-related goods and services is difficult to track based on the patterns of UC San Diego health benefits contributions, and therefore does not lend itself to inclusion in this type of analysis.

Despite the exclusion of employee benefits contributions from the analysis of the University’s economic impact, these sizable contributions do play an important role in supporting the personal and financial needs of UC San Diego employees and undoubtedly make important yet distinct economic contributions to the local, regional and state economies.

Finally, for the purposes of the analysis of total economic impacts, the University direct payroll number has been reduced by approximately \$56.20 million, which is the estimated share of total payroll received by student employees. CBRE Consulting measures the impact of student spending in a separate analysis; therefore, to avoid double counting, this share of the total payroll is excluded from the analysis of University payroll impacts.

APPENDIX B: STUDENT SPENDING METHODOLOGY

Student Spending Methodology

Aggregate student spending estimates were calculated using three main inputs of data. The first is the estimated average annual student budgets provided by the Office of Financial Aid. The second is student enrollment by category and location of residence provided by Student Research and Information and the Registrar. The third input includes spending capture rates that estimate the percentage of student spending that occurred in the City of San Diego, other San Diego County, and other California. These capture rates reflect several factors, such as the residential location of students, the distribution of retail and entertainment venues, and the expectation that students who do not live in San Diego make expenditures there because of time spent on or around campus. For example, for students living off campus in the City of San Diego, 85.0 percent of spending is assumed to occur within the City of San Diego, 10.0 percent within Other San Diego County, and the remaining 5.0 percent within Other California. These percentages were then applied to the estimated average annual budget multiplied by the number of enrolled students by geography. This process was repeated for every student category by location to arrive at an aggregate student spending estimate.

The reader should be aware of one limitation in interpreting the estimates of UC San Diego student spending impacts. The analysis in this report does not discount student spending impacts in San Diego or San Diego County by taking into account the share of student spending that can be attributed to commuter students, or students who live locally with family and would be spending money in the community whether or not they attended UC San Diego. There is no way to estimate how these students' spending habits may have been different if there were no UC campus in San Diego – perhaps some of them would have moved out of the community to attend another college, or some might have commuted to a different college nearby – but it is realistic to assume that some of their spending would have occurred in the San Diego area even if they had not attended UC San Diego. However, the fact that their attendance at UC San Diego anchors them in the San Diego community, and therefore encourages them to spend their money in the greater San Diego area, renders it reasonable to attribute a significant portion of the impact of their spending to the presence of UC San Diego.

International Student Spending Methodology

Informed by average student budget estimates from the Financial Aid Office, CBRE Consulting collaborated with University Extension and a local agency called San Diego Homestay to create budget estimates for international students based on housing type and geography. Specific geographic capture rates were then applied to personal spending based on University sponsored trip information provided by University Extension. Budgets for international students were assumed to be the same as undergraduate students living in similar locations on a full time equivalent (FTE) basis, with a few exceptions. First, the personal budget for international students was applied on a total student basis rather than an FTE basis to reflect the larger amount of discretionary income of most international students coming to the United States through the UC San Diego Extension program. Second, specific budget estimates for international students living with a family ("homestay" students) were developed using information provided by San Diego Homestay. The agency estimated student budget to be \$700 per month for lodging and food, and \$600 per month for all other expenses. This equates to a \$15,600 total annual budget comprised of \$8,400

for food and rent, and \$7,200 for transportation and personal expenses. CBRE Consulting then applied the budget proportions from undergraduate students living off campus, to calculate the student spending by category (food, personal, transportation, and rent).

Appendix C: UC San Diego Start-Up Companies Located in California

<u>Region</u>	<u>Company Name</u>	<u>City</u>	<u>Annual Sales</u>	<u>Total Employees</u>	<u>Year Started</u>
San Diego County					
	Chuaa Chocolatier, Inc.	Carlsbad	\$1,200,000	30	2004
	Genoptix Medical Laboratory	Carlsbad	\$4,100,000	50	1999
	Viasat, Inc.	Carlsbad	\$516,566,000	1,463	1986
	Network Digicality, Inc.	Coronado	\$85,000	1	N/A
	Biostretch Med, Inc.	La Jolla	\$100,000	1	N/A
	Celladon Corp.	La Jolla	\$1,100,000	10	2000
	Cymer, Inc.	San Diego	\$543,855,000	555	1986
	Ortiva Wireless, Inc.	La Jolla	\$3,000,000	30	2004
	Quanlight, Inc.	La Jolla	\$180,000	3	2006
	Seashell Technology, LLC	La Jolla	\$1,000,000	7	1996
	Surf Diva, Inc.	La Jolla	\$2,300,000	25	1996
	Traversa Therapeutics, Inc.	La Jolla	\$73,000	1	2007
	Zacharon Pharmaceuticals, Inc.	La Jolla	\$140,000	2	2003
	Digivision, Inc.	Poway	\$1,400,000	13	2006
	Aethlon Medical, Inc.	San Diego	\$710,000	6	1999
	American Specialty Health Networks	San Diego	\$128,297,969	500	1987
	Androclus Therapeutics, Inc.	San Diego	\$180,000	3	2002
	Awarepoint Corp.	San Diego	\$2,500,000	26	2007
	Braincells, Inc.	San Diego	\$510,000	5	2003
	Canji, Inc.	San Diego	\$5,600,000	78	1996
	Caris & Company	San Diego	\$4,300,000	57	2002
	Ceregene, Inc.	San Diego	\$2,600,000	32	2005
	Emitations.com	San Diego	\$65,000	1	2005
	Genomatica, Inc.	San Diego	\$1,500,000	18	1998
	Global Energy Network International	San Diego	\$100,000	2	1987
	Glysens, Inc.	San Diego	\$90,000	1	1997
	Higene Therapeutics, Inc.	San Diego	\$83,000	1	N/A
	Huntington Capital	San Diego	\$880,000	3	2002
	Innercool Therapies, Inc.	San Diego	\$2,700,000	39	2006
	Iq-Analog	San Diego	\$79,000	1	N/A
	Linspire, Inc.	San Diego	\$3,000,000	30	2001
	Minnow Medical, LLC	San Diego	\$1,400,000	15	2003
	Mission Playground	San Diego	\$73,000	1	2004
	Mushroom Networks, Inc.	San Diego	\$200,000	3	N/A
	Nautilus Environmental, LLC	San Diego	\$1,800,000	26	2004
	Nereus Pharmaceuticals, Inc.	San Diego	\$9,258,934	29	1998
	Netsift, Inc.	San Diego	\$240,000	3	2005
	Q 3 D M, Inc.	San Diego	\$1,600,000	17	2000
	Qualcomm	San Diego	\$8,871,000,000	12,800	1985
	Rhevision Technology, Inc.	San Diego	\$57,000	1	N/A
	Rusty Surfboards, Inc.	San Diego	\$2,100,000	24	1985
	San Pasqual Winery, LLC	San Diego	\$370,000	4	2005
	Sangart, Inc.	San Diego	\$7,300,000	35	1998
	Senomyx, Inc.	San Diego	\$12,230,000	112	1998
	Sigalert.com	San Diego	\$750,000	3	N/A
	Signal Pharmaceuticals, LLC	San Diego	\$41,800,000	134	2000
	Softmax, Inc.	San Diego	\$1,200,000	12	2007
	Swankpets.com	San Diego	\$160,000	2	2005
	Tom Shepard & Associates, Inc.	San Diego	\$620,000	7	2001
	U.S. Spine & Sport	San Diego	\$1,400,000	20	1998
	Vical, Inc.	San Diego	\$14,740,000	147	1987
	Muttropolis, LLC	Solana Beach	\$280,000	4	2002
	Subtotal, San Diego County:		\$10,196,872,903	16,393	

Appendix C: UC San Diego Start-Up Companies Located in California

<u>Region</u>	<u>Company Name</u>	<u>City</u>	<u>Annual Sales</u>	<u>Total Employees</u>	<u>Year Started</u>
San Francisco Bay Area					
	Dynavax Technologies Corp.	Berkeley	\$4,847,000	153	1996
	Getactive Software, Inc.	Berkeley	\$9,300,000	60	2001
	Urigen Pharmaceuticals, Inc.	Burlingame	\$571,000	5	1999
	Askjeeves.com	Oakland	\$1,200,000	10	1999
	Hispanic Scholarship Fund	San Francisco	\$1,700,000	45	1975
	Fastrack Design, Inc.	San Jose	\$4,900,000	24	2001
	Cell Genesys, Inc.	So. San Francisco	\$1,364,000	296	1988
	Cytokinetics, Inc.	So. San Francisco	\$3,127,000	148	1997
	Renovis, Inc.	So. San Francisco	\$10,428,000	70	2000
	Blaze Dfm, Inc.	Sunnyvale	\$2,000,000	26	2004
	Flowcardia, Inc.	Sunnyvale	\$1,800,000	16	2002
	Subtotal, San Francisco Bay Area:		\$41,237,000	853	
Los Angeles Area					
	3ddigitalphoto.com	Long Beach	\$49,000	1	N/A
	California Woman's Law Center	Los Angeles	\$560,000	11	1989
	Afrobabies Collection	Pasadena	\$40,000	2	2005
	Glyport, Inc.	Pasadena	\$100,000	1	2002
	Subtotal, Los Angeles Area:		\$749,000	15	
	Grand Total		\$10,238,858,903	17,261	

Sources: UC San Diego office of Alumni Relations, Tech TIPS; Dun & Bradstreet; company websites; and CBRE Consulting.

Notes: This table was generated based on lists of companies provided to CBRE Consulting by UC San Diego Tech TIPS and the UC San Diego office of Alumni Relations. Of the 193 companies identified, the above companies were found to be located in California. These exclude start-up companies founded by UC San Diego faculty or alumni, that were subsequently acquired by other companies. CBRE Consulting found that 28 of the 193 companies have been acquired.