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CEO EXECUTIVE SUMMARY

GREG MCKEE



Photo by: Melissa Jacobs

In 2005, CONNECT began monitoring and measuring the growth of the innovation economy in the San Diego region. Since then, we've seen consistent and continued growth of this very significant sector of our economy and 2017 again demonstrated San Diego's strength as an innovation hub, through research, funding, start-up activity, job creation and M&A transactions.

The CONNECT San Diego Innovation Report is the most comprehensive report of San Diego's robust and ever-growing innovation economy that details the enormous benefits to our region and captures the impact of startup growth on the region. From unmanned robotics companies to pharmaceuticals, life sciences, cleantech platforms, and apps that monetize our recommendations, our startups demonstrate the breadth and depth of San Diego's entrepreneurs, their rich talent and deep skill sets.

A few of my top takeaways from this year's report include:

Innovation continues to be a foundational part of San Diego's economy.

Again in 2017, the innovation economy accounted for 25 percent (\$55 billion) of San Diego's GDP.

Software remains San Diego's leading innovation industry.

The software industry created 271 new companies and 887 new jobs.

Capital funding and M&A increased significantly in 2017

Up 173 percent from 2016, capital funding in San Diego was \$18.3 billion. Mergers and acquisitions also increased 161 percent from 2016, with \$27.7 billion across 166 deals.

San Diego is a leader in research and intellectual property.

Grant funding was \$1.7 billion in 2017, an increase from 2016. San Diego was the top ranked county in Southern California for patents granted and patent applications published, and the fourth ranked county in California overall.

Innovation is a job creator.

462 new innovation startups were created in San Diego county in 2017, and a total of 1,705 new jobs were created by those same companies. Combined with the 2.7x job multiplier effect on overall employment in the San Diego region, tech and life sciences are creating opportunities for thousands of San Diegans.

CONNECT is dedicated to the success of the tech and life sciences companies for the growth and benefit of the San Diego economy and innovation ecosystem. Through our flagship offering – the Springboard Accelerator Program – we provide innovators with mentorship, and work to match companies with capital and talent to scale.

In 2018, in partnership with the Jacobs Center for Neighborhood Innovation with funding from a Community Development Block Grant from the City of San Diego and support from the Mayor Kevin Faulconer, we will open the CONNECT ALL @ the Jacobs Center, the region's first diversity-focused accelerator program. CONNECT ALL @ the Jacobs Center will feature an accelerator focused on helping startups with diverse founders scale and grow, with the goal of creating jobs in San Diego. This initiative is an important step in expanding San Diego's pool of entrepreneurs and innovators and will continue to bolster our reputation as a leading innovation economy.

We're committed to helping San Diego entrepreneurs create highly successful innovation companies in our region. The CONNECT Innovation Report provides detailed information that the work we do with our entrepreneurs, research institutes, mentors, investors, and partners has tangible outcomes that grow the San Diego economy. We're proud to take a leading role in impacting San Diego's future.

Greg McKee
Chief Executive Officer, CONNECT

REPORT HIGHLIGHTS

ECONOMIC IMPACT - \$55 BILLION, 404,660 JOBS

The innovation economy accounted for more than **\$55 billion**, or 25 percent, of San Diego's economic activity (Gross Domestic Product).

San Diego's research institutions have a **\$4.6 billion** economic impact and are at the center of the region's **\$14.4 billion** scientific R&D cluster.

 ${\bf 2.7x}$ job multiplier effect impact of innovation economy employment on overall San Diego region employment.

San Diego's
innovation economy
impacts more than
404,660 jobs in the region

- More than 30 percent of private sector jobs
- More than 40 percent of the region's total labor income

GROWTH - STARTUPS

GROWTH - INNOVATION COMPANIES. JOBS AND WAGES

462

NEW INNOVATION STARTUPS CREATED IN 2017

271

NEW SOFTWARE COMPANIES CREATED

93

NEW LIFE SCIENCES COMPANIES CREATED

59

NEW COMMUNICATIONS, COMPUTER & ELECTRONICS COMPANIES CREATED

21

NEW AEROSPACE, NAVIGATION & MARITIME TECH COMPANIES CREATED

11

NEW RECREATIONAL
GOODS MANUFACTURING
COMPANIES CREATED

7

NEW ENVIRONMENTAL TECHNOLOGY COMPANIES CREATED

1,705 NEW STARTUP JOBS CREATED BY SAN DIEGO INNOVATION STARTUPS IN 2017

Top Sectors

887
NEW SOFTWARE
JOBS CREATED

348

NEW LIFE SCIENCES
JOBS CREATED

380

NEW COMMUNICATIONS, COMPUTER & ELECTRONICS JOBS CREATED

60

NEW AEROSPACE, NAVIGATION & MARITIME TECH
JOBS CREATED

REPORT

INNOVATION COMPANIES, JOBS, AND WAGES

The average innovation sector job paid **2.2X** the average job in San Diego in 2017

- Innovation Economy avg. annual salary \$114,800
- Rest of Economy avg. annual salary **\$52,200**

6.820 COMPANIES

7 percent of total number of companies in San Diego County

152.230 EMPLOYEES

11 percent of total employment in San Diego County

\$16 BILLION PAYROLL

27 percent of total payroll in San Diego County

CAPITAL FUNDING - \$18.3 BILLION AND M&A - \$27.7 BILLION

Venture Capital Funding

\$1.2 BILLION in venture capital was invested in 126 deals in San Diego in 2017. Investment in early stage San Diego companies fell off significantly in 2017 from the high of more than \$700 million in 2016 to \$242 million in 2017. Expansion and later stage VC deals were up 10 percent in 2017 over 2016 amounts.

Equity Capital Markets (IPOs and FPOs)

\$310 MILLION was raised by three San Diego companies in initial public equity offerings (IPOs) in 2017. This was twice the amount raised by the three companies that went public in 2016.

\$16.7 BILLION was raised by
40 San Diego companies in
60 follow-on public equity
offerings (FPOs) in 2017. This
was more than a three-fold
increase from the amount
raised in secondary offerings
in 2016. The increase was
driven by \$11 billion in senior
unsecured note offerings by
Qualcomm in May 2017.

Angel & Other Non-VC Capital Funding

\$63 MILLION in angel and other non-VC backed funding was invested in **63 deals** in San Diego in 2017.

Tech & Life Sciences Mergers and Acquisitions (M&A)

\$27.7 BILLION in 166 M&A deals in technology and life sciences sectors were closed in 2017 where the merger or acquisition target, buyer, or seller was a San Diego company. This was up significantly from the \$11 billion in total M&A transaction value in 154 deals in 2016.

GRANTS - \$1.7 BILLION TOTAL IN 2017 - UP FROM \$1.5 BILLION IN 2016

\$851 MILLION in NIH grants funding to San Diego companies and institutions in 2017

\$418 MILLION in Department of Defense grants funding to San Diego companies and institutions in 2017

\$244 MILLION in NSF grants funding to San Diego companies and institutions in 2017

\$112 MILLION in Department of Energy grants funding to San Diego companies and institutions in 2017 **\$101 MILLION** in SBIR-STTR grants funding to San Diego companies and institutions in 2017

\$46 MILLION in NASA and NOAA grant funding to San Diego companies and institutions in 2017

INTELLECTUAL PROPERTY - SAN DIEGO ACCOUNTED FOR 10 PERCENT OF PATENTS ISSUED IN CALIFORNIA IN 2017

#1 ranked county in Southern California for patents granted and patent applications published. Southern California accounted for more than 25 percent of both patents issued and published in 2017.

#4 ranked county in California in patents issued in 2017, after Santa Clara, San Mateo and Alameda counties.

#4 ranked county in California in patent applications published in 2017, after Santa Clara, San Mateo, and Alameda counties.

The Innovation economy accounts for more than \$55 billion, or 25 percent of San Diego's total economic activity

SAN DIEGO INNOVATION ECONOMY - ECONOMIC IMPACT

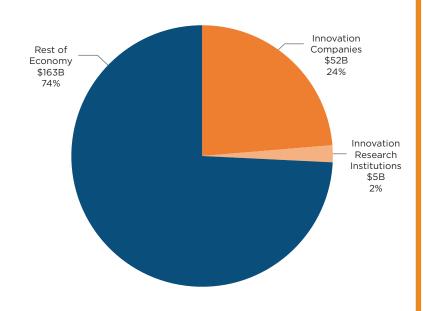
San Diego's innovation economy companies directly generate more than \$55 billion in sales, employ more than 152,000 workers, and provide \$16 billion in payrolls.

The direct economic contribution to San Diego's economy is more than \$28 billion, accounting for more than 13 percent of the regional economy or gross domestic product (GDP), estimated to be \$220 billion. Including indirect and induced impacts results in a \$57 billion impact, or 26 percent of San Diego's estimated GDP.

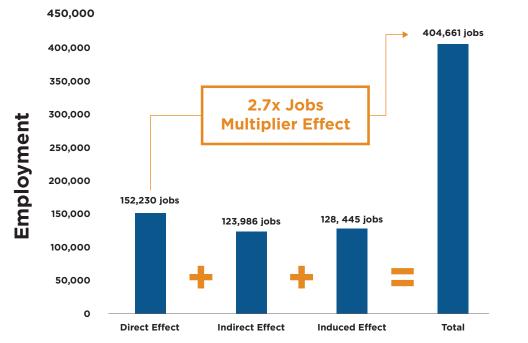
Including indirect and induced jobs, the multiplier effect on jobs is 2.7 - this means for every technology job, another 2.7 jobs are dependent or created.

EMPLOYMENT GENERATED FROM TECHNOLOGY INNOVATION BUSINESS IS EQUIVALENT TO MORE THAN 404,600 JOBS, OR 30% OF ALL CIVILIAN JOBS AND MORE THAN 40% OF THE REGION'S TOTAL LABOR INCOME.

San Diego Gross Domestic Product (GDP) By Sector \$220 Billion



Economic Impact of Innovation Economy - 404,660 Jobs



Source: National University System Institute for Policy Research, based on IMPLAN econometric model for San Diego County; SANDAG; San Diego Tourism Authority Annual Report; San Diego Military Advisory Council (SDMAC); CONNECT



STARTUP SPOTLIGHT

FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES







Dr. Eugene Izhikevich Co-Founder & CEO

Brain Corporation

Braincorp.com Robotics and Unmanned Vehicles

Brain Corp is a San Diegobased technology company specializing in the development of intelligent, autonomous navigation systems for everyday machines. In 2017, Brain Corp's BrainOs was recognized as a Most Innovative New Product by CONNECT in the Robotics and Unmanned Vehicles category. The company was co-founded in 2009 by world-renowned computational neuroscientist, Dr. Eugene Izhikevich, and serial tech entrepreneur, Dr. Allen Gruber; Brain Corp then participated in and graduated from CONNECT'S accelerator program, Springboard, in 2016. Brain Corp's initial work involved advanced R&D for Qualcomm Inc. and DARPA. The company is now focused on developing advanced machine learning and computer vision systems for the next generation of self-driving robots. Brain Corp is funded by the Softbank Vision Fund and Qualcomm Ventures, the investment arm of mobile technology leader, Qualcomm Inc.

Brandon Maseda Co-Founder & CEO

Accel Robotics

Accelrobotics.com Robotics and Unmanned Vehicles

Accel Robotics automates and improves service experiences. Their team of Ph.Ds in neuroscience and computer vision is building a breakthrough 360 Perception Engine that enables machines to see and understand the real world. Accel helps companies deliver smarter services by enabling grab and go commerce experiences and powering robotic shopping assistants. In 2017, San Diego Venture Group named Accel Robotics a Cool Company.

Jennifer Worrall Co-Founder & CEO

Iteros

Iteros.com Cleantech

Iteros' intelligent automation platform enables the optimized operation of resources and their entire ecosystems. For energy and power ecosystems, Iteros' platform services both utilityside and customer-side assets, reducing costs and complexity, as well as increasing energy security and resiliency for end-users. Iteros is a 2017 graduate of CONNECT's Springboard accelerator program and was named a 2018 Cool Company by San Diego Venture Group. The Iteros energy cloud orchestration platform is designed to help provide a balanced energy profile for power producers and large power consumers.

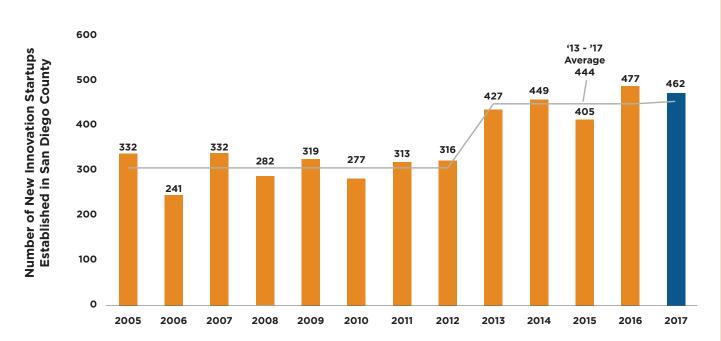
SAN DIEGO TECHNOLOGY & LIFE SCIENCES STARTUPS



Startup creation remained strong in 2017. 462 new innovation startup companies were created in 2017 in San Diego – continuing a five-year trend of more than 400 new innovation companies created each year in the San Diego region.

The average number of innovation startups established between 2005 and 2012 was slightly more than 300 per year. The average number of innovation startups jumped to 444 per year for the period 2013 through 2017, continuing to be driven by an increase in new software companies.

New Innovation Companies Established in San Diego County Since 2005

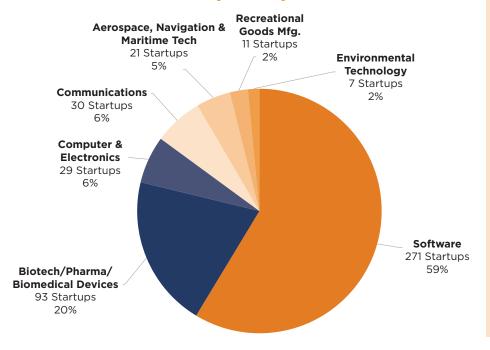


More than 4,600 new tech and life sciences companies have been created in San Diego during the period 2005 - 2017.

SAN DIEGO INNOVATION ECONOMY - NEW STARTUP CREATION IN 2017

Software startups made up almost 60 percent of San Diego County's new innovation startup companies established in 2017. More than 270 new software companies were created, ranking San Diego County fifth among California counties for software startups. Life sciences startups established in 2017 totaled 93 companies – just below the historical high of 95 for San Diego County in 2016. San Diego County continued to rank first in California in the number of life sciences startups established in the past three years.

San Diego Innovation Startups Established in 2017 by Industry Sector



SAN DIEGO COUNTY
RANKED

IN CA FOR
LIFE SCIENCES STARTUPS
IN 2017

1,705
NEW INNOVATION
ECONOMY JOBS
CREATED IN 2017

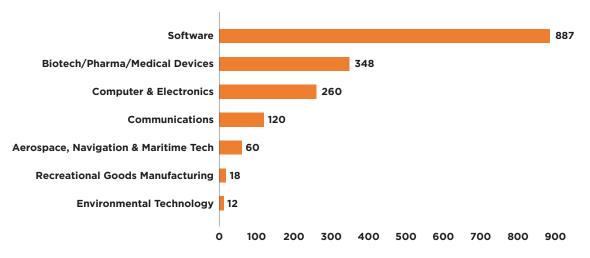
462

NEW SAN DIEGO
INNOVATION STARTUPS
ESTABLISHED IN 2017

SOFTWARE STARTUPS
CREATED MORE THAN

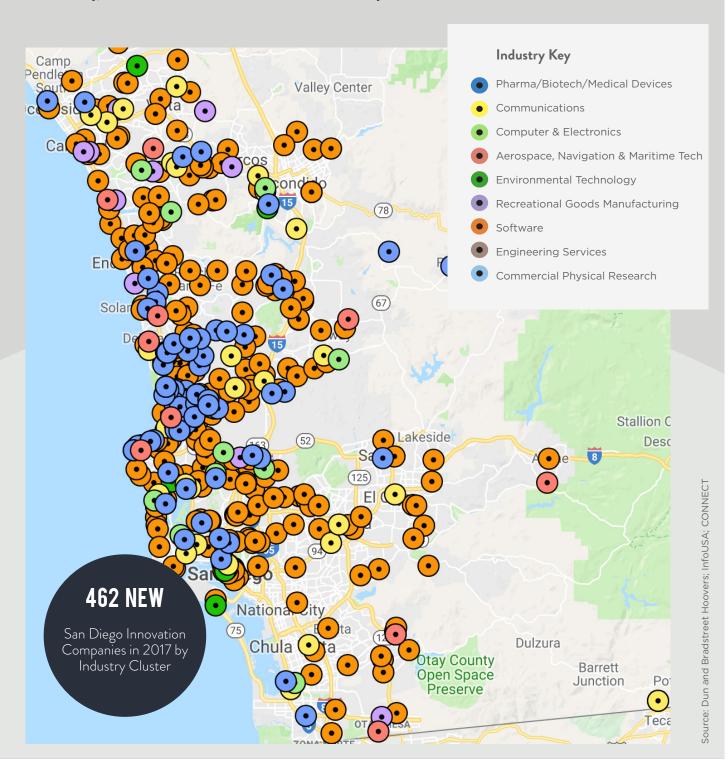
880
NEW JOBS

San Diego Innovation Startup Jobs Created by Industry Sector in 2017



GEOGRAPHY: WHERE SAN DIEGO INNOVATION STARTUPS ARE LOCATED

Software startups (in orange) were widely spread throughout San Diego County in 2017. The next largest industry cluster, life sciences startups (in blue), were concentrated in La Jolla and Sorrento Valley, but also show wide distribution across the county.



Source: Dun and Bradstreet Hoovers; InfoUSA; CONNECT

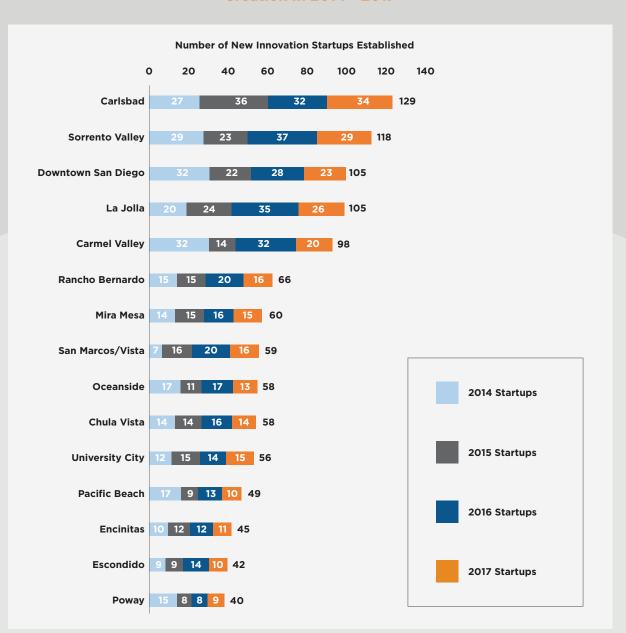
GROWTH

GEOGRAPHY: WHERE SAN DIEGO INNOVATION STARTUPS ARE LOCATED

Carlsbad, Sorrento Valley, Downtown, La Jolla, and Carmel Valley were the hotspots for new innovation company startup creation over the past four years.

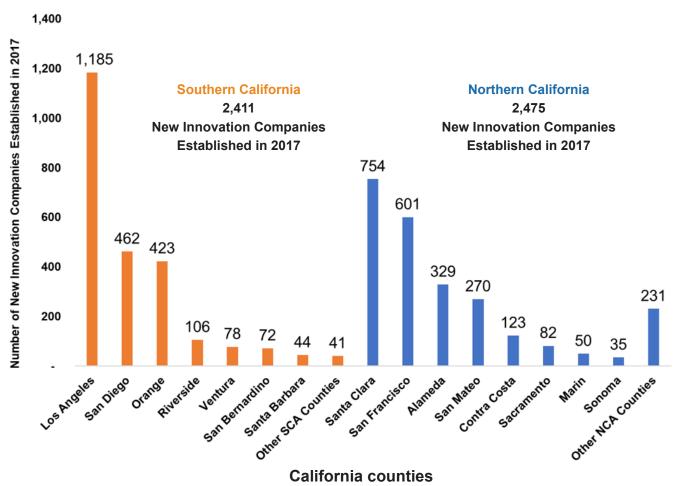
Carlsbad took the top spot in 2017 with 34 new startups, followed closely by Sorrento Valley with 29 startups. La Jolla had 26 new innovation startups in 2017, and Downtown San Diego area saw 23 new innovation startups established. Carmel Valley had 20 startups in 2017.

Top 15 Hotspots in San Diego for Innovation Startup Creation in 2014 - 2017



CALIFORNIA TECHNOLOGY & LIFE SCIENCES STARTUPS

New Innovation Startups in 2017 by County in Northern and Southern California



Innovation Startup Creation - Southern and Northern California Regions
Were Equally Matched in 2017 - 4,900 New Innovation Companies

CALIFORNIA TECHNOLOGY & LIFE SCIENCES STARTUPS - SOUTHERN CALIFORNIA

Southern California created slightly less than half (49 percent) of all tech and life sciences startups established statewide in 2017.

Southern California software startups accounted for 46 percent of all software startups established statewide in 2017. Life sciences (52 percent), computer & electronics (53 percent) and communications tech startups (57 percent) in Southern California accounted for more than half the total number of startups for those sectors statewide in 2017. Southern California accounted for almost 80 percent of aerospace, navigation, and maritime tech startups in 2017 and more than 65 percent of recreational goods manufacturing startups.

2017 Southern California Innovation Startups by Industry



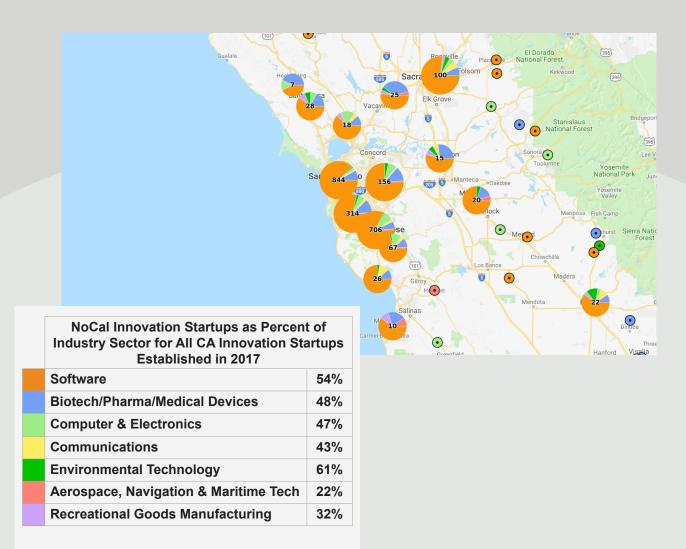
CALIFORNIA TECHNOLOGY & LIFE SCIENCES STARTUPS - NORTHERN CALIFORNIA

Northern California had approximately half of all innovation startups established statewide in 2017.

Northern California software startups established in 2017 accounted for 54 percent of all newly established software startups statewide. Life sciences (48 percent), computer & electronics (47 percent) and communications tech startups (43 percent) in Northern California accounted for slightly less than half the total number of startups for those sectors statewide in 2017.

Northern California environmental tech startups represented more than 60 percent of all new startups in that sector statewide in 2017.

2017 Northern California Innovation Startups by Industry



SAN DIEGO INNOVATION ECONOMY – SECTOR BREAKDOWN

In 2017, San Diego's innovation economy included approximately 6,820 companies and provided 152,230 jobs. San Diego's innovation economy is comprised of knowledge-based sectors* on the leading-edge of research, innovation, and development of technologies. These sectors are defined by businesses** involved in the development and production of technical equipment, communications, and/or advanced technology services. The specific technology sectors encompass:

- Research and development in physical, engineering, and life sciences
- Biomedical products (medical devices)
- Biotechnology and pharmaceuticals
- Communications (telecommunications)
- Computers and electronics
- Aerospace, navigation & maritime tech
- · Environmental technology
- · Recreational goods manufacturing
- Software

2017 San Diego's Innovation Economy Represented

6,820 COMPANIES

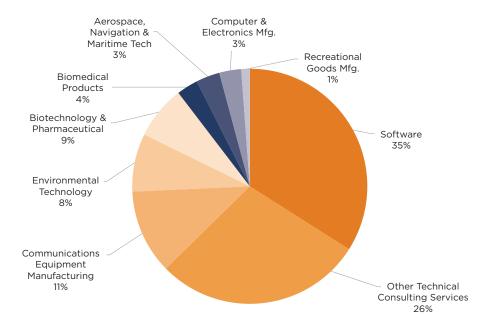
7 percent of total number of companies in San Diego County

152,230 EMPLOYEES

11 percent of total employment in San Diego County

\$16 BILLION PAYROLL

25 percent of total payroll in San Diego County



*Innovation sectors were defined by the San Diego Association of Governments (SANDAG) "cluster" definitions in conjunction with CONNECT, and further refined in collaboration with the National University System Institute for Policy Research.

Source: CONNECT, based upon California Employment Development Department, Quarterly Census of Employment and Wages (QCEW); UC Regents; San Diego Regional EDC; *San Diego Business Journal Book of Lists 2016; CONNECT

^{**}Public and private academic and research institutions are not included in the figures.



STARTUP SPOTLIGHT

FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES



Jordan Glazier CEO

Wildfire Systems

Wildlink.me Software and Information Technology

Wildlink is an affiliate marketing app from Wildfire Systems that aims to help consumers earn a fair share of the sales they drive when their recommendations result in purchases. Wildlink also helps merchants turn customers into advocates by motivating and rewarding people for recommending their favorite products. Wildfire Systems has received \$2 million in seed money, led by Mucker Capital in 2017, and was named a Cool Company by San Diego Venture Group in 2018.



Andy Kieatiwong Founder & CEO

Additive Rocket Corporation

arc-engines.com Defense, Aerospace, and Transportation

Addictive Rocket Corporation (ARC) 3D prints metal rocket engines for the space industry. ARC's mission is to democratize space by providing reliable and affordable propulsion systems so that scientists, engineers, and pioneers can create a brighter future on Earth and beyond. ARC capitalizes on the limitless potential of metal 3D printing technologies to deliver products with a high standard of safety and reliability in order to promote innovation of propulsion technology. ARC is a 2018 San Diego Venture Group Cool Company.

StemoniX

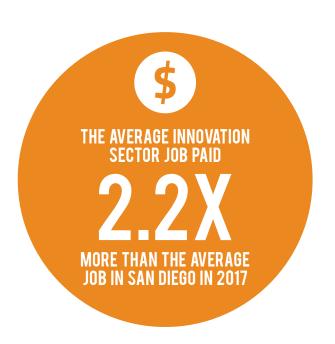
Ping Yeh Founder & CEO

StemoniX

stemonix.com Life Science Diagnostics

StemoniX is accelerating the discovery of new drugs by creating ready-to-use preclinical plates of biologically relevant human micro-organs. They currently are launching their microHeart and microBrain products and services to help find cures for cardiac and nervous system diseases as well as pandemics. Founded by Ping Yeh after his battle with Hodgkins Lymphoma, StemoniX's microHeart was named a Most Innovative New Product by CONNECT in 2017. StemoniX has also participated as a resident of Johnson & Johnson's JLABS.

SAN DIEGO INNOVATION ECONOMY - SECTOR BREAKDOWN



AVERAGE ANNUAL SALARY



INNOVATION ECONOMY JOB

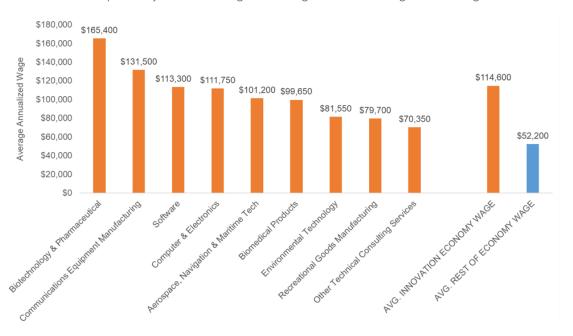
\$114,800

REST OF ECONOMY JOB

\$52,200

San Diego Innovation Economy Annualized Wages - 2017

Biotech and pharma jobs had the highest average annualized wage in San Diego in 2017



Source: CONNECT, based upon California Employment Development Department, Quarterly Census of Employment and Wages (QCEW). Technology sectors based upon NAICS codes defined, in part, by SANDAG Cluster Analysis and CONNECT innovation sector definitions adjusted by National University System Institute for Policy Research and CONNECT.

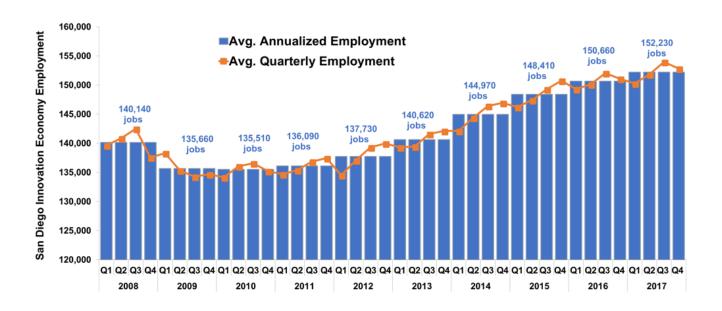
SAN DIEGO INNOVATION ECONOMY - EMPLOYMENT BREAKDOWN

San Diego Innovation Economy Grows to Historic High in 2017

San Diego's innovation economy provided nearly 152,230 high-paying jobs in 2017 - a historical high. San Diego's innovation economy continued to show steady growth in 2016 adding more than 12,000 jobs on average since 2008.

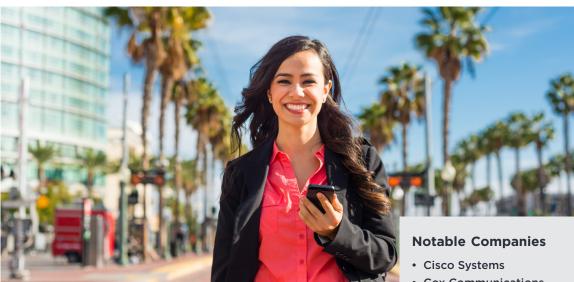
The number of innovation economy jobs grew slightly in 2017 as compared to 2016.

San Diego Innovation Economy Employment: 2017 - 152,230 jobs



Source: CONNECT, based upon California Employment Development Department, Quarterly Census of Employment and Wages (QCEW). Technology sectors based upon NAICS codes defined, in part, by SANDAG Cluster Analysis and CONNECT innovation sector definitions adjusted by National University System Institute for Policy Research and CONNECT.

SAN DIEGO INNOVATION ECONOMY -PRIMARY INDUSTRY SECTOR HIGHLIGHTS



San Diego's largest sector in the innovation economy is the ICT sector, which is made up of software, telecommunications, computer & electronics manufacturing, cybersecurity and informatics. These sectors touch nearly all aspects of the region's

In 2017, the ICT sectors accounted for:

- 60 percent of San Diego's innovation economy companies
- 48 percent of San Diego's innovation economy employees
- 38 percent of San Diego's innovation economy total wages

72,000 High-Paying Jobs

The cluster accounted for about 3,450 companies and 72,000 employees in 2017.

- Cox Communications
- Cymer
- ESET North America
- Intuit
- Kyocera
- Mitchell International
- · Mitek Systems Inc.
- Qualcomm
- ScaleMatrix
- ServiceNOW
- SONY
- Teradata
- Underground Elephant
- ViaSat

The average annual wage of the communications equipment manufacturing sector was \$131,500, followed by the software sector at \$113,300 and the computer & electronics sector at \$111,750. The software development sector is a significant contributor to the overall economic impact of San Diego's economy - more than 100,000 jobs in the San Diego region depend on the area's software industry. A recent study produced by the San Diego Regional Economic Development Corporation estimates the software development sector contributes \$12.2 billion in economic impact.

In the San Diego Regional EDC study, San Diego ranked 7th among U.S. metros based on concentration of software developers, employee retention, computer science degrees per capita, computer/math degree attainment among the 25+ population, job/wage growth, average adjusted wages and venture capital dollars invested per capita. San Diego ranks ahead of Austin, New York City, and Portland, Oregon, among others, according to the report. San Jose was ranked 1st, followed by Seattle, San Francisco, Boston, and Raleigh.

Sources: CONNECT Innovation Report; San Diego Regional EDC: Software Development: Driving San Diego's Tech Ecosystem (3/2016)

SAN DIEGO INNOVATION ECONOMY - PRIMARY INDUSTRY SECTOR HIGHLIGHTS



In 2017, the biotechnology, pharmaceuticals, and biomedical devices sectors accounted for:

- 26% of San Diego's innovation economy companies
- 16% of San Diego's innovation economy employees
- 20% of San Diego's innovation economy total wages

50,000 High-Paying Jobs

When related industries such as bio-renewables (e.g., biofuels), research and development/education labs (e.g., research institutes) and support jobs are included, the life science sector represents more than 50,000 high-paying jobs.

The average annual wage of the biotech/pharma sector was the highest in the region at \$165,400. Average annual wage of biomedical devices was \$99,650.

San Diego's life sciences sector generates \$33.6 billion in economic output and adds \$19.4 billion to the local gross product.

With 1,200 unique life science establishments, San Diego County's life science industry provides nearly 50,000 jobs and supports 133,000 jobs in the county, for a total countywide impact of more than 183,000 jobs.

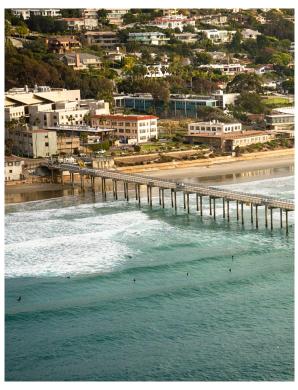
Life science establishments brought over \$851 million in NIH grants to San Diego during the 2016 fiscal year*.

San Diego's life sciences sector enjoys a strong competitive advantage compared to other regions of the country. One way of assessing regional competitive advantage is by "location quotient". Location quotients, determined by the Bureau of Labor Statistics, compare regional industry employment levels to the U.S. overall. A figure greater than 1.2 indicates a competitive advantage. San Diego's level well exceeds that with a location quotient of 1.98 and has increased from 1.81 in 2011.

San Diego has one of the largest and most diverse contract research organization sectors in the world with more than **85 CROs**. Contract research organizations provide support to the pharmaceutical, biotechnology, and medical device industries in the form of research services outsourced on a contract basis to speed discovery and clinical development.

Sources: CONNECT Innovation Report; San Diego Regional EDC; *Biocom 2017 Economic Impact Report;

GENOMICS RESEARCH AND DEVELOPMENT



San Diego is widely considered to be a global leader in the genomics field with more than 115 genomics companies. Genomics experts work to determine complete DNA sequences and perform genetic mapping to help understand disease. Technologies in the industry include DNA sequencing, informatics, and genome analysis.

- A recent study by the San Diego Regional EDC found that venture capital firms invested more than \$290 million in San Diego genomics companies in 2016. This was more than 20 percent of the \$1.3 billion invested nationwide in 2016 in genomics deals.
- Gene sequencing leader Illumina effectively reduced the cost of individual gene sequencing from \$100 million to \$1,000 over the course of a single decade. During the 2017 J.P. Morgan annual healthcare conference, the company projected a cost of as little as \$100.
- San Diego's genomics industry directly supports more than 10,000 jobs found across more than 115 firms. In 2016, the industry's gross regional product totaled \$5.6 billion (source: San Diego Regional EDC).

• #1 in patent intensity: From 2014-2016, San Diego was at the forefront of innovation, generating 371 genomics-related patents. Collectively, 28 firms in the region generated 120 genomics-related patents in 2016 (source: San Diego Regional EDC).

Notable Companies

- · Agena Bioscience
- Ajinomoto Althea Inc.
- CareFusion, a BD Company
- Edico Genome (acquired by Illumina in 2018)
- Eli Lilly
- Genentech
- Halozyme Therapeutics

- Hologic
- Human Longevity Inc.
- Ionis Pharmaceuticals
- Illumina
- Johnson & Johnson
- Nuvasive Inc.
- Pathway Genomics
- Pfizer

- Philips Healthcare
- · Quidel Corp.
- Regulus Therapeutics
- ResMed
- Sequenom
- Thermo Fisher Scientific







Sources: CONNECT Innovation Report; San Diego Regional EDC's report, Cracking the Code: The Economic Impact of San Diego's Genomics Industry; *Biocom 2017 Economic Impact Report; Xconomy

SAN DIEGO INNOVATION ECONOMY - PRIMARY INDUSTRY SECTOR HIGHLIGHTS



28,000 High-Paying Jobs

The aerospace, navigation, and maritime technologies cluster employs more than 28,000 people in the San Diego region and more than 220 firms. The average annual wage in 2017 was \$101,200 making it one of San Diego's highest paying sectors. The cluster attracts more than \$8 billion in procurement contracts from the Department of Defense.

The aerospace cluster is an integral part of San Diego's defense and innovation economies, and several large aerospace, aircraft and R&D companies make the region an aerospace hub. San Diego's naval and marine bases rely on technologies developed by companies in the cluster.

San Diego's defense cluster continues to play a critical role in the region's innovation and military economy and the United States' national security priorities. San Diego is home to the largest concentration of military assets in the world and the largest federal military workforce in the country.

When considering the overall ripple effects of the defense cluster in San Diego, about 20 percent of San Diego's gross regional product (GRP) is the result of defense-related spending. Jobs supported because of defense spending include uniformed military, federal government employees and defense contractors, as well as employees in healthcare, engineering, construction, hospitality, and tourism. As the region's defense cluster catalyzes and inspires local entrepreneurs, emerging industries like unmanned systems and cybersecurity are burgeoning in San Diego and expanding into international markets. Local expertise in these fields provides strategic advantages for product development, job growth and the commercialization of defense technology.

- In fiscal year 2017, **\$9.2 billion** in procurement contracts was projected to flow into San Diego
- In fiscal year 2017, direct spending by the Department of Defense in compensation for the more than **140,000** active duty and civilians, support for veteran services, and defense contracts was an estimated **\$25.2 billion**
- San Diego County receives more defense spending than any other county in the U.S. except for Fairfax County, Virginia
- San Diego is home port to the Pacific Fleet and is the primary training ground for much of U.S. Marine Corps

Notable Companies

- BAE Systems
- Booz Allen Hamilton
- Cubic Corporation
- General Atomics
- General Dynamics NASSCO
- Kratos Defense & Security Solutions
- Leidos
- Lockheed Martin
- Northrop Grumman
- Ocean Aero
- Orca Marine
- · Orbital ATK Systems
- Poseidon Resources

- SNC Space Systems
- Space Micro
- Teledyne SeaBotix
- UTC Aerospace Systems
- ViaSat

Sources: CONNECT Innovation Report; San Diego Regional EDC: "Mapping San Diego's Defense Ecosystem", San Diego Military Advisory Council, "San Diego Military Economic Impact Study", 2017; U.S. Department of Defense

SAN DIEGO INNOVATION ECONOMY - PRIMARY INDUSTRY SECTOR HIGHLIGHTS



25,000 High-Paying Jobs

San Diego is the most concentrated major metropolitan area in the U.S. for cleantech employment with 25,000 cleantech jobs. San Diego has some of the most innovative cleantech research and development companies in the world and is home to more than 800 cleantech companies.

In 2017, the region ranked #4 in the nation for cleantech leadership. Continued growth in markets such as solar, wind, energy efficiency, storage, and electric vehicles has elevated San Diego as a leader in the climate action and smart cities movements.

- San Diego employs 1.9X as many people in cleantech as the national average.
- San Diego ranks #2 in the nation in solar installations, with more than 93,000 rooftop systems in the region, and with more than 303 megawatts of installed solar capacity enough to power the equivalent of nearly 76,000 homes.
- Smart Cities Summit named San Diego's Smart City Solutions one of the world's top 10 smart city projects.
- San Diego ranks #8 in the nation for clean power production, with more than 51 million kilowatt-hours annually.
- The San Diego Regional Energy Innovation Network program is the result of a five-year, \$5 million grant from the California Energy Commission awarded in 2016 to advance the San Diego region's energy innovation industry. SDREIN is a free program for startups that are developing solutions to help California meet its energy goals. The program provides access to the resources and facilities of several regional partner organizations and connections with industry in order to accelerate the commercialization of emerging energy technologies in areas such as: Energy Efficiency, Renewable Energy, Energy Storage, Smart Metering/Smart Grid, Transportation, and Energy Services.

In addition, the cleantech cluster is supported by world-class research institutions such as UC San Diego, San Diego State University, and University of San Diego that help seed and support innovation in sustainability technologies. In addition to solar power, San Diego's cleantech industry includes wind and water energy, bio-renewables, clean transportation, and energy storage technologies.

Source: San Diego Regional EDC; Cleantech San Diego; SDREIN; CONNECT

New State-Funded Regional Energy Innovation Network Established in 2016



In 2016, The San Diego Regional Energy Innovation Network (SDREIN) was established. The SDREIN is a program for entrepreneurs who are developing solutions to help address the region's energy priorities.

The program is funded by a five-year, \$5 million grant from the California Energy Commission and extends its offerings to the energy innovation industry in San Diego, Imperial, Riverside, and San Bernardino counties.

The SDREIN provides entrepreneurs with access to the facilities and services of several regional partner organizations and connection with industry to help accelerate the commercialization of their energy technologies:

- Energy Efficiency (envelope, lighting, HVAC, plugload, pumps)
- Renewable Energy (hydro, wind, solar, geothermal, wave)
- Energy Storage (mechanical, electrochemical, electrical, thermal)
- Smart Metering/Smart Grid (hardware, software, data analytics, microgrids)
- Transportation (electric vehicles, hybrids, infrastructure, software platforms)
- Energy Services (energy planning, analysis, management)

PARTNER ORGANIZATIONS

Cleantech San Diego Center for Sustainable Energy CONNECT

Imperial Valley EDC Inland Empire Economic Partnership San Diego State University

San Diego Venture Group UC San Diego University of San Diego

SUPPORTING ORGANIZATIONS

Flow Rocket Fund Cybertech Tech Coast Angels EvoNexus

RELATED FUNDING PROGRAMS

CalSEED California Clean Energy Fund (CalCEF) California Energy Commission

Source: SDREIN



STARTUP SPOTLIGHT

FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES







Nathan Resnick Co-Founder & CEO

Sourcify

Trysourcify.com Software and Digital Media

Sourcify is an automated sourcing platform providing a straightforward way to source products from overseas factories. Pre-vetted factories, real-time messaging with suppliers, product specification tools, and a team of dedicated sourcing experts makes running your production needs through Sourcify simple, reliable, and safe. Sourcify has participated in both Y Combinator and EvoNexus, was awarded a Most Innovative New Product Award from CONNECT in 2017 and named a Cool Company by the San Diego Venture Group in 2018.

Paul Laikind, Ph.D. President & CEO

ViaCyte

viacyte.com Pharmaceutical Drugs and Therapeutics

ViaCyte's innovative products focus on the emerging field of regenerative medicine and are based on the differentiation of stem cells into pancreatic beta cell precursors (PEC-01™), with subcutaneous implantation in a retrievable medical device (Encaptra® cell delivery system). ViaCyte's goal is a product that can free patients with type 1 and type 2 diabetes from long-term insulin dependence. If successful, ViaCyte's products will relieve patients of both the acute challenges and risks, as well as the long-term complications associated with diabetes. ViaCyte has received substantial financial, scientific, advocacy, and technical support from both the California Institute for Regenerative Medicine (CIRM) and JDRF. Its PEC-Direct was named a Most Innovative New Product by CONNECT in 2017.

Stephanie Venn-Watson, DVM, MPH, Co-Founder & CEO

EpiTracker

epitracker.com Pharmaceutical Drugs and Therapeutics

Epitracker is a life sciences company that discovers and optimizes small molecules to treat some of the world's most devastating diseases. Named a San Diego Venture Group Cool Company in 2018, Epitracker has analyzed over one million metabolomic, genomic, and clinical data points from archived serum samples collected over 50 years. Through this process, Epitracker has discovered novel small molecules that target cardiometabolic diseases. neurodegenerative diseases, skin repair, and aging.

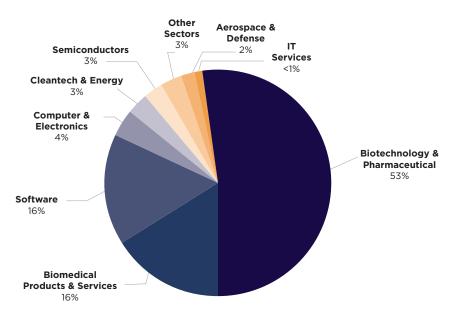
VENTURE CAPITAL FUNDING IN SAN DIEGO - \$1.2 BILLION IN 2017

Venture capital funding to companies in San Diego County totaled more than \$1.2 billion invested in 126 deals in 2017 according to deal data sourced from PitchBook and PwC Moneytree and analyzed by CONNECT.

Life sciences companies received nearly 70 percent of the total VC funding in San Diego in 2017. Biotechnology companies accounted for the largest share of venture investment in San Diego in 2017 with more than 50 percent of the VC funding totaling more than \$630 million. The medical devices sector accounted for an additional 16 percent with \$190 million. Both sectors were lower than amounts invested in 2016.

The software sector saw a slight increase in VC investment in 2017 with \$191 million invested – up from 2016 when \$180 million was invested. The computer and electronics sector was the next largest in terms of VC investment in 2017 totaling \$46 million, also down from 2016 when \$65 million was invested in the sector.

San Diego VC Investment by Industry 2017 - \$1.2 Billion



Top 10 San Diego Companies Receiving Venture Capital Funding in 2017

COMPANY	DEAL SIZE	INDUSTRY
Human Longevity	\$200M	Pharmaceuticals and Biotechnology
Progenity	\$125M	Healthcare Diagnostics
Brain Corp	\$114M	Robotics Software
Amplyx	\$67M	Pharmaceuticals and Biotechnology
Vividion Therapeutics	\$50M	Pharmaceuticals and Biotechnology
OcuNexus Therapeutics	\$46M	Pharmaceuticals and Biotechnology
TP Therapeutics	\$45M	Pharmaceuticals and Biotechnology
SmartDrive (Driver Safety Software)	\$40M	Software
eFFECTOR Therapeutics	\$39M	Pharmaceuticals and Biotechnology
Sotera Wireless	\$32M	Communications Technology

Note: investment value rounded to nearest \$million

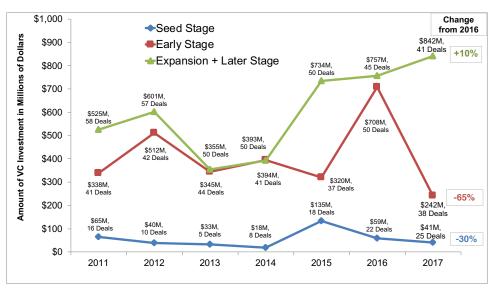
Source: Pitchbook; CONNECT

VENTURE CAPITAL FUNDING IN SAN DIEGO BY STAGE OF DEVELOPMENT – CONTINUED GROWTH IN EXPANSION + LATER STAGE INVESTMENT IN 2017

San Diego saw a marked fall-off in VC funding to early stage companies in 2017 compared to the previous year, which was a historic high-water mark. Early stage companies received \$242 million in 2017 compared to \$708 million in 2016, down more than 190 percent.

Seed stage deal activity was down 30 percent from 2016 as well in terms of the amount invested though the number of deals was up slightly - 25 deals in 2017 compared to 22 deals in 2016.

San Diego VC Investment by Stage of Company Development



Expansion and later stage deal activity in San Diego was down slightly in 2017 - 41 deals in 2017 compared to 45 deals in 2016. Total VC investment for expansion and later companies was up 10 percent - \$842 million in 2017 compared to \$757 million in 2016.

The stage of development classifications are as follows:



SEED STAGE

The initial stage. The company has a concept or product under development but is probably not fully operational. Usually in existence less than 18 months.



EARLY STAGE

The company has a product or service in testing or pilot production. In some cases, the product may be commercially available. May or may not be generating revenues. Usually in business less than three years.



EXPANSION STAGE + LATER STAGE

Product or service is in production and commercially available. The company demonstrates significant revenue growth but may or may not be showing a profit. Usually in business more than three years. May include spin-offs of operating divisions of existing private companies and established private companies.

Source: PwC Moneytree; CONNECT

VENTURE CAPITAL INVESTMENT





Raised \$4.54 Million Seed Funding

Molecular Assemblies

Michael Kamdar, Chief Executive Officer, President & Board Member

Molecular Assemblies, Inc. is a San Diego-based company developing a revolutionary, enzymatic DNA synthesis technology capable of powering new products in industrial synthetic biology, personalized therapeutics, precision diagnostics, and eventually information storage, nanotechnology and more. Inspired by nature, the company's proprietary DNA synthesis method is designed to produce long, high quality, sequence-specific DNA reliably, affordably and sustainably. Molecular Assemblies has attracted investments from Agilent Technologies, Cavendish Impact Capital Fund, Data Collective Venture Capital, Eleven Two Capital, Genomics Investment Syndicate, Keshif Ventures, Newport Holdings, LP, and Alexandria Venture





Raised \$200 Million Series B2 Funding

Human Longevity

David S. Karrow, Interim CEO

An early stage provider of genomics and cell therapy-based diagnostic and therapeutic technology designed to give everyone access to the power of data-driven health intelligence. The company's cell therapy-based diagnostic and therapeutic technology address age-related decline in endogenous stem cell function and concentrates on cancer, diabetes and obesity, heart and liver diseases and dementia by combining DNA sequencing and expert analysis with machine learning, to help change medicine to a more data-driven science, enabling people to shape their own health and shift the practice of medicine from reactive to proactive, personalized and preventative technologies.





Raised \$114 Million Series C Funding

Brain Corp

Eugene Izhikevich, Co-Founder, CEO & Chairman

A later stage developer of a next generation AI based self-driving technology designed to automate commercial equipment. The company's self-driving technology is a BrainOS platform that creates autonomous commercial robots using off-the-shelf hardware and sensors, enabling robots to perceive their environment, learn to control their motion, and navigate using visual cues and landmarks while avoiding people and obstacles.

Source: PitchBook; CONNECT

VENTURE CAPITAL INVESTMENT - TOP COMPANIES BY VALUATION

Human Longevity - San Diego's Venture-Backed Unicorn in 2017

Human Longevity, Inc., a provider of genomics and cell therapy-based diagnostic and therapeutic technology designed to give everyone access to the power of data-driven health intelligence, was founded in 2013 and is valued at \$1.9 billion and has raised more than \$500 million to date.

Top Ten San Diego Venture-Backed Companies - Ranked by Valuation in 2017

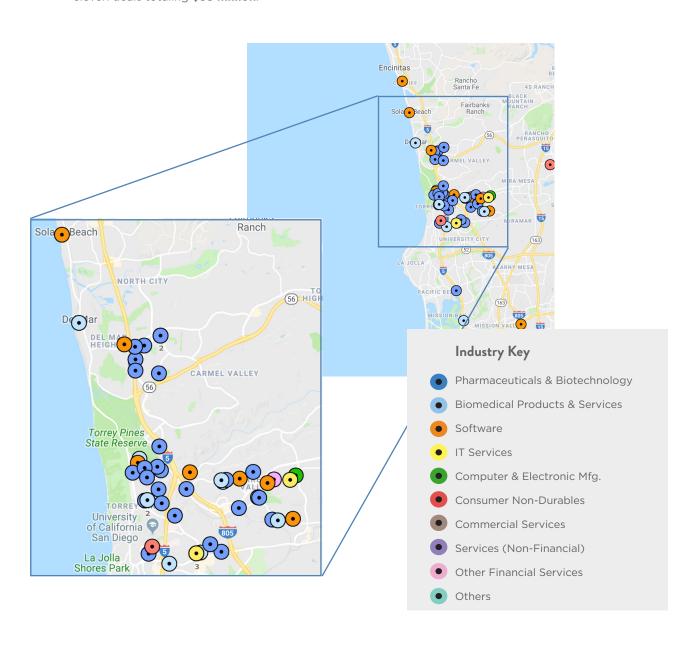
Company	Pre-Money Valuation (as of 2017)	Post- Money Valuation (as of 2017)	Total Raised to Date (as of 2017)	Year Founded	Industry	Employees
Human Longevity	\$1.7B	\$1.9B	\$500M	2013	Genomics	146
SmartDrive	\$250M	\$290M	\$230M	2004	Software	725
eFFECTOR Therapeutics	\$154M	\$193M	\$150M	2013	Drug Discovery	40
Aspyrian Therapeutics	\$153M	\$168M	\$83M	2011	Drug Discovery	6
Amplyx	\$100M	\$167M	\$118M	2006	Pharmaceuticals	24
OcuNexus Therapeutics	\$80M	\$125M	\$67M	2005	Drug Discovery	11
Poseida Therapuetics	\$100M	\$111M	\$41M	2014	Drug Discovery	5
Achates Power	\$80M	\$110M	\$130M	2004	Automotive Machinery	100
Metacrine	\$60M	\$82M	\$60M	2014	Biotechnology	26
TP Therapeutics	\$71M	\$80M	\$50M	2013	Biotechnology	13

Source: PitchBook; CONNECT

VENTURE CAPITAL INVESTMENT SAN DIEGO VC DEAL HOTSPOTS IN 2017

Sorrento Valley/UTC again was the concentrated hotspot of VC activity for life sciences companies in San Diego in 2017 with **32 deals** totaling **\$835 million** - 70 percent of total San Diego VC investment in 2017.

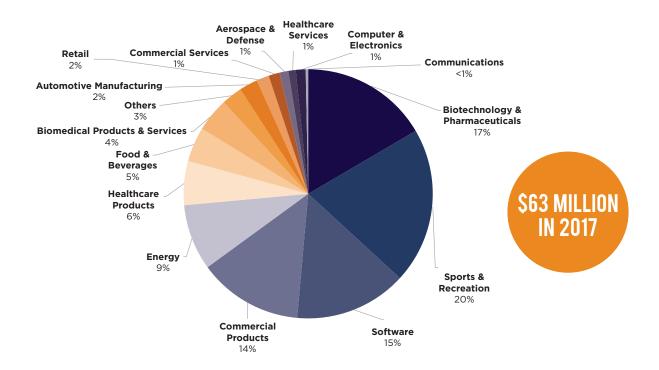
Del Mar/Carmel Valley companies raised more than **\$185 million** in ten deals in 2017. **La Jolla/Torrey Mesa** companies raised more than **\$40 million** in eleven deals. **Downtown San Diego** saw eleven deals totaling **\$38 million**.



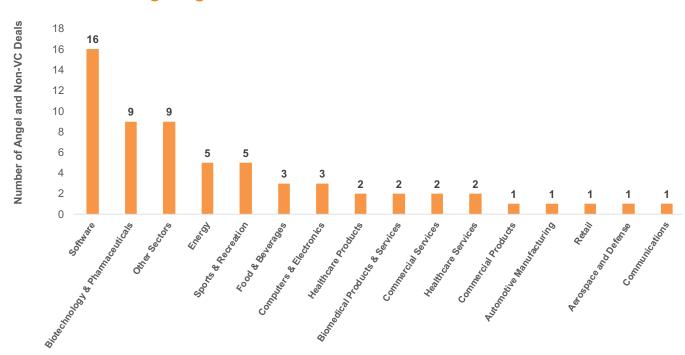
Source: PitchBook; CONNECT

SAN DIEGO ANGEL AND OTHER NON-VENTURE CAPITAL INVESTMENT

San Diego companies raised more than \$63 million in 63 deals in 2017 where the investors were not institutional venture capital firms. Most of the deals had a single, angel investor.



San Diego Angel & Other Non-VC Investment - 63 Deals in 2017

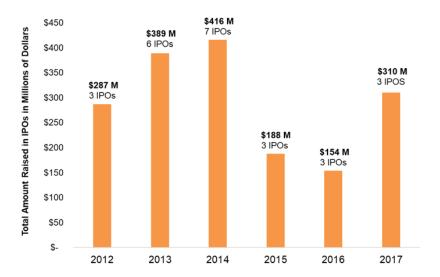


PitchBook; CONNECT

Source:

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)

The San Diego IPO market activity in 2017 was on par with the previous year with three companies going public. The three companies raised \$310 million through their IPOs. This value was more than twice that of 2016 when three companies raised \$154 million. In 2014, seven San Diego biotech companies went public initially raising \$416 million, which followed on \$389 million raised in six deals in 2013.





Tocagen Inc. (NasdaqGS:TOCA)

Founded 2007

\$85 Million IPO

Went public 4/12/2017

Tocagen is a developer of cancer-selective gene therapies designed to activate a patient's immune system against their own cancer from within. The company's gene therapy technology delivers therapeutic genes into the DNA of cancer cells and activates a patient's immune system to fight against their cancer from within, enabling cancer patients to safely and effectively control the disease.

The company raised \$85 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol of TOCA on April 12, 2017.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre- Valuation	Post- Valuation	Stage
12	IPO	2017	\$85M	\$209.2M	\$100M	\$185M	Clinical Trials Phase 3
11	Later Stage VC	2017	\$10.9M (Debt)	\$124.2M	\$356M	\$274.06M	Product Development
10	Later Stage VC (Series H)	2015	\$46.2M	\$113.3M	\$309.8M	\$356	Product Development
9	Later Stage VC (Series G)	2012	\$9.06M	\$67.1M	\$265M	\$274.06	Startup
8	Grant	2012	Undisclosed				Startup
7	Later Stage VC (Series F)	2011	\$15.31M	\$58M	\$205M	\$220.3M	Startup
6	Later Stage VC (Series E)	2010	\$5.3M	\$42.7M	\$190.1M	\$195.3M	Startup
5	Later Stage VC (Series D)	2010	\$7.8M	\$37.4M	\$88M	\$95M	Startup
4	Later Stage VC (Series C1)	2010	\$3M	\$29.7M			Startup
3	Later Stage VC (Series C)	2009	\$9.1M	\$26.66M	\$54.4M	\$63.5M	Startup
2	Early Stage VC (Series B)	2009	\$10.9M	\$17.6M	\$31.3M	\$42.1M	Startup
1	Early Stage VC (Series A)	2008	\$6.7M	\$6.7M	\$15M	\$21.7M	Startup

Source: Pitchbook: S&P Capital IQ: Roth Capital Partners: CONNECT

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)



Significant Company Co

Founded 2013

Went public 12/7/2017

Odonate Therapeutics is a developer of oral chemotherapy drug intended to improve and extend the lives of cancer patients. The company's cancer therapeutics platform focuses on the development of tesetaxel, a novel, orally administered taxane.

The company raised \$150 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol of ODT on December 7, 2017. A total of 63,00,000 shares were sold at \$24 per share. The company intends to use the proceeds of the offering for development and regulatory activities relating to tesetaxel and for working capital and general corporate purposes.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre- Valuation	Post- Valuation	Stage
2	IPO	2017	\$150M	\$150M	\$495.37M	\$645.37M	Clinical Trials Phase 3
1	Early Stage VC	Undisclosed	Undisclosed				Product Development



Source: Pitchbook; S&P Capital IQ; Roth Capital Partners; CrunchBase Inc.; CONNECT

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)



AnaptysBio, Inc. (Nasdaq:ANAB)

Founded 2005

\$75 Million IPO Went public 1/25/2017

AnaptysBio is a developer of therapeutic antibodies for inflammation and immuno-oncology designed to provide first-inclass antibody product candidates. The company's therapeutic antibodies generate somatic hyper-mutation for antibody discovery and protein optimization which replicates, in vitro, the natural process of antibody generation, enabling medical experts to focus on unmet medical needs in inflammation.

The company raised \$75 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol of ANAB on January 25, 2017. The company intends to use net proceeds for product discovery and development and general corporate purposes.

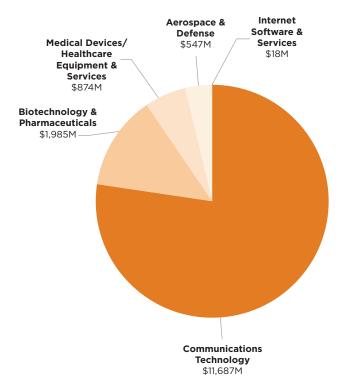
Funding Round	Deal Type	Date	Amount	Raised to Date	Pre- Valuation	Post- Valuation	Stage
10	IPO	2017	\$75M	\$178.2M	\$212.4M	\$287.4M	Pre-Clinical Trials
9	Later Stage VC (Series D)	2015	\$40.8M	\$103.2M	\$83.9M	\$124.6M	Generating Revenue
8	Debt - General	2014	\$15M	\$62.4M			Generating Revenue
7	Later Stage VC (Series C1)	2013	\$2M	\$47.4M	\$44.5M	\$46.6M	Generating Revenue
6	Later Stage VC (Series C)	2011	\$8M	\$45.4M	\$35.8M	\$43.8M	Generating Revenue
5	Later Stage VC	2011	\$0.01M	\$37.4M			Generating Revenue
4	Later Stage VC	2010	\$0.01M	\$37.4M			Generating Revenue
3	Early Stage VC (Series B)	2008	\$0.5M	\$37.4M			Startup
2	Early Stage VC (Series B)	2007	\$33.8M	\$36.9M	\$33.6M	\$67.4M	Startup
1	Early Stage VC (Series A)	2006	\$3.1M	\$3.1M	\$3.95M	\$7M	Startup

Source: Pitchbook; S&P Capital IQ; Roth Capital Partners; CrunchBase Inc.; CONNECT

FOLLOW-ON PUBLIC EQUITY OFFERINGS - \$16.7 BILLION IN ADDITIONAL FUNDING FOR SAN DIEGO TECH & LIFE SCIENCES COMPANIES

Company (Issuer)	Total Public Offering Amount (\$M)	Number of Public Offerings	
QUALCOMM Incorporated	\$10,987.1	9	
Sempra Energy	\$1,597.7	2	
Viasat, Inc.	\$700.0	1	
Kratos Defense & Security Solutions, Inc	\$546.5	3	
Neurocrine Biosciences, Inc.	\$450.0	1	
DexCom, Inc.	\$350.0	1	
Evolent Health, Inc.	\$319.0	2	
Heron Therapeutics, Inc.	\$292.8	2	
Arena Pharmaceuticals, Inc.	\$219.0	2	
AnaptysBio, Inc.	\$205.5	1	
Ignyta, Inc.	\$160.0	1	
Halozyme Therapeutics, Inc.	\$125.0	1	
La Jolla Pharmaceutical Company	\$125.0	1	
Mirati Therapeutics, Inc.	\$104.4	2	
GenMark Diagnostics, Inc.	\$75.0	1	
Kura Oncology, Inc.	\$50.1	1	
Sorrento Therapeutics, Inc.	\$47.3	1	
Regulus Therapeutics Inc.	\$40.0	1	
Fate Therapeutics, Inc.	\$40.0	1	
Maxwell Technologies, Inc.	\$40.0	1	
Tandem Diabetes Care, Inc.	\$38.7	2	
Vital Therapies, Inc.	\$35.0	1	
Conatus Pharmaceuticals Inc.	\$28.6	1	
Vical Incorporated	\$24.9	1	
AmpliPhi Biosciences Corporation	\$20.8	1	
Cytori Therapeutics, Inc.	\$19.5	2	
Adamis Pharmaceuticals Corporation	\$15.0	1	
Biocept, Inc.	\$15.0	1	
Viking Therapeutics, Inc.	\$12.8	1	
ImageWare Systems, Inc.	\$11.O	1	
OncoSec Medical Incorporated	\$8.2	2	
Apricus Biosciences, Inc.	\$7.0	1	
Evoke Pharma, Inc.	\$7.0	1	
MabVax Therapeutics Holdings, Inc.	\$6.7	3	
Aethlon Medical, Inc.	\$6.0	1	
Mitek Systems, Inc.	\$5.7	1	
TrovaGene, Inc.	\$4.5	1	
Imprimis Pharmaceuticals, Inc.	\$3.1	1	
TearLab Corporation	\$3.0	1	
InfoSonics Corporation	\$1.0	1	
TOTAL FOLLOW-ON PUBLIC EQUITY OFFERINGS IN 2017	\$16,747.9	60	

This was more than three times the amount raised in 2016 when 33 companies raised \$4.9 billion. The huge increase was driven by Qualcomm's public offering of senior unsecured notes in a combined aggregate principal amount of \$11 billion. A follow-on public equity offer (FPO) is an issuing of supplementary shares to investors by a public company that is already listed on an exchange and has gone through the IPO process. FPOs are popular methods for companies to raise additional equity capital in the capital markets through a stock issue.



Communications technology was the largest industry sector due to the nearly \$11 billion raised by Qualcomm. ViaSat raised the remainder of the sector amount. Sempra Energy raised nearly \$1.6 billion in follow-on equity offerings.

The biotechnology and pharmaceuticals sector had the most deals totaling \$1.985 million, led by Neurocrine Biosciences \$450 million FPO.

Source: S&P Capital IQ; Roth Capital Partners; CrunchBase; CONNECT



STARTUP SPOTLIGHT

FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES



Liane Thompson Founder, CEO

Simeon Pieterkosky Founder, CVO

Aquaai Technologies

aquaai.com Bluetech

Aquaai is a B2B model offering monitoring services performed by biomimetic fishlike drones. When addressing monitoring, Aquaai considers environmental, scientific, and business concerns, providing alternative methodology while preserving marine environments. A 2014 CONNECT Springboard graduate, Aquaai designs with the environment in mind; camera and sensor equipped flexible platforms are unobtrusive to natural habitat. Users are able to swim close for superior data acquisition with fin propulsion for maneuverability and powerefficiency.



Arthur T. Suckow, Ph.D.

DTx Pharma

dtxpharma.com
Pharmaceutical Drugs
and Therapeutics

DTx Pharma is developing technology that will unleash RNA-based therapeutics as the modality of choice for personalized treatment across most therapeutic areas. A 2018 CONNECT Springboard graduate, DTx has developed proprietary technology based on lipidation, the direct conjugation of long chain fatty acids to siRNA, that enables delivery of siRNA therapeutics across multiple cell types. This technology enables oligonucleotide therapeutics to compete with small molecules and other biologics across most indications and additionally, enables access to drug targets and indications that small molecules and biologics could never be able to modulate. San Diego Venture Group named DTx Pharma a 2018 Cool Company.



Sumner Lee President

Fuse Integration

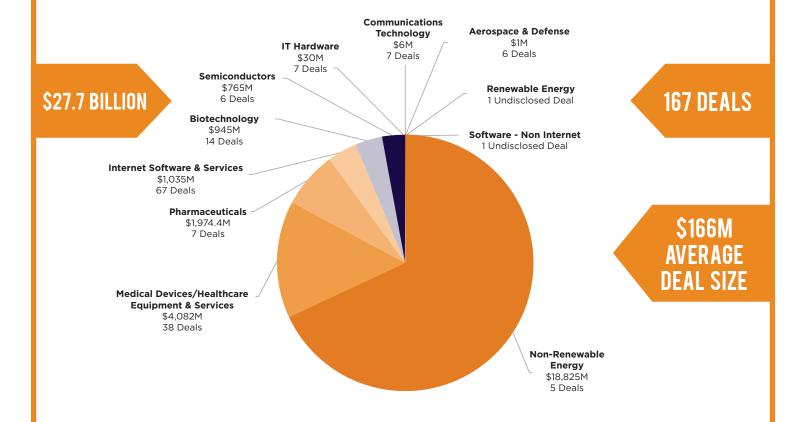
fuseintegration.com Defense, Aerospace, and Transportation

Fuse was founded with the intent of bringing the benefits of commercial human-centered design processes to first responder and military systems engineering. Founded by military veterans, Fuse identified that far too much engineering for DoD systems did not connect with the real needs of the users at the tactical edge. Those users, warfighters who are deployed around the world today, face some of the most challenging and life-threatening situations anywhere on Earth and Fuse aims to equip them with systems that meet their needs, improve their quality of life, and help them accomplish their mission safely and efficiently. Fuse is a 2017 graduate of the CONNECT Springboard accelerator program, and in 2017 Fuse's CORE product was given a Most Innovative New Product Award.

MERGERS & ACQUISITIONS

TECHNOLOGY & LIFE SCIENCES MERGERS & ACQUISITIONS (M&A)

\$27.7 billion in technology and life sciences M&A deals were closed in 2017 where the target, buyer, or seller was a San Diego company – up considerably from 2016, when M&A value totaled \$11 billion and 157 deals. San Diego's innovation sector accounted for a third of the total San Diego M&A deal value and more than 75 percent of the total number of M&A deals closed in 2017.



One large deal in the non-renewable energy sector accounted for \$18.8 billion – the acquisition of Energy Future Holding Corp. by Sempra Energy.

Life sciences related sectors continue to represent a significant amount of M&A activity among San Diego's innovation economy sectors.

- The medical devices sector accounted for more than 20 percent of the total number of M&A deals with 38 deals totaling \$4.1 billion.
- The pharmaceutical and biotechnology sectors together accounted for more than 10 percent of the overall M&A value with 21 deals totaling \$2.9 billion.

Amongst the other technology industries:

- · The internet software and services sector accounted for 67 deals totaling more than \$1 billion.
- There were six semiconductor sector deals totaling \$765 million and seven IT hardware deals totaling almost \$30 million.

Source: S&P Capital IQ; Roth Capital Partners; CrunchBase; CONNECT

TOP 10 SAN DIEGO TECHNOLOGY & LIFE SCIENCES M&A DEALS IN 2017

Company Acquired	Deal Amount (in \$M)	Buyers	Sellers	San Diego Connection	Industry
Energy Future Holdings Corp.	\$18,800	Sempra Energy	KKR & Co. L.P.; Texas Energy Future Holdings Limited Partnership	Sempra Energy (Buyer)	Non-Renewable Energy
The Spectranetics Corporation	\$2,117	Philips Holding USA Inc.	Franklin Advisers, Inc.; BAMCO, Inc.; FMR Co., Inc.; ArrowMark Colorado Holdings, LLC; Tamarack Advisers, LP	Tamarack Advisers, LP (Seller)	Medical Devices/ Healthcare Equipment & Services
Ignyta, Inc.	\$1,969	Roche Holdings, Inc.	Eli Lilly and Company; Tang Capital Management, LLC; Millennium Management LLC; Great Point Partners, LLC; RA Capital Management, LLC; Oxford Finance LLC; SVB Silicon Valley Bank, Investment Arm; City Hill Ventures, LLC; Cormorant Asset Management, LLC; Reneo Capital Management LP	City Hill Ventures, LLC (Seller)	Pharmaceuticals
True North Therapeutics, Inc.	\$825	Bioverativ Inc.	Kleiner Perkins Caufield & Byers; MPM Capital; S.R. One, Limited; OrbiMed Advisors, LLC.; Franklin Templeton Investments Corp.; HBM Healthcare Investments AG; Perceptive Advisors LLC; HBM Partners Ltd.; New Leaf Venture Partners, LLC.; Biogen New Ventures Inc.; Redmile Group, LLC; Baxet Ventures; Cowen Structured Credit Group LLC; Baxalta Ventures	Biogen New Ventures Inc. (Seller)	Biotechnology
Entellus Medical, Inc.	\$715	Stryker Corporation	EW Healthcare Partners; Western Technology Investment; SV Health Investors, LLC; Aisling Capital LLC; Aperture Venture Partners, LLC; Split Rock Partners, LLC; G C & H Investments; Correlation Ventures; PD Properties LLC; International Life Sciences Fund III L.P.; International Life Sciences Fund III Co-investment, L.P.; Covidien Group S.a.r.l.; D3D Cinema LLC; HealthQuest Capital; Sand Grove Capital Management LLP		Medical Devices/ Healthcare Equipment & Services
Exar Corporation	\$683	MaxLinear, Inc.	BlackRock, Inc.; American Century Investment Management Inc.; Renaissance Technologies Corp.; Alonim Investments, Inc.; Simcoe Management Company, LLC; Simcoe Capital Management, LLC	MaxLinear, Inc. (Buyer)	Semiconductors
Alere Inc., Triage MeterPro Assets and B-type Naturietic Peptide Assay Business	\$680	Quidel Cardiovascular Inc.	Alere Inc.	Quidel (Buyer)	Internet Software & Services
Syneron Medical Ltd.	\$397	Apax Partners (Israel) Ltd	Senvest Management, LLC; Brandes Investment Partners, L.P.; Sand Grove Capital Management LLP	Brandes Investment Partners, L.P. (Seller)	Medical Devices/ Healthcare Equipment & Services
Accriva Diagnostics Holdings, Inc.	\$379	Instrumentation Laboratory Company	Warburg Pincus LLC	Accriva Diagnostics Holdings, Inc. (Company)	Medical Devices/ Healthcare Equipment & Services
ImThera Medical, Inc.	\$225	LivaNova PLC	Spencer Trask & Company	Imthera Medical, Inc. (Company)	Medical Devices/ Healthcare Equipment & Services

Source: S&P Capital IQ; Roth Capital Partners; CONNECT

IMPACT OF RESEARCH INSTITUTIONS ON SAN DIEGO'S ECONOMY: \$4.6 BILLION



San Diego's research institutions have a \$4.6 billion economic impact and are at the center of the region's \$14.4 billion scientific R&D cluster.

San Diego is one of the most concentrated scientific R&D markets in the United States and a global leader in innovation. In total, scientific R&D impacts more than 100,000 local jobs and generates over \$14 billion in economic impact—a third of which stems from research institutions.

- Research institutions impact roughly 37,000 jobs and have a combined \$4.6 billion total impact on the region's GDP every year.
- All scientific R&D, including for-profit enterprises, generates \$14.4 billion annually in economic impact—roughly equal to San Diego's visitor industry.
- \$1.8 billion in federal and philanthropic research funding flows to the region's research institutions every year.
- Independent research institutions in San Diego receive more NIH research funding and generate more patents than counterparts in any metro area of the United States.
- An estimated 111 National Academy of Science members and more than 2,600 postdocs call San Diego's research institutions home.
- San Diego has more than 41.8 million square feet of lab and R&D space—more than 3 times the total shopping mall space in the region.

THE \$4.6 BILLION ECONOMIC IMPACT OF SAN DIEGO'S RESEARCH INSTITUTIONS EQUATES TO THAT OF:

4

SAN DIEGO CONVENTION CENTERS

34

SAN DIEGO COMIC-CONS 6

AIRCRAFT CARRIERS 33

U.S. OPEN GOLF CHAMPIONSHIPS

Source: San Diego Regional Economic Development Corporation, "The Economic Impact of San Diego's Research Institutions -Driving San Diego's Innovation Economy"

FEDERAL GRANTS - HIGHLIGHTS

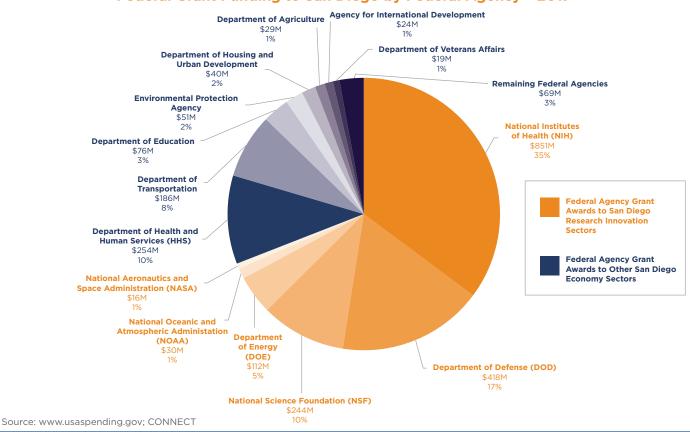
Federal agencies continued to pump a substantial amount of research grant money – \$2.4 billion – into the San Diego region in 2017, on par with 2016. A substantial portion of this funding, more than \$1.67 billion (69 percent of total federal agency grant funding to San Diego), goes to scientific research that provides a foundation for San Diego's innovation economy. The major agencies that provide grant funding support to San Diego's innovation economy are shown by the corresponding chart.

Three agencies, the Department of Health and Human Services (DHHS) – largely through the National Institutes of Health (NIH) – the Department of Defense (DOD) and the National Science Foundation (NSF), account for 63 percent of the federal grant funding to San Diego. Federal grant funding awarded to San Diego institutions and companies by the NIH and the NSF totaled more than \$1.1 billion in 2017, on par with the \$1.15 billion awarded in 2016. NIH grant awards in 2017 totaled \$851 million. NSF grant awards totaled \$244 million.

Other bureaus of DHHS, not including the NIH, awarded \$254 million in grant funding to promote the economic and social well-being of families, children, individuals, and communities. These funds support research to improve the quality, effectiveness, accessibility, and cost effectiveness of health care; disease control and prevention; and developing new or enhancing existing programs intended to aid in safeguarding products intended for human or animal use.

San Diego companies and institutions received an additional \$112 million from the Department of Energy (DOE), \$30 million from the National Oceanic and Atmospheric Administration (NOAA), and \$16 million from NASA in 2017.

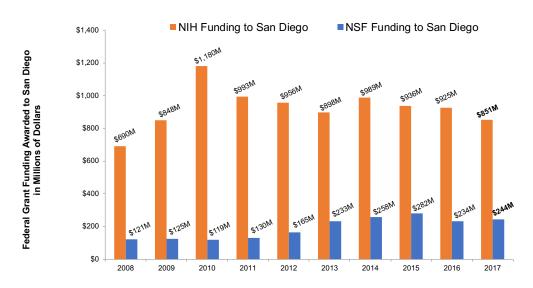
Federal Grant Funding to San Diego by Federal Agency - 2017



FEDERAL GRANTS - HIGHLIGHTS

MORE THAN \$1.1 BILLION IN NIH, NSF AND \$101 MILLION IN SBIR-STTR GRANT FUNDING AWARDED TO SAN DIEGO RESEARCH INSTITUTIONS AND COMPANIES IN 2017

NIH and NSF Grant Funding to San Diego Institutions and Companies: \$1.1B in 2017



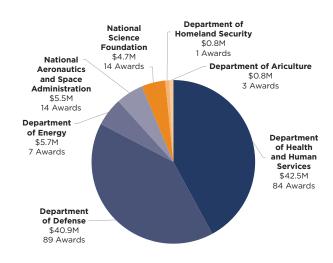
\$101 million in Small Business Innovation Research-Small Business Technology Transfer (SBIR-STIR) Grant Funding was awarded to San Diego companies and institutions in 2017. That is twice the amount awarded by the government agency in 2016.

The Department of Health & Human Services, primarily through the NIH, awarded more than 40 percent of total of SBIR-STTR grants with 84 awards totaling almost \$42.5 million in 2017. This was up from \$35 million through 69 awards in 2016. SBIR-STTR grants awarded by the Department of Defense totaled almost \$40.9 million, up significantly from the \$7 million awarded in 2016.

The SBIR program encourages small businesses to engage in Federal Research/Research and Development (R/R&D) that has the potential for commercialization.

The STTR program encourages joint venture opportunities for small businesses and nonprofit research institutions.

2017 SBIR-STTR Grant Awards -San Diego County



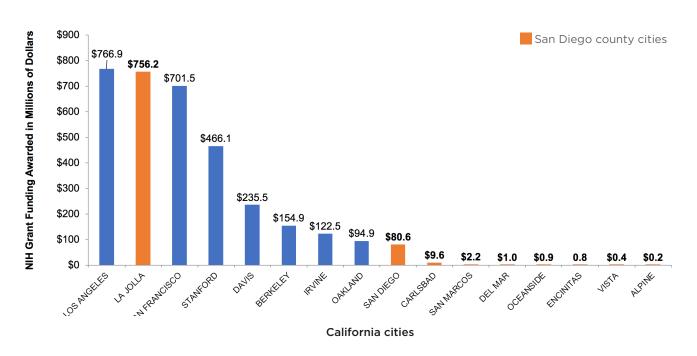
Source: NIH, NSF, https://www.sbir.gov; CONNECT

FEDERAL RESEARCH GRANTS - NIH TOP AWARDS IN CALIFORNIA BY CITY

NIH Grant Funding Awarded in 2017 by City - California

San Diego County institutions and companies received more than \$850 million in research grant funding from the National Institutes of Health in 2017. La Jolla ranked as the number two city in California for NIH research funding in 2017 with more than \$756 million or 20 percent of the entire amount of NIH funding received in California. Los Angeles ranked first with more than \$767 million, and San Francisco ranked third with just more than \$700 million. The city of San Diego ranked ninth with \$81 million. Another \$15 million in NIH research grant funding was received by companies and institutions in Carlsbad, San Marcos, Oceanside, Encinitas, Del Mar, and Vista.

NIH Grant Funding Awarded to California Cities in 2017



CITY OF LA JOLLA RANKED #2 IN CALIFORNIA FOR NIH GRANT FUNDING RECEIVED IN 2017 WITH \$756 MILLION

Source: NIH; CONNECT

FEDERAL RESEARCH GRANTS - NSF TOP AWARDS IN CALIFORNIA BY CITY

NSF Grant Funding Awarded in 2017 by City - California

La Jolla ranked as the number one city in California for NSF research funding in 2017 with more than \$215 million, 16 percent of the entire amount of NSF funding received in California. NSF research grant funding to La Jolla institutions and companies was up slightly over the \$211 million in 2016. Los Angeles ranked second in California with more than \$179 million – up more than 35 percent from the \$132 million awarded to the city in 2016. The city of San Diego ranked eleventh overall with more than \$22 million and the city of San Marcos received more than \$3 million. An additional \$2.6 million dollars of NSF research grant funding was received by companies and institutions in Del Mar, Encinitas, El Cajon, and Carlsbad.

NSF Grant Funding Awarded to California Cities in 2017



CITY OF LA JOLLA RANKED #1 IN CALIFORNIA FOR NSF GRANT FUNDING RECEIVED IN 2017 WITH \$215 MILLION

Source: NSF: CONNECT

FEDERAL RESEARCH GRANTS TOP AWARDS IN CALIFORNIA BY INSTITUTION

NIH Grant Funding to Top California Institutions in 2017

UC San Diego ranked third in California for NIH funding in 2017 with a total of \$424 million awarded to researchers through 889 awards. The Scripps Research Institute in La Jolla was also among the top seven California institutions with \$160 million in awards. The top San Diego institutions receiving NIH awards in 2017 are highlighted in bold below. UC San Francisco ranked first with \$594 million and nearly 1,250 awards.

NIH Grant Funding to Top California Institutions in 2017				
California Ranking		City		
1	UNIVERSITY OF CALIFORNIA, SAN FRANCISCO	San Francisco	\$593.9	1,246
2	STANFORD UNIVERSITY	Stanford	\$465.9	979
3	UNIVERSITY OF CALIFORNIA, SAN DIEGO	San Diego	\$424.4	889
4	UNIVERSITY OF CALIFORNIA, LOS ANGELES	Los Angeles	\$401.2	838
5	UNIVERSITY OF SOUTHERN CALIFORNIA	Los Angeles	\$258.1	450
6	UNIVERSITY OF CALIFORNIA, DAVIS	Davis	\$234.2	468
7	SCRIPPS RESEARCH INSTITUTE	La Jolla	\$159.9	255
8	UNIVERSITY OF CALIFORNIA, BERKELEY	Berkeley	\$126.8	351
9	UNIVERSITY OF CALIFORNIA, IRVINE	Irvine	\$116.5	299
10	KAISER FOUNDATION RESEARCH INSTITUTE	Oakland	\$73.0	90
12	SANFORD BURNHAM PREBYS MEDICAL DISCOVERY INSTITUTE	La Jolla	\$62.3	111
16	SALK INSTITUTE FOR BIOLOGICAL STUDIES	La Jolla	\$49.6	85
21	LA JOLLA INST FOR ALLERGY & IMMUNOLOGY	La Jolla	\$31.5	49
23	SAN DIEGO STATE UNIVERSITY	San Diego	\$22.4	64
34	J. CRAIG VENTER INSTITUTE, INC.	La Jolla	\$8.2	8
66	CALIFORNIA STATE UNIVERSITY, SAN MARCOS	San Marcos	\$2.2	8
79	SAN DIEGO BIOMEDICAL RESEARCH INSTITUTE	San Diego	\$1.9	5

^{*}Institutions ranked by total amount of awards

Source: National Institutes of Health; National Science Foundation; CONNECT

FEDERAL RESEARCH GRANTS TOP AWARDS IN CALIFORNIA BY INSTITUTION

NSF Grant Funding to Top California Institutions in 2017

UC San Diego ranked first in California for NSF funding in 2017, up from second in 2016, with \$200 million awarded across 244 grant awards. NSF funding to UC San Diego in 2017 was up more than 70 percent over the \$115 million received by the University in 2016. UC Berkeley ranked second with \$144 million and 203 NSF awards. The top San Diego institutions receiving NSF awards in 2017 are indicated in the corresponding chart.

NSF Grant Funding to Top California Institutions in 2017				
California Ranking		City		
1	UNIVERSITY OF CALIFORNIA, SAN DIEGO	La Jolla	\$200.4	244
2	UNIVERSITY OF CALIFORNIA, BERKELEY	Berkeley	\$144.4	203
3	STANFORD UNIVERSITY	Stanford	\$129.7	195
4	UNIVERSITY OF CALIFORNIA, LOS ANGELES	Los Angeles	\$112.4	161
5	UNIVERSITY OF CALIFORNIA, SANTA BARBARA	Santa Barbara	\$90.6	112
6	CALIFORNIA INSTITUTE OF TECHNOLOGY	Pasadena	\$79.3	76
7	UNIVERSITY OF CALIFORNIA, IRVINE	Irvine	\$78.2	144
8	UNIVERSITY OF CALIFORNIA, DAVIS	Davis	\$67.2	125
9	SRI INTERNATIONAL	Menlo Park	\$64.3	24
10	UNIVERSITY OF SOUTHERN CALIFORNIA	Los Angeles	\$56.5	128
19	SCRIPPS RESEARCH INSTITUTE, THE	La Jolla	\$7.7	8
20	SAN DIEGO STATE UNIVERSITY FOUNDATION	San Diego	\$7.6	34
39	SALK INSTITUTE FOR BIOLOGICAL STUDIES	La Jolla	\$2.6	4
45	J. CRAIG VENTER INSTITUTE, INC.	La Jolla	\$2.0	2
47	UNIVERSITY OF SAN DIEGO	San Diego	\$1.7	7

^{*}Institutions ranked by total amount of awards

Source: National Institutes of Health; National Science Foundation; CONNECT

FEDERAL GRANTS - TOP SBIR-STTR AWARDS BY COMPANY IN 2017

126 small businesses in San Diego County received 212 SBIR-STTR awards totaling \$101 million in 2017. The number of companies receiving awards was up as was the total amount and number of awards. In 2016, 90 small businesses received 125 awards totaling \$54 million. The top 20 awarded companies are shown below.

	Company	SBIR Amount Awarded in 2017 (in \$M)	Number of Awards
1	(ES3) ENGINEERING & SOFTWARE SYSTEM SOLUTIONS	\$8.4	7
2	SAN DIEGO COMPOSITES, INC.	\$4.6	13
3	BIOSPYDER TECHNOLOGIES, INC.	\$4.3	4
4	ZIVA CORPORATION	\$3.1	3
5	HEAT, LIGHT, AND SOUND RESEARCH, INC.	\$2.4	3
6	NANOCOMPOSIX INC.	\$2.3	5
7	3DT HOLDINGS, LLC	\$2.3	4
8	CRINETICS PHARMACEUTICALS, INC.	\$2.0	3
9	GROUNDMETRICS, INC.	\$2.0	2
10	TACTICAL EDGE	\$2.0	1
11	WINSANTOR, INC.	\$1.7	3
12	INHIBRX LP	\$1.7	3
13	MAPP BIOPHARMACEUTICAL, INC.	\$1.5	3
14	NANOCELLECT BIOMEDICAL, INC.	\$1.5	2
15	UNIVERSAL STABILIZATION TECHNOLOGIES, INC.	\$1.5	2
16	ATA ENGINEERING, INC.	\$1.4	6
17	SIGNALRX PHARMACEUTICALS, INC.	\$1.3	1
18	ONE RESONANCE SENSORS, LLC	\$1.3	2
19	NANOSD, INC.	\$1.3	1
20	ECLIPSE BIOINNOVATIONS, INC.	\$1.3	1
	TOTAL SBIR-STTR ACTIVITY - SAN DIEGO COUNTY	\$101.0	212

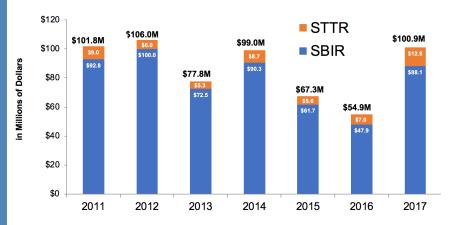
FEDERAL RESEARCH GRANTS - SBIR-STTR AWARDS

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The STTR program encourages joint venture opportunities for small businesses and nonprofit research institutions.

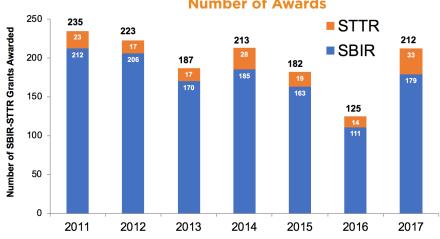
These grants provide valuable non-dilutive funding to small businesses to commercialize their research and development efforts. Both federal programs are administered by the Small Business Administration, funded by federal agency budget allocations.

SBIR-STTR Awards - San Diego County Amount Awarded



SBIR-STTR grant awards to San Diego companies and institutions returned to the \$100 million mark again in 2017 with \$101 million – up dramatically from a low of \$55 million in 2016. The Department of Health & Human Services, primarily through the NIH, awarded more than 40 percent of amount of SBIR-STTR grants with 84 awards totaling almost \$42.5 million in 2017. SBIR-STTR grants awarded by the Department of Defense totaled almost \$40.9 million, also up significantly from the \$7 million awarded in 2016.

SBIR-STTR Awards - San Diego County Number of Awards



The number of SBIR-STTR awarded to San Diego companies and research institutions in 2017 increased by 70 percent to 212 awards, compared with 125 awards in 2016. The number of awards granted in 2017 returned to pre-2015 levels. The variance is due to the increased number of awards made by the Department of Defense – 89 awards in 2017 compared to 13 awards in 2016.

Source: https://www.sbir.gov; CONNECT

PATENTS

APPLICATIONS GRANTED AND PUBLISHED IN CALIFORNIA

San Diego County Patent Activity Grew Strongly in 2017

Patent activity is one reflection of innovation activity in the region. In 2017, 8,007 patent applications were published, and 7,346 patents were granted – both numbers were up significantly from the previous year when 6,794 patent applications were published, and 6,252 patents were granted.

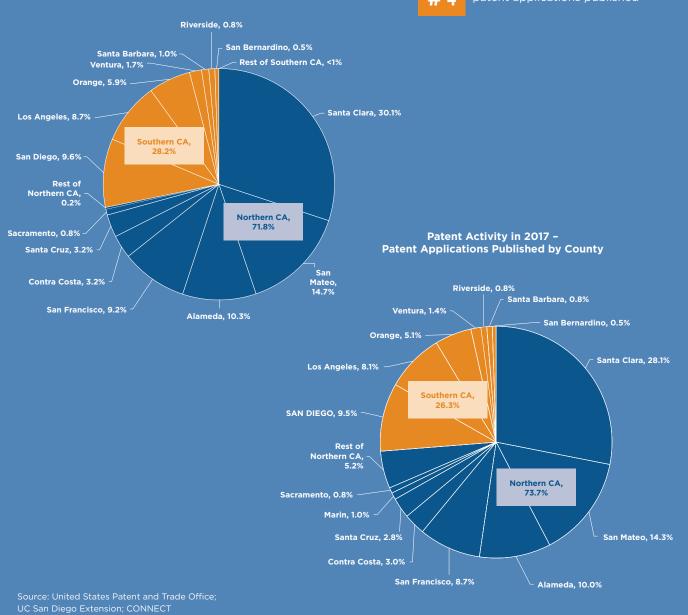
Patent Activity in 2017 - Patents Granted by County

San Diego is the:











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Commission

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Dentons

DeskHub

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Solar Turbines

Stradling Yocca Carlson & Rauth

Takeda

UC San Diego, Chancellor's Office

UC San Diego School of Extension

U.S. Small Business Administration

Voit

Wilson Sonsini Goodrich & Rosati

ABOUT

The CONNECT San Diego Innovation Report provides an overview of the strength and impact of the innovation economy in San Diego. By gathering and analyzing data year over year, the report provides comparisons across innovation economy clusters and selected regions, monitors several types of capital investment in the region, and tracks the overall health of the San Diego innovation economy. This report also helps guide policymakers and trade organizations with their planning and advocacy work to foster the growth and expansion of the region's economy including, but not limited to: availability of international visas and workforce training for talent in high-growth clusters, building an attractive environment of capital investment, allocation of grant funding, reform of the patent system, and zoning. The report also underscores San Diego as a world leader in innovation with world-class research, leadership, and management talent.

Online

www.connect.org/innovation-reports

Contact

For additional information or inquiries about the 2017 San Diego Innovation report, please call 858.964.1300