

2018
SAN DIEGO
INNOVATION
REPORT



CONNECT

W/ SAN DIEGO VENTURE GROUP

TABLE OF CONTENTS

Executive Summary from the CEO & President	3
Report Highlights	4
Growth – San Diego Innovation Economy: Economic Impact	6
Startup Spotlight	7
Growth – San Diego Technology & Life Sciences Startups	8
New Startup Creation in 2018	9
Geography: Where San Diego Innovation Startups are Located	10
California Technology & Life Sciences Startups	12
Southern California	13
Northern California	14
San Diego Innovation Economy – Sector Breakdown	15
Startup Spotlight	16
San Diego Innovation Economy – Wage Breakdown	17
San Diego Innovation Economy – Employment Breakdown	18
Startup Spotlight	19
Venture Capital Funding in San Diego	20
Venture Capital Funding in San Diego – By Stage of Development	21
Venture Capital Investment – Top Companies by Valuation	23
Venture Capital Investment – San Diego VC Deal Hotspots	24
San Diego Angel & Other Non-Venture Capital Investment	25
Initial Public Equity Offerings (IPOs)	26
Follow-on Public Equity Offerings	31
Startup Spotlight	33
Mergers & Acquisitions	34
Top 10 San Diego Tech & Life Sciences M&A Deals	35
Federal Research Grants	36
Patents	44
About	45



EXECUTIVE SUMMARY

The San Diego Regional Innovation Report produced by Connect is undertaken annually to reflect on the enormous benefit of startup growth on the region. Connect has been monitoring this impact since 2005 and in those 14 years, we've seen significant change and growth from the technology and life sciences sectors, including sustained employment growth year over year since 2010.

This report is the most comprehensive detailing of San Diego's robust and ever-growing innovation economy. From drones to pharmaceuticals, life sciences, wastewater treatments, and industry specific software, the startups highlighted in this report demonstrate the breadth and depth of San Diego's entrepreneurs and the startups they are building.

Flourishing ecosystems consist of collaborative organizations working together and interacting frequently to support a common goal of economic success. Connect is focused on supporting cooperative networks of investors, entrepreneurs, accelerators, incubators, universities, government agencies, and other key market influencers in order to benefit great companies in San Diego. Innovation is key to sustainable regional growth and development, requiring strong participation in open and collaborative networks.

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

Venture was at its peak in San Diego in 2018, with \$2.8 billion invested.

The highest amount invested in a single year: 167 deals produced \$2.8 billion.

Funding at all stages rose in 2018.

Investment in early stage companies increased 451 percent from \$242 million in 2017 to \$1.3 billion in 2018. Expansion and later stage deals were up 66 percent, while seed deal value increased more than 150 percent from 2017 to 2018.

Software continues to be San Diego's leading innovation industry.

The software industry created 233 new companies and 733 new jobs last year.

Innovation is critical to the growth and stability of San Diego's economy.

365 new startups were created in San Diego county in 2018, and a total of 1,632 new jobs were created by software companies. Innovation economy jobs account for 21.1 percent, or \$19.1 billion, of the total payroll in San Diego county.

La Jolla was the top ranked city in California for both NSF and NIH funding.

La Jolla led NSF funding again in 2018 with \$85.1 million, creating a three-year trend of La Jolla taking the top spot. University of California - San Diego, Scripps Institute of Oceanography, Salk Institute, J. Craig Venter Institute, Scripps Research Institute and National University make up the institutions that received NSF funding in La Jolla.

San Diego continues to lead in research and intellectual property.

San Diego was again the top ranked county in Southern California for patents granted and patent applications published. In California overall in 2018, San Diego ranked number three in patent applications published and number four in patents issued. Grant funding was down slightly from \$1.7 billion to \$1.5 billion from 2017 to 2018.

2019 is looking strong!

Despite initially conservative projections for 2019 after such a standout year in 2018, we're seeing similar results from 2018 in 2019. According to PwC/MoneyTree, San Diego companies have raised \$1.8 billion in venture funding this year, through the third quarter of 2019.

Connect is dedicated to helping San Diego entrepreneurs grow and scale highly successful technology and life sciences companies for the growth and benefit of the San Diego economy. The San Diego Regional Innovation Report provides detailed information that the work our region does to support our entrepreneurs, research institutes, mentors, investors, and partners has tangible outcomes that grow and sustain the San Diego economy.

Mike Krenn, *CEO*
Dr. Silviah Mah, *President*



REPORT HIGHLIGHTS

ECONOMIC IMPACT - \$58 BILLION, 413,298 JOBS

The innovation economy accounted for more than **\$58 billion**, or 24 percent, of San Diego's economic activity (Gross Domestic Product).

San Diego's research institutions have a **\$5 billion** economic impact on the region.

2.6x job multiplier effect impact of innovation economy employment on overall San Diego region employment.

San Diego's innovation economy impacts almost **413,300 jobs** in the region

- More than **28%** of private sector jobs
- More than **38%** of the region's total labor income

GROWTH - STARTUPS

- 365** NEW INNOVATION startups created in 2018
- 233** NEW SOFTWARE companies created
- 60** NEW LIFE SCIENCES companies created
- 38** NEW COMMUNICATION, COMPUTER & ELECTRONICS companies created
- 17** NEW RECREATIONAL GOODS MANUFACTURING companies created
- 10** NEW ENVIRONMENTAL TECHNOLOGY companies created
- 7** NEW DEFENSE & TRANSPORTATION companies created

GROWTH - INNOVATION JOBS

1,632 new startup jobs created by San Diego innovation startups in 2018

TOP SECTORS

- 733** NEW SOFTWARE JOBS CREATED
- 458** NEW LIFE SCIENCES JOBS CREATED
- 329** NEW COMMUNICATIONS, COMPUTER & ELECTRONICS JOBS CREATED
- 70** NEW RECREATIONAL GOODS MANUFACTURING JOBS CREATED
- 25** NEW ENVIRONMENTAL TECHNOLOGY JOBS CREATED
- 17** NEW DEFENSE & TRANSPORTATION JOBS CREATED

REPORT HIGHLIGHTS

TOTAL SIZE OF THE INNOVATION ECONOMY IN SAN DIEGO

6,986 Companies

157,505 Employees

\$19.1 Billion Payroll

6.2%of total number of companies
in San Diego County**10.8 %**of total employment in
San Diego County**21.1 %**of total payroll in
San Diego County

The average innovation sector job paid
1.96X THE AVERAGE JOB
in San Diego in 2018

Innovation economy
avg. annual salary
\$121,233

Rest of economy avg.
annual salary
\$61,915

CAPITAL FUNDING - \$2.8 BILLION M&A - \$9.8 BILLION

Venture Capital Funding

\$2.8 BILLION in venture capital was invested in **167 deals** in San Diego in 2018. Investment in early stage San Diego companies increased significantly in 2018 from a low of **\$242 million** in 2017 to **\$1.3 billion** in 2018, up 451 percent. Expansion and later stage deals were up 66 percent in 2018 over 2017 amounts. Seed deal value increased over 150 percent in 2018 over 2017 levels.

Equity Capital Markets (IPOs and FPOs)

\$572 MILLION was raised by **eight** San Diego companies in **initial public equity offerings (IPOs)** in 2018. This was almost twice the amount raised by the three companies that went public in 2017.

\$13.2 BILLION was raised by **46** San Diego companies in **62 follow-on public equity offerings (FPOs)** in 2018. This was a decrease from the \$16.7 billion raised in secondary offerings in 2017. The 2018 funding was led by Sempra Energy, who raised almost \$7 billion through nine public offerings.

Angel & Other Non-VC Capital Funding

\$74 MILLION in angel and other non-VC backed funding was invested in **39 deals** in San Diego in 2018.

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

\$9.8 BILLION in **59 M&A deals** in technology and life sciences sectors were closed in 2018 where the merger or acquisition target was a San Diego company.

GRANTS - \$1.5 BILLION TOTAL IN 2018

DOWN FROM \$1.7 BILLION IN 2017

\$872 MILLION in NIH grant funding to San Diego companies and institutions in 2018

\$162 MILLION in NSF grant funding to San Diego companies and institutions

\$130 MILLION in Department of Energy grant funding to San Diego companies and institutions

\$146 MILLION in NASA and NOAA grant funding to San Diego companies and institutions

\$111 MILLION in Department of Defense grant funding to San Diego companies and institutions

\$43.9 MILLION in SBIR-STTR grant funding to San Diego companies and institutions

INTELLECTUAL PROPERTY

SAN DIEGO ACCOUNTED FOR 10 PERCENT OF PATENTS ISSUED IN CALIFORNIA IN 2018

#1 RANKED COUNTY in Southern California for patents granted (issued) and applications published.

#4 RANKED COUNTY in California in patents issued, after Santa Clara, San Mateo, and Alameda counties.

#3 RANKED COUNTY in California in patent applications published in 2018, after Santa Clara and San Mateo.

Southern California accounted for more than 27 percent of patents issued and more than 28 percent of patent applications published in California in 2018.

The innovation economy accounts for more than \$58 billion, or 24 percent, of San Diego's total economic activity

GROWTH

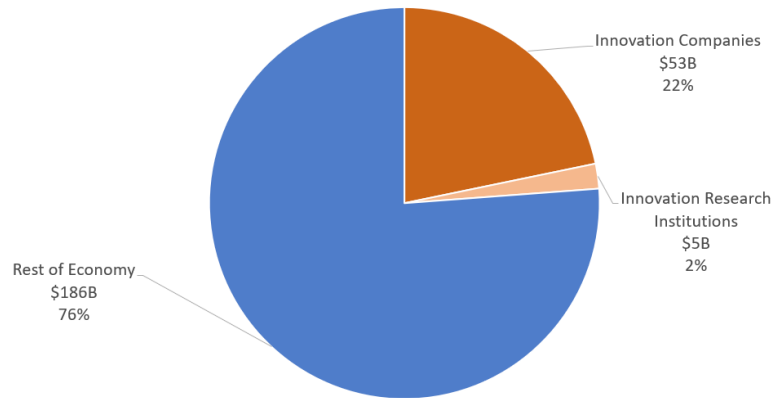
SAN DIEGO INNOVATION ECONOMY - ECONOMIC IMPACT

San Diego's innovation economy companies directly generate more than \$61 billion in sales, employ more than 157,000 workers, and provide almost \$20 billion in payrolls.

The direct economic contribution to San Diego's economy is almost \$32 billion, accounting for more than 13 percent of the total regional economy or gross domestic product (GDP), estimated to be almost \$244 billion. Including indirect and induced impacts results in a \$58 billion impact, 24 percent, of San Diego's estimated total GDP.

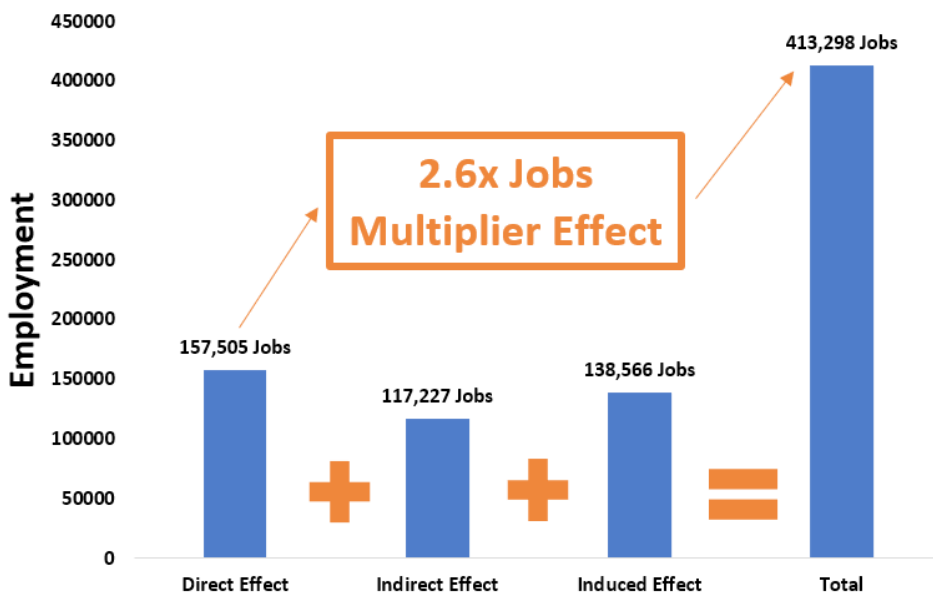
Including indirect and induced jobs, the multiplier effect on jobs is 2.6 – this means **for every technology job, another 2.6 jobs are dependent or created.**

San Diego Gross Domestic Product (GDP) By Sector
\$244 Billion



Employment generated from technology innovation businesses is equivalent to almost 413,300 jobs, or over 28 percent, of all civilian jobs and more than 38 percent of the region's total labor income.

Economic Impact of Innovation Economy – 413,298 Jobs



Source: San Diego Institute for Economic 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

LOCAL INNOVATION COMPANIES



METACRINE

Ken Song, M.D.
CEO

Metacrine is a clinical-stage biopharmaceutical company focused on building an innovative pipeline of best-in-class drugs to treat liver and gastrointestinal (GI) diseases. The most advanced program is focused on the farnesoid X receptor (FXR) an important drug target in multiple liver and GI diseases. Beyond the FXR program, a pipeline of novel drug candidates against other drug targets is being explored by taking advantage of internal drug discovery and development capabilities.



HOUSECALL

Ian Heidt
CEO

Developer of a mobile software platform designed to connect back-end business operations and homeowners. The company's mobile software platform supports service professionals with business workflow, such as job scheduling, technician dispatching, automated receipts and invoicing, payment processing, customer database and custom marketing campaigns, enabling customers to streamline their workflow and operations.



SKYSAFE

Grant Jordan
CEO

SkySafe is an industry leader in advanced drone defense and airspace management systems. We're tackling the problem of drones flying where they shouldn't - critical airspace like stadiums, prisons, airports, and military environments. Our system safely detects, identifies, and takes control of reckless and malicious drones while managing and tracking legitimate drone activity. SkySafe is built on groundbreaking technology developed by a crack team of MIT grads, former military, and seasoned security researchers.



GROWTH

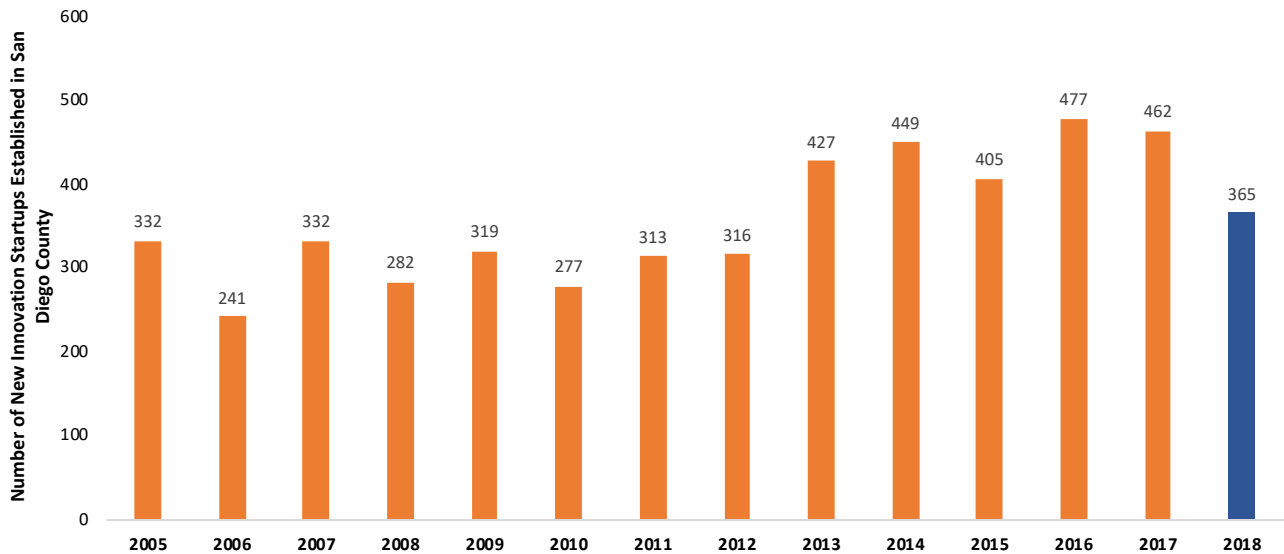
SAN DIEGO TECHNOLOGY & LIFE SCIENCES STARTUPS

365
 New innovation startups
 were created in San
 Diego in 2018

Compared to previous years, startup creation dropped in 2018. 365 new innovation startup companies were created in 2018 in San Diego – ending 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 over 430 per year for the period between 2013 and 2018, continuing to be driven by an increase in new software companies.

New Innovation Companies Established in San Diego County Since 2005



At least 4,997 new tech and life sciences companies have been created in San Diego during the period 2005 – 2018.

Source: Dun and Bradstreet Hoovers; Connect



GROWTH

SAN DIEGO INNOVATION ECONOMY — NEW STARTUP CREATION IN 2018

Software startups made up over 64 percent of San Diego County's new innovation startup companies established in 2018. More than 230 new software companies were created, ranking San Diego County fifth among California counties for software startups. Life sciences startups – Biotechnology, Pharmaceuticals, Medical Device – established in 2018 totaled 60 companies – a drop from 93 companies in 2017 and a historical high of 95 companies 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 four years.

SAN DIEGO COUNTY RANKED

#1

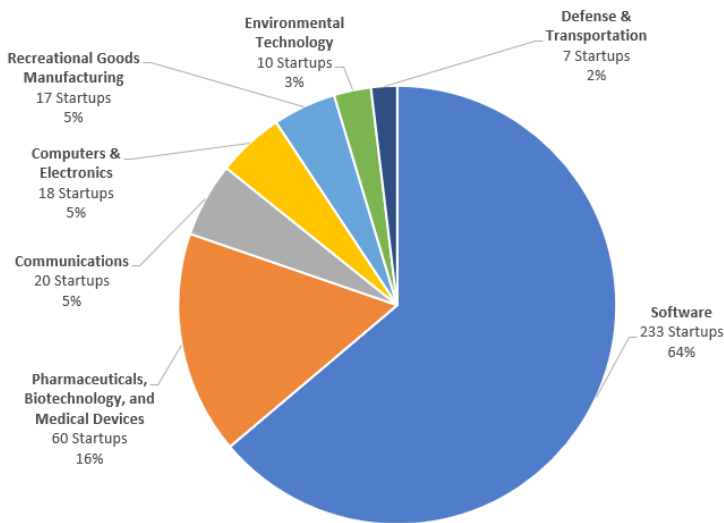
IN CA FOR LIFE SCIENCES STARTUPS IN 2018

1,632
NEW INNOVATION
ECONOMY JOBS
CREATED IN 2018

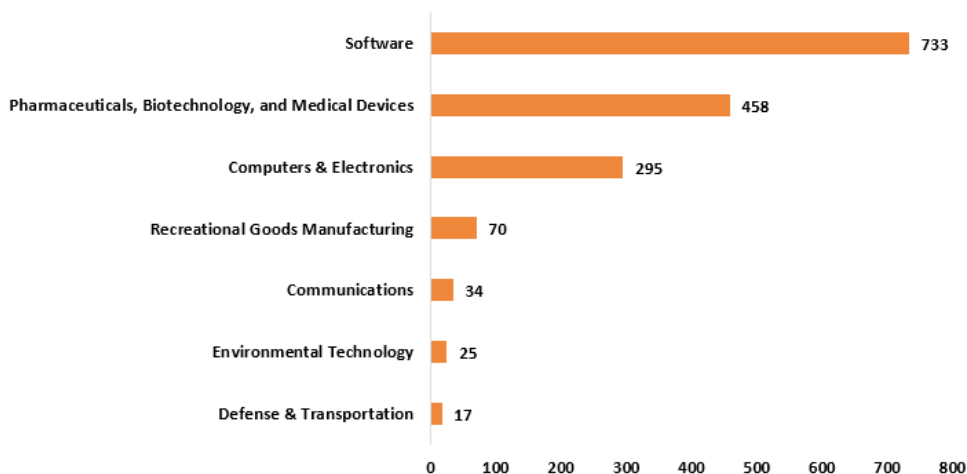
365
NEW SAN DIEGO
INNOVATION STARTUPS
ESTABLISHED IN 2018

SOFTWARE STARTUPS
CREATED MORE THAN
730
NEW JOBS

San Diego Innovation Startups Established in 2018 by Industry Sector



San Diego Innovation Startup Jobs Created by Industry Sector in 2018



Source: Dun and Bradstreet Hoovers; Connect

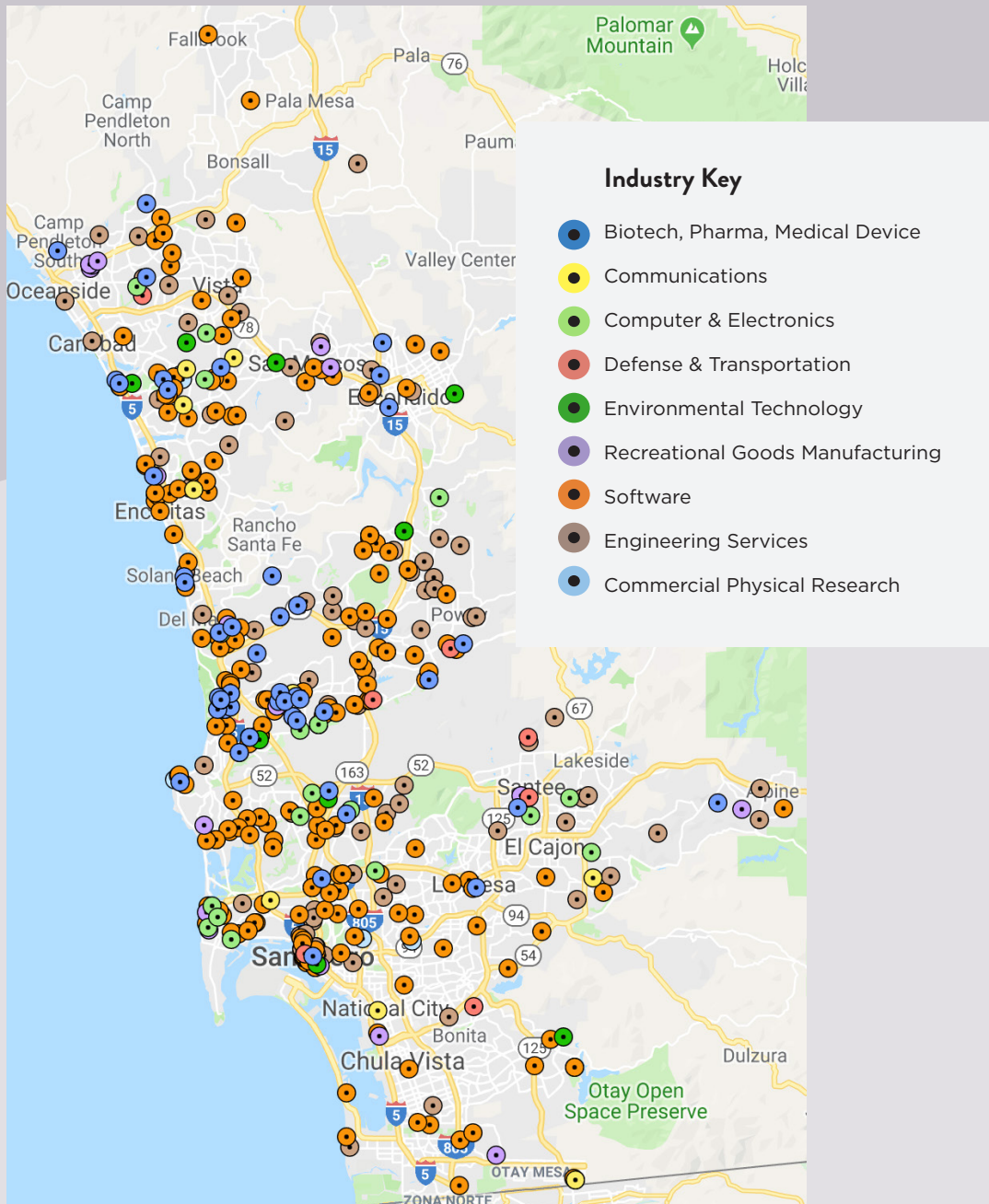


GROWTH

GEOGRAPHY: WHERE SAN DIEGO INNOVATION STARTUPS ARE LOCATED

Software startups (in orange) continued to be widely spread throughout San Diego County in 2018. The next largest industry cluster, life sciences startups (in blue), were concentrated primarily in UTC and Sorrento Valley, but also show wide distribution across the county.

365 New San Diego Innovation Companies in 2018 by Industry Cluster



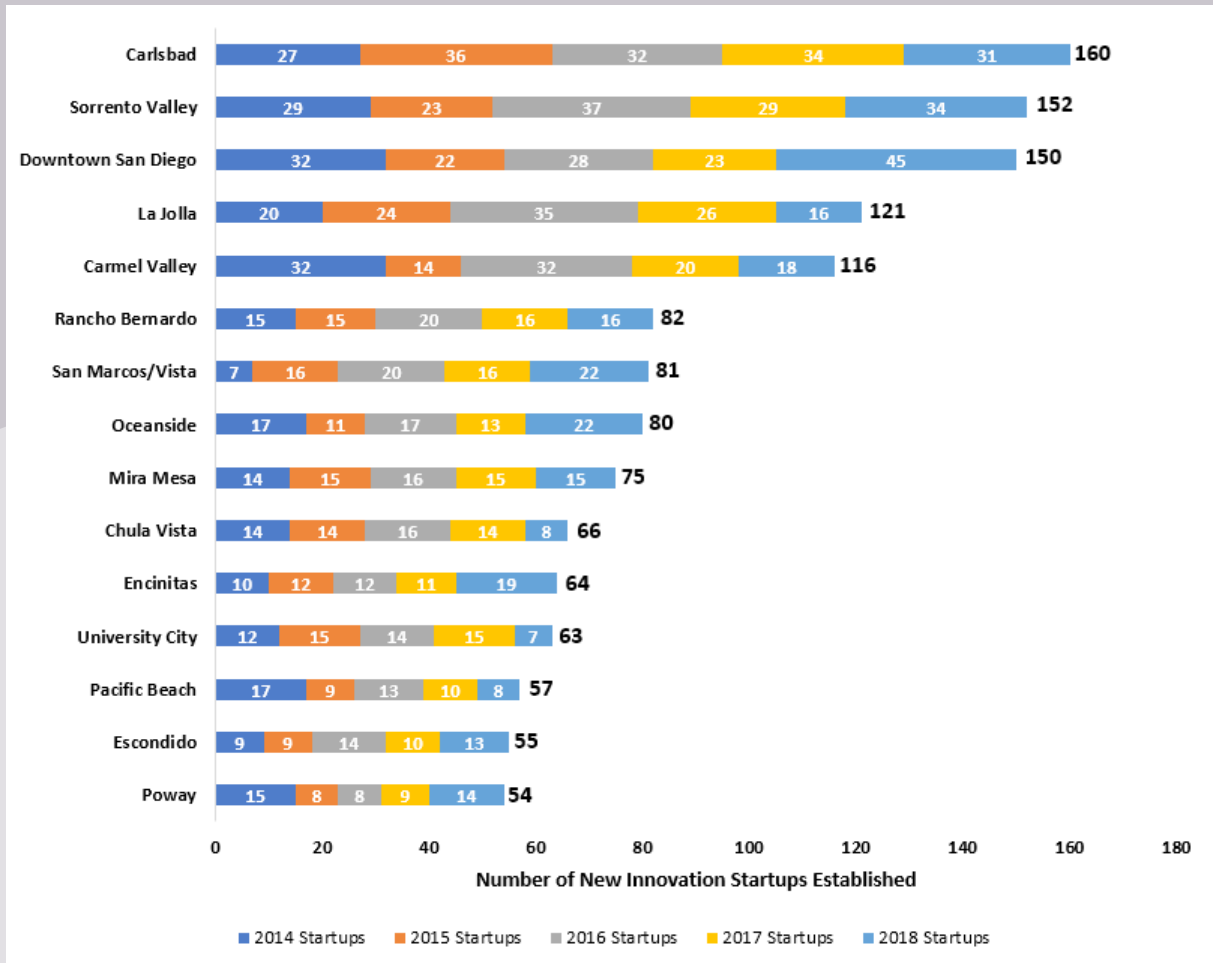
Source: Dun and Bradstreet Hoovers; Connect

GROWTH

GEOGRAPHY: WHERE SAN DIEGO INNOVATION STARTUPS ARE LOCATED

Downtown San Diego, Sorrento Valley, and Carlsbad were the main hotspots for new innovation company startup creation in 2018, and the same areas have also been the leaders in local startup creation since 2014.

Downtown San Diego took the top spot for startup creation in 2018 with 45, followed by Sorrento Valley with 34, and Carlsbad with 31 new innovation companies created. Two new areas also appear to be growing in popularity beginning in 2018: Ocean Beach and Scripps Ranch both saw 11 startups created in their neighborhoods.

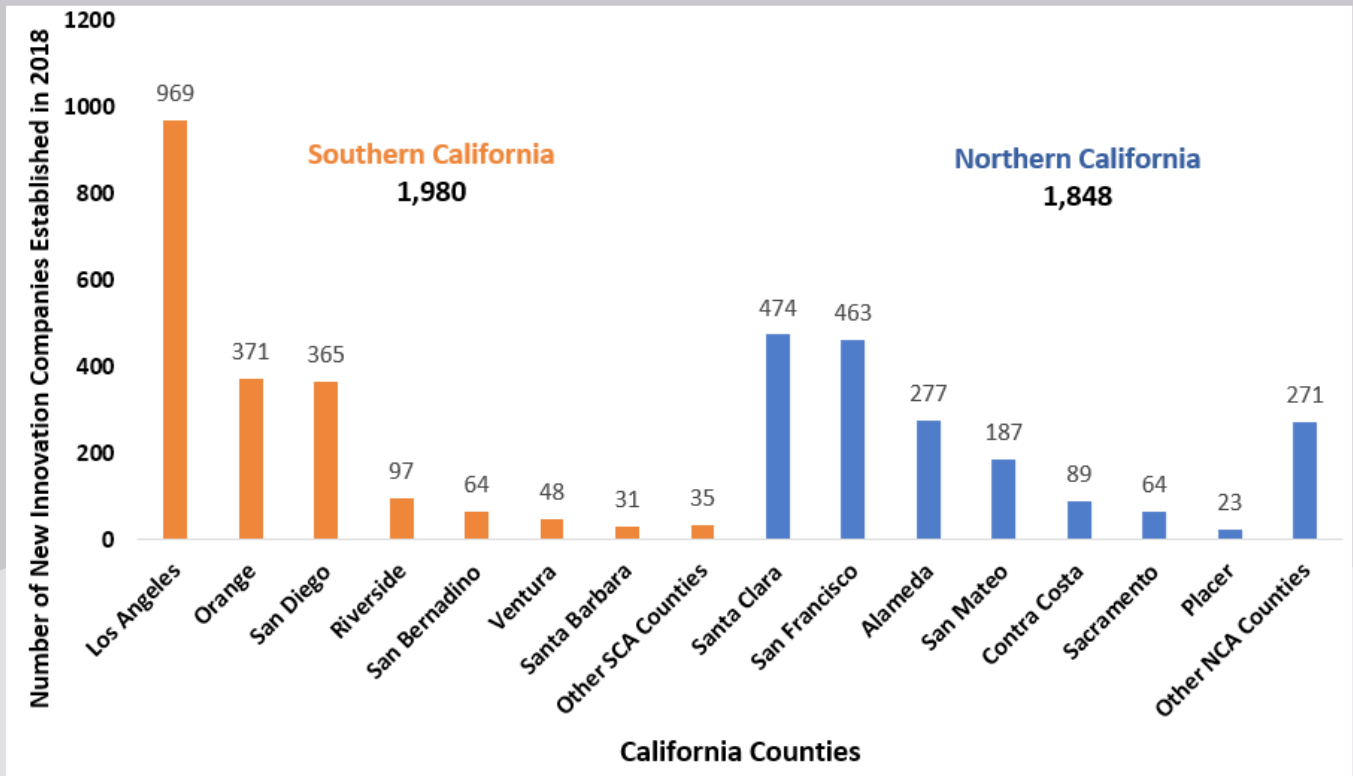


Source: Dun and Bradstreet Hoovers; Connect

GROWTH

SAN DIEGO TECHNOLOGY & LIFE SCIENCES STARTUPS

New Innovation Startups in 2018 by County in Northern and Southern California



Innovation Startup Creation: Southern California slightly outpaced Northern California in startup creation in 2018 – over 3,800 new innovation companies were started in CA in total.

Source: Dun and Bradstreet Hoovers; Info USA; Connect

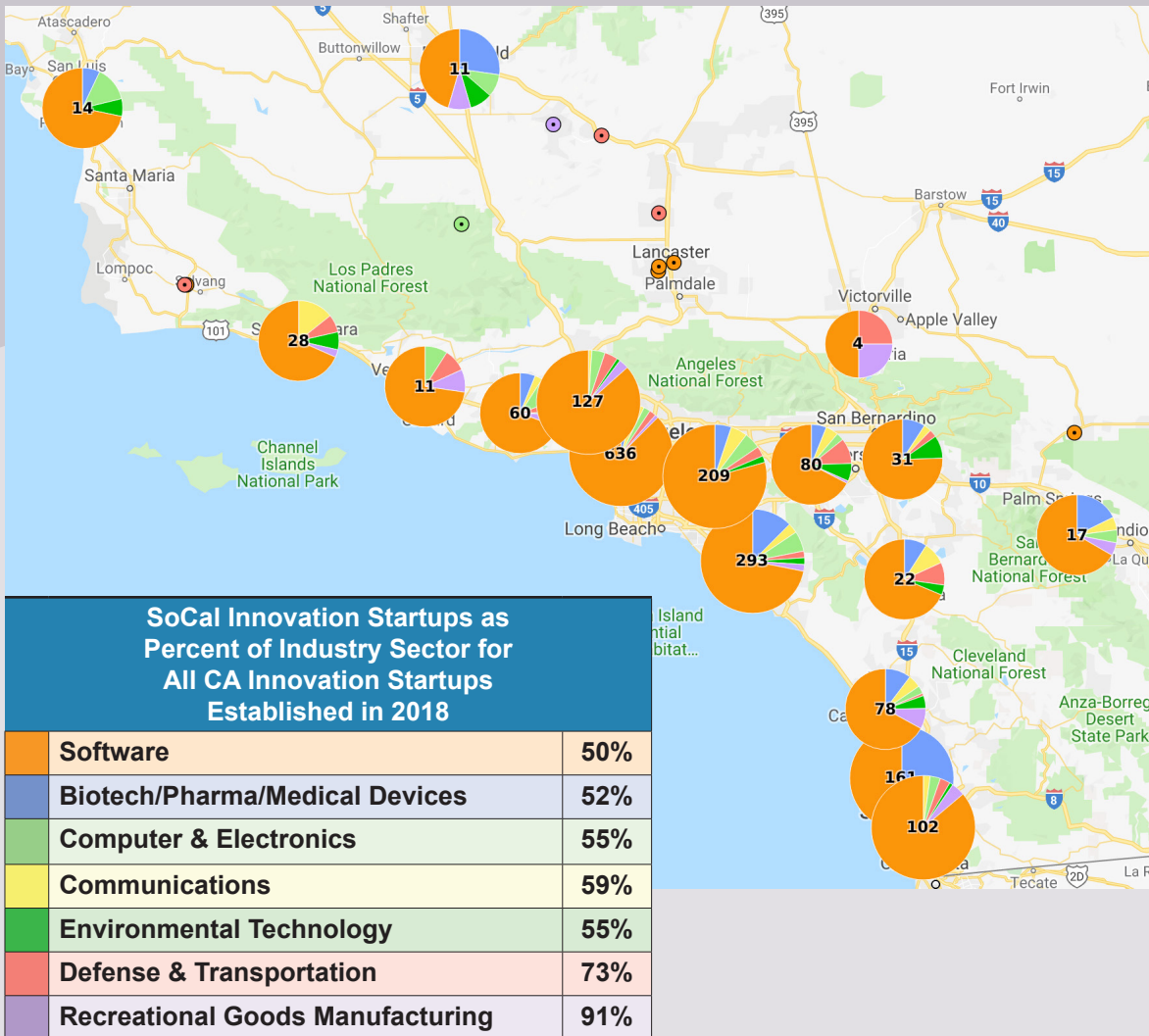
GROWTH

CALIFORNIA TECHNOLOGY & LIFE SCIENCES STARTUPS – SOUTHERN CALIFORNIA

Southern California created slightly more than half (52 percent) of all tech and life sciences startups established statewide in 2018.

Southern California software startups accounted for 50 percent of all software startups established statewide in 2018. Life sciences (52 percent), computer & electronics (55 percent), environmental technology (55 percent) and communications tech startups (59 percent) in Southern California accounted for more than half the total number of startups for those sectors statewide in 2018. Southern California accounted for 73 percent of defense & transportation tech startups in 2018 and 91 percent of recreational goods manufacturing startups.

2018 Southern California Innovation Startups by Industry



Source: Dun and Bradstreet Hoovers; InfoUSA; Connect

GROWTH

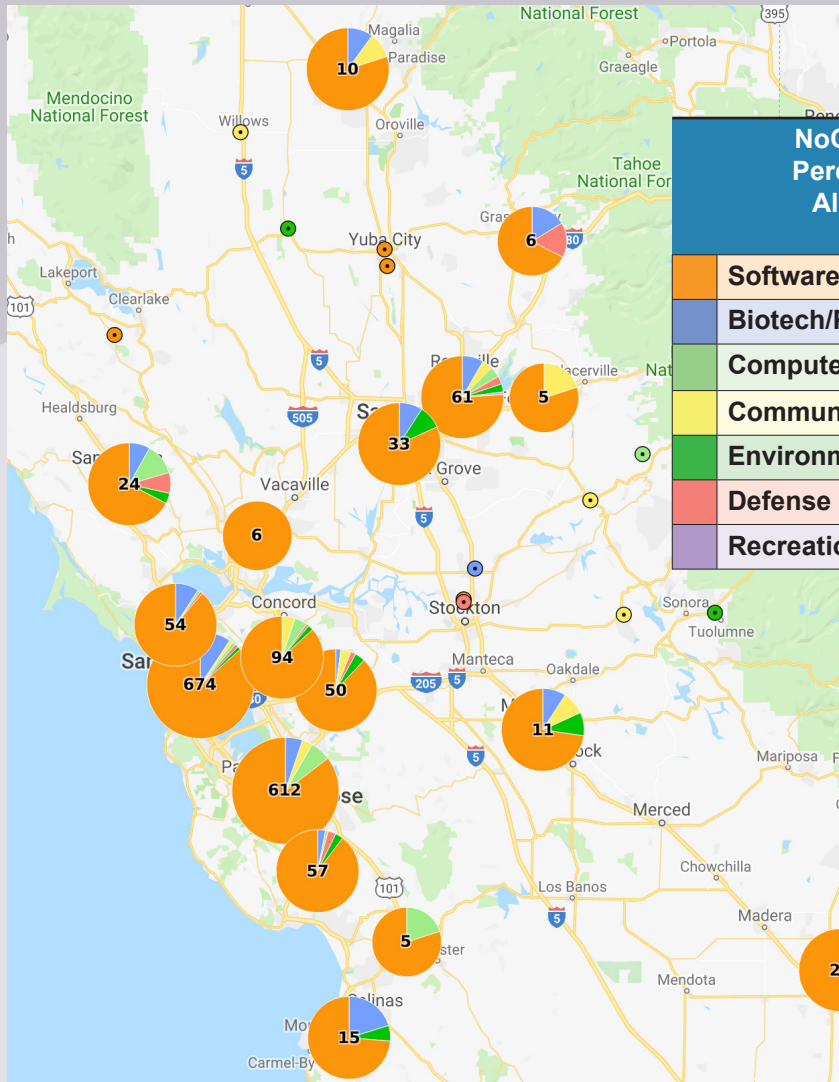
CALIFORNIA TECHNOLOGY & LIFE SCIENCES STARTUPS – NORTHERN CALIFORNIA

Northern California had slightly less than half (48 percent) of all innovation startups established statewide in 2018.

Northern California software startups established in 2018 accounted for 50 percent of all newly established software startups statewide. Life sciences (48 percent), computer & electronics (45 percent), environmental technology (45 percent), and communications tech startups (41 percent) in Northern California accounted for slightly less than half the total number of startups for those sectors statewide in 2018.

Northern California defense & transportation tech startups accounted for 27 percent of all new startups and recreational goods manufacturing accounts for nine percent of all new startups in those industries statewide in 2018.

2018 Northern California Innovation Startups by Industry



NoCal Innovation Startups as Percent of Industry Sector for All CA Innovation Startups Established in 2018	
Software	50%
Biotech/Pharma/Medical Devices	48%
Computer & Electronics	45%
Communications	41%
Environmental Technology	45%
Defense & Transportation	27%
Recreational Goods Manufacturing	9%

Source: Dun and Bradstreet Hoovers; InfoUSA; Connect

GROWTH

SAN DIEGO INNOVATION ECONOMY – SECTOR BREAKDOWN

In 2018, San Diego's innovation economy included approximately 6,986 companies and provided 157,505 jobs. San Diego's innovation economy is comprised of knowledge-based sectors* on the leading-edge of research, innovation, and the 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 sciences, life sciences and engineering
- Biomedical Products (Medical Devices)
- Biotechnology and Pharmaceuticals
- Communications (Telecommunications)
- Computers and Electronics
- Defense and Transportation
- Environmental Technology
- Recreational Goods Manufacturing
- Software

2018 San Diego's Innovation Economy Represented

6,986 COMPANIES

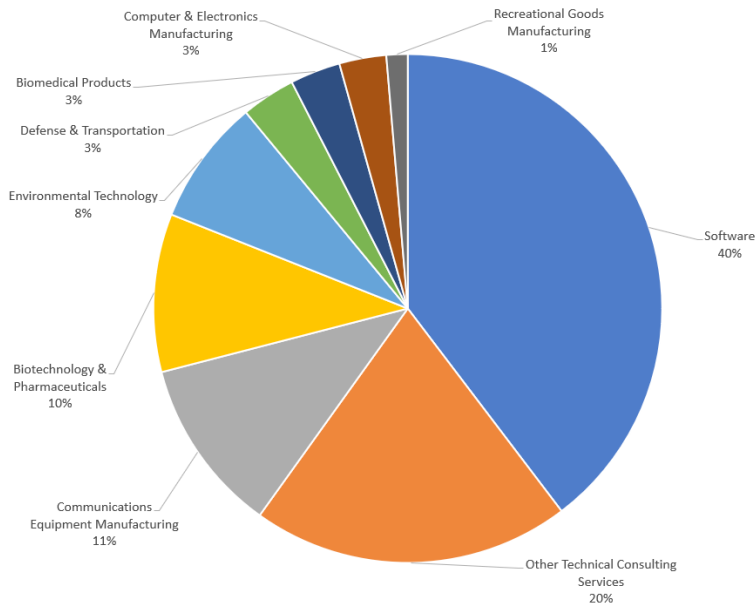
157,505 EMPLOYEES

\$19.1 BILLION PAYROLL

6.2%
of total number of companies
in San Diego County

10.8%
of total employment in
San Diego County

21.1%
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.

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

Source: Connect, based upon California Employment Development Department, Quarterly Census of Employment and Wages (QCEW); UC Regents; San Diego Regional EDC



STARTUP SPOTLIGHT

LOCAL INNOVATION COMPANIES



CLOUDBEDS

Adam Harris
CEO

Cloudbeds is an easy-to-use hospitality management suite that simplifies the working lives of hoteliers and hosts. Cloudbeds helps properties, like hotels and hostels, automate their workflows, make more money and make their guests happier. In 2019 Cloudbeds was named to the Inc 5000 list of Fastest Growing Companies for the second straight year. Cloudbeds has expanded to over 300 people with local teams in 31 countries, speaking 17 languages.



AIRSPACE TECHNOLOGIES

Nick Bulcao
CEO

Provider of a technology-enabled logistic platform intended to provide time-definite delivery and supply chain services. The company's platform features proprietary routing algorithms to offer features such as automatic quoting, routing and tracking in addition to courier through next flight out, hand carry, international shipping, provision for dangerous goods, charter service and others, enabling shippers to communicate with their customers in real-time for their most critical shipments.



AQUACYCL

Orianna Bretschger
CEO

Aquacycl provides technology for onsite wastewater treatment plants that can eliminate up to 80% of primary sludge, recover energy as direct electricity (no methane), and enable onsite water reuse at operational costs that are 50%-95% lower than incumbent technologies for high strength wastewater. Aquacycl offers the only technology for treating chemical oxygen demand concentrations up to 100,000 ppm and eliminating total suspended solids up to 3,000 ppm for organic waste streams. Aquacycl's modular and scalable treatment systems help customers save capital through competitive equipment rental and the service plan guarantees discharge quality per customer requirements. In 2019, Aquacycl was selected as an SDVG Cool Company, and closed a \$4M seed round led by The Roddenberry Foundation.



GROWTH

SAN DIEGO INNOVATION ECONOMY – WAGE BREAKDOWN

The average innovation sector job paid

1.96x

more than the average job in San Diego in 2018

AVERAGE ANNUAL SALARY

INNOVATION ECONOMY JOB

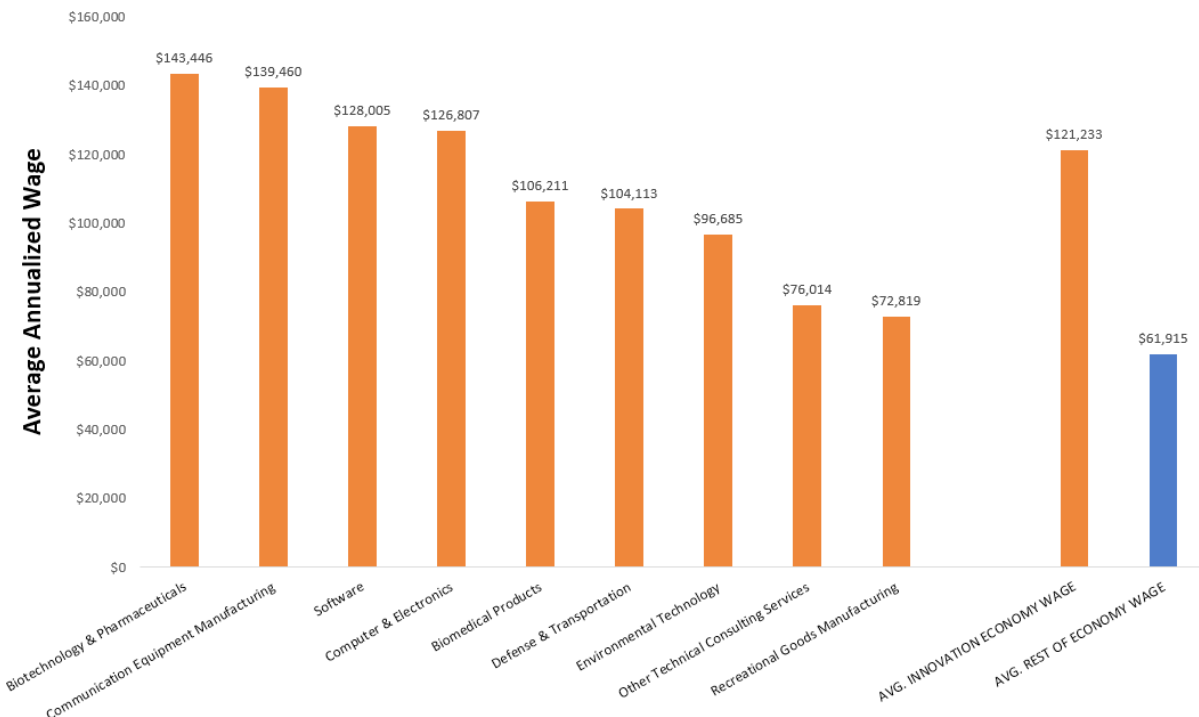
\$121,233

REST OF ECONOMY JOB

\$61,915

San Diego Innovation Economy Annualized Wages

Biotechnology and pharmaceutical jobs had the highest average annualized wage in San Diego



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 San Diego Institute for Economic Research and Connect.



GROWTH

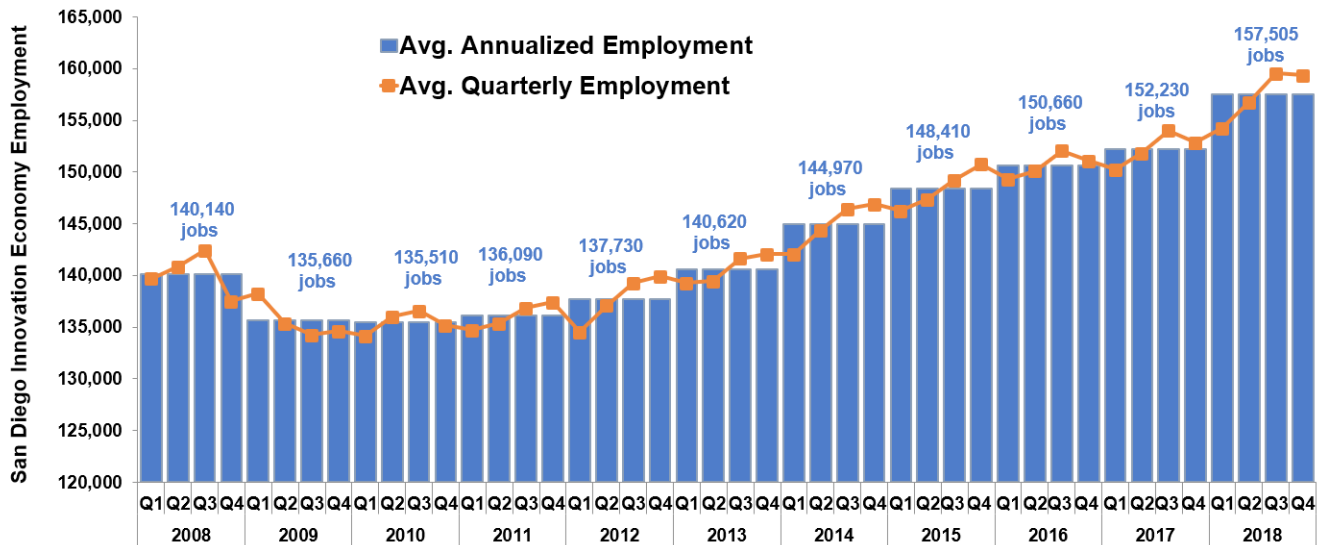
SAN DIEGO INNOVATION ECONOMY – EMPLOYMENT BREAKDOWN

San Diego's innovation economy provided nearly

157,505
high paying jobs in 2018

continuing the trend of growth to historic highs since the beginning of the decade.

The number of innovation economy jobs in 2018 jumped significantly from 2017. San Diego innovation economy continues decade of growth to historic high in 2018.



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 San Diego Institute for Economic Research and Connect.



STARTUP SPOTLIGHT

LOCAL INNOVATION COMPANIES



ESCIENT PHARMACEUTICALS

Alain Baron, M.D.
CEO

Provider of bio-technical research and development services intended to focus in advancement of first-in-class G Protein-Coupled Receptor targeted drugs. The company's services focus on offering therapies for neuro-immuno-inflammatory and autoreactive diseases, enabling its clients to receive drugs required for treatment of serious, unserved medical needs across a broad range of therapeutic indications.



eSUB

Wendy Rogers
CEO

Developer of a project management and document control software intended to make construction management better. The company's cloud-based software collects field data, manages site events, labor activities, material costs and workforce information as well as generates reports in real-time, enabling contractors to manage tasks, increase productivity and complete construction projects without a hassle.



TEALIUM

Jeff Lunsford
CEO

Provider of a turnkey integration ecosystem designed to make data actionable, in real-time, across every customer experience touch point. The company's ecosystem encompasses tag management, API hub, customer data platform and data management solutions, enabling organizations to leverage real-time data to create richer, more personalized digital experiences across every team, technology and customer touchpoint.



CAPITAL

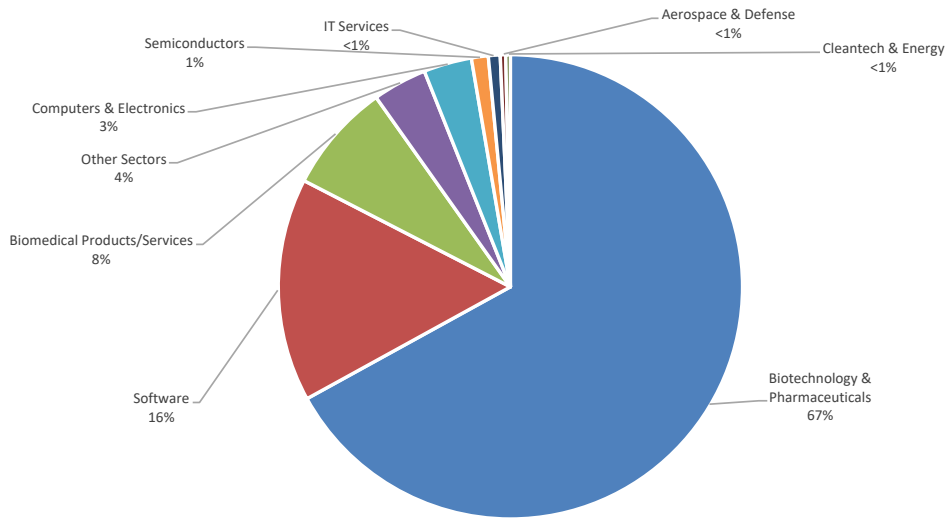
VENTURE CAPITAL FUNDING IN SAN DIEGO - \$2.8 BILLION IN 2018

Venture capital (VC) funding to companies in San Diego County totaled more than \$2.8 billion invested in 167 deals in 2018 according to deal data sourced from Pitchbook and analyzed by Connect.

Life sciences companies received around 75 percent of the total VC funding in San Diego in 2018. Companies in the biotechnology and pharmaceutical sectors accounted for the largest share of venture investment in San Diego in 2018 with more than 65 percent of the VC funding totaling more than \$1.8 billion. The sectors of biomedical products and services accounted for an additional eight percent with \$213 million. Both sectors combined received more investment than in 2017.

The software sector also saw a large increase in VC investment in 2018 with \$436 million invested – up from \$191 million in 2017 and \$180 million in 2016. The computers and electronics sector also saw an increase in investment in 2018 with \$93 million, up from \$46 million in 2017.

SAN DIEGO VC INVESTMENT BY INDUSTRY 2018 - \$2.8 BILLION



TOP 10 SAN DIEGO COMPANIES RECEIVING VENTURE CAPITAL FUNDING IN 2018

COMPANY	DEAL SIZE	INDUSTRY
Rakuten Medical	\$350M	Pharmaceuticals and Biotechnology
Gossamer Bio	\$230M	Pharmaceuticals and Biotechnology
Mirum Pharmaceuticals	\$120M	Pharmaceuticals and Biotechnology
Seismic	\$100M	Software
TuSimple	\$95M	Software
IDEAYA Bioscience	\$94M	Pharmaceuticals and Biotechnology
Genomatica	\$90M	Manufacturing
Ansun Biopharma	\$85M	Pharmaceuticals and Biotechnology
Gossamer Bio	\$80M	Pharmaceuticals and Biotechnology
ViaCyte	\$80M	Pharmaceuticals and Biotechnology

Note: Investment value rounded to nearest million dollars.

Source: PitchBook; Connect



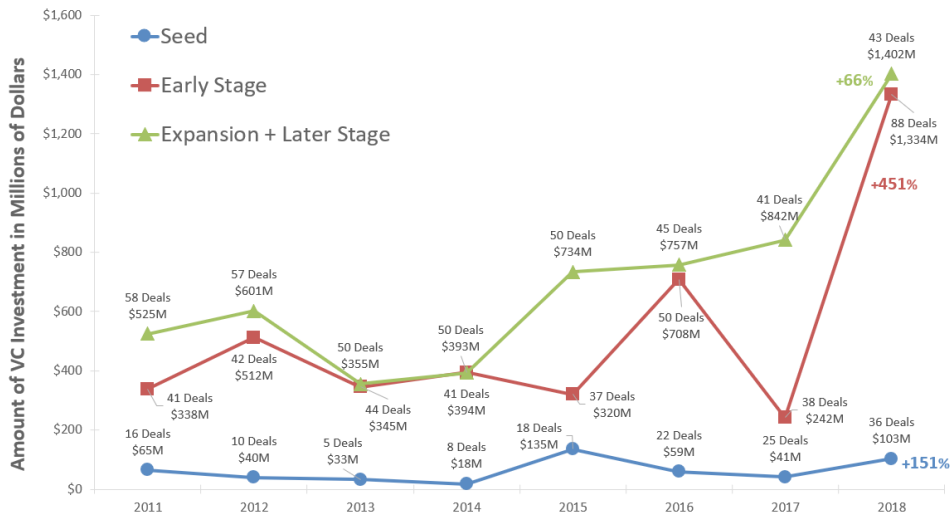
CAPITAL

VENTURE CAPITAL FUNDING IN SAN DIEGO BY STAGE OF DEVELOPMENT – CONTINUED GROWTH IN EXPANSION + LATER STAGE INVESTMENT IN 2018

San Diego saw substantial increases in VC funding at all stages in 2018 compared to the previous year.

Seed stage companies received \$103 million in 2018, compared to \$41 million in 2017, up **151 percent**. Early stage companies had the largest increase of any category, up **451 percent**, to \$1.3 billion in 2018 from \$242 million in 2017. Expansion and later stage investment also noticed a significant bump, up **66 percent**, to \$1.4 billion in 2018 from \$842 million in 2017.

Early stage deal count also experienced a 132 percent increase from 2017 to 2018, from 38 to 88 deals.



THE STAGE OF DEVELOPMENT CLASSIFICATIONS ARE AS FOLLOWS:

1 SEED STAGE

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

2 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 revenue. Usually in business less than 3 years.

3 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: PitchBook; Connect



CAPITAL

VENTURE CAPITAL FUNDING IN SAN DIEGO \$2.8 BILLION IN 2018



SEED STAGE

Raised \$10.8 Million Seed Funding



Boomcloud360

Darrin Hegemier, Chief Executive Officer and Board Member

Provider of an in-line wired headphone audio enhancer amp and signal processor designed to change the way consumers experience games, movies, music and streaming across any device. The company's external sound processor BoomStick enhances the sound of any pair of headphones, profoundly transforming audio for movies, music and games.



EARLY STAGE

Raised \$230 Million Series B Funding



Gossamer Bio

Sheila Gujrathi MD, Chief Executive Officer, Co-Founder & Board Member

Gossamer Bio Inc., is a clinical-stage biopharmaceutical company. It is focused on discovering, acquiring, developing and commercializing therapeutics in the disease areas of immunology, inflammation, and oncology. The company pipeline products include GB001 (DP2 Antagonist), GB002 (PDGF Receptor Kinase Inhibitor), GB004 (HIF-1a Stabilizer), and others. Gossamer Bio raised an additional \$80M in a separate round in 2018.



LATER STAGE

Raised \$350 Million Series C Funding



Rakuten Medical

Miguel Garcia-Guzman Ph.D, Chief Executive Officer, Board Member & President

Developer of precision-targeted cancer therapies designed to treat solid tumors. The company's photoimmunotherapy technology consists of a cancer targeting monoclonal antibody conjugated to a photoactivatable molecule to gain anticancer activity upon light-mediated activation at the tumor site, enabling patients with recurrent head and neck cancer to access oncologic drugs that permit rapid cancer cell killing without damage to the surrounding healthy tissues.



CAPITAL

VENTURE CAPITAL INVESTMENT – TOP COMPANIES BY VALUATION



TUSIMPLE

Developer of camera-based computer vision technology intended to provide self-driving truck solutions. The company was founded in 2015, is valued at \$1.1 billion, and has raised more than \$178 million to date.



SEISMIC

Developer of an end-to-end sales enablement software designed to pitch sales of client's product. The company was founded in 2010, is valued at \$1 billion, and has raised more than \$185 million to date.

San Diego's Venture-Backed Unicorns in 2018.

TOP 10 SAN DIEGO VENTURE-BACKED COMPANIES RANKED BY VALUATION IN 2018

Company	Pre-Money Valuation (as of 2018)	Post-Money Valuation (as of 2018)	Total Raised to Date (as of 2018)	Year Founded	Industry	Employees
TuSimple	\$1.0B	\$1.1B	\$178M	2015	Software	500
Seismic	\$900M	\$1.0B	\$185M	2010	Software	600
Rakuten Medical	\$550M	\$834M	\$371M	2011	Biotechnology	85
Ostendo	\$765M	\$810M	\$208M	2005	Computers and Electronics	140
Gossamer Bio	\$420M	\$650M	\$330M	2015	Biotechnology	50
Poseida Therapeutics	\$200M	\$231M	\$72M	2015	Biotechnology	50
Anokiwave	\$210M	\$225M	\$32M	1999	Semiconductors	33
Metacrine	\$150M	\$215M	\$125M	2014	Biotechnology	26
IDEAYA Biosciences	\$115M	\$209M	\$140M	2015	Biotechnology	Unknown
Gossamer Bio	\$120M	\$200M	\$100M	2015	Biotechnology	50

Source: PitchBook; Connect



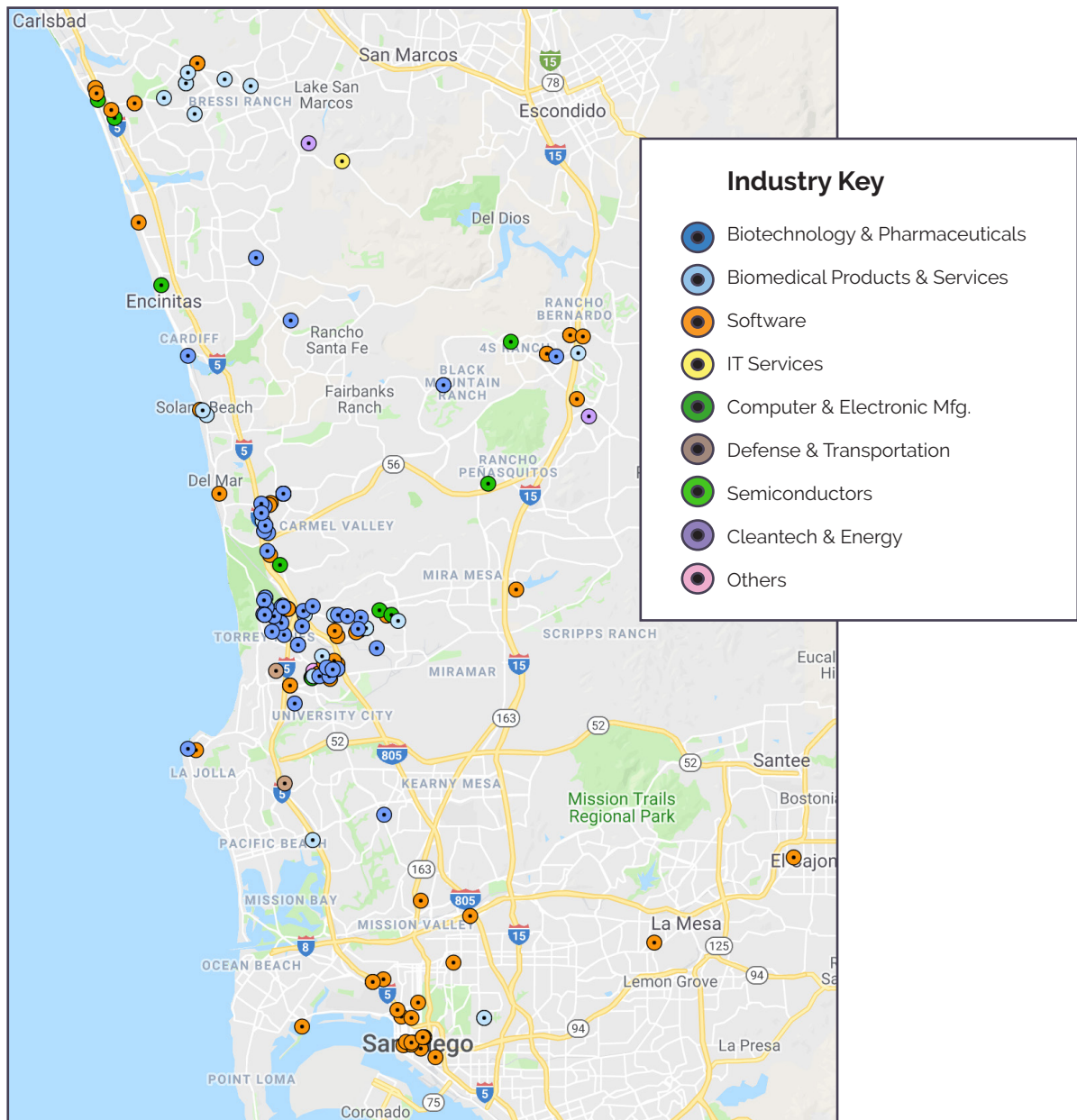
CAPITAL

VENTURE CAPITAL INVESTMENT

SAN DIEGO VC DEAL HOTSPOTS IN 2018

Sorrento Valley/UTC was again the concentrated hotspot of VC activity for life sciences companies in San Diego in 2018.

Downtown San Diego has emerged as a hub for VC activity in software startups, and a new hub in North County, near **Carlsbad** and **San Marcos**, is growing for biomedical products/services and software.



Source: PitchBook; Connect

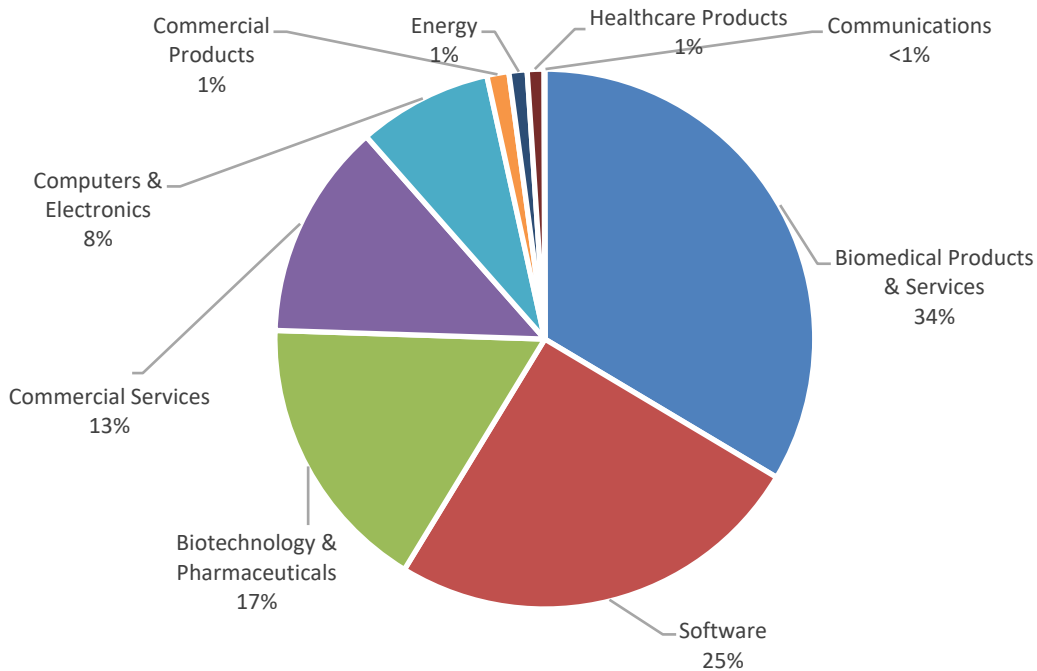


CAPITAL

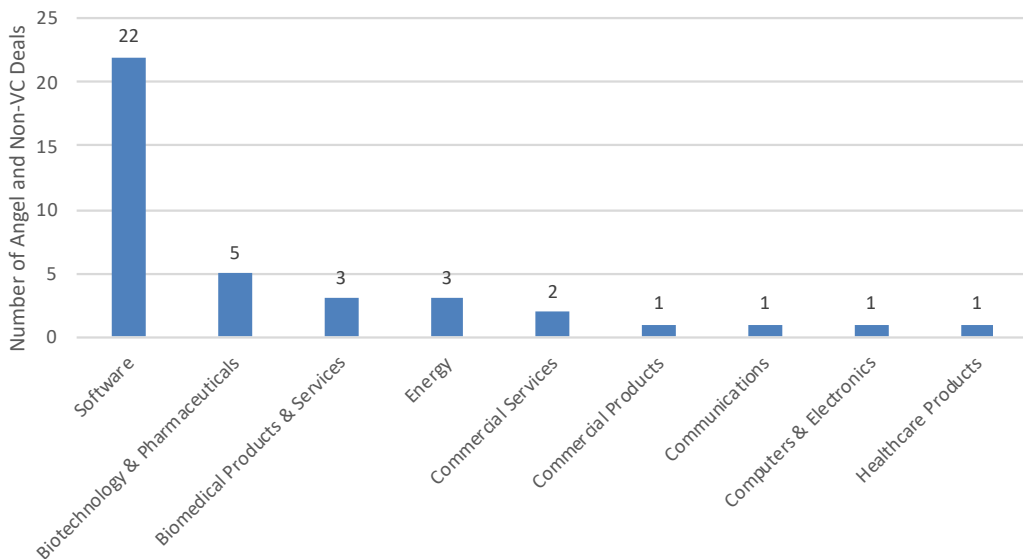
SAN DIEGO ANGEL AND OTHER NON-VENTURE CAPITAL INVESTMENT

San Diego companies raised more than **\$74 million** in **39 deals** in 2018 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 - \$74 MILLION IN 2018



SAN DIEGO ANGEL & OTHER NON-VC INVESTMENT – 39 DEALS IN 2018



Source: PitchBook; Connect

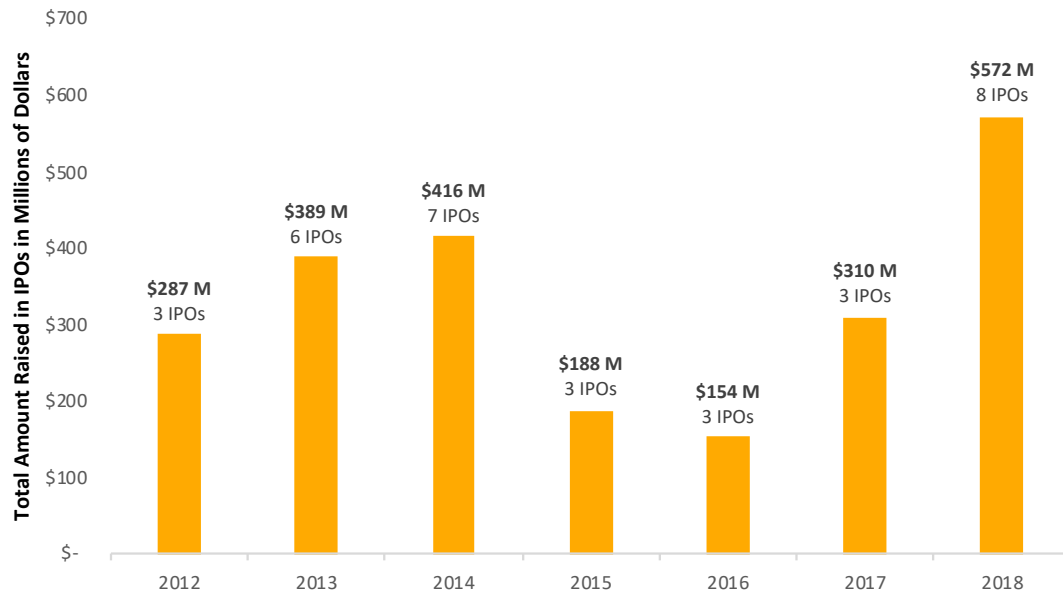


CAPITAL

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)

The San Diego IPO market activity in 2018 surpassed all recent years in both the number of IPOs and the total money raised through these IPOs. In 2018 \$572 million was raised through eight IPOs. This is almost an 85 percent increase in total money raised and more than double the number of IPOs as compared to 2017.

INITIAL PUBLIC EQUITY OFFERINGS (IPOS) BY SAN DIEGO COMPANIES



Source: Pitchbook; S&P Capital IQ; Roth Capital Partners; Connect

One Stop Systems (NasdaqGS:OSS)



\$19 Million IPO
Founded 1998
Went Public 2/1/2018

One Stop Systems Inc. is a US-based company which is principally engaged in designing, manufacturing, and marketing high-end systems for high performance computing (HPC) applications. The company offers custom servers, compute accelerators, solid-state storage arrays and system expansion systems. The product line of the company includes GPU Appliances, GPU Expansion, GPUs and co-processors, Flash storage arrays, Flash storage expansion, Servers, Disk Arrays, Desktop computing appliances, accessories and parts. The company delivers high-end technology to customers through the sale of equipment and software for use on their premises or through remote cloud access to secure data center's housing technology. The company raised \$19 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol of OSS on February 1, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
2	IPO	2018	\$19M	\$21.97M	\$42.72M	\$61.72M	Profitable
1	VC	2007	\$2.97M	\$2.97M	—	—	Startup

Source: PitchBook; Connect
Grants are not included in "Raised to Date" values; S&P Capital IQ; Roth Capital Partners



CAPITAL

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)

Crinetics Pharmaceuticals
(NasdaqGS: CRNX)



\$102 Million IPO
Founded 2008
Went Public 7/18/2018

Crinetics Pharmaceuticals Inc. is a clinical-stage pharmaceutical company focused on the discovery, development, and commercialization of novel therapeutics for rare endocrine diseases and endocrine-related tumors. The company raised \$102 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol of CRNX on July 18, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
11	IPO	2018	\$102M	\$209.42M	\$289.14M	\$391M	Clinical Trials – Phase 1
10	Later Stage VC (Series B)	2018	\$65M	\$107.42M	\$135M	\$198.5M	Generating Revenue
9	Grant	2018	\$3.2M	\$42.42M	—	—	Generating Revenue
8	Later Stage VC (Series A2)	2017	\$2.42M	\$42.42M	—	—	Generating Revenue
7	Grant	2017	\$2.8M	\$40M	—	—	Generating Revenue
6	Later Stage VC (Series A)	2015	\$40M	\$40M	\$12.67M	\$52.67M	Generating Revenue
5	Grant	2015	\$4.2M	—	—	—	Generating Revenue
4	Grant	2014	Undisclosed	—	—	—	Generating Revenue
3	Grant	2013	\$2.2M	—	—	—	Startup
2	Grant	2011	Undisclosed	—	—	—	Startup
1	Grant	2009	Undisclosed	—	—	—	Startup

Source: PitchBook; Connect
Grants are not included in "Raised to Date" values; S&P Capital IQ; Roth Capital Partners



CAPITAL

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)

BioNano Genomics
(NasdaqGS: BNGO)



\$20.58 Million IPO
Founded 2003
Went Public 8/21/2018

BioNano Genomics Inc. is a life sciences instrumentation company in the genome analysis space. It is engaged in the development and marketing of the Saphyr system, a platform for ultra-sensitive and ultra-specific structural variation detection that enables researchers and clinicians to accelerate the search for new diagnostics and therapeutic targets and to streamline the study of changes in chromosomes. The company raised \$20.58 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol of BNGO on August 21, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
12	IPO	2018	\$20.58M	\$169.47M	\$3756M	\$58.14M	Generating Revenue/Not Profitable
11	Debt-General	2018	\$15M	\$148.89M	—	—	Generating Revenue/Not Profitable
10	Later Stage VC (Series D1)	2016	\$35M (E)	—	\$55M	\$90M	Profitable
9	Later Stage VC (Series D)	2016	\$25M	\$133.89M	\$30M	\$55M	Profitable
8	Later Stage VC (Series C)	2014	\$68.44M	\$108.89M	\$56.87M	\$125.32M	Profitable
7	Later Stage VC (Series B1)	2012	\$11.57M	\$40.45M	\$39.19M	\$50.76M	Profitable
6	Later Stage VC (Series B)	2011	\$23.27M	\$28.88M	\$14.69M	\$37.96M	Profitable
5	Grant	2009	\$2.08M	\$5.61M	—	—	Profitable
4	Convertible Debt	2008	\$0.5M	\$5.61M	—	—	Profitable
3	Early Stage VC (Series A)	2008	\$5.11M	\$5.11M	\$6.56M	\$11.67M	Profitable
2	Grant	2007	\$8.8M	—	—	—	Profitable
1	Seed	2006	Undisclosed	—	—	—	Profitable

Source: PitchBook; Connect
Grants are not included in "Raised to Date" values; S&P Capital IQ; Roth Capital Partners
(E) - Estimated



CAPITAL

INITIAL PUBLIC EQUITY OFFERINGS (IPOs)

Ra Medical Systems

(NasdaqGS: RMED)



\$66.3 Million IPO
 Founded 2002
 Went Public 9/27/2018

Ra Medical Systems Inc. is a commercial-stage medical device company. It is engaged in designing, developing, and commercialization of excimer lasers for the treatment of dermatologic and cardiovascular diseases. The company's products include DABRA and Pharos. DABRA System is an effective, and versatile catheter and excimer laser system for the treatment of complex and diffuse arterial blockages in the lower vessels, and the Pharos is a monochromatic, xenon-chlorine, 308-nm UVB excimer laser for the treatment of difficult-to-treat, chronic diseases including psoriasis and vitiligo. Its business segments are the Dermatology segment and the Vascular segment. The key revenue is derived from the Dermatology segment. Geographically, the company generates a majority of its revenue from the U.S. The company raised \$66.3 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol RMED on September 27, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
2	IPO	2018	\$66.3M	\$89.92M	\$139.47M	\$205.77M	Generating Revenue/Not Profitable
1	Later Stage VC	2018	\$23.62M	\$23.62M	—	—	Generating Revenue

Equillum

(NasdaqGS: EQ)



\$65.38 Million IPO
 Founded 2017
 Went Public 10/12/2018

Equillum Inc. is a biotechnology company that develops products for autoimmune and inflammatory, or immuno-inflammatory disorders with unmet medical need. Its primary product candidate is EQ001, which is a clinical stage first-in-class monoclonal antibody that selectively targets the novel immune checkpoint receptor CD6. CD6 plays a central role in effector T cell activity, which drives a number of immuno-inflammatory diseases such as graft versus host disease, asthma, uveitis, colitis, lupus and multiple sclerosis. The company raised \$65.38 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol EQ on October 12, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
2	IPO	2018	\$65.38M	\$65.38M	\$169.16M	\$234.54M	Clinical Trials – General
1	Early Stage VC	Undisclosed	Undisclosed				Startup

Source: PitchBook; Connect
 Grants are not included in "Raised to Date" values; S&P Capital IQ; Roth Capital Partners



CAPITAL

INITIAL PUBLIC EQUITY OFFERINGS (IPOS)

Synthorox
(NasdaqGS: THOR)



\$131.04 Million IPO
Founded 2014
Went Public 12/7/2018

Synthorx Inc. is a biopharmaceutical company focused on prolonging and improving the lives of people with cancer and autoimmune disorders. The company, through its platform technology, expands the genetic code by adding a new DNA base pair. Its lead product candidate includes THOR-707 a variant of IL-2 designed to kill tumor cells. It uses the Expanded Genetic Alphabet platform technology to develop cytokine Synthorins. It has designed cytokine Synthorin programs, including IL-2, IL-10 and IL-15, for the treatment of cancer, and another IL-2 Synthorin program for the treatment of autoimmune disorders. The company raised \$131.04 million in its initial public offering on the NASDAQ stock exchange under the ticker symbol THOR on December 7, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
4	IPO	2018	\$131.04M	\$210.04M	\$201.49M	\$332.53M	Pre-Clinical Trials
3	Later Stage VC (Series C)	2018	\$63M	\$79M	\$45M	\$108M	Product Development
2	Early Stage VC (Series B)	2016	\$10M	\$16M	\$15M	\$25M	Product Development
1	Early Stage VC (Series A)	2014	\$6M	\$6M	\$5M	\$11M	Product Development

Zander Therapeutics



Disbursement of 3 Million shares
Founded 2015
Went Public 5/10/2018

Developer of veterinary treatments for cancer and autoimmune disorders designed to utilize small molecule therapies for treating autoimmune disorders (arthritis) in animal companions, feline leukemia (cats), and canine cancer (dogs). The company's products treat blood disorders using small molecules based on nuclear receptor NR2F6 under a license agreement for veterinary use.

Arlo Technologies
(NYSE: ARLO)



\$167.4 Million IPO
Founded 2014
Went Public 8/3/2018

Arlo Technologies Inc. is engaged in the provision of security and video monitoring solutions for homes and businesses. Its product portfolio comprises Arlo Security Camera, Arlo Q and Arlo Q Plus, Arlo Pro, Arlo Baby, Arlo Audio Doorbell and Arlo Chime, and Arlo Security Light. The company conducts its business across many geographic regions: Americas, Asia-Pacific, Europe, the Middle East and Africa. Geographically the company receives maximum revenue from the Americas. The company raised \$167.4 million in its initial public offering on the New York Stock Exchange under the ticker symbol ARLO on August 3, 2018.

Funding Round	Deal Type	Date	Amount	Raised to Date	Pre-Valuation	Post-Valuation	Stage
1	IPO	2018	\$167.4M	\$163.4M	\$1.0B	\$1.16B	Profitable

Source: PitchBook; Connect
Grants are not included in "Raised to Date" values; S&P Capital IQ; Roth Capital Partners



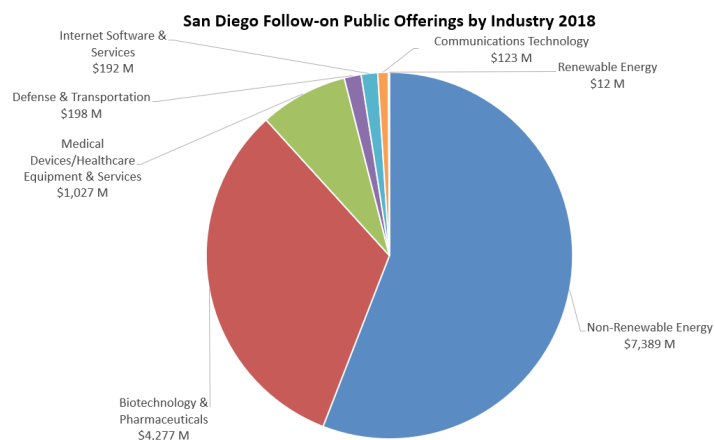
CAPITAL

FOLLOW-ON PUBLIC EQUITY OFFERINGS - \$13.2 BILLION IN ADDITIONAL FUNDING FOR SAN DIEGO TECH & LIFE SCIENCES COMPANIES

Company (Issuer)	Total Public Offering Amount (\$M)	Number of Public Offerings
Sempra Energy (NYSE:SRE)	6968.83	9
DexCom, Inc. (NasdaqGS:DXCM)	750	1
Illumina, Inc. (NasdaqGS:ILMN)	650	1
Ligand Pharmaceuticals Incorporated (NasdaqGM:LGND)	650	1
Realty Income Corporation (NYSE:O)	497.5	1
San Diego Gas & Electric Company	398.23	1
Arena Pharmaceuticals, Inc. (NasdaqGS:ARNA)	352.75	1
Heron Therapeutics, Inc. (NasdaqCM:HRTX)	350.66	2
Viking Therapeutics, Inc. (NasdaqCM:VKTX)	298.25	3
Gossamer Bio, Inc. (NasdaqGS:GOSS)	276	1
ACADIA Pharmaceuticals Inc. (NasdaqGS:ACAD)	275	1
Retrophin, Inc. (NasdaqGM:RTRX)	240	1
AnaptysBio, Inc. (NasdaqGS:ANAB)	207.81	1
ChaSerg Technology Acquisition Corp. (NasdaqCM:CTAC)	200	1
Cubic Corporation (NYSE:CUB)	198	1
Talend S.A. (NasdaqGM:TLND)	190.34	1
Innovative Industrial Properties, Inc. (NYSE:IIPR)	176.8	2
Tandem Diabetes Care, Inc. (NasdaqGM:TNDM)	160	2
Encore Capital Europe Finance Limited	150	1
Synthorx, Inc. (NasdaqGS:THOR)	131.04	1
Fate Therapeutics, Inc. (NasdaqGM:FATE)	125	1
QUALCOMM Incorporated (NasdaqGS:QCOM)	123.05	1
Mirati Therapeutics, Inc. (NasdaqGS:MRTX)	106.84	1
Crinetics Pharmaceuticals, Inc. (NasdaqGS:CRNX)	102	1

\$13.2 Billion raised by 46 San Diego companies through 62 follow-on public offerings (FPOs) in 2018

The total raised in 2018 through follow-on public offerings was lower than the \$16.7 billion raised in 2017, but still much more than was raised in 2016, \$4.9 billion. This total was driven in large part by Sempra Energy's nine public offerings in 2018. A follow-on public offering (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 a popular method for companies to raise additional equity capital in the capital markets through a stock issue.



Non-Renewable Energy was the largest industry sector due to the nearly \$7 billion raised by Sempra Energy. San Diego Gas & Electric and Maxwell Technologies raised the remainder for this industry sector.

The biotechnology and pharmaceuticals sector had the highest number of deals, 35, which totaled \$4.2 billion raised, led by a \$650 million offering from Ligand Pharmaceuticals.

Continued on next page

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



CAPITAL

FOLLOW-ON PUBLIC EQUITY OFFERINGS - \$13.2 BILLION IN ADDITIONAL FUNDING FOR SAN DIEGO TECH & LIFE SCIENCES COMPANIES

Company (Issuer)	Total Public Offering Amount (\$M)	Number of Public Offerings
La Jolla Pharmaceutical Company (NasdaqCM:LJPC)	100.3	1
Kura Oncology, Inc. (NasdaqGS:KURA)	67	1
Ra Medical Systems, Inc. (NYSE:RMED)	66.3	1
Equillium, Inc. (NasdaqGM:EQ)	65.38	1
SeaSpine Holdings Corporation (NasdaqGS:SPNE)	50.38	1
MediciNova, Inc. (NasdaqGM:MNOV)	40	1
Evoform Biosciences, Inc. (NasdaqCM:EVFM)	39.95	1
Pfenex Inc. (AMEX:PFNX)	37.4	1
Adamis Pharmaceuticals Corporation (NasdaqCM:ADMP)	35	1
Tocagen Inc. (NasdaqGS:TOCA)	30	1
Maxwell Technologies, Inc. (NasdaqGS:MXWL)	21.45	1
Bionano Genomics, Inc. (NasdaqCM:BNGO)	20.58	1
Cytori Therapeutics, Inc. (NasdaqCM:CYTX)	20	1
TrovaGene, Inc. (NasdaqCM:TROV)	18	1
AmpliPhi Biosciences Corporation (AMEX:APHB)	13.64	3
Envision Solar International, Inc. (NasdaqCM:EVSI)	12	1
INmune Bio Inc. (NasdaqCM:INMB)	8.16	1
Biocept, Inc. (NasdaqCM:BIOC)	7.5	2
Guardion Health Sciences, Inc. (NasdaqCM:GHSI)	5	1
Apricus Biosciences, Inc.	3.55	1
NTN Buzztime, Inc. (AMEX:NTN)	1.56	1
Daré Bioscience, Inc. (NasdaqCM:DARE)	0	1
Totals	\$13.2 billion	62



STARTUP SPOTLIGHT

LOCAL INNOVATION COMPANIES



SEISMIC
Doug Winter
CEO

Developer of an end-to-end sales enablement software designed to pitch sales of a client's product. The company's software automates the creation of personalized sales materials with content that finds sales repetition, improving close rates and delivering larger deals for sales while increasing marketing's impact on the bottom line, enabling clients to automate their marketing process. Seismic is headquartered in San Diego with additional offices in North America, Europe, and Australia.



KYRIBA
Jean-Luc Robert
CEO

Developer of a cloud-based treasury and cash management software designed to help in supply chain finance, payments, and risk management operations. The company's treasury and cash management software offer cash positioning, forecasting management, automated general ledger posting, investment portfolio reporting, bank statement collection, bank and ledger reconciliations facilitation services, enabling corporate treasurers and finance teams to make strategic investment decisions and improve financial controls.



TRUVIAN
Jeff Hawkins
CEO

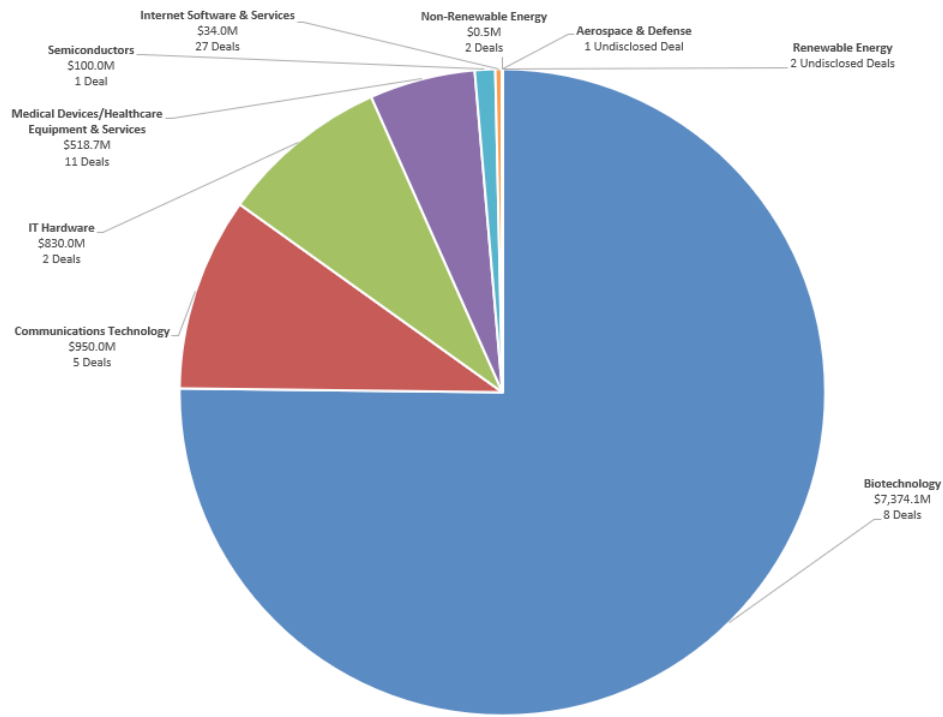
Truvian Sciences is a healthcare company at the intersection of diagnostics and consumer tech. Truvian is developing an FDA-cleared automated system that produces lab-accurate results for a full suite of health tests from a single, small sample of blood. Powered by patented technologies and intelligent integration, Truvian's benchtop solution delivers an accurate, convenient, and affordable alternative to off-site labs, producing immediate insights that care be shared with individuals in an easy-to-use digital format. With its team of visionary scientists and business leaders, Truvian is building a future of predictive medicine — a future in which individuals, with their healthcare providers, have information they need, when they need it, to stop disease before it starts.



MERGERS & ACQUISITIONS

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

\$9.8 billion in technology and life sciences M&A deals were closed in 2018 where the target was a San Diego company.



One large deal in the biotechnology sector accounted for **\$7 BILLION** – the acquisition of Impact Biomedicines.

Biotechnology M&A activity accounted for over **75 PERCENT** of total deal value in San Diego county for 2018.

The communications technology sector accounted for the **NEXT BIGGEST** portion of deal value, almost 10 percent, largely driven by Best Buy's acquisition of GreatCall for \$800 million.

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



MERGERS & ACQUISITIONS

TOP 10 SAN DIEGO TECHNOLOGY AND LIFE SCIENCES M&A DEALS IN 2018

Company Acquired	Deal Amount (in \$M)	Buyers	Sellers	Industry
Impact Biomedicines, Inc.	\$7,000	Celgene Corporation (NasdaqGS:CELG)	Oberland Capital Management LLC; Medicxi Ventures (UK) LLP	Biotechnology
GreatCall, Inc.	\$800	Best Buy Co., Inc. (NYSE:BBY)	GTCR, LLC	Communications Technology
Pulse Electronics Corporation	\$740	Yageo Corporation (TSEC:2327)	Oaktree Capital Management, L.P.	IT Hardware
ACEA Biosciences, Inc.	\$250	Agilent Technologies, Inc. (NYSE:A)	—	Medical Devices/Healthcare Services & Equipment
Zavante Therapeutics, Inc.	\$182.95	Nabriva Therapeutics plc (NasdaqGS:NBRV)	—	Biotechnology
AVX Antenna, Inc.	\$150	AVX Corporation (NYSE:AVX)	—	Communications Technology
Genoptix, Inc.	\$138.66	NeoGenomics Laboratories, Inc.	Ampersand Capital Partners; 1315 Capital LLC	Medical Devices/Healthcare Services & Equipment
Orion Ophthalmology LLC	\$117.01	IVERIC bio, Inc. (NasdaqGS:OPHT)	Versant Venture Management, LLC	Biotechnology
Edico Genome, Inc.	\$100	Illumina, Inc. (NasdaqGS:ILMN)	—	Semiconductors
Astute Medical, Inc.	\$90	bioMérieux S.A. (ENXTPA:BIM)	Delphi Ventures; Domain Associates, L.L.C.; MPM Capital; De Novo Ventures; Bio-Techne Corporation (NasdaqGS:TECH); Ortho-Clinical Diagnostics, Inc.; Kaiser Permanente Ventures	Medical Devices/Healthcare Services & Equipment

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



RESEARCH GRANTS

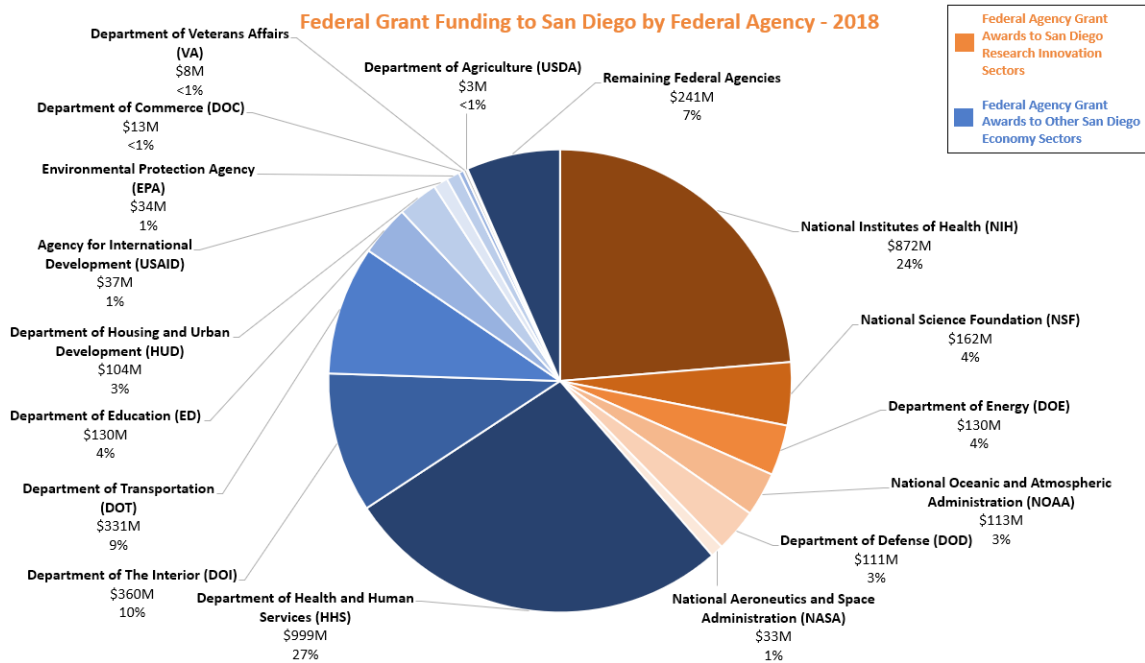
FEDERAL GRANTS – HIGHLIGHTS

Federal agencies significantly increased the amount of research grant money - \$3.7 billion - invested into the San Diego region in 2018, up from \$2.4 billion in 2017. About 39 percent of total funding, more than \$1.4 billion, 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.

Two agencies, the Department of Health and Human Services (DHHS) - largely through the National Institutes of Health (NIH) - and the National Science Foundation (NSF), account for about 28 percent of the federal grant funding supporting innovation in San Diego. Federal grant funding awarded to San Diego institutions and companies by the NIH and NSF totaled more than \$1 billion in 2018, as compared to \$1 billion in 2017 and \$1.15 billion awarded in 2016. NIH grant awards in 2018 totaled \$872 million. NSF grant awards totaled \$162 million.

Other bureaus of DHHS, not including the NIH, awarded almost \$1 billion 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 \$130 million from the Department of Energy (DOE), \$113 million from the National Oceanic and Atmospheric Administration (NOAA), \$111 million from the Department of Defense (DOD), and \$33 million from the National Aeronautics and Space Administration (NASA).



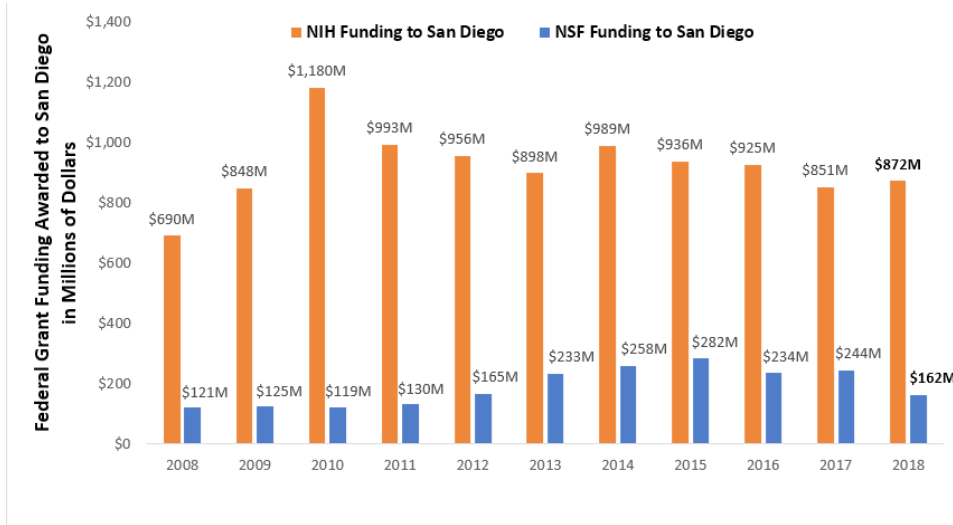
Source: www.usaspending.gov; NSF; NIH; Connect



RESEARCH GRANTS

FEDERAL GRANTS – HIGHLIGHTS

TOTAL NIH AND NSF GRANT FUNDING TO SAN DIEGO RESEARCH INSTITUTIONS AND COMPANIES: \$1B IN 2018



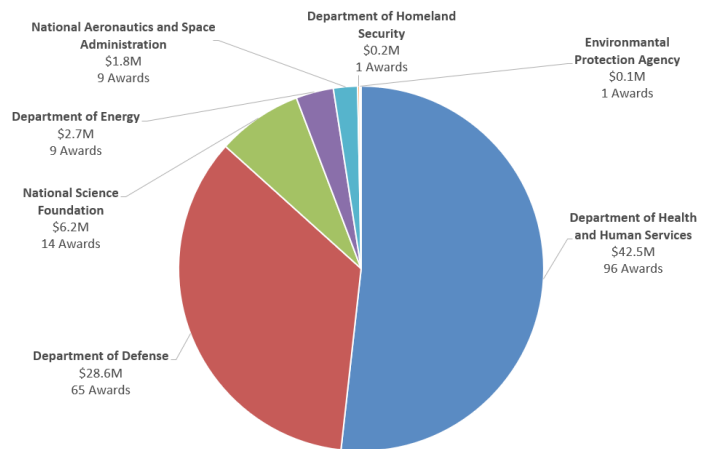
Over \$82 million in Small Business Innovation Research-Small Business Technology Transfer (SBIR-STTR) grant funding was awarded to San Diego companies and institutions in 2018. This is a slight reduction compared to the \$101 million awarded by the government agency in 2017.

The Department of Health & Human Services, primarily through the NIH, awarded over 50 percent of the total SBIR-STTR grants with 96 awards totaling more than \$42 million dollars in 2018. This is similar to the \$42.5 million awarded in 2017. SBIR-STTR grants awarded by the Department of Defense totaled \$28.6 million, also down from 2017, when \$40.9 million was awarded, but up over 2016 when \$7 million was awarded.

The SBIR program encourages small businesses to engage in federal research/research and development (R&D) that has the potential for commercialization.

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

2018 SBIR-STTR GRANT AWARDS – SAN DIEGO COUNTY



Source: NIH, NSF, www.sbir.gov; Connect



RESEARCH GRANTS

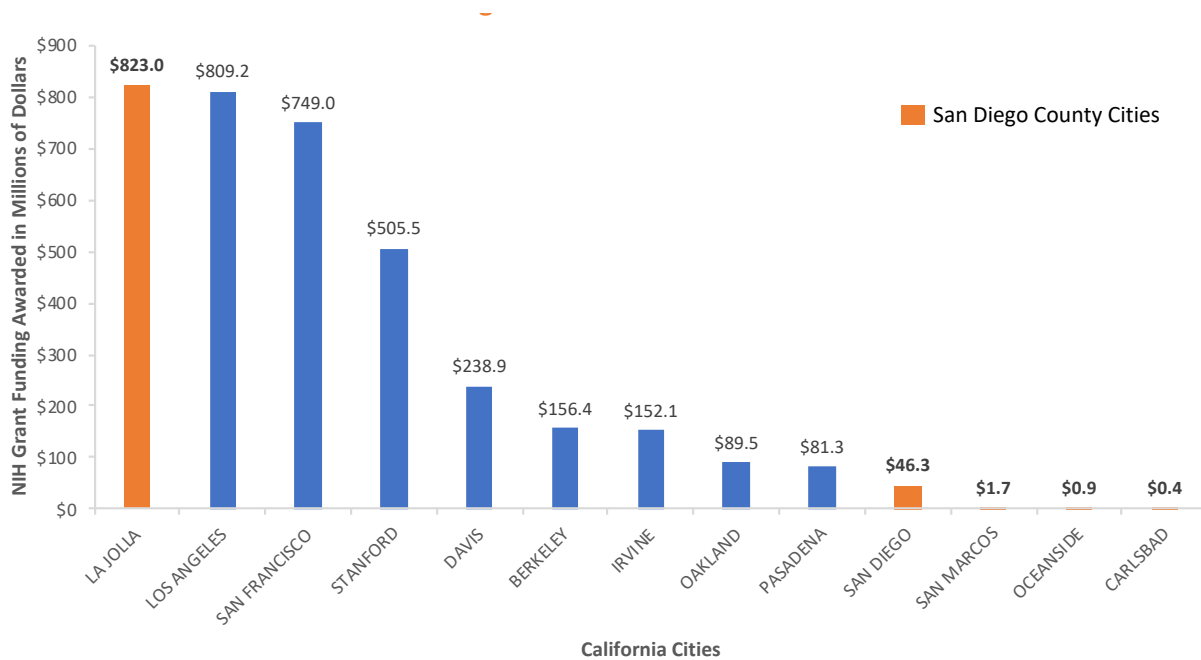
FEDERAL RESEARCH GRANTS – NIH TOP AWARDS IN CALIFORNIA BY CITY



NIH Grant Funding Awarded in 2018 by City - California

San Diego County institutions and companies received more than \$870 million in research grant funding from the National Institutes of Health in 2018. La Jolla ranked as the number one city in California for NIH research funding in 2018 with more than \$823 million or about 20 percent of the entire amount of NIH funding received in California. In 2018 Los Angeles ranked second with \$809 million, and San Francisco ranked third with \$749 million. The city of San Diego ranked eleventh with \$46.3 million. Another \$3 million in NIH research grant funding was received by companies and institutions in San Marcos, Oceanside, and Carlsbad.

NIH GRANT FUNDING AWARDED TO CALIFORNIA CITIES IN 2018



CITY OF LA JOLLA RANKED #1 IN CALIFORNIA FOR NIH GRANT FUNDING RECEIVED IN 2018 WITH \$823 MILLION.

Source: NIH; Connect



RESEARCH GRANTS

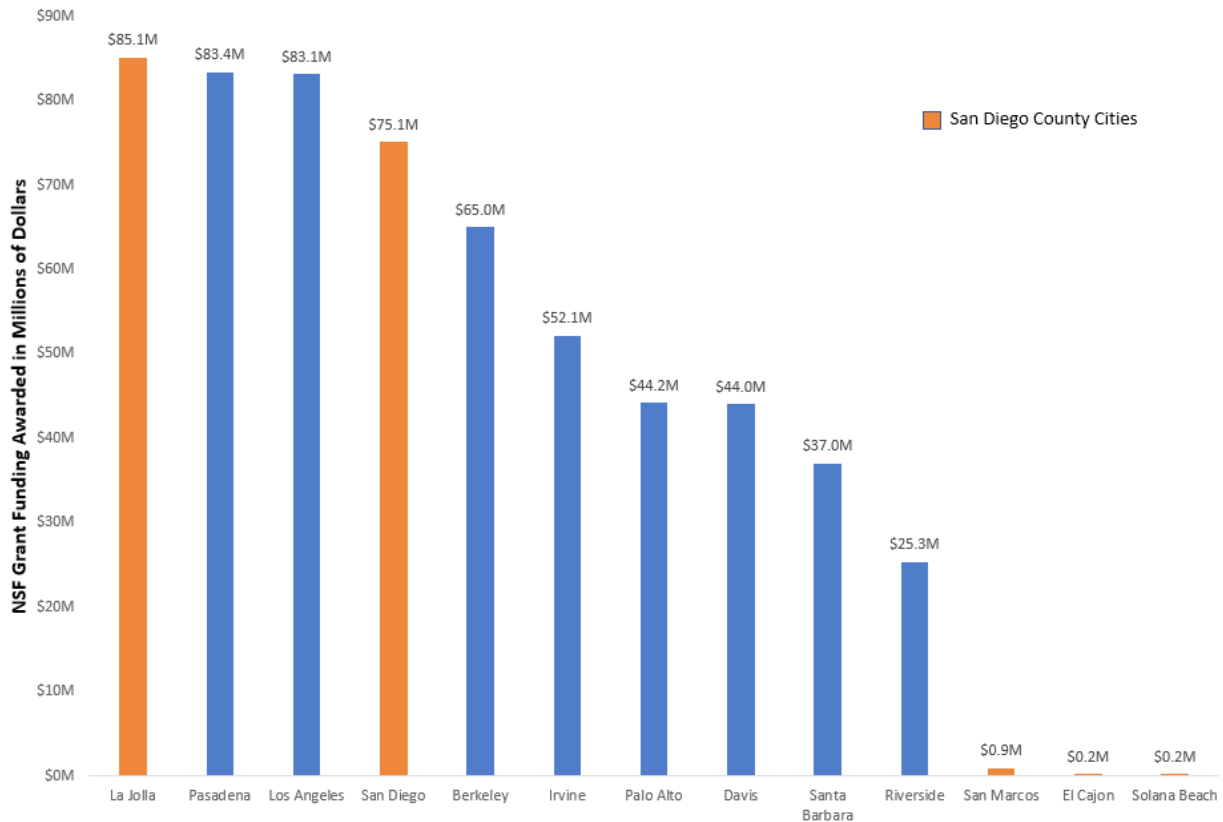
FEDERAL RESEARCH GRANTS – NSF TOP AWARDS IN CALIFORNIA BY CITY

NSF Grant Funding Awarded in 2018 by City – California

La Jolla ranked as the number one city in California for NSF research funding in 2018 with \$85.1 million, 11.5 percent of the total awards granted in the state of California. NSF research grant funding to La Jolla institutions and companies dropped significantly in 2018 from \$215.3 million in 2017, and \$211 million in 2016. The city of San Diego received a large increase in grant funding of \$75.1 million in 2018, up from \$22.6 million in 2017; which represents a 232 percent increase. An additional \$1.3 million of NSF research grant funding was received by companies and institutions in San Marcos, El Cajon, and Solana Beach.



NSF GRANT FUNDING AWARDED TO CALIFORNIA CITIES IN 2018



CITY OF LA JOLLA RANKED #1 IN CALIFORNIA FOR NSF GRANT FUNDING RECEIVED IN 2018 WITH \$85.1 MILLION

Source: NSF; Connect



RESEARCH GRANTS

FEDERAL RESEARCH GRANTS – TOP AWARDS IN CALIFORNIA BY INSTITUTION

NIH Grant Funding to Top California Institutions in 2018

UC San Diego ranked third in California for NIH funding in 2018 with a total of \$459.1 million awarded to researchers through 958 awards. The Scripps Research Institute in La Jolla was also among the top seven California Institutions with \$196.6 million in awards. The top San Diego institutions receiving NIH awards in 2018 are highlighted in bold below. UC San Francisco ranked first with \$647.9 million and 1,309 awards.

NIH Grant Funding to Top California Institutions in 2018				
California Ranking	Institution	City	NIH Award Amount	Number of Awards
1	University of California, San Francisco	San Francisco	\$647.9M	1,309
2	Stanford University	Stanford	\$505.5M	1,059
3	University of California, San Diego	San Diego	\$459.1M	958
4	University of California, Los Angeles	Los Angeles	\$409.7M	842
5	University of Southern California	Los Angeles	\$273.5M	458
6	University of California, Davis	Davis	\$238.9M	492
7	Scripps Research Institute	La Jolla	\$196.6M	255
8	University of California, Irvine	Irvine	\$150.6M	314
9	University of California, Berkeley	Berkeley	\$128.4M	346
10	California Institute of Technology	Pasadena	\$79.9M	149
14	Salk Institute for Biological Studies	La Jolla	\$53.9M	105
15	Sanford Burnham Prebys Medical Discovery Institute	La Jolla	\$53.9M	91
17	La Jolla Inst for Allergy & Immunolgy	La Jolla	\$37.7M	58
25	San Diego State University	San Diego	\$24.1M	59
39	J. Craig Venter Institute, Inc.	La Jolla	\$8.1M	8
40	Ludwig Institute for Cancer Res Ltd	La Jolla	\$7.9M	18
42	Veterans Medical Research FDN/San Diego	San Diego	\$5.4M	13
48	Proteogenomics Research Instit/Sys/ Med	La Jolla	\$4.3M	5
57	San Diego Biomedical Research Institute	San Diego	\$2.2M	3
58	Ensysce Biosciences, Inc.	San Diego	\$2.1M	1
61	Ocean Nanotech, LLC	San Diego	\$2.0M	1
66	California State University San Marcos	San Marcos	\$1.7M	7
67	California Medical Innovations Institute	San Diego	\$1.7M	1
69	Scripps Health	San Diego	\$1.6M	4
78	Sharp Memorial Hospital	San Diego	\$1.2M	2

*Institutions ranked by total amount of awards



RESEARCH GRANTS

FEDERAL RESEARCH GRANTS – TOP AWARDS IN CALIFORNIA BY INSTITUTION

NSF Grant Funding to Top California Institutions in 2018

UC San Diego ranked fourth in California for NSF funding in 2018, dropping from first in 2017 and second in 2016. In 2018 UC San Diego received \$50.5 million awarded across 124 grants. The California Institute of Technology ranked first with \$83.4 million granted across 69 awards.

NSF Grant Funding to Top California Institutions in 2018				
California Ranking	Institution	City	NSF Award Amount	Number of Awards
1	California Institute of Technology	Pasadena	\$83.4M	69
2	University of California, Berkeley	Berkeley	\$56.8M	137
3	University of California, Irvine	Irvine	\$51.4M	113
4	University of California, San Diego	La Jolla	\$50.5M	124
5	University of California, Davis	Davis	\$43.6M	121
6	Stanford University	Stanford	\$41.3M	107
7	University of Southern California	Los Angeles	\$40.8M	97
8	University of California, Los Angeles	Los Angeles	\$35.8M	114
9	University of California, Santa Barbara	Santa Barbara	\$34.7M	93
10	Scripps Institute of Oceanography	La Jolla	\$29.8M	47
13	San Diego State University	San Diego	\$10.3M	31

*Institutions ranked by total amount of awards



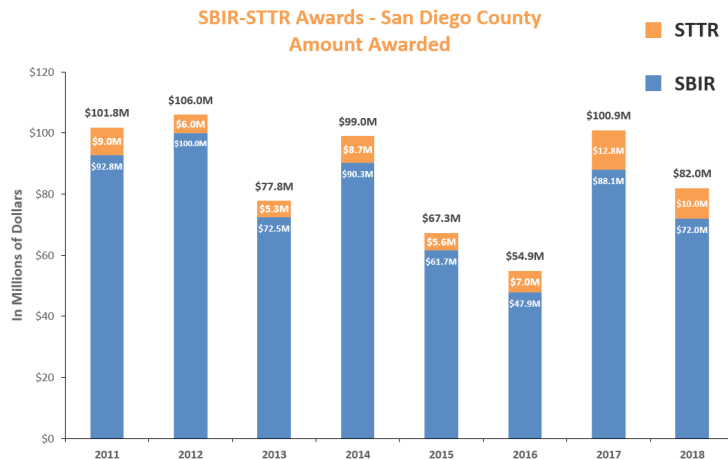
RESEARCH GRANTS

FEDERAL RESEARCH GRANTS – SBIR-STTR AWARDS

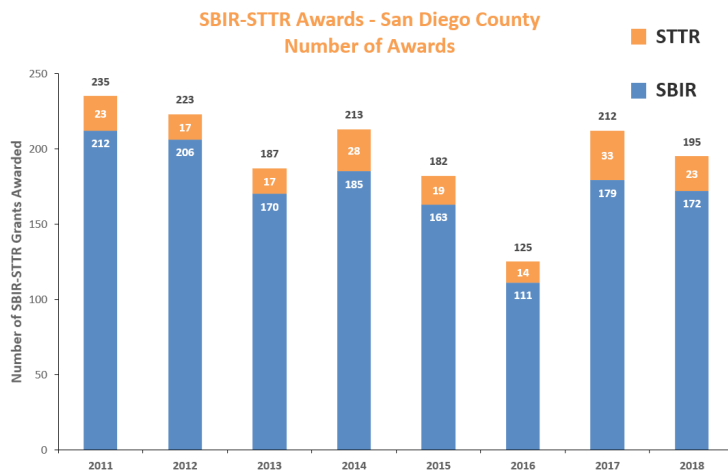
The SBIR program encourages small businesses to engage in federal research/research and development (R/R&D) that has the potential for commercialization.

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

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, and funded by federal agency budget allocations.



SBIR-STTR grant awards to San Diego companies and institutions in 2018 dropped to \$82 million from \$100.9 million in 2017. The Department of Health and Human Services, primarily through the NIH, awarded more than 50 percent of the total amount of SBIR-STTR grants awarded in 2018, with 96 awards totaling \$42.5 million. SBIR-STTR grants awarded by the Department of Defense totaled \$28.6 million, down from \$40.9 million in 2017 but still above the 2016 level of \$7 million.



The number of SBIR-STTR grants awarded to San Diego companies and research institutions in 2018 decreased to 195 from 212 in 2017. This variance can be partly attributed to the reduction in Department of Defense awards in 2018 – 65 as opposed to 89 in 2017.

Source: www.sbir.gov; Connect



RESEARCH GRANTS

FEDERAL GRANTS – TOP SBIR-STTR AWARDS BY COMPANY IN 2018

124 small businesses in San Diego County received 195 SBIR-STTR awards totaling \$82 million in 2018. The number of companies and total amount awarded was down compared to 2017, when 126 small businesses received 212 awards totaling \$101 million. The top 20 awarded companies are shown below.

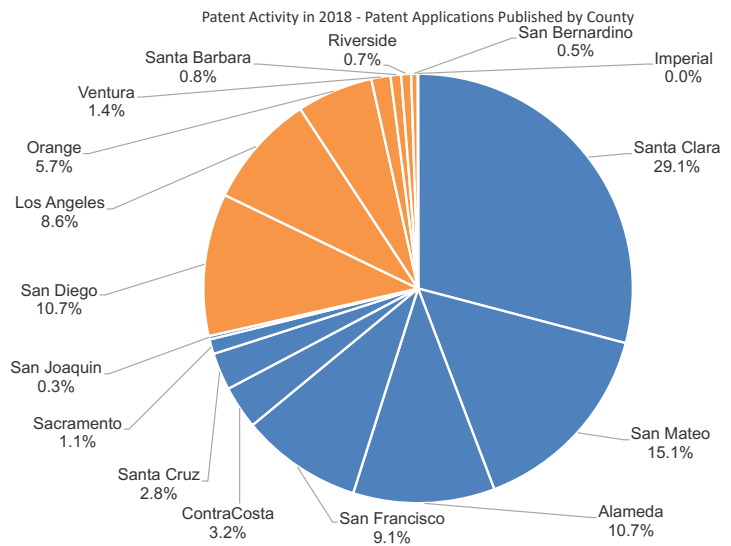
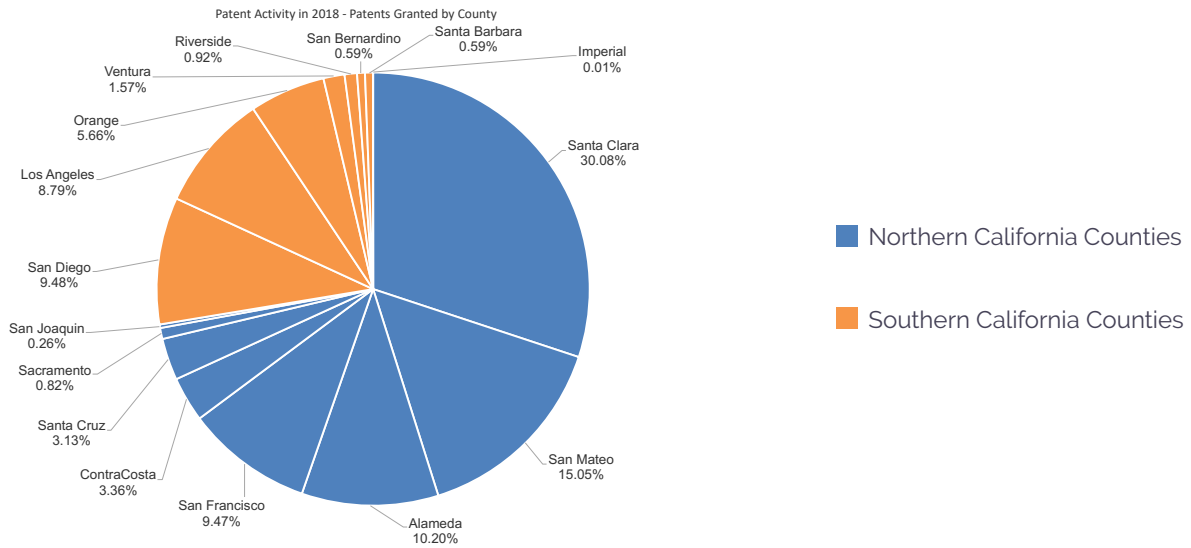
	Company	SBIR Amount Awarded in 2018	Number of Awards
1	Engineering And Software System Solutions, Inc.	\$7,276,581	9
2	Ocean Nano Tech LLC	\$2,450,000	3
3	SPACE MICRO INC	\$2,352,029	8
4	VALA SCIENCES, INC.	\$2,091,838	4
5	Peptide Logic LLC	\$2,064,299	2
6	Nu-Trek	\$1,995,458	3
7	Innoflight, Inc.	\$1,972,539	4
8	ORPRO THERAPEUTICS, INC.	\$1,952,487	3
9	3dt Holdings, LLC	\$1,851,636	2
10	Arima Genomics Inc	\$1,573,140	1
11	Matrix Sensors, Inc.	\$1,529,831	2
12	Epigen Biosciences, Inc.	\$1,523,446	3
13	Royal Caliber	\$1,499,996	1
14	SEACOAST SCIENCE, INC.	\$1,475,000	4
15	Crosslife Technologies Inc.	\$1,366,143	3
16	ATA Engineering, Inc.	\$1,278,132	5
17	Tristan Technologies, Inc.	\$1,146,606	2
18	Zeno Management, Inc.	\$1,139,689	1
19	ELECTRONIC BIOSCIENCES, INC.	\$1,130,108	4
20	PREDICTIVE BIOLOGY	\$1,099,488	2
	SBIR-STTR Activity - Top 20 Recipients in San Diego	\$38,768,446	66
	Total SBIR-STTR Activity - San Diego County	\$82,018,109	195



PATENTS

APPLICATIONS GRANTED AND PUBLISHED IN CALIFORNIA

Patent activity is one reflection of innovation activity in the region. In 2018, 8,082 patent applications were published, and 7,035 patents were granted. Patent applications published in 2018 increased slightly over 2017 when 8,007 applications were published, but applications granted dropped slightly from 7,346 in the year prior.



Source: United States Patent & Trade Office; UC San Diego Extension; Connection



PATENTS

San Diego is...

#1

County in Southern California for patents granted and applications published

#4

County in California for patents granted – Outpacing San Francisco county by 8 patents granted

#3

County in California for new patent applications published – Outpacing Alameda county by 47 patent applications





SPEED
LIMIT
35

NO RECYCLE
NO BICYCLING
NO SKATEBOARDING
NO STAYING

THE SAN DIEGO REGIONAL INNOVATION REPORT

IS CREATED BY CONNECT W/ SAN DIEGO VENTURE GROUP



CONNECT

W/ SAN DIEGO VENTURE GROUP

For more than 30 years, both Connect and San Diego Venture Group have focused on supporting and elevating entrepreneurs in the San Diego region. Combining the deep histories and wide successes of each organization creates a powerhouse of resources such as mentorship, education, and capital for innovators.

Connect w/ San Diego Venture Group serves entrepreneurs and startups throughout their growth journey, from early stage to capital raise, with a suite of curated programs and events to help companies grow, gain access to capital, and scale.

The 2018 Innovation Report is Sponsored by

County of San Diego Community Enhancement Fund

In Partnership with

PitchBook



SAN DIEGO AND IMPERIAL NETWORK

connect.org/innovation-report

For additional information or inquiries about the 2018 San Diego Innovation report, please email team@connect.org.

Connect w/ SDVG is part of the San Diego & Imperial SBDC Network, serving entrepreneurs and small businesses with low to no-cost services to support business growth.



CONNECT

W/ SAN DIEGO VENTURE GROUP