



# SAN DIEGO INNOVATION REPORT / 2015



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# A WORD FROM THE PRESIDENT & CEO

## GREG MCKEE



Photo by: Melissa Jacobs

### CEO Executive Summary

Since 2005, CONNECT has monitored and measured the growth of the innovation economy in the San Diego region. I'm proud to present the San Diego community with the 2015 Innovation Report - another banner year for San Diego.

Over the past few years we've seen several key trends emerging in San Diego's innovation economy. To that point, we analyzed the last four years of reports and have found the following trends of interest:

- The innovation sector is gaining a strong foothold in San Diego's economy. The innovation economy has grown to \$52 billion dollars, which represent almost a quarter of San Diego's GDP.
- There is faster and more robust growth of innovation startups. 2013-2015 saw more than 400 startups created each year in San Diego County. That's an increase from an average of 300 startups each year between 2005 and 2012. San Diego was also the number one county for creation of new life sciences startups in 2015.
- There is steady job growth in the innovation sector. Employment in San Diego's innovation economy has grown steadily since 2011 from 136,000 jobs to nearly 150,000 in 2015. With an average salary of over \$116,000, innovation

economy jobs pay, on average, 2.4 times the average job in San Diego.

- Venture funding to early stage companies is trending up. Seed stage deal funding was up more than 600 percent in 2015 over 2014 and early stage deal funding was up more than 170 percent. Forty percent of the San Diego's VC funding went to seed and early stage companies in 2015.

- Corporate M&A activity in the innovation sector is on an upswing. San Diego's innovation economy represents almost 80 percent of the region's total mergers & acquisitions deal value in 2015 totaling \$31 billion dollars.

- Research in San Diego is big business. San Diego's research institutions have a \$4.6 billion dollar economic impact and are the core of the region's \$14.4 billion dollar scientific R&D cluster.

CONNECT is dedicated to the success of the tech and life sciences companies for the growth and good of the San Diego region. In the past year CONNECT has continued to strengthen and refine our flagship program - the Springboard Accelerator Program; we've launched programs to match innovation companies with the capital and talent they need to grow and we've expanded the offerings of programming for growing innovation companies.

We're committed to help San Diego create the next 10 \$1 billion dollar innovation companies in our region. The CONNECT Innovation Report provides hard evidence that the work we do with our entrepreneurs, research institutes, mentors, investors, and partners has tangible outcomes that grow the San Diego economy in an impactful way. We're proud to take a leading role in growing San Diego's future.

**Greg McKee**  
Chief Executive Officer CONNECT

# REPORT HIGHLIGHTS

## GROWTH

NEW Technology & Life Science Startups

**255** NEW SOFTWARE COMPANIES CREATED

**82** NEW LIFE SCIENCES COMPANIES CREATED

**50** NEW COMMUNICATIONS, COMPUTER & ELECTRONICS COMPANIES CREATED

**8** NEW AEROSPACE, NAVIGATION & MARITIME TECH COMPANIES CREATED

**7** NEW ENVIRONMENTAL TECHNOLOGY COMPANIES CREATED

**3** NEW RECREATIONAL GOODS MANUFACTURING COMPANIES CREATED

**405**

NEW INNOVATION STARTUPS IN 2015

(449 New Innovation Startups in 2014)

New Startup Jobs Created

SAN DIEGO INNOVATION STARTUPS CREATED 1,650  
NEW JOBS IN 2015

Top Sectors

**906** NEW SOFTWARE JOBS CREATED

**342** NEW COMMUNICATIONS, COMPUTER & ELECTRONICS JOBS CREATED

**330** NEW LIFE SCIENCES JOBS CREATED

**1,275** NEW INNOVATION STARTUPS CREATED IN SAN DIEGO COUNTY IN 2013-2015  
**4,725** NEW JOBS CREATED BY INNOVATION STARTUPS IN SAN DIEGO COUNTY IN 2013-2015

## FUNDING

### Equity Capital Markets

**\$187** million was raised by 3 San Diego companies in initial public equity offerings (IPOs) in 2015

**\$2.7** billion was raised by 40 San Diego companies in follow-on public equity offerings (FPOs) in 2015

### Venture Capital Funding

**\$1.2** billion in venture capital was invested in 104 deals in San Diego in 2015

### Grant Funding

**\$936** million in NIH grant funding to San Diego companies and institutions in 2015

**\$67** million in SBIR-STTR grant funding to San Diego companies and institutions in 2015

### Angel Funding

**\$74** million in angel capital was invested in 122 deals in San Diego in 2015

**\$282** million in NSF grant funding to San Diego companies and institutions in 2015

**\$41** million in NASA and NOAA grant funding to San Diego companies and institutions in 2015

## INTELLECTUAL PROPERTY

### Patents

**#1** ranked county in Southern California for patents granted and patent applications published

**6,957** Patent applications published in 2015. Second ranked county in California

**6,443** Patents granted in 2015. Second ranked county in California

## ECONOMIC IMPACT

### Economic Activity (Gross Domestic Product)

The innovation economy accounted for almost **\$52 BILLION**, or 24 percent, of San Diego's economic activity (GDP) in 2015

**2.7x** job multiplier effect impact of innovation economy employment on overall San Diego region employment

San Diego's innovation economy impacts **403,890 JOBS** in the region, or 30 percent of private sector jobs, and 42 percent of the region's total labor income

# STARTUP SPOTLIGHT

FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES



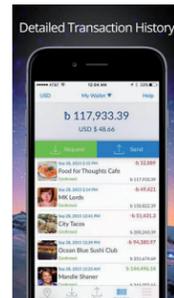
Medical Technology & Diagnostics

[abreos.com](http://abreos.com)

2013

Bradley Messmer, Ph.D.  
Founder & CEO

Abreos Biosciences is an early stage biotech company pioneering point-of-care tests for personalized dosing and counterfeit detection of biologic drugs using its proprietary Veritope™ technology. Abreos develops laboratory-based and point-of-care assays that enable personalized dosing and counterfeit detection of expensive drugs such as therapeutic monoclonal antibodies. Their reagents and assays are customizable and can be developed for the detection of any biologic drug in a variety of formats, including lateral flow and ELISA.



Fintech/Security/Blockchain

[airbitz.co](http://airbitz.co)

2014

Paul Puey  
CEO & Co-Founder

Airbitz created a mobile friendly software toolkit, SDK, that provides client-side auto encryption, auto backup, device-to-device synchronization, and one-touch 2 factor with a familiar user interface. Targeted to blockchain developers, the SDK secures a blockchain application with a few lines of code allowing developers to focus on their unique application.

Applications of Airbitz technology will enable private and secure storage of your personal information including health records, financial records, authentication credentials, and sensitive documents. SDK secures data on an individual's device first with encryption that can only be unlocked with a user's credentials. Neither Airbitz, nor any 3rd party, can access user data providing the zero-knowledge, zero-trust model required to secure blockchain private keys. This "Edge Security" model significantly increases the effort to attack the system by decentralizing the data security to individual devices.



Marketplace, Social Venture, Research, Philanthropy

[benefunder.com](http://benefunder.com)

2014

Christian Braemer  
Chief Executive Officer

Benefunder is a marketplace where researchers and innovation meets impact philanthropy. Aimed at reducing the innovation deficit by matching individual programs with philanthropists, Benefunder offers a nationwide network of vetted, active programs in health, technology, environment, and arts/humanities. Each program is hosted at a top tier institution and features pre-negotiated funding terms, full transparency, and maximum efficiency.

For the first time, donors can create a personalized portfolio of best of breed researchers across institutions working in the areas they care most about. This reduces overhead, shortens funding cycles, and accelerates results. Whether you're passionate about a cure, change in policy, helping people, the next big thing, or changing the world in general, Benefunder has a deep roster of programs for you.

# GROWTH

TECHNOLOGY & LIFE SCIENCES STARTUPS IN SAN DIEGO IN 2015

405

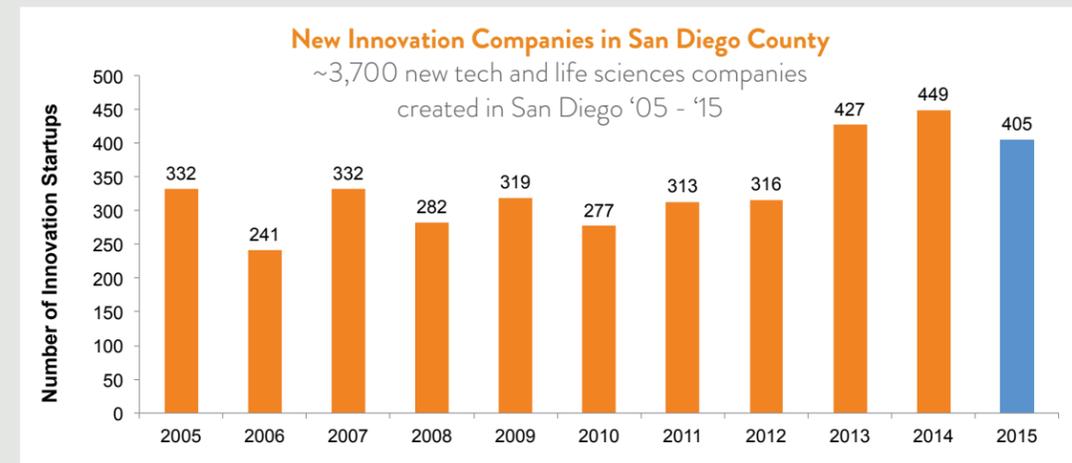
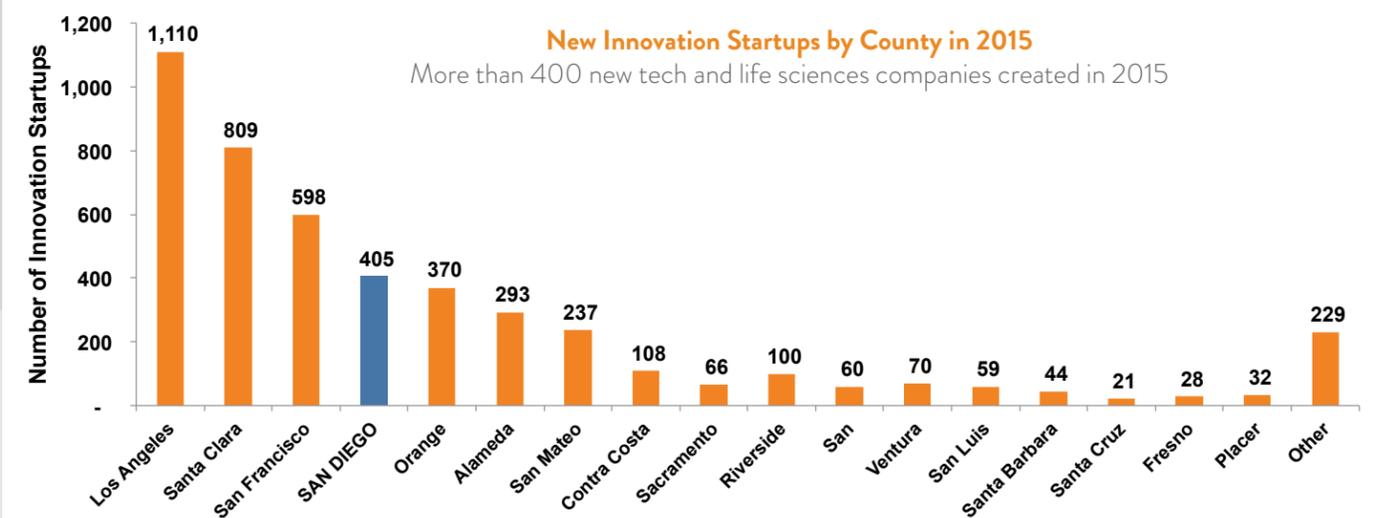
New innovation startup companies were created in 2015 in San Diego - continuing the three-year trend of more than 400 new innovation companies created a year in the San Diego region. These startups drive the future growth of San Diego's innovation economy.

4<sup>TH</sup>

San Diego County's rank, in California for new innovation startups created in 2015.

1<sup>ST</sup>

San Diego County's rank, in California for new innovation life sciences startups created in 2015.



Source: Dun and Bradstreet Hoovers; InfoUSA; CONNECT; National University System Institute for Policy Research, commissioned by CONNECT

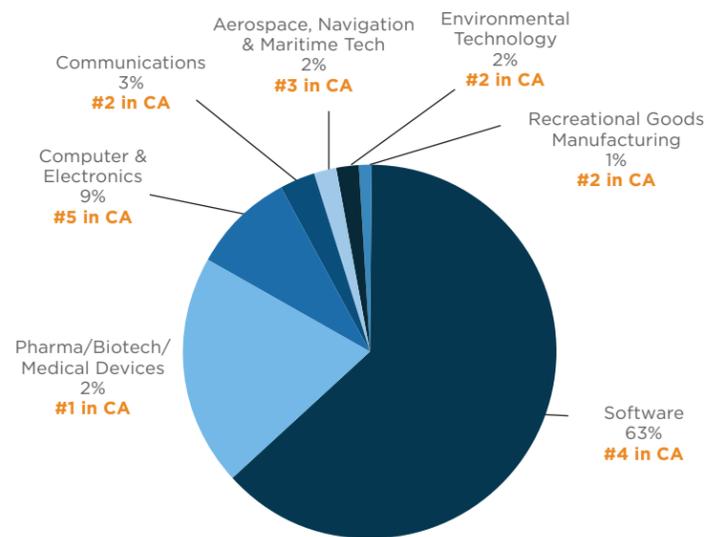
# GROWTH

## INNOVATION ECONOMY - COMPANY CREATION

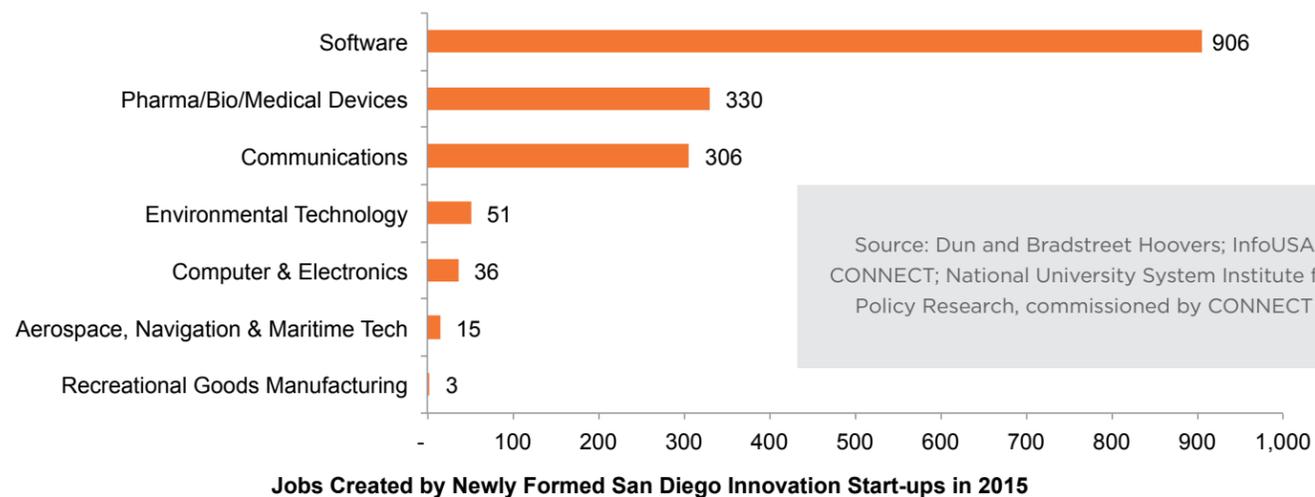
San Diego county ranked 1st in the state in the number of life sciences startups for the first time since CONNECT has published this report. San Diego County ranked 2nd in the number of communications technology, recreational goods manufacturing and environmental technology startups created in 2015.

Software startups made up more than 60 percent of San Diego's innovation startup companies in 2015 with more than 250 new software companies created, ranking San Diego county 4th in California. Software app development companies continue to drive the growth of innovation startups in San Diego and across California.

### San Diego Innovation Startups by Industry Sector 2015



### San Diego Innovation Startup Jobs Created by Industry Sector 2015



**No. 1 in California**  
2015 Life Sciences Company Startups

COUNTIES	Startups
SAN DIEGO	82
Los Angeles	79
Santa Clara	40
Orange	39
San Luis Obispo	38
Other	38
San Francisco	34
Alameda	32
Riverside	12
Sacramento	10

**No. 4 in California**  
2015 Software Company Startups

COUNTIES	Startups
Los Angeles	889
Santa Clara	670
San Francisco	537
SAN DIEGO	255
Orange	241
Alameda	230
San Mateo	220
Contra Costa	86
Riverside	55
Sacramento	43

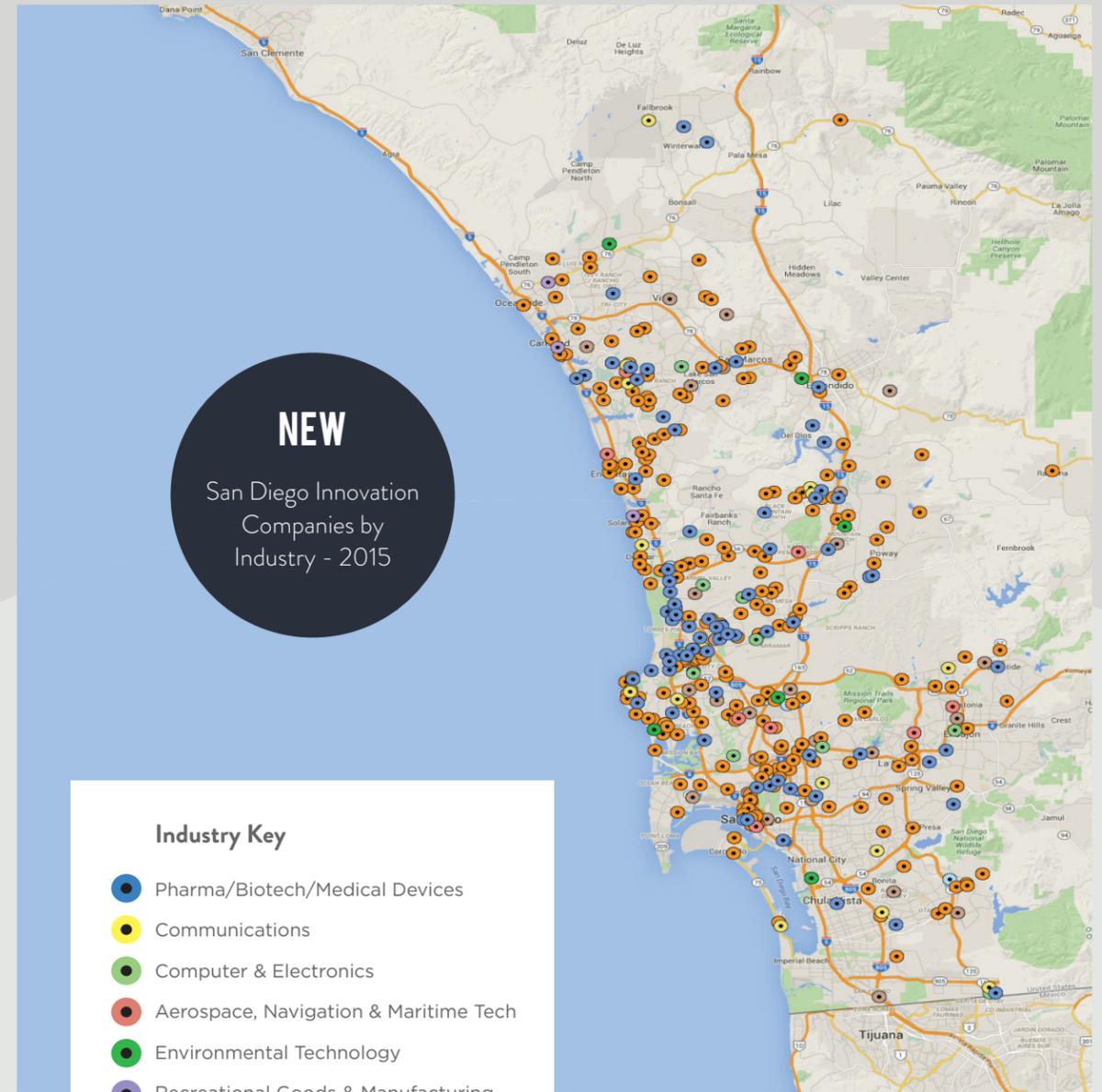
**1,650 NEW INNOVATION ECONOMY JOBS WERE CREATED BY 405 SAN DIEGO INNOVATION STARTUPS IN 2015**

Source: Dun and Bradstreet Hoovers; InfoUSA; CONNECT; National University System Institute for Policy Research, commissioned by CONNECT

# GROWTH

## GEOGRAPHY: WHERE THE STARTUPS ARE LOCATED

Technology and life sciences startup creation is widely spread throughout San Diego County



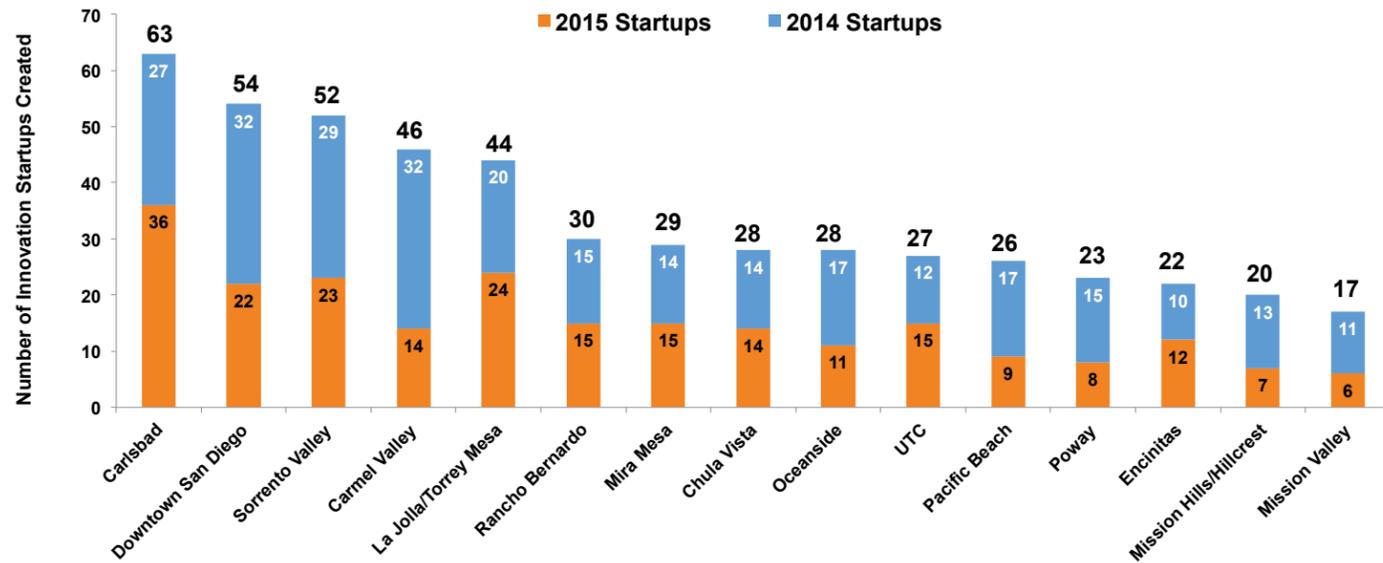
### Industry Key

- Pharma/Biotech/Medical Devices
- Communications
- Computer & Electronics
- Aerospace, Navigation & Maritime Tech
- Environmental Technology
- Recreational Goods & Manufacturing
- Software
- Engineering Services
- Commercial Physical Research

# GROWTH

## GEOGRAPHY: WHERE THE STARTUPS ARE LOCATED

Top 15 Hotspots in San Diego for Innovation Startup Creation in 2014 and 2015



A number of location clusters of startup activity have emerged: (2014-2015)

- Carlsbad (63 new innovation startups created)
- Downtown San Diego (54 new innovation startups created)
- Sorrento Valley (52 new innovation startups created)
- Carmel Valley (46 new innovation startups created)
- La Jolla/Torrey Mesa (44 new innovation startups created)
- Rancho Bernardo (30 new innovation startups created)
- Mira Mesa (29 new innovation startups created)
- Chula Vista (28 new innovation startups created)
- Oceanside (28 new innovation startups created)
- UTC (27 new innovation startups created)
- Pacific Beach (26 new innovation startups created)

Source: Dun and Bradstreet Hoovers; InfoUSA; CONNECT; National University System Institute for Policy Research, commissioned by CONNECT

# GROWTH

## SAN DIEGO INNOVATION ECONOMY – CLUSTER BREAKDOWN

In 2015 San Diego's innovation economy included approximately 6,700 companies and provided 149,440 jobs. San Diego's innovation economy is comprised of knowledge-based sectors\* on the leading-edge of research, innovation, and development of the 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
- Biotechnology and pharmaceuticals
- Communications (telecommunications)
- Computers and electronics
- Aerospace, navigation & maritime tech
- Environmental technology
- Recreational goods manufacturing
- Software

\*Innovation sectors are 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 figure below.

## 2015 SAN DIEGO'S INNOVATION ECONOMY REPRESENTED

**6,700 COMPANIES**

7% of total number of companies in San Diego County

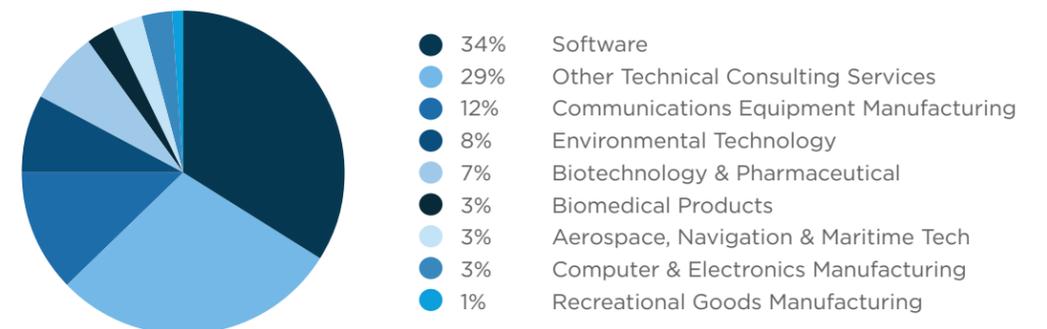
**149,440 EMPLOYEES**

11% of total employment in San Diego County

**\$15 BILLION**

23% of total payroll in San Diego County

San Diego Innovation Economy Companies in 2015: 6,700 Companies

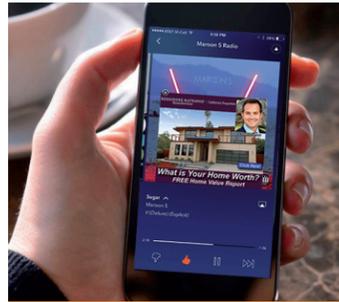


Source: National University System Institute for Policy Research, based upon California Employment Development Department, Quarterly Census of Employment and Wages (QCEW)



# STARTUP SPOTLIGHT

## FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES



Mobile Advertising Technology

[chalkdigital.com](http://chalkdigital.com)

2013

Craig Hagopian  
CEO & Founder

Chalk Digital has pioneered a new class of DIY advertising that enables brands, franchises, and businesses to reach and engage with local consumers in an easy, cost effective, real-time location delivery solution.

Chalk's mobile ad creation and publishing platform eliminates waste by enabling businesses to harness the power of location, time, and intent to more effectively engage with consumers through their mobile devices by providing them with relevant and actionable multimedia content.

By focusing on key signals, such as a person's location, time of day, and persona, Chalk's technology empowers businesses to provide consumers with valuable, timely information to educate, enrich, and engage them in a more effective and meaningful way.



Public Safety and Security & Defense

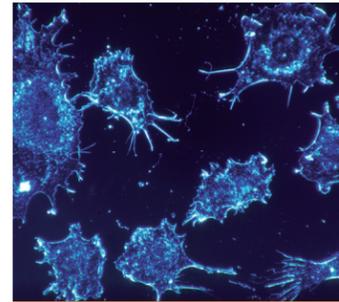
[dronecitadel.co](http://dronecitadel.co)

2016

Daniel Magy  
CEO & Founder

Citadel has created an automated, cost-effective drone defense system that automatically detects and neutralizes drones around high value targets, such as schools or sports arenas.

Citadel detection and neutralizing technology can be installed around any "high risk" target. Citadel passively detects all communication frequencies around a potential target. Citadel uses machine learning to compare all communication frequency activity to a known set of threat profiles. When a match occurs between a communication signal and a known threat profile the DFU system enters intercept mode. Authorities are notified of encroachment as soon as a threat has been engaged.



Marketplace, Social Venture, Research, Philanthropy

[curematch.com](http://curematch.com)

2015

Stéphane Richard, Ph.D.  
Chief Executive Officer

The CureMatch proprietary software platform was designed to help guide oncologists in the selection of cancer drugs for effective combination therapy. This "decision support system" analyzes the applicability of all available drugs in conjunction with the genetic profile and diagnostic analyses of the patient's own tumor. The solution leverages powerful predictive analytics and both machine and supervised learning to further advance the proprietary algorithm that drives the combination therapy recommendations. Additionally, CureMatch can digest genomic sequencing data from any company's summary report and produce an advanced level of combination therapy recommendations for the provider to consider.

The CureMatch leadership team has been assembled to add multiple dimensions to its proprietary analysis algorithms, initiate business development activities, and will be responsible for the planning and execution of the commercial launch of the solution.

# GROWTH

## SAN DIEGO INNOVATION ECONOMY - CLUSTER BREAKDOWN

**\$**

THE AVERAGE INNOVATION SECTOR JOB PAID

**2.4X**

MORE THAN THE AVERAGE JOB IN SAN DIEGO IN 2015

**AVERAGE ANNUAL SALARY**

**\$116,300**

INNOVATION ECONOMY JOB

**\$49,350**

REST OF ECONOMY JOB

San Diego Innovation Economy Annualized Wages - 2015  
Biotech and pharma jobs had the highest average annualized wage in San Diego in 2015



Source: National University System Institute for Policy Research, 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.

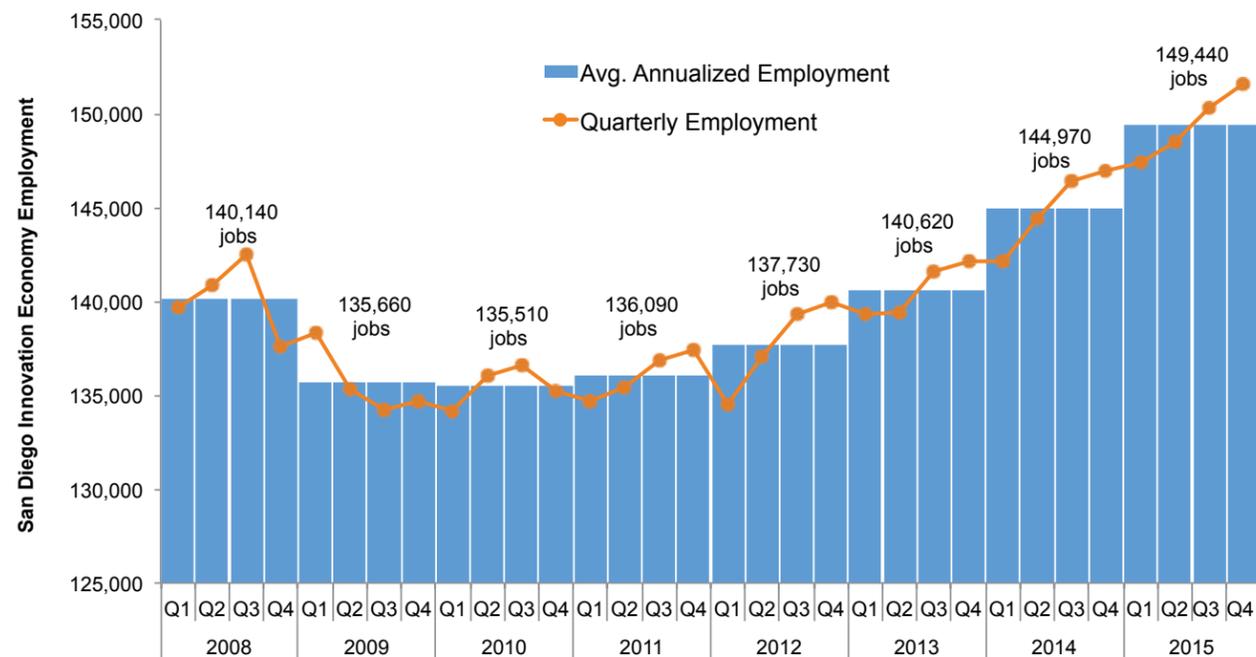
# GROWTH

## EMPLOYMENT BREAKDOWN

**SAN DIEGO INNOVATION ECONOMY GROWS TO HISTORIC HIGH IN 2015**

San Diego's innovation economy provided nearly 149,440 high-paying jobs in 2015 - an historic high. San Diego's innovation economy continued to show strong growth in 2015 adding more than 8,800 jobs since 2013. The number of innovation economy jobs grew more than three percent in 2015 as compared to 2014. Job growth was up more than 10 percent from 135,510 employed in San Diego's innovation sectors in 2010 during the economic downturn.

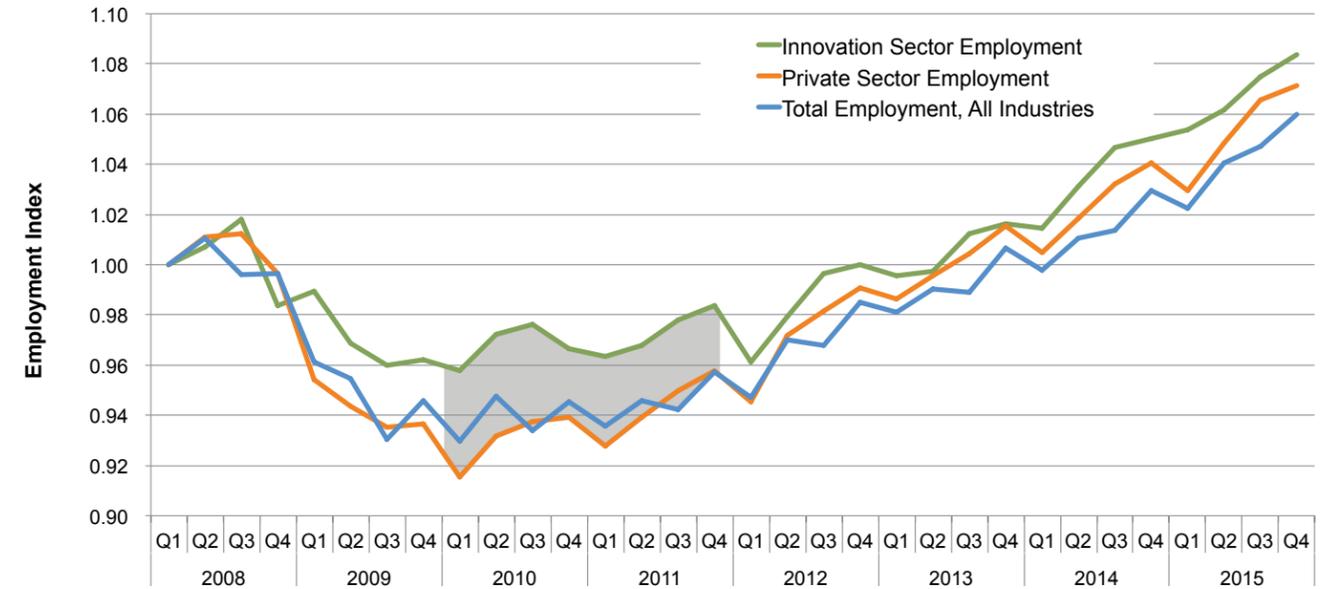
**San Diego Innovation Economy Employment: 2015 - 149,440 jobs**  
Number of innovation economy jobs hits historic high in 2015



### San Diego Innovation Economy - Employment Breakdown

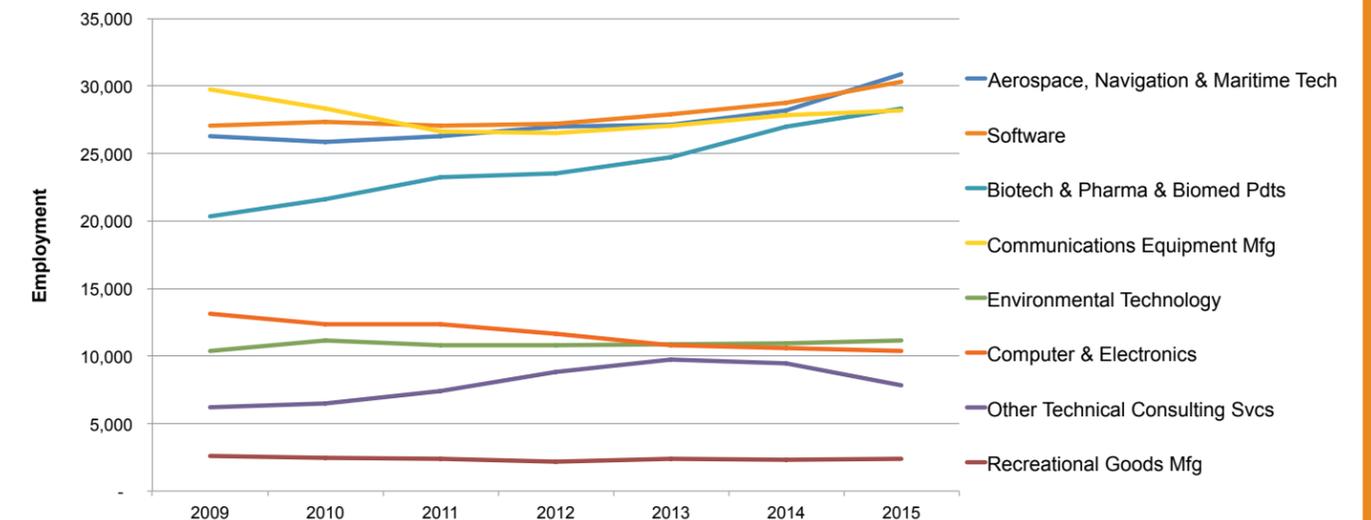
#### San Diego Employment Index by Quarter

The innovation sector showed substantial growth in 2015. The index tracks employment from the start of the "Great Recession" in 2008 (Q1 2008=1.0 Index). Employment in the innovation sector of San Diego's economy was more robust throughout the recession than the rest of the San Diego private sector, losing fewer jobs - see the shaded portion Q1 2009 through Q1 2012 in the chart below. Job growth in the innovation economy was strong in 2015 driven by employment in the life sciences, ICT (information and communications tech), and aerospace, navigation & maritime tech sectors.



### San Diego Innovation Economy Employment by Industry

The aerospace, navigation, & maritime technology sector and the software sector contributed substantially to job growth in San Diego in 2015. The life sciences and communications sectors showed modest growth. The technical consulting services sector saw a slight decrease in jobs in 2015 compared to 2014.



Source: National University System Institute for Policy Research, 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.

# GROWTH

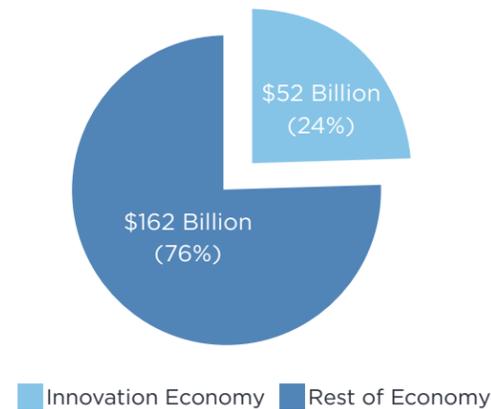
## SAN DIEGO INNOVATION ECONOMY – ECONOMIC IMPACT

During 2015, San Diego's innovation economy companies directly generated \$61.4 billion in sales, employed 151,940 workers, and provided \$18 billion in payrolls.

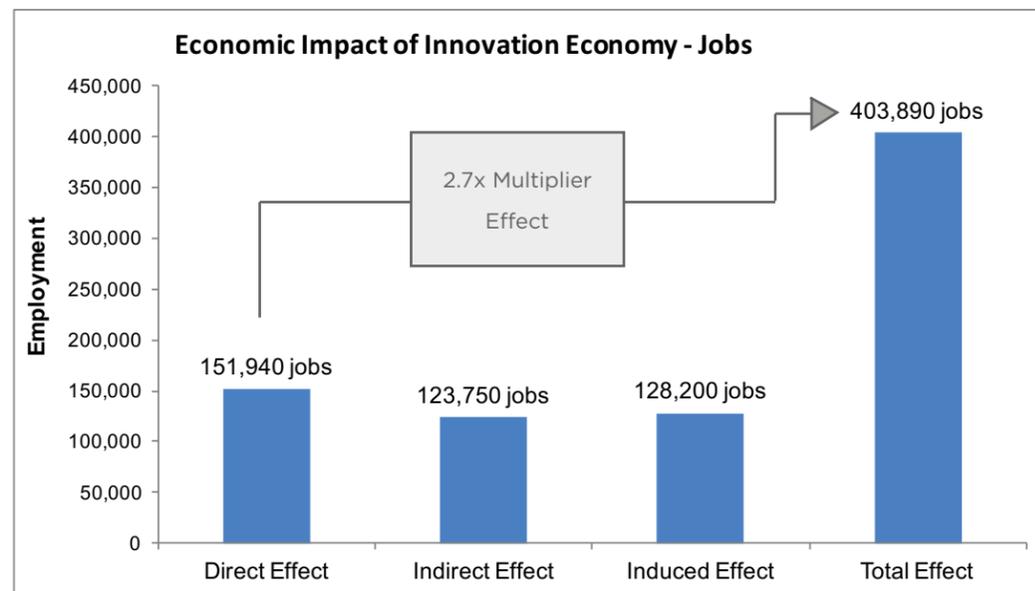
The direct economic contribution to San Diego's economy was nearly \$28.1 billion, accounting for 13.1 percent of the regional economy or gross domestic product (GDP), estimated to be \$214.4 billion in 2015.

The innovation economy accounts for almost \$52 billion, or 24 percent of San Diego's total economic activity.

2015 San Diego Gross Domestic Product (GDP) \$214.4 Billion



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 therefore equivalent to nearly 403,890 jobs, or 30 percent of all civilian jobs and 42 percent of the region's total labor income.



Source: National University System Institute for Policy Research, based on IMPLAN econometric model for San Diego County.

# GROWTH

## SAN DIEGO RANKS IN TOP TEN U.S. METROS FOR STARTUP ACTIVITY AND GROWTH ENTREPRENEURSHIP IN 2015

The **Kauffman Index: Startup Activity** provides a broad index measure of business startup activity in the United States. It is an equally weighted index of three normalized measures of startup activity. The three component measures of the Startup Activity Index are:

- The **Rate of New Entrepreneurs** in the economy, calculated as the percentage of adults becoming entrepreneurs in a given month.
- The **Opportunity Share of New Entrepreneurs**, calculated as the percentage of new entrepreneurs driven primarily by "opportunity" vs. "necessity."
- The **Startup Density of a region**, measured as the number of new employer businesses normalized by population.

Source: Kauffman Index of Growth Entrepreneurship

Top Ten Metros in Rank Kauffman Index: 2015 Startup Activity

RANK	METRO AREA
1	Austin
2	Miami
3	San Jose
4	Los Angeles
5	Denver
6	San Francisco
7	New York
8	Houston
9	San Diego
10	San Antonio

Top Ten Metros in Rank - Kauffman Index of Growth Entrepreneurship

RANK	METRO AREA	RATE OF STARTUP GROWTH	SHARE OF SCALEUPS	HIGH-GROWTH COMPANY DENSITY
1	Washington, D.C.	116.9%	2.3%	271.5
2	Austin	81.2%	2.3%	234.7
3	San Jose	128.1%	2.2%	109.6
4	Columbus	51.9%	2.7%	143.8
5	Nashville	71.5%	2.1%	153.3
6	Boston	74.3%	2.1%	138.7
7	San Diego	73%	1.6%	162.1
8	San Francisco	71.5%	1.8%	147.9
9	San Antonio	85.8%	2.7%	58.8
10	Dallas	56.3%	2.0%	137.4

The **Kauffman Index of Growth Entrepreneurship** is a new indicator of business growth in the United States, integrating several high-quality sources of timely information into one composite indicator of entrepreneurial business growth. The Index captures growth entrepreneurship in all industries, and is based on data covering the universe of all employer businesses in the United States and a privately collected benchmark of growth businesses.

The Index measures growth entrepreneurship through three indicators that point to its direct contribution to the economy through job creation and revenue growth.

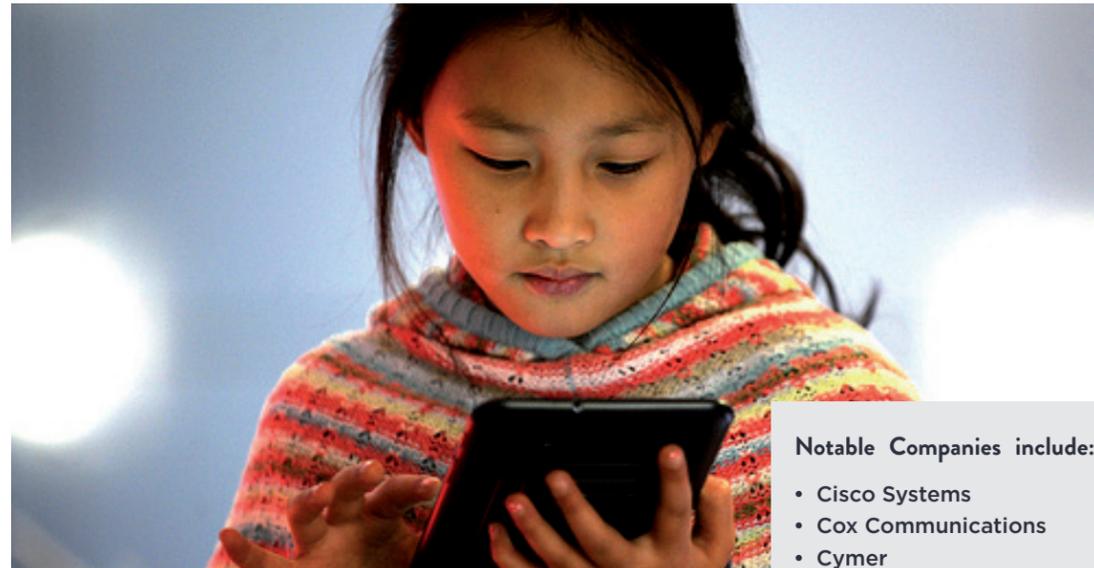
- The **Rate of Startup Growth**, calculated as how much startups have grown, on average, after five years of founding, as measured by change in employment.
- The **Share of Scaleups**, calculated as the number of firms that started small but grew to employ fifty people or more by their tenth year of operation as a percentage of all employer firms ten years and younger.
- The **High-Growth Company Density of a region**, measured as the number of private businesses with at least \$2 million in annual revenue reaching three years of 20 percent annualized revenue growth, normalized by total employer business population

Source: The Kaufmann Foundation; Kauffman Index of Growth Entrepreneurship .

# GROWTH

## SAN DIEGO INNOVATION ECONOMY PRIMARY INDUSTRY SECTOR HIGHLIGHTS

### Information & Communication Technologies



#### Notable Companies include:

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

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

In 2015, the ICT sectors accounted for:

- Almost 50% of San Diego's innovation economy companies
- More than 45% of San Diego's innovation economy employees
- 47% of San Diego's innovation economy total wages

The cluster accounted for about 3,270 companies and 68,825 employees in 2015. The average annual wage of the communications equipment manufacturing sector was \$132,500, followed by the computer & electronics sector at \$113,250 and software sector at \$119,600.

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 Economic Development Corporation estimates the software development sector to contribute \$12.2 billion in economic impact.

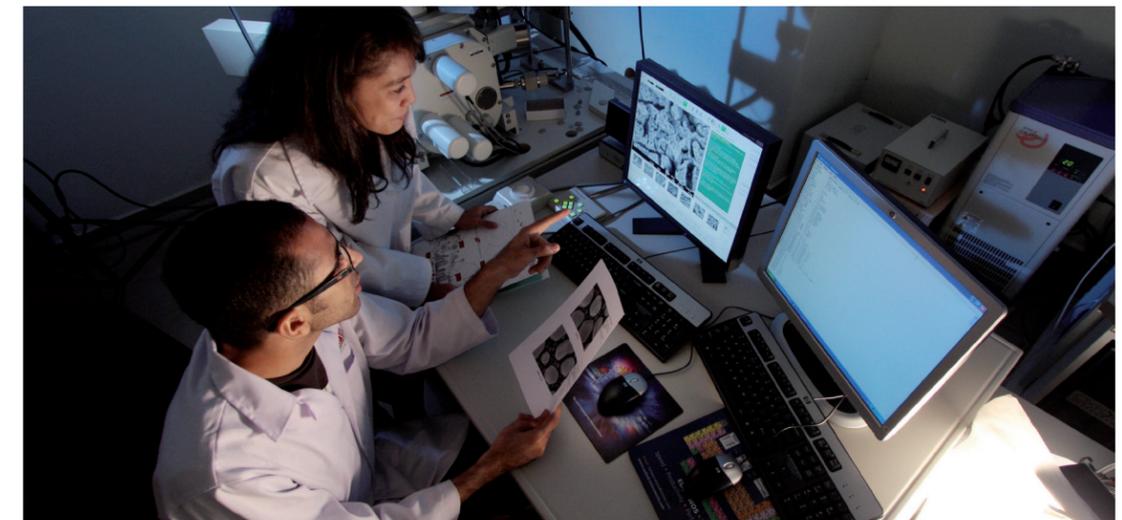
In the San Diego EDC study, San Diego ranked 7th among U.S. metros based on concentration of software developers, employee retention, computer science degrees per capita, computer/math degree attainment among the 25+ population, job/wage growth, average adjusted wages and venture capital dollars invested 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 EDC: *Software Development: Driving San Diego's Tech Ecosystem* (3/2016)

# GROWTH

## SAN DIEGO INNOVATION ECONOMY PRIMARY INDUSTRY SECTOR HIGHLIGHTS

### Life Sciences



#### Notable Companies include:

- Ajinomoto Althea Inc.
- CareFusion, a BD Company
- Edico Genome
- Eli Lilly
- Genentech
- Halozyme Therapeutics
- Hologic
- Isis Pharmaceuticals
- Illumina
- Johnson & Johnson
- Nuvasive Inc.
- Pathway Genomics
- Pfizer
- Philips Healthcare
- Regulus Therapeutics
- ResMed
- Thermo Fischer Scientific
- Quidel Corp.

Life sciences activity accounts for \$32 billion in total economic impact in San Diego.

In 2015, the biotechnology, pharmaceuticals and biomedical devices sectors accounted for:

- 10% of San Diego's innovation economy companies
- 20% of San Diego's innovation economy employees
- More than 25% of San Diego's innovation economy total wages.

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 \$175,000. Average annual wage of biomedical devices was \$95,300.

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 EDC; Biocom

# GROWTH

## SAN DIEGO INNOVATION ECONOMY PRIMARY INDUSTRY SECTOR HIGHLIGHTS



### Aerospace, Navigation and Maritime Technologies



The aerospace, navigation and maritime technologies cluster employs more than 31,000 people in the San Diego region and more than 220 firms. The average annual wage in 2015 was \$96,750 making it one of San Diego's highest paying sectors. The cluster attracts almost \$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 a number of largest 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.

#### Notable Companies include:

- BAE Systems
- 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 EDC

# GROWTH

## SAN DIEGO INNOVATION ECONOMY PRIMARY INDUSTRY SECTOR HIGHLIGHTS

### Cleantech



#### Notable Companies include:

- Assure Controls
- Black & Veatch
- Cellana
- EDF Renewable Energy
- Kyocera Solar
- NRG Energy
- OneRoof Solar
- San Diego Gas & Electric
- Sapphire Energy
- Solar Turbines
- Synthetic Genomics
- Sullivan Solar Power

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. San Diego ranks first in the nation for solar installations and solar industry-related jobs, and clean energy is a top area for future job growth in the region.

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

Sources: CONNECT Innovation Report; San Diego EDC; CleanTECH San Diego

# CAPITAL

## VENTURE CAPITAL FUNDING IN SAN DIEGO SOFTWARE SECTOR SURGES IN 2015

Venture capital funding to San Diego companies totaled more than \$1.2 billion invested in 104 deals in 2015 - up almost 35 percent from 2014. This was the highest amount of VC investment in San Diego companies since 2007 when \$1.9 billion was invested in 174 deals.

The software sector saw resurgence in VC investment in 2015 with \$240 million invested in 28 deals - up 150 percent from 2014 when \$96 million was invested in 24 deals. 2015 was the biggest year for VC funding to San Diego software companies since 2007 when more than \$330 million was invested in 37 deals.

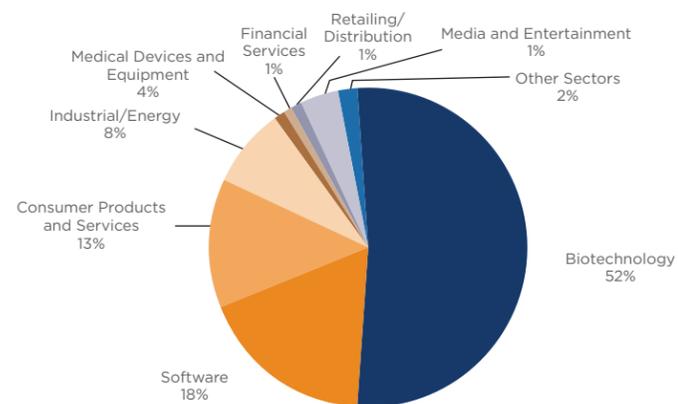
Biotechnology companies accounted for the largest share of venture investment in San

Diego in 2015 with 48 percent of the VC funding totaling \$569 million invested in 38 deals - up 3.6 percent from \$590 million invested in 42 deals in 2014.

The other major sectors rounding out the top four industries receiving venture funding included consumer products & services with \$167 million invested in five deals and the industrial/energy sector with \$102 million invested in six deals.

The medical devices sector received \$49 million invested in seven deals and the financial services (fintech) sector totaled more than \$18 million across three deals in 2015.

San Diego VC Investment by Industry 2015 - \$1.2 Billion



Source: PricewaterhouseCoopers MoneyTree™ Report; National Venture Capital Association; data provided by Thomson Reuters

### Top 10 San Diego Companies Receiving Venture Capital Funding in 2015

Suja Life	\$149M	Health Food & Beverage
Sapphire Energy	\$92M	Industrial Biotechnology
aTyr Pharma	\$76M	Biotechnology
SmartDrive Systems	\$50M	Transportation Software
Genalyte	\$44M	Medical Devices
Cidara Therapeutics	\$42M	Biotechnology
AnaptysBio	\$41M	Biotechnology
eFFECTOR Therapeutics	\$40M	Biotechnology
Metacrine	\$36M	Biotechnology
Tealium	\$31M	Web Marketing Software

Note: investment value rounded to nearest \$M

# CAPITAL

## VENTURE CAPITAL FUNDING IN SAN DIEGO BY STAGE OF DEVELOPMENT SURGE IN SEED STAGE INVESTMENT IN 2015

San Diego seed stage companies received \$135 million in 17 VC investment deals in 2015 - an historic high-water mark - up almost 650 percent from 2014 when seed stage companies raised \$18 million in 8 deals. The majority of the seed stage VC investment came in the second and third quarters of 2015 when \$107.5 million was invested in 11 deals, the highest quarterly amount of VC investment in San Diego seed stage companies in history.

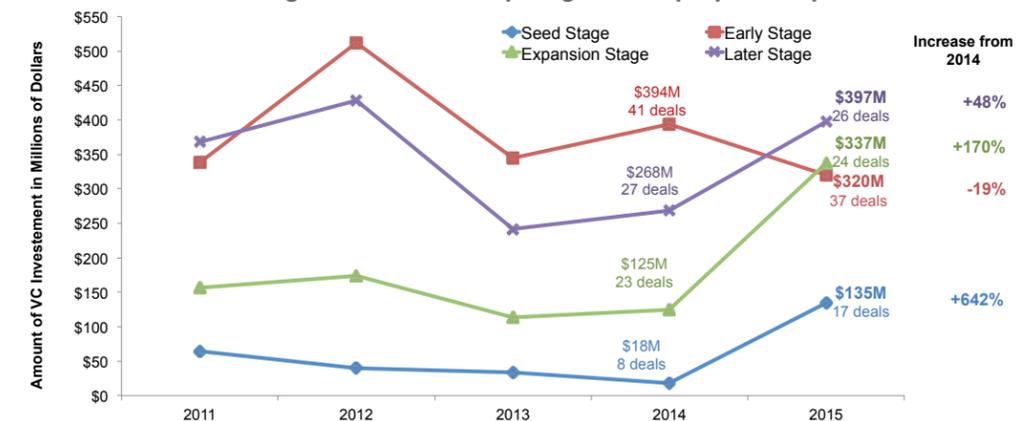
### Top Ten 2015 San Diego Seed Stage VC Deals

Metacrine Inc. (3 deals)	\$42.9M
Ankasa Regenerative Therapeutics Inc	\$18.0M
Hera Therapeutics Inc.	\$16.0M
Enlirium Inc	\$15.0M
Adrenergics Inc.	\$10.0M
Cadherx Therapeutics Inc.	\$10.0M
Calporta Therapeutics Inc.	\$10.0M
Inception IBD Inc.	\$6.9M
Omniome Inc.	\$4.0M
Forge Therapeutics Inc.	\$1.8M

Expansion stage deals in 2015 were also up dramatically - 170 percent over 2014 - with \$320 million invested in 37 deals.

Early stage companies received \$320 million in 27 deals, down 19 percent from 2014. Later stage companies received \$397 million in 26 deals, up almost 50 percent from 2014.

San Diego VC Investment by Stage of Company Development



Source: PricewaterhouseCoopers MoneyTree™ Report; National Venture Capital Association; data provided by Thomson Reuters

### The stage of development classifications used in the MoneyTree™ Report are as follows:

#### 1 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.

#### 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 revenues. Usually in business less than three years.

#### 3 EXPANSION 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.

#### 4 LATER STAGE

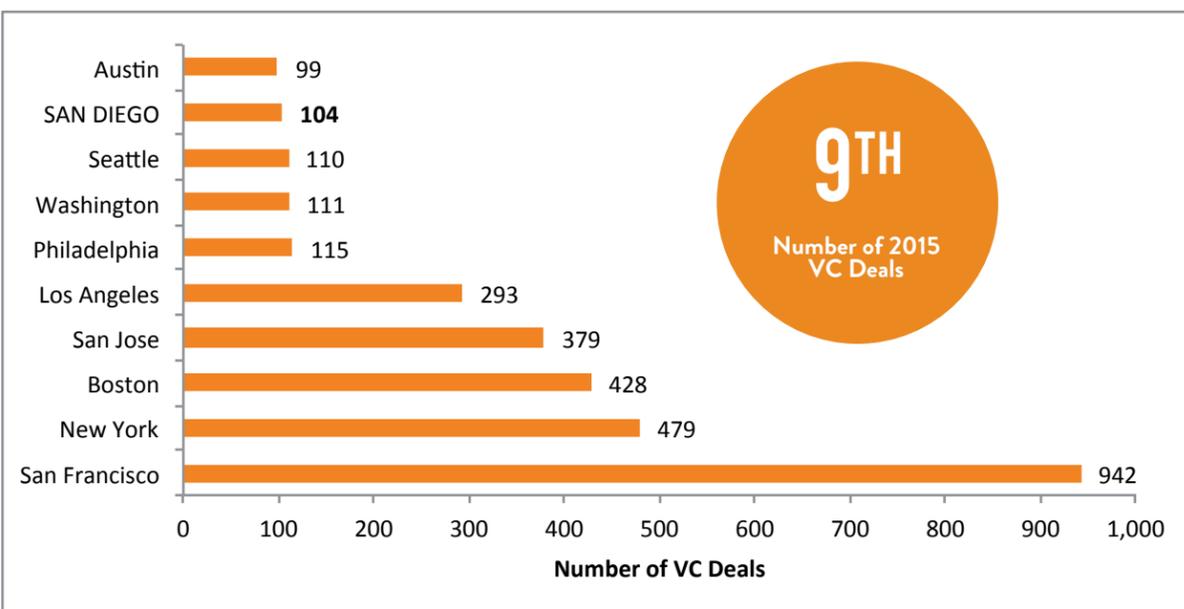
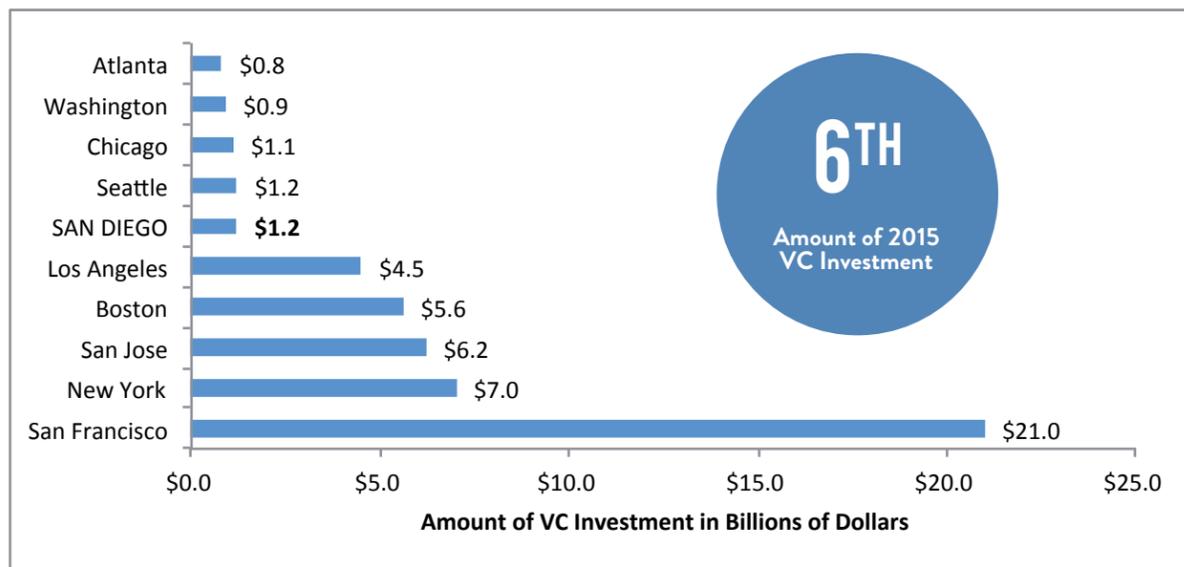
Product or service is widely available. Company is generating on-going revenue; probably positive cash flow. More likely to be, but not necessarily, profitable. May include spin-offs of operating divisions of existing private companies and established private companies.

# CAPITAL

## VENTURE CAPITAL INVESTMENT BY REGION

In 2015, the San Diego metro region ranked sixth in the nation for the total amount of VC investment. San Francisco metro took the top spot with \$21 billion in VC investment followed by New York, San Jose, Boston and LA metros. San Diego ranked ninth in the number of VC deals completed.

### San Diego Region's Ranking Among the Top Ten Metro Areas

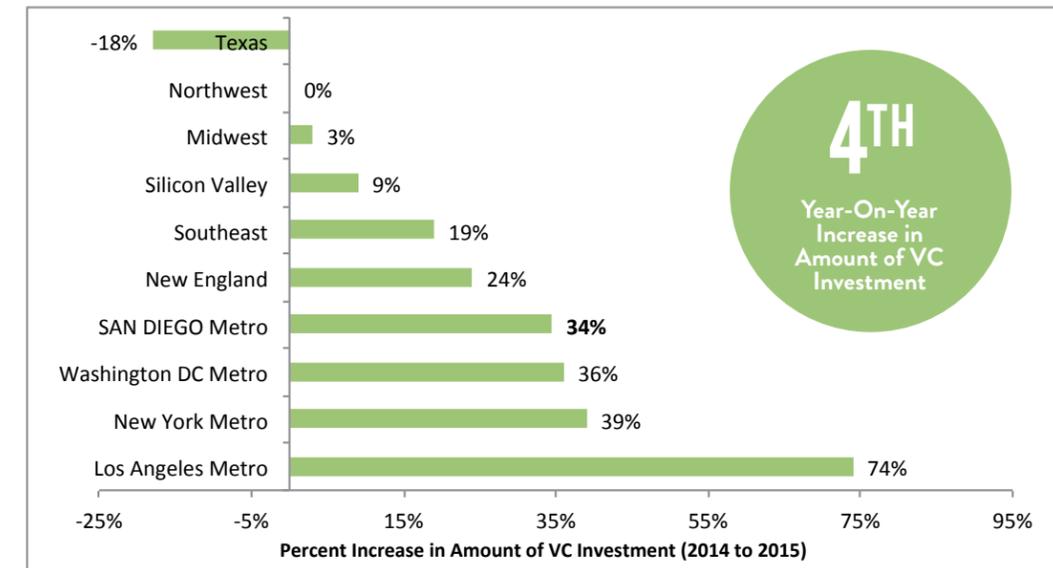


Source: PricewaterhouseCoopers MoneyTree™ Report; National Venture Capital Association; data provided by Thomson Reuters

# CAPITAL

## VENTURE CAPITAL INVESTMENT BY REGION

The southern California region showed the largest percent increase in the amount of VC investment from 2014 to 2015. San Diego metro region ranked fourth nationwide in 2015 based on year-on-year percent increase of VC investment. San Diego companies received more than \$1.2 billion in VC investment in 2015 compared to \$913 million in 2014, a 34 percent increase. The Los Angeles metro region saw VC investment increase almost 75 percent from \$3 billion in 2014 to more than \$5 billion in 2015.



### Sorrento Valley – A Top Neighborhood for VC Investment

A recent report released by researchers at the Martin Prosperity Institute in Toronto using VC investment 2013 data from Thomson Reuters identified U.S. hot spots concentrated in “distinct microclusters.”

San Diego's Sorrento Valley ranked fifth on the list, having attracted more than \$568 million in venture capital in 2013; more venture investment than any other U.S. city outside of the Bay Area. More than half of the Sorrento Valley investment, \$310 million went to biotechnology companies.

Sorrento Valley is a key area for life sciences and tech startup activity (see page 11 in this Report) as well as established companies such as Accelrys, Halozyme, Hologic, iBoss Cybersecurity and Qualcomm and Quidel Corp. The neighborhood's biotechnology VC investment ranked second in the U.S. to South San Francisco, which attracted \$474 million in venture investment in 2013.

Source: PricewaterhouseCoopers MoneyTree™ Report; National Venture Capital Association; data provided by Thomson Reuters

### Top Ten Neighborhoods for VC Investment in 2013

Neighborhood	Metro Region	Venture Capital Investment
South of Market/ Mission District	San Francisco	\$1,063 Million
Rincon Hill	San Francisco	\$1,004 Million
Palo Alto	San Jose	\$998 Million
Potrero Hill/Dogpatch/South Beach	San Francisco	\$885 Million
SORRENTO VALLEY	SAN DIEGO	\$568 Million
South San Francisco	San Francisco	\$501 Million
Prospect Hill Park	Boston-Cambridge	\$484 Million
Financial District	San Francisco	\$481 Million
Menlo Park	San Francisco	\$430 Million
Mountain View	San Jose	\$416 Million

Source: Martin Prosperity Institute (MPI); Thomson Reuters; San Diego Business Journal

# CAPITAL

## VENTURE-BACKED INITIAL PUBLIC OFFERINGS

The San Diego IPO market cooled in 2015 with three venture-backed biotech companies going public and raising \$188 million. Seven San Diego companies went public in 2014 raising \$416 million.



Cidara Therapeutics, Inc.		\$76.8 Million IPO	
Went public 4/14/2015		Founded	2012
Cidara Therapeutics is a clinical stage biotechnology company focused on the discovery, development, and commercialization of novel anti-infectives for the treatment of diseases that are inadequately addressed by current standard of care therapies.			
Investment Funding Rounds (2) - \$74M			
Date	Amount / Round	Lead Investor	Investors
Feb, 2015	\$42M / Series B	RA Capital Management	10
Jun, 2014	\$32M / Series A	5AM Ventures	4



aTyr Pharma Inc.		\$75.0 Million IPO	
Went public 5/6/2015		Founded	2005
aTyr Pharma is a biotherapeutics company engaged in the discovery and development of Physiocrine-based therapeutics to address severe rare diseases.			
Investment Funding Rounds (6) - \$180.5M			
Date	Amount / Round	Lead Investor	Investors
Mar, 2015	\$76M / Series E	Sofinnova Ventures	1
Jul, 2013	\$10M / Debt Financing	—	1
Jul, 2013	\$49M / Series D	—	4
Oct, 2010	\$23M / Series C	—	4
Sep, 2009	\$12M / Series C	—	3
Apr, 2007	\$10.5M / Series B	Alta Partners	3
		Polaris Partners	



TRACON Pharmaceuticals, Inc.		\$36.0 Million IPO	
Went public 1/29/2015		Founded	2005
TRACON Pharmaceuticals, Inc. is a clinical stage biopharmaceutical company focused on the development and commercialization of novel targeted therapeutics for cancer, age-related macular degeneration and fibrotic diseases.			
Investment Funding Rounds (4) - \$52.04M			
Date	Amount / Round	Lead Investor	Investors
Sep, 2014	\$27M / Series B	—	5
Apr, 2011	\$14M / Series A	—	1
Oct, 2010	\$1.54M / Debt Financing	—	0
Apr, 2007	\$9.5M / Convertible Note	—	0

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

# CAPITAL

## FOLLOW ON PUBLIC OFFERINGS & PRIVATE PLACEMENTS

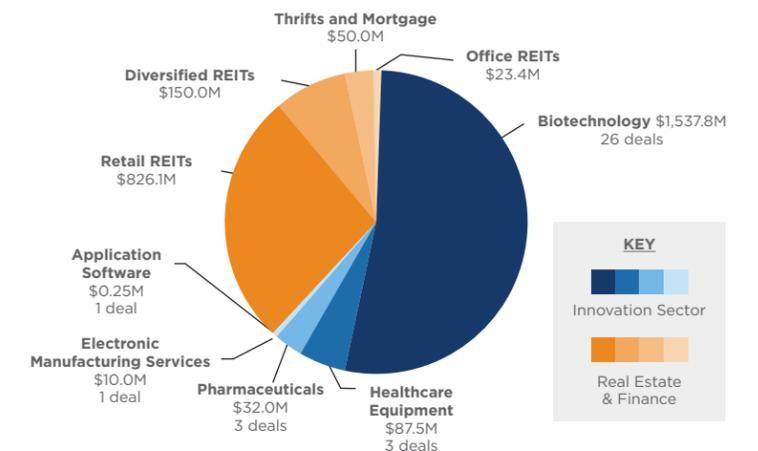
FPOs **\$2.7 BILLION**

Raised By 40 San Diego Companies Through Follow-On Public Offerings (FPOs) In 2015.

### Top Ten FPO Deals in 2015

Company	FPO Deal Value (\$M)
Neurocrine Biosciences	\$250
Auspex Pharmaceuticals	\$226
Mirati Therapeutics	\$146
Retrophin	\$130
Arena Pharmaceuticals	\$101
Pfenex	\$100
La Jolla Pharmaceutical	\$97
Ignyta	\$75
Otonomy	\$75
Tandem Diabetes Care	\$60

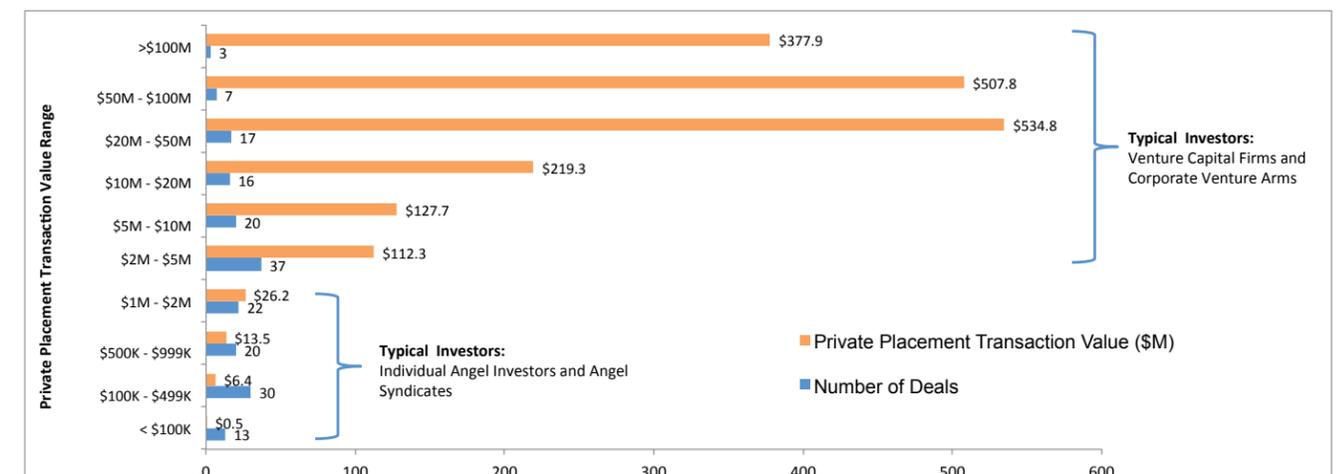
Follow on financing rounds by publicly traded companies were up from 2014 when 20 companies raised \$2.4 billion. Eighty-five percent of the FPO deals were from the life sciences and tech sectors, totaling \$1.7 billion raised in 34 deals.



Private Placements **\$1.93 BILLION**

Raised By 193 San Diego Companies Through Private Placements\* In 2015.

This was an increase of 54 percent from 2014 when \$1.25 billion was raised by 142 companies.



\* A number of private placement deals included here from the S&P Capital IQ data were also reported in the PwC MoneyTree™ venture capital investment funding data for San Diego.  
Source: S&P Capital IQ; Roth Capital Partners; CrunchBase; CONNECT

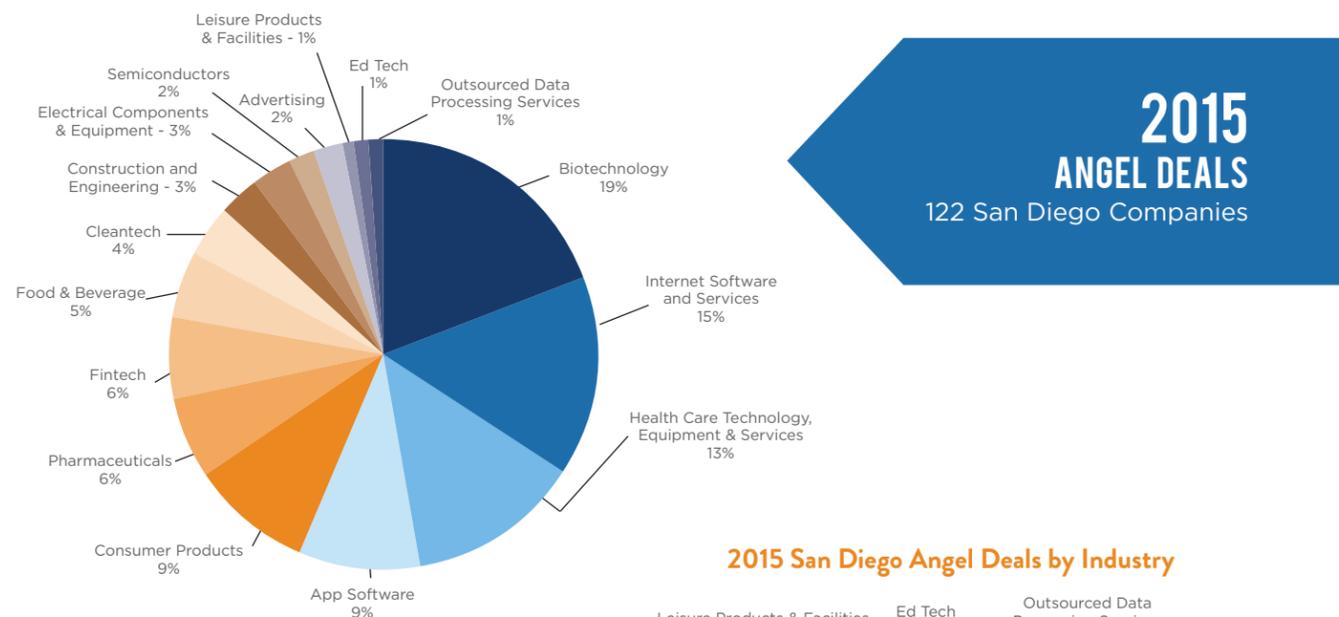
# CAPITAL

## SAN DIEGO ANGEL INVESTMENT

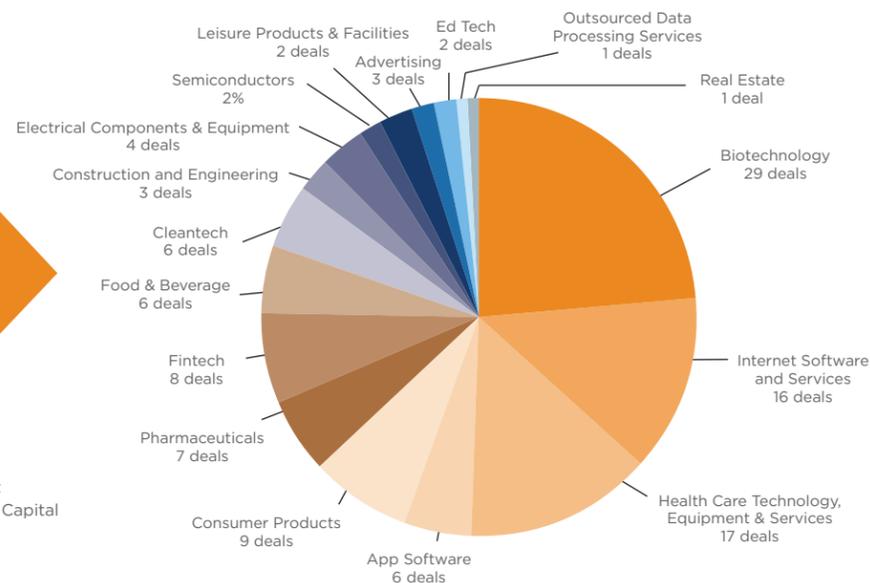
CONNECT has gathered available data on San Diego company angel investment deals (sized \$2 million and lower), and for the first time present the findings in this report. In 2015, 122 San Diego companies raised approximately \$74 million in angel funding.

The life sciences sector (biotechnology, health care tech and pharma) accounted for 35 percent of the total amount of angel investment to San Diego companies in 2015 with \$28 million invested in 53 companies. Internet software companies received more than \$11 million in 16 deals. Applications software and consumer products sectors accounted for \$6.5 million each in angel investment in 2015.

### 2015 San Diego Angel Investment by Industry



### 2015 San Diego Angel Deals by Industry



**\$74 BILLION**

in Angel Investments to San Diego Companies

Source: 2015 CONNECT Springboard Impact Assessment survey; Tech Coast Angels; S&P Capital IQ; <https://www.sec.gov/edgar/>

# CAPITAL

## ANGEL INVESTMENT - TECH COAST ANGELS

Tech Coast Angels (TCA), the second most active angel investing organization in the United States with more than 325 individual members, invested a total of \$13.5 million in 58 deals in 2015; 10 of the deals involved San Diego early stage companies.

In addition to the direct investment by TCA or its Angel Capital Entrepreneurial (ACE), the angel network also helped companies in its portfolio obtain \$82 million through additional funding sources in 2015. The average investment per company in 2015 was \$233,000.

San Diego TCA, the largest chapter of Tech Coast Angels, invested \$4.2 million in 18 companies in 2015. Over the past four years, the San Diego chapter of TCA has raised 46% of the total capital raised by the TCA network and accounted for

approximately 60% of the total amount invested in new and portfolio companies by the angel investor group.

There is a growing trend among angels groups across the U.S. to syndicate deals to each other. In 2015, approximately half of the deals syndicated with other investment organizations outside the San Diego region were led by the San Diego TCA chapter.

The TCA network had six exits in 2015. One exit was the acquisition of CRISI Medical Systems, a San Diego-based medical technology company dedicated to improving the safety and delivery of IV injectable medications. CRISI Medical Systems was acquired by BD (Becton, Dickinson and Company).

### 10 SAN DIEGO COMPANIES RECEIVED TCA INVESTMENT IN 2015

CardioCreate, Inc.	Biopharmaceutical company developing cardiac stem cell therapies to repair and replace damaged heart tissues after a heart attack
Cloudbeds	Integrated digital marketing hospitality software platform for hotels
Doctible	Cash-based healthcare network to shop for healthcare
everyStory	Interactive cloud based social media platform, combining photo and audio story-sharing technologies
Forge Therapeutics	Biotechnology company developing novel medicines by combining bio-inorganic with medicinal chemistry to target metalloproteins
Groundmetrics	Electromagnetic sensor solution for oil, gas, mining, and geothermal companies
MOGL	Online cash back service for dining at affiliated restaurants
Pediatric Biosciences, Inc.	Biotechnology company developing novel biomarkers for diagnosis of autism
Perfectna	Online foreign exchange trading platform

Source: Tech Coast Angels; CrunchBase

# MERGERS & ACQUISITIONS

## TECH & LIFE SCIENCES MERGERS & ACQUISITIONS (M&A)

More than \$31 billion in technology and life sciences M&A deals were closed in 2015 where the target or buyer was a San Diego company – up 16 percent from 2014. San Diego's innovation sector accounted for almost 80 percent of the total San Diego M&A deal value in 2015 and more than 40 percent of the total number of M&A deals closed in 2015.

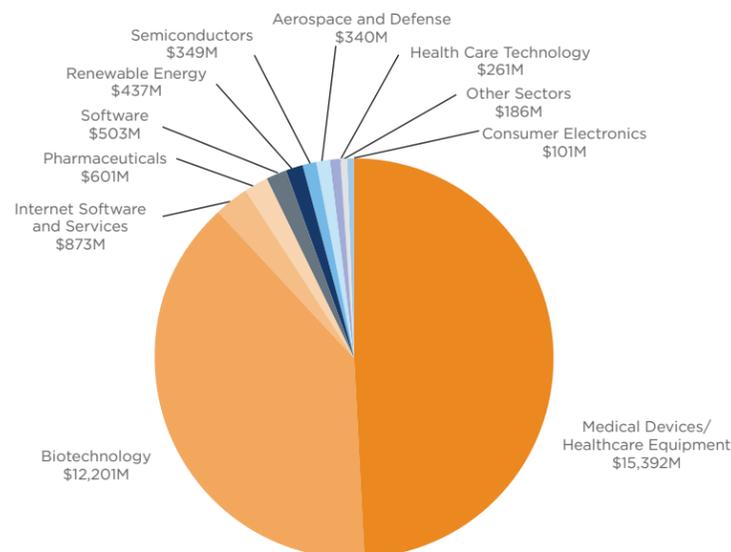
**\$31.2 BILLION**

**169 DEALS**

**\$185 MILLION  
AVERAGE DEAL SIZE**

Industry Sector	Transaction Value in \$M	# of Deals	Avg. Deal Size \$M
Medical Devices/Healthcare Equipment	\$15,392	12	\$1,283
Biotechnology	\$12,201	9	\$1,356
Internet Software and Services	\$873	36	\$24
Pharmaceuticals	\$601	11	\$55
Software	\$503	24	\$21
Renewable Energy	\$437	14	\$31
Semiconductors	\$349	4	\$87
Aerospace and Defense	\$340	4	\$85
Health Care Technology	\$261	16	\$16
Other Sectors	\$186	36	\$5
Consumer Electronics	\$101	3	\$34

### 2015 San Diego M&A – Innovation Sectors



Life sciences companies dominate San Diego's M&A scene in the innovation sectors. The medical devices sector accounted for almost half of the total M&A deal value for San Diego's innovation economy in 2015 with 12 deals totaling \$15.4 billion. Becton Dickinson's acquisition of CareFusion accounted for \$13.8 billion of the medical devices sector total. The biotechnology sector accounted for almost 40 percent with 9 deals totaling \$12.2 billion. Internet software and software-related sectors accounted for the largest number of M&A deals in San Diego with 60 deals totaling almost \$1.4 billion.

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

## TOP 15 SAN DIEGO TECH & LIFE SCIENCES M&A DEALS

Orange highlighted & bold indicates company acquired, buyer, or seller is a San Diego company.

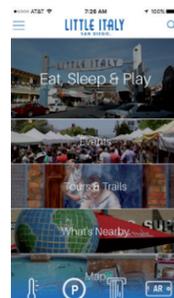
Company Acquired	Deal Amount	Buyer/Acquirer	Seller	Industry
CareFusion Corporation	\$13.79B	Becton, Dickinson and Company	The Vanguard Group, Inc.	Healthcare Equipment
Receptos, Inc.	\$7.32B	Celgene Corporation	Arch Venture Partners, L.P.; Polaris Partners; Venrock; Osage Partners LLC; HBM Healthcare Investments AG; Lilly Ventures; Franklin Advisers, Inc.; Fidelity Management & Research Company; HBM Partners Ltd.; Altitude Life Science Ventures	Biotechnology
Auspex Pharmaceuticals, Inc.	\$3.49B	Teva Pharmaceutical Industries Limited	Presidio Partners; Thomas, Mc Nerney & Partners; Deerfield Management Company, L.P.; Oxford Finance LLC; Panorama Capital; Deerfield Capital, L.P.; Foresite Capital Management, LLC; BioMed Ventures LP	Biotechnology
Volcano Corporation	\$1.36B	Philips Holding USA Inc.	T. Rowe Price Associates, Inc.; Camber Capital Management LLC; Engaged Capital, LLC	Healthcare Equipment
IgDraSol Inc.	\$1.29B	NantPharma, LLC	Sorrento Therapeutics, Inc.	Biotechnology
Ticketfly, Inc.	\$499.5M	Pandora Media, Inc.	Mohr Davidow Ventures; Sapphire Ventures LLC; Cross Creek Advisors; Riverwood Capital; <b>Social Leverage, LLC</b> ; IA Capital Partners	Internet Software and Services
Good Technology Corporation	\$417M	BlackBerry Limited	Draper Fisher Jurvetson; Allegis Capital; MeriTech Capital Partners; New Enterprise Associates; Oak Investment Partners; Rho Capital Partners, Inc.; Rustic Canyon Partners; Blueprint Ventures; <b>Avalon Ventures, LLC</b> ; Morgan Stanley Private Equity; Altitude Capital Partners; ePlanet Capital; Riverwood Capital; 137 Ventures	Systems Software
Entropic Communications, Inc.	\$293.8M	MaxLinear, Inc.	Presidio Partners; BlackRock Fund Advisors; AWM Investment Company Inc.; Raging Capital Management, LLC; Viex Capital Advisors, LLC	Semiconductors
Kratos Defense & Security Solutions, Inc., Electronic Prdcts. Div.	\$265M	Ultra Electronics Defense, Inc.	<b>Kratos Defense &amp; Security Solutions, Inc.</b>	Aerospace and Defense
Retrophin, Inc., Pediatric PRV	\$245M	Sanofi	Retrophin, Inc.	Pharmaceuticals
Meritage Pharma, Inc.	\$244.9M	Shire Plc	Domain Associates, L.L.C.; The Vertical Group; Latterell Venture Partners	Pharmaceuticals
RF Surgical Systems, Inc.	\$235M	Medtronic Plc	Menlo Ventures; Split Rock Partners, LLC	Healthcare Equipment
EDF Renewable Energy Inc., Cottonwood and Catalina Solar 2 Projects	\$176M	Dominion Resources, Inc.	EDF Renewable Energy, Inc.	Renewable Energy
Beethoven Wind, LLC	\$143M	Northwestern Corporation	BayWa r.e. Wind, LLC	Renewable Energy
MaintenanceNet, Inc.	\$139M	Cisco Systems, Inc.	Kayne Anderson Capital Advisors, L.P.	Internet Software and Services

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



# STARTUP SPOTLIGHT

## FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES



SAAS/Mobile

[theguru.co](http://theguru.co)

2015

Paul Burke  
Co-Founder & CEO

Guru is an experiential technology company that creates apps and solutions for scenic attractions including museums, parks, aquariums, and zoos to change the way attendees experience learning at cultural institutions. Guru's educational platform utilizes cutting-edge solutions to help users easily navigate and explore a specific exhibit or city attraction in seconds by providing exciting information and various tour options fitting for everyone's interests. The app, customized for each institution, is easily downloadable and available on iOS and Android devices and serves as an expert tour guide to encourage users to take ownership of their own experiences in a modernized way. The Guru team seeks to bring a fresh perspective on how to approach learning at large establishments and assist individuals in rediscovering historical hidden gems that come with exploring well-known attractions.



Lead Generation

[leadcrunch.com](http://leadcrunch.com)

2015

Olin Hyde  
Chief Executive Officer

LeadCrunch delivers high precision B2B leads using artificial intelligence. LeadCrunch is the perfect way to use predictive analytics and big data to dramatically improve sales and marketing results. LeadCrunch is an easy-to-use, self-service platform. Simply upload a list of at least 25 of your best customers and LeadCrunch delivers a custom list of look-a-like leads. LeadCrunch gets smarter every time you use it because it automatically adjusts to the unique needs of each customer. LeadCrunch's technology addresses three significant challenges in sales; it reduces the cost of selling to small and medium businesses by accurately predicting best fit between buyers and sellers; it collects proprietary data that makes predictions better for each customer; and, most importantly, we provide predictive leads as a service to almost any marketing technology tool.



Maritime/Unmanned Systems

[oceanairo.us](http://oceanairo.us)

2012

Eric Patten  
CEO & President

Ocean Aero, a San Diego based unmanned systems company, epitomizes the next generation in unmanned ocean systems with the development of an autonomous, highly persistent, energy scavenging, and solar/wind-powered unmanned vessel. The Submaran™, a new class of Unmanned Underwater Surface Vessel (UUSV), takes the best of both of surface and subsurface vessels and combines them into a completely new, transformable, self-propelling body, capable of long missions in extreme conditions. With the use of the sun and wind to power new ideas in ocean exploration, Ocean Aero has created a versatile, practical, and efficient platform for critical ocean observation and data collection. Ocean Aero is committed to accelerating ocean discovery with its cutting-edge Submaran™ designs, wingsail innovations and SaaS service options.

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



San Diego's research institutions have a \$4.6 billion annual economic impact and are at the center of the region's \$14.4 billion scientific R&D cluster, according to a study released by the San Diego Economic Development Corporation in October 2015.

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 GRP every year.
- All scientific R&D, including for-profit enterprises, generates \$14.4 billion annually in economic impact—roughly equal to the 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 institutes 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, or 33 U.S. Open Golf Championships every year.**

Source: San Diego Economic Development Corporation, "The Economic Impact of San Diego's Research Institutions - Driving San Diego's Innovation Economy", Fall 2015.

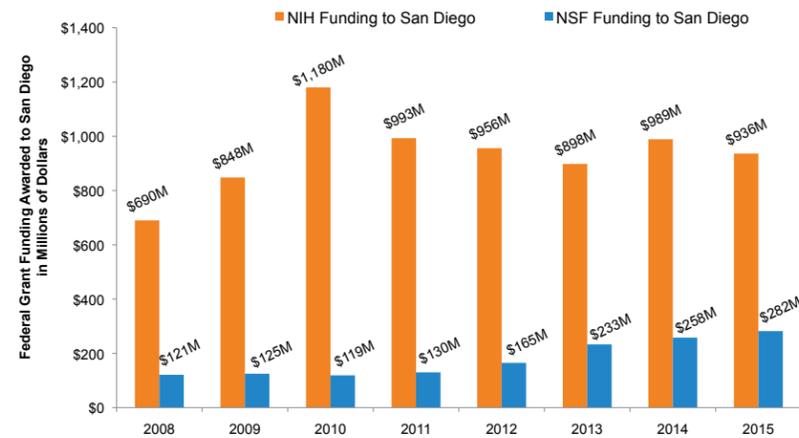
# RESEARCH GRANTS

## FEDERAL GRANTS - HIGHLIGHTS

More than **\$1.29 BILLION** in NIH, NSF and SBIR/STTR grant funding awarded to San Diego research institutions and companies

### NIH and NSF Grant Funding to San Diego Institutions and Companies: \$1.22 B in 2015

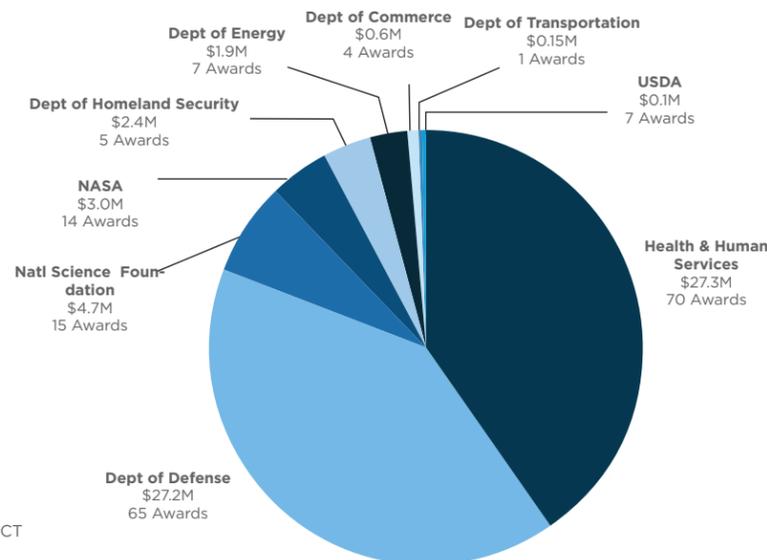
Federal grant funding awarded to San Diego institutions and companies by the NIH and NSF totaled more than \$1.2 billion in 2015, on par with the amounts awarded in 2014. NIH grant awards in 2015 were down five percent from 2014 totaling almost \$940 million. NSF grant awards totaled \$282 million and were up nine percent over 2014.



### SBIR/STTR Grant Funding to San Diego Companies and Institutions by Government Agency: \$66.3M awarded in 2015

The Department of Health & Human Service and the Department of Defense awarded more than \$27 million each in Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) awards. That accounts for more than 89 percent of the total SBIR/STTR funding to San Diego companies and institutions.

- 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.



Source: <https://www.sbir.gov/sbirsearch/technology>; CONNECT

# RESEARCH GRANTS

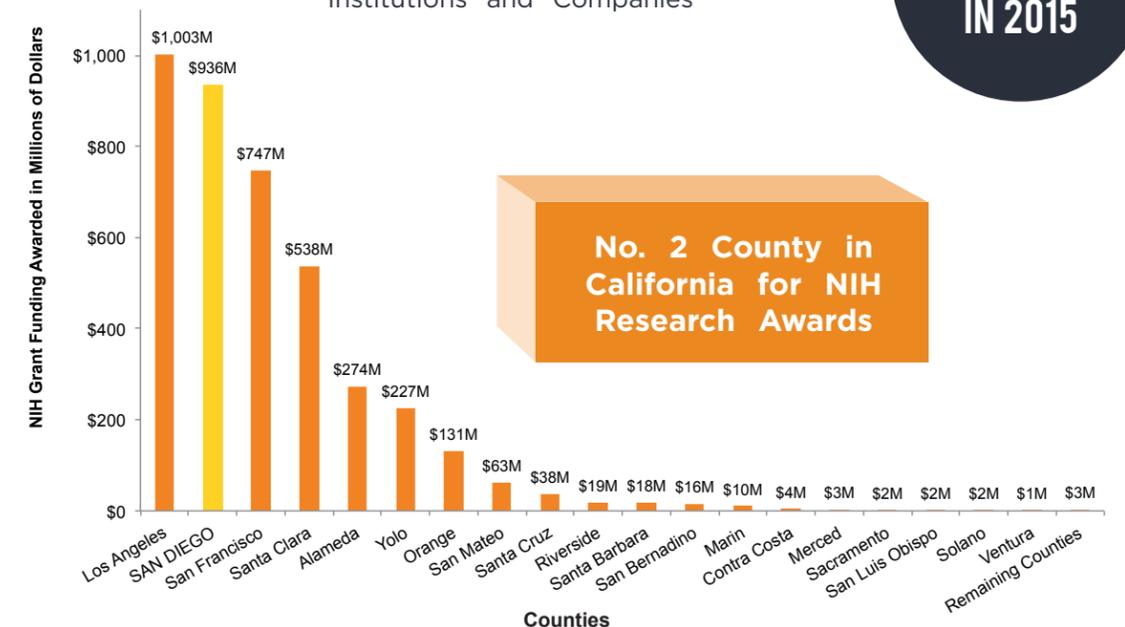
## FEDERAL GRANTS - NIH AND NSF AWARDS

**SAN DIEGO COUNTY RANKED 2ND**

in California behind Los Angeles County for NIH grant funding and in NSF grant funding received in 2015

**\$936 MILLION IN 2015**

NIH Grant Funding to San Diego Institutions and Companies



**No. 2 County in California for NIH Research Awards**



**No. 2 County in California for NSF Research Awards**

Source: National Institutes of Health; UC San Diego Extension; CONNECT

NSF Grant Funding to San Diego Institutions and Companies

**\$282 MILLION IN 2015**

Source: National Science Foundation; UC San Diego Extension; CONNECT

# RESEARCH GRANTS

## FEDERAL RESEARCH GRANTS TOP AWARDS IN CALIFORNIA BY INSTITUTION

UC San Diego ranked third in California for NIH funding in fiscal year 2015 with almost \$390 million awarded to researchers. The Scripps Research Institute in La Jolla was also among the top seven California institutions awarded with \$168 million. The top institutions receiving NIH awards in 2015 are

NIH Grant Funding to Top California Institutions in 2015				
California Ranking*	Institution	City	NIH Award Amount (in millions of dollars)	Number of Awards
1	University of California, San Francisco	San Francisco	\$560.4	1,223
2	Stanford University	Stanford	\$422.4	929
<b>3</b>	<b>University of California San Diego</b>	<b>La Jolla</b>	<b>\$388.7</b>	<b>841</b>
4	University of California Los Angeles	Los Angeles	\$370.7	860
5	University of California At Davis	Davis	\$194.9	433
6	University of Southern California	Los Angeles	\$192.7	379
<b>7</b>	<b>Scripps Research Institute</b>	<b>La Jolla</b>	<b>\$168.3</b>	<b>275</b>
8	University of California Berkeley	Berkeley	\$122.4	362
9	University of California-Irvine	Irvine	\$107.9	289
10	California Institute of Technology	Pasadena	\$55.3	129
<b>11</b>	<b>Sanford Burnham Prebys Medical Discovery Institute</b>	<b>La Jolla</b>	<b>\$48.8</b>	<b>112</b>
<b>16</b>	<b>Salk Institute For Biological Studies</b>	<b>La Jolla</b>	<b>\$33.9</b>	<b>68</b>
<b>17</b>	<b>La Jolla Inst. For Allergy &amp; Immunolgy</b>	<b>La Jolla</b>	<b>\$31.1</b>	<b>51</b>
<b>22</b>	<b>San Diego State University</b>	<b>San Diego</b>	<b>\$24.9</b>	<b>73</b>
<b>29</b>	<b>Ludwig Institute For Cancer Res Ltd</b>	<b>La Jolla</b>	<b>\$11.5</b>	<b>22</b>
<b>39</b>	<b>Veterans Medical Research Foundation, San Diego</b>	<b>San Diego</b>	<b>\$7.0</b>	<b>13</b>
<b>42</b>	<b>Mapp Biopharmaceutical, Inc.</b>	<b>San Diego</b>	<b>\$4.9</b>	<b>6</b>
<b>45</b>	<b>Proteogenomics Research Institute for Systems Medicine</b>	<b>La Jolla</b>	<b>\$4.0</b>	<b>4</b>

Source: National Institutes of Health; CONNECT

UC San Diego ranked fifth in the state and 22nd in the nation for NSF funding in FY 2015 with \$71

NIH Grant Funding to Top California Institutions in 2015				
California Ranking*	Institution	City	NSF Award Amount (in millions of dollars)	Number of Awards
1	University of California, Berkeley	Berkeley	\$113	269
2	Stanford University	Palo Alto	\$79	209
3	University of California, Los Angeles	Los Angeles	\$74	221
4	California Institute of Technology	Pasadena	\$73	101
<b>5</b>	<b>University of California, San Diego</b>	<b>La Jolla</b>	<b>\$71</b>	<b>186</b>
6	Department of Defense, San Diego	San Diego	\$67	1
7	University of California, Irvine	Irvine	\$48	143
8	University of California, Davis	Davis	\$48	187
9	University of Southern California	Los Angeles	\$45	142
10	University of California, Santa Barbara	Santa Barbara	\$45	125

Source: National Science Foundation; CONNECT

\* Institutions ranked by total amount of awards

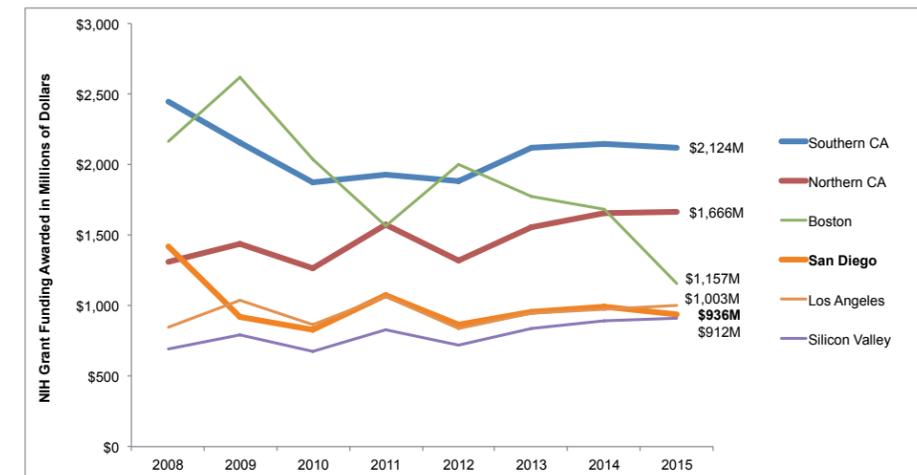
# RESEARCH GRANTS

## REGIONAL COMPARISON

California research institutions and companies received more than \$4 billion in NIH funding awarded in 2015. California accounted for 20 percent of the \$21 billion of NIH research grants awarded in 2015.

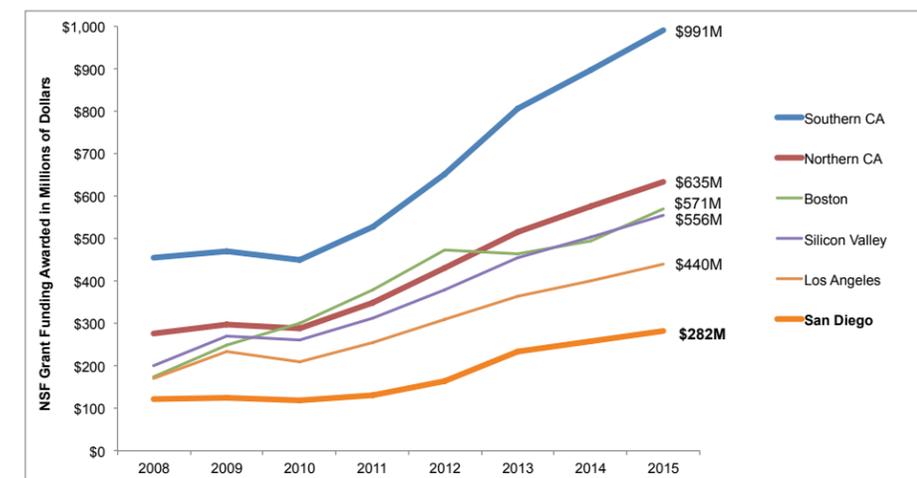
Southern California received the largest amount of both NIH and NSF funding in 2015. The Boston metro region has shown marked decline in NIH funding from a high of \$2.6 billion in 2009 to \$1.2 billion in 2015. San Diego and Los Angeles track together in terms of NIH funding.

NIH Funding by Region



Source: National Institutes of Health; UC San Diego Extension; CONNECT

NSF Funding by Region



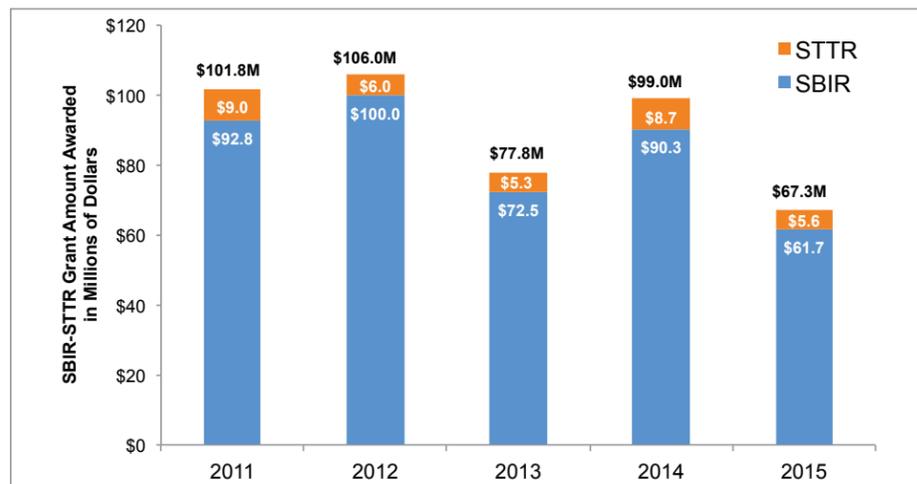
Source: National Science Foundation; UC San Diego Extension; CONNECT

# RESEARCH GRANTS

## FEDERAL GRANTS – SBIR–STTR AWARDS

SBIR-STTR grant awards to San Diego companies and institutions dipped in 2015 to \$67 million from \$99 million in 2014.

Amount of SBIR-STTR Awards - San Diego County



The number of SBIR-STTR Awards to San Diego companies in 2015 decreased by 15 percent to 182 awards compared to the 213 awards in 2014. The number of awards has fallen steadily since 2011 when 235 SBIR-STTR grants

Number of SBIR-STTR Awards - San Diego County



Source: <https://www.sbir.gov/sbirsearch/technology>; CONNECT

# STARTUP SPOTLIGHT

## FEATURED LOCAL, EARLY-STAGE INNOVATION COMPANIES

### PORTABLE GENOMICS



Digital Health/Genomics

[portablegenomics.com](http://portablegenomics.com)

2013

Patrick Merel, Ph.D.  
President

Portable Genomics, Inc. (PGI) is a digital health startup at the convergence of healthcare, life sciences, genomics, and big data. PGI is a new generation of mobile health platform to accelerate the discovery process for precision medicine with a win-win business model.

PGI enables individuals to control their own health data by collecting and aggregating personal health data in their own private silo, controlled from their mobile phone. PGI allows patients to share their real data, as they choose, with external organizations. PGI also allows patients use their personal health datasets to generate financial gain.

PGI also facilitates access to aggregate patient data by gathering organized and diverse data types, including highly valuable genomic components. PGI substantially reduces the cost of patient recruitment and engagement by incentivizing patients with a profit sharing business model.

### Portfolium StemoniX



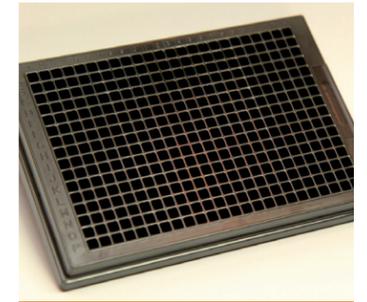
Ed Tech

[portfolium.com](http://portfolium.com)

2014

Adam Markowitz  
Chief Executive Officer

Portfolium partners with colleges & universities to help students connect learning with opportunity. Their ePortfolio network helps 5M+ students and alumni from over 150 partner institutions manage their skills and launch their careers. Portfolium's cloud-based platform empowers students with lifelong opportunities to capture, curate, and convert skills into job offers while giving learning institutions and employers the tools they need to assess competencies and recruit talent.



Regenerative Diagnostics

[stemonix.com](http://stemonix.com)

2014

Ping Yeh  
Founder & CEO

StemoniX is accelerating the discovery of new drugs by creating ready-to-use pre-clinical 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. Put simply, they help pharma fail early and cheaply.

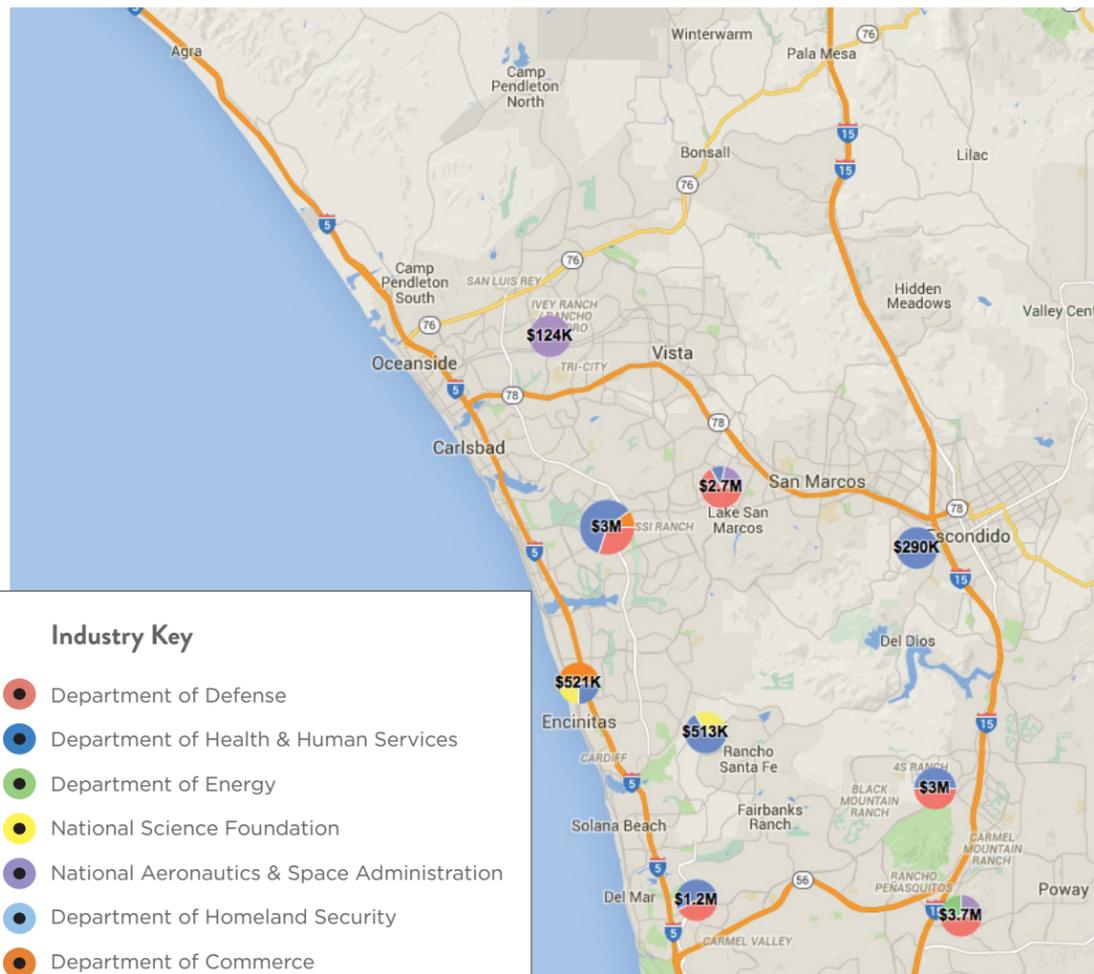
Cofounded by Ping Yeh, StemoniX was born from the experience of being a cancer survivor. After being told he was resistant to the standard chemo treatment, Ping underwent a high toxicity cocktail with the potential of causing heart failure. Thankfully Ping survived, but the experience planted the seed for StemoniX - the idea of testing drugs on reflections of ourselves via regenerative medicine to help millions of patients select and undergo treatment knowing a more certain outcome.

# RESEARCH GRANTS

## FEDERAL GRANTS – SBIR–STTR AWARDS BY COMPANY

### North San Diego County Map of SBIR-STTR Funding - 2015

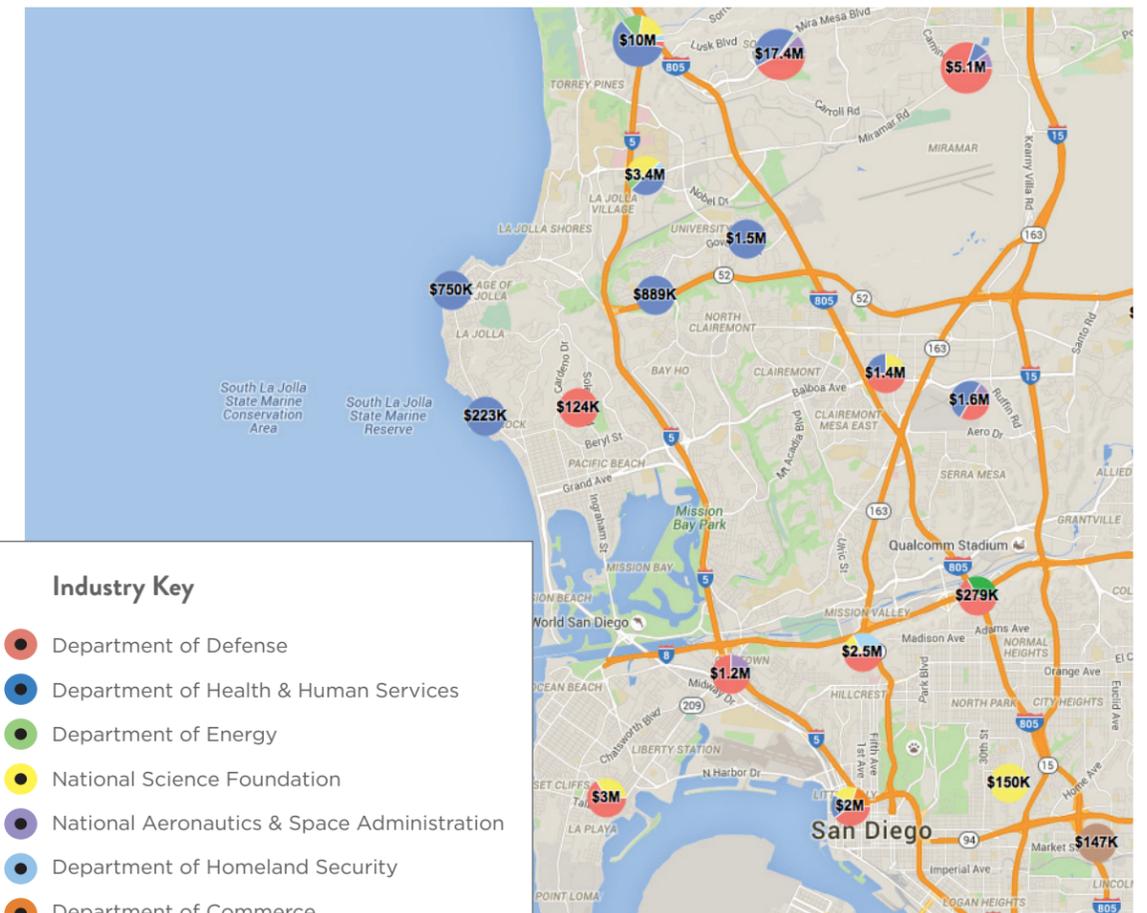
The maps below show the clusters of San Diego companies receiving SBIR-STTR funding in 2015 sorted by Federal agency. The companies receiving SBIR-STTR funding are spread across the county, with the majority of life sciences related awards (from Department of Health and Human Services) clustered in the north and central parts of the county. Awards from the Department of Defense and NSF were received by companies from the downtown area to North County.



# RESEARCH GRANTS

## FEDERAL GRANTS – SBIR–STTR AWARDS BY COMPANY

### Central & South San Diego County Map of SBIR-STTR Funding 2015



#### Industry Key

- Department of Defense
- Department of Health & Human Services
- Department of Energy
- National Science Foundation
- National Aeronautics & Space Administration
- Department of Homeland Security
- Department of Commerce
- Department of Transportation
- Department of Agriculture

#### Other Research Grant Funding

##### Federal Grants – NOAA/NASA Awards

San Diego companies and institutions received an additional \$24.9 million from the National Oceanic and Atmospheric Administration (NOAA) and \$16.4 million from NASA in 2015. NOAA funding to San Diego in 2015 was up almost 10 percent from 2014. NASA funding to San Diego was up more than 22 percent in 2015.

Source: National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA); UC San Diego Extension; CONNECT

# PATENTS

## APPLICATIONS GRANTED AND PUBLISHED

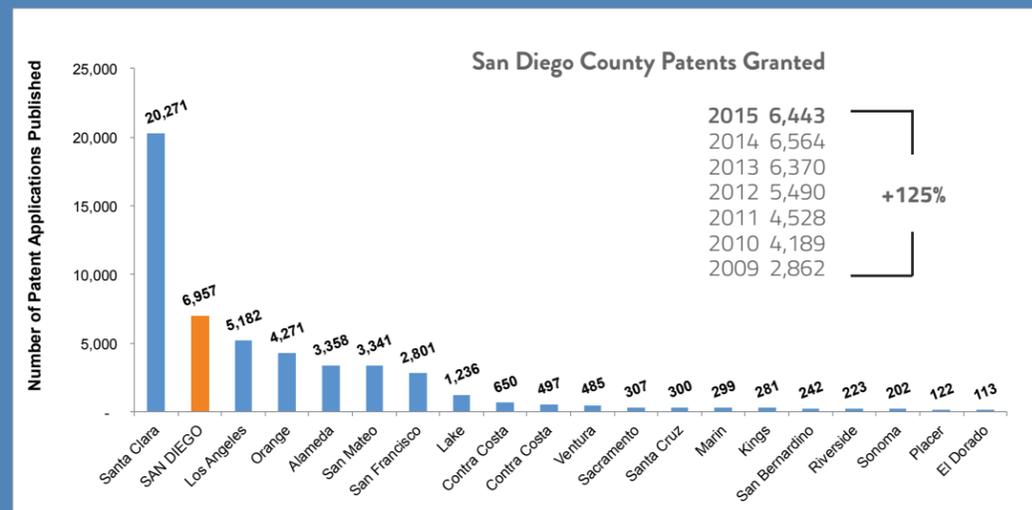
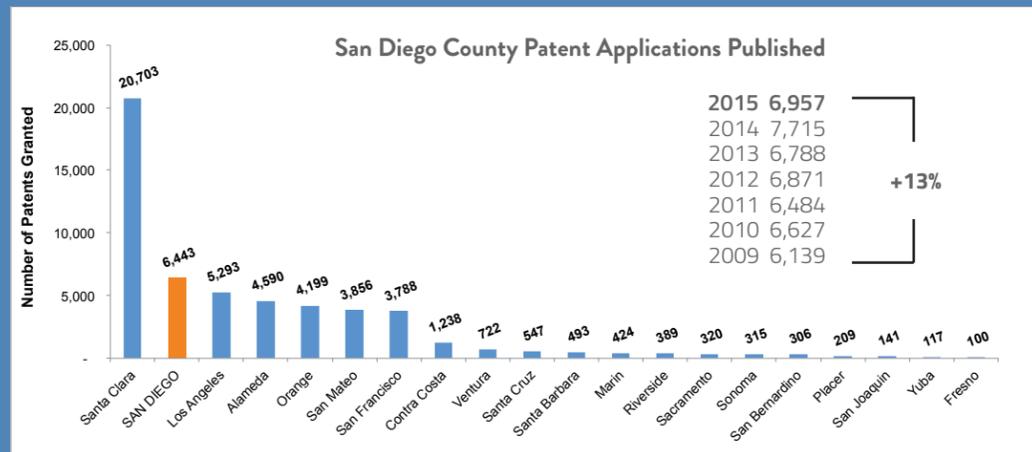
### San Diego Patent Activity Strong in 2015

Patent activity in the San Diego region reflects innovation activity. In 2015, 6,957 patent applications were published and 6,443 patents were granted – both numbers were down slightly from historic highs in 2014. The number of patents granted to San Diego inventors, researchers and companies has grown substantially since 2009 – almost 125 percent. The number of patents granted in 2015 was down slightly from 2014. Patent applications published were down almost 10 percent from 2014.

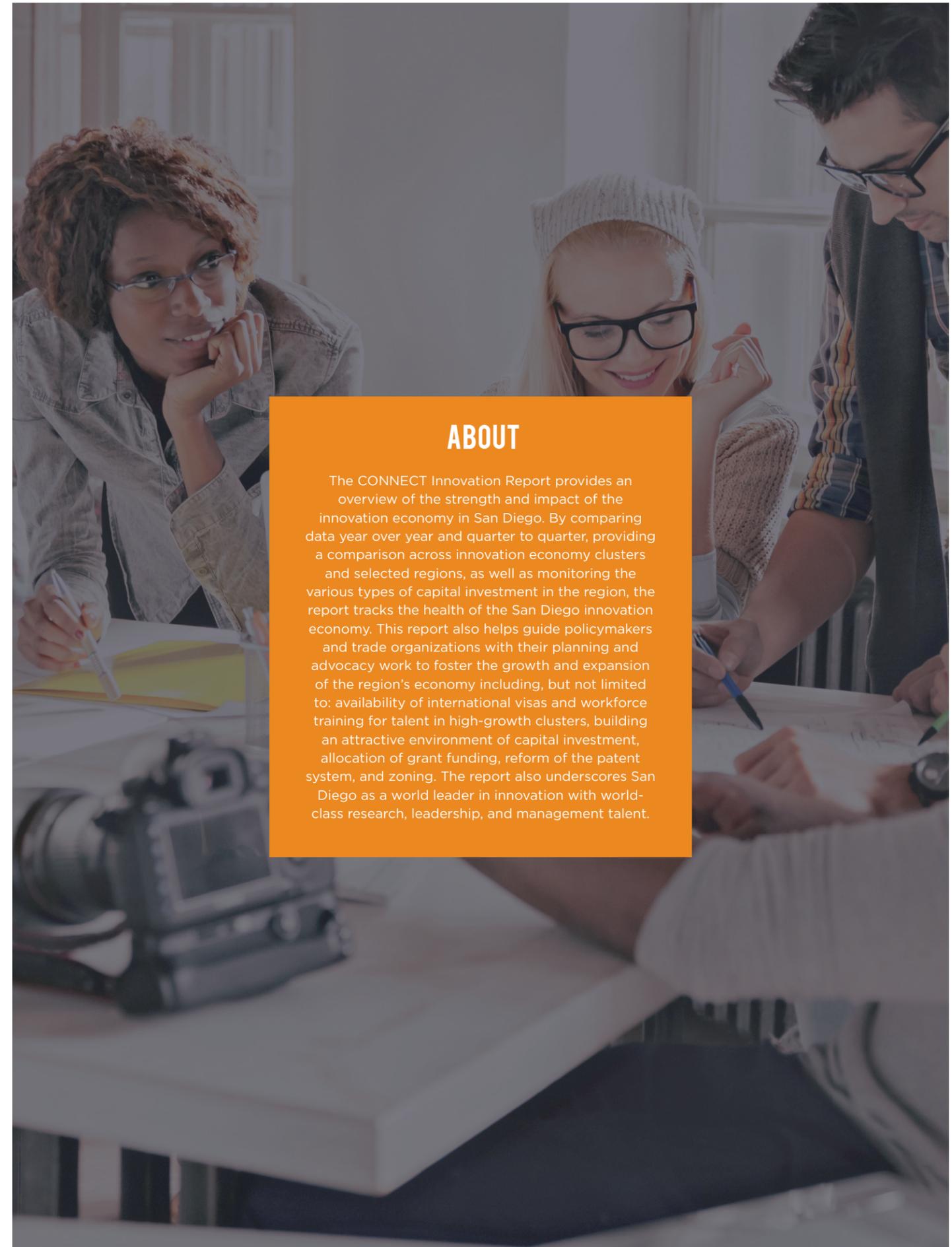
**No. 1** County in Southern California for patents granted and applications published

**No. 2** County in California for patents granted

**No. 2** County in California for new patent applications published



Source: United States Patent and Trade Office; UC San Diego Extension; CONNECT



### ABOUT

The CONNECT Innovation Report provides an overview of the strength and impact of the innovation economy in San Diego. By comparing data year over year and quarter to quarter, providing a comparison across innovation economy clusters and selected regions, as well as monitoring the various types of capital investment in the region, the report tracks the 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.

**CONNECT**

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