The American Research University Serving Society

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The historical roots of the American Public Research University are deeply embedded in the notion of a university as an institution which;

a) enhances regional economies; b) develops human capital through education and training; c) contributes to civic culture and the sustainability of a democratic society.

Historically through devices such as cooperative extension, schools of continuing education, offices of public service and outreach, this mission has been fulfilled.

The imperatives of the 21st century ever-changing global political economy have catalyzed American Universities to fulfill this mission in new ways.

21st Century Imperatives

1) The central research questions and human development issues of our time require interdisciplinary and cross-functional approaches to research, teaching and learning.
2) Without broad, public understanding of change and the new realities of change, it is impossible to implement economic development or human development initiatives at the local level.

3) This means that engagement strategies need to be holistic, addressing simultaneously civic culture, human development and economic development. It requires connecting meaningful conversations among multiple stakeholders in the knowledge enterprise, both on campus and in the community.

4) Successful Implementation Depends on:

- A commitment from senior leadership and processes which build institution-wide buy-in, i.e. strategic planning
- Business models which enable engagement activities; organizing and financing 21st century engagement
- Leveraging existing assets and enhancing investments to produce results
- Recognizing the need for a new kind of knowledge worker: the boundary spanner, the linker, facilitator, integrator role
- Convening diverse stakeholders in conversations and the co-creation of initiatives with shared goals and shared metrics
- Assuring a wide circle of co-investors

The Concept of Engagement

Engagement is a very different phenomenon than outreach.

It assumes;

a) that important knowledge exists not only in the university but in the society, organizations and everyday practice.

b) it recognizes that university anchored basic research and knowledge development are enhanced and enriched by multiple forms of knowledge.

c) it organizes activities in a manner which harvests and integrates rather than simply disseminates knowledge.

A Case Study of an Engaged University: UC San Diego

- Contributing to business development and economic growth: UCSD CONNECT and the Von Liebig Center
- Addressing the talent development needs of existing and emerging industry clusters:
  - Certificate and executive programs;
  - Applied Masters Degrees and Ph.D. partnerships with industry
- Informing and enriching regional Civic Culture; Center for US Mexico Studies, Endowed Lecture Series, UCTV
- Assuring access to education and enrichment opportunities; Academic Connections, Reality Changers, community clinics

Examples of How We Report Our Work

- UC San Diego Annual Report 2015
http://annualreport.ucsd.edu/2015/downloads/UCSanDiego-AFR2015.pdf

- UC San Diego Extension Annual Report 2014-2015
https://issuu.com/ucsandiegoextension/docs/annual_report___2014-2015___uc_san_

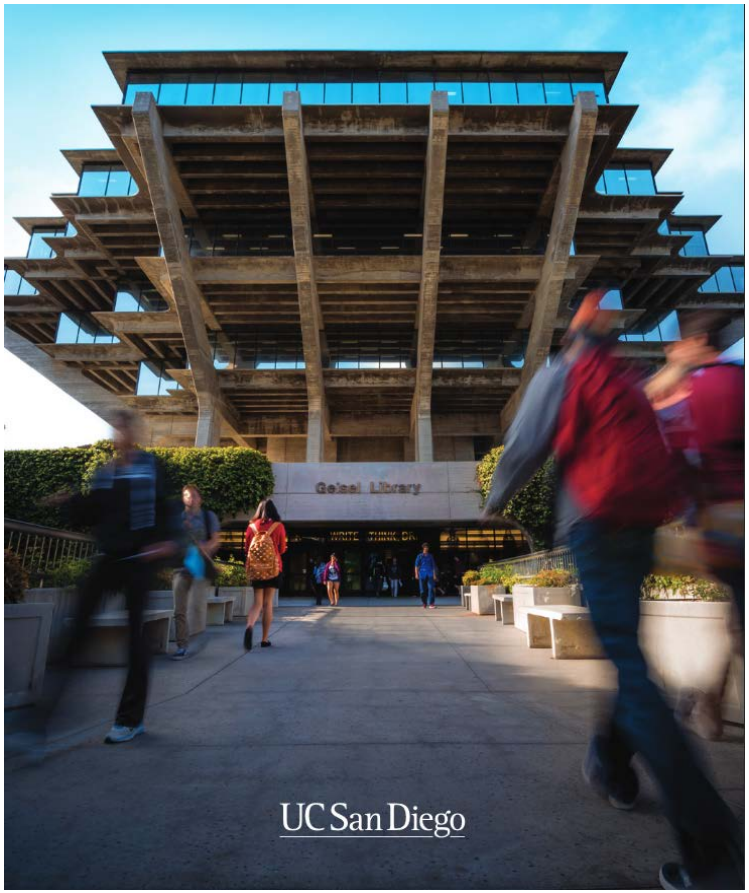
- UC San Diego Technology Transfer Annual Report FY2014 (latest available)
http://invent.ucsd.edu/invent/wp-content/uploads/2015/07/FY14ARTTO_web.pdf

- UC San Diego Rady School of Management Impact Report 2015
http://rady.ucsd.edu/docs/invest/Impact-Report-2015.pdf

- UC San Diego Jacobs School of Engineering Snapshot 2015
http://jacobsschool.ucsd.edu/news/news_resources/docs/snapshot2015.pdf

- CONNECT 2015 Innovation Report
http://www.connect.org/innovation-reports

UC San Diego Annual Report 2015



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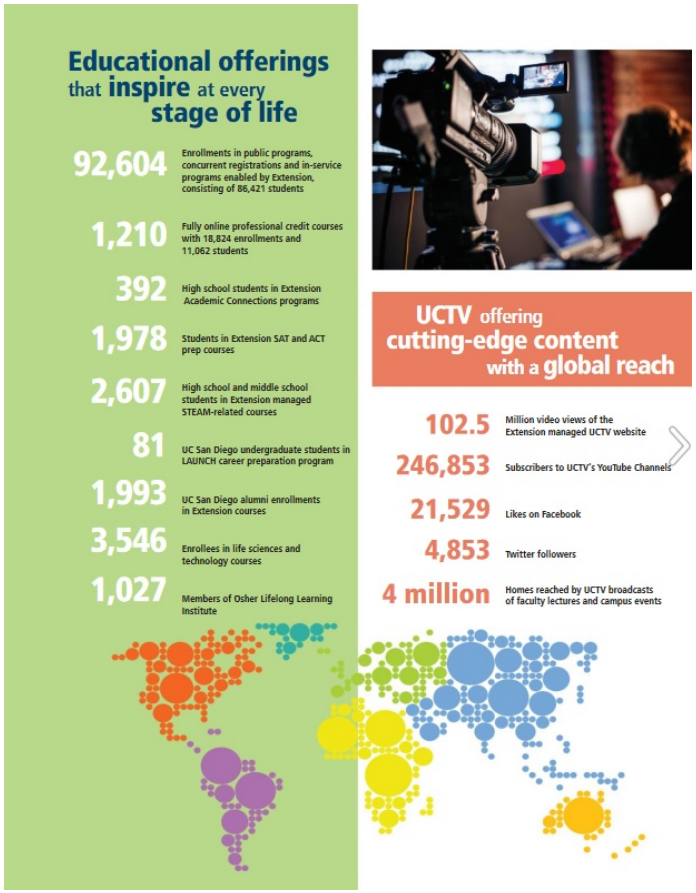
UC San Diego Extension Annual Report 2015



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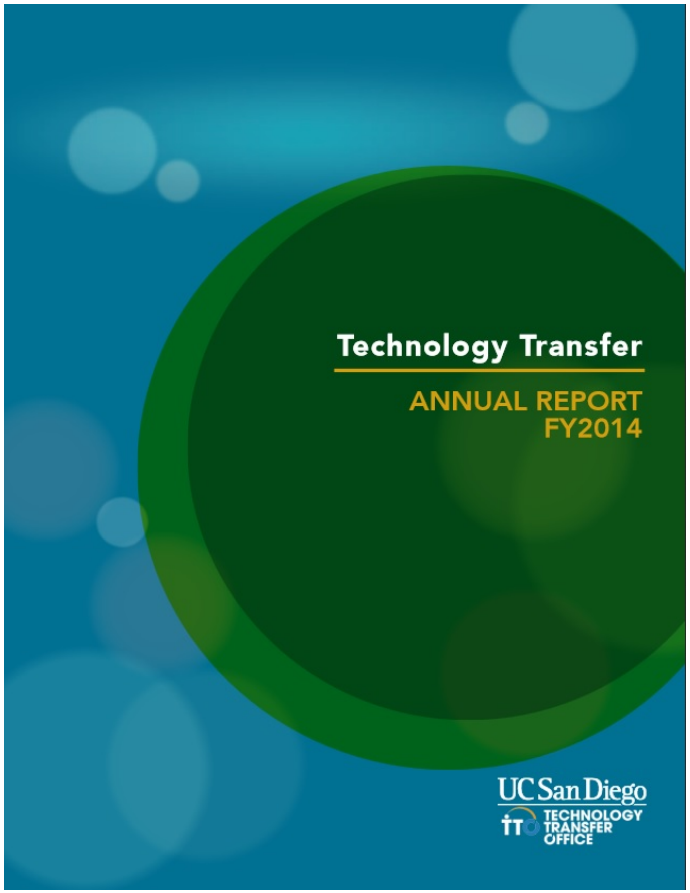
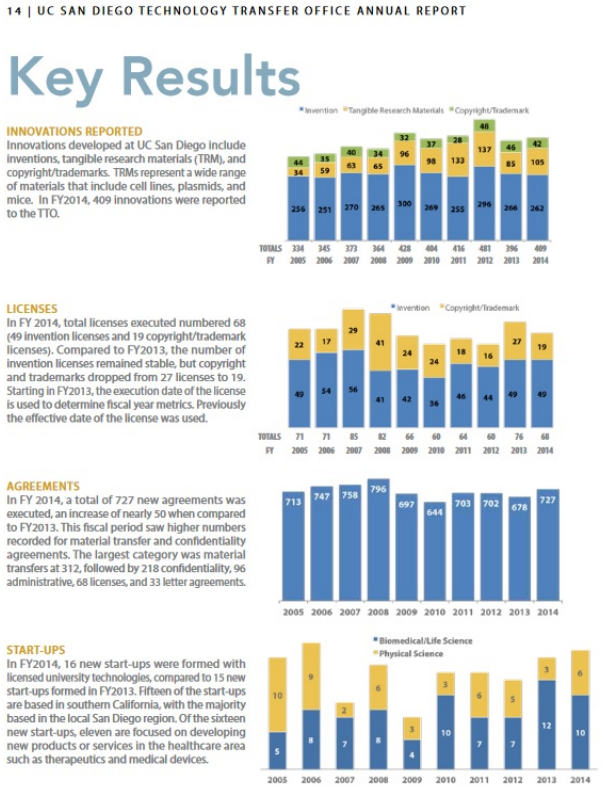
UC San Diego Technology Transfer Annual Report FY2014





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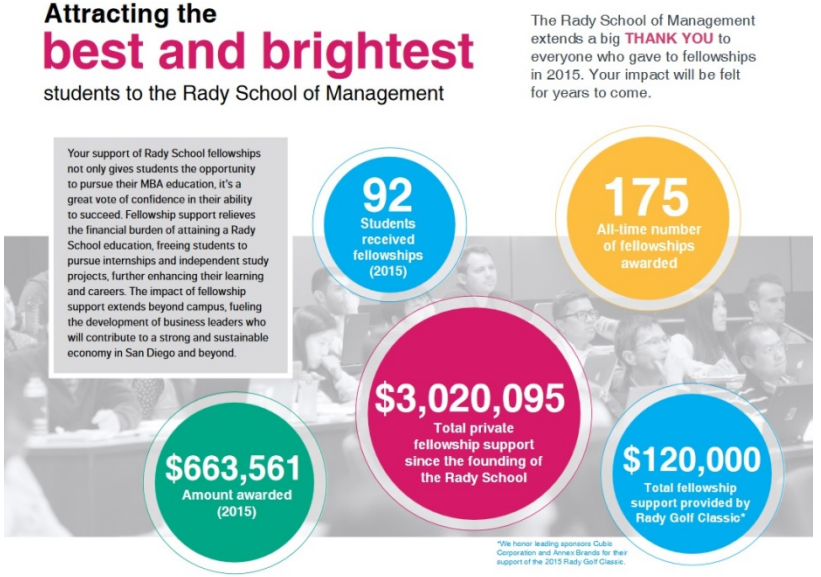
UC San Diego Rady School of Management Impact Report 2015



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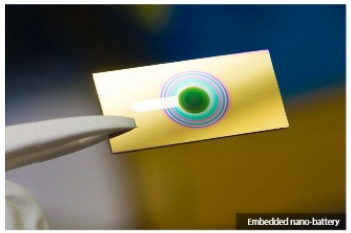
UC San Diego Jacobs School of Engineering Snapshot 2015

UC San Diego
Jacobs School of Engineering

2015
SNAPSHOT



RELEVANCE + EXCELLENCE

Through research, education and entrepreneurship, we solve global challenges while creating career opportunities, generating IP, launching companies and supporting industry clusters.

INTERDISCIPLINARY INITIATIVES

Engineering and Clinical Medicine
Materials and Energy
Global Entrepreneurism
Oceans and Environment
Maker Space and Design
Global Production and Innovation
Contextual Robotics

224 PROFESSORS

18 New faculty hired in 2015
17-23 New faculty to be hired in 2016

8,921 ENGINEERING STUDENTS

6,677 Undergraduate students
1,198 Bachelors degrees conferred

1,177 Masters students
438 Masters degrees conferred

1,067 PhD students
163 PhD degrees conferred

$162M IN RESEARCH FUNDING

$117M Government-sponsored research

$45M Industry-sponsored research + income from gifts/endowments

CONTEXTUAL ROBOTICS INSTITUTE

We develop safe, useful robotics systems that will act based on real-time context for disaster response, medicine, transportation and more. Launched by the Jacobs School of Engineering and the Division of Social Sciences at UC San Diego.

UC San Diego by the numbers

$1.0 Billion 5th in USA	Research Enterprise For Federal R&D Expenditures
1,611 26,590 7,145	UC San Diego Faculty Undergraduates (Fall 2015) Graduate Students (Fall 2015)

AGILE RESEARCH CENTERS

CaliBaja Center for Resilient Materials & Systems
Center for Extreme Events Research
Center for Microbiome Innovation
Center for Visual Computing
Center for Wearable Sensors
CHO Systems Biology Center
Sustainable Power and Energy Center

INNOVATION HAPPENS HERE

UC San Diego
Jacobs School of Engineering

ACADEMIC DEPARTMENTS

BIOENGINEERING

25 Faculty
621 Undergraduates
252 Graduate students

- bioinformatics / genomics
- biomechanics / biomaterials
- biophotonics / biosensors
- cardiac mechanics, cardiology, cardiovascular engineering
- cartilage tissue engineering
- cell / tissue mechanics
- genomic engineering
- metabolic bioengineering
- microcirculation / microhemodynamics
- molecular / cellular bioengineering
- nanotechnology
- neuroengineering
- stem cells / regenerative medicine
- systems biology

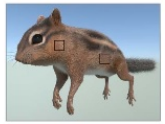
MECHANICAL & AEROSPACE ENGINEERING

44 Faculty
1,008 Undergraduates
477 Graduate students

- biomaterials / biomimetics
- cell / membrane mechanics
- control, estimation and optimization
- energy technologies
- environmental technologies
- hard disk drive tribology
- high-energy materials processing
- materials for extreme conditions
- medical device technology
- MEMS for extreme and biological environments
- metamaterials
- robotics / networked systems
- solid and soft matter
- turbulence, geophysical flows, macro/microfluidic flows

COMPUTER SCIENCE & ENGINEERING

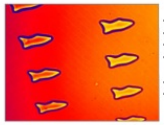
54 Faculty
2,279 Undergraduates
586 Graduate students



- bioinformatics
- computer architecture
- computer science pedagogy
- databases
- embedded systems & design
- graphics and vision
- machine learning
- programming languages and compilers
- security / cryptography
- software engineering
- systems and networking
- theoretical computer science

NANOENGINEERING

26 Faculty
912 Undergraduates
146 Graduate students



- nanobiotechnology
- nanomedicine
- computational materials science
- advanced nanomaterials
- nanomanufacturing
- nanorobotics
- nanotechnologies for energy storage and conversion
- stretchable electronics
- chemical engineering

ELECTRICAL & COMPUTER ENGINEERING

51 Faculty
1,269 Undergraduates
587 Graduate students

- bioinformatics / bionanotech
- brain imaging / mapping
- cyber-physical sys. security
- electromagnetics
- electronic circuits and systems
- embedded systems
- info tech / communications
- intelligent systems / robotics
- machine learning
- magnetic and optical storage
- medical devices and robotics
- nanoelectronics
- network infrastructure
- neural interfaces
- photonics / nanophotonics
- signal/image/video processing
- systems energy engineering
- wearable sensors

STRUCTURAL ENGINEERING

24 Faculty
588 Undergraduates
196 Graduate students

- large-scale experimental research
- earthquake engineering and infrastructure renewal
- multi-hazard mitigation for earthquakes, blasts and more
- computational mechanics for extreme events damage prediction
- aerospace structures / safety
- composites / nanomaterials
- computational fluid-structure interaction analysis
- biomechanics / geomechanics
- geotechnical engineering
- risk analysis / visualization
- structural health monitoring / nondestructive examination

University of California, San Diego | Jacobs School of Engineering
JacobsSchool.ucsd.edu

http://jacobsschool.ucsd.edu/news/news_resources/docs/snapshot2015.pdf

CONNECT 2015 Innovation Report

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

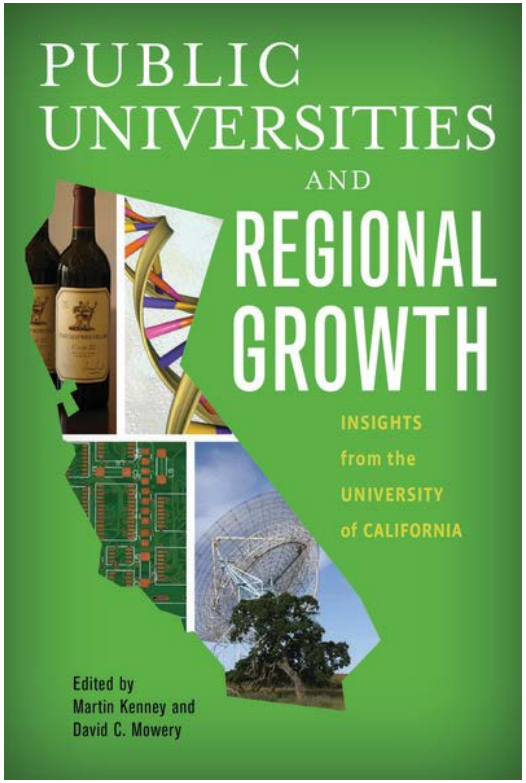
1,275 NEW INNOVATION STARTUPS CREATED IN SAN DIEGO COUNTY IN 2013–2015
4,725 NEW JOBS CREATED BY INNOVATION STARTUPS IN SAN DIEGO COUNTY IN 2013–2015

4

http://www.connect.org/innovation-reports

Sample Measures of University Engagement

Engagement Focused Culture	Diversity of Industry Connections	Tech-transfer Activities and Outputs	Commercialization Supports	Talent Development Contributions
• Percent of leadership with industry knowledge and experience • Committees and initiatives focused on cross-disciplinary entrepreneurship • Campus identity tied to innovation and entrepreneurship • Number of offices and staff dedicated to industry relations • Leadership valuing and supportive of technology commercialization • Content analysis of speeches, news releases, PR campaigns by university officials embracing economic development mandate • Explicit statements, policies and funds to incentivize and rework engagement	• Corporate affiliate programs (number of sectors served, company members, financial support) • Number of industry brokers in what department/divisions • Scope of industry of sponsored research • Industry Advisory boards • Philanthropy (endowed chairs, faculty forums, private support, and fellowships) • Multidisciplinary research centers • Number of research/ outreach events annually and participation rates • Entrepreneur in residence (EIR's), practitioners teaching	• Patent applications and awards • Licensing applications and awards • Spin-outs annually • Equity positions taken in start-ups • Amount of licensing revenue • Number of invention disclosures • Amount of royalties • Number and revenues from material transfer agreements	• Proof of concept centers (number, size, advisors, outputs) • Business planning and financing forums • Technology assessment groups/centers (activities on general campus, within TTO, and number of ideas evaluated annually) • Incubators and science parks (numbers and industry partners)	• Undergraduate internships and projects with companies • Continuing education certificates and seminars serving companies • Entrepreneurship centers (curriculum, activities, number of participants, ideas/business plans vetted, outcomes) • Undergraduates and graduates' job placements • Business service infrastructure • Number and types of student research and doctoral projects annually • Number of post-docs employed in the region



Thank you

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