

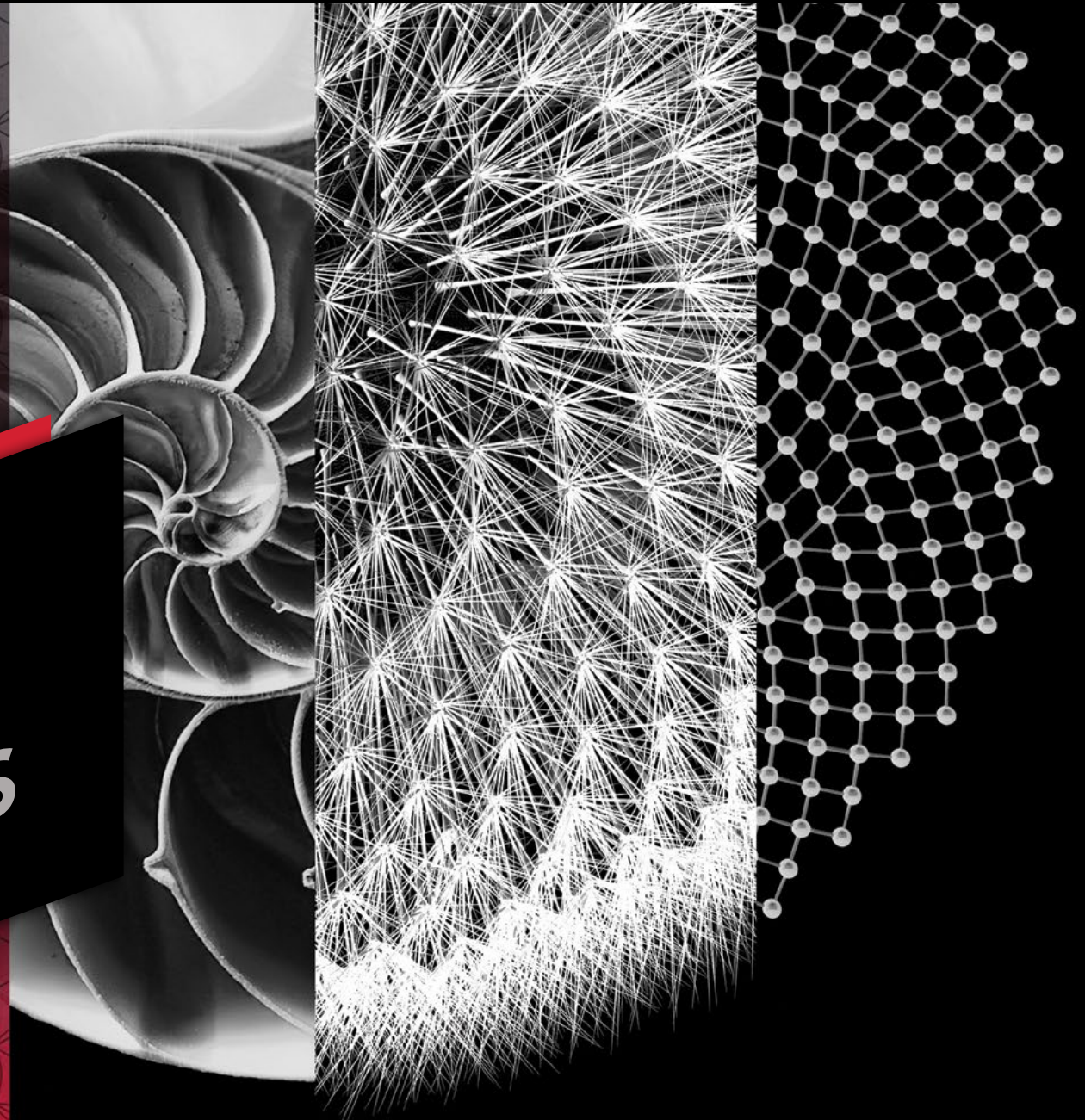
**CSUN**<sup>®</sup>

CALIFORNIA  
STATE UNIVERSITY  
NORTHRIIDGE

**Top 5** among  
peer institutions  
in graduates who  
**earn doctorates**  
– Ph.D. and M.D. –  
in the sciences.

*National Science  
Foundation*

**COLLEGE OF  
SCIENCE AND  
MATHEMATICS**





# TABLE OF CONTENTS

[College of Science and Mathematics](#)

[The Work We Do](#)

[The Region at a Glance](#)

[Science- and math-focused organizations  
in Southern California](#)

[A Career in Progress](#)

[Career Options](#)

[CSUN Alumni](#)

[Outstanding Value](#)

[Students Outside California](#)

[Programs Offered](#)

[Centers and Special Programs](#)

[Student Clubs and Organizations](#)





# CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

# COLLEGE OF SCIENCE AND MATHEMATICS

California State University, Northridge (CSUN) serves as **an engine of creativity, discovery and service for Greater Los Angeles and beyond**. Each year, CSUN students set forth, like a network of innovators, in search of bold solutions to intricate global challenges. And each year, their innovations elevate the campus.

At CSUN's College of Science and Mathematics, **the student takes center stage**. Whether it's publishing a scientific breakthrough or accessing state-of-the-art technologies, here, students can expect a level of service rare among public universities.

The journal *Nature* recently lauded CSUN as a rising star in scientific research, naming the university as **one of North America's top 25 institutions for science**. We placed alongside Stanford, Columbia and the University of Pennsylvania, and stand on the list as California's sole public higher education institution.

The list tells you who we are and where we stand. But to rise implies direction —where we're going and what we'll be — so we invite you, in the coming pages, to see what lies ahead.





The National Science Foundation recently ranked CSUN in the top 22.5 percentile nationally, based on the University's number of full-time graduate students in the fields of science, engineering and health.

### **There are 3,000 students enrolled in the College of Science and Mathematics ...**

CSUN is a model institution for cultural diversity and rigorous academic scholarship. In total, more than 40,000 students, each with a unique story, collectively inspire the university's inclusive identity. And, like the larger campus, students in the college stem from broad points of origin. From the international, first-time visitor, to the full-time midcareer professional, our diverse student body endows the university with an enduring intellectual curiosity and a great spirit of adventure.



### **... studying in 5 departments ...**

Observe the nanoscale in computational physics, or track the shifting fault lines in geology. Make breakthroughs in cancer research, or perhaps shed light on nebulous cosmic mysteries. Through painstaking, peer-reviewed work and student-centric curriculum, the college offers a superior selection of courses, methods and disciplines in five distinct departments: Biology, Chemistry and Biochemistry, Geological Sciences, Mathematics, and Physics and Astronomy.

### **... and none of them dream small.**

Students in the college dream about innovation and discovery. They see within the universe a set of solvable equations. Distant star clusters burn red hot in their visions of the great unknown. It's in their DNA to wonder. To wonder about the first payloads to Martian colonies or gene editing; about nanobots fighting cancer autonomously within hosts; about the science fictions of today and the scientific realities of tomorrow. Those thoughts, real or fiction, put astronauts on moons and self-driving automation in cars.

CSUN's Mathematics department won the American Mathematical Society's 2016 Exemplary Program in a Mathematics Department award for the creation of both the PUMP (Preparing Undergraduates through Mentoring toward Ph.D.'s) program and for CSU Alliance for PUMP, a consortium of 10 California State University campuses.

### **Those thoughts happen at CSUN.**





# THE WORK WE DO

Grounded in robust scientific practice and research, faculty in the College of Science and Mathematics pilot the university into new and uncharted academic territory. In partnership with diverse agencies from the private and public sectors, faculty lead teams of students and other education professionals in highly specialized projects and experiments.

In 2014-15, the California State University system received **\$567 million in research funds**, resulting in more than **15,000 publications** and **51,500 research journal citations**. CSUN's College of Science and Mathematics earned dozens of externally-funded research grants in 2015 for ongoing studies and projects in the fields of biology, geological sciences, mathematics, as well as physics and astronomy. The following few examples illustrate the complexity of the college's work.



*"They have small amounts of uranium that decay to lead, so by analyzing uranium and lead, we can calculate the age in which certain crystals, like zircon, are formed." – Schwartz*

**Don't expect dry lectures**, especially not in a geology course with Dr. Joshua Schwartz, whose work on Earth's continental crust digs into the fiery innards of our planet's lower levels. With CSUN's high-

resolution mass spectrometer – housed in the college's PLASMA lab – Schwartz determines the isotope ratios of uranium and lead within the minerals found in molten rocks.

Schwartz's hunt for rare, molten material results in frequent trips to the mountains of southwest New Zealand, where, often accompanied by his graduate students, he acquires new samples and examines arc flare-ups.

**No frills... Just science.** With a throng of eager undergraduates, Steven Oppenheimer, professor of biology emeritus, conducts groundbreaking cancer research on yeast cell clusters. Oppenheimer's inclusive approach to research, and his decades-long list of scientific achievements, garnered him the Presidential Award for Excellence in Mathematics and Science Mentoring. President Obama personally presented the award to Oppenheimer – one of only 20 educators honored – at a special White House Ceremony.

**Backed by the National Institutes of Health**, chemistry professor Yann Schrodi hunts for cheaper, nontoxic alternatives to the rare transitional metals currently needed to produce many drugs and treatments. Each semester, numerous CSUN students join Schrodi in his organometallic and inorganic chemistry lab to tinker with a cocktail of compounds that might, they hope, yield a major pharmaceutical breakthrough.



**Not far away, in CSUN's Developmental Oncogene**

**Laboratory**, Dr. Jonathan Kelber's team, loaded with undergraduate, graduate and PhD-level researchers, conducts groundbreaking breast and pancreatic cancer research. His team recently identified a novel mechanism by which the gene PEAK1 helps breast cancer cells metastasize. Their first-ever findings were recently published in the *Public Library of Science (PLOS One)* and *Biochemical and Biophysical Research Communications (BBRC)*.

*"It's exhilarating to mentor my lab trainees as we partner with leaders in oncology research to tackle some of the most important questions in these fields." – Kelber*

The team has also been working tirelessly to characterize the function of another gene, known as ITGA1, that may be a new diagnostic and therapeutic target in pancreatic cancer – one of the deadliest. This work is currently under review at the *Nature Journal*, *Scientific Reports*.

The proposed findings netted one of the project's lead researchers, undergraduate student Sa La Kim, two prestigious honors: a 2016 award and scholarship from the Howell Foundation and CSUPERB (California State University Program for Education and Research in Biotechnology), and the 2016 Julie Gorchynski Center for Cancer and Developmental Biology Undergraduate Research Award.

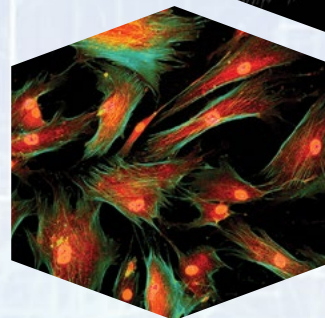
The National Institutes of Health recently awarded Kelber a prestigious four-year, \$1.46 million grant to support his research team in their ongoing efforts.

**In the deep, microscopic abyss,**

Dr. Nicholas Kioussis uses computational physics to probe the nanoscale for radical new forms of energy and material. A lineup of diverse researchers – some physicists, some students – join Kioussis at CSUN's W.M. Keck Center to conduct transformative research on particles often smaller than a single strand of DNA. The center uses five high performing computing clusters, each with 20 to 35 InfiniBand interconnection server nodes.

Backed by an \$18.5 million grant from the National Science Foundation (NSF), Kioussis helped establish, and now works with, the prestigious, multi-institutional Engineering Research Center (ERC). At the Center, the team develops robust, highly efficient electromagnetic systems (about the size of a biological cell) to power a range of devices, from miniature consumer electronics and national security technologies to nanobots inside human hosts.

*"In many ways, the NSF grant brings together a 'dream team' of people, pioneers in the field of multiferroics who hope to create a new 'Silicon Valley' in the field of nanotechnology." – Kioussis*



Students create and test nanotechnology devices to study DNA and the human genome. Using an atomic force microscope, they can observe objects 1000 times smaller than the width of a human hair.



Geological Sciences Emeritus Professor Richard Squires received the prestigious Gilbert N. Harris Award for exceptional contribution to systematic paleontology in 2014.

Biology professor Rachel Mackelprang recently received a three-year \$1.3 million NASA grant to probe the soils of frozen planets and comets for possible life.





# THE REGION AT A GLANCE

Within the Greater Los Angeles area – atop rolling, green hills and on bright, sandy beaches – is some of the planet's most valuable real estate. In dense, resource-rich pockets, residents and industries fuse into bustling communities. And in busy urban centers, like Downtown L.A., more and more inhabitants choose to live and work in the same location. These clustered professionals, combined with the city's renowned scientific institutions, form the region's highly concentrated infrastructure of innovation.

At the city's southern tip, **The California Science Center**, home of the Space Shuttle Endeavor, draws a global audience to its extensive catalogue of scientific innovations and artifacts.



*The annual **Space Tech Expo**, a business-to-business space industry event in Pasadena, California, attracts hundreds of corporate exhibitors and thousands of engineers, scientists, executives, government representatives, space agencies, military and entrepreneurs.*

In the Hollywood Hills, removed from the busy city below, is the iconic **Griffith Observatory**. Inside, stars, planets and other celestial bodies project upon the planetarium's aluminum dome, and outside, from the terrace, the Observatory offers sweeping, panoramic views of the sprawling Los Angeles metropolis.

Just a few miles from the Los Angeles International Airport (LAX), Elon Musk and his fleet of Mars-minded experts is busy at work in **SpaceX's** Hawthorne headquarters. There, among many other projects, the private aeronautics company designs and manufactures re-usable rocket technology in a bid to revolutionize space travel.

At the **La Brea Tar Pits**, on L.A.'s Miracle Mile, scientists excavate Ice Age relics and study prehistoric wildlife. Species buried for millennia – dire wolves and saber tooth tigers – reemerge at last from the oily, black pools of this active, urban dig site.

In Pasadena, at **NASA's Jet Propulsion Laboratory (JPL)**, scientists develop aviation's most experimental technology. In test centers, control rooms and hangars larger than football fields, JPL builds and operates robotic spacecraft, like the Curiosity Rover, to explore the solar system's deepest cosmic terrain.

These institutions, among countless, unlisted others, are within close reach of CSUN's Transit Center. On the city's fleet of clean-air buses or via the vast subway system, visitors and students have easy public access to the region's many cultural and scientific assets.







The **Los Angeles Cleantech Incubator (LACI)** hosts a renowned satellite business incubator at CSUN. LACI@CSUN attracts entrepreneurs and new technologies that have a global impact.

UBI Global ranked LACI **third on its list of Top University Associated Business Incubators of 2015**. LACI also won the small business and green job creation award from the U.S. Small Business Administration.

### Science- and math-focused organizations in Southern California:

- American Chemical Association
- Biocom Los Angeles
- California Life Sciences Association
- California Science Center Foundation
- Environmental Science
- Greater Los Angeles Mathematics Council
- Los Angeles Astronomical Society
- Los Angeles Basin Geological Society
- Society of Environmental Toxicology and Chemistry
- Southern California Biomedical Council
- Southern California Paleontological Society
- Sustainable Works

CSUN's Origins Lab unites astronomy and astrophysics students from around the world to share ideas. Members have worked at NASA's Jet Propulsion Laboratory and on NASA's Space Hubble Telescope.



Mathematics professor Mark Schilling won the Mathematical Association's 2017 Chauvenet Prize for his groundbreaking article on probability, "The Surprising Predictability of Long Runs."



Associate professor of biology Cindy Malone directs the \$6.1 million CSUN-UCLA Bridges to Stem Cell Research Program, funded by the California Institute for Regenerative Medicine.





# A CAREER IN PROGRESS

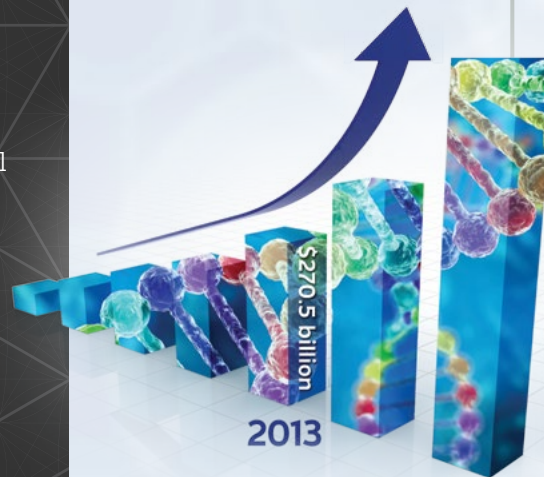
CSUN students depart **industry-ready, prepped for doctoral work** and outfitted with high demand skills. Each quarter, Southern California sees continued job growth in the science and math sectors. In this high-value market, top paid jobs increasingly call for science and math backgrounds.

In the biomedical field alone, the Greater Los Angeles area possesses a concentration of more than 235,000 jobs. And in Santa Monica, an innovation district of tech companies, start-ups and venture capital firms, known as "Silicon Beach," snakes up the coastline. Inside these progressive, caffeine-fueled hotspots, technological progress occurs in booming, exponential waves. To accommodate the breakneck pace, the area continually hires bright new minds from the fields of math and science.

## California is a leader in:

- Bioscience venture capital investments
- National Institutes of Health funding awards to state institutions
- Academic bioscience research and development expenditures

Grand View Research reports the global biotechnology market was valued at \$270.5 billion in 2013 and is **expected to grow** through the end of the decade.



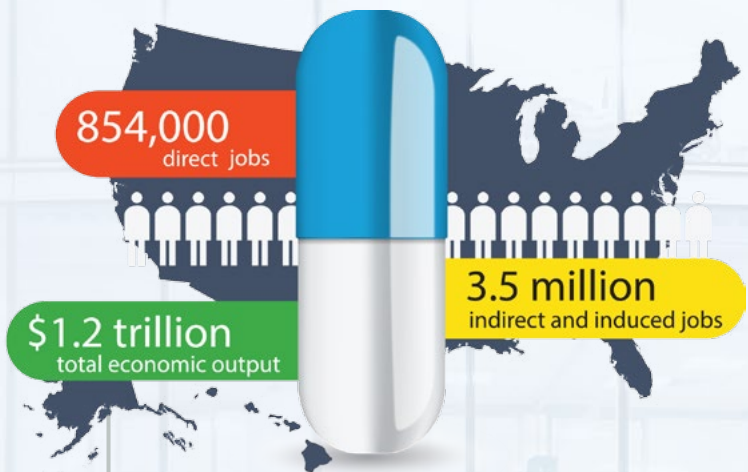
## Career Options

Scientists and mathematicians are increasingly members of interdisciplinary research teams, working together to solve complex problems. Below are just a few of the opportunities open to graduates in science and mathematics.

- Actuary
- Applied mathematician
- Astronomer
- Astrophysicist
- Biomedical researcher
- Biophysicist
- Biotechnologist
- Chemist/biochemist
- Clinical scientist
- Dentist
- Ecologist
- Fisheries biologist
- Forensic scientist
- Geneticist
- Geologist/engineering geologist
- Marine biologist
- Mathematician
- Microbiologist
- Nuclear physicist
- Ophthalmologist
- Optometrist
- Osteopathic medicine specialist
- Petroleum geologist
- Pharmacist
- Physician
- Physicist
- Statistician
- Systems analyst
- Teacher, college instructor or university professor
- Veterinarian

## CSUN Alumni

When students graduate from CSUN, they join an extensive network of more than 330,000 alumni – in California, across the nation and around the globe – who thrive on helping Matadors find personal and professional success.

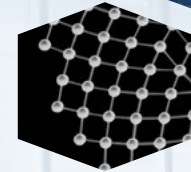


*TEconomy Partners LLC reports that, in 2014, the U.S. biopharmaceutical industry supported nearly 854,000 direct jobs, 3.5 million indirect and induced jobs, and more than \$1.2 trillion in total economic output in the United States.*

Alumna **Patricia Maloney** is the principal director for joint operational programs in the NASA Programs Division at The Aerospace Corporation, and she was named the company's 2005 Woman of the Year. Maloney manages relationships and oversees a team working with some of the most prestigious partners in The Aerospace Corporation's portfolio – including NASA, the U.S. Air Force and the National Oceanic and Atmospheric Administration.

**Ryan Davis**, a CSUN alumnus, recently began a doctoral program in chemistry at Yale University as a recipient of a 2016 National Science Foundation Graduate Research Fellowship, the oldest graduate fellowship of its kind and one of the most prestigious.

The College of Science and Mathematics is proud to honor **Tania Benjamin**, who earned her B.S. in Cell and Molecular Biology and was named the 2014-15 Wolfson Scholar, CSUN's highest honor bestowed upon a graduating senior. Tania recently started medical school at UC San Francisco.



In 2016, CSUN students from the Biology Department's Developmental Oncogene Lab presented at the 2016 American Association for Cancer Research conference.

CSUN's annual Techfest introduces students to major regional employers in technology and science, including Aerojet Rocketdyne, Amgen, NASA's Jet Propulsion Laboratory, U.S. Air Force, Caltrans, AT&T and many more.





# OUTSTANDING VALUE

By choosing the College of Science and Mathematics, students receive an education grounded in **research, scholarship and academic excellence**.

With more than 85 post-baccalaureate programs, including doctoral degrees and professional certificates, CSUN is the **fourth largest university** in California.

A degree in the college holds long-term national and international credibility at a price that is moderate in comparison with similar programs from other universities.

In the professional sector, firms seek new hires with applied, firsthand experience. And likewise, in education, top graduate institutions, including most medical schools, increasingly desire applicants with backgrounds in research.

It's also at the college that many soon-to-be doctoral students unknowingly begin the first chapter of their life's work – theories of the improbable, dissertations on new frontiers.

Where those in the field see breakpoints, or theories set in stone, CSUN students see opportunity. And in them, the college sees its most formative resource.



*The National Science Foundation recently ranked CSUN among the **nation's Top 5** comprehensive universities in the **number of graduates who go on to earn doctorates** in research and the sciences.*

**Statement of Nondiscrimination and Disability Services Information:** CSUN does not discriminate on the basis of age, color, disability, national origin, race, religion, sex, sexual orientation or veteran status, as monitored by the Department of Labor (Office of Federal Contract Compliance) and the Department of Education, or in violation of section 504 of the Rehabilitation Act of 1973 and the regulations adopted thereunder.

**Students Needing Classroom Accommodations or Auxiliary Aids:** Students requiring classroom accommodations should contact either the Center on Disabilities or the National Center on Deafness (for those who are deaf or hard of hearing) for assistance as soon as the decision to enroll has been made.

## Students Outside California

Attending CSUN lets out-of-state and international students live the L.A. lifestyle as they earn the degree they need. And the best part is, by choosing CSUN, they can do it all from the comfort, safety and prestige of one of the nation's largest and most respected public universities.

Moreover, since Los Angeles is now ranked the world's number one student city, CSUN students can rest easy when it comes to what's out there. Because here, the answer is... Well, just about everything.

Accompanying the vast local culture is the institutional prowess of CSUN. Being a university of such size, the many resources at our disposal allow us to design programs and services that tap deeply into the student experience. That's as true for those from another state as it is for those from another country. Because it's not the "where" that matters to us – it's the student.

CSUN recently ranked number one among master's colleges and universities for the highest number of international students in the United States, with a total enrollment of more than 3,900. Along with students, the university hosts visiting scholars from institutions in China, Italy, Spain, Russia, Korea, Iran and more.

CSUN offers a distinct set of services, designed specifically to meet the needs of the international community. These programs include

- Intensive English and University Pathways (IEP)
- Semester at CSUN (SAC)
- English and Cultural Experience (ELCE)

In addition to receiving academic and administrative support, students also gain access to free tutoring and can participate in cultural expeditions that enable them to experience life in Los Angeles more fully.

## Programs Offered

Majors and options

- Master of Science
- Bachelor of Science
- Bachelor of Arts

Biochemistry		●	○
Biology	●	●	○
Biotechnology/medical technology		●	
Cell and evolutionary biology		●	
Ecology and evolutionary biology		●	
Marine biology		●	
Microbiology		●	
Chemistry	●	●	○
Geology		●	○
Environmental geology		●	
Geophysics		●	○
Secondary teaching		●	
Mathematics	●	●	○
Applied mathematical sciences		●	
Secondary teaching	●		
Statistics		●	
Physics	●	●	○
Astrophysics		●	

Information subject to change

## Centers and Special Programs

### Biology

- Marine Biology Semester
- Tropical Biology Semester
- CSUN-UCLA Stem Cell Research Program
- Center for Cancer and Developmental Biology

### Mathematics

- Developmental Math Program
- Interdisciplinary Research Institute for the Sciences (IRIS)
- Climate Science Program

### Physics

- Planetarium
- Center for Supramolecular Studies
- Center of Excellence for Materials Innovation
- W.M. Keck Computational Materials Science Center

### Student-centric

- CSUN/JPL Cooperative Program
- Maximizing Access to Research Careers (MARC) and Research Initiative for Scientific Enhancement (RISE) programs
- Science and Math Student Services Center/EOP

## Student Clubs and Organizations

- American Medical Student Association
- Astronomy Club
- Behavior, Ecology and Evolutionary Reading Club
- Biology Club
- Chemistry and Biochemistry Club
- Chicanos for Community Medicine
- Coalition of Physician Assistants Club
- Genetics Club
- Geology Club
- Marine Biology Graduate Student Association
- Matador Math Society
- Microbiology Student Association
- Phi Delta Epsilon
- Pre-Dental Club
- Pre-Optometry Student Association
- Pre-Pharmacy Club







# **CALIFORNIA** STATE UNIVERSITY, NORTHRIDGE

**CSUN** is Among  
North America's  
**Top 25 Rising Star**  
Institutions for **Research**.

*Nature*