

Fact Sheet: UC Research and the National Science Foundation

The University of California (UC) is an economic engine for California and the nation, due in large part to National Science Foundation (NSF) funding. NSF has a broad mission: “to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense.” The NSF sponsors about 25 percent of all merit-based university research across every discipline and helps to train and educate the next generation of the scientific and engineering workforce.

- UC researchers are awarded more NSF funding than any other institution in the country, receiving approximately 7 to 8 percent of NSF’s annual appropriations.
- In fiscal year (FY) 2018, UC successfully competed for \$485 million in NSF funding across more than 2,200 grant awards. Historically, UC’s funding award total from the NSF represents more than half the total for all California institutions.
- UC’s NSF-funded research addresses key areas – bioengineering; computing; geology and earth sciences; social sciences; materials research; and science education.
- With NSF funding, UC advances knowledge, builds technical expertise, drives innovation, helps to create new businesses and trains tomorrow’s scientific workforce.

Strong funding for the National Science Foundation across all research disciplines is critical for UC scientists and graduate students to tackle our nation’s great challenges and expand knowledge of our world and the universe.

**UC supports an appropriation of \$9.0 billion
for NSF in fiscal year 2020.**

If you have questions about NSF-sponsored research at the University of California, please contact the UC Office of Federal Governmental Relations at 202-974-6300.

The following are examples of NSF-funded UC research projects.



UC Berkeley – Sustainable, Compostable, “Foam” Packaging from Seafood Waste

John Felts – a UCB I-Corps alum and CEO of Cruz Foam – and his co-founders create sustainable and compostable packaging foam from up-cycled seafood waste as a replacement for single-use plastics. Their mission is saving our oceans and helping end the global plastic pollution epidemic. After working with faculty at UC Santa Cruz, where the patent was filed in 2017, Cruz Foam participated in the local program at Berkeley-Haas before moving on to the NSF I-Corps program in 2018. As a result, the team formed a company and has acquired initial pilot customers, including one of the largest domestic soda manufacturers. Felts is joined by a mentor, Rhonda Shrader, executive director of Berkeley-Haas Entrepreneurship Program. *NSF Funding: NSF-wide, Innovation-Corps—National Innovation Network Teams Program (I-Corps™ Teams)*



UC Davis – Expanding the Frontiers of Physics and the Universe

UC Davis researcher Tony Tyson is the chief scientist for the NSF’s Large Synoptic Survey Telescope, a nine-year construction project in its sixth year. When completed, it will conduct a survey of the sky, thereby allowing for the study of the universe and the objects in it and providing new insights into dark matter and dark energy, hazardous asteroids and the structure and contents of the Milky Way Galaxy. *NSF Funding: Mathematical and Physical Sciences Directorate, Division of Astronomical Sciences.*



UC Irvine – Solving Environmental Problems through Research and Training

UC Irvine researchers discovered that the soil microbiome provides environmental benefits even under drought and extreme climate conditions. A complementary graduate education program is training the next generation of environmental problem solvers in partnership with public and private organizations. *NSF Funding: Education and Human Resources Directorate, Division of Graduate Education; Biological Sciences Directorate, Division of Environmental Biology.*



UCLA – Advancing Propulsion and Energy Technologies using Laser-Based Sensors

Professor Mitchell Spearrin’s lab works with advanced laser-based sensing methods to investigate complex flows in extreme conditions, with applications to design, diagnosis, monitor and control dynamic thermal-fluid systems, including rocket propulsion devices, hypersonic aircraft and planetary entry systems. Spearrin is using spectroscopy to understand the chemistry and physics of combustion at high pressures. Knowledge learned from the studies will be applied to the next-generation of ultra-efficient engines. Clean, high-performance propulsion and energy technologies are critical to national security and sustainable economic health. *NSF Funding: CAREER Award.*



UC Merced – Deep Look into Child Development

A new grant to Professor Rose Scott, a developmental psychologist, is funding a three-year study to investigate the impact of economic inequality on children’s psychological reasoning – specifically false-belief understanding, children’s ability to reason about other people’s behavior by considering other’s underlying mental states. This project will substantially advance understanding of how and why economic inequality influences children’s psychological reasoning. This project has the potential to help us understand the perspective taking processes in children, as well as identifying ways to improve the developmental outcomes of disadvantaged children. *NSF Funding: Social, Behavioral, and Economic Sciences Directorate.*



UC Riverside – Basic to Applied Materials Fabrication and Fluidic Structures

Associate Professor Ming Lee Tang and Assistant Professor Mona Eskadari launched their research careers with support from the NSF Early CAREER and Graduate Research Funding Program. Today, Eskadari is developing predictive technologies and optimized innovative strategies for medical intervention to diagnose and predict risk of lung disease. Tang received additional funding from the NSF's Office of International Science and Engineering (OISE) that has enabled her to gain a better understanding for the fabrication of air-stable, photon upconversion thin films or liquids that can operate efficiently with diffuse sunlight, without the need for volatile organic solvents that currently limit practical use in applications. *NSF Funding: Office of International Science and Engineering (OISE), Programs and Analysis Cluster; Graduate Fellowship Research Program (GFRP), Engineering Directorate.*



UC San Diego (UCSD) – Shake Table

The world's largest outdoor earthquake simulator, operated by structural engineers at UCSD, has received a \$16.3 million grant from the NSF to upgrade the facility to expand its testing capabilities. The funds will enable the simulator, also commonly known as a shake table, to more realistically recreate the motion of the ground during strong earthquakes. After the upgrade, the facility will be able to test the heaviest test specimens in the world – from multi-story buildings to bridge columns, bridge bents and wind turbines – with a full range of ground motions that can occur during an earthquake. *NSF Funding: Engineering Directorate, Division of Civil, Mechanical and Manufacturing Innovation, Natural Hazards Engineering Research Infrastructure (NHERI) Program.*



UC San Francisco (UCSF) – Center for Cellular Construction

The NSF has funded a “blue-sky” bioengineering center at UCSF that aims to transform the field of cell biology into an engineering discipline by adapting tools from mathematics, computer sciences and the physical sciences to develop technologies that use cells instead of silicon as their building blocks. Directed by Professor Wallace Marshall, center researchers will learn how to reliably engineer cells for desired functions, design complex multicellular and multi-organism structures for specific tasks and develop living “bioreactors” to produce drugs or biofuels. *NSF Funding: Biological Sciences Directorate, Division of Molecular and Cellular Biosciences.*



UC Santa Barbara (UCSB) – Making Tactile Waves: Somatosensation as Elastic Wave Propagation

The sense of touch is so fundamental to our everyday lives that we take it for granted, yet we know little about the physical processes that relate the mechanics of touching an object to our sensory perceptions. At UCSB, Dr. Yon Visell, assistant professor of electrical and computer engineering, is studying how mechanical signals propagate through our hands. A detailed, quantitative understanding of this process is critical for the advancement of a vast array of haptic technologies, such as prosthetic devices, virtual reality and soft robotics. *NSF funding: Faculty Early Career Development Program (CAREER), Computer and Information Science and Engineering Directorate, Division of Information and Intelligent Systems.*



UC Santa Cruz (UCSC)– Agro-Food Tech Sector

Research at UCSC focuses on the food-technology sector in the San Francisco Bay Area, examining the interests, principles, social relationships and institutional forces that are guiding the sector. The research goals include encouraging philanthropists and public institutions to invest in solutions most likely to be effective, equitable and widely embraced and generate a more nuanced public engagement with these technologies to acquiring a better understanding of the nature of their interventions and how they align with their stated aims. *NSF Funding: Social, Behavioral and Economic Sciences Directorate, Division of Social and Economic Sciences and Division of Behavioral and Cognitive Sciences.*