



## San José State University Capability Statement

Institution: San José State University

SJSU Research Foundation Unique Entity Identifier (UEI): **056820715** Cage Code: **1DPM3** NAICS ID(s): **611310**

SIC: **8221** Federal EIN No: **94-6017638**

Certificates, Registrations, Accreditations: **WASC, ABET, ALA, AACSB, CTC**

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### OVERVIEW

The California State University (CSU) system is the largest university system in the United States. San José State University (SJSU) is 5th in enrollment within the 23-campus CSU system. Annually, SJSU delivers a comprehensive university education to over 36,000 students and awards over 9,500 bachelor's and master's degrees across 250 areas of study. SJSU has one of the nation's most ethnically diverse student bodies, 85% of students reported as non-white in fall 2020 with 34% Asian Americans, 28% Hispanic/Latinx Americans, and 3% African Americans, while those declaring mixed or other racial background is 5%. We are a federally designated minority-serving institution (MSI), an Asian American and Native American Pacific Islander-Serving Institution (AANAPISI), and a Hispanic Serving Institution (HSI). *The Wall Street Journal* included SJSU among its Top Colleges for Diversity (2021). *Money Magazine* ranked SJSU as #1 Most Transformative College in the U.S. (2020). Engineering at SJSU has been ranked #3 Best Undergraduate Engineering in Public Universities by *US News & World Report* (2021) and the #1 Engineering Graduate School in *Diverse Issues in Higher Education* (2020). SJSU has nine colleges: Business, Education, Engineering, Science, Graduate Education, Health and Human Sciences, Humanities & the Arts, Professional and Global Education, and Social Sciences. [San José State University's mission](#) and its recent Strategic Plan: [Transformation 2030](#) targets research as an institutional priority. We have launched an initiative to decrease teaching loads to free up time for faculty to conduct research and integrate students into their research endeavors. Over half of our faculty now receive a reduction in their teaching load of one course per semester to further their research activities.

### STEM RESEARCH CAPABILITIES

**Aerospace Engineering:** aircraft design; spacecraft trajectory optimization and design; machine learning in structural dynamics; transportation system safety; urban air mobility; space transportation vehicle design; control theory; UAVs; hypersonic, high temperature external and internal aerodynamics; supersonic wind tunnel design.

**Aviation & Technology:** predictive analytics; machine learning; industrial & manufacturing systems; safety of autonomous systems; human factors in semi-autonomous systems; sensors; wireless technologies; deep learning; robotic systems; network coding; distributed systems; aviation management.

**Biomedical Engineering:** biocompatibility; failure analysis; fluid mechanics of biomedical devices; hemodynamics and cardiovascular mechanics; wearable devices; biomedical applications of nanotechnology; mobile imaging platforms; cellularized microfluidics; design and evaluation of mobility-assistive technology; biomechanics; microfluidics; biosensors; nanotechnology-based detection devices; food/water safety; genetic study of pathogens and diseases.

**Biological Sciences:** marine science; fire ecology and wildfire science; biomedical cell and molecular science (neuroscience, microbiology); cell signaling.

**Chemistry:** computer simulations of biochemical compositions, biomedical cell and molecular science (organic, biochemistry, microbiology); X-ray crystallography; enzymology; diamond chemistry.

**Civil & Environmental Engineering:** geotechnical engineering; high performance concrete; traffic engineering; geotechnical earthquake engineering; GIS; surface wave methods; sensing for infrastructure; environmental biotechnology; process kinetics and bioreactor design; biotransformation of hazardous compounds; estuarine dynamics.

**Chemical & Materials Engineering:** process design and control; green energies; semiconductor devices; membrane technology; conductive polymers; biodegradable /compostable materials; smart materials; water filtration;

nanotechnology and nanocomposites; industrial biotechnology; energy storage; quantum materials; 2D materials; additive manufacturing; enzyme kinetics; energy/water/food nexus; thin film applications for drug delivery and photovoltaics; aqueous lithium ion batteries.

**Computer Science:** open knowledge networks; human computer interaction; bioinformatics; artificial intelligence; biomedical devices; cyberinfrastructure; cybersecurity.

**Computer Engineering:** Computer networking; network security; machine learning; cyber-physical systems; Internet of Things; smart city applications; augmented reality for safety and education; data mining; high performance computing; communicational genomics smart city; VLSI design; computer architecture and robotics; recommender systems; big data analytics; data compression; parallel programming; field-programmable gate arrays (FPGAs); energy-efficient computer architecture design; self-navigation vehicle design; applied AI; cybersecurity; bioinformatics; embedded systems; neural networks; mobile and cyber-physical systems; intelligent and autonomous systems; biometric security.

**Electrical Engineering:** Power electronic configurations for advanced electric vehicles; battery charging applications; digital and embedded systems; system on chip; domain-specific computer architecture; energy-efficient nano-systems; neural networks and applications; carbon nanotube; brain-machine interface systems; arithmetic circuits; high-performance computing; computer networks and protocols; network security; cloud data centers; mobile networks; cellular and LTE signaling; autonomous & semi-autonomous systems; additive manufacturing; sensor networks; mechatronics and robotics; optical networks; network security; IoT; data center architecture and networks.

**Forensic Sciences:** Computer forensic tool testing.

**Industrial & Systems Engineering:** production and lean systems; optimization modeling; supply chain engineering; operations research; intelligent transportation systems; quality monitoring; anomaly detection; degradation prognostics; transportation policy; human factors in healthcare; human-robot trust; ergonomics; user-centered design.

**Mathematics:** applied mathematics; statistical methodology; clustering; math education

**Mechanical Engineering:** Finite element analysis, computer-aided design; acoustic and elastic wave propagation and scattering; metamaterials; "invisibility" cloak; renewable energy; precision machine design; structural ceramics; functionally graded materials; smart structures; sheet metal forming; microfluidic techniques for bio-applications.

**Meteorology & Climate Science:** wildfire prevention; climate science; smoke particle inhalation; remote sensing of wildfire.

**Physics & Astronomy:** quantum physics; laser interferometry; magnetism and superconductivity in cuprate superconductors; stochastic models and algorithms for multiscale problems in fluids; physics of animation; atmospheric physics; magnetic anisotropy in thin films; experimental optics and condensed matter physics; optical microscopy and medical diagnostics.

## **FACILITIES**

Ultrapure water system, Zeiss LSM 700 fluorescence confocal microscope, PCR machines, 37 degree shaking incubators, DNA gel documentation device, Milli-Q water purification system, Makerbot 3D Printer and Print Software, waterjet cutting machine, welding and cutting equipment, soldering station, remote fire weather stations, two 4x4 trucks with Doppler lidar and radar, laser interferometry that allow for detection sensitivity beyond the standard quantum limit, High Performance Computer (HPC) clusters, Materials Characterization and Metrology Center, Mineta Transportation Institute, Moss Landing Marine Laboratory, Proteomics Research Lab, hands-on aviation operation and maintenance, facilities for large-scale casting and fabricating sculptures, Microscale Process Engineering Laboratory, Materials Characterization and Metrology Center, HPLC Coupled Mass Spectrometer, Zeiss LSM Confocal Microscope

## **PAST PERFORMANCE**

SJSU has \$60M in annual research expenditures from NASA, NSF, NIH, DOD, DOE, DHHS, DOI, DOJ, DON, DOT, LLNL, DOA, EPA, SNL, ONR, NOAA, NEH, NEA and other federal and state agencies and industry.

Examples by agency.

**NASA:** Advanced Rotocraft Research; Human System Integration; Implementing Macroergonomics; Future Vertical Lift; Center for Applied Atmospheric Research and Education; Using the Astronomical Infrared Bands as Calibrated Probes of Astrophysical Conditions with The NASA Ames PAH IR Spectroscopic Database

**DOE:** Advancing the Understanding of Cloud Phase Partitioning and Microphysical Properties by Linking In-Situ Measurements, Satellite Observations and Climate Model Simulations

**DOT:** Mineta Consortium for Transportation Mobility

**EPA:** Evaluating Agricultural Management Practices Benefiting the Monterey Bay: Reducing Nutrient Loads and Harmful Algal Bloom (HAB) Events