

# UNIVERSITY OF CALIFORNIA MERCED



## CAPABILITY STATEMENT

### **For more information, contact**

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# ABOUT UC MERCED

UC Merced is the most ethnically diverse campus in the UC system and has been designated a Hispanic-Serving Institution by the U.S. Department of Education since 2010. As of fall 2021, 57 percent of UC Merced undergraduate students are Hispanic. The campus also enrolls one of the highest percentages of first-generation college students among UC campuses (73 percent of undergraduates).

Research is the cornerstone of UC Merced. Innovative faculty members and students conduct interdisciplinary, groundbreaking research that will solve complex problems affecting the San Joaquin Valley, California, and the world.



**BUILDING THE FUTURE IN  
THE HEART OF  
CALIFORNIA**

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## INTERDISCIPLINARY RESEARCH INSTITUTES AND CENTERS

- Sierra Nevada Research Institute
- Health Sciences Research Institutes
- CITRIS and the Banatao Institute
- UC Advanced Solar Technologies Institute
- Center for the Humanities
- Spatial Analysis Research Center

## PERTINENT CODES

- DUNS No: 113645084
- Cage Code: 3MTG5
- NAICS ID(s): 611310
- SIC: 8221
- Federal EIN No: 270093858

## RECENT RANKINGS

- No. 17 Best Public Undergraduate Teaching (USNWR)
- No. 38 among publics (USNWR)
- No. 57 Most Innovative Schools (USNWR)
- No. 3 Young University (Times Higher Ed)
- No. 4 for social mobility (USNWR)
- No. 7 Top Ten “Cool School,” Sierra magazine ‘2021 Cool Schools’ list
- No. 8 Economic Diversity (USNWR)
- No. 12 most transformative colleges (Money’s 2020 Best Colleges)
- No. 19 for social mobility (Washington Monthly’s 2020 College Guide and Rankings).

## RESEARCH CAPABILITIES

Human Health and Environmental Health Sciences; Applied Mathematics; Bioengineering/Biotechnology Research; Environmental Science; Biomedical Research; Materials and Biomaterials Science and Engineering; Experimental Condensed Matter; Soft Matter and Biophysics; Solar Energy; Astrophysics; Computational Biology and Biophysics; Biomolecular Science and Engineering; Cellular Science and Engineering; Biomaterials and Devices; Chemistry and Biochemistry; Agricultural Technology; Earth Observations; Geospatial Analytics.

# FACILITIES

**Environmental Analytical Laboratory:** offers rapid and accurate measurements in environmental materials—including water, soil, and biological samples—for major and trace elements, selected chemical species, nutrients, and stable isotopes to meet a wide range of analytical needs in support of diverse research and education programs in environmental, chemical, biological, the Earth systems, ecological sciences, and engineering.

**Imaging and Microscopy Facility:** hosts optical, Scanning and Transmission Electron Microscopes, Wide Angle X-ray Diffraction, X-ray Photoelectron Spectroscopy, in addition to equipment for preparing specimens for examination.

**Natural Reserve System:** a network of reserves that represent ecosystems throughout California. Most of the state's major habitat types are represented, from coastal tidepools to inland deserts, and lush wetlands to redwood forests. The Natural Reserve System includes Yosemite Field Station, which is comprised of a historic office building with four workspaces, a small lab, a conference room that can accommodate 25, and housing for 58 people across 6 cabins including an ADA-accessible cabin. The Natural Reserve System also includes the Merced Vernal Pools and Grassland Reserve (MVPGR), which is comprised of 6,500 acres of intact rolling grasslands that protect thousands of ephemeral pools and swale wetlands, spread across a remarkably intact alluvial terrace, the reserve contains perhaps the densest concentration of vernal pools in the West and some of the most ancient continuously exposed soils in North America (2-4 million years old).

**Sequoia Field Station:** provides year-round access to the southern Sierra Nevada mixed conifer, subalpine, and alpine ecosystems of Sequoia and Kings Canyon National Parks for research, teaching, conservation work, and public service.

**SCICON Field Station:** adjacent to nearby conservation lands that serve as living laboratories in the heart of foothill oak woodland, grassland, and vernal pool habitats, some of which have active cattle grazing programs.

**Center for Cellular and Biomolecular Machines Cluster:** addresses the needs for both experimental and theory researchers through a traditional computational cluster and five powerful workstations that are geared toward experimentalists.

**Nuclear Magnetic Resonance (NMR) Facility:** includes 400 MHz, 500 MHz and 600 MHz NMR spectrometers, a Bruker Vertex 70 FT-IR spectrometer with a diamond crystal ATR accessory, and a high resolution Thermo Electron Exactive Plus LC-MS for detecting small molecules.

**Greenhouse:** facilitates controlled, hands-on research in areas such as food and water security, biodiversity, climate change, renewable energy, and ecosystems.

**Biostatistics and Data Support (BDS) Core:** supporting quantitative consultation services related to study design, data collection and management, and statistical analysis for basic, clinical, and translational research projects.

# FACILITIES CONT.

**Biosafety Level 3 Facility:** contains three laboratory rooms and two animal holding rooms with adjoining procedure rooms. The facility contains the necessary equipment to perform animal infections, process tissues and cells, and prepare samples for analysis, prior to fixation and/or storage. Shakers and incubators are available for fungal growth and longer-term cellular stimulation experiments.

**Stable Isotope Laboratory:** includes two ThermoFisher Delta V Plus isotope ratio mass spectrometers (purchased in 2014) each with ConFlo IV interfaces. Peripheral devices include the TCEA and a GC Isolink with RSH autosampler equipped for carbon, nitrogen, and hydrogen isotope measurements, along with a Costech elemental analyzer with a zero blank autosampler.

**Stem Cell Instrumentation Foundry:** includes Class 1000 and 100 clean rooms for micro/nano fabrication, facilities for human and mouse stem cell culture, cell imaging, flow cytometry, cell sorting, histology services, and data workstations.

**The MERCED Cluster:** a Linux cluster composed of - 100+ nodes with between 20 and 42 cores, from 128G to 256G per machine for a total of 2000+ core an 18T of RAM.

**The WAVE Lab:** constructed of 20 4K (Ultra HD), stereoscopic Organic Light Emitting Diode (OLED) displays tiled together in a 5 x 4 half-pipe matrix. These OLED displays are capable of displaying over 1 billion distinct colors (compared to standard displays of around 1.7 million) and a contrast ratio of 200,000:1. The system is driven by 10 Dual Tesla GPU compute nodes with several TB ultra-fast SSD Drives to work with multi TB data sets. In addition to the stunning 2D/3D imagery, the system is connected to the ScienceDMZ at 10Gbps (and to the rest of campus at 40 Gbps), so multi-site collaborations are possible.

**FIONA (Flash I/O Network Appliance):** possesses one FIONA (Flash I/O Network Appliance) with GPU and NVMe Drives as a data transfer node for extremely large inbound or outbound datasets, and one FIONA owned by the library campus for data archival and sharing.

**Rapid Prototyping Lab:** includes Replicator Z18 3D Printer capable of creating objects as large as 12×12×18 inches out of ABS/PLA plastic, Form 2 3D Printers capable of creating features as fine as 25 microns out of a variety of material properties (e.g., high-temperature, tough, flexible), and 1,000 DPI 30 Watt Laser Cutters that can accommodate objects up to 12×16" and cut through and engrave upon a variety of materials (e.g., paper, plastics, acrylic, leather, wood). The lab has many smaller Afinia, Creator Pro, Makergear 3D Printers; Logitech, MakerBot 3D Scanners; Othermill CNC Mills. It also has soldering workstations equipped with 21 Velleman soldering irons, test equipment and electronics tools.

**Bimolecular Mass Spectrometry Facility (BMSF):** provide UCM researchers state of the art high performance mass spectrometry services, to collaborate and to collect the highest quality mass spectrometry data possible on biological samples with high mass accuracy and precision obtainable.