

NANOFABRICATION FACILITY

SHANE CYBART DIRECTOR



ASSOCIATE PROFESSOR

- Department of Electrical & Computer Engineering

RESEARCH

- Nanoscale Materials
- Devices and Circuits

EDUCATION

- Ph.D. University of California, San Diego, Material Science

ACTIVITIES

- Director of the Ion Beam Lab
- Conducts research in superconducting quantum devices

RESEARCH

The UCR Nanofabrication Facility provides state-of-the-art Nanofabrication equipment to both internal and external users. Our facility is greater than 10,000 sq ft in size with most space certified at Class 100. There are currently over 100 trained users conducting research in various fields of engineering and sciences from Physics, Chemistry, Environmental, Chemical, Mechanical Electrical Engineering and biomedical. The facility is also available to industrial users for research projects in other fields.

NANOFABRICATION FACILITY MISSION

- Enables world-class research and graduate student training in all areas of nanotechnology
- Fosters interdisciplinary research and cooperation among scientists and engineers
- Provides a state-of-the-art environment for graduate students, postdoctoral researchers and professors from all countries
- Ensures the highest international academic standards, integrity, equality and diversity, as well as respect and recognition for all
- Maintains the highest level of safety
- Serves as the framework and precursor for future externally funded multi-PI projects and research centers at UCR
- Facilitates cooperation with the high-tech industry in the Inland Empire and California

FEDERAL GRANTS



Department of Energy



Department of Education



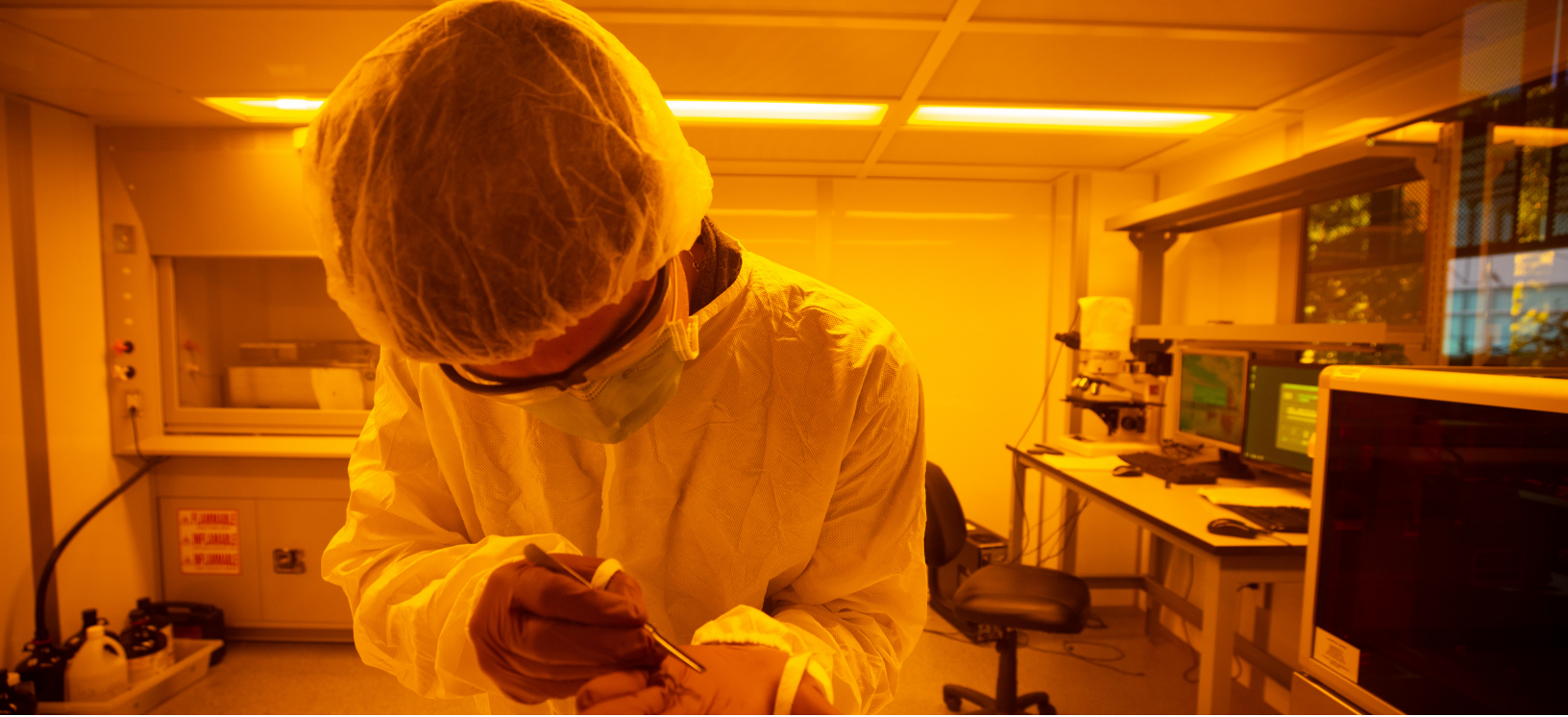
Air Force Office of
Scientific Research



Office of Naval Research



National Science
Foundation



LAB CAPABILITIES

The Nanofabrication Facility has been designed and built to enhance the research capabilities of a diverse set of researchers engaged in multidisciplinary nanotechnology research within a controlled environment and provide the committed users a convenient, safe and technologically advanced laboratory within which to conduct research in Nanoscale science and engineering.

Majority of its research involves fundamental materials investigation in the areas of silicon-based CMOS, FET transistors and MEMS devices or variants of these or other devices with novel materials such as Graphene and process sequence development. These samples and experimental substrates form the basic platform for research that may take any form or direction. In addition, the facility includes Electron Beam lithography and Focused Ion Beam (FIB) instruments that provide state-of-the-art nanofabrication capabilities - the FIB is located outside the clean room envelope to facilitate access by a variety of researchers.

FABRICATION PROCESSES

Standard suite of capabilities available in clean room operations: Surface preparation, Thermal gate oxidation, Low Pressure and Plasma Enhanced Chemical Vapor Deposition, Photolithography and associated wet chemical processing, Electron-beam Pattern Generation, Reactive Ion Etching, Plasma Etching, Atomic Layer Deposition, Thermal and Electron-beam Evaporation of various metals and materials, Metal Sputtering and Rapid Thermal Annealing.

METROLOGY CAPABILITIES

Metrology tools with material and surface analysis capability includes: Oxide metrology for oxide/nitride measurements, Atomic Force Microscopy (AFM), Energy dispersive Spectroscopy (EDS), Electron Backscatter Diffraction (EBSD), Scanning Transmission Electron Microscopy (STEM), Thin-film profiling for photo resist and metal layer thickness, C/V Stress measurement to ensure gate oxide process integrity, I/V Probe for electrical parametric control, Digital camera display optical and Confocal Microscopes for surface inspection and 3D surface analysis.

