# **Shared Research Facilities**

**W.M. Keck Nanofabrication Facility**:

Dual beam microscope lab: This 1,200 sqft. laboratory houses a dual electron/ion beam nanofabrication instrument (FEI Quanta 3D FEG) and minor sample preparation and characterization equipment (ellipsometer, SEM sputter coater, optical microscopes). The dual beam instrument can be used on a recharge basis for ion beam milling, gas assisted nanoscale metal and dielectric deposition, electron-beam lithography (Nabity electron beam writer) and scanning electron imaging in various modes with down to 1.2 nm resolution.

Website: https://cleanroom.soe.ucsc.edu/dualbeam

Cleanroom: A class 1,000 cleanroom facility equipped with optical mask aligner, electron beam evaporator, RIE etcher etc. is also available. The cleanroom in the Electrical Engineering department at UCSC houses microfabrication equipment for photolithography, etching, plasma bonding, and deposition tools that complement the nanofabrication capabilities in the W.M. Keck Center. The cleanroom is also equipped for carrying out soft lithography to build fluidic layers usisng PDMS (polydimethylsiloxane).

Website: https://cleanroom.soe.ucsc.edu/equipment

**NMR Facility**:

The NMR facility in the Department of Chemistry and Biochemistry houses three high resolution NMR spectrometers: A Bruker Avance III HD 800 MHz spectrometer equipped with a TCI cryoprobe; a Varian INOVA 600 MHz spectrometer equipped with a triple resonances cryoprobe; and a recently upgraded Bruker Avance III HD 500 MHz spectrometer equipped with a multinuclear Smart Probe. Instruments are available to researchers on an hourly recharge basis.

Website: http://nmr.ucsc.edu/Home.html

**XRD Facility**:

The XRD facility is housed in the PSB building and offers X-ray diffraction service for crystals, powders, thin films, polymers, gels. It contains state-of-the-art diffraction instrumentation (Bruker APEX-II Single Crystal Diffractometer; Rigaku Smartlab Powder & Thin Film Diffractometer) for detailed structural analyses utilizing single crystal, powder and thin film diffraction techniques, such as SCXRD, PXRD, thin film XRD, grazing angle, in-plane XRD, XRR, SAXS, pole figures, texture analysis, etc. Instruments are available to researchers on an hourly recharge basis.

Website: <https://xrducsc.weebly.com/>

**Mass Spectrometry Facility**:

The mass spectrometry facility is located in the Physical Sciences Building and provides analytical support with the following instruments: (i) -LC-MSLTQ, (ii) LTQ-Orbitrap Velos Pro MS. The orbitrap possesses high mass accuracy in full ion scan, and MSn modes accompanied by substantial resolving power. The facility is available on an hourly recharge basis.

Website: https://www.chemistry.ucsc.edu/mass\_spec/index.html

**Hummingbird Computational Cluster**:

Hummingbird is the UC Santa Cruz campus open access computational cluster. It has a number of preinstalled software packages for use in the sciences and engineering. The cluster consists of: 404 Intel cores, 288 AMD cores, a ZFS storage back, SLURM batch management, modules software environment.

Hummingbird is a campus resource that can be utilized for many different different applications from a simple 1 cpu to multiple cpus. The cluster environment is built on CentOS 7 using the OpenHPC cluster environment packages. OpenHPC has common scientific libraries and use of Environmental Modules to streamline the use of applications and software. OpenHPC uses the batch scheduler system called SLURM. This is a job management system that will be more in line with many other high performance computing cluster centers.

Website: https://www.hb.ucsc.edu/

**IBSC Stem Cell Facility**:

The IBSC Stem Cell Facilities in the Biomedical Sciences and Sinsheimer buildings are advanced research laboratories for the culture and analysis of stem cells. They both provide space for embryonic stem cell growth and manipulation, for researchers doing stem cell related projects. The Sinsheimer tissue culture (TC) recharge facility is open to all UCSC Investigators on a recharge basis. The facility staff offers expertise in experimental design, protocol development, and data analysis. This facility enables work on non-NIH-approved human embryonic stem cell (hESC) lines.

Both facilities include multiple BSL2 culture rooms, with spaces that are dedicated as needed to viral transductions and other procedures warranting a higher level of containment. The IBSC Biomedical Science facility also houses equipment required recording images of living cells, and for applying functional genomics techniques to the study of stem cell biology.

Website: https://stemcell.soe.ucsc.edu/facilities/ibsc\_sc

**Flow Cytometry Facility**:

The IBSC Flow Cytometry Facility located in the Biomedical Sciences Building offers multicolor cell analysis by a BD FACS LSRII cell analyzer and single-cell sorting by a BD Biosciences FACS Aria cell sorter. Staff is available to support researchers with designing experiments and developing protocols. The facility offers fully assisted cell sorting and analysis by appointment. The facility is available for use by any interested researcher for stem cell research as well as other life sciences research. Instruments are available to researchers on an hourly recharge basis.

Website: https://stemcell.soe.ucsc.edu/facilities/flow

**Life Sciences Microscopy Facility**:

The UCSC Life Sciences Microscopy Center is a core facility supported by the California Institute for Regenerative Medicine (CIRM) and the California Institute for Quantitative Biosciences (QB3). The center serves the UCSC research community by providing personalized assistance on various aspects of imaging, from experimental design to training on the shared microscopes and image analysis. Supported microscopes include: Leica SP5 Confocal, Zeiss/METX Confocal, Zeiss Axioskop, Zeiss AxioZoom, Zeiss Live Cell Imaging Station, Olympus Multi-Photon, Leica Epi-Fluorescence Widefield, Keyence Widefield.

The light microscopy core facility is housed within the CIRM Shared Stem Cell Facility in Sinsheimer Labs and supports the stem cell research community as well as other life sciences research. Additional shared instrumentation is located in the Biomedical Sciences Building. Instruments are available to researchers on an hourly recharge basis.

Website: https://stemcell.soe.ucsc.edu/facilities/microscopy