The Optical Biology Core comprises three facilities on the UC Irvine campus: i) a self-use OBC facility equipped with fluorescence microscopes and image analysis software, ii) the Laser Microbeam and Medical Program (LAMMP), a collaborative facility dedicated to the use of lasers and other optics in Biology and Medicine, and iii) a flow cytometry facility in Hewitt Hall equipped with three multiparameter flow cytometers. The OBC is a Shared Resource funded in part by the Chao Family NCI-Comprehensive Cancer Center Support Grant (P30CA062203) from the National Cancer Institute.

**OBC self-use Facility:** This facility, located on the main campus in 4443 McGaugh Hall hosts a **Zeiss 780 LSM** with a two photon laser for deep tissue imaging and single photon lasers for imaging all fluorophores from DAPI (405nm) to far red (633nm) as well as a FLIM (Fluorescence Lifetime Microscopy) detector for studying molecules based on their fluorescence lifetime. It also has new **Zeiss 900** with **Airyscan** and Leica SP8 confocal microscopes equipped with 2 HyD and 2 PMT detectors and a full suite of 6 laser lines from UV to far red and 20x multi-immersion and 63x oil objectives. The facility has a Mesoscale **Zeiss Z1 Lightsheet** (Single Plane Illumination Microscope) for both live sample and cleared tissue imaging. The Z1 has 4 laser lines (405nm, 488nm, 561nm, and 633nm) and a custom chamber for organically cleared samples. A Super Resolution **Elyra 7 STORM** microscope has been installed and available for rapid, high resolution imaging and Super Resolution and has the SiM² processing get down to 60nm resolution along **Single Molecule Localization** for down to 20nm resolution. There are multiple workstations for data analysis, including **Imaris advanced 3D/4D** analysis, **Imaris Stitcher**, **Arivis Vision 4D**, and **Huygens Deconvolution**. Users can sign in 24 hours/day, 7 days a week. ([http://obc.bio.uci.edu/](http://obc.bio.uci.edu/))

The services provided in this facility are:
- Confocal microscopy
- 2-photon microscopy
- Mesoscale Single Plane Illumination (SPIM) Microscopy for imaging large samples
- Super Resolution Lattice SIM (120nm), SiM² (60nm) and STORM (20nm) localization microscopy
- Fluorescence Lifetime Imaging Microscopy (FLIM) / FRET via FLIM
- Single particle tracking
- Image Correlation Spectroscopy (ICS) / Raster Image Correlation Spectroscopy (RICS)
- Mapping of molecular aggregates using Number & Brightness (N&B) analysis
- Extensive training and workshops to bring users rapidly up to the full capabilities of the systems available.
- Further information regarding all services offered can be found at: [http://www.cancer.uci.edu/resources/optical_biology_core.asp](http://www.cancer.uci.edu/resources/optical_biology_core.asp)

**The NLOM Facility:** is located in the Beckman Laser Institute and Medical Clinic (BLIMC). It is equipped with a state-of-the-art customized laser scanning microscope (Leica SP8 Falcon with Coherent anti-Stokes Raman imaging modality). This is a commercial imaging platform customized to feature the following modalities: confocal fluorescence and two-photon excited fluorescence (TPEF) microscopy, second harmonic generation (SHG), CARS and fluorescence lifetime microscopy. This imaging system was recently acquired through a high-end shared instrumentation grant. Support for this shared resource is provided by the Beckman Laser Institute & Medical Clinic. More details about this imaging platform and contact information for using it can be found at: [https://sites.uci.edu/nlom/resources/](https://sites.uci.edu/nlom/resources/)

**iii) The Flow Cytometry Facility:** The Institute for Immunology (IFI) runs an open-use Flow Core Facility providing the latest technology and professional technical assistance for flow cytometric analysis, flow-imaging...
and sorting. The facility operates a suite of five multi-parameter flow cytometers that are well equipped for fluorescence-activated cell sorting (FACS) and emerging flow cytometry assays. The facility Manager, Dr. Jennifer Atwood, Ph.D. (949-824-3431, jmatwood@uci.edu), has more than 14+ years in the use of numerous flow cytometry platforms and continues to develop new applications with the advancement of instruments and emerging applications. Dr. Atwood is available for one-on-one consultation for experimental design, instruction on use of the instruments, and data analysis.

**Amnis® ImageStream® Mark II Imaging Flow Cytometer** combines the phenotyping abilities of flow cytometry with the detailed imagery and functional insights of microscopy.

- Excitation lasers at 405nm, 488nm and 642nm allows for 12 high-resolution images of every event in the flow cell, including bright field, dark field and 10 fluorescent channels.
- multiple magnifications with 20X/40X/60X objectives (motorized and autofocused)
- Speed: up to 5000 cells/sec (ideal for rare cell analysis)
- Applications are for quantitative and qualitative measurements (i.e. cell signaling and intensity, internalization, cell cycle, morphology, cell-cell interaction, co-localization, autophagy, etc).
- Data is analyzed using IDEAS® software loaded on a separate workstation.

**ACEA NovoCyte Quanteon Flow Cytometer** features 4 lasers and 25 Silicon photomultipliers with 7.2 logs of dynamic range plus forward and side scatter parameters. The photodectors and signal processing allow for exceptional sensitivity and resolution, including particles at 100 nm. It has a flexible optical configuration for user-directed choice of mirrors and filters. The fluidic system is exceptionally stable and includes automation for high throughput analysis of multiple plate formats (24/48/96/384) in addition to support for traditional FACS 5 ml tubes. Startup, shutdown and other fluidics maintenance procedures are largely automated.

**ACEA NovoCyteTM Flow Cytometer** is equipped with three lasers (405nm, 488nm and 640nm) with multiple bandpass filters for analysis of up to 13 parameters. The NovoCyteTM is also equipped with the NovoSamplerTM, an autosampler option compatible with standard 5ml sample tubes or 24/96 well plates for high throughput analysis.

**BD FACSAriaTM Fusion** is equipped for state of the art cell sorting with biosafety expertise, thereby allowing analysis of cells exposed to BSL2 virus, bacteria or fungi. The FACSAriaTM Fusion uses 4 lasers allowing for a total of 11 simultaneous colors, and the Aria II Temperature Control system allowing for cooling of the sort collection device.

**BD FACSAriaIITM** is equipped for cell sorting with 4 lasers allowing for a total of 10 simultaneous colors. The FACSAriaIITM controls for potential aerosols with the Whisper Aerosol Evacuation system, and also includes the Aria II Temperature Control system allowing for cooling of the sort collection device. Further information regarding all services offered can be found at: [https://sites.uci.edu/ififlowcore/](https://sites.uci.edu/ififlowcore/).