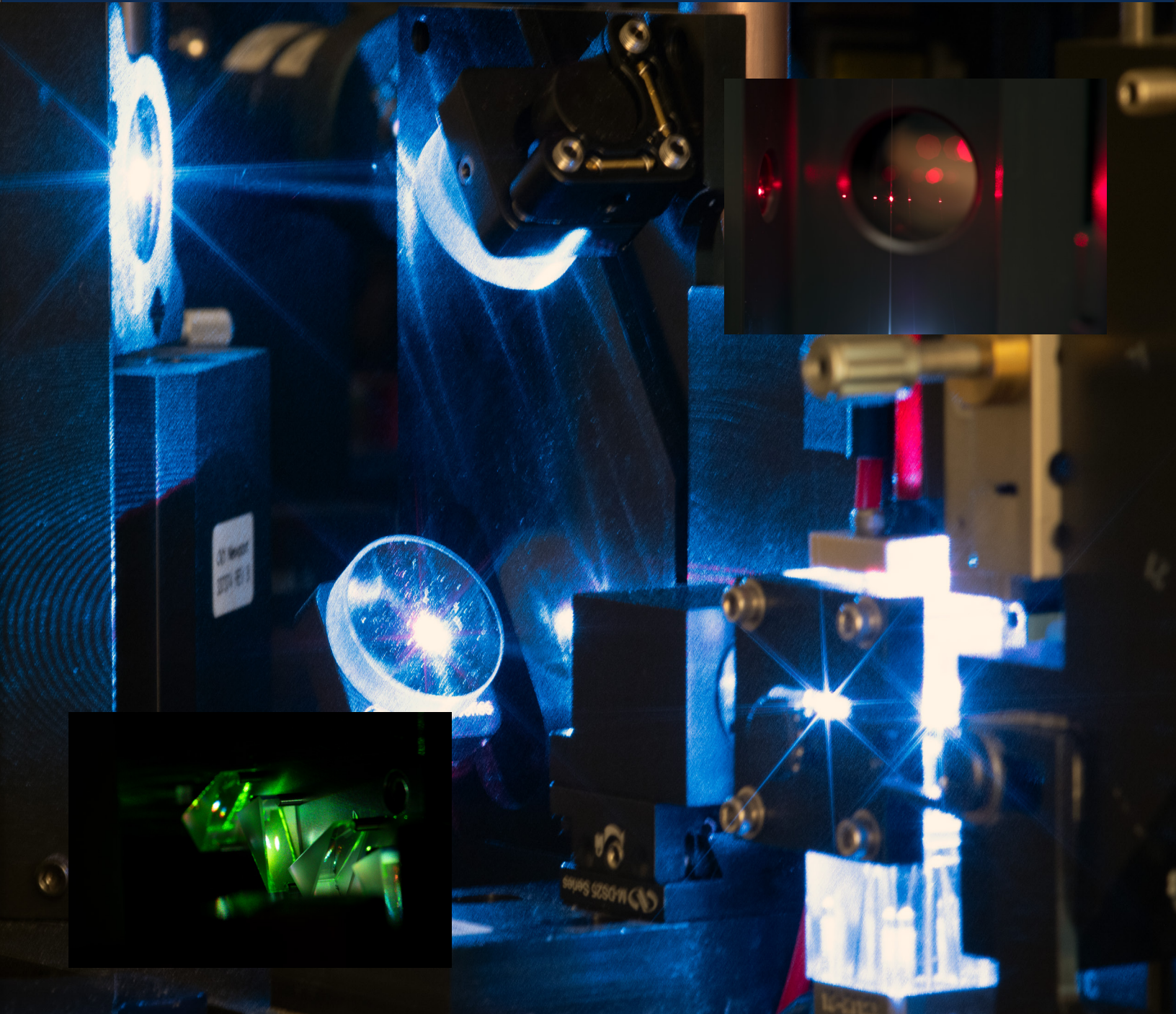


Stem Cell Instrumentation Foundry

Cytometry Unit



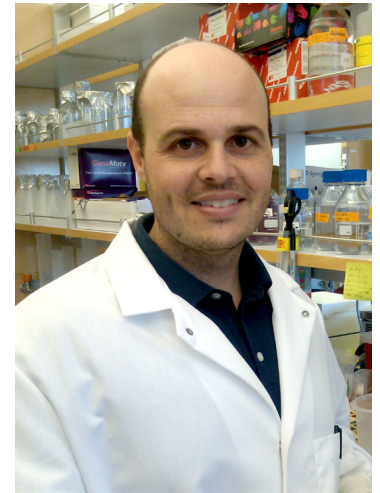
2020 Annual Report

Message from the Technical Director

The Cytometry Unit of the Stem Cell Instrumentation Foundry (SCIF) provides UC Merced investigators with access to advanced instrumentation and shared resources to support interdisciplinary research projects involving cellular characterization. We focus on quality assurance, user training, and technical knowledge of staff to ensure the generation of high quality, reproducible data.

The Cytometry Unit of the SCIF has had another record setting year for instrument usage and services provided. In addition to our workhorse users in the field of immunology and cell biology, we saw an expansion of new labs utilizing flow cytometry for unique applications, including synthetic biology, virology, and microbial genetics.

To us, cytometry means “measurement of cells” and encompasses several techniques with flow cytometry at the heart. Our Cytometry services include flow cytometry and cell sorting, a new histology service, and a cell culture area. Over the coming year we are looking forward to new instrumentation and our lab move as part of the UC Merced 2020 Project.



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Services and Rates

At the SCIF, we provide UC Merced investigators with access to advanced instrumentation, training, quality assurance, and technical knowledge from our staff to ensure consistent, high fidelity data can be produced. Our services include cellular characterization and sorting by flow cytometry, microscopy, and histology at an affordable rate.

Flow Cytometry

We offer instruments capable of flow analysis and cell sorting with up to 14 fluorescent channels.

Service	Self-Use Rate	Operator Assisted Rate
BD LSR II	\$25/hour	\$35/hour
BD ARIA II	\$40/hour	\$50/hour
BD ARIA III	\$45/hour	\$55/hour

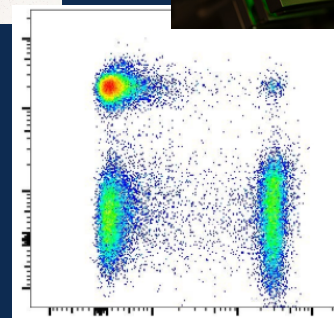
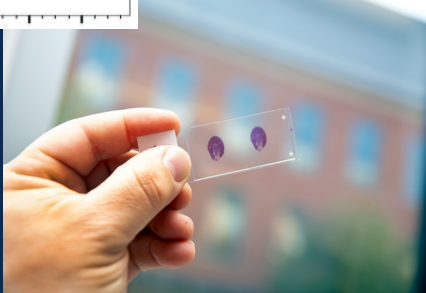
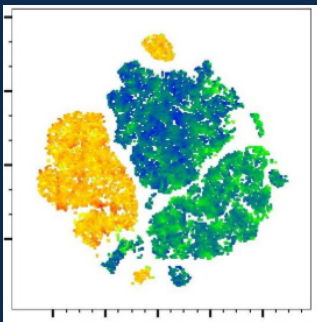
Coming Soon:

Bio-Rad ZE5 5 laser, 27 fluorescent channel flow cytometer

Histology

We perform routine paraffin-based histology and sample staining. Available stains include H&E and PAS staining. We provide cassettes and formalin jars.

Service	Rate
Tissue Processing and Block Embedding	\$6/sample
Microtomy and Slide Generation	\$4/slide \$2/each additional slide
Hematoxylin and Eosin Staining (<30 slides)	\$4/slide
Hematoxylin and Eosin Staining (>30 slides)	\$3/slide



Cell Culture

The SCIF has biological safety cabinets and incubators that are freely available for research use. Our facility is stocked with all the equipment you will need for basic cell culture, including a refrigerated tabletop centrifuge, inverted fluorescent microscope, water bath, and refrigerator space. This is a **free service** that we provide to all UC Merced researchers.

Training

All users are required to take our mandatory instrument training. Additionally, we offer 2-day “Intro to Flow Cytometry” and “Advanced Sorting” courses each summer, and we provide tutorials on cytometry-related applications and techniques throughout the year. Topics include high-dimensional data analysis, instrument standardization, and new analytical resources.

2019 SERVICES AT A GLANCE

1650 Hours

Total 2019 Cytometry Hours

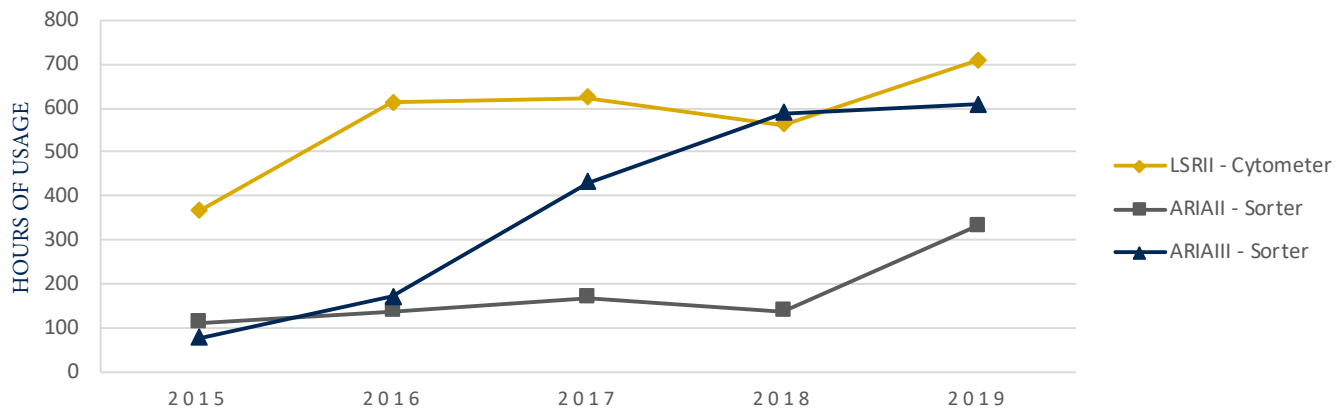
52 Users

Individual SCIF cytometry users in 2019

20 Labs

Labs utilizing SCIF cytometers in 2019

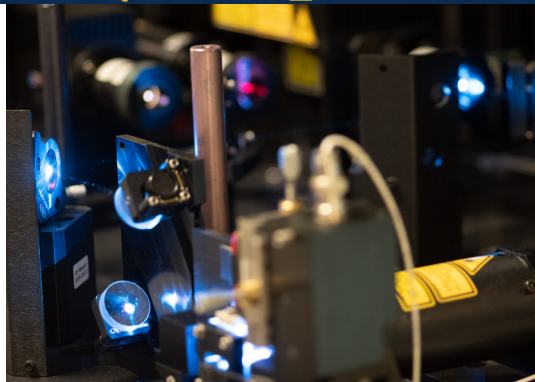
CYTOMETRY USAGE HAS **TRIPLED** SINCE 2015



Flow Cytometry Propels UCM Research

26 Publications

Publications utilizing SCIF Resources since 2015



4+ Cytometers

Cytometers available for UC Merced Researchers to Utilize

Selected Publications

Jahan B, McCloskey KE: Differentiation and expansion of endothelial cells requires pre-optimization of KDR+ expression kinetics. *Stem Cell Res* 2020;42:101685.

Leung GA, Cool T, Valencia CH, Worthington A, Beaudin AE, Forsberg EC: The lymphoid-associated interleukin 7 receptor (IL7R) regulates tissue-resident macrophage development. *Development* 2019;146

Millan AJ, Elizaldi SR, Lee EM, Aceves JO, Muruges D, Loots GG, Manilay JO: Sostdc1 Regulates NK Cell Maturation and Cytotoxicity. *J Immunol* 2019;202:2296-2306.

Valentine KM, Davini D, Lawrence TJ, Mullins GN, Manansala M, Al-Kuhlani M, Pinney JM, Davis JK, Beaudin AE, Sindi SS, Gravano DM, Hoyer KK: CD8 Follicular T Cells Promote B Cell Antibody Class Switch in Autoimmune Disease. *J Immunol* 2018

Splitt SD, Souza SP, Valentine KM, Castellanos BE, Curd AB, Hoyer KK, Jensen KDC: PD-L1, TIM-3, and CTLA-4 blockade fail to promote resistance to secondary infection with virulent strains of. *Infect Immun* 2018

Cytometry Unit Facilitates Analysis of Immune Response to Valley Fever-causing Fungus

Dr. Katrina Hoyer's lab group is studying how the immune system responds to infection by the airborne fungus *Coccidioides immitis* that causes Valley fever. In collaboration with the SCIF Cytometry Unit, Dr. Hoyer's group analyzed blood drawn from 50 Valley fever pediatric patients or healthy controls at Valley Children's Healthcare in Madera.

Through the techniques of 10-color flow cytometry, cytometric bead-based immunoarrays, and high-dimensional data analysis her team characterized the dynamics of cellular populations and serum cytokines during disease. These studies revealed key differences in the immune response in patients that went on to resolve the infection versus those that developed chronic disease.

This work was published in the Journal of Allergy and Clinical Immunology.

Hoyer Lab Group

Left to Right: Oscar Davalos, Kristen Valentine, Ph.D., Katrina Hoyer, Ph.D, Anh Diep, Genevieve Mullins



Testimonials

“The SCIF Cytometry Unit is critical for my group. The cytometry technical director provides training and guidance with experimental design to the members of my lab, and assists with data analysis. Having a strong cytometry core facility is an absolute requirement for my research and our cytometry unit is an amazing asset to our campus and our research. ”

Katrina Hoyer, Ph.D.
Associate Professor
Molecular and Cell Biology Unit



“The SCIF Cytometry Unit is a valuable partner in our research projects. We're grateful for their ability to provide expert advice and keep the cytometers running smoothly.”

Scott Souza
Ph.D. Candidate
Quantitative and Systems Biology Graduate Program

New in 2020

We're Moving!

We are relocating to the Biomedical Sciences and Physics (BSP) building in Fall 2020 as part of the 2020 Project. We will be located on the fourth floor, allowing more convenient access to our cytometry services as well as space for future expansion.



Bio-Rad ZE5 Flow-Cytometer



Drs. Clarissa Nobile and David Gravano were awarded a DoD Instrumentation Grant (Award number W911NF1910529) for the purchase of a new high-parameter flow cytometer for research and education. The Bio-Rad ZE5 can detect 27 fluorescent channels, plus forward and side scatter.

Other advantages include:

- 5 excitation lasers: UV, Violet, Blue, Yellow-Green, and Red
- Enhanced small particle resolution by Forward Scatter down to 0.2 μ m
- Automated sample handling from various formats including 5ml tubes and 96-well plates
- Volumetric sampling useful in determining exact cell counts

The ZE5 is expected to arrive by late spring of 2020

iLab Management Software

We are transitioning to the iLab Core Facility Management Software. This will allow SCIF investigators to streamline instrument reservations, usage tracking, and billing.

