New Investments in Shared Resources Strengthen Research Capabilities

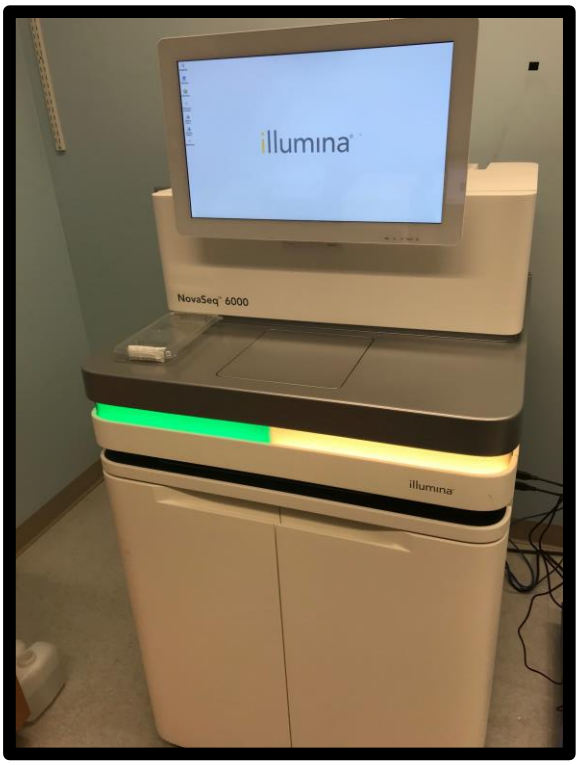
The Shared Resource Laboratories (SRL) have invested $3 million in the last year in new state-of-the art instrumentation. These advanced technologies will enhance the University's research capabilities in microscopy, mass spectrometry, genomics, and flow cytometry.

The SRL, which is directed by Tim Bushnell, Ph.D., provide leading edge services and instrumentation to researchers across the University. The new acquisitions were made possible through a combination of internal investment, NIH grant supplements, and NIH SIG grants.

NovaSeq6000

University of Rochester's Genomics Research Center (GRC), located within the Wilmot Cancer Institute, provides core laboratory support, technical consultation, assistance with experimental design and data analysis for investigators using high-throughput genomic sequencing, genotyping, and gene expression in their research programs. In April 2018, a new Illumina NovaSeq6000 DNA sequencer was added to the GRC high-throughput sequencer cluster, augmenting capacity and lowering sequencing costs, including the cost for whole genome sequencing.

Procurement of the NovaSeq6000 signals a new era for genomics at the University, which will aid in advancing personalized medicine and discovery of novel therapeutic approaches towards improving patient outcomes. In addition to bolstering whole genome sequencing capabilities within the GRC, the NovaSeq6000 acquisition will aid investigators interested in studying rare cell populations through single-cell RNA sequencing.



NovaSeq6000

Two-Photon Microscopy

The Multiphoton Research Core Facility is now equipped with an Olympus Fluoview FVMPE-RS Twin Lasers Imaging System which was installed in January 2018. This system was brought to the URMC, in part, with support from a NIH supplement secured by Deborah Fowell, Ph.D., professor of Microbiology and Immunology. Two-photon laser scanning microscopy is a fluorescence imaging technique that uses near-infrared excitation light to achieve living tissue deep imaging.

The Multiphoton Core Facility provides UR researchers the ability and expertise to obtain high quality imaging-based data from in-vitro tissue and intravital animal research studies in the field of immunology, neuroscience, biomaterial engineering, biophysics, and cancer research. Staff members within the laboratory have expertise in sample preparation methodologies and image analyses to support additional research needs.

Super-Resolution Microscopy

The Light Microscopy Core Facility has acquired an Abberior Instruments Stimulated Emission Depletion (STED) microscope. STED microscopy is a super-resolution imaging technique which allows researcher to image beyond the theoretical resolution limit of light. A STED microscope can resolve objects located less than 20 nm (0.00002mm) apart, enabling researchers to visualize individual components of complex structures.

This instrument was purchased with a NIH grant awarded to David Yule, Ph.D., professor of Pharmacology and Physiology, and additional support from the University of Rochester. It will be housed in the Confocal and Conventional Microscopy Resource Core. The instrument is expected to be installed this summer and will be introduced by a lecture from the inventor of STED technology, Nobel Prize Laureate Stephan Hell of the Max Planck Institute for Biophysical Chemistry in Göttingen, Germany.

Mass Spectrometry

Mass spectrometry is a methodology for the analysis and quantification of complex collection of proteins, peptides, lipids, and small molecule metabolites. Recent advances in mass spectrometry have provided more powerful tools for high-throughput analysis of proteins that are widely used in medical and biological research.

Sina Ghaemmaghami, Ph.D., an assistant professor of Biology, and the Mass Spectrometry Resource Laboratory have been awarded a NIH grant to purchase of a Thermo Scientific Orbitrap Fusion Lumos Tribrid Mass Spectrometer. This mass spectrometer is a versatile instrument that excels at high-throughput and high-resolution applications and performs at a level far beyond the capabilities of the current mass spectrometers in the core facility.

Bio-Rad S3e

Flow cytometry is a powerful technique to analyze and isolate cells of interest in a phenotypically defined manner. This allows researchers to understand complex relationships at the cellular level and feed downstream applications, such as genomics analysis, with highly purified populations of cells. The Flow Cytometry Shared Resource (FCR) core currently houses 8 dedicated staff, 6 traditional analyzers,

with capacity for detection of 4 to 18 fluorescent parameters simultaneously, 2 high-end cell sorters as well as the ImageStream imaging flow cytometer and the CyTOF mass cytometer.

Last fall, through a generous donation from the Wilmot Cancer Institute, the FCR was able to acquire the Bio-Rad S3e cell sorter. This 4-color, 2-laser system has a host of features that allow for automated startup and walkaway sorting of up to two populations of interest. These features will allow for researchers to be trained to run this system at their convenience.

# # #