



## Leaders' Update

### A message from Paul Fawcett, associate director for shared resources

Dear colleagues,

I'm pleased to announce that Massey Cancer Center has been very successful in the latest round of submissions for funding from the VA Higher Education Equipment Trust Fund (HEETF). HEETF funding will be used to acquire new instrumentation that will modernize our core laboratories and will allow us to offer transformative new capabilities to our MCC members. If the state funding timeline is consistent with historical precedent, the new equipment, described as follows, should begin to come online in the first quarter of calendar year 2019.

On 1 July of this year, the Massey Cancer Mouse Models Core (CMMC) received official designation as a full institutionally recognized core laboratory. Please join me in recognizing core director Jennifer Koblinski for her hard work and able leadership in achievement of this significant milestone! To continue to build upon the core's established strength, we will acquire two new pieces of equipment for the CMMC this cycle. The first is a HEMAVET 950FS Multi-Species Hematology System. This will be a boon for MCC members using mouse models to conduct research on hematologic malignancies or other conditions affecting blood cells. The HEMAVET carries out complete blood cell (CBC) analysis of mouse blood, including the quantification of red blood cells, various types of white blood cells and platelets. This will be the first dedicated animal-specific CBC analyzer at VCU and satisfies a significant unmet need. The next is a Karl Storz Coloview System and associated anesthesia unit. The Coloview is an ultra-miniature endoscope for visual examination (imaging), injection of tumor cells or drugs and collection of biopsies for histologic and molecular examination in animal models. The acquisition of this endoscope will provide CMMC users with state-of-the-art equipment for obtaining images of the colon and the oral cavity, thus facilitating research on colon cancer and chronic inflammatory bowel disease as well as oral squamous carcinoma.

Next, I am pleased to announce that VCU this summer successfully concluded our search for a new faculty director for the VCU Microscopy Core Laboratory. We were joined in July by Tytus Bernas, Ph.D., who came to us from the Nencki Institute of Experimental Biology in Warsaw, Poland. In recognition of the significance of this recruitment, and to relieve pressure on our very heavily utilized Zeiss LSM 710 laser scanning microscopy system, the core will be acquiring an Zeiss LSM 880, representing the third generation of the Zeiss LSM 700 product line. The LSM 880 will be equipped with an AiryScan detector, which can be used to image fluorescence distributions at the confocal pinhole; whereas, the older systems provided only integrated single value measurements. This arrangement leads to increase of spatial resolution by a factor of 170 percent. This super-resolution modality nevertheless remains fully compatible with existing confocal sample preparation protocols. The LSM 880 system will meet increasing

demand for confocal imaging, while offering significantly enhanced capabilities in all typical applications and a seamless transition for users of our existing LSM 700 and LSM 710 systems.

In February of 2018, we were pleased to announce the appointment of L. Ashley Cowart, Ph.D., as the new faculty scientific director of the VCU Lipidomics and Metabolomics Core Laboratory (VLMC). This core received a rare and coveted “outstanding” assessment at Massey’s last NCI CCSG review and is therefore acknowledged as a scientific resource of national significance. To maintain the currency and relevancy of this core, HEETF has awarded funds to acquire a ThermoFisher Q Exactive HF Hybrid Quadrupole/Orbitrap Mass Spectrometry system. Acquisition of this instrument will allow us to carry out sophisticated untargeted lipidomics and untargeted general metabolomics workflows, building on the core’s well-established expertise in the realm of targeted lipidomics. This HEETF funding flowed from a joint request with the VCU School of Medicine.

The Flow Cytometry Core will be acquiring a 10X Genomics Chromium System. The Chromium is a microfluidics-based platform that collects individual cells and creates an amplified library from the RNA or DNA from each cell. The resulting libraries are then sent out for high-throughput sequencing, and as each cell is barcoded, everything can be run on a single lane. The resulting ability to carry out what effectively amounts to single cell DNA sequencing or RNA-Seq analysis will be transformative for many research programs at Massey, especially those concerned with characterization of the tumor microenvironment. The Chromium facilitates identification of different cellular populations within tumors that drive therapeutic resistance and is therefore essential for Massey’s and VCU’s precision medicine initiatives.

Massey will be acquiring a second ThermoFisher Q Exactive HF Hybrid Quadrupole/Orbitrap Mass Spectrometry system that will be dedicated to mass spectrometry-based proteomics. This system will replace an obsolete 15-year-old LCQ Deca. The Q Exactive HF instrument has four times the mass range, 24-fold greater mass resolution and 100,000-fold greater mass accuracy than the current LCQ Deca. The Q Exactive will not only produce high-quality data for routine studies quickly, but it will also give VCU PIs access to some of the most cutting-edge and innovative proteomic methods to incorporate into their research.

Regards,

Paul Fawcett, Ph.D.  
Associate director for shared resources