

*Celebrating the 10th anniversary of CMCF operations*

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The Canadian Macromolecular Crystallography Facility (CMCF) supports more than 70 protein crystallographers from across Canada. It consists of an insertion device beamline (CMCF-ID) and a bending magnet beamline (CMCF-BM). The first diffraction image was acquired at the CMCF-ID beamline on March 18, 2006, and the first paper containing data collected at CMCF-ID was published in December 2006 [1]. CMCF-BM was commissioned in 2011, and is a general-purpose crystallography beamline having characteristics that support the protein and chemical crystallography communities. Both beamlines are fully automatized and operate mainly through remote access to the CMCF facility [2]. Up to 25% of available beamtime is reserved for commercial users. To date, more than 450 peer reviewed articles used data collected at the CMCF. Additionally, some 860 PDB deposits and 6 patents have originated from the CMCF. Since 2010, we have been running the Annual CLS Mx Data Collection School which has trained more than 140 participants (<http://cmcf.lightsource.ca/school/>). After a successful 10 years of operation, the CMCF-ID beamline will undergo an upgrade to establish micro-beam capabilities [3]. After completion, the focused beam at the sample will have a much smaller size of  $50 \times 5 \mu\text{m}^2$  (H x V) with flux at 12 keV of  $\sim 10^{13}$  [photons/s], allowing measurement of X-ray diffraction patterns from much smaller crystals than possible presently. The beamline will be equipped with a very fast sample changer and an ultra-low noise photon counting detector, allowing shutter-less operation of the beamline. The first phase of the upgrade will include installation of a new PILATUS 3 6M detector that will become operational in May 2017, while an ISARA robot will be installed at the beamline in the autumn of 2017. For the second phase of the upgrade, a new longer in-vacuum undulator and new optics will be installed in approximately 3 years.

To substantially increase the flux produced by the CMCF-BM beamline, we will additionally be upgrading its double crystal monochromator with multilayers.

[1] Qian, X. et al. (2006) J. Biol. Chem. 281(51) 39380-39387.

[2] Grochulski et al. (2012) J. Struct. Funct. Genomics. 13(2) , 49-55.

[3] Grochulski, P. et al. (2016) Postepy Biochem. 62(3) 395-400.

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