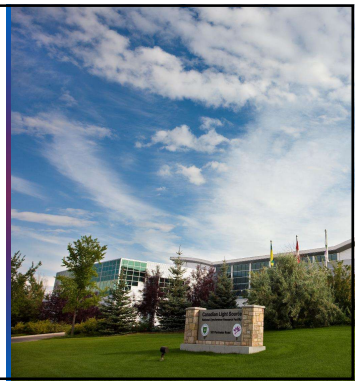
10th Annual
CLS MX Data Collection School
VIRTUAL EDITION

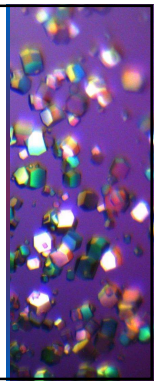
Samples & Preparation

Shaun Labiuk



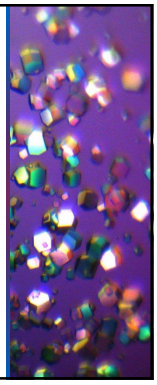
Outline

Access to the facility
Preparing samples for the CMCF

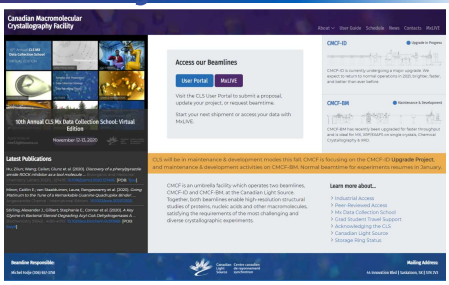


Access to the facility

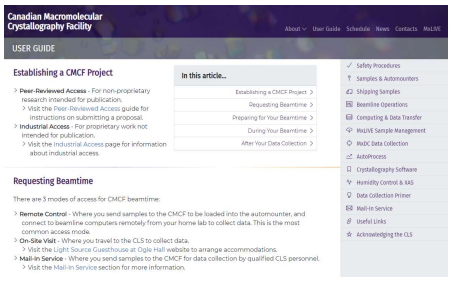
Website
Beamtime
Registration
Training
Proposals
Permit



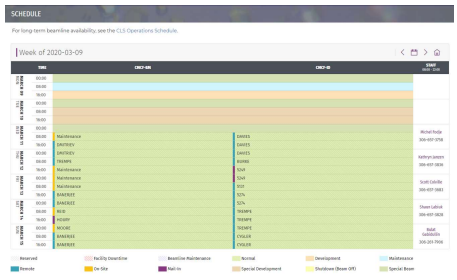
Website - cmcf.lightsource.ca



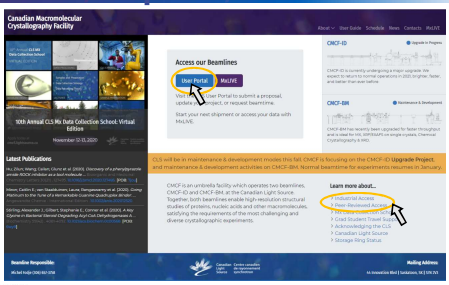
Website – User Guide



Website – Schedule



Registration, Proposals, Beamtime



Registration, Proposals, Beamtime

- Everyone controlling the beamline must be registered as a CLS User
- Lab PI or delegate responsible for proposals & beamtime requests
  - Note on accounts
    - Each **individual**, once registered as a CLS User, has an individual CLS User Portal account which is also used in the CLS Training Site
    - Each **lab** has a CMCF account which is used for data collection & MxLIVE

Registration, Proposals, Beamtime

- Proposal Types
  - Peer-Reviewed Access (General User Program)
    - For non-proprietary research intended for publication
    - Call for Proposals twice per year
    - Approved Proposals become Projects which are active for 2 years
  - Rapid Access
    - Can be submitted if proposal deadline was missed, but a full proposal should be submitted during the subsequent Call for Proposals
  - Industrial Access
    - For proprietary data collection
    - Coordinated by the CLS Industry Services Group

Registration, Proposals, Beamtime

- Modes of access
  - Remote Control
    - Where you send samples to the CMCF to be loaded into the automounter, and connect to beamline computers remotely from your home lab to collect data
    - Most common access mode
  - On-Site Visit
    - Where you travel to the CLS to collect data
  - Mail-In Service
    - Where you send samples to the CMCF for data collection by qualified CLS personnel

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Registration, Proposals, Beamtime

- Requesting Beamtime
  - Peer-Reviewed Proposals
    - Request shifts under your valid project as needed, preferably 2+ weeks in advance
    - Note that beam is generally only provided for experiments during shifts indicated as "Normal" mode (green)
  - Industrial Access
    - Contact your industry contact person to arrange beamtime

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Training

Remote BSO Tomorrow!

- Remote Control
  - Remote Beamline Specific Orientation (BSO – CMCF – Remote) is the only required training
    - Ensure new team members complete the Remote BSO with staff over the phone ahead of time, and collect data with an experienced mentor who is also on the team
- On-Site Visit
  - Complete WHMIS, HSO & RAM modules online in the CLS Training Site
    - On-Site BSOs are additionally completed with staff at the beginning of beamtime when needed, and expire after 2 years. Complete the Cryogenic Safety Training module if planning to cool crystals at the beamline. If needed, you may pick up your access badge from the CLS Reception Desk in the Main Lobby (Monday – Friday 8:00 am – 4:30 pm, excluding holidays). You will need to present government-issued photo ID before a user badge can be issued
- Mail-In Service
  - No training is needed, as CLS staff collect data

Check training status or complete online modules at training.lightsource.ca

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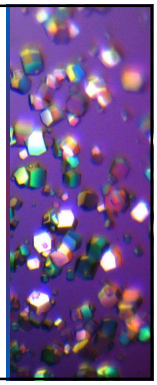
Permit

- In User Portal, staff **Hand Over** the beamline
- Team representative then **Signs-On** to the session in the User Portal, indicating team members that will collect data, and samples
- Permit must be active for the duration of data collection
  - If pausing data collection for >30 minutes, indicate this by selecting **Unattend** and leaving the requested information
  - Upon returning, select the same button and indicate you have returned
- **Sign Off** when finishing the session
  - This lets staff know you are finished but it is also good practise to send an e-mail to cmcf-support@lightsource.ca

Preparing Samples for the CMCF

Samples Containers Shipping



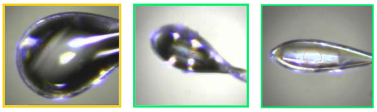
Samples – Pins & Bases

- Tips
  - Ensure pins are secure in bases
  - Avoid rusty or deformed bases & pins
  - Avoid lumps of glue

18 mm mounts are required when using the sample changers and strongly recommended. Plastic mounts should not be used.

Samples – Mounting

- Loops & pins need to be firmly secured within base
- Loop should match crystal size
  - easier to centre crystals
- Excess cryoprotectant should be removed when possible



Containers

CMCF-BM ONLY

SSRL-Style Cassettes
Only compatible with CMCF-BM

CMCF-ID & CMCF-BM

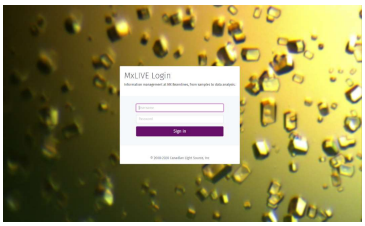
Uni-Pucks
Compatible with both beamlines

Shipping

- Samples are sent in a cold dry shipping dewar
  - No "liquid nitrogen"
  - Proper maintenance according to manufacturer instructions
    - should hold charge for several days/week, test before use
  - We fill them on arrival
  - Instructions for shipping on website
- Allow sufficient time
  - Should arrive at least a day before beamtime
  - Several days is safest

Shipping

- Automounters & Mail-In require information about which sample is in which position
  - CMCF uses MxLIVE
    - Web-based Laboratory Information Management System (LIMS)
    - Available *via* CMCF website



Highlights Tomorrow!

Fodje *et al* (2012) J Syncrotron Rad **19**(2), 274-280

Summary

- Visit the CMCF User Guide for a detailed checklist and full resources:
  - Esteblishing a CMCF Project
  - Requesting Beamtime
  - Preparing for Your Beamtime
  - During Your Beamtime
  - After Your Data Collection

cmcf.lightsource.ca/user-guide

Reference Books

- Rupp (2010) Biomolecular Crystallography
- Rhodes (2006) Crystallography Made Crystal Clear
- Doublié (ed) Macromolecular Crystallography Protocols Vol 1: Preparation and Crystallization of Macromolecules