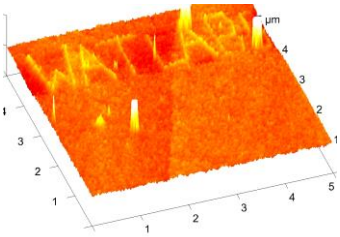
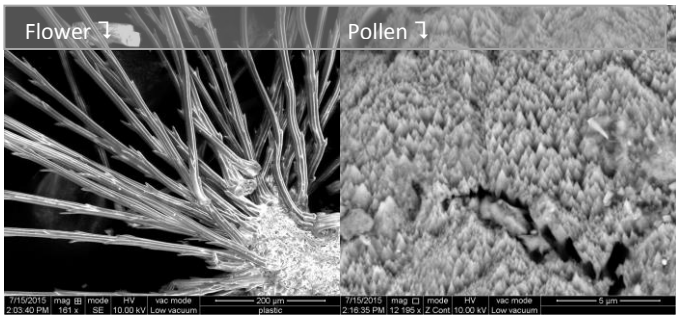


The WATLab Newsletter

There have been significant changes in WATLab[1] in the past five years, with many new tools now coming online in full operational mode. Despite my failure to secure further funding in the last CFI competition, WATLab has been very fortunate to have acquired a full fleet of advanced materials research tools second to none in Canada. Many of our tools are unique and Canada's first. For example, the Raith IonLine ion beam lithography system is one of less than 10 in the world! We are working out all the bugs and are ramping up operation for this tool. For more detail, please visit www.watlab.com . Virtual lab tours will soon be available. I have a few quick items to report below.

1. New ESEM now on line

A new FEI Quanta FEG 250 Environmental SEM is now online and some users have been trained and are getting excellent images. The Quanta FEG is a field-emission SEM with resolution better than 1.4 nm in low vacuum mode and a maximum operating pressure of 3% of an atmosphere. It is capable of getting exceptional images even for not-too-conducting materials by manipulating the water partial pressure.



Please contact Nafiseh (nafiseh@watlab.com) or Lei (lei@watlab.com) for further info.

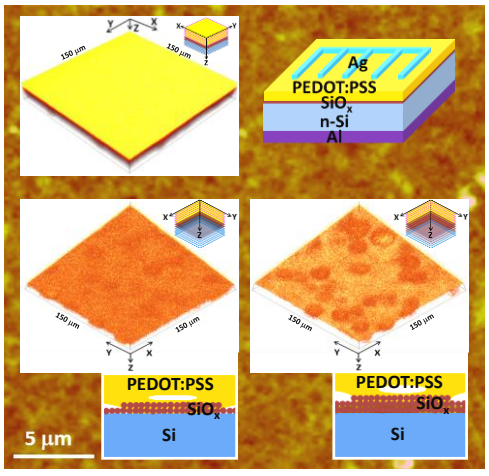
2. PPMS and MPMS (SQUID) now on line and in 24/7 operational mode

For users interested in magnetic property and/or physical property measurement, both PPMS and MPMS systems are always cold and are ready for service (as both systems have liquid helium refrigerators on board). This is particularly useful for users interested in tried-and-true experiments and these systems can basically provide the info on demand (i.e. without needing to plan way ahead, e.g., to order tanks of liquid helium for the experiments).

Please contact Shanti (shanti@watlab.com) for further info.

3. SIMS now on line

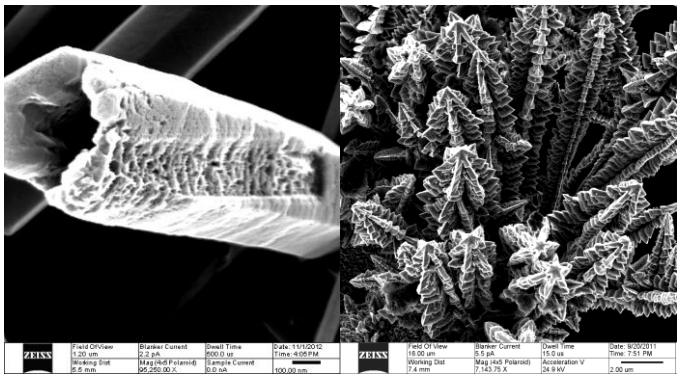
For users interested in static SIMS (secondary ion mass spectrometry) experiments, the new ION-TOF SIMS-5 system has been providing excellent data. This system has a unique argon cluster sputtering source, excellent for soft material (e.g. polymer and bio-material) removal with minimal surface damage. It is also equipped with all the advanced ion sources appropriate for inorganic material 3D chemical mapping.



Please contact Joseph (joseph@watlab.com) for further info.

[1] We the willing, led by the unknowing, are doing the impossible for the ungrateful. We have done so much for so long with so little that we are qualified to do anything with nothing.

4. WATLab Promotion: User fee reduction for Zeiss Orion Plus Helium Ion Microscope

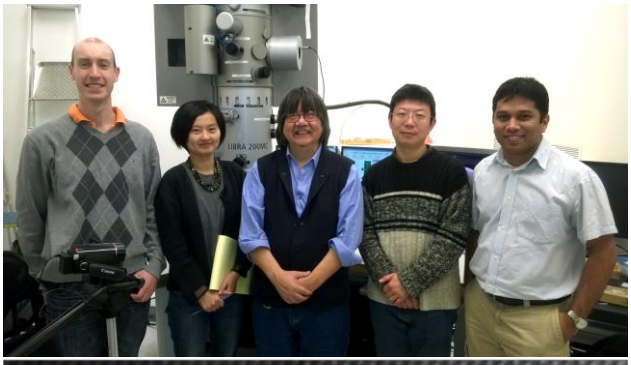


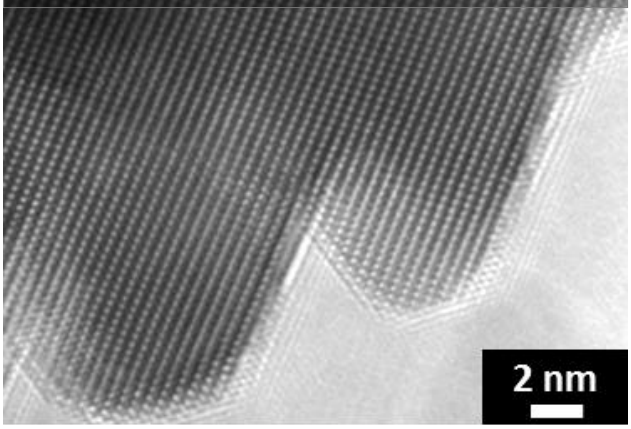
The Zeiss ORION Plus HIM is the first ion microscope in Canada. In addition to its ultrahigh spatial resolution (0.35 nm), the HIM has exceptional depth of focus, making it particularly powerful for imaging 1D nanostructures. To encourage more users to take advantage of this unique tool at WATLab, we have reduced the rate to $80/h for the next billing cycle.[2]

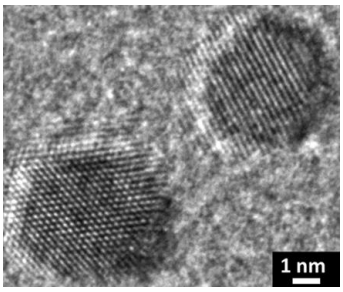
Please contact Lei (lei@watlab.com) or Nafiseh (nafiseh@watlab.com) for further info.

5. WATLab Promotion: One *free* two-hour try-out session for Zeiss Libra 200 MC TEM

The Zeiss Libra 200 MC transmission electron microscope has undergone extensive machine physics and we are stabilizing operation. The operational reliability has improved and our operator team has acquired extended experience in operating this tool. In addition to ultrahigh performance (with a point resolution of 2.4 Å and an information limit of 1.4 Å) that can effortlessly resolve atoms, this TEM has unique features, including Kohler illumination and in-column energy filter capability. It also has excellent energy loss resolution (0.18 eV) and the fastest EDX system on Earth (with full mapping capability). The images are just gorgeous! The rate of the TEM has been reduced to be among the lowest in its class in North America ($80/h).







To further encourage usage of this tool, we will provide one free 2-hour try-out session for new TEM users in the next billing cycle.

Please contact Joseph (joseph@watlab.com) for further info and/or make appointment.

6. WATLab Promotion: Use-5h-get-1h-free for all SEM services

To show our appreciation to our loyal SEM users, we will implement in the next billing cycle new user fee structure for SEM usage over our entire SEM fleet at WATLab (including the LEO FESEM 1530, Zeiss Ultraplus, and the new Environmental SEM). [In addition to outstanding resolution, all SEMs are fully equipped with EDX capable of light element sensitivity and of full mapping. The LEO also has electron beam lithography capability with Nabity NPGS Ver. 9.] We will provide one free hour for every five hours of certified user service. As SEM is

[2] The next billing cycle starts on 1 September 2015 and will cover the next six months.

an essential tool for all nanoscience, we hope that this will lessen the financial burden particularly for our junior research groups on campus. We also hope that more students will be properly trained and educated with these important tools.

Please contact Nina (nina@watlab.com) or Nafiseh (nafiseh@watlab.com) for further info.

7. Training of SEM certified user

To ensure that all our users are properly trained with SEM usage (a fundamental skill that all grad students in materials science should have), we have been using a "graduated" certification system. This training involves:

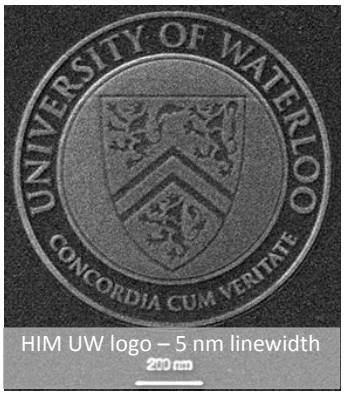
- Overview of SEM principle and operation [usually 2 h of Operator Service (OS) or $160].
- One-on-one hands-on training (usually 2 to 3 h of OS at $80/OS h) – Our operator will be training the new user (to run his/her own samples) with actual operation of the machine. In these sessions, the user will collect useful data and our operator will provide helpful tips about how best to handle the user's samples.

Please contact Nina (nina@watlab.com) or Nafiseh (nafiseh@watlab.com) for further info.

We encourage all research groups to train new students whose projects will involve a lot of SEM work. For groups who may only need a few images once every three months, then the OS service will be more cost-effective. For experienced certified users of the LEO (our first-generation SEM) who may wish to move onto newer SEM systems (such as the Ultra or Quanta), please contact Nina or Nafiseh.

8. User appreciation: 10% Discount for total usage over $2,000

To show our appreciation for the continued support of our loyal users, we will apply a 10% discount in the next billing cycle for all users whose total WATLab charges (after the promotional discounts) are over $2,000 in a single billing cycle. This discount will apply to the total charge that includes all WATLab services (SEM, TEM, XRD, XPS, SIMS, SQUID, FTIR, etc.). We take this opportunity to thank our long-term users and my good colleagues who continue to stand by us and support us since WATLab's humble beginning in 2000.



9. External assistance

We are aware that CMC microsystems has in the past helped some of our users with part of their fabrication or analysis cost (up to $2,000) - http://www.cmc.ca/WhatWeOffer/ResourceCompetitions.aspx. To enable the user to apply for this type of support on his/her own, WATLab will assist by providing verification of usage.

10. Same rates for all Canadian academic users

WATLab does not differentiate between Waterloo and non-Waterloo users. All Canadian academic users will be offered the same rates and the same privilege, whether they are from Waterloo or not. We have established a painless mechanism for servicing our off-campus users.

We also provide one of the lowest rates and best services for industrial users.

Please contact Tong (tong@watlab.com) for further info.

For more information about WATLab or a guided lab tour, please visit watlab.com or contact Tong (tong@uwaterloo.ca).