CCMR

Cornell Center for Materials Research
Spring 2024 Newsletter

Welcome to the Spring 2024 CCMR Newsletter. We are excited to tell you about a bunch of new capabilities in the CCMR Facilities. If you want to know what the CCMR Facilities can do for your company, sign up for the "Facilities 101" class to be held in April. We also describe new collaborations between the CCMR and small businesses, and report recent recognition of CCMR faculty members.

Frank Wise, Director

Upcoming Events

FACILITIES 101

Wednesday, April 3, 2024

8am-4pm

PSB 120 and Clark Atrium

Facilities 101 is an annual event to introduce prospective business and industry users to CCMR shared facilities and resources with an overview provided by staff along with facility tours and live demonstrations.

For more information about Facilities 101, go to:
https://www.ccmr.cornell.edu/industry/facilities-101-workshop/

CCMR Facility News

Welcome Alicia Tripp!

We are happy to announce that Alicia Tripp will join the CCMR facility staff starting in June 2024. Alicia is finishing her PhD in Chemistry at the University of Wisconsin-Madison where she is studying MXenes utilizing XPS, SEM, FTIR and other methods. She has also assisted numerous other researchers with analysis using her group's XPS system and has participated in science leadership and outreach. Alicia will be a great addition to the CCMR facility staff, and we look forward to having her expertise at Cornell!

CCMR Glass Shop

The Cornell Glass Shop (formerly Chemistry Glass Shop) will soon be reopened under CCMR management. We are happy to announce that your glasswork needs will soon be met by our new glass blower, Sean Donlon. Sean is coming from Virginia Commonwealth University in Richmond, Virginia, and is an experienced scientific glassblower as well as an accomplished artist. Sean will be in Ithaca full time starting in June with some visits to campus in the spring. Please email ccmr-glass-shop@cornell.edu for more information; we will try to address urgent repair needs. The process for job requests will soon be described at www.ccmr.cornell.edu/facilities/glass-shop

Industrial Outreach News

JumpStart Program funds three projects in Spring 2024

Each semester, the JumpStart programs funds projects, that are designed to support New York State small businesses. JumpStart partners with NYSTAR, the New York State Empire State Development's Division of Science, Technology, and Innovation, to provide technical assistance and matching funds to advance collaborative research initiatives.

The projects were selected, after a rigorous evaluation process, by members of the Cornell Staff and the CCMR JumpStart Advisory board. The projects encompass a diverse range of industries and technologies, and were chosen based on their leveraging the expertise of CCMR researchers and their potential impact.

The Spring 2024 selected projects are:

- **NanoHydroChem** (Buffalo): Understanding Failure Mechanisms in Next-Generation Battery Materials
- **rsspcts LLC** (New York City): Design and Development of Swim Gear for Diverse Populations
- **ZeroValentNanoMetals** (Rochester): Transition Metal Nanomaterial Characterization

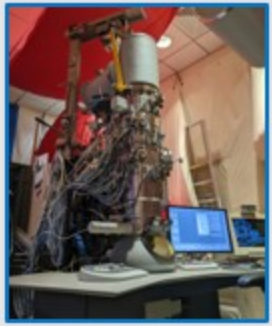
For more information, visit CCMR's JumpStart Progam page:
https://www.ccmr.cornell.edu/industry/streamlined-solutions-matching-funds-for-industry-partners/jumpstart-program-for-ny-state-small-businesses/
and the Cornell Chronicle article:
https://news.cornell.edu/stories/2024/02/ccmr-jumpstart-program-funds=three-projects-spring-2024

New Facility Instrumentation

The **Andromeda**, which is in 150 Duffield Hall, is a **Thermo Fisher Spectra 300 STEM 30-300kV**. It has an X-CFEG (Extreme-Brightness Cold Field Emission Gun) Ultra-High brightness source and is the first electron microscope to have a Lorentz module for imaging of nanoscale magnetic domains.

For more information, contact Phil Carubia at pmc228.

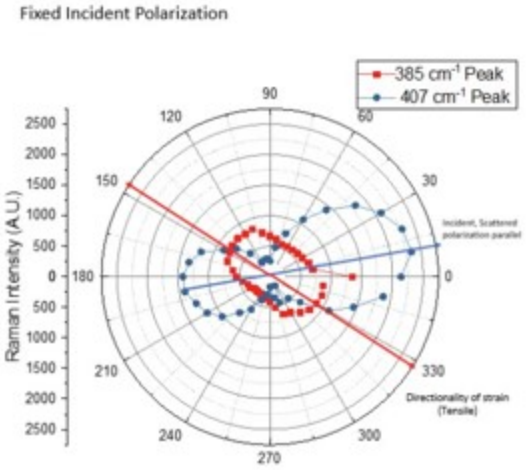
The CCMR is excited to once again have a workhorse TEM/STEM for all our researchers. In Duffield 150 is a new-to-us **ThermoFisher Titan80-300S/TEM**. Perseus (renamed Percy) has a Gatan UltraScan camera and EELS spectrometer as well as EDS and EMPAD detectors. When tuned at 300kV, researchers can expect resolutions of approximately 200pm in TEM and 130pm in STEM mode.



Interested users should contact John Grazul (jlg98) or Philip Carubia (pmc228).

New Polarization control added to WITec confocal Raman microscope.

The **WITec Alpha 300R confocal Raman microscope** has been upgraded with the addition of a **polarization kit**. The linear polarization of the 532 nm and 785 nm lasers can be selected arbitrarily, as can the polarization of Raman shifted light passing through the Glan-Thompson analyzer to the spectrometers. Polarization dependent Raman measurements are used for anisotropic materials such as crystals and fibers. The polarization of the laser light relative to the sample determines what vibrational modes are excited and can even provide information about the symmetries of bonds in isotropic samples such as liquids and randomly-oriented polymers.



Kevin Silverstein (kws74) manages the CCMR's Raman microscopes in B-30 Bard Hall.

Tergeo Plasma Cleaner

A Tergeo plasma cleaner has been added to the Clark Hall Scanning Electron Microscopy lab in room F-3. This cleaner removes carbonaceous contamination from SEM/TEM samples. There are two cleaning modes, a direct mode, and a downstream mode. The direct mode enables high-speed etching and surface modification; the downstream mode enables the gentle removal of surface contamination from SEM/TEM samples. The downstream mode is important for SEM/TEM samples as its precise control limits the chance of sample damage during cleaning. For more information, contact Mick Thomas, mt57.

PPMS van der Pauw and Hall Transport Accessory

Now installed and ready for use, the Hall Transport accessory automatically records and analyzes data. The Hall Transport Accessory spec sheet is at:

www.qdusa.com/siteDocs/productBrochures/1076-001_PPMS_van_der_Pauw_Hall_Transport.pdf

The new capability is on the PPMS in Clark Hall, D-22. For more information, contact Steve Kriske (sjk27).

PPMS He-3 Probe

Newly installed and available, the PPMS He-3 Probe is located in Clark Hall. The Spec Sheet for the accessory is here:

www.qdusa.com/siteDocs/productBrochures/1084-500_PPMS_Helium-3.pdf

For more information about training on the instrument, contact Steve Kriske (sjk27).

Awards and Recognition

ScholarGPS recognizes CCMR Faculty Members

Darrell Schlom, MSE Lynden Archer, CBE Emmanuel Giannelis, MSE Christopher Ober, MSE

David Muller, AEP Frank Wise, AEP Hector Abruña, CCB Geoffrey Coates, CCB

ScholarGPS, a comprehensive scholarly analytics platform, recognized CCMR faculty members as Highly Ranked Scholars – Lifetime. Highly Ranked Scholars are the most productive (by number of publications), authors whose works are of profound impact (as measured by number of citations), and of utmost quality (as measured by the h-index).

The CCMR faculty members recognized are:

- Darrell Schlom --Tisch University Professor (MSE)
- Lynden Archer – Joseph Silbert Dean of Engineering and James A. Friend Family Distinguished Professor in Engineering (CBE)
- Emmanuel Giannelis – Walter R. Read Professor of Engineering (MSE)
- Christopher Ober -- Francis Norwood Bard Professor of Metallurgical Engineering (MSE)
- Frank Wise -- Samuel B. Eckert Professor of Engineering (AEP)
- Geoffrey Coates --Tisch University Professor (CCB)
- Hector Abruña --Emile M. Chamot Professor (CCB)
- David Muller --Samuel B. Eckert Professor of Engineering (AEP)

To learn more about ScholarGPS, go to: scholargps.com

Atieh Moridi Receives Early Career Faculty Award

Atieh Moridi, assistant professor in MAE, was selected for the 2024 Early Career Faculty Award from the Mineral, Metals & Materials Society (TMS): www.tms.org This award recognizes faculty who have "advanced the academic institution where employed, and for the abilities to broaden the technological profile of TMS."

Prof. Moridi will be giving an Emerging Professionals Tutorial Lecture at the TMS Annual Meeting in March 2024 entitled "The Power of Instability: Non-Equilibrium Dynamics in Additive Manufacturing and Professional Development."

The Cornell Center for Materials Research (CCMR) is an interdisciplinary research center at Cornell University dedicated to advancing materials science research and innovation.

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Visit the CCMR website: ccmr.cornell.edu