National Center for CryoEM Access and Training

November 2019

The mission of NCCAT is twofold: to provide nationwide access to advanced cryoEM technical capabilities, and to assist users in the development of cryoEM skills needed for independent research. NCCAT provides access to state-of-the-art equipment required to solve structures to the highest possible resolution using cryoEM methods. Supported by the **NIH Common Fund** Transformative High Resolution Cryo-Electron Microscopy program (U24 GM-129539).

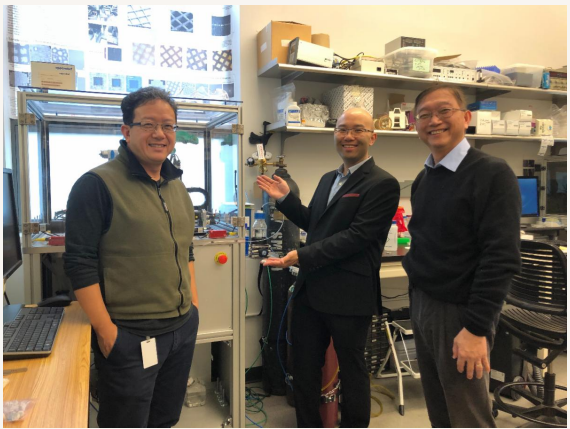
NCCAT Opening Reception

On November 7 NCCAT held an official opening reception. After years of organizing and over a year of construction, NCCAT is ready to serve the nation. Speakers at this event included Jim & Marilyn Simons (Simons Foundation), Willa Appel (Director, NYSBC), Jim Deatherage (Formerly NIH), and Lyn Jakeman (NIH), all of whom were integral to bringing this project to fruition.

Story of the Month: The Denature of the Problem

Making high quality vitrified grids with ice of an appropriate thickness, translucency, and evenly distributed particles remains one of the major bottlenecks in the structure determination process for cryoEM.

Dr. Wei-Jen Tang is no stranger to the frustrations of sample preparation. As a Principal investigator in the University of Chicago's Ben-May Department for Cancer



Research he has run into these bottlenecks
many times while trying to prepare a cryoEM sample. Dr. Tang's laboratory focuses on using structural biology techniques to uncover the molecular basis of protein-protein interactions and protein-ligand/drug interactions that are relevant to human health and diseases. One of these proteins is presequence protease (PreP), which is susceptible to a point mutation that is linked to many neurological disorders in humans. CryoEM analysis of human PreP structures has the potential to provide insights into how this process works. However, when Dr. Tang's group pursued this approach they discovered that when grids are prepared using standard vitrification instruments (in this case the Vitrobot) half the protein was observed to be denatured, presumably as a result if interactions at the air-water interface.

Fortunately for Dr. Tang, NCCAT has a General User Proposal (GUP2) that is designed to help researchers having issues like this. The GUP2 proposal provides access for users in need of staff-assisted sample preparation and screening resources with the intent of preparing grids suitable for data collection on a high-end instrument.

Dr. Tang's successful GUP2 proposal provided access to **Chameleon**, the commercial prototype of the Spotiton system, which was developed here at the home of NCCAT, the New York Structural Biology Center. Chameleon's blot-free, high-speed plunging process reduces some of the deleterious effects of proteins interacting with the air-water interface. Wei-Jen's grids prepared using Chameleon dramatically reduced the denaturation issues. His group was able to use data collected using Chameleon grids to obtain several distinct conformational states that are vital for the catalysis of the PreP protein.

Short Courses for Single Particle and Tomography

Single Particle Short Course
March 2-6, 2020

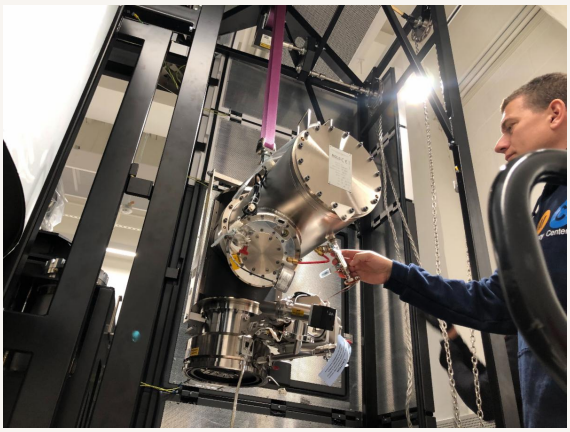
NCCAT will be offering a 1 week workshop focused on the theory and practice of single-particle analysis. The mornings will be devoted to lectures and stimulating round table discussions. The afternoons will be used to provide hands-on practicals to reinforce fundamental concepts and topics covered earlier in the day. Please **visit the website** for more details, including the course schedule and how to apply. The course will likely be oversubscribed so early registration is encouraged.

Tomography Short Course
April 13-17, 2020

SEMC and NCCAT will be offering a 1 week workshop focused on the theory and practice of tomographic methods. The mornings will be devoted to lectures and stimulating round table discussions. The afternoons will provide hands-on practicals to reinforce fundamental concepts and topics covered earlier in the day. Please **visit the website** for more details, including the course schedule and how to apply. The course will likely be oversubscribed so early registration is encouraged.

Construction Updates

Krios #4 is performing very well and is all ready to go once the Gatan K3 direct detector is installed. Krios #5 was delivered on October 5th and is being assembled, Krios #6 is expected to arrive on November 23rd.



NCCAT On-Site Housing

NCCAT has **guest housing** available at **CCNY's The Towers** for a fee of $100 per night/room. Any user that has been awarded time on their NCCAT user proposal is eligible.

For availability email **nccatinfo@nysbc.org**

Submit Your Proposal to NCCAT

NCCAT GUP1 PROPOSAL SUBMISSION

The **GUP1 early access program** supports single particle cryoEM data collection on one of our existing Titan Krios instruments using a Gatan K2 direct-electron detector.

Submit Now!

NCCAT GUP2 PROPOSAL SUBMISSION

The **GUP2 cycle** supports use of Chameleon (the commercialized version of Spotiton) and an exploratory screening microscope session.

Submit Now!

NCCAT TP1 PROPOSAL SUBMISSION

The **TP1 cycle** supports embedded scientist training.

Submit Now!

NCCAT TP2 PROPOSAL SUBMISSION

The **TP2 cycle** supports facility manager training

Submit Now!

VISIT OUR WEBSITE

FOLLOW NCCAT

NCCAT is supported by the NIH Common Fund Transformative High Resolution Cryo-Electron Microscopy program (U24 GM-129539).