



April 2020

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).

Call For COVID-19 Projects

During the NYC lockdown, NCCAT will be focusing all our resources to support researchers working on COVID-19 projects. We welcome both single and multiple investigator projects as well as collaborative projects between centers. Reviews of these proposals will be expedited.

To submit a Rapid Access Proposal for COVID-19 research (RAP-c) please go to our website: <u>https://nccat.nysbc.org/proposalcentral/rapc-submit/</u>.

For additional inquires you may contact us at: nccatinfo@nysbc.org



SARS-CoV-2 spike protein imaged and reconstructed at SEMC during NYC lockdown. This project is a collaboration between the Shapiro lab from Columbia's Aaron Diamond AIDS Research Center, and many members of the Simons Electron Microscopy Center, National Resource for Automated Molecular Microscopy, and the National Center for CryoEM Access and Training.

Inside Scoop on Single Particle Analysis Cross-Training

On the first week of March, NCCAT held its first ever week-long short course on the theory and practice of single-particle analysis. This also happened to coincide with the first confirmed coronavirus case in New York City, so it ended up being the last gathering any of us would have for some months. Eighteen students from all over the country (and a few outside) attended





National Center for CryoEM Access and Training Workshop Series Single Particle Analysis Short Course March 2-6, 2020

Attendees: Emilia Arturo, Agnese Baronina, Irina Bregy, Christiane Brugger, Elenora Di Zanni, Sarah Doore, Andrew Grassetti, Sissy Kalavil, Sohail Khoshnevis, Kyle Kroeck, David Lin, Maria Molledo, Smriti Sangwan, Kye Stachowski, Karthikeyan Subramanian, Francesca Vallase, Zhen Xu, Christina Zimanyi



lectures from leaders in the field, including Joachim Frank, Fred Sigworth, and Tom Walz were combined with hands on exercises for the full SPA pipeline, from grid prep to model building.

Three of the students agreed to answer a few questions about themselves, their work, and their experience taking the course for this newsletter*. Below is an excerpt, **the entire interview can be read on the NCCAT website**.

Tell us about yourself and what you do.

Emilia Arturo: My name is Emilia Arturo. I am a post-doctoral associate in the laboratory of Erica Ollmann Saphire at the La Jolla Institute for Immunology in the Division of Structural Biology & Infectious Diseases.

Irina Bregy: I'm from a small village in the south of Switzerland. For my studies (Bachelor in Cell Biology, Master in Molecular Biology), I moved to Bern (Switzerland). Bern is my home for almost 6 years now. With the start of my PhD (one year ago), I dove into the field of structural biology.

Sohail Khoshnevis: My name is Sohail Khoshnevis and I am a scientist at Emory University in Atlanta.

What was the most useful thing you learned during the course?

EA: The course was the first time I processed data on my own, which happened during the cryoSPARC tutorial. I am now processing my own project data at home, and was able to jump in relatively easily. Before the workshop I was intimidated to begin processing because I just didn't understand the workflow, or the rationale for choosing among many different types of workflow.

IB: The reconstruction on cryoSPARC was very helpful. Especially the fact that the reconstructions for most people didn't work at first. It gave us the opportunity to troubleshoot, and see how some seemingly unimportant parameters may have big impacts on the end product.

SK: I learned many useful things from sample preparation to analysis and model building and refinement.

Were there any skills you've learned that you'd like to apply to the work at your home institution?

EA: The workshop did an excellent job at reinforcing the importance of sample preparation. I made several grids within a week of returning to the lab from NYC. I included several new-to-me conditions (e.g. multi-blotting) I had learned at the workshop, for which I'm grateful. I am now processing a dataset that resulted from one of these grids.

IB: The processing part was completely new for me. With the practicals at the SPA course, I feel ready to play around and reconstruct things.

SK: I liked the tricks for model building we learned on the last day. I am also advocating for using cryoSPARC at my institute.

What would you tell someone who was thinking of applying for an NCCAT crosstraining course?

EA: DO IT. Do it regardless of your level of expertise. It's a treat to be tutored by so many experts in such a small teacher-to-student ratio. There's always something new to learn in a field that's growing so rapidly.

IB: Go for it, and take me with you!

SK: Definitely do it!!

Lectures and roundtables from the course are now <u>on YouTube</u>. Lecture slides can be downloaded at the <u>NCCAT website</u>.

*Some questions and answers have been edited for clarity and brevity

Remote Learning Opportunities

NCCAT is currently evolving our cross-training content to provide opportunities for remote learning to help the biomedical research community continue to develop the skills needed for independent cryoEM research.

We look forward to rescheduling our on-site training programs but until that time, we encourage you encourage you to take advantage of some of the new and existing resources offered by visiting **Remote Learning Central** on the NCCAT website; you can also learn more from the links below.





Welcome to our embedded scientist liaison, Christina Zimanyi

Christina has joined the NCCAT team to serve as a main point of contact for our visiting embedded trainees, ensuring they meet their cross-training goals during their time on site. With over a decade of experience as a structural biologist, Christina is excited to further the mission of training researchers to be independent users of EM techniques, with broad impact in the biomedical sciences.

Krios #7 Delivery

On Saturday March 7 2020, Krios #7 was delivered to NYSBC. This is the

Krios # 6 and Glacios Sign-Off

On April 6, 2020, while most of SEMC and NCCAT were still "sheltering at

first Krios G4 at the facility and, as far as we know, the first in the USA home", we signed off on Krios #6 a.k.a. "Caitlin" and Glacios a.k.a "Alison".

Both are currently going through remote benchmark testing, but should be up and running for users once NCCAT is back on site.





On the second week of March NCCAT welcomed embedded Facility Manger, Rangarajan Erumbi, for on site cross-training. Although his personalized two week training program had to end a week early due to COVID-19 he had hands on training with NCCAT staff and demoed <u>Chameleon</u>. NCCAT plans to have him back for training on microscopes as soon as possible.



Submit Your Proposal to NCCAT

NCCAT GUP1 PROPOSAL SUBMISSION	NCCAT GUP2 PROPOSAL SUBMISSION	NCCAT RAP-c PROPOSAL SUBMISSION	NCCAT BAG PROPOSAL SUBMISSION
The GUP1 access program supports single particle cryoEM data collection on one of our existing Titan Krios instruments using a Gatan K2 direct-electron detector.	The GUP2 access program supports use of <u>Chameleon</u> (the commercialized version of <u>Spotiton</u>) and an exploratory screening microscope session.	The RAP-c access program is focused on projects specifically working on COVID-19. Applications are accepted on a rolling basis and reviews will be expedited	The <u>BAG access</u> program allows researchers greater flexibility in instrumentation access by combining General User Proposal (GUP) access proposals
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NCCAT is supported by the NIH Common Fund Transformative High Resolution Cryo-Electron Microscopy program (U24 GM-129539).			