A new CryoEM facility has recently been established at the Institute for Bioscience and Biotechnology Research. The facility is operated as a cooperation between NIST, the University of Maryland, Baltimore, and the University of Maryland, College Park. Currently installed is a 200 kV instrument (Talos Arctica) with Falcon 3EC direct electron detector. An additional instrument (Glacios) has been delivered and is in the process of being installed; this is also a 200 kV instrument with similar characteristics to the Arctica, but will be equipped with a Volta phase plate, as well as a different direct electron detector (K3, Gatan) with roughly 10-fold higher data collection rate than the Falcon 3EC. Sample prep facilities are also available, including Vitrobot and Cryoplunge 3 systems for semi-automated grid freezing. Computing capabilities include roughly 0.75 PB of storage for data and 5 GPU nodes for processing (2 nodes with 8x GeForce GTX 1080 each are prioritized for CryoEM work while the others are shared). The computing facility will soon be adding real-time data reduction nodes and additional GPU processing nodes.

I will provide an introduction to biological CryoEM, discuss the capabilities of our new facility at NIST/IBBR, and show some of our preliminary data, including system suitability standards, liposomes, and protein-based magnetic nanoparticles. I will also discuss future directions, including our interests in pursuing joint CryoEM/scattering studies of biomaterials.

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