

## Introducing the Pacific Northwest Center for Cryo-EM

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The Pacific Northwest Center for Cryo-EM (PNCC) [1] is a state-of-the-art electron microscopy facility funded by the NIH Common Fund [2] and operated jointly by Oregon Health & Science University (OHSU) [3] and the Pacific Northwest National Laboratory (PNNL) [4]. The center is physically situated in the low-vibration imaging suite at the Robertson Life Sciences Building in Portland, Oregon.

Our mission is to service researchers from a diverse range of backgrounds by helping them tackle challenging scientific problems and training them to achieve independence in cryo-electron microscopy (cryo-EM). PNCC instrument time, consumables, and staff effort are provided to users at no-cost once their proposals have been approved.

### **PNCC Capabilities [5]**

- 120kV T12 Spirit – negative stain screening and training \*availability may be limited
- 200kV Talos Arctica – screening, training, Micro-ED, single-particle data collection
  - CETA, Gatan K2 DED
- 300kV Titan Krios – single-particle or tomography data collection and training \* available June 2019
  - CETA, Gatan K3 DED post GIF, Falcon 3 DED, Volta Phase Plate
- 300kV Titan Krios – single-particle data collection and training \* available June 2019
  - CETA, stand-alone Gatan K3 and Falcon 3 DEDs
- 300kV Titan Krios – single-particle data collection \* available June 2019
  - CETA, Falcon 3 DED
- Low Humidity WetLab - Sample Optimization and Preparation
  - Vitrobot Marck IV, Leica GP2, manual plunge-freezer, Centrifuge, Ultracentrifuge, FPLC, HPLC, DLS

### **User Access Mechanisms**

Individuals wanting access to PNCC resources submit their research proposals through our User Portal [6]. Proposals are reviewed by an external panel and scored based on feasibility and scientific merit. There are three access routes to obtain services at the center that are based on the breadth and urgency of projects.

- Rapid Access – This is for projects of very defined duration and scope that require access to PNCC resources within a 2-week window. Proposals are reviewed on a rolling basis. Blocks of up to 24hrs are scheduled based on a well-defined number of samples. Additional follow-up allocations may be given to help assess whether progress is made based on initial feedback.
- Standard Access – This is for projects of well-defined scope that have needs that require blocks of time up to 5 days. This includes requests for *ad hoc* training in specific areas of cryo-EM workflows. Proposals are reviewed monthly.
- Programmatic Access – This is for projects whose scientific scope is large enough to require the need for multiple yearly visits in blocks of time from a few hours, to 5 consecutive days. Time for programmatic projects have an overall yearly cap, but can make requests on a rolling basis.

**Training [7]**

Our PNCC Annual Symposium will host invited speakers, PNCC faculty, and PNCC staff presenting lectures on cryo-EM advances and highlighting any changes at PNCC that most impact our users. This symposium will be open to the public and the presentations will be captured and leveraged as persistent online educational resources, allowing us to switch to the most topical issues each year.

**Intensive Workshops** will be held twice yearly and primarily involve hands-on sessions. Small-class presentations will accompany the hands-on training to review pertinent material from online resources and to provide details on advanced and new topics to help trainees get the most from each session.

**Personal Trainer Sessions** will be available for all users who plan to visit PNCC directly for sample analysis. The training will be supervised use—with a coach looking over the user's shoulder—and tailored to the user's specific sample and matching cryo-EM methodology.

**Apprenticeships** are available for outside graduate students to be embedded and shadow PNCC staff for periods of one to three months. This is an opportunity those students to consolidate their training and provide a solid foundation for professional development. Students interested in applying for Apprenticeships should contact PNCC staff directly.

**References:**

[1] <https://pncc.labworks.org/>

[2] <https://commonfund.nih.gov/CryoEM>

[3] <https://www.ohsu.edu/xd/>

[4] <https://www.pnnl.gov/>

[5] <https://pncc.labworks.org/instruments>

[6] <https://eus.emsl.pnl.gov/Portal/>

[7] <https://pncc.labworks.org/training>

[8] The author acknowledges the support of the National NIH-Funded Cryo-EM Centers: Transformative High Resolution Cryo-Electron Microscopy (grant number U24GM129547).