



Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

Open Day of Technology Platforms

Electron Cryo-Microscopy

31.01.2024 **Carolyn Seuring**

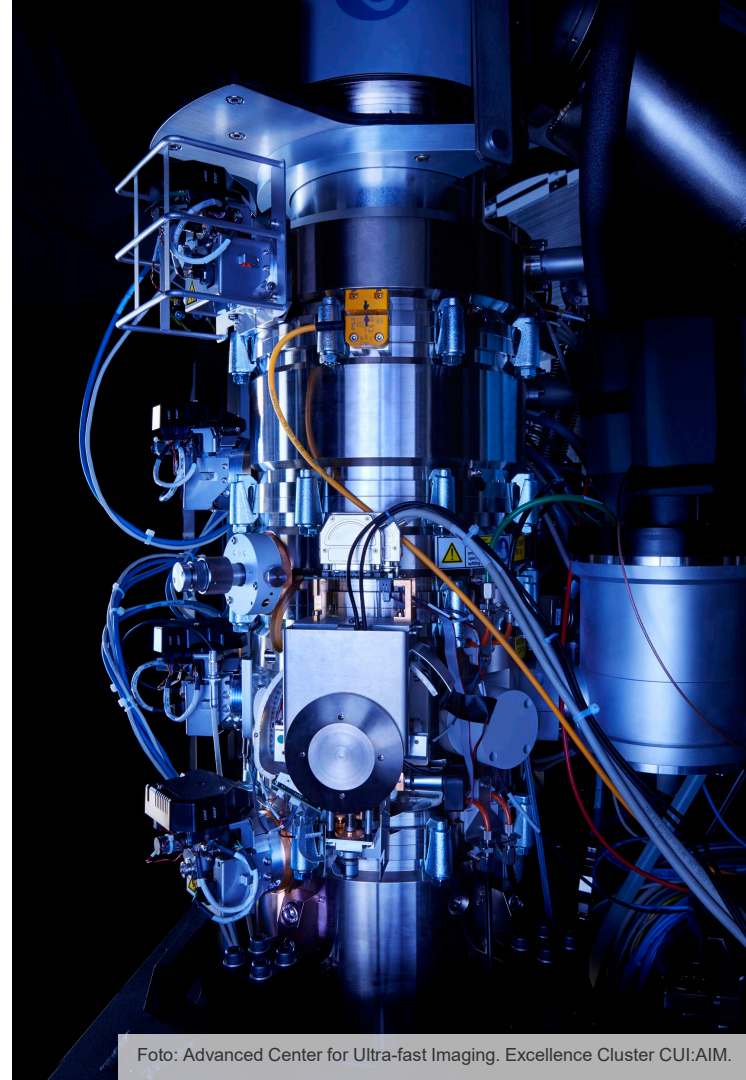
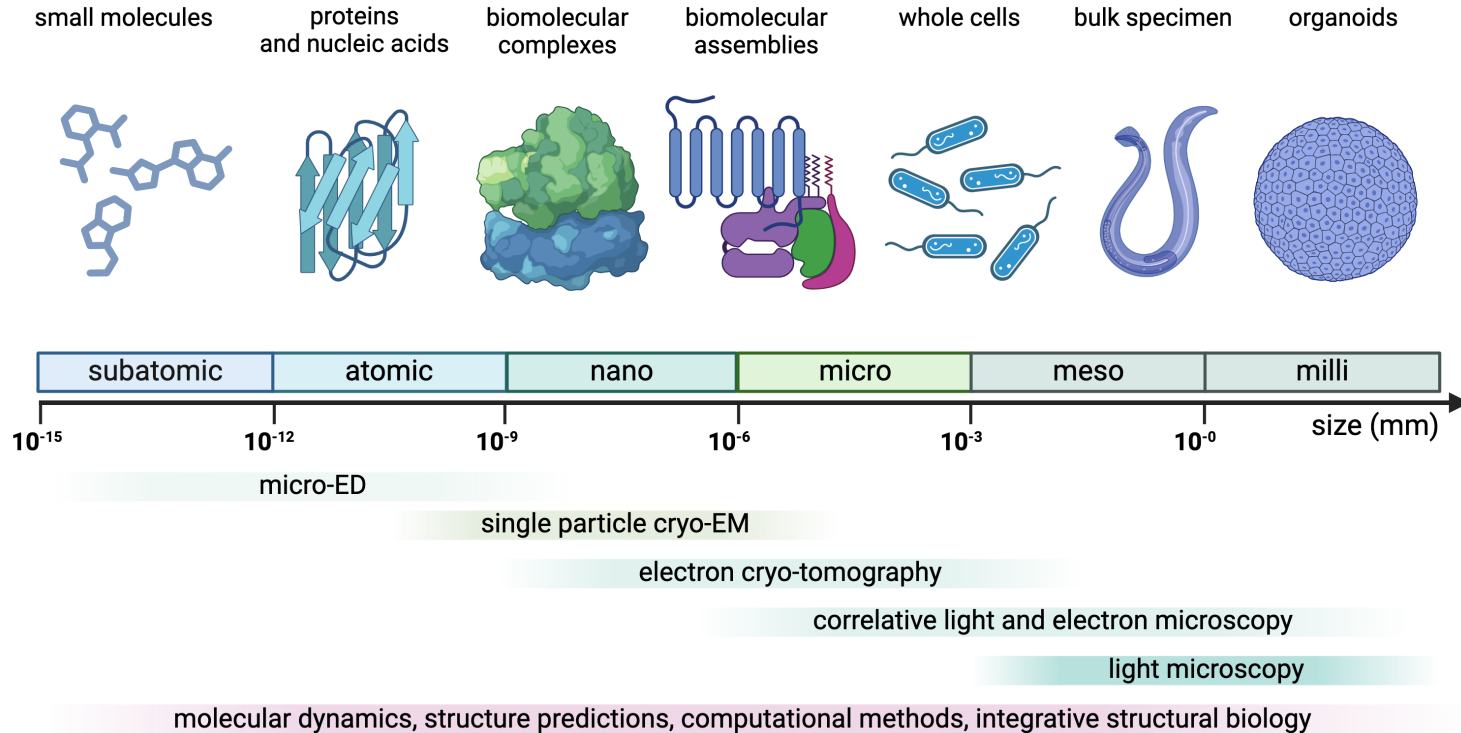


Foto: Advanced Center for Ultra-fast Imaging. Excellence Cluster CUI:AIM.

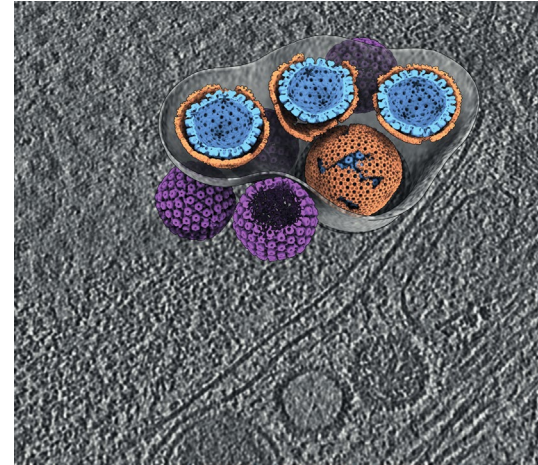
cryo-EM images the small world



cryoSPA
 cryoTOMO
 cryo-FIB milling
 cryo-CLEM

Morphology	Purity
3D structure	size distribution
interactions	assembly states
membrane texture	native structures

How the cryoEM TP contributes to UHH excellence



Real Life Sciences
Teaching and Bioinformatics

Cutting edge microscopes + auxiliaries in BSL-2

The Cryo-EM Facility is equipped with state-of-the-art instruments including two 300 kV electron microscopes for high-resolution data collection. All equipment can be operated remotely.



Talos L120c

- 120 kV
- CETA camera
- SerialEM
- **Cd/Te Detector (X-spectrum)**



Talos Arctica

- 200 kV
- X-FEG
- Phase Plates
- Ceta + Falcon 3EC
- **+ Falcon 4i (04/23)**



Krios G3

- 300 kV
- X-FEG
- Bioquantum
- K3
- Phase Plates
- double-tilt stage
- **+ FFI (03/23)**



Krios G3i

- 300 kV
- X-FEG
- Bioquantum
- K3, Falcon 3
- Phase Plates
- **+ FFI (05/23)**



Aquilos 2

- Maps
- AutoScripting
- Automatic Milling
- **+ iFLM (05/23)**
- **+ cryo-lift-out**



Plasma-FIB since 09/23

- **+ iFLM**
- **BSL-3 heating option**

Cutting edge microscopes + auxiliaries in BSL-2 + 3

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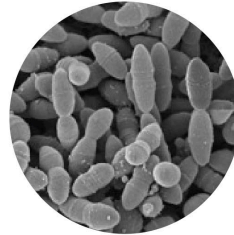
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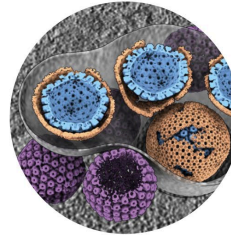
Upcoming: Plasma-FIB and Krios G4 in BSL-3

Sample Portfolio

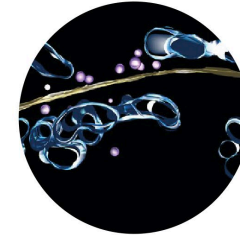
We currently have over 30 biosafety level 2 organisms registered. Our user groups mainly work with the *herpesviridae*, *bunyaviridae*, *poxviridae* and influenza but also mycobacteria and parasites such as *Plasmodium falciparum* and *Giardia intestinalis*.



Bacteria



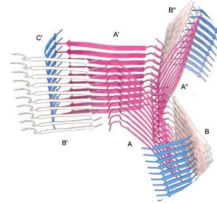
Virus



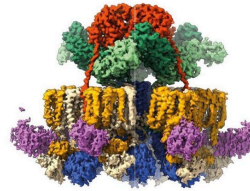
Parasites



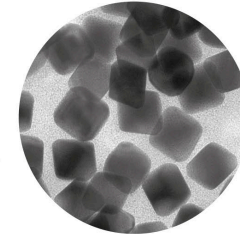
Organelles



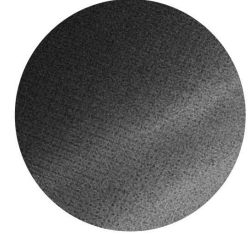
filaments



purified protein complexes

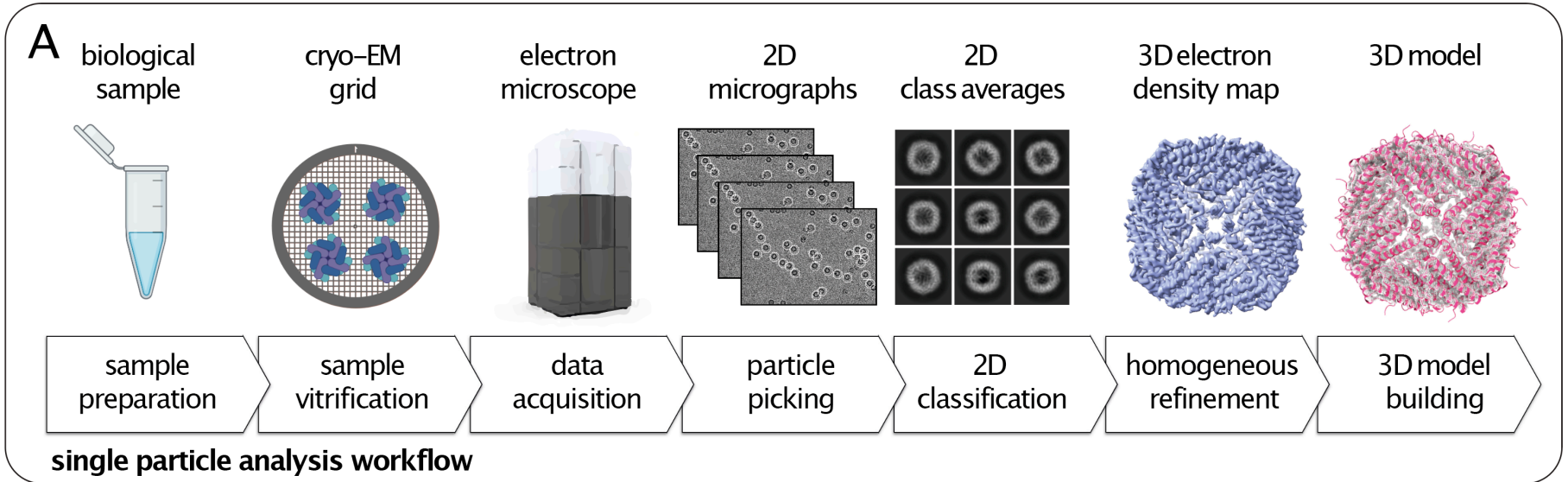


nanoparticles

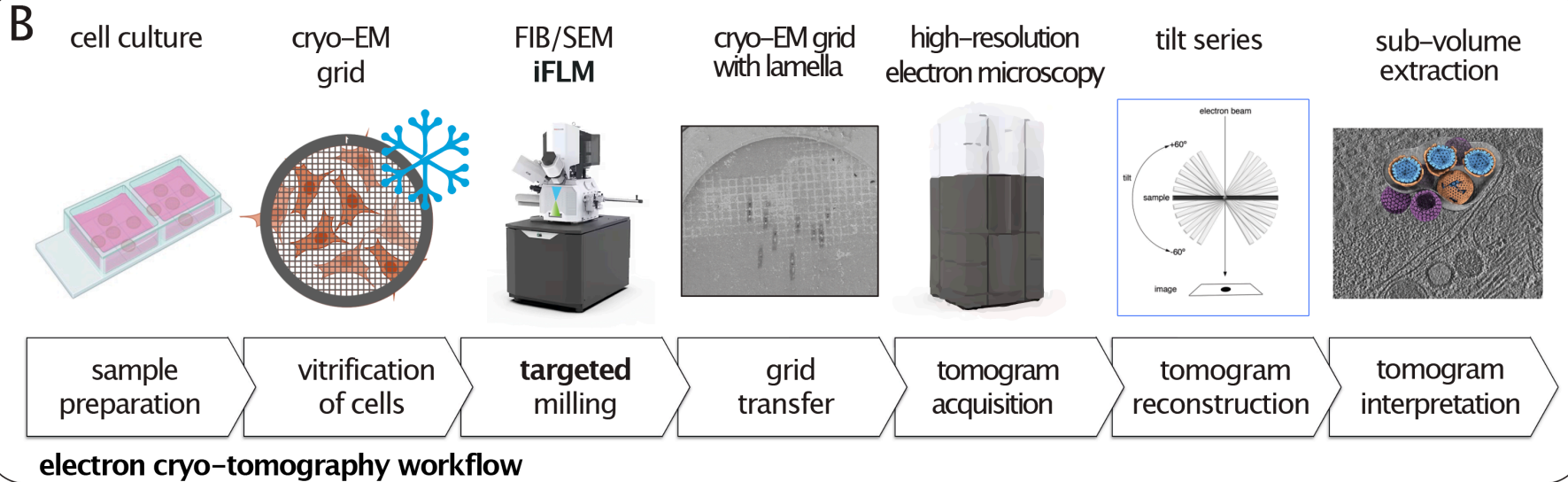


crystals

Our service: Training Modules and Workflows



Our service: 12 Training Modules and Workflows



Correlative light and electron microscopy

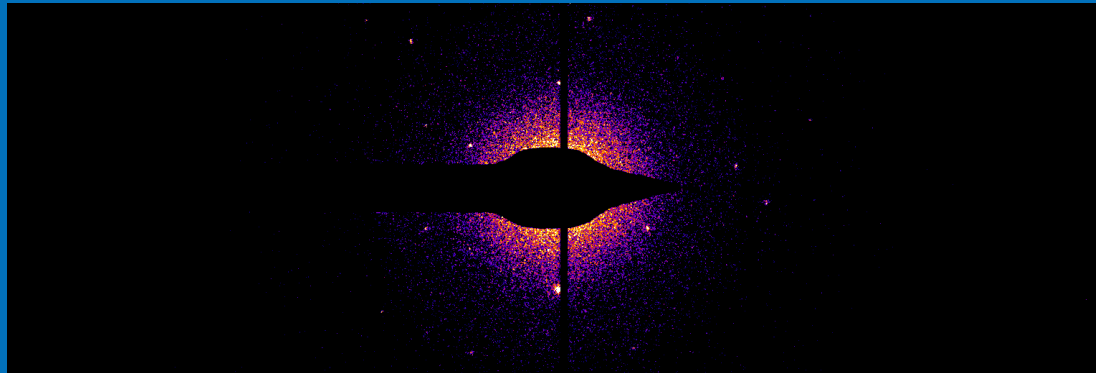
microED data collection

Problem:

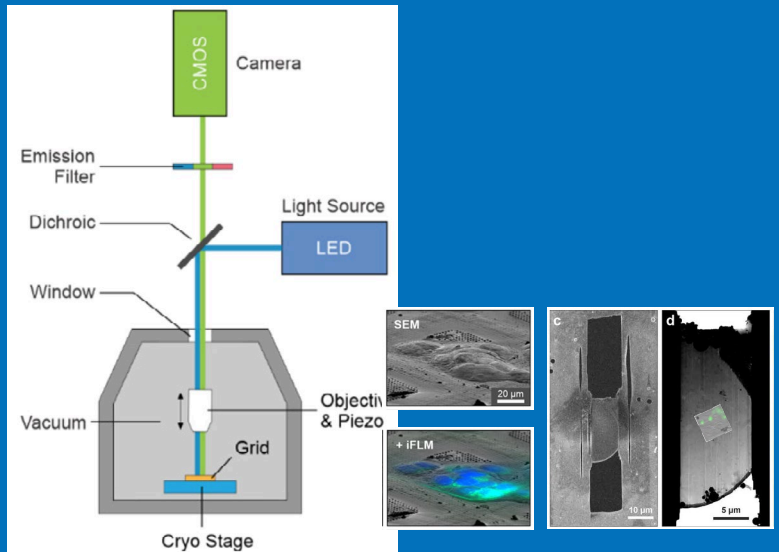
- Precise targetting of events

Aim:

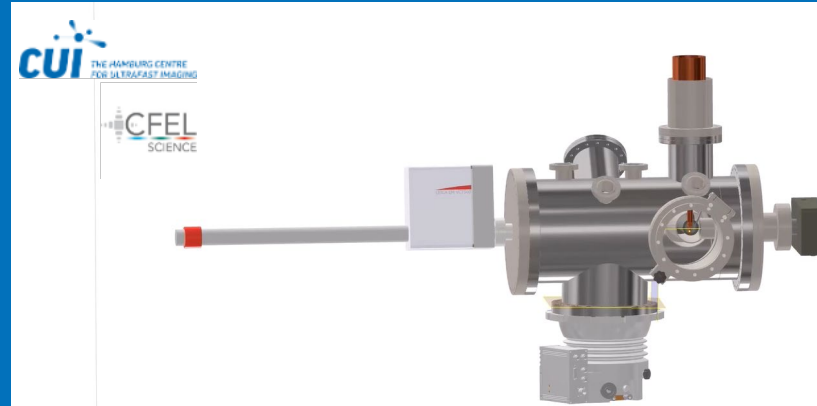
- Improve Milling at your target site using correlation



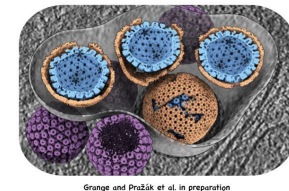
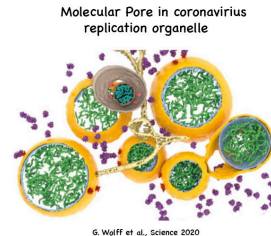
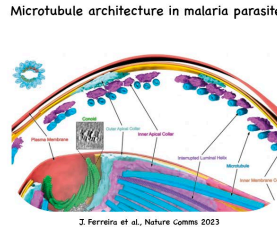
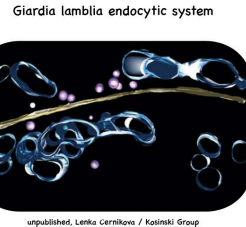
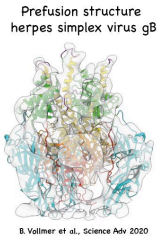
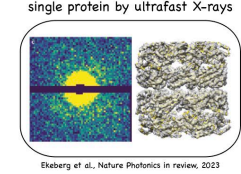
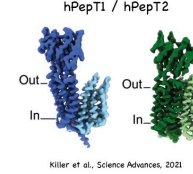
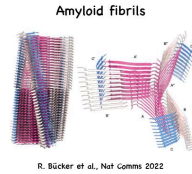
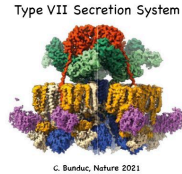
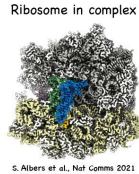
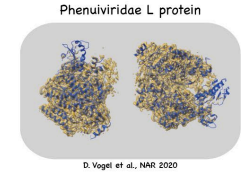
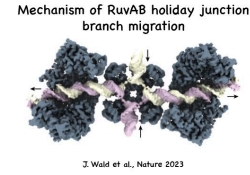
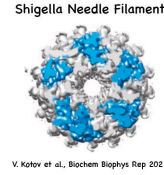
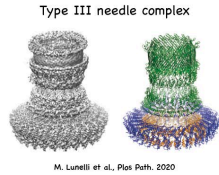
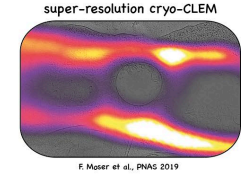
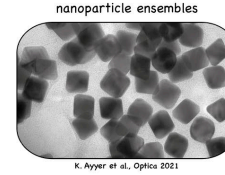
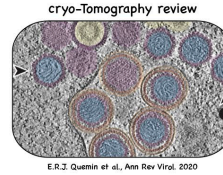
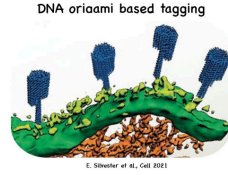
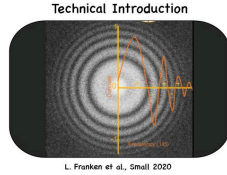
MOF sample by Janina Sprenger, Anastasios Pateras et al.



Time-resolved sample vitrification



Publications from cryoEM TP



Our Internal Advisory Board

Current Members:

- Arwen Pearson (tr-crystallography)
- Thomas Marlovits (electron cryo-microscopy)
- Henry Chapman (coherent diffraction imaging)
- Charlotte Uetrecht (mass spectrometry, samples)
- Maya Topf (integrative modelling)

Regular meetings - every three months.



External Advisory Board(s)

Regular evaluations by SAB

Facility Specific evaluations

Who can get access and how?

- 1 For UHH and consortium members email Ulrike Laugks via cryoem@cssb-hamburg.de to request access; the facility staff will organize an orientation training
- 2 Up to 20 % of available time can be granted to external users, fees apply (Abt. 7)
 - (1) collaborative with user groups or facility staff
 - (2) new technology developments
 - to get a quote or discuss interest, email Carolin Seuring via cryoem@cssb-hamburg.de
- 3 Industry in some cases (method developments)



Team CryoEM



cryoem@cssb-hamburg.de

weekly user meetings!

Carolin Seuring

Head of Technology Platform Cryo-EM

Ulrike Laugks

Specialist Cryo-Tomography (Deputy-Head)

Wolfgang Lugmayr

Staff Scientific Computing

Cornelia Cazey (Katharina Jungnickel*)

Staff Scientist Microscopy

Method development: Amir Banari

CUI-funded scientist „Jetfreezing“

Kay Grünewald : Scientific Director

Those interested in a tour,
join me!

