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Prerequisite training programme for access to high-end cryo-EM facilities for SPA/Tomo | Authors(s):
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Introduction

This document's purpose is to establish a set of training objectives at discrete levels, which define the prerequisite knowledge a user is expected to have before joining eBIC user training. The training objectives do not intend to describe a complete set of competencies to operate a local facilities electron microscope but rather the prerequisite knowledge that is essential for understanding operations carried out on a modern electron microscope at eBIC. Therefore, training should always be carried out by local staff qualified to train on local equipment. eBIC will then refer to these training levels to understand the level of prerequisite training received by a user. To attend user training they must have received Basic Operator Training, and ideally completed Transitional Operator Training. Where this document refers to Thermo Fisher Scientific EPU, the same learning objectives could be applied within open-source solutions such as serialEM or Leginon.

0: Theory training

Defocus range choice

1: Basic Operator Training

Goal:	**To understand how to screen, probably side entry** **Fundamental understanding of electron microscopy**
Method:	Training on a side-entry microscope by local facility manager

Learning objectives:

> Eucentric height
> Focus via minimum contrast method
> Focus via live FFT
> Eucentric focus
> C2 alignment
> Direct alignments: Beam centring
> Direct alignments: Rotation centre and/or Pivot points
> Objective aperture alignment
> Safe use of sensitive detectors and best practise
> Low dose imaging concept
> SPA workflow

2: Transitional Operator Training

Goal:	**Familiarisation with modern electron microscope operation software** **Translate concepts performed in manual collection into automatic collection**
Method:	Training on a modern microscope with EPU/Tomo by local facility manager Show concepts of manual operation but in EPU/Tomo Demonstrate how EPU/Tomo session iterates through these manual operations automatically

Learning objectives:

> Taking a picture using a Preset and navigating the specimen in EPU/Tomo
> 'Manual' low dose imaging in EPU using Presets and Autofunctions
> Single square setup, hole finding and template execution

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3: Independent Operator Training

Goal: **To ensure complete knowledge of current best practise for automatic collection on a Krios**
To ensure efficiency in user automatic collection on a Krios
To ensure competency in all peripheral systems necessary for remote access and analysis
To clarify expectations of user and eBIC local contact during a session

Method: User training on a modern microscope with EPU/Tomo by eBIC facility staff

Learning objectives:

> Grid assessment
> Optimising Presets for specimen
> Image shift calibrations
> Alignments in EPU/Tomo
> Automatic low dose imaging using an 'EPU session'
>> Square selection utilities
>> Hole selection and filtering utilities
>> Template definition and testing
>> Defocus
>> Dose
> Current best practise for speed & quality
> In-line analysis tools
> Additional objectives may include:
>> Tilted collection
>> Multi-grid collection