Cryo EM Single Particle Analysis & Map Interpretation — Hands-on

Learn how modern cryo EM single particle analysis converts noisy micrographs into high resolution 3D maps and interpretable atomic models. You will walk through motion correction, CTF estimation, particle picking, classification, refinement and map interpretation with a focus on quality metrics and practical decision points.

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Session Index

Session 1 — Cryo EM Workflow & Instrument Basics | Session 2 — Motion Correction, CTF & Particle Picking | Session 3 — 2D and 3D Classification & Refinement | Session 4 — Map Interpretation, Validation & Reporting

Session 1

Fee: Rs 8800 Apply Now

Cryo EM Workflow & Instrument Basics

Cryo EM sample preparation and vitrification concepts

grid types and supports | **ice thickness and particle distribution** | **preferred orientation issues**

Microscope and detector overview

electron optics and dose | **direct detectors** | **movie frames and dose fractionation**

End to end single particle workflow overview

motion correction | CTF estimation | classification and refinement

Session 2

Fee: Rs 11800 Apply Now

Motion Correction, CTF & Particle Picking

Motion correction and dose weighting

frame alignment | global and local motion | drift and beam induced motion

CTF estimation and micrograph quality

Thon rings and defocus | astigmatism | resolution estimates from CTF fits

Particle picking strategies

manual, template and reference free picking | false positives and junk rejection | particle extraction parameters

Session 3

Fee: Rs 14800 Apply Now

2D and 3D Classification & Refinement

2D classification and dataset cleaning

class averages and views | removal of ice and junk particles | diagnostics for heterogeneity

Initial model generation and 3D classification

ab initio reconstruction concepts | conformational and compositional classes | symmetry considerations

High resolution refinement and map quality

gold standard FSC | local resolution estimation | anisotropy and preferred orientation checks

Session 4

Fee: Rs 18800 Apply Now

Map Interpretation, Validation & Reporting

Map sharpening, filtering and segmentation

Theory + Practical

Docking and refinement of atomic models into maps

rigid body fitting | real space refinement ideas | map model agreement metrics

Validation, deposition and figure ready reporting

EMRinger and geometry checks | EMDB and PDB deposition | panels and methods text for manuscripts