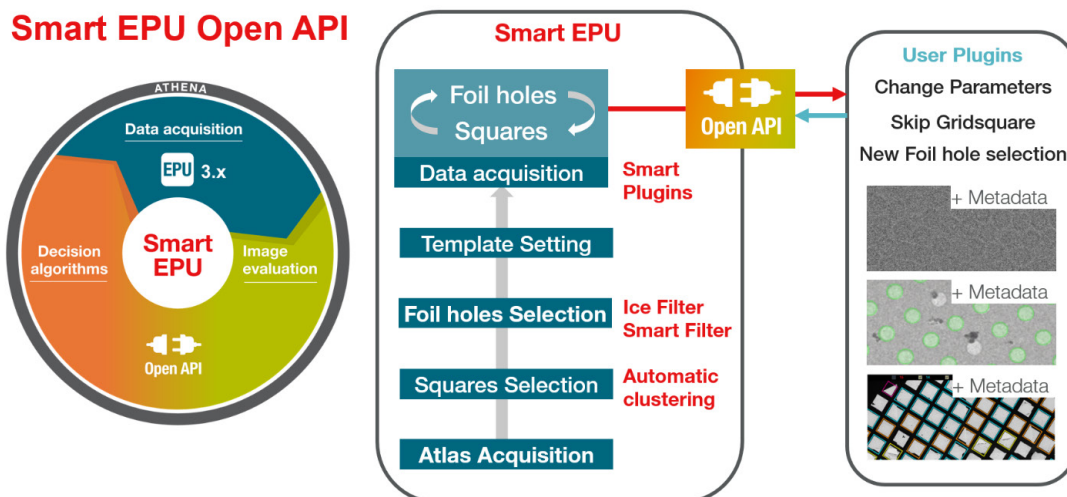


Introducing Smart EPU Open API

Thermo Scientific™ Smart EPU Software was designed to make cryo-EM easier while increasing efficiency and productivity. It provides on-the-fly monitoring of data collection sessions (EPU runs) through image evaluation programs and AI-assisted decision-making Smart Plugins, helping you avoid manual interventions in routine and time-consuming tasks.

To help Smart EPU Software users customize monitoring of data acquisition and still benefit from the powerful capabilities of the platform, we developed Smart EPU Open API, an open application programming interface for Smart EPU Software. This API allows users with programming skills to develop User Plugins, algorithms that evaluate microscope outputs and influence Smart EPU Software in certain critical steps during the execution of an EPU run according to their specific needs.

With Smart EPU Open API, the cryo-EM community can change its own routines and drive innovation.



How does Smart EPU Open API work?

Deployed on the Data Management Platform (DMP) Server, Smart EPU Open API allows you to create User Plugins that modify the course of an EPU run through feedback loops. User Plugins can evaluate data, metadata, and models produced by Smart EPU Software and then alter autofocus measurements, stage waiting time, foil hole selection, and grid square selection. The API is currently limited to these parameters to ensure system stability and prevent unwanted behaviors.

Our python library, Smart EPU Client, makes it easy to write plugins for Smart EPU Open API. It offers access to EPU Software and Thermo Scientific™ Athena™ Software and includes all the tools needed to integrate your plugins.

Software requirements

- EPU Software 3.3 or later
- Athena Software 1.19 or later
- Python 3.6.6 or later (for Smart EPU Client)

Security credentials are required to connect User Plugins to Smart EPU Software. To learn more and get started, contact:

EPUOpenAPI@thermofisher.com

Smart EPU Open API Glossary

Athena Software: Thermo Scientific visual data management platform enabling Smart EPU Software with a web-based UI accessible on local network.

Decisions: Results of the algorithms (plugins) that can influence the EPU run.

DMP: Data Management Platform. Refers to a server connected to Thermo Scientific Cryo-TEMs for managing the output data and providing processing capabilities. Athena Software is configured to run on this server.

Embedded CryoSPARC Live™: An integrated version of CryoSPARC Live™ from Structura Biotechnology Inc. fully integrated into Smart EPU Software. It performs data processing on the fly for image and sample quality evaluation.

EPU Data: Raw images recorded by a camera attached to a Thermo Scientific cryo-TEM and processed Smart EPU images by EQM whenever available.

EPU Data Models: Identified EPU areas of interest (e.g. squares, foil holes) and their status.

EPU Metadata: Provided information about the EPU Data, e.g., acquisition parameters and EQM whenever available.

EPU run: Session of data collection initiated with defined imaging presets.

EPU Software: A component of Smart EPU Software facilitating automated screening and data acquisition for single particle analysis (SPA).

EQM: EPU quality monitor. Smart EPU Software image evaluation program that executes motion correction and CTF-estimation of cryo-EM data, providing image quality metrics.

MPC: Microscope PC. A computer connected with Thermo Scientific Cryo-TEMs.

Smart EPU Client: A python library to assist developers in writing User Plugins using the Smart EPU Open API.

Smart EPU Open API: Open application programming interface (API) of Smart EPU Software that allows development of User Plugins for Smart EPU Software. It is a REST API offered through the DMP server.

Smart EPU Software: Thermo Scientific platform to increase efficiency, productivity, and ease of use for cryo-EM. Composed of EPU Software, EPU Multigrid, image evaluation programs (EQM and Embedded CryoSPARC Live™), Smart Plugins, and Athena Software.

Smart Plugins: Thermo Scientific algorithms that monitor data acquisition on the fly. Executed by Smart EPU Software based on images and associated metadata.

 Learn more at thermofisher.com/smartepu

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