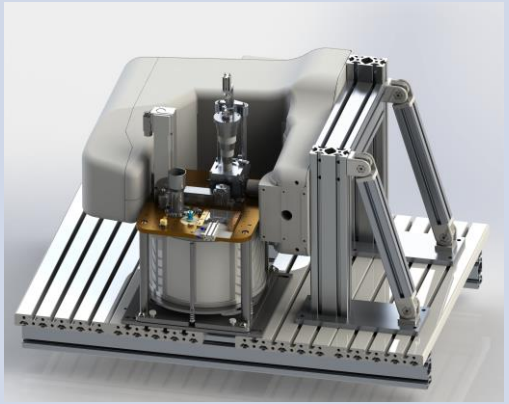
Abstract/Description



Cryo-Electron Microscopy is one of the major imaging technologies for structural biology. While pushing the limits of the microscopes towards higher resolutions and faster data-collection, the sample preparation stage still remains poorly automated and inaccessible to untrained users. Today various developments are ongoing worldwide to make the Cryo-EM sample grid preparation easier, faster and more reliable (e.g. Vitrojet by CryoSol, Chameleon by spt labtech, etc.) while others propose time-resolved compatible, less user-friendly solutions (TrEM*) but no machine proposes a universal approach. Within this landscape we started the development of our EasyGrid machine in 2017 aiming to find a general solution to the actual challenges encountered in the Cryo-EM sample grid preparation, by proposing a fully automated preparation procedure that uses in-line plasma treatment, picoliter drop dispensers, jet vitrification and automated storage. Following the successful completion of a proof of principle study using model proteins, today the machine is accessible to external partners for pilot projects. In addition, a separate prototype has been developed for grid quality control at cryogenic temperatures. With this machine a nanometer scale thickness map can be obtained of the sample grids.

*Frank J. Time-resolved cryo-electron microscopy: Recent progress. J Struct Biol. 2017 Dec;200(3):303-306. doi: 10.1016/j.jsb.2017.06.005. Epub 2017 Jun 16. PMID: 28625887; PMCID: PMC5732889.

Technology Transfer proposal BSBF 2022

Original/Potential Field of Application

- Cryo-EM sample grid preparation for single particle analysis

- Fully automated cell vitrification for Cryo-Electron Tomography
- On-grid compound mixing and time-resolved vitrification to study dynamic systems
- Light Triggered time-resolved vitrification to study dynamic systems

IPR Status & Contact Information

- Patent of the sample thickness measurement system: https://data.epo.org/publication-server/document?iDocId=6804623&iFormat=0

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