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Alpion CryoSolutions
Advancing cryo-electron microscopy from static structures to dynamic molecular insight

In a nutshell

Cryo-electron microscopy has revolutionized structural biology by allowing researchers to visualize proteins at near-atomic resolution. However, current cryo-EM technology captures molecules only in static equilibrium states. In reality, proteins are dynamic: they move, change shape, and interact with other molecules in ways that determine how they function. These motions are central to processes such as enzyme activity, signal transduction, viral infection, and drug binding. Yet existing instruments struggle to capture these rapid structural changes, particularly at short timescales where many biologically important events occur.

Alpion develops a portfolio of patented technologies that enable time-resolved cryo-EM across multiple experimental regimes. Our solutions allow researchers to capture proteins in motion with microsecond precision, either by transiently melting vitrified samples to allow dynamics unfold or by triggering dynamics directly during sample preparation. In addition, we provide dedicated solutions to overcome preferred particle orientation, one of cryo-EM's major technical bottlenecks.

Together, these innovations expand cryo-EM from static imaging to dynamic structural analysis, unlocking new possibilities in drug discovery, biotechnology, and AI-driven protein modelling.

Why is our technology important?

Conventional cryo-EM captures only static snapshots. This creates critical limitations:

- Missing transient intermediate states
- Incomplete understanding of reaction mechanisms
- Limited access to dynamic drug-binding conformations

As a result, key functional states often remain invisible, limiting therapeutic innovation and biological insight. There is currently no commercially available solution that enables robust, time-resolved cryo-EM with broad applicability across different timescales and experimental workflows.
Alpion closes this gap by providing complementary technologies that enable dynamic structural studies and improve data quality within existing cryo-EM infrastructures.

The benefits of our solution

Alpion will provide technologies that enable:

- Time-resolved cryo-EM experiments across multiple timescales (from microseconds to seconds)
- Direct capture of short-lived intermediate conformations
- Triggering of dynamics during sample preparation
- Overcoming preferred particle orientation
- Improved three-dimensional reconstructions
- Seamless integration into existing cryo-EM workflows

Keywords

Time-resolved Cryo-EM, Cryo-EM, Scientific Instrumentation, Protein Dynamics, Dynamic Structural Biology, Laser Melt&Freeze, Overcoming Preferred Particle Orientation

Founding Team

Constantin Krüger
Mischa Flór

Linkedin page: www.linkedin.com/company/alpioncryo/
Website: www.alpioncryo.com/