

Structural Biology for Industry – an Integrated Offer

Structural biology enables scientists to look in detail at the structure and behaviour of cells and their macromolecular components, such as proteins and nucleic acids. To do so requires very powerful analytical tools to capture high resolution information and uncover details about biological function, the effect of disease or genetic variations and explore how these can be modified through the use of pharmaceutical drugs.

X-ray crystallography remains a key tool for the characterisation of macromolecules, small molecules, complexes and ligand binding, while complementary techniques such as electron microscopy and small angle X-ray scattering are increasingly leading to a more complete understanding of the process in question.

Here at Diamond we provide access to the very latest generation of microscopes and high performance crystallography instrumentation along with the expertise of our dedicated team of scientists. Our unique facility enables users to combine a range of approaches

using multiple techniques, across one site. So whether your samples are in crystal form, in solution or in their native state, we can help you to determine the best techniques/or combination of techniques to meet your research needs.

Macromolecular Crystallography

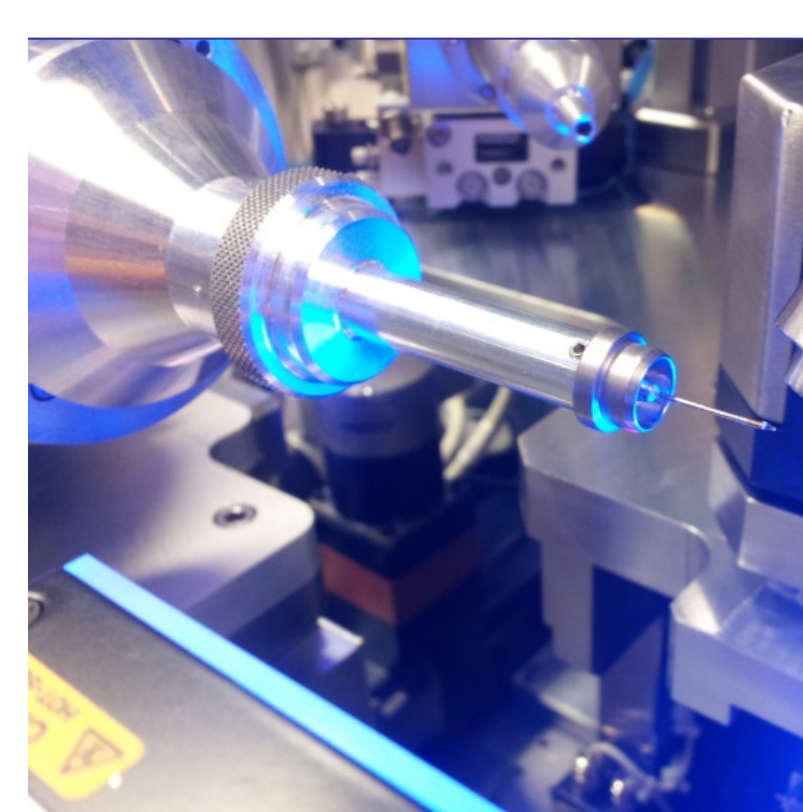
5 operational MX beamlines

3 fully tuneable (5-20 keV range) for MAD/SAD, 1 fixed λ (Br-edge), 1 long wavelength (3-8 keV).

In development: 1 *in situ* and 1 submicron beamlines.

Ancillary techniques

- Routine data collection from cryo-cooled samples and crystallisation plates



- Containment measures for samples in biohazard group 2 & 3
- Crystal dehumidifier for sample humidity control
- UV-VIS absorption spectroscopy
- Kappa goniometry.

Automated data collection and mail-in service

Rapid data collection from a large volume of routine samples benefiting from fast sample changers, precise automated loop centring and fast readout detectors.

Data from non-routine samples (very small, in LCP or requiring MAD/SAD phasing) can be collected and processed by highly qualified Industrial Liaison scientists.

"In crystallo" Fragment Screening - XChem

Soaking compounds

Rapid crystal detection from crystallisation tray(s) and selection of coordinates for compound transfer. An acoustic liquid dispenser distributes each compound to its target location (~800 compounds in 30 min).

Crystal harvesting

An X and Y motorised stage accelerates and facilitates

the crystal harvesting while keeping a track record of the whole experiment (> 100 crystals/hr).

Unattended data collection

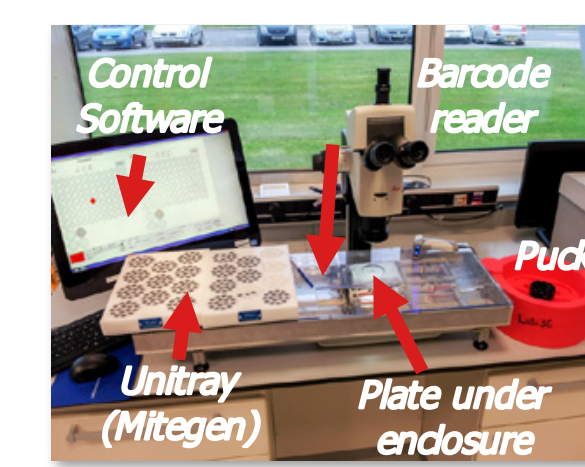
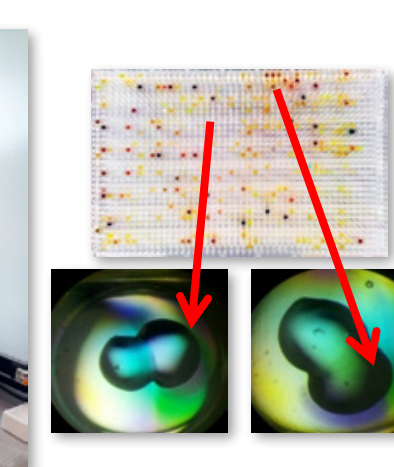
Combination of a fast, high capacity sample changer, a rapid and precise loop centring and a Pilatus 6M detector to a bright X-ray beam on I04-1 (30 samples/hr).

Hit identification (PanDDA)

The presence of bound ligands is confirmed easily via high performance auto processing pipelines.



Echo 550 and Fragments in 1536 well plate



Crystal mounting station



Loop centring routine and I04-1 end-station

eBIC for Industry

Located within the electron-Bio Imaging Centre at Diamond, a dedicated facility for industrial cryo-EM has been established in partnership with leading microscope manufacturer Thermo Fisher. Bringing together the experience of the Diamond Industrial Liaison Team in supporting drug discovery science and the Thermo Fisher experience in state-of-the-art cryo-electron microscopy, the combination of skills and techniques on offer provides a unique proposition for industrial researchers.

Benefits of cryo-EM

- Achieve structural insights without the need to crystallise your target protein
- Resolve protein complexes and protein-ligand interactions
- Study macromolecules in as close to native state as possible
- Study much larger and complex assemblies within their cellular context
- Identify and characterise dynamic biological states by observing multiple conformations.

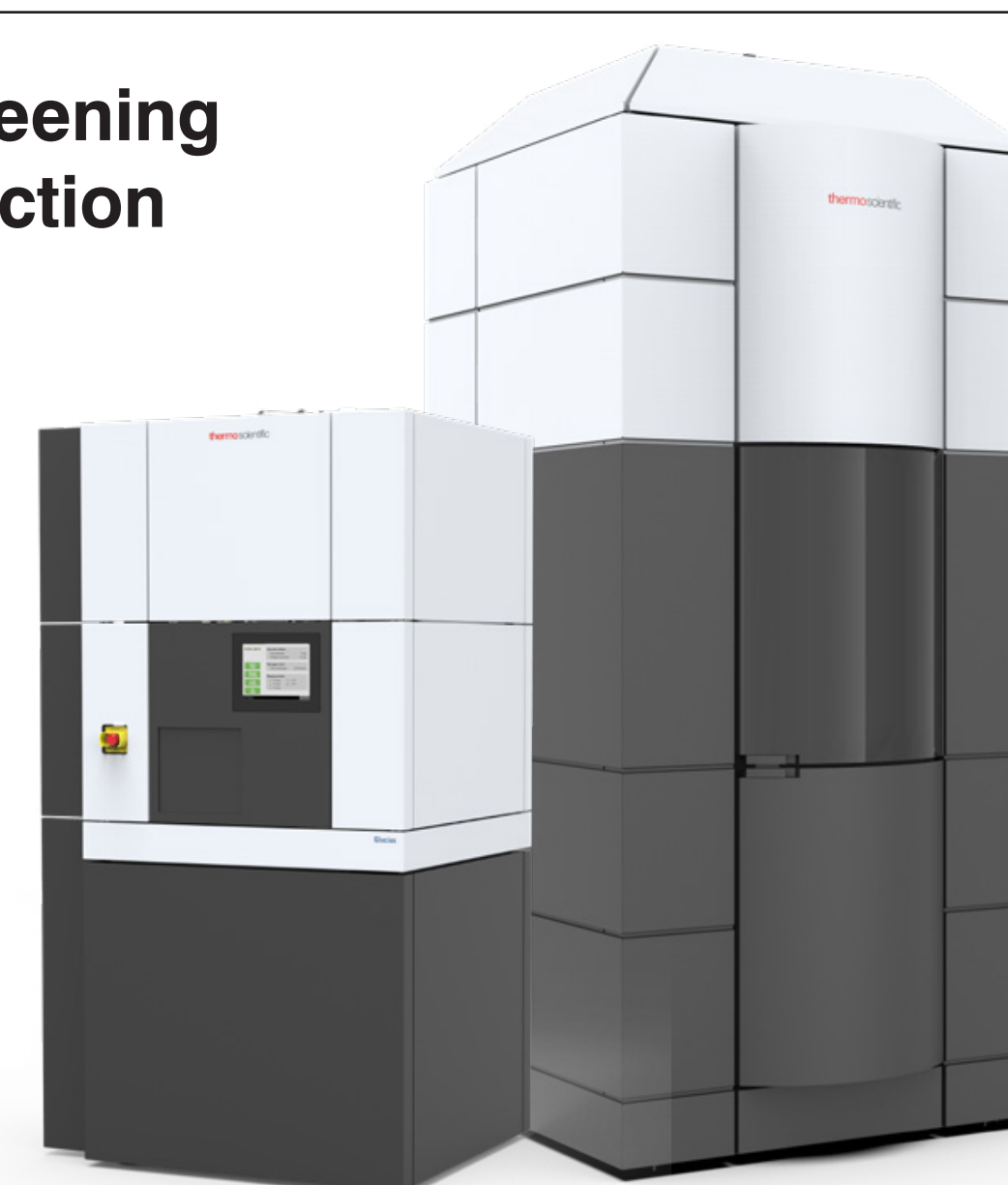
Experienced scientific support

A team of microscopists, experienced in working with industry, can support the adoption or application of cryo-EM in challenging research projects.



Dedicated screening and data collection microscopes

The facility will house the latest generation of cryo-transmission electron microscopes and detectors providing high-resolution structural insights to single-particle and tomography projects.



Glacios™ Krios™ G3i

Thermo Fisher
SCIENTIFIC

Features	Benefits
Cryo-Autoloader for workflow compatibility between instruments	Increased screening throughput with minimal contamination
Latest generation of direct electron detectors (K3 & Falcon 3EC)	Improved contrast and ultimate biological structure resolution
Improved cryo anti-contamination design	Longer acquisition times (5 days without contamination)
Phase-Plate equipped	Possible to study smaller proteins (< 150 kDa)
Improved thermal and mechanical stability	Optimal performance during prolonged high-resolution data collection
EPU automated grid screening and data collection software	Increased screening/data collection rates and reduced training times

Why use eBIC for Industry?

- Integration with Diamond's synchrotron-based complementary techniques
- Dedicated microscopes and experienced staff to support user requirements
- Access to the latest generation of microscopes and detectors
- In-house screening facility to lower the risk and costs of cryo-EM data collection
- Operational support with the capacity to confidentially handle large numbers of industrial experiments and visits
- Secure, high-performance scientific computing enabling real-time evaluation of data quality during collection
- On-site manufacturer support and expertise from Thermo Fisher.

Full service offerings

The facility is equipped to offer a range of services to both experienced groups and new entrants to the field from grid preparation to analysed data.

