

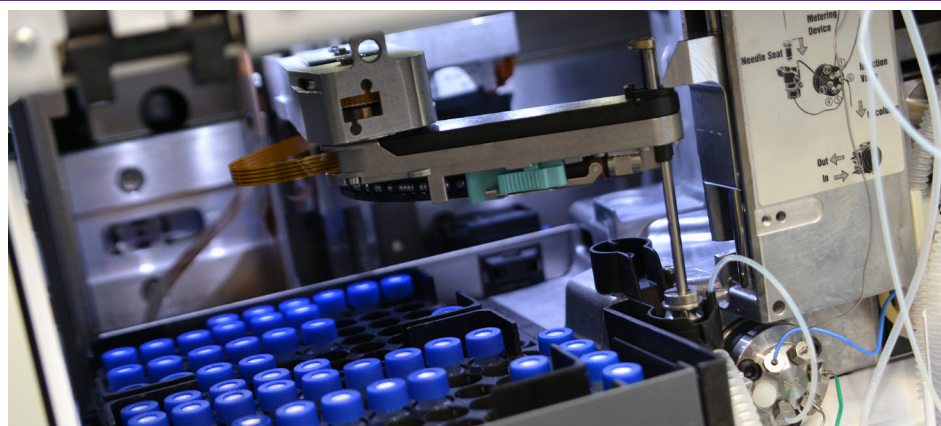


Research Facilities

Analytical Research Facilities

Analytical research facilities within the Faculty of Life Sciences

- Bioimaging
- Bioinformatics
- Biomolecular Analysis
- Electron Microscopy
- Flow Cytometry
- Fly Facility
- Genomic Technologies
- Histology
- Macromolecular Crystallography
- Mass Spectrometry
- Protein Expression
- Transgenic Technologies



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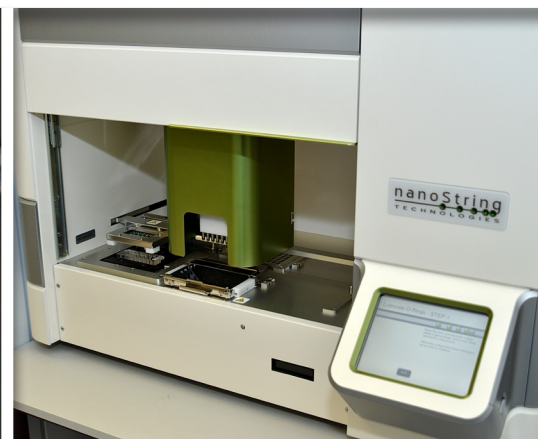
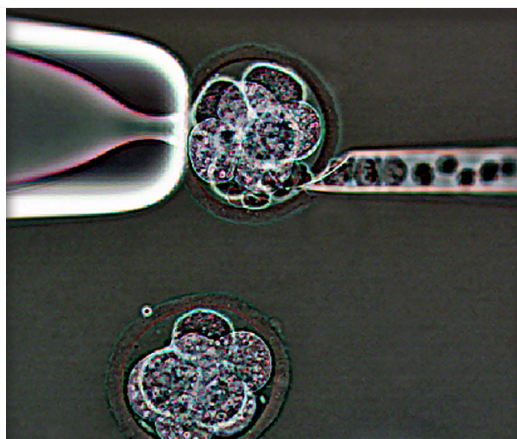
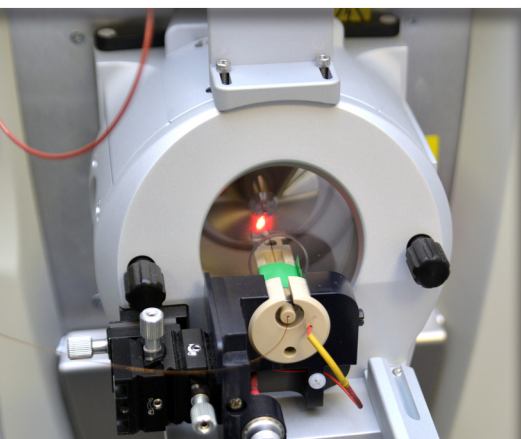
Supporting research within life sciences

The Faculty of Life Sciences maintains a broad range of state-of-the-art analytical research facilities. These facilities, available to all staff and students, are maintained by dedicated personnel who can provide expertise in planning and running experiments, interpreting data, and technical support and training for routine and specialist techniques.

Through the provision of centralised facilities, housed in custom-built laboratories, all researchers in the Faculty have access to the best available equipment that would be beyond the budgets of most individual research groups. There is over £20M of equipment in these facilities, which are maintained and continually updated through a mixed portfolio of external research grants and Faculty/University contributions.

Our facilities allow investigation of biological phenomena at the molecular and cellular levels through to organismal studies. Scales of investigation range from single molecules, through to genome and proteome-wide studies.

Through combining the use of different facilities it is possible to apply an integrated cross-interdisciplinary approach to any given research problem.



Bioimaging

The Bioimaging Facility offers state of the art microscopy to users from across the Faculty of Life Sciences and the University. Life science research is often focused on live cell imaging and the facility addresses this in the equipment provided, with most of the systems allowing multipoint visiting over prolonged periods of time using motorised XYZ, autofocus, temperature, and CO₂ control. The facility provides a range of systems from digital whole slide scanners, manual fluorescent microscopes, timelapse confocals through to *in vivo* multiphoton confocal systems.

Bioinformatics

The Bioinformatics Facility works closely with the Genomic Technologies Facility and provides support for analysing genomic, epigenomic, and transcriptomic data. Levels of support range from routine data analysis including presentation of results for publication, through to project-specific integration of genome-wide datasets. The Bioinformatics Facility also assists with automation of data pipelines and genomics software support. Training of staff in analysis procedures is routinely given.

Biomolecular Analysis

The Biomolecular Analysis Facility aids in sample analysis, grant applications, consultation, training, method development and publications in the field of molecular biophysics. The highly technical instrumentation available within the facility includes methodologies such as surface plasmon resonance with the newest Biacore T200 and the innovative Bio-Rad XPR-36, as well as surface analysis instruments such as dual polarisation interferometry which is able to analyse minute changes within the evanescent field above customisable surfaces. The facility also houses several instruments for the analysis of macromolecular hydrodynamics and light scattering techniques.

Electron Microscopy

The Electron Microscopy Facility houses four electron microscopy systems: an FEI Tecnai 12 Twin, an FEI Tecnai 12 Biotwin, a new FEI Tecnai G2 Polara 300kV FEGTEM, and FEI Quanta 250 with Gatan 3View system. The facility also provides a full range of sample preparation equipment including ultramicrotomes, cryo-ultramicrotomes, knife makers, coating units, high pressure freezing equipment, an FEI Vitrobot plunge freezing unit, and the Leica freeze substitution systems.

Flow Cytometry

The Flow Cytometry Facilities contains cutting edge cell analysis technology. With six analysers and two high speed cell sorters, up to 18 separately labelled markers can be measured on, typically, 10-50,000 individual cells to provide high-throughput analysis of cell characteristics. In addition, cells can be isolated aseptically to high purity from mixed samples in order to perform downstream biochemical or genetic characterisation, or for further culturing.

Fly Facility

The Manchester Fly Facility is one of the largest fly facilities in the UK, comprising 13 groups using *Drosophila* in a broad range of scientific research areas. This dedicated state-of-the-art facility, and the unique expertise therein, is open to all scientists who already use fruit flies or intend to expand their research to *Drosophila*. Resources include constant temperature rooms and incubators for fly storage, dedicated work stations for classical genetic work, fluorescent microscopes, and a supply of consumables for fly work. The facility offers comprehensive training and advice on all *Drosophila* related experiments.

Genomic Technologies

The Genomic Technologies Facility was established to provide access to cutting-edge, post-genomic technologies. The facility supports five main technology categories: Next-generation sequencing, Affymetrix GeneChip Microarrays, real-time PCR instruments (including Fluidigm BioMark HD), RNAi library screening, and digital nucleic acid analyses (NanoString Technologies). Also, the facility has extensive liquid handling and automation capacity, together with instrumentation for quantification and sample QC. The facility operates in close association with the Bioinformatics Facility to facilitate a complete service from experimental design through to bioinformatic analyses.

Histology

The Histology Facility provides the knowledge, expertise, and equipment to take tissue from animals, or cells in culture, to stained, mounted, ready to analyse tissue sections, using light and fluorescent techniques, histochemistry, immunohistochemistry, and cytochemistry. Full on-site training in techniques, use of equipment, and service work is provided by staff with decades of knowledge in both clinical and non-clinical research, and commercial sectors.

Macromolecular Crystallography

The Macromolecular Crystallography Facility provides a complete service pipeline, from purified protein to X-Ray crystal structure. Meeting the often rate-limiting challenge of crystallogenesis are two complementary high throughput nanolitre dispensing platforms (Mosquito & Phoenix), allowing rapid screening and optimisation. The facility houses two rotating anode X-ray generators and associated data collection equipment. These in-house facilities are further supplemented with regular synchrotron access.

Mass Spectrometry

The Mass Spectrometry Facility has six complementary mass spectrometry systems and a staff of six highly experienced analytical biochemists and informaticians. The major approaches within the facility are global proteomics (Thermo Orbitrap Elite), high sensitivity/selectivity targeting (ABSciex 6500 Q-Trap with Selexion), and methodologies for protein identification/characterisation and metabolite profiling. The facility provides high performance and easily accessible and affordable support to biological researchers, whether new to mass spectrometry or highly experienced.

Protein Expression

The Protein Expression Facility provides a comprehensive resource for the cloning and high-level production of recombinant proteins from microgram to gram quantities. Four expression systems are available: bacteria, yeast, insect, and mammalian cells, to help cater for the varying complexities of protein folding and modifications. By using extensive solubility screens the facility staff can quickly identify optimal construct designs and protein expression conditions. In-house training courses are run on a regular basis.

Transgenic Technologies

The Transgenic Unit provides advanced transgenic technologies together with core animal husbandry services. Core services include cryopreservation, embryo implantation, IVF based retrieval, expansion, and quality control. To generate *de novo* transgenic lines we utilise laser assisted embryonic stem (ES) cell (morula microinjection and DNA pronuclear injection). To support this, the unit has a dedicated ES cell culture suite. The unit offers project consultations and guidance regarding new and emerging transgenic methodologies, with particular emphasis on the genomic editing potential of CRISPR/Cas or TALENs sequence specific nucleases.