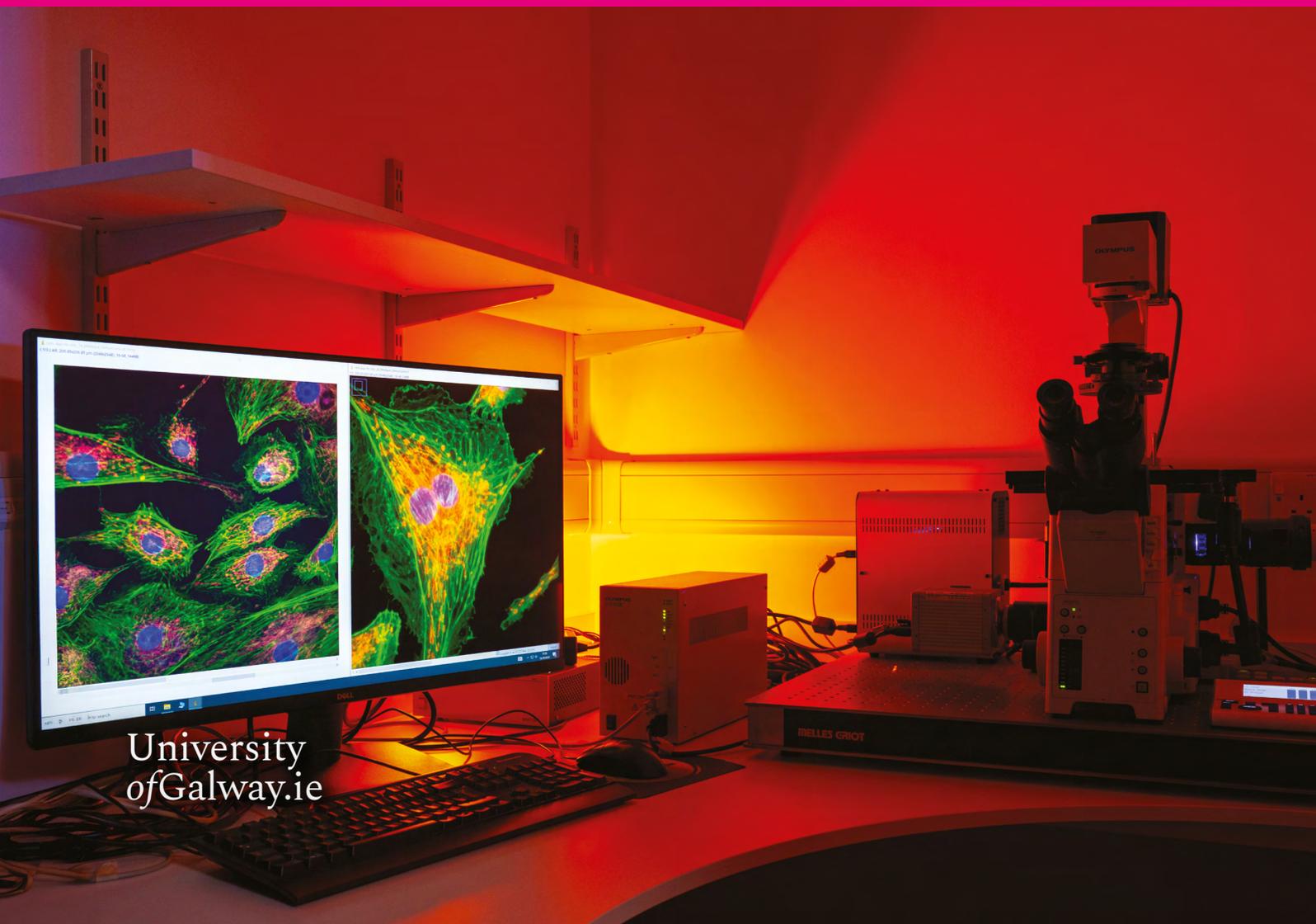




OLLSCOIL NA GAILLIMHE  
UNIVERSITY OF GALWAY

# Technology Services Directorate



University  
ofGalway.ie

# TSD Overview

The Technology Services Directorate (TSD), at University of Galway integrates and manages research facilities, providing access to instruments, services and expert consultation and training to researchers.

These facilities are available on a fee-for-service basis to all investigators and researchers, as well as to a wider external community. By providing access to shared infrastructure and expertise, the TSD is enabling world class research by consolidating and streamlining access to essential research tools and services across the university driving scientific outputs. It also supports publications and funding applications, as well as extensive training for the research community.

The TSD provides core facilities and technology services of relevance to the broad area of biomedical engineering science, underpinning research aligned to the Institute for Health Discovery and Innovation and the Institute for Clinical Trials, and providing support to both members and non-members of the institutes, as well as to external users.

## Mission Statement

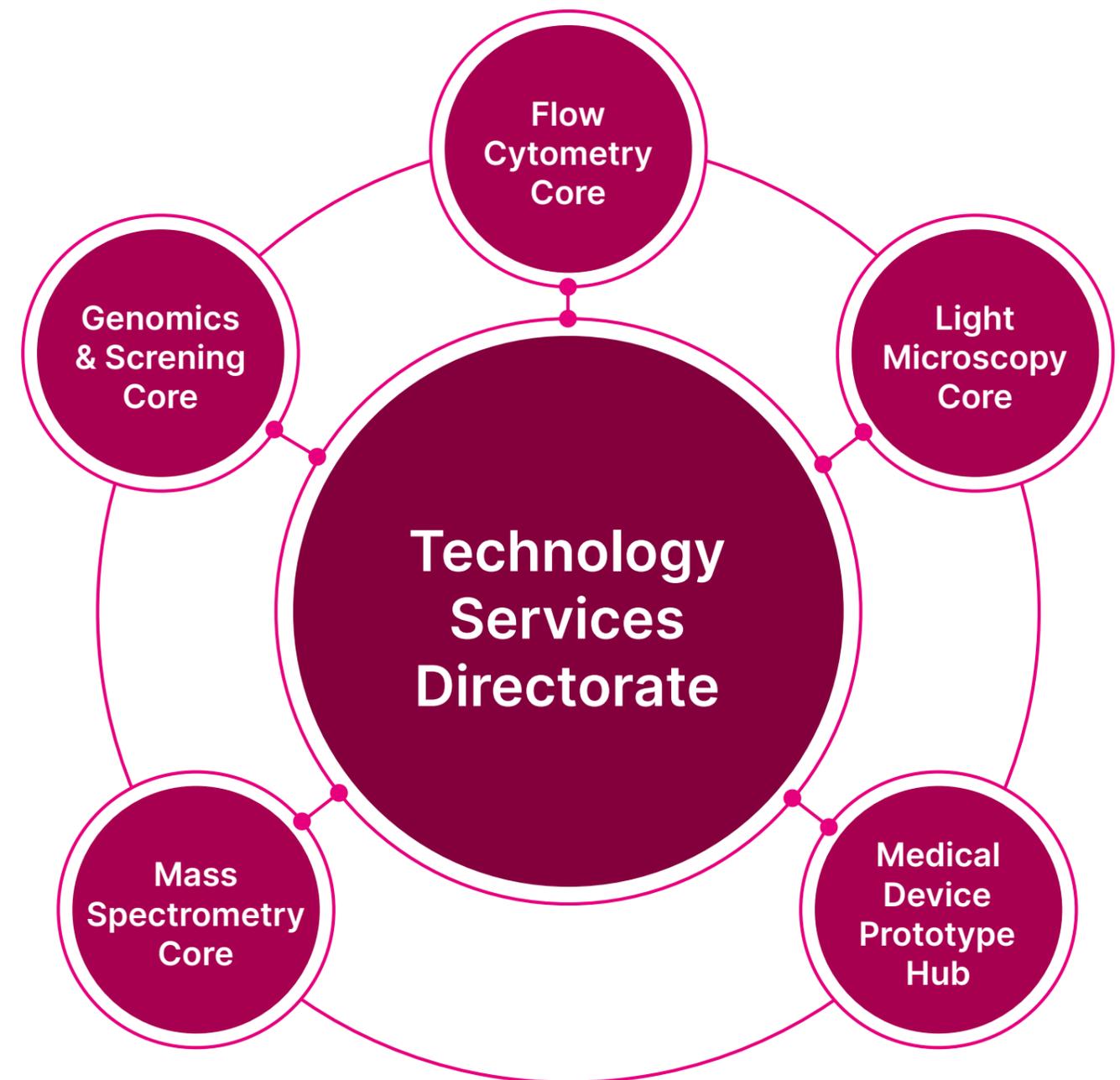
*“Our mission is to advance University of Galway’s research excellence by creating and implementing a coordinated ecosystem of state-of-the-art core facilities. We aim to achieve this by leveraging the expertise of highly experienced technical professionals, ensuring operational excellence, and making strategic decisions on infrastructure and investments to support groundbreaking research and innovation.”*

**Aoife Duffy**

Director, Technology Services Directorate

# TSD Services

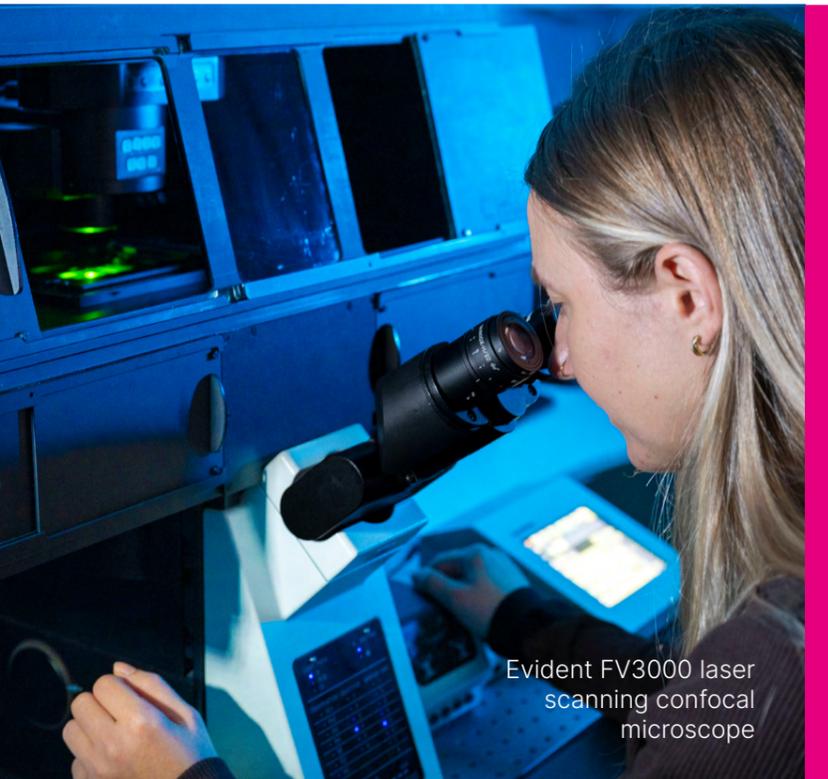
The TSD currently has five cores within the Directorate and each one of these cores has state-of-the-art equipment in-situ, which are outlined below. In addition to the equipment, each core has a highly experienced and specialised technical officer(s) who manages each core and provides training, consulting and research support for all users both internally and externally to the university.



# Light Microscopy

The Light Microscopy Facility specialises in basic and advanced fluorescence microscopy techniques. Microscopy is the gold standard technique for the morphological analysis of cells and tissues. The use of immunofluorescence staining and fluorescence microscopy allows for targeted analysis of proteins of interest in fixed samples. Live cell microscopy can be employed to study dynamic biological processes in real-time.

In the facility we work with a wide range of sample types, which are primarily biological such as cells, tissues, bacteria or small multicellular organisms mounted with coverslips. We can also image more advanced samples such as 3D cell-laden gels, 2D and 3D live cultures, 3D spheroids and organoids. Outside of biological samples we work with various materials using raman spectroscopy. With this technique we can acquire brightfield images of a material and create an overlay containing its chemical fingerprint, also known as the raman spectrum.



Evident FV3000 laser scanning confocal microscope



## Contact:

### Email

microscopy@universityofgalway.ie

## Equipment

### Zeiss Elyra 7 Lattice SIM

Inverted super-resolution and fast live cell imaging.

### Leica Stellaris Dive Falcon

Upright laser scanning confocal, multiphoton and fluorescence lifetime imaging.

### Evident FV3000

Inverted laser scanning confocal, live cell imaging.

### Evident FV1000

Inverted laser scanning confocal.

### Olympus IX71

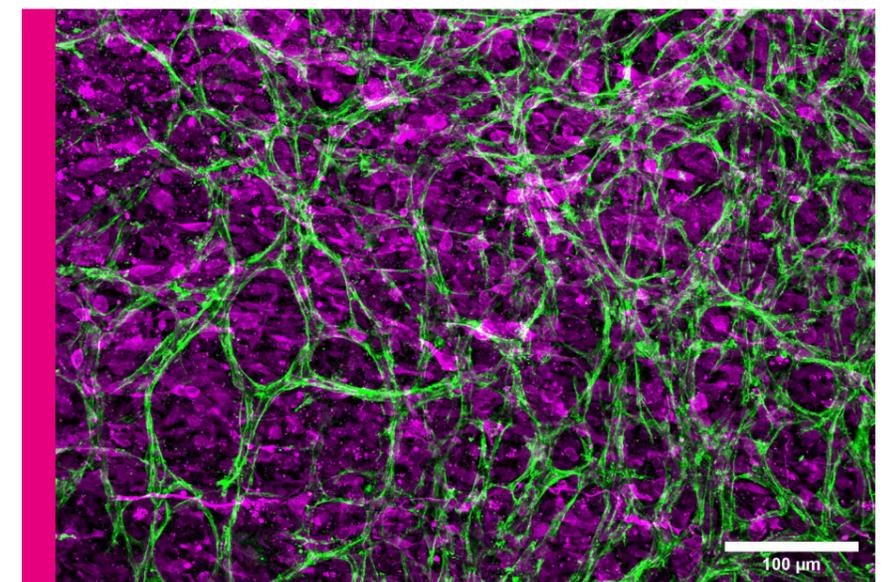
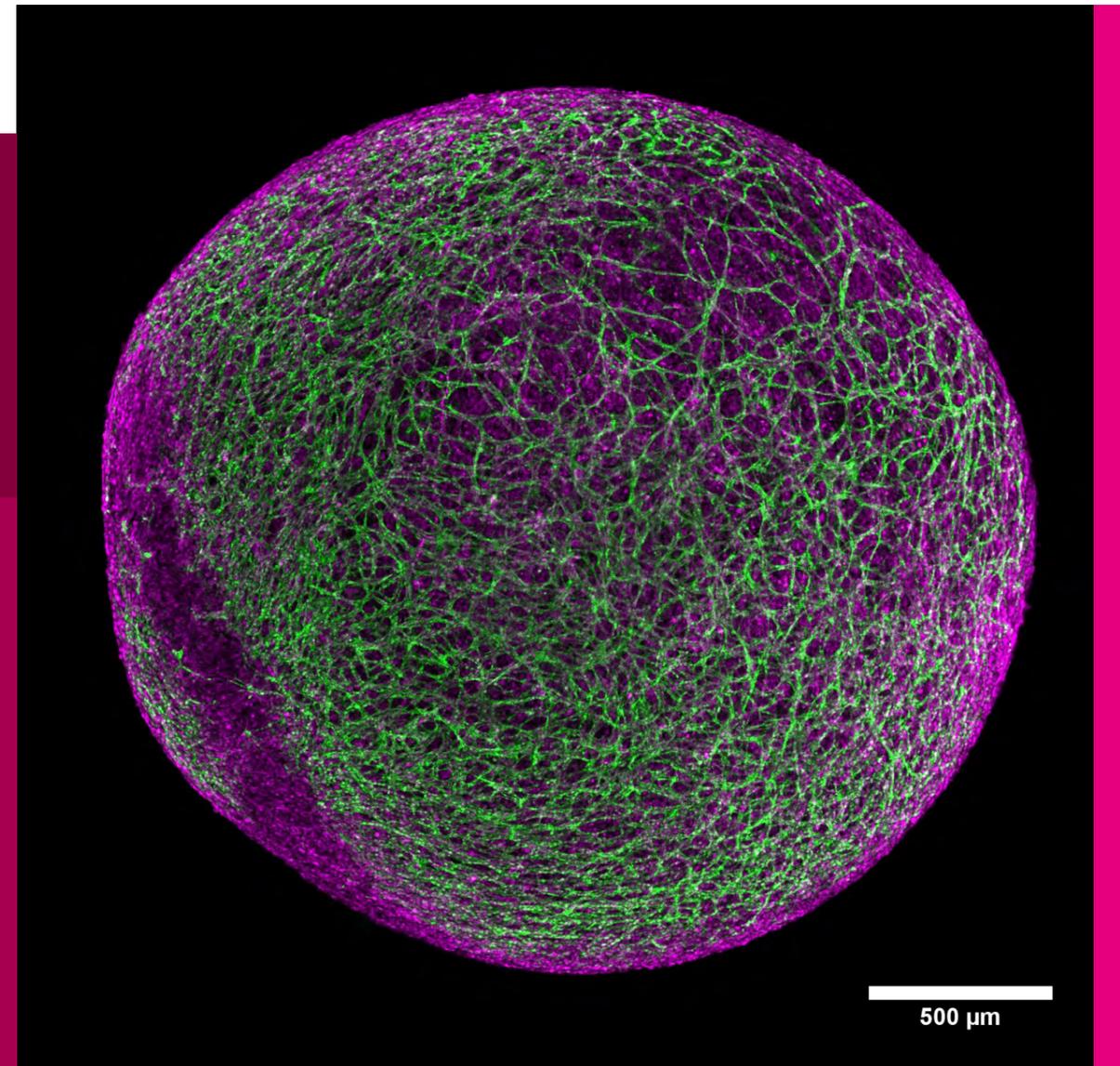
Inverted widefield fluorescence.

### Nikon Eclipse

Upright widefield fluorescence and darkfield optics.

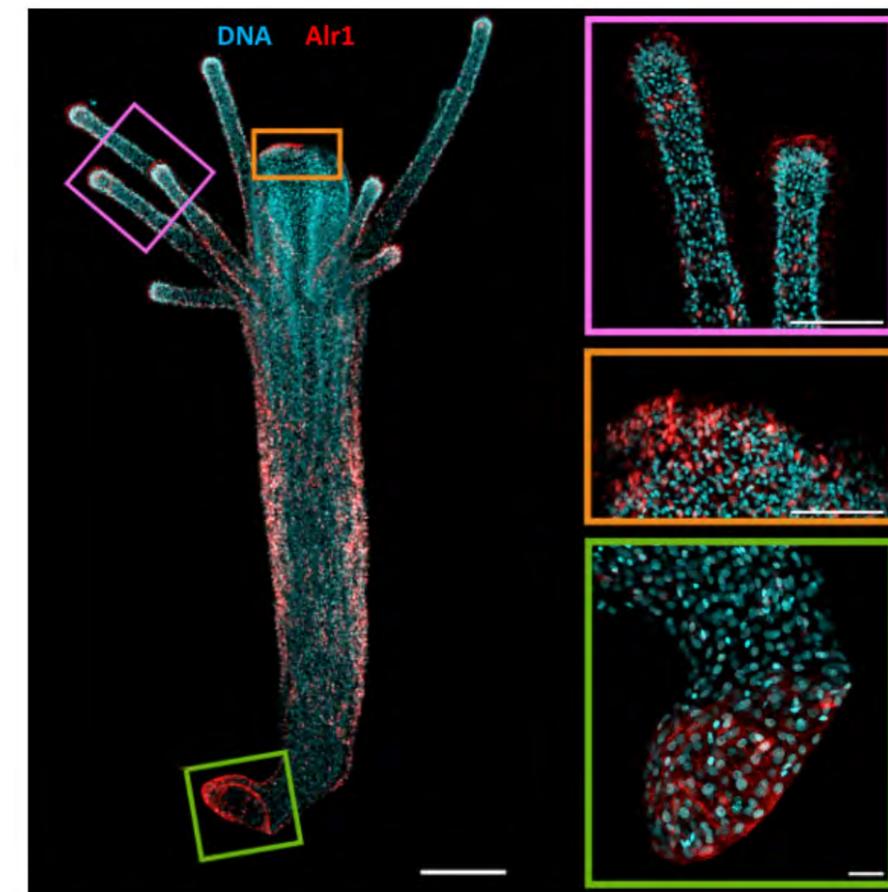
### Witec Alpha500

Upright confocal raman spectroscopy.



Cerebral organoid with induced multicellular endothelial networks. Staining shows vascular like networks (green) and neurons (magenta). Image taken using the Evident FV3000 laser scanning confocal microscope. CerebroMachines Lab led by Dr. Mihai Lomora, published in 2025, Journal of Advanced Science.

System	Type/ Technique	Main Features
Zeiss Elyra7 SIM	Super-resolution	Inverted structured illumination microscope with an environmental chamber for live cell imaging. Super-resolution with resolving power below 100 nm. <b>Samples types:</b> fixed and live cell monolayers, thin tissue sections, nanoparticles and extracellular vesicles, unicellular organisms. <b>Sample carriers:</b> slides mounted with a coverslip, multi-well dishes.
Leica Stellaris Dive Falcon	Confocal multi-photon Fluorescence lifetime imaging	Upright laser scanning confocal microscope with an environmental chamber for live cell imaging. <b>Samples types:</b> fixed cell monolayers, thin and thick tissue sections, small and large spheroids and organoids, large cell-laden gels, small multicellular organisms. <b>Sample carriers:</b> slides mounted with a coverslip, petridishes with large gels (multiphoton).
Olympus FV3000	Confocal	Inverted laser scanning confocal microscope with an environmental chamber for live cell imaging. <b>Samples types:</b> fixed and live cell monolayers, thin and thick tissue sections, small spheroids and organoids, small multicellular organisms. <b>Sample carriers:</b> slides mounted with a coverslip, multi-well dishes.
Witec Alpha500	Raman spectroscopy	Upright confocal raman microscope. <b>Samples types:</b> variety of biological and chemical samples such as tissue sections, polymers, powders <b>Sample carriers:</b> quartz slides.
Olympus IX71	Widefield	Inverted widefield fluorescence microscope <b>Samples types:</b> fixed and live cell monolayers, thin tissue sections. <b>Sample carriers:</b> slides mounted with a coverslip, multi-well dishes.
Olympus FV1000	Confocal	Inverted laser scanning confocal microscope <b>Samples types:</b> fixed and live cell monolayers, thin and thick tissue sections, small spheroids and organoids, small multicellular organisms. <b>Sample carriers:</b> slides mounted with a coverslip, multi-well dishes.
Nikon Eclipse	Widefield Darkfield	Upright widefield fluorescence microscope with darkfield add-on <b>Samples types:</b> fixed cell monolayers, thin tissue sections, small multicellular animals. <b>Sample carriers:</b> slides mounted with a coverslip.



*Hydractinia symbiolongicarpus* feeding polyp. *Hydractinia* is a cnidarian, a close relative of jellyfish and corals. Staining shows DNA (cyan) and Alr1 protein (red). Coloured squares represent magnified regions of the polyp, tentacles (magenta), mouth (orange) and growing stolon (green). Image taken using the Evident FV3000 laser scanning confocal microscope. Prof. Uri Frank lab, Published in 2025, Nature Communications.



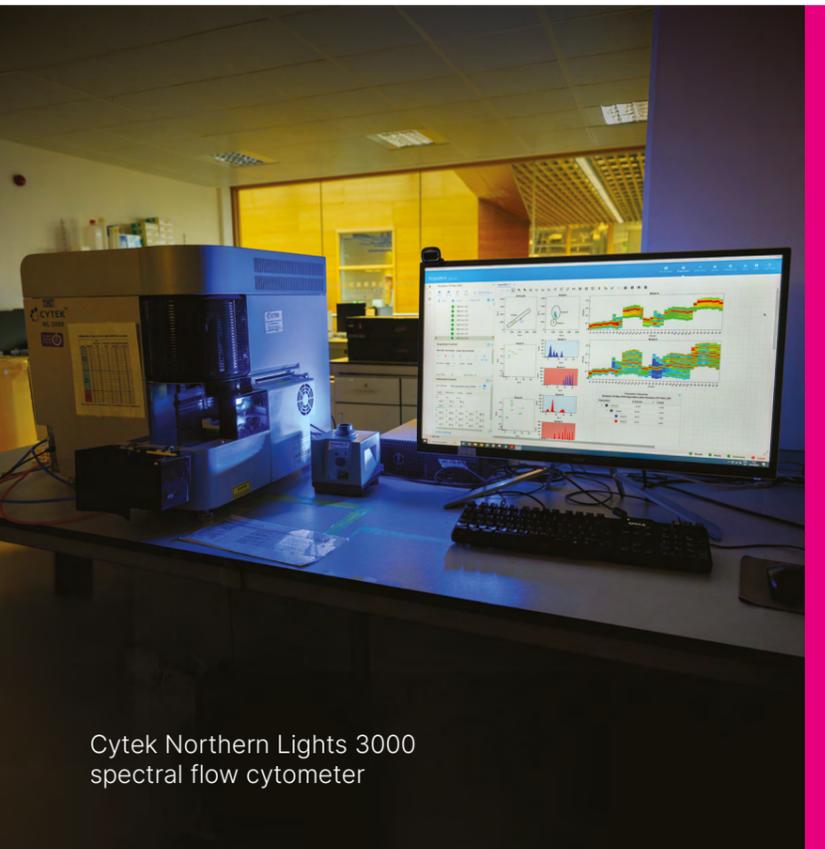
Leica Stellaris Dive FALCON laser scanning confocal microscope with multiphoton and fluorescence lifetime imaging

# Flow Cytometry

Flow cytometry is a powerful, flexible and widely used research technology that allows for multi-parameter phenotypic analysis of complex mixes of cells or particles in suspension. Its applications range across the fields of biological, engineering, environmental and biomedical sciences. Commonly used applications include DNA cell cycle analysis, apoptosis/necrosis, ploidy determination, cell surface immunophenotyping, intracellular protein expression and calcium flux assays.

Fluorescence activated cell sorting, FACS, allows the physical separation and purification of cell populations for further procedures such as cell culture, RNA and protein expression.

Services offered include training for autonomous usage, assisted cell sorting, data analysis suite and technical support and assistance.



Cytek Northern Lights 3000 spectral flow cytometer



## Contact:

**Email**  
flowcytometry@universityofgalway.ie

## Equipment

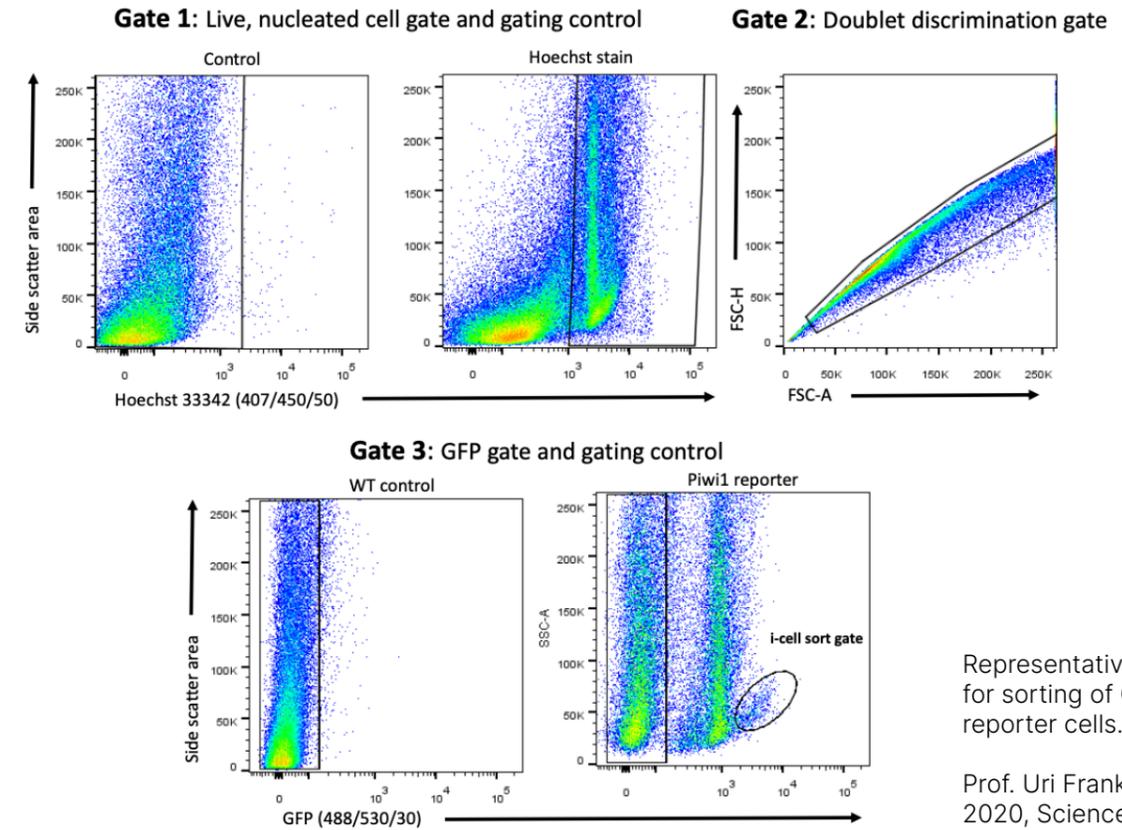
**BD Accuri C6 Sampler Plus**  
Analytical flow cytometer.

**Cytek Biosciences Northern Lights 3000**  
Spectral flow cytometer.

**Cytek Biosciences Northern Lights 2000**  
Spectral flow cytometer.

**BD FACS Canto II**  
Analytical flow cytometer.

**ThermoFisher Bigfoot**  
Spectral Cell Sorter.



Representative gating strategy for sorting of GFP+ transgenic reporter cells.

Prof. Uri Frank lab, Published in 2020, Science.

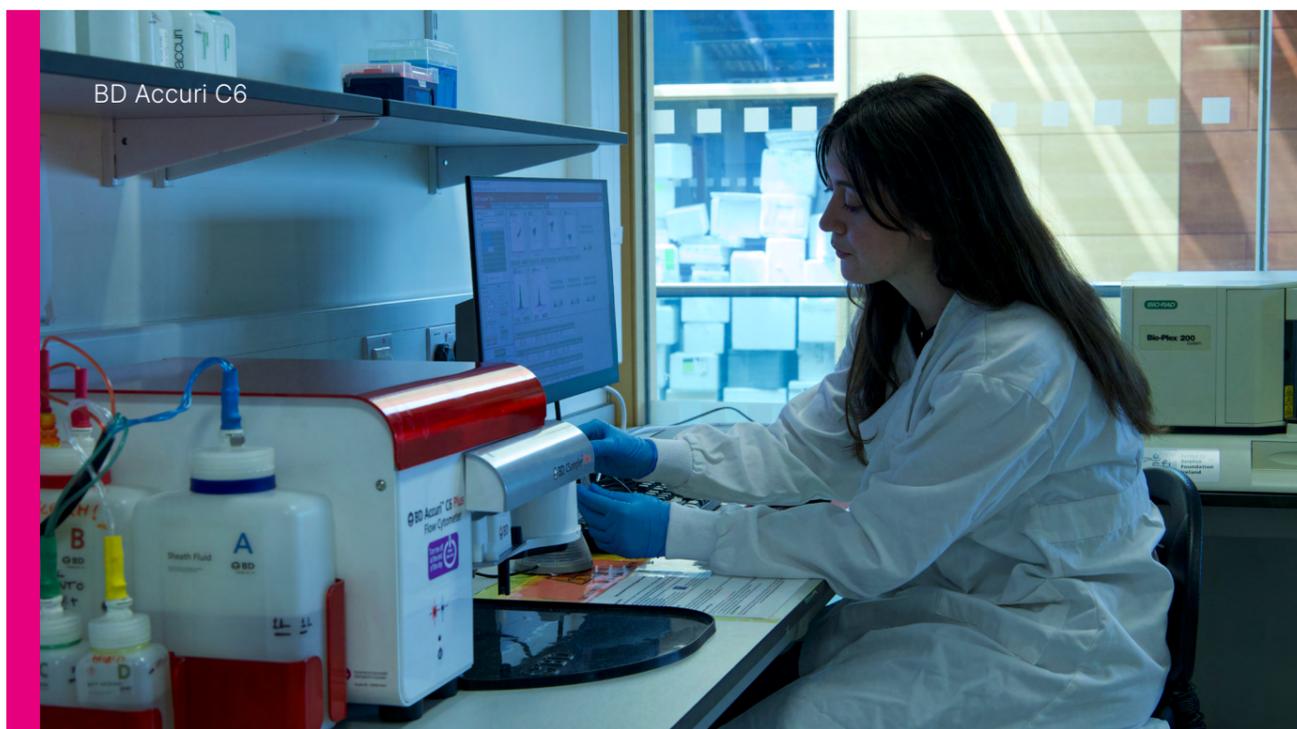


BD FACS Canto II flow cytometer

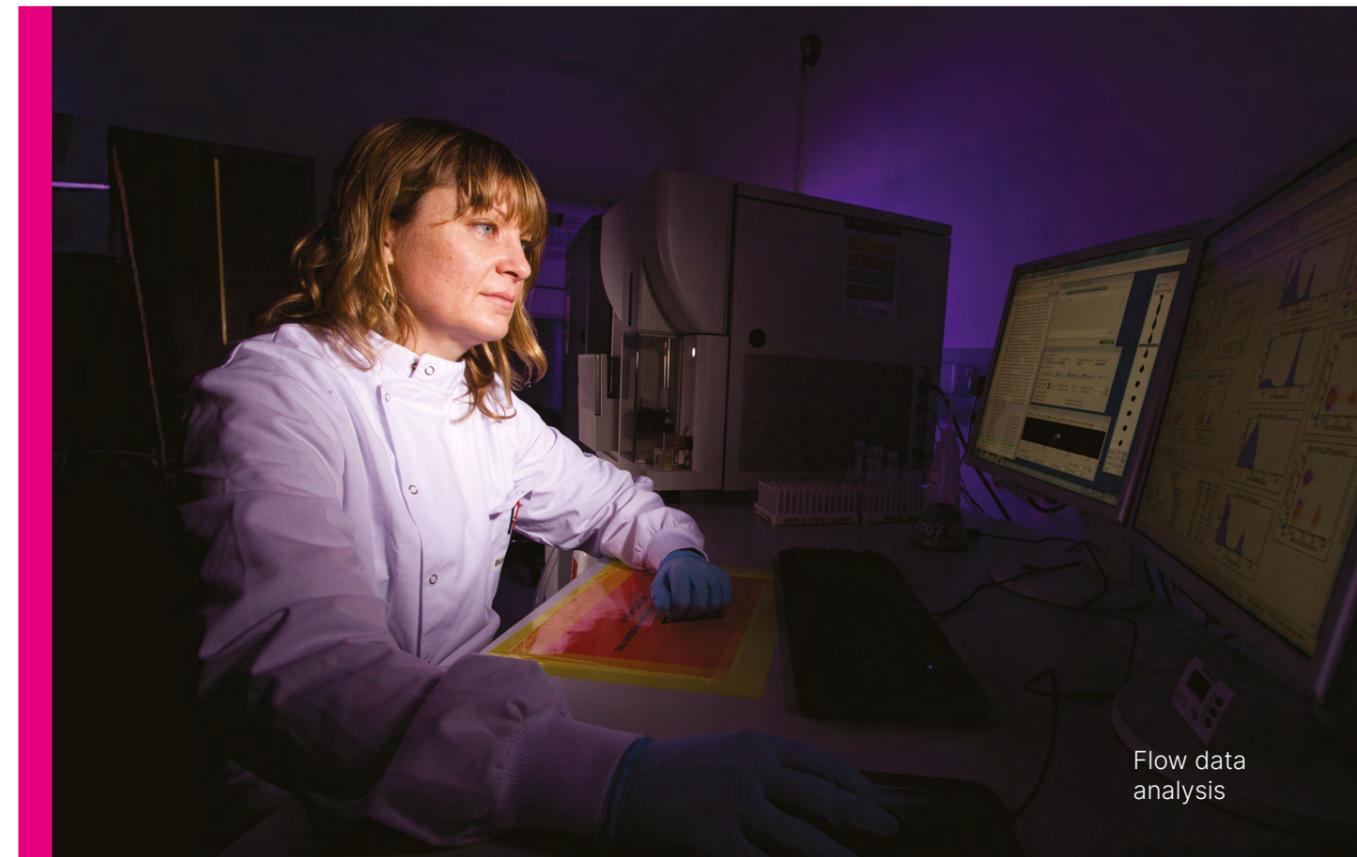
System	Type	Main Features
BD Accuri C6 Sampler Plus	Analytical flow cytometer	2 Laser, 4 colour conventional system High throughput capability Absolute cell counts Intuitive, easy to use software
Cytek Northern Lights 3000	Analytical flow cytometer	3 laser, 38 detector spectral system High throughput capability Absolute cell counts Autofluorescence extraction
Cytek Northern Lights 2000	Analytical flow cytometer	2 laser, 30 detector spectral system Absolute cell counts Autofluorescence extraction
BD FACS Canto II	Analytical flow cytometer	3 laser, 8 colour conventional system Highly flexible data acquisition 3 laser, 9 colour conventional system
Thermofisher BigFoot Cell sorter	Fluorescence activated cell sorter	Fast High throughput spectral cell sorting 6 way sorts - capable of sort speeds of up to 70,000 events per second Integrated biocontainment and aerosol management Real-time spectral unmixing



Flow cytometry core facility, Bioscience Research Building



BD Accuri C6



Flow data analysis

# Mass Spectrometry

Targeted mass spectrometry is a gold standard technique for precise compound quantification and is widely used in industry and clinical laboratories. This powerful technology enables efficient translation from research discoveries to commercial applications.

The Mass spectrometry Core Facility supports diverse projects across biology, chemistry and environmental science. The MS Core Facility supports the analysis of diverse sample types, ranging from biological fluids, tissues, and cells to environmental and small-molecule chemistry samples.

The core is expanding into MS-driven proteomics, metabolomics, and lipidomics using advanced mass spectrometry workflows. These approaches analyze proteins, small-molecule metabolites, and lipids, respectively, providing systems-level insight into complex biology and disease.



## Contact:

Email  
massspec@universityofgalway.ie

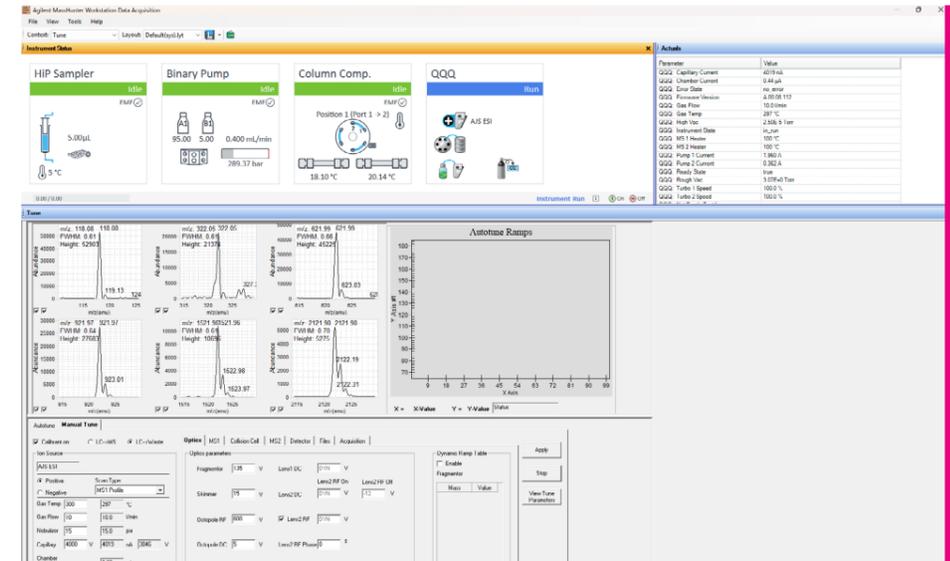
## Equipment

### SCIEX 4500 QTRAP

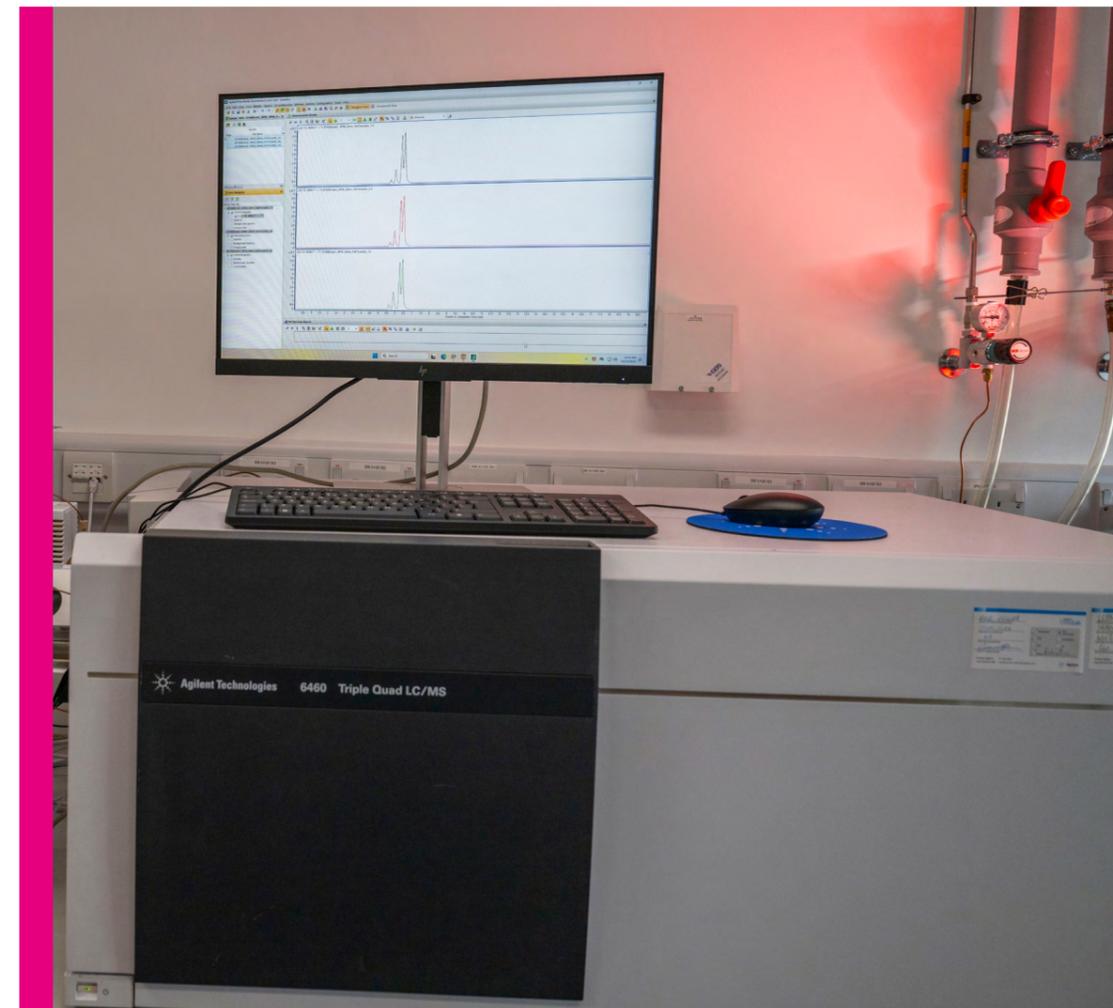
A highly sensitive and reliable hybrid triple quadrupole-linear ion trap (LC-MS/MS) for high-throughput qualitative and quantitative analysis.

### Agilent 6460

A robust and versatile triple quadrupole mass spectrometer capable of supporting multiplexed analysis of analytes with high-selectivity and low-background noise.

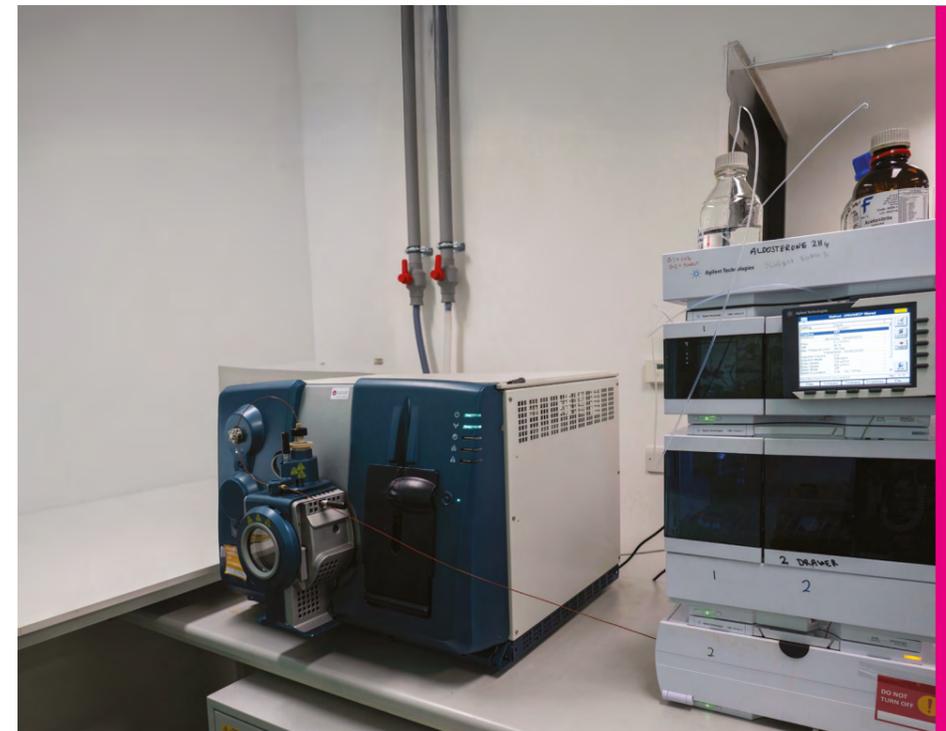


Agilent 6460:  
Calibration Ions



Agilent 6460/LC/MS  
Triple Quad

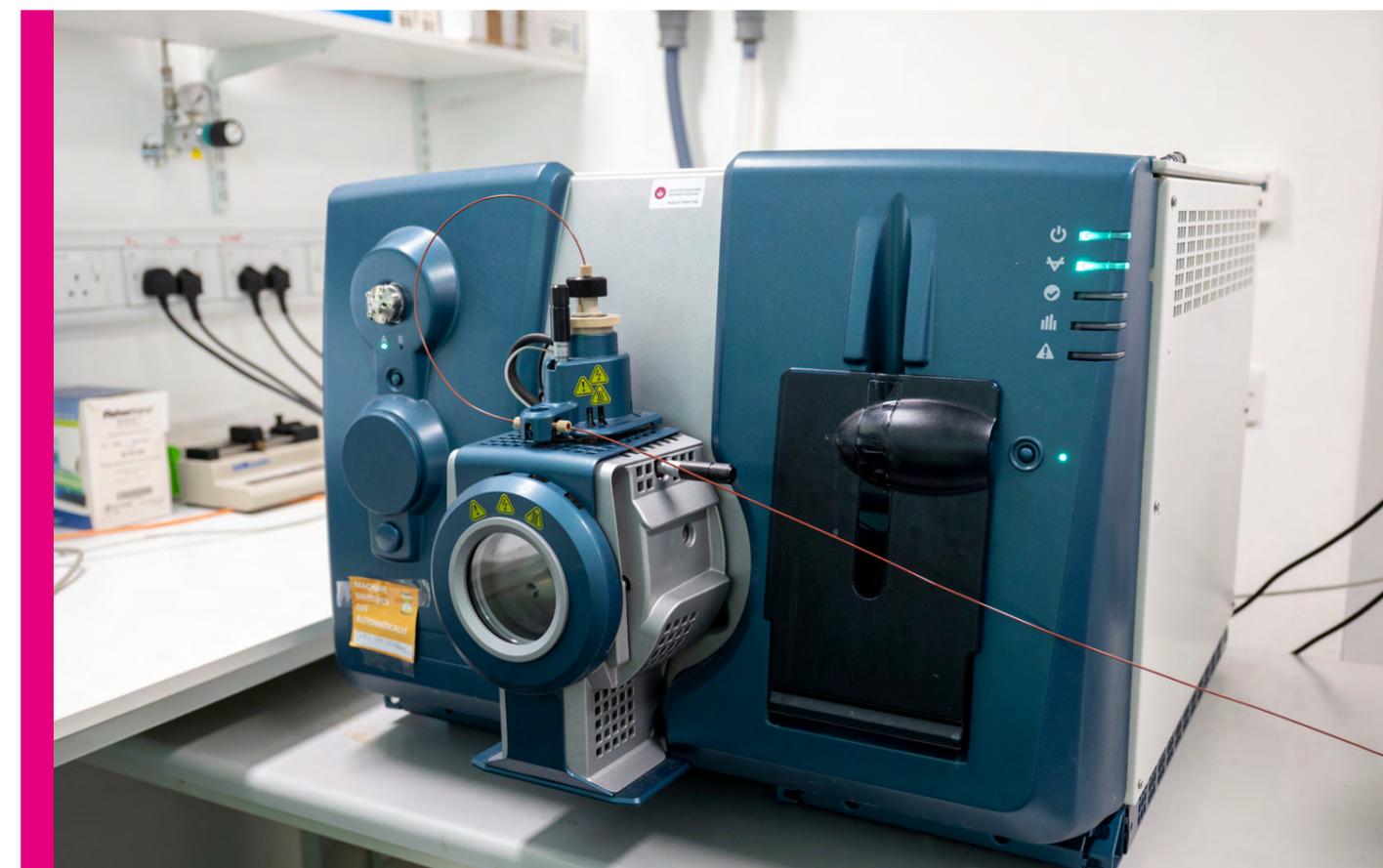
System	Type	Main Features
Sciex 4500 Qtrap	Hybrid triple quadrupole ion trap (LC-MS/MS) mass spec	<p><b>Source:</b> Electrospray ionization (positive and negative mode).</p> <p><b>Mass range:</b> 5-2000 m/z</p> <p><b>Mass Analysers:</b> Hybrid: Quadrupole-linear ion trap</p> <p><b>Fragmentation:</b> Collision induced fragmentation (CID)</p>
Agilent 6460	Triple quadrupole	<p><b>Source:</b> Electrospray ionization (positive and negative mode).</p> <p><b>Mass range:</b> 5-3000 m/z</p> <p><b>Mass Analysers:</b> triple quadrupole</p> <p><b>Fragmentation:</b> Collision induced fragmentation (CID)</p>



Sciex Qtrap 4500 Mass Spectrometer



Sciex Qtrap 4500



# Genomics and Screening

High Throughput Screening and Genomics are some of the most cutting edge techniques used today to identify new bioactive compounds and determine how cells respond to drug treatment and disease. Researchers tackling cancer, neurodegenerative disorders or infectious diseases and those using regenerative medicine or biomedical engineering to translate research into better patient care, benefit from these established and productive technologies.

For more than 15 years, University of Galway Genomics and Screening Core Facility has provided researchers with expert training, support and access to high-throughput screening, high-content imaging and qPCR systems, enabling a previously unavailable efficiency, scale and quality of data.



Operetta high throughput imaging system



## Contact:

**Email**  
genomics@universityofgalway.ie

## Equipment

**Revvity Operetta**  
High Content Imaging.

**Revvity Janus**  
High throughput screening workstation for cell based assays.

**Biotek Multiflo FX**  
Automated dispenser for reagent dispensing (Biotek).

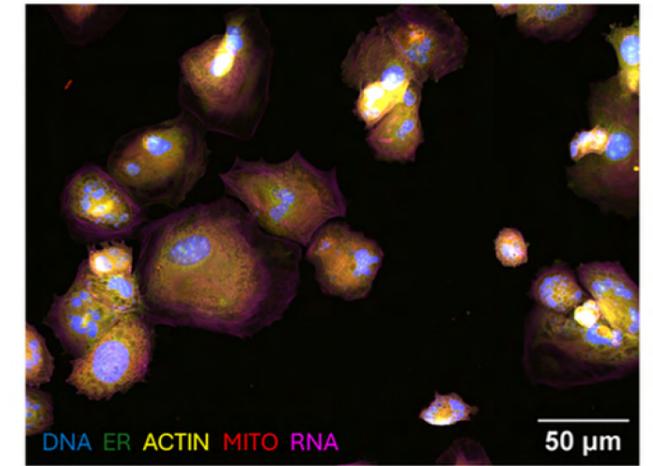
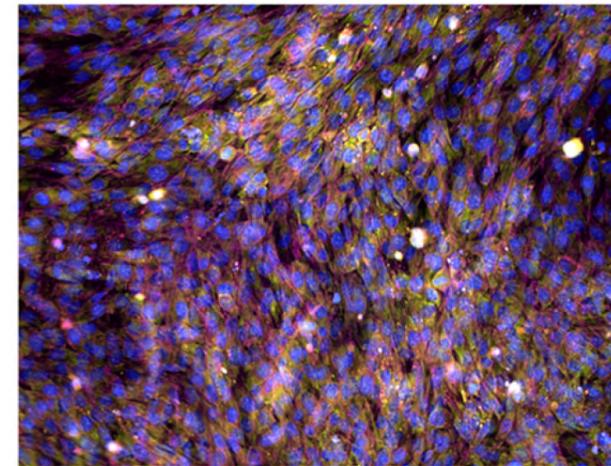
**Applied Biosystems QuantStudio 5 & QuantStudio 3**  
For quantitative polymerase chain reaction (qPCR).

**Applied Biosystems Veriti**  
PCR.

**Agilent TapeStation 4150** Nucleic Acid quality control.

**BMG Labtech VANTAStar**  
Multimode plate reader.

**10X Chromium**  
For single cell sequencing.



Myoblast cells captured using the Operetta high-throughput imaging system. Staining shows DNA (blue), endoplasmic reticulum (green), mitochondria (red), actin (magenta) and RNA (yellow). Dr Howard Fearnhead lab, published in 2025 in PloS ONE.



Using the Janus automated liquid handling system  
Genomics and Screening Core Facility

System	Type	Main Features
Revvity Operetta	High Content Imaging	Automated imaging of multiwell plates, slides, etc. Widefield, brightfield and confocal microscopy Automated image analysis, e.g: cell painting, cell death, cell cycle, migration, 3D analysis, protein quantification and localisation
Revvity Janus	High Throughput Screening Workstation	Automated high-throughput liquid handling to multiwell plates for cell-based assays Operations include: sample preparation, dilution, cell seeding, treatment, fixation and staining
Biotek Multiflo FX	Automated Dispenser	Rapid automated reagent dispensing to multiwell plates for cell-based assays, ELISAs, etc.
ABI QuantStudio 5 & QuantStudio 3	qPCR	Gene and miRNA expression, genotyping, melt curve analysis 4-6 colour multiplexing VeriFlex temp. optimisation
ABI Veriti	PCR	Endpoint PCR, cDNA synthesis
Agilent TapeStation 4150	Nucleic Acid QC	DNA and RNA analysis of size, concentration and integrity as part of NGS workflow
BMG Labtech VANTAStar	MultimodePlate Reader	Fluorescence, absorbance, luminescence and fluorescent polarisation assays possible Monochromator for 220-1000 nm ELISAs, protein conc., cell viability, cytotoxicity, enzyme activity, reporter assays, binding assay
10x Chromium	Single cell sequencer	Single cell sequencing allows scientists to see the unique gene expression patterns of each cell. This view more fully characterizes tissue heterogeneity, revealing the rare cell types that have big consequences in health and disease.



Agilent  
TapeStation 4150



Quant Studio 5 PCR

# Medical Device Prototype Hub

The Medical Device Prototype Hub, supported by Medtronic, offers a comprehensive suite of services to support early-stage medical device innovation. The Hub provides both virtual and physical prototyping, enabling rapid design iteration through CAD modelling and simulation. Designed to provide world-class research infrastructure, the Hub combines state-of-the-art laboratory space with dedicated equipment across affiliated campus facilities. The Hub aims to accelerate medical technology innovation, attract global talent in medical technologies, expand educational opportunities, and unlock new funding streams through strategic infrastructure investments.

The Medical Device Prototype Hub is equipped with advanced infrastructure to support every stage of medical device development.

Its capabilities include:

- Additive Manufacturing: A full suite of SLA and FDM 3D printing systems
- Non-Destructive Imaging: Nano- and micro-Computed Tomography (CT) imaging systems
- Software Tools: Leading CAD platforms and image-based finite element analysis solutions

These resources are backed by leading technical expertise, ensuring innovators receive end-to-end support—from design consulting and prototyping to regulatory documentation and commercialisation planning. These resources enable innovators to progress technologies efficiently from concept development to commercial-ready prototypes, ensuring precision, regulatory readiness, and impact.

## Medtronic



### Contact:

**Email**  
pthub@universityofgalway.ie

### Equipment

**Formlabs Form 3BL**  
Large-format resin 3D printer with Biomedical resin printing capabilities.

**Phrozen Sonic Mini 8K**  
Ultra high-resolution resin printer.

**Bambu Lab A1**  
Fused Deposition Modelling (FDM) printer with Automatic Material Management System (AMS)

**Bambu Lab X1C**  
High speed, AI- assisted FDM printer with AMS.

**Bambu Lab H2D**  
Industrial-grade dual-extruder FDM printer for high performance engineering materials with AMS.

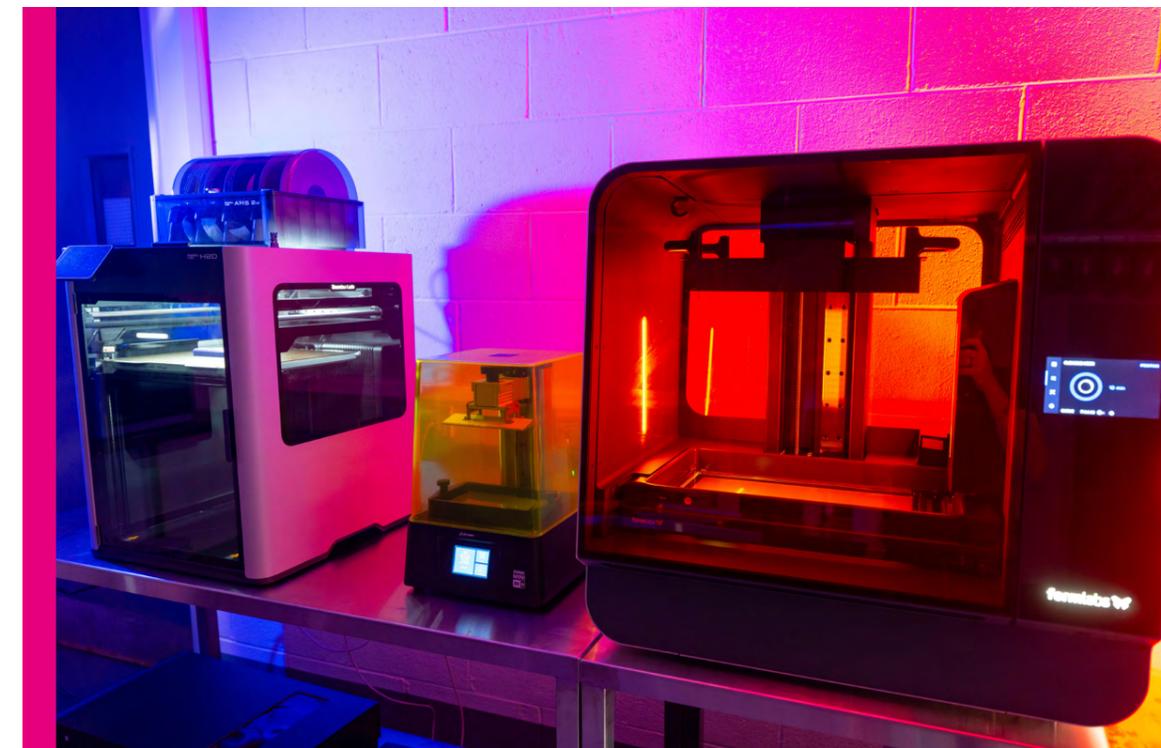
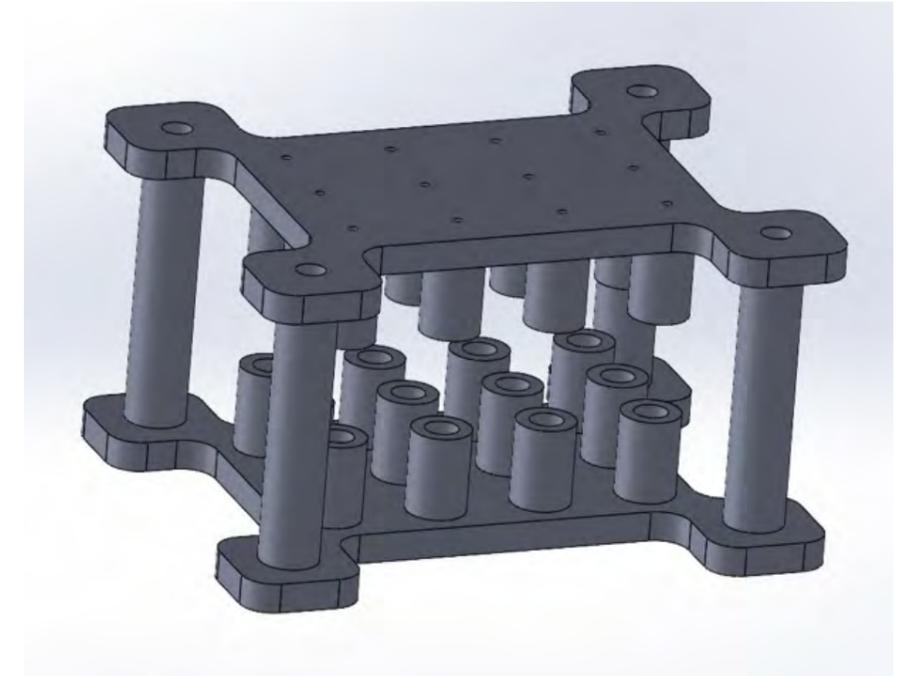
**Zeiss Xradia 620 Versa Nano-CT**  
Imaging system

**Scanco Micro-CT**  
Imaging system

Injector assembly printed with clear resin



Mould design: 3D CAD assembly



Medical Device Prototyping Hub 3D Printers

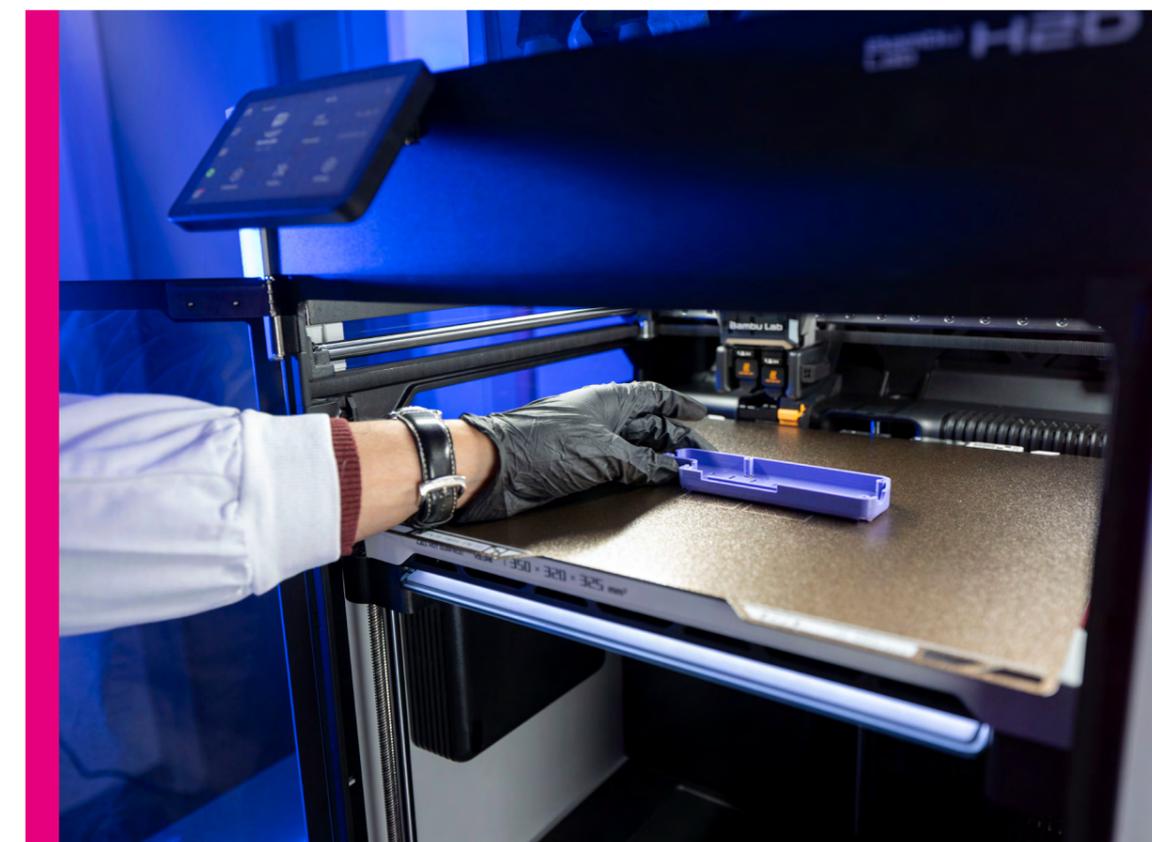
System	Type	Main Features
<b>Formlabs Form 3BL</b>	Large-format High Resolution SLA 3D printer	High fidelity prototyping using variety of engineering and biomedical resins (Biomed durable, Tough Grey 2000 resins) Capable of printing biocompatible materials and large anatomical models with high precision.
<b>Phrozen Sonic Mini 8K</b>	Compact High Resolution SLA 3D printer	22 µm XY resolution for extremely detailed miniatures and models Used to print high fidelity compact prototypes for engineering applications. (Grey engineering resin)
<b>Bambu H2D</b>	Industrial Grade Dual Extruder FDM 3D printer	High-performance engineering materials (ABS, TPU, PVA, ASA) available for FDM printing Precise control, repeatability and reliability for prototyping. Quick turnaround for high tolerances and high-fidelity prototypes.
<b>Bambu X1C</b>	High-speed AI-assisted FDM printer	High-performance engineering materials (ABS, TPU, PVA, ASA) available for FDM printing Multi-color and multi-material printing capability using AMS. Lidar calibration, advanced automation used for high-fidelity FDM printing. Printing moulds for silicone and other materials which cure over time.
<b>Bambu A1</b>	Desktop FDM printer	Multi-color multi-material printing, for the early state iterative prototyping. (PETG, PLA, PC)
<b>Zeiss Xradia 620 Versa</b>	Nano-CT imaging system	High-resolution X-ray micro-computed tomography (Nano-CT) system designed for non-destructive 2D and 3D imaging Detailed analysis of anatomical structures, medical devices offering submicron voxel resolution and multi-scale imaging capabilities.
<b>Scanco Micro-CT 100</b>	Micro-CT imaging system	Compact, high-precision micro-computed tomography system optimized for non-destructive biomedical and materials research applications. Micron-scale 3D imaging with adjustable energy levels and quantitative analysis tools for bone, tissue, and scaffold studies. Used to evaluate microarchitecture, porosity, and internal geometry of medical devices, anatomical samples and biomedical prototypes



Prototype Hub Design Space



Scanco Micro-CT system



Bambu H2D

# Locations



Biomedical  
Sciences Building



Human  
Biology Building



Lambe Institute



Orbsen Building

# Services Available

## Autonomous Use

- Users undergo full training and evaluation on equipment
- Users can book and use the instruments autonomously
- Technical support available as required
- Charges based on hourly rates

## Assisted

- Work is carried out by the technical staff
- Assisted charges are available for all instruments

## Industry Services

- Full range of services available for industry
- Provide consultation and technical advice
- Assisted work and project design

# Equipment Access Options

The PPMS booking system offers real-time resource availability and easy scheduling of equipment and training sessions.

OLLSCOIL NA GAILLIMHE  
UNIVERSITY OF GALWAY

PPMS for the University of Galway Shared Resources - TSD

Home Account creation request Schedules Logout

### Login

Login with your University of Galway credentials (for University of Galway users)

Login with your PPMS credentials (for external users)

# Contact Information

The TSD University website offers detailed TSD information, booking portals, and training schedules.

 <https://www.universityofgalway.ie/tsdg>

For general enquires on the TSD, please contact;

 [tsd@universityofgalway.ie](mailto:tsd@universityofgalway.ie)

Please contact our staff at any time to discuss individual requirements or enquires and would be happy to arrange a visit to our facilities.

## For Core Specific enquires contact:

-  **Light Microscopy**  
[microscopy@universityofgalway.ie](mailto:microscopy@universityofgalway.ie)
-  **Flow Cytometry**  
[flowcytometry@universityofgalway.ie](mailto:flowcytometry@universityofgalway.ie)
-  **Gemonics and Screening**  
[genomics@universityofgalway.ie](mailto:genomics@universityofgalway.ie)
-  **Mass Spectrometry**  
[massspec@universityofgalway.ie](mailto:massspec@universityofgalway.ie)
-  **Medical Device Prototype Hub**  
[pthub@universityofgalway.ie](mailto:pthub@universityofgalway.ie)

The Technology Services Directorate spans both the Institute for Health Discovery and Innovation and the Institute for Clinical Trials at University of Galway, advancing research excellence by creating and implementing a coordinated ecosystem of state-of-the-art core facilities.



OLLSCOIL NA  
GAILLIMHE  
UNIVERSITY  
OF GALWAY

An Institiúid don Fhionnachtain  
agus Nuálaíocht Sláinte

Institute for Health Discovery  
and Innovation



OLLSCOIL NA  
GAILLIMHE  
UNIVERSITY  
OF GALWAY

An Institiúid do Thrialacha Cliniciúla

Institute for Clinical Trials