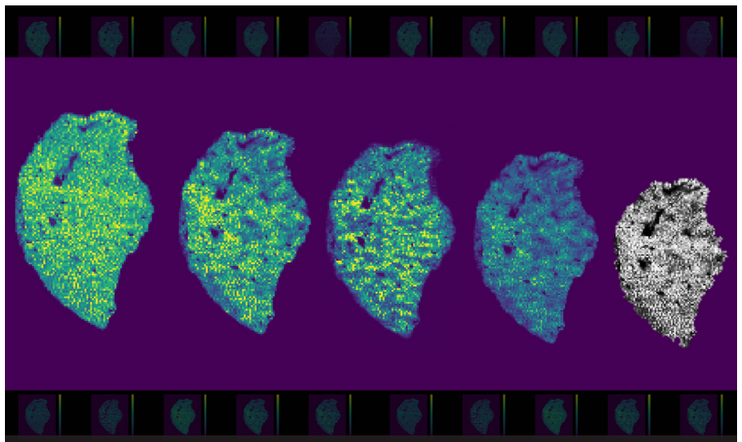
Mass Spectrometry



umass.edu/ials/mass-spectrometry

Located on the 5th floor in the Life Science Laboratories the Mass Spectrometry Core houses a suite of state-of-the-art instrumentation for characterizing compounds across the mass range from small (metal ions) to large (macromolecular assemblies). Specialized mass spectrometers encompass a variety of ionization techniques and separation devices to cover a range of analytical capabilities.

The facility accepts samples and will perform requested analysis. We offer training to users to conduct experimentation for use on a fee for service basis to both internal and external researchers, academic or industry based. Following an initial consultation, covering experimental parameters training and access is arranged through the director.

Our rates are competitive and tiered based on needs and usage. Visit our website at *umass.edu/ials/mass-spectrometry* for current listing.

TRAINING

Training for new users consists of:

- lab safety training,
- operation of the instrument and associated software,
- use of data analysis software,
- exporting or presenting data,
- clean up of the instrumentation.

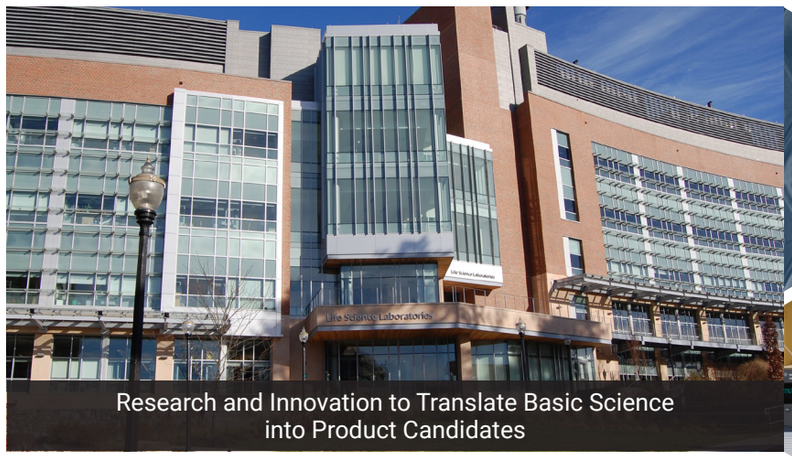
Once the training is complete, researchers may schedule their experiments through the director of Mass Spectrometry (Stephen Eyles) or online through CORUM at *corum.umass.edu*.

ACCESS

To request access, training, or additional information please contact Stephen Eyles at eyles@umass.edu or (413) 577-1528.

UMassAmherst | Core Facilities

Institute for Applied Life Sciences
University of Massachusetts Amherst
Life Science Laboratories
240 Thatcher Road
Amherst, MA 01003



Research and Innovation to Translate Basic Science into Product Candidates

PARTNER WITH US!

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Revision (07/18/22)

UMassAmherst | Core Facilities

Mass Spectrometry

Institute for Applied Life Sciences
University of Massachusetts Amherst

Characterizing Compounds and Biomolecules Across the Mass Range

EQUIPMENT

Perkin-Elmer NexION 350D ICP-MS

Inductively coupled plasma mass spectrometry enables sensitive quantitative measurement of most metals and many non-metals in a variety of samples, including biological matrices. Examples include environmental analysis (water contamination), metals in biological tissues and fluids, quantitation of metals in plant material and even geological samples. Quantitation levels in the low parts per trillion range can be achieved for many elements. Laser ablation is also available for spatial imaging of metals in tissues and other sample types. HPLC can also be coupled for quantitative measurement of metal speciation.

Agilent 6890/5973 GC-MS and 7890B/7000C GC-QQQ MS

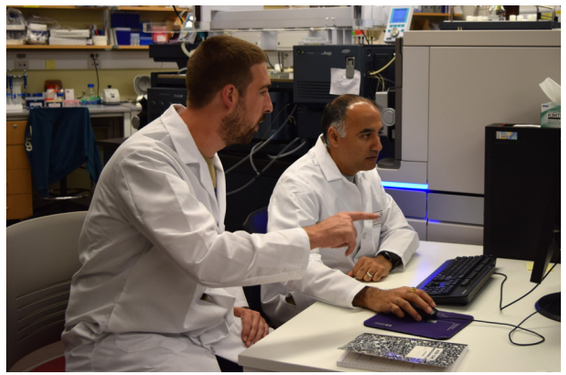
Gas chromatography is a powerful tool for separation of volatile small molecule analyses. Samples are volatilized at high temperature in the injector and then separated based on hydrophobicity and boiling point in the GC column, followed by mass determination in the MS. Results can be searched against the NIST MS libraries to identify compounds. Coupled to triple quadrupole mass spectrometry this enables quantitation of e.g. metabolites. Robotic auto-sampler can perform normal liquid-phase sample injection as well as headspace and SPME pre-treatments.

Waters UPLC/Xevo TQD QQQ-MS

Tandem quadrupole mass spectrometer coupled to UPLC achieves rapid separation of complex mixtures, for quantitation of a broad range of small molecules from metabolites to peptides. High sensitivity and selectivity of triple quadrupole enables quantitation at low levels even in a complex matrix background.

Multi-mode ESCI ion source allows simultaneous ESI and APCI modes of ionization, together with rapid polarity switching for maximal compound detection. >1000 MRMs can be monitored per sample run for quantitation, with optional triggered full scan for compound confirmation and spectral interference determination.

Waters Synapt G2Si Q-TOF with IMS and HDX Automation



Q-TOF instruments have a wide range of capabilities for characterization of small and large biomolecules. Additionally, ion mobility separation capabilities add an orthogonal separation based on gas-phase collisional cross-section (CCS). Applications include determining ligand binding or oligomerization state of macromolecules.

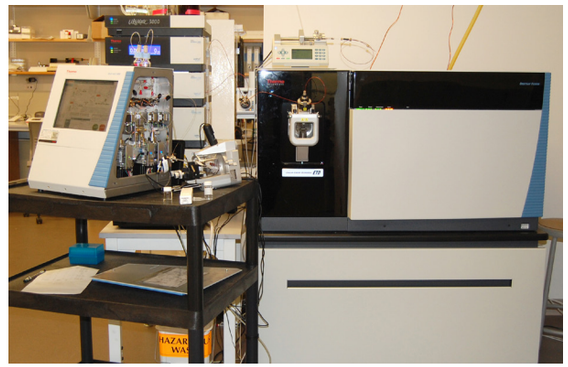
Hydrogen-deuterium exchange is a powerful technique for measurement of protein-protein, protein-ligand interactions and protein dynamics. HDX automation enables experiments to be performed in an automated and highly reproducible fashion.

Bruker UltrafleXtreme MALDI-TOF/TOF

State of the art MALDI-TOF instrument for high sensitivity measurement of limited sample quantity (routinely low fmol amounts). 2 kHz laser repetition rate enables rapid data acquisition at high resolution and mass accuracy. Laser technology enables focus to 10 µm for high resolution spatial imaging applications.

Applications include rapid top-down sequence confirmation of biopharmaceuticals, high speed tissue imaging for biodistribution and biomarker discovery, proteomics and glycoproteomics. LC-MALDI is also available for high sensitivity measurement and off-line interrogation of samples at greater depth than conventional online LC-MS proteomics.

Thermo Orbitrap Fusion



The Orbitrap Fusion combines supremely high sensitivity with high resolution and high mass accuracy to probe complex sample mixtures. Separation devices such as Ultimate 3000 RSLC or Easy nLC 1000 nanoLC systems can be applied to metabolomics or proteomics workflows. The Orbitrap Fusion tribrid mass spectrometer delivers unprecedented depth of analysis. It enables life scientists to analyze even the most challenging samples to identify more compounds more quickly, quantify more accurately, and elucidate structures more thoroughly.

Massachusetts LIFE SCIENCES CENTER

A significant portion of core equipment has been purchased through MLSC grant funding support.

TESTIMONIAL

"Under Dr. Stephen Eyles direction the Mass Spectrometry Core Facility has helped support several of our drug discovery programs. The facility includes a broad spectrum of recent, cutting edge and well-maintained instruments allowing a variety of proteomic and structural MS-based studies. Dr. Eyles is always eager to discuss data, troubleshoot difficulties and share his knowledge. His insights and the state of the art instrumentation have both been critical for our high quality data."

– Valerie Vivat, Senior Scientist
Constellation Pharmaceuticals, Cambridge, MA