Edinburgh Complex Fluids Partnership

Equipment and capabilities

Technique	Instrument details	Notes
Dynamic Light Scattering	Malvern ALV/LSE-5004	Particle size distribution
Laser diffraction particle size analyser	Beckman Coulter LS 13 320	Particle size distribution
Scanning Electron Microscopy	Jeol JSM-6010PLUS/LV Zeiss Crossbeam 550 w/ Quorum Technologies PP3010T	Capability to perform cryogenic Focus Ion Beam SEM imaging. Range of detectors including the Inlens, SESI, ESB and EDS to maximise output information, including chemical analysis, from the sample
Differential Dynamic Microscopy	Light microscope and bespoke analytical software	Sizing of particles, particularly powerful for polydispersed systems
Zeta Potential	Malvern Zetasizer Nano	Average and surface charge distribution of colloids and proteins
Optical Tensiometer	Krüss EasyDrop model FM40Mk2	Surface tension and contact angle information
Oscillating Drop Tensiometer	Krüss DSA100R	Oscillating/ Dynamic surface tension and contact angle information
Langmuir Trough	KSV minitrough	Surface pressure information
Oscillatory and Flow Rheology	TA Discovery-HR2 TA AR-2000 TA Ares G2 Anton Paar MCR 301 Anton Paar MCR 302	Storage and loss moduli information. Shear stress and viscosity information. Including Double Wall Ring Geometry for interfacial rheology. Simultaneous imaging and rheological data of sample under shear

Extensional Rheology	HAAKE™ CaBER™ 1	Measuring the elongational properties of fluids: extensional viscosity, relaxation times, Hencky strains, Strain rate.
Mechanical Testing	Universal testing analyser	
Optical Tweezers		Microrheological information
Atomic Force Microscopy	JPK NanoWizard® 4 XP AFM integrated with a fluorescent inverted optical microscope (Zeiss Axio Observer 5 with CoolLED pE-300^{White} illumination)	Nanotopography imaging, nanomechanical mapping, and force spectroscopy measurements of synthetic and living materials & interfaces. A comprehensive set of AFM mode options such as QI™ mode, PeakForce™ Tapping, TappingMode™ with Phase Imaging, CellMech™ microrheology package, Contact Mode with Lateral Force, Advanced Force Mapping and force spectroscopy. FluidFM® microfluid control system – can inject pre-filled liquid to a targeted locations and/or attach items like to the AFM tip for colloidal probe force spectroscopy and cell adhesion measurements. Temperature control from -30 to 120°C
Variable temperature X-Ray Diffractometer	Rigaku Smartlab Diffractometer- Powder X-ray Diffraction (PXRD) with additional Differential Scanning Calorimetry (DSC) and Humidity Chamber.	Determine the crystallography of the material and how the structure changes upon temperature and humidity changes.
Confocal Microscopy	Leica SP8 Zeiss LSM700 coupled to Zeiss Observer.Z1 inverted microscope	With up to 3 simultaneous fluorescently tagged components to observe dynamics.
Potentiostat		
Rheo-imaging	Physica MCR 301 coupled to either Leica DMi 8 Inverted microscope or Leica	Track the motion individual colloids whilst under shear, whilst simultaneously collecting rheology data

	Leica TCS SP8 confocal microscope	
Differential Scanning Calorimeter	TA Discovery 2500	Gain insight to the thermal behaviour of the sample
Isothermal Calorimetry	TA NanoITC LV	Understand binding interactions, e.g. protein interactions
Fourier Transform Infra-Red Spectrometer		Chemical composition of the surface and sub-surface (microns)
Optical coherence tomography		Non invasive imaging technique through cross-sections of material, can image dynamic or static materials
Aquaflux		Determine the transepidermal water loss through a substrate such as skin, to determine its barrier properties
Diffusing Wave Spectroscopy		Track the early stages of particle aggregation, creaming, sedimentation and coarsening of emulsions and foams
Quartz Crystal Microbalance	Biolin Scientific QSense Explorer	Understand behaviour of molecular adsorption onto surfaces
Turbidostat		Measuring cell density
Other light microscopes	Olympus BX50	With environmental box and automated stage. Imaging of biofilms and aggregate size and shape distribution analysis
Raspberry Pi Imaging Setup	Raspberry Pi Model 3B	
Density meter	Anton Paar DMA 4500	Measure density and specific gravity of fluids
Liposome extruder	tt Scientific Nanosizer	
Multi-wavelength fluorescence excitation system	CoolLED precisExcite	
Fluorescence spectrophotometer	Cary Eclipse	
Spin coater	Cammax Precima	

Biolabs		
Microplate reader	CLARIOstar Plus plate reader SN 430-2317	The CLARIOstar *Plus* is a multi-mode microplate reader with advanced LVF Monochromators™, highly sensitive filters, and an ultra-fast UV/vis spectrometer. The Enhanced Dynamic Range and automatic focus technologies make manual settings superfluous and detection optimisation easier than ever. Atmospheric Control Unit, temperature incubation, multiple shaking, well scan and reagent injectors make the CLARIOstar *Plus* the ideal platform for any live cell-based assay. https://brochures.bmglabtech.com/view/933977329/2/
Microplate reader	CLARIOstar plate reader SN 430-0396	The CLARIOstar is a multi-mode microplate reader with advanced LVF Monochromators™, highly sensitive filters, and an ultra-fast UV/vis spectrometer. The Enhanced Dynamic Range and automatic focus technologies make manual settings superfluous and detection optimisation easier than ever. Atmospheric Control Unit, temperature incubation, multiple shaking, well scan and reagent injectors make the CLARIOstar *Plus* the ideal platform for any live cell-based assay. https://brochures.bmglabtech.com/view/933977329/2/
Microplate reader	FLUOstar OMEGA plate reader SN 415-1276,	The FLUOstar Omega is a versatile multi-mode microplate reader with six detection modes: fluorescence intensity (including FRET), luminescence (including BRET), UV/vis absorbance, time-resolved fluorescence, TR-FRET, and AlphaScreen®/AlphaLISA®. https://brochures.bmglabtech.com/view/97071948/2/
Spectrophotometer	Hach DR 5000™ UV-Vis Spectrophotometer SN 1254063	Versatile UV-VIS Spectrophotometer with a wavelength range from 190-1100nm for water analysis and more. https://www.manualsdir.com/manuals/333082/hach-lange-dr-5000-user-manual.html
Spectrophotometer	Agilent G9821A Cary Series UV-Vis Spectrophotometer SN MY1826003	The system has multiple applications: Scanning / Kinetics / RNA/DNA / Concentration / Simple Reads / Validation. Wavelength Range: 190 to 900 nm

Spectrophotometer	Jenway 7205 Spectrophotometer	The spectrophotometer covers a wavelength range of 335 to 800nm with a spectral bandwidth of 7nm. http://www.jenway.com/product.asp?dsl=9171
Polymerase Chain Reaction (PCR) machine	Eppendorf Mastercycler EP Gradient S PCR SN 021319	This thermal cycler has standard slope technology allowing users to program their desired gradient across 12 rows with a spread of 1-24°C, with a heating rate of 6°C/s and cooling rate of 4.5 °C/s. Holds up to 96 PCR tubes (0.2ml) or a 96-well PCR plate. https://www.eppendorf.com/product-media/doc/en/103627_Operating-Manual/Eppendorf_Automated-Liquid-Handling_Operating-manual_Mastercycler-ep-epBlue.pdf
Microscopy	Nikon Eclipse Ti2-E inverted microscope SN 541893	https://www.microscope.healthcare.nikon.com/products/inverted-microscopes/eclipse-ti2-series/specifications https://www.microscope.healthcare.nikon.com/products/inverted-microscopes/eclipse-ti2-series
Microscopy	Zeiss Primo Vert inverted microscope SN 3841003400	Inverted microscope for routine or research laboratories. Ideal for quick assessments and inspections of living cells. Quality optics from Carl Zeiss https://www.hitechinstruments.com/Portals/0/Inverted/PrimoVert%20User%20Manual.pdf