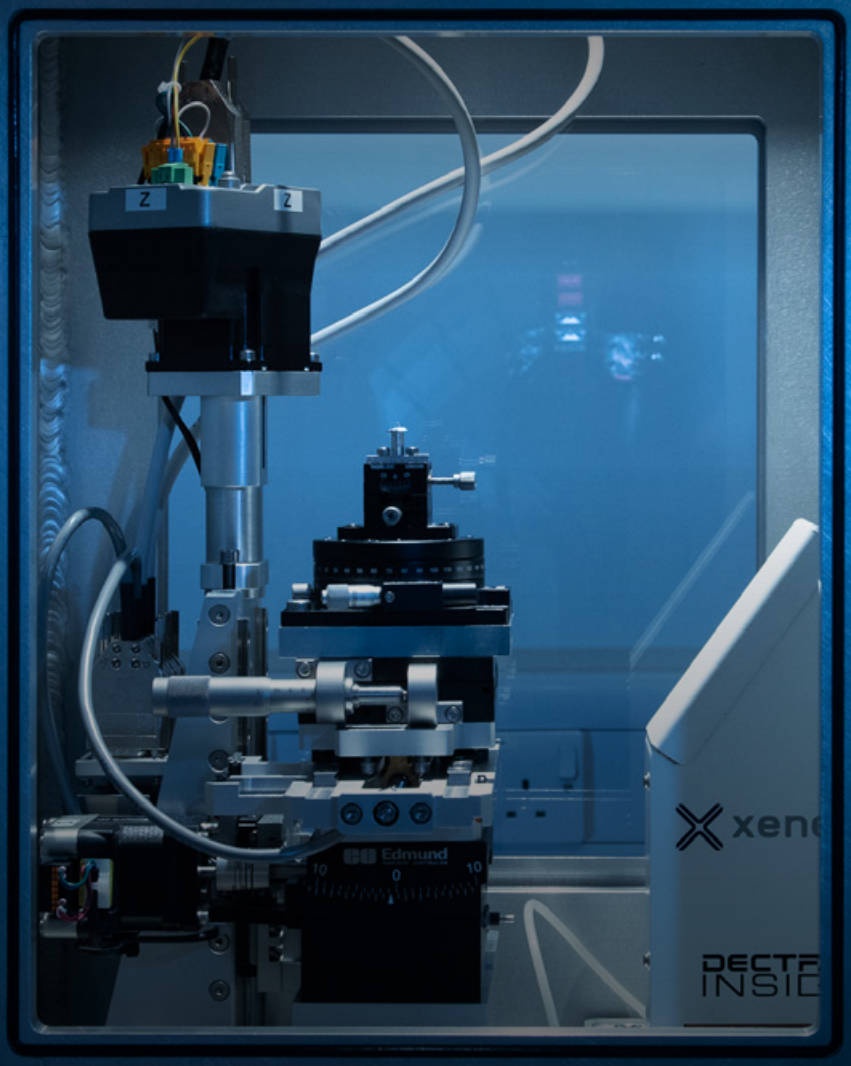
WARWICK
THE UNIVERSITY OF WARWICK



WARWICK ANALYTICAL SCIENCE CENTRE

Welcome to WASC

The Warwick Analytical Science Centre (WASC) brings together state-of-the-art instrumentation and expertise in a wide range of analytical science areas spanning Chemistry, Engineering, Life Sciences and Physics. Thanks to a four-year £954,000 resource-only strategic equipment grant from the Engineering and Physical Sciences Research Council (EP/V007688/1), we are able to offer 480 days of seedcorn use to this analytical science instrumentation to foster new collaborations. These seedcorn access days are open to PhD students, from the Midlands region and nationally for Analytical Science based projects.

We are pleased to work with a number of external partners who provided the EPSRC grant application with letters of support. This includes learned societies such as the Royal Society of Chemistry (Analytical Division, and electrochemistry, electron spin resonance, and spectroscopy and dynamics groups), the Royal Microscopical Society, the Institute of Physics Electron Microscopy and Analysis Group, the British Mass Spectrometry Society, the UK surface analysis forum. In addition, this includes the Henry Royce Institute and the Rosalind Franklin Institute, as well as the EPSRC funded Harwell X-ray photoelectron spectroscopy national research facility, UK national crystallography service, the UK physical sciences data-science service, and Connect NMR, a national NMR network for the physical and life sciences. There is also interaction with industry partners such as Arcinova, AstraZeneca, BYK, Lubrizol, Syngenta and Xerion. WASC is overseen by a management committee at the University of Warwick, and an 10-person advisory board, with representatives from 7 UK universities and 3 companies.

A key focus of WASC and the EPSRC grant funding are the research technical professionals (RTProfs) who manage the state-of-the-art research technologies and are key to the delivery of WASC, both in terms of the knowledge and training they can provide, as well as the work they do to ensure our infrastructure is maintained and used efficiently. A number of events are being organized to support RTProfs, within the region, together with Midlands Innovation, and nationally, with input from the supporting external partners.

Please read on to discover more about WASC and the analytical science instrumentation at Warwick.

Professor Steven P. Brown,
Director of WASC

£954,000
EPRSC Grant

13 facilities

>15 dedicated staff

What is WASC?

FREE ACCESS TO THE ANALYTICAL SCIENCE INSTRUMENTATION AT WARWICK:

Our support received from the EPSRC (EP/V007688/1) enables us to provide access to our world-leading analytical instruments and technical knowledge to PhD students across the UK at no cost. This seedcorn access typically includes up to 2 days analysis and support with facilities that the applicant hasn't accessed at Warwick before.

This seedcorn access may, for example, allow you to carry out preliminary measurements to assess the suitability of a technique that may otherwise be cost prohibitive, or to obtain data to enhance a paper using an instrument that you don't have at your own institution.

Our expert Research Technical Professionals (RTProfs) are key to the seedcorn access, where they will work with you on experimental design, running samples and subsequent data analysis. We strongly encourage applicants to visit Warwick in-person to maximise this benefit and will assist with travel expenses and overnight accommodation where appropriate.

CONFERENCES AND TRAINING FOR PHD STUDENTS AND RESEARCH TECHNICAL PROFESSIONALS:

In conjunction with our industrial and learned society partners, we will host two national two-day meetings, as well as twelve national one-day meetings and workshops for PhD students and RTProfs - providing training, networking and collaboration opportunities to all.

These meetings will be on an analytical science or professional development theme, be a mixture of online and in person events, and with free registration to promote maximum accessibility.

> "The WASC seedcorn funding allowed my PhD students to access equipment not available at Strathclyde, obtaining measurements that will contribute to two PhD thesis and at least two papers… The students received advice on techniques and optimum analytical approaches and welcomed the genuine interest in their research."
>
> **PROF. JOHN LIGGAT, UNIVERSITY OF STRATHCLYDE**

Seedcorn Access

https://warwick.ac.uk/fac/sci/wasc/seedcorn/

We are providing 480 days of seedcorn use of our facilities to postgraduate students from outside Warwick - this provision will be spread across the four years of the WASC grant, with 60 days in 2021, 120 days in 2022, and 150 days in 2023 and 2024.

Upon successful application, students will be able to carry out short analytical investigations of up to three days per facility, although special cases can be made for instruments that have an especially long set up time.

Applicants are advised to first contact the relevant facility manager, with contact details in this brochure, to discuss the scope and feasibility of their investigation. Then a one-page scientific justification should be submitted on the WASC webpages. After submission, the case will be reviewed by two members of the WASC team, with timely confirmation of outcome to the applicant.

If your application is successful, you will be invited to Warwick to carry out the measurements, but you will also be welcome to send the samples to us for analysis.

Please refer to the following page for full application guidance, including restrictions.

"I would highly recommend applying for the WASC Seedcorn fund. The Facility Manager Marc Walker was exceptionally helpful when selecting samples for analysis and explaining how the XPS works and what can be achieved with the instrument. The application form itself was very simple and quick and the Seedcorn team was very understanding and helped me with a couple of questions while the application was processing. Furthermore, I've received the approval confirmation very fast which allowed me to get my samples analysed in approximately a month from applying. I even had a chance to visit the facility and see the instrument in action!"

EGLE LATVYTE, PHD STUDENT, COVENTRY UNIVERSITY

60 Days in 2021

120 Days in 2022/23

150 Days in 2024

13 facilities available

APPLICATION GUIDANCE

1. What does 'seedcorn' mean?
By 'seedcorn' we mean that use of the facility is free for an initial short-term investigation and that subsequent use will be on a paid-for basis, or part of a formal collaboration with Warwick.

2. Are there any restrictions on who can apply?
This provision is only for PhD students. Access is only for those who have not used a specific facility before, and those who are not already Warwick collaborators for that specific facility (e.g., no joint publications for the PI and the team for that particular facility). Users of one specific area are encouraged to use the seedcorn access scheme to interact for the first time with a different area.

3. Which facilities can I use?
All 13 facilities listed on the WASC website are available for seedcorn access. If there are other techniques at Warwick that you are interested in using, please contact us and we can help facilitate access for you outside of this process.

4. How long can I use a facility for?
Typical usage should be for 1-2 days, and this will be determined via the initial discussion with the relevant facility manager. Some illustrative examples include – 8 core-level XPS scans, 20 XRD short experiments for structural determination, 10 measurements using Raman spectroscopy.

5. What do you expect in the Scientific Case document?
The scientific case should outline the aim of the investigation, the experiments that you wish to carry out, why they are needed, an estimate of the time required, and what the impact of the investigation will be. Please include figures/schemes where appropriate, and the specific details of the experiments that you would like carrying out – this should come from your initial discussions with the facility manager. We place no restrictions on the content of the case proposal, other than it be limited to one page, follow UKRI style guidelines, and is uploaded as a .PDF.

6. What happens after I submit my application?
Your application will be reviewed by the academic director of the facility in question, and by the manager of a different facility, who is a non-expert.

7. What does WASC expect in return?
We ask that users of the seedcorn provision abide by the Fair Attribution Policy as a condition of receiving the access. In particular, the EPSRC funding must be acknowledged along with the grant code (EP/V007688/1) for any published data that is a result of the seedcorn use (papers, posters, presentations). Please inform WASC if any of the obtained data is presented/published in a paper, poster, presentation, or PhD thesis as this is an important measure of the grant impact.
We also ask that you provide us with feedback regarding your experience, when requested.

Facilities

The following pages give an overview of the 13 facilities that constitute WASC, their capabilities and contact details:

For further information, please visit: **https://warwick.ac.uk/fac/sci/wasc/facilities/**

"I would personally recommend to material scientists and PhD students to take advantage of these great facilities which are not available at every university…Being able to visit the laboratory in person, observe, and learn about the equipment and how the measurements are done and analysed was also a big part of the whole experience"

MOHAMMAD HAKIM KHALILI, PHD STUDENT, CRANFIELD UNIVERSITY

Advanced Bioimaging

CONTACT DETAILS:

Professor Corinne Smith,
Advanced Bioimaging RTP Director
corinne.smith@warwick.ac.uk 02476 5 22461

Dr Saskia Bakker,
Advanced Bioimaging RTP Manager
s.bakker@warwick.ac.uk 02476 574095

go.warwick.ac.uk/bioimaging

Imaging temperature down to
-176°C

70nm
slice thickness

£2m
worth externally funded equipment

INTRODUCTION TO FACILITY:

The Advanced Bioimaging RTP was established in 2015. It supports the investigation of complex biological problems by researchers at Warwick and externally, through the application of cutting-edge imaging technologies. The RTP specialises in advanced light and electron microscopy.

The RTP houses two electron microscopes. The JEOL2200FS (2016) is equipped with a field emission gun electron source, an in-column energy filter, and a Gatan K2 Direct electron detector. The JEOL2100Plus (2018) is fitted with a LaB6 filament and a Gatan OneView IS CMOS camera. Additionally, the suite boasts a Leica GP plunge-freezer, an RMS cryo-ultramicrotome, and other supporting equipment such as a glow discharger and a carbon coater.

CAPABILITIES:

Thin section TEM
Negative stain TEM
Cryo-TEM
DiSPIM
Sample preparation

Electrochemistry

CONTACT DETAILS:

Professor Julie Macpherson
j.macpherson@warwick.ac.uk +44 (0)2476151013

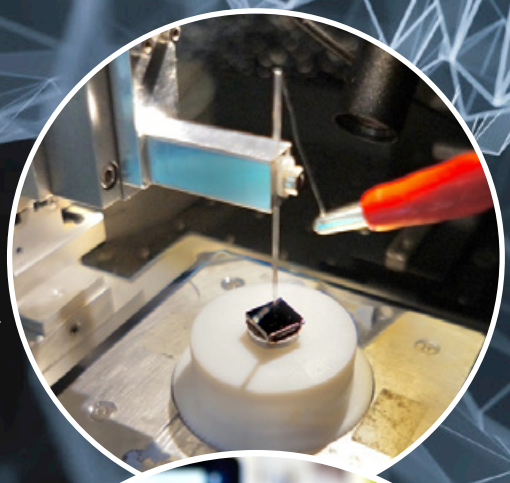
Professor Pat Unwin
p.r.unwin@warwick.ac.uk +44 (0)2476151008

https://warwick.ac.uk/fac/sci/chemistry/research/unwin/electrochemistry/

INTRODUCTION TO FACILITY:

The ability to visualise surfaces and interfaces is of critical importance towards understanding dynamic physicochemical processes.

The Electrochemistry and Interfaces group at Warwick is well-known for the development of a number of novel electrochemical imaging techniques that have wide-ranging applications in the physical and life sciences. These include scanning electrochemical cell microscopy (SECCM), which is opening up new nanoscale views of electrochemical interfaces, scanning electrochemical microscopy (SECM), new modes of scanning ion conductance microscopy (SICM) and various hybrid techniques, such as combined SECM-SICM and other methods. Central to the diversification of electrochemical imaging methods is the fabrication and characterisation of new electrochemical nanoprobes that offer new capability and functionality.



CAPABILITIES:

Our Electrochemistry facility offers the following techniques for seedcorn access:

- Commercial potentiostats with a range of conventional electrochemical techniques, such as digital and analogue linear sweep and cyclic voltammetry, chronoamperometry and square wave voltammetry
- Electrochemical cells for working in both aqueous and non-aqueous solvents
- Rotating disc and ring disc electrodes to enable hydrodynamic voltammetry, including bespoke 3D printed systems enabling use of less common electrode materials including boron doped diamond
- Advanced electrochemical imaging techniques on the Warwick Electrochemical Scanned Probe Microscopy platform, including scanning electrochemical cell microscopy (SECCM) and scanning ion conductance microscopy (SICM)

Access to most techniques, especially advanced methods, will be by collaboration, as these techniques produce large specialised datasets which need analysis via bespoke software.

Electron Microscopy

CONTACT DETAILS:

Professor Richard Beanland,
Electron Microscopy RTP Director
r.beanland@warwick.ac.uk 02476 573884

Steve York,
Electron Microscopy RTP Manager
s.j.york@warwick.ac.uk 02476 523391

go.warwick.ac.uk/electronmicroscopy

8 instruments

22 external clients

1000+ hours of instrument use each month

INTRODUCTION TO RTP:

The Electron Microscopy RTP is a central facility for the University of Warwick and is one of the leading centres in the UK. It contains a wide range of microscopes in a purpose-built suite, including: high resolution scanning electron microscopes (SEM); focused ion beam (FIB); several transmission electron microscopes, from simple imaging to atomic resolution; and state of the art scanning probe microscopes (SPM/AFM). There are currently more than 200 registered users of the microscopes, both within the University as well as external commercial and academic users.

CAPABILITIES:

TEM
SEM
FIBSEM
Scanning Probe Microscopy
Specimen Preparation

FT-ICR Mass Spectrometry

CONTACT DETAILS:

Dr Mark Barrow
M.P.Barrow@warwick.ac.uk +44 (0)2476151013

Professor Peter O'Connor
p.oconnor@warwick.ac.uk +44 (0)2476151008

https://warwick.ac.uk/fac/sci/chemistry/research/facilities/icr/

12T & 15T instruments

20 ionization, dissociation and separation methods

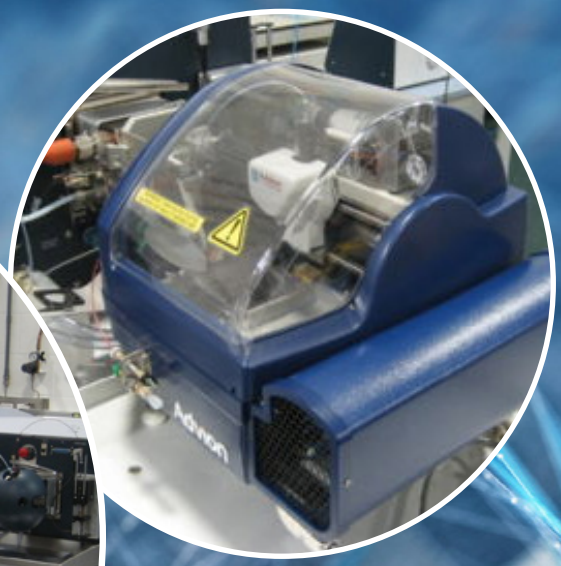
In-house data analysis software

INTRODUCTION TO FACILITY:

Fourier transform ion cyclotron resonance mass spectrometry (FT-ICR), also known as Fourier transform mass spectrometry (FT-MS), is a type of mass analyzer (or mass spectrometer) for determining the mass-to-charge ratio (m/z) of ions based on the cyclotron frequency of the ions in a fixed magnetic field.

The University of Warwick Ion Cyclotron Resonance Laboratory (ICR Lab) houses a Bruker 12 T solariX FT-ICR mass spectrometer with the capabilities outlined below, and we recently took delivery of a new Bruker 15 T solariX XR instrument.

Example research areas include: peptides and proteins (e.g. post-translational modifications, deamidation and isomerization of aspartic acid residues), ionization methods, petroleum (crude oils, asphaltenes, etc.), fuels, bio-oils/biofuels, environmental samples, agrochemicals, and development of new data processing methods.



Photoemission Spectroscopy

CONTACT DETAILS:

Professor Giovanni Costantini RTP Director
G.Costantini@warwick.ac.uk 02476 524934

Dr Marc Walker RTP Manager
M.Walker@warwick.ac.uk 02476 151776

go.warwick.ac.uk/XPS

INTRODUCTION TO RTP:

The Warwick Photoemission Facility was established in 2012 and thus has many years of experience in dealing with both academic and industrial surface characterisation projects across the full spectrum of the sciences. The research undertaken in the RTP is broadly divided into two categories, routine surface analysis and more fundamental surface science. The RTP hosts two modern instruments, both capable of performing surface characterisation experiments with X-ray photoelectron spectroscopy (XPS) and ultraviolet photoelectron spectroscopy (UPS).

The Kratos Axis Ultra DLD spectrometer is a high throughput instrument with automated sample positioning and data acquisition for XPS and UPS. The instrument is also capable of XPS-imaging of surfaces to a resolution of 3 mm, depth profiling of surfaces and annealing to 600 °C. Samples can be loaded via an inert transfer vessel from a suitable N_2 or Ar glovebox.

The Omicron Multiprobe spectrometer also provides routine XPS and UPS, in addition to depth profiling, annealing to 850 °C in vacuum, examining the periodicity of crystalline surfaces with low energy electron diffraction (LEED) and transfer from compatible vacuum systems using a vacuum suitcase. The preparation chamber also houses a thermal gas cracker and a port for user deposition sources.

CAPABILITIES:

X-ray photoelectron spectroscopy (XPS)
Ultraviolet photoelectron spectroscopy (UPS)
XPS Imaging

2 instruments

1000+ samples per year

50+ active users per year

Polymer Characterisation

CONTACT DETAILS:

Professor David Haddleton,
Polymer Characterisation RTP Director
d.m.haddleton@warwick.ac.uk 02476 5 23256

Dr. Daniel Lester,
Polymer Characterisation RTP Manager
d.lester@warwick.ac.uk 02476 574147

go.warwick.ac.uk/polymercharacterisation

INTRODUCTION TO FACILITY:

The University of Warwick is a globally-recognised centre of excellence in polymer research, which is underpinned by the state-of-the-art Polymer Characterisation RTP. The RTP houses a world-class size exclusion chromatography (SEC) suite, a wide range of thermal analysis equipment, particle sizing from nanometre to micrometre scales, materials analysis, such as rheology and mechanical testing, and contact angle measurement. On top of this we have access to more general analytical techniques such as, GC, IR and HPLC.

In addition to experiments using the analytical techniques above, external users can take advantage of formulation development and analysis, plus bespoke project design to meet your requirements.

CAPABILITIES:

Multi-Detector Gel Permeation Chromotography (GPC) / Size Exclusion Chromotography (SEC)
Thermal Analysis
Mechanical Testing
Rheology
Particle Size Determination
Drop Shape Analysis
GCFID/GCMS
HPLC

>25 instruments

50+ external clients

1250 hours of instrument use each month

Polymer Imaging

CONTACT DETAILS:

Professor Giovanni Costantini,
G.Costantini@warwick.ac.uk +44 (0)2476524934

https://warwick.ac.uk/fac/sci/wasc/facilities/polymerimaging/

INTRODUCTION TO FACILITY:

Polymers have a wide range of applications, with conjugated polymers being used in flexible electronic applications such as organic photovoltaics, transistors, light emitting diodes and sensors. In order to optimise these materials for use in devices, we need to fully understand the characteristics of the polymer microstructure. We have developed a technique for depositing and subsequent high-resolution imaging of conjugated polymers.

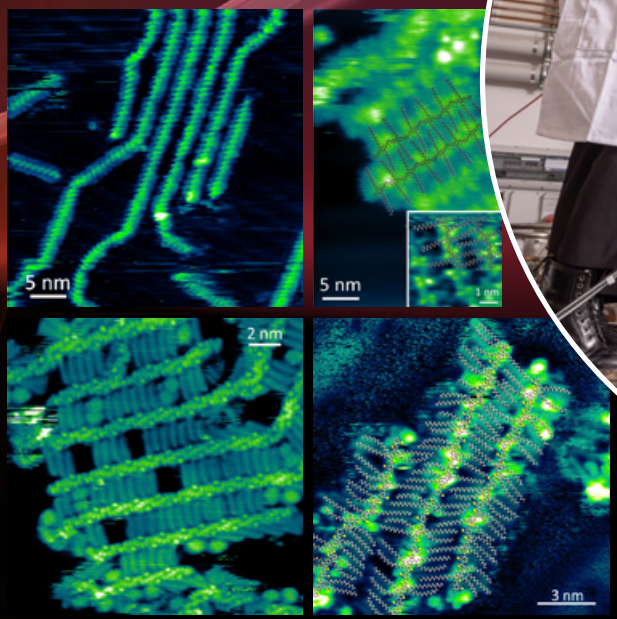
Imaging of individual polymer chains

Sub-nanometre resolution

CAPABILITIES:

The Technique
The polymer imaging technique uses a combination of vacuum electrospray deposition (ESD) and low temperature scanning tunnelling microscopy (STM) to achieve high resolution images under ultra-high vacuum.

What Can it Show?
The technique can image individual molecular species with sub-nanometer resolution. It can be used to identify monomer units and side chains to provide a precise sequence of polymer structure. It enables the user to understand the nature, number and position of defects on a polymer backbone.
Example images are provided below.



Proteomics

CONTACT DETAILS:

Dr Alex Jones, Proteomics Facility RTP Director
alex.jones@warwick.ac.uk 02476 528144

Dr Andrew R. Bottrill,
Proteomics Facility RTP Manager
proteomics@warwick.ac.uk 02476 574182

go.warwick.ac.uk/proteomics

INTRODUCTION TO FACILITY:

The Proteomics RTP provides service and support to academic and commercial researchers seeking to identify and quantify proteins and their modifications. The analysis of protein mixtures from gel slices, co-immunoprecipitations or enrichments is routine and we can identify several thousand proteins in complex samples such as cell lysates and tissue extracts. Our favourite challenges include the analysis of protein phosphorylation and post-translational modification mapping. You will find support from an enthusiastic proteomics team to help with scientific discussion, experimental design, sample preparation, analysis of data and provision of training.

CAPABILITIES:

Experimental design and sample preparation
timsTOF Pro with nanoLC
- Ion Mobility and ultra-fast LC-MS/MS.

Orbitrap Fusion with UltiMate 3000 RSLCnano System (Thermo Scientific)
- Identify and Quantify unknowns from complex mixtures.

Quantiva triple quadrupole with UltiMate 3000 RSLCnano System (Thermo Scientific)
- Validate targets generated from analysis of complex mixtures

Data analysis

3
instruments

Bespoke experimental design

126
users from 65 research groups

Solid-State Nuclear Magnetic Resonance

CONTACT DETAILS:

Professor Steven Brown, Director of WASC
S.P.Brown@warwick.ac.uk
+44 (0)2476574359

Dr Anjali Menakath, Research Fellow
A.Menakath.1@warwick.ac.uk

go.warwick.ac.uk/nmr

CAPABILITIES:

Spectrometers
700 MHz Bruker Avance III HD
600 MHz Bruker Avance Neo
500 MHz Bruker Avance III
400 MHz Bruker Avance III HD
300 MHz Varian InfinityPlus
300 MHz Bruker Avance III HD
200 MHz Bruker Avance III HD
100 MHz Bruker Avance III HD

>8
magnets

>60
probes
Up to 700 MHz

INTRODUCTION TO FACILITY:

The Solid-State NMR laboratory at Millburn House hosts superconducting magnets for performing NMR, ranging from 600 MHz to 100 MHz for solid-state NMR. An additional 700 MHz solid-state NMR spectrometer is housed in the NMR hall in the MAS building. Although subject to its own application procedure as an EPSRC-funded National Research Facility (go.warwick.ac.uk/850mhz) and not offered as part of WASC, we are also home to the UK High-Field Solid-State NMR Facility which houses a 1 GHz and a 850 MHz system.

Over sixty probes enable NMR to be performed over a wide temperature range from 90 K to 1000 K, with air or nitrogen gas, and magic-angle spinning (MAS) rotors with diameters ranging from 0.7 mm to 0.8 mm (100+ kHz spinning) to 1.3 mm (67 kHz spinning) to 1.8 mm (45 kHz spinning) to 2.5 mm (35 kHz spinning) to 3.2 mm (22 kHz spinning) mm to 4 mm (15 kHz spinning) to 7 mm (5 kHz spinning) to 14 mm (4 kHz spinning). There are also two Double-Rotation (DOR) probes.

The multi-departmental team has a wide range of solid-state NMR research interests encompassing the development of multinuclear solid-state NMR methodology and pulse-sequences, combined with calculations and application to materials science, biological solids and pharmaceuticals and supramolecular chemistry.

Spectroscopy

CONTACT DETAILS:

Dr Ben Green, Spectroscopy RTP Director
B.Green@warwick.ac.uk

Dr Ben Breeze, Spectroscopy RTP Manager
B.Breeze.1@warwick.ac.uk
02476 572865 / 07384 231344

General enquiries **spectroscopy@warwick.ac.uk**
go.warwick.ac.uk/spectroscopy

INTRODUCTION TO FACILITY:

The Spectroscopy RTP has enabled easier access to the facilities and tailored training for researchers requiring the spectroscopic data that supports Warwick's world class scientific research. The range of complementary techniques available at the RTP enables non-destructive investigation and characterisation of liquid, solid and gaseous samples.

Services include Raman, photoluminescence and optical absorption spectroscopy and microscopy; and electron paramagnetic resonance. In addition to these techniques we are able to create custom experiments to meet specific non-standard needs. The RTP has access to specialised data analysis software and databases of reference spectra to aid material characterisation.

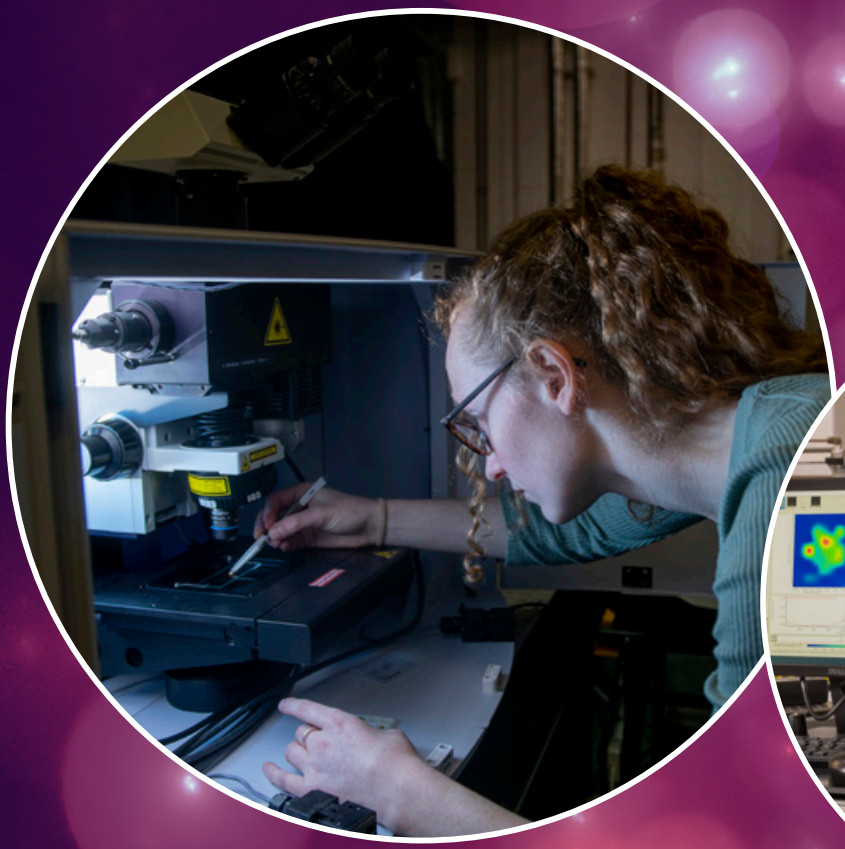
CAPABILITIES:

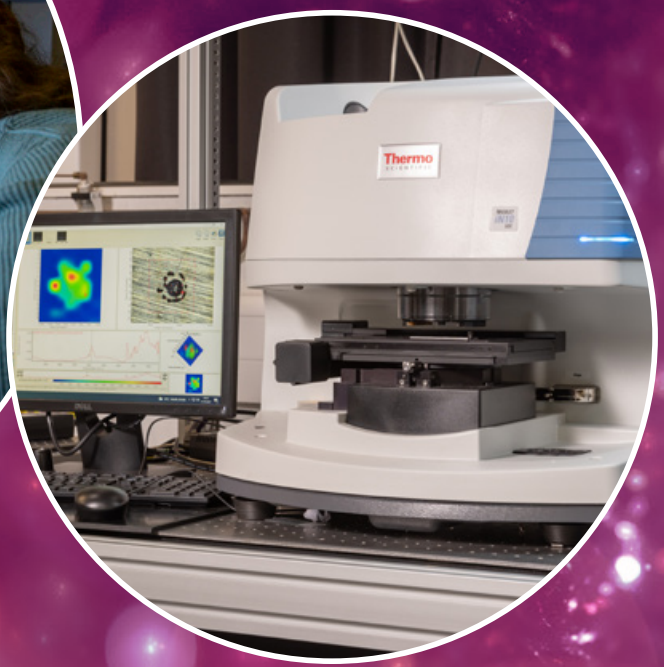
- Raman Spectroscopy and Microscopy
- Photoluminescence Spectroscopy and Microscopy
- FT-IR Spectroscopy and Microscopy
- UV Vis Optical Absorption Spectroscopy
- Electron Paramagnetic Resonance (EPR)
- White Light Interferometry

16 instruments

used by **6** departments

75+ active users in the last 6 months





Trace Metals in Medicine

CONTACT DETAILS:

Professor Joanna Collingwood,
Head of the Trace Metals in Medicine Laboratory
J.F.Collingwood@warwick.ac.uk
+44 (0)2476523152

https://warwick.ac.uk/fac/sci/eng/people/joanna_collingwood/tracemetalslab/

INTRODUCTION TO FACILITY:

Our primary focus is imaging and quantifying transition metal ion distribution in the human brain, supporting progress in early detection and diagnosis for neurodegenerative disorders. We use a variety of analytical techniques, including high resolution MRI, synchrotron X-ray microfocus spectroscopy, and magnetometry to characterize the distribution and form of trace metals in tissues and protein aggregates. We are offering several of our techniques for WASC, as outlined below.

Magnetic Resonance Imaging

Ultramicrotome Sectioning

CAPABILITIES:

Magnetic Resonance Imaging
MRI Probe (for imaging at 9.4 T): we have a state-of-the-art MR microscopy probe that utilizes the 400 MHz spectrometer in Millburn House, under the Science Cities Translational Medicine 2 Programme. It is presently configured for in-vitro work, and the coils are primarily volume coils for ^{1}H imaging; we also have a surface coil, and a ^{19}F volume coil for small samples (<5mm).

General Sample Preparation
Wet-lab with chemical safety cabinets, refrigerated centrifuge, balances, ultrapure water supply, and refrigeration equipment. Containment level 1 area with Class II biosafety cabinets, (cryo)microtome sectioning for trace metals analysis in tissues, fluorescence light microscopy (inverted microscopy), and freeze drying.
Cell culture resources (including incubator and fluorescence plate reader).

Ultramicrotome Sectioning
An ultramicrotome is an instrument used for cutting sections of a specimen to sub-micron thicknesses, compatible with analysis by transmission electron/x-ray microscopy. The Trace Metals in Medicine Laboratory houses a Reichert-Jung ultra-cut microtome, which is mostly used for sectioning resin-embedded biological specimens

Ultrafast Spectroscopy

CONTACT DETAILS:

Dr James Lloyd-Hughes,
Ultrafast Spectroscopy RTP Director
J.Lloyd-Hughes@warwick.ac.uk 02476 522043

Dr Jack Woolley,
Ultrafast Spectroscopy RTP Manager
Jack.Woolley@warwick.ac.uk 02476 151013

go.warwick.ac.uk/ultrafast

INTRODUCTION TO FACILITY:

The Warwick Centre for Ultrafast Spectroscopy (WCUS) was established in 2017 and became an RTP in 2021. The use of cutting-edge ultrafast (femtosecond = 10^{-15} s) lasers allows for the observation of atomic and charge carrier motion. This is used to investigate novel materials and molecules from semiconductors to new sunscreen filters.

Wide range of working wavelengths from 200-20000 nm and 0.5-3 THz

£2M

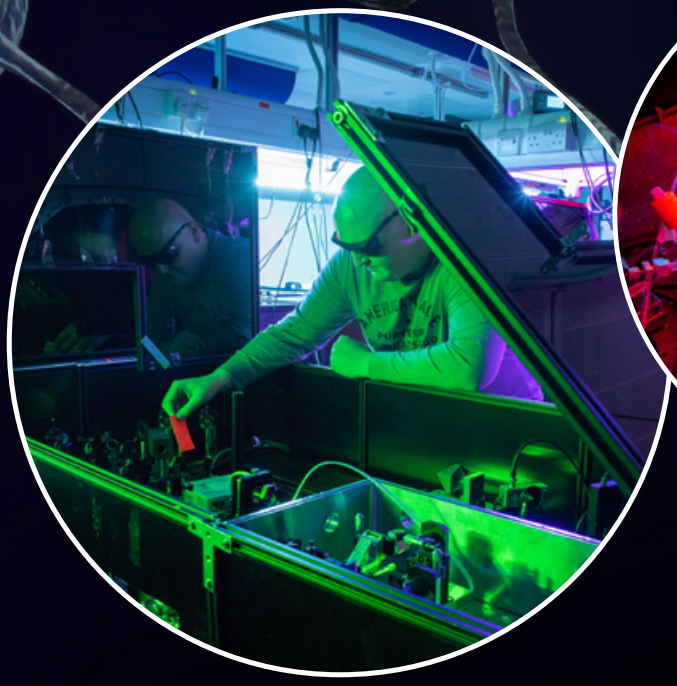
worth externally funded equipment

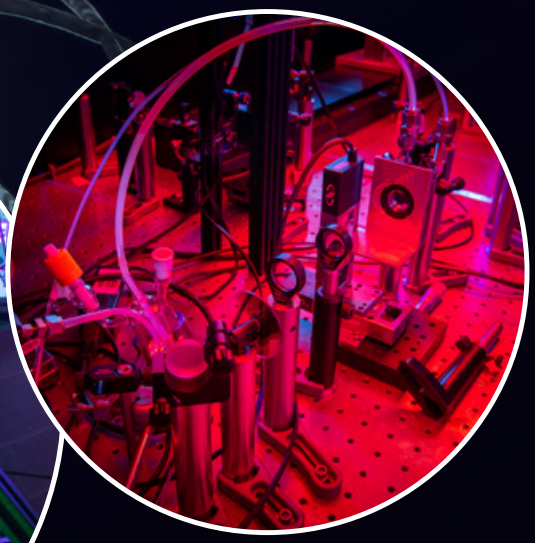
40 femtosecond time resolution

The RTP houses an ultrafast Ti:sapphire laser system (Newport Spectra-Physics Spitfire PA Pro) with four independently-compressible beam outputs. Through use of several optical parametric amplifiers (TOPAS, Light Conversion) the 800 nm fundamental of the Spitfire can be converted into any wavelength from the UV (235 nm) to the mid-infrared (20 microns), while we use custom non-linear effects to produce far-infrared (terahertz) pulses (75 to 600 microns). These sources serve four major beamlines in the facility: Transient Electronic Absorption, Transient Vibrational Absorption, Optical Pump/Terahertz Probe and High Field Terahertz Spectroscopy. Additionally, the facility has a Cary60 UV-Vis absorption spectrometer, a Bruker 70 V Fourier Transform IR spectrometer and a Horiba Fluorolog 3 fluorescence spectrometer, which performs time-resolved fluorescence measurements down to 1 ns time resolution over the 300 nm to 1700 nm wavelength range. We can run experiments in a number of environments, including air, dry N_2 atmosphere and vacuum, and have a number of cryostats available to test samples from 77 to 300 K.

CAPABILITIES:

- Transient Electronic Absorption Spectroscopy
- Transient Infrared Absorption Spectroscopy
- Optical Pump Terahertz Probe Spectroscopy
- High Field Terahertz Spectroscopy





X-ray Diffraction

CONTACT DETAILS:

Professor Richard Walton, XRD RTP Director
r.i.walton@warwick.ac.uk 02476 523241

Dr David Walker, XRD RTP Manager
d.walker.2@warwick.ac.uk 02476 151299

Dr Steven Huband, SAXS Specialist
s.huband@warwick.ac.uk 02476 151782

go.warwick.ac.uk/x-ray

5 metre long SAXS

470+ publications since 2008

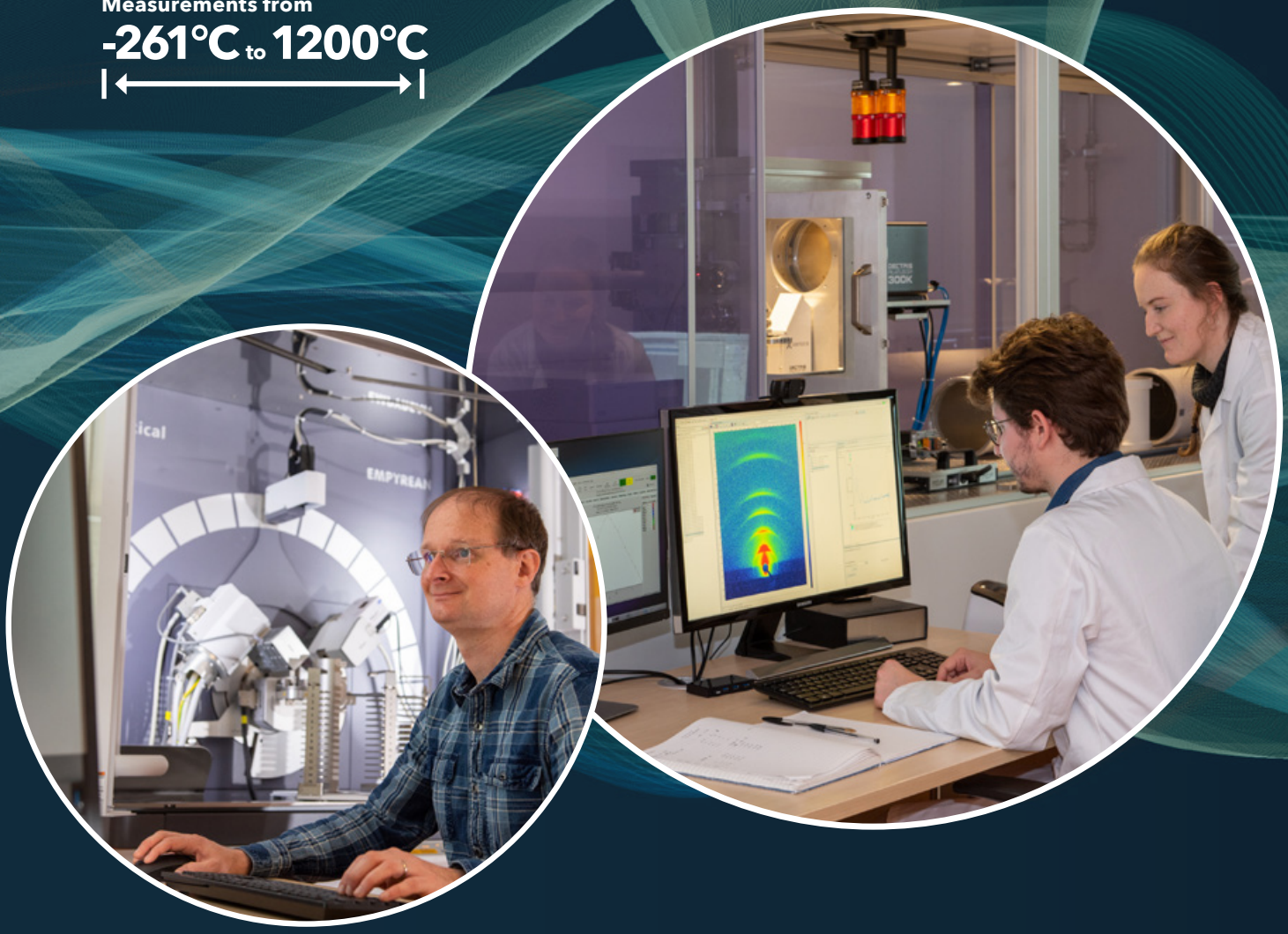
Measurements from
-261°C to 1200°C

INTRODUCTION TO FACILITY:

The X-ray Diffraction (XRD) RTP has a wide range of x-ray technologies and expertise in data analysis. A dedicated team of three members of staff can help train you, provide access to state-of-the-art equipment or carry out experiments on your behalf. The RTP houses 5 powder diffractometers (with non-ambient conditions available), 2 single crystal diffractometers, 2 high resolution diffractometers, a wavelength dispersive x-ray fluorescence (WD-XRF) and a small angle x-ray scattering (SAXS) system.

CAPABILITIES

X-ray Diffraction
Small angle X-ray scattering (SAXS)
Wavelength Dispersive X-ray Fluorescence (WD-XRF)



WARWICK ANALYTICAL SCIENCE CENTRE (WASC)

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https://warwick.ac.uk/fac/sci/wasc/

Photography by: Hollis Photography UK