

CORE FACILITIES

2021-22 Report

Core Facilities is a fast growing, dynamic part of the Research Management & Innovation Directorate at King's College London. We have eight state-of-the-art facilities, supporting cutting edge research.

We provide sustainable and accessible research infrastructure, technical expertise and training to King's researchers, external collaborators and private institutions.

Facilities

Centre for Ultrastructural Imaging

CL3 Facility

Genomics Centre

London Metallomics Facility

Nikon Imaging Centre

Microscopy Innovation Centre

NMR Facility

Proteomics

CORE FACILITIES

2021-22 Annual Report

FOREWORD



The Core Facilities team continue to deliver on our mission to offer world-class research capabilities and infrastructure to our research community.

I am very proud of the resilience demonstrated by our talented team during the COVID-19 pandemic; rapidly adjusting to new ways of working to maintain high levels of service and support to minimise disruption to critical research. The team quickly developed a comprehensive programme of online training to support researchers accessing our Core Facilities, along with an increased commitment to online teaching of students on a range of undergraduate and postgraduate programmes. The demand for online training and teaching is still strong post-pandemic and where possible, we continue to offer these online services.

KCL TEST, the COVID-19 testing facility, designed, initiated and consistently delivered by Core Facilities and made available to King's staff and students and the general public was a huge success for the Core facilities team and benefit to the University. Onsite testing kits and drop-off points at each campus, fit-to-fly processing and fast turnaround times supported many of us as the lockdown restrictions eased.

Alongside our commitment to deliver excellent service to researchers, the Core Facilities team strives to maintain a competitive advantage through collaborations and seizing funding opportunities that enable us to offer our researchers faster and higher quality data acquisition.

Core Facilities formed a number of important collaborations this year, notably a successful application for a UK Biomedicine Node with King's as the lead organisation. We have contributed to the Mars programme, in collaboration with UCL and NASA and we have created training opportunities for our staff at leading institutions including Harvard University and the University of Sao Paulo. We will be installing a new automated cryo-transmission electron microscope in the Centre for Ultra-Structural Imaging this year, and have procured a flagship laser ablation system and the first ever placement of the Vitesse time-of-flight instrument.

We will continue to work with the research community this coming year, as we open the doors of our new Containment Level Three (CL3) facility and explore ways in which we can meet the changing needs of the research community in terms of our mass spectrometry capabilities and enhancing our imaging analytical skills base.

We look forward to continuing to work closely with the research community at King's.

Jo Martindale
Director, Research Platforms



Jo Martindale, Director, Research Platforms

AT A GLANCE

**53%**

equipment utilisation,
equating to **26,827**
booked equipment hours

**508**

users, made up
of **460** King's researchers
and **40** external
researchers

**29**

research articles
published, including
10 as authorships

**1,180**

hours
training researchers to
use specialist equipment

**186**

teaching hours,
across **12** undergraduate
and graduate teaching
modules

**130**

funded
research projects
supported

INTRODUCTION



Core Facilities is part of the Research Management and Innovation Directorate. We are made up of 8 centers of expertise, offering distinctive and innovative capabilities and providing access to state-of-the-art facilities, equipment and techniques.

We facilitate knowledge exchange and provide expert advice, training and support to facility users and deliver an extensive teaching program. Our funding model supports a wide range of access, promoting innovation and discovery-based research.

The Core Facilities management team has grown over the past two years, expanding our expertise to grow the team and provide increased support for our research facilities. This expansion has allowed dedicated support for Health and Safety, Business Development and other business critical areas such as Infrastructure Management and Sustainability, enabling us to operate more effectively as a network.

The delivery team, made up of 20 professional services staff members, supported over 460 King's and 40 external users this year, contributing to over 130 funded research projects and 29 peer reviewed journals, including 10 authorships.

The pandemic posed numerous challenges for our Core Facilities, but many have made significant gains post pandemic and we continue to review our offering and working practices to adapt after such a significant period of disruption.

Continued improvement is a key focus for all the facilities, and we have initiated a number of projects this year, including a detailed review of our metrics reporting and costing tools, improvements to our online presence and working collaboratively with our users to identify gaps in our research offer.

LEADING THE DEVELOPMENT OF RESEARCH AND INNOVATION

The creation of the Core Facilities Operations Management Board (CFOMB) to operationally oversee the full portfolio of facilities strengthens our governance structure and increases the Core Facilities profile. We have representatives from across the university, enhancing our engagement and collaborative working.

Our Containment Level 3/Schedule 5 facility will be the first one of its kind at the university. Our vision is to enable high impact infectious disease research at King's – a priority of several of our major funders – which will serve communities by driving positive change in health and improve pandemic preparedness. Facility users, (lab based staff, PIs and the facility manager) attended a comprehensive Containment Level 3 training course. This provided background knowledge of legislation and procedures, clearly defined roles and responsibilities and equipped the team to operate to the highest standards. Once the facility is signed off by the Head of Biological Safety and appropriate regulators (HSE, CTSA), the facility will open for a period of "soft landing" (estimated September 2023).

A merger of King's Genomics Centre on the Waterloo Campus with NIHR BioResource Centre Maudsley Genomics Facility, based at IoPPN is underway, with the new facility scheduled to open at the end of May. This merger increases the genomics offerings to researchers and will improve visibility across the university. We look forward to working with our faculty partners in making this facility a success.

During the pandemic KCL TEST, our in-house COVID 19 testing service became an integral part of the university's safety plan, supporting many operational challenges experienced during such unprecedented times. The KCL TEST facility closed in June 2022 after providing 18 months of popular services (rapid non-invasive testing, Fit to Fly, Day2/8) to students, staff and their families whilst making contributions to SARS-CoV-2 research and contributing our test results to the national surveillance efforts through UK Health Security Agency (UKHSA).

The KCL TEST lab has applied for accreditation status from the UK Accreditation Service (UKAS). The standard, ISO 15189, is specific to medical laboratory testing and final assessment is expected to be completed by May. We are working with the research community to identify opportunities that make maintaining the standard worthwhile. Performing assays in a UKAS accredited laboratory would enable the analysis of clinical samples to ISO standards - similar to an NHS laboratory. We plan to extend the scope of accreditation to other assays, starting with the new Centre for Lung Health, which involves researchers across the whole of King's Health Partners (KHP).

Sustainability continues to be a key priority for the Core Facilities. The LMF have started working with Recycle Lab, a small company recycling lab plastic. As a result, the LMF now recycles all plastics that are not contaminated with biological waste (approximately 85% of the plastics we use). We are looking to implement this service in other labs across our Core Facilities over the coming year.

The Microscopy Innovations Center (MIC) and the Nikon Imaging Centre (NIC) registered with the Laboratory Efficiency Assessment Framework (LEAF) this year and are working towards their bronze certification, identifying practical steps to make their lab more sustainable.

KCL TEST SUCCESS

158,277
PCR TESTS

20,000
PARTICIPANTS

12,528
FIT TO FLY
CERTIFICATES

We're looking forward to the implementation of the new, organisation wide, research facilities management system, Stratocore. The new system will streamline processes across Core Facilities and the wider university and improve research management, support and reporting. The newly formed Research Infrastructure Fund (RIF), to maintain and upgrade critical research infrastructure, gives Core Facilities access to an annual £1m funding pot. This allows us to address life cycle replacement and gaps in the core facilities offering and will benefit our facilities infrastructure significantly.

The London Metallomics Facility (LMF) have plans for a major refurbishment of the laboratory space to house three new instruments, (Vitesse TOF-MS, NexION 5000 TQ-MS and iridia laser) which will allow the facility to perform novel measurements at unprecedented speeds and accuracies. The planned works will significantly increase scope of users, through the introduction of containment level 2 (CL2) infrastructure with a focus on health-safety compliance and staff-wellbeing. This refurbishment will solidify the LMF as a nationally and globally unique analytical hub in the rapidly growing field of Metallomics.

The CUI was Co-I on a successful BBSRC multiuser equipment call for an automated cryo-transmission electron microscope. This addition to the CUI increases our capabilities in advanced EM and allows quantitative EM of targeted regions of interest at high temporal and spatial resolution.

SERVICE DELIVERY



Our Accelerating Research programme continues to map the agenda for improvement and innovation for Core Facilities. Through a series of focus groups, we're listening to researchers to learn how we can improve our services and are working with RMID to achieve a collaborative approach.

Feedback from our 'Accelerating Research' programme highlighted key areas of improvement for Core Facilities, including improving our online presence and communication, identifying gaps in our research offer and streamlining processes and administration for external contracts.

This had led to a number of projects, including the development of the King's Research Facilities webpages, updating content and standardising the look and feel. We're leading an initiative to assess the scope of mass spectrometry research to ensure that King's is effectively communicating its existing resources for current research, and understand which mass spec-based technologies, infrastructure and expertise are needed to maintain cutting edge research. We've improved the administrative process for quotes, streamlining processes and communication across departments, and we're working with the contracts team to create robust and streamlined workflows for external contract work in Core Facilities.

TEACHING COMMITMENT

Core Facilities are committed to supporting King's 'teach to inspire' aspirations by providing training and teaching to our staff and student community. This year, every operational facility was involved in teaching, collectively delivering 186 teaching hours across 12 undergraduate and graduate course modules and group workshops. We have invested 1,180 hours training researchers to use specialist equipment within our facilities and provided support and expertise to develop advanced research techniques and data analyses.

We host a range of workshops and drop-in clinics across the year. The CUI hosted a successful symposium, 'Bringing Structural Biology to Cells and Tissues', focusing on the current and future potential of electron microscopy in the high-resolution 3D study of cells, tissues and in situ macromolecules.

The second LMF virtual symposium 'Role of Metals in Brain Health and Disease' was held in May 22 and talks were recorded and made available online to support further engagement.



186 teaching hours, across **12** teaching modules



1,180 hours training researchers to use specialist equipment

BUSINESS DEVELOPMENT AND COLLABORATIONS



We continue to explore and promote innovative technology, workflows and collaborations to create unique service offerings that meet both internal and external demands. Thea Stewart, Business Development Manager has identified a number of opportunities this year to boost growth across the facilities and strengthen our core offer.

Following a successful bid, led by Thea, King's will host the 9th International Symposium on Metallomics in June 2024, with an expected 250 in person attendance as well as online engagement. The theme for ISM9 will be sustainability, addressing how we can have a sustainable research impact through breaking scientific and cultural silos, whilst engaging a wider community to support meaningful and directed collaborations. Key topics, including metals in human health and environmental health & sustainability will facilitate rich discussions for new horizons in metallomics research among academic and clinical researchers, industry, and the commercial sectors, and serve as an international launch for the LM.

Additionally, Thea is carrying out a review of mass spec facilities at King's and has conducted a survey to gather information and user feedback. Results from this survey highlighted key strengths and also areas where we can improve our services and capacity. The review will take into consideration a national UKRI bid for Critical Mass, to transform MS research and innovation in the UK with £100m of national infrastructure funding awarded to leading research institutes.

Strong collaborative partnerships continue to strengthen our research capabilities and outputs. Significant achievements this year include the Microscopy Innovation Centre (MIC) joining the London Centre for Nanotechnology (LCN) network, increasing our Core Facilities membership to four facilities, and King's successful application to form a UK BioImaging Node involving four of our Core Facilities; The Nikon Imaging Centre (NIC), Microscopy Innovation Centre (MIC), Centre for Ultra Structural Imaging (CUI) and the London Metallomics Facility (LMF). This collaboration, coordinated by King's, brings together seven complimentary and interlinking institutions, and will significantly enhance our international profile & partnerships.

The MIC received two awards from the Royal Microscopical Society Business Interaction Voucher scheme to partner with Nano Clinical Ltd. to investigate a novel fluorescence lifetime imaging modality, and with Nikon UK to continue development of a 3D localisation microscope.

HEALTH AND SAFETY



A new RMID H&S Manager was recruited in August 2021 to support the diverse risk profile of the Core Facilities in what has been an exciting, busy and productive first year. Initially supporting KCL TEST in preparation for UKAS accreditation, the H&S Manager has gone on to work with all the Core Facilities to identify gaps where further support is needed, make plans for improvement and to be available to the staff when they need day to day support.

To deliver on RMID's H&S plan, critical guidance documents, procedures and templates have been created and tailored to Core Facilities and the team continue to integrate these into their local H&S processes and activities. The team have also benefitted from the RMID wide additional paid for support from Posturite to resolve issues with computer workstations and ergonomics. The securing of a lone worker app for the university, with faculty and H&SS colleagues, is an exciting project in the pipeline, representing a huge benefit for many of our Core Facilities staff as well as supporting the research of our users who may need to work beyond normal hours.

PARTNERSHIP WITH UCL AND NASA

The Proteomics Facility are working with UCL and NASA, determining protein changes in kidney tissue exposed to galactic cosmic radiation (GCR) and microgravity (MG). MG is thought to damage protein pathways in calcium transport while GCR is thought to damage the protein networks in renal proximal cells, both likely to cause kidney failure within the timeframe of a Mars mission.

'Working on this collaboration has been exciting. To be part of a research project that will be used to inform scientists about the effects of deep space exploration has been a privilege.'

Steven Lynham
Proteomics Facility Manager

KING'S FAIR PUBLICATION POLICY

To ensure the contributions of colleagues are credited, King's now has a new Fair Publication Policy which aids researchers in recognising the work performed by our Research Facility staff. Led by Dr Nicholas Anthony, Microscopy Innovation Centre Manager, the policy supports the aims of our Accelerating Research Programme and King's Technician Commitment.

This year, Core Facilities contributed to 29 peer-reviewed journals, including 10 authorships.

'The new Fair Publication Policy is an important step forward for King's as we seek to recognise our technicians and all those across King's who contribute to our research endeavours. This new policy formalises King's approach and makes sure all those who facilitate our research success and impact are fairly acknowledged'.

Professor Shitij Kapur

President & Principal, King's College London

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TRAINING AND DEVELOPMENT



This year Core Facilities increased and centralised the training and development budget to support a more inclusive and fair deployment of support across the facilities. The team have been involved with a variety of training, have engaged with national and international conferences and worked collaboratively to share knowledge and support team development.

Working from a gap analysis, significant upskilling has taken place for many of the Core Facilities managers to support them in their roles and responsibilities for H&S. This included the NIC Manager successfully completing the 5 day 'Laser Safety Management Course' and several facility managers and staff training as Biological Safety Supervisors to better support work with human primary samples in their respective facilities. Additionally, each facility has a nominated and trained accident investigator who has completed the relevant training course.

Our Proteomics Manager, Steve Lynham participated in training at the world renowned Proteomics Facility at Harvard University, resulting in workflow optimisations of current processes and a longer-term blueprint towards achieving 100% cost recovery for our Proteomics Facility.

Mental Health First Aid Training

'The Mental health first aid course (MHFA) was a two-day course providing insight and understanding of mental health and factors that can affect our well-being. I found it to be very informative and it gave me new insights and perspectives on aspects of our mental health and how it affects people from varying backgrounds. I'm looking forward to offering this support to colleagues within our team and hope I can have a positive impact on wellbeing.'

**Dylan Herzog, Microscopy Innovation Centre
Deputy Manager**

Proteomics training at Harvard Medical School

'Visiting the proteomics facility of Steve Gygi at Harvard Medical School gave me the opportunity to see how one of the world's premier proteomics facilities operates, not only at the bench level but also at the management level. The visit gave me insight in how a high-throughput research facility, analysing >9,000 samples per annum with 14 mass spectrometers, delivers a world-class service. We have now implemented improvements on protocols to aid streamlining of sample preparation, equipment methods, and data analysis which will greatly improve the service level we can offer in our own facility.'

Steven Lynham, Proteomics Facility Manager