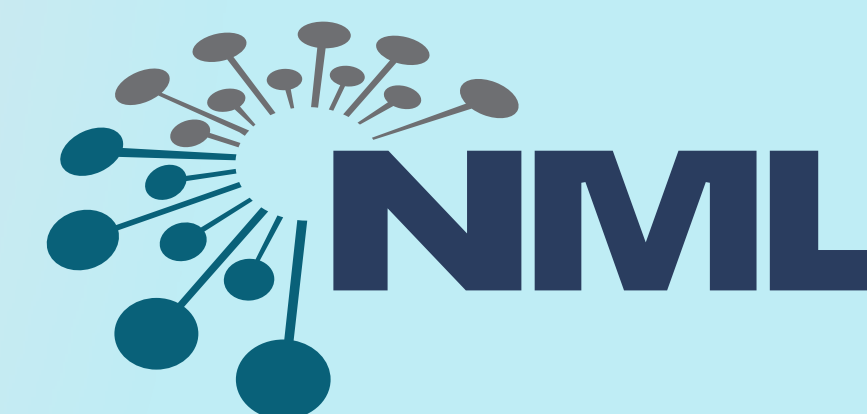


National Measurement Laboratory Annual Review 2025



Executive summary

This year has seen an exciting new chapter in the continued growth of the UK's Designated Institute for chemical and biological metrology.

As part of the National Laboratories at LGC, the National Measurement Laboratory (NML) is one of three critical national functions of science and safety hosted by LGC and brought together in a purpose-designed, low-carbon laboratory facility.

Now located in The Priestley Building on the Surrey Research Park in Guildford, the new laboratories connect national capability with a thriving local innovation ecosystem of academia, the health service and industry.

The £20 million investment in this new facility by the LGC Group strengthens national scientific infrastructure and signals long-term private sector commitment to UK public sector research and innovation capability. It represents both a continuation of our long scientific heritage and a clear investment in our future.

“Much of the science that we benefit from every day, from new medicines to high food safety standards, is underpinned by the work of the National Measurement Laboratory and the Government Chemist. This new lab will ensure our facilities are fit for future as new opportunities develop in areas like advanced therapeutics and engineering biology, helping to improve lives and grow our economy through new discoveries.”

– **Lord Patrick Vallance, Minister for Science, Innovation, Research and Nuclear in the Department for Science, Innovation and Technology (DSIT) and the Department for Energy Security and Net Zero (DESNZ).**

It therefore remains a privilege to continue to lead the NML into the next phase of its evolution, underpinning the critical issues facing society with sound measurement principles and application. Our mission is to give confidence – trust that the data, products and services that shape our world are accurate, reliable and fit for purpose. Work that allows scientific results and regulatory decisions to be compared and trusted across borders. By underpinning this global traceability network, we help foster innovation, improve productivity and enable smoother trade.

Our purpose may remain constant, but we are better than ever prepared to tackle new scientific challenges that protect, inform and enable, with a renewed energy and ambition – a catalyst for change.

Julian Braybrook

Director, National Measurement Laboratory



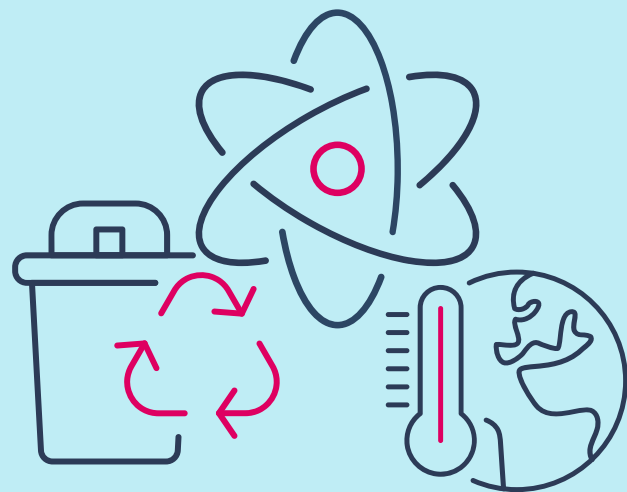
Our sectors



Health



Food



Sustainability



Security

Our numbers

Reference materials	~120
Peer reviewed publications	47
New accredited measurement services	3
Direct contributions on documentary standards	27
Published*	4*



Our core roles

We are the **UK's Designated Institute for chemical and biological metrology**, providing world leading measurement expertise.

We provide **trusted measurement science, standards and evidence** that enables policy makers and governments to make informed decisions.

We deliver **specialist training and commercial services** to upskill researchers and support translation in industry.

We facilitate **programmes and networks** to embed measurement science, connect stakeholders and drive translation across sectors.

We connect industry, academia and government **across the UK to develop place-based expertise** and generate the best environment to support and encourage growth and innovation.

Our locations



Explore our locations →

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Investing in the future of UK measurement infrastructure

Investing in world-class measurement infrastructure is essential to ensuring the UK remains at the forefront of science, innovation and economic growth.

Through targeted investment in advanced facilities, capabilities and partnerships, the National Measurement Laboratory is strengthening the foundations that enable accurate, reliable measurement – supporting industry, informing policy, and addressing emerging national challenges.

Investing in resilient measurement infrastructure for the UK's future

The National Measurement Laboratory relocated to a new facility in 2025. As part of the National Laboratories at LGC, the NML is one of three critical national functions of science and safety hosted by LGC and brought together in a purpose-designed laboratory facility.

Located in The Priestley Building on the Surrey Research Park in Guildford, the new low-carbon laboratories connect national capability with a thriving local innovation ecosystem of academia, the health service, and industry.

The £20 million investment in this new facility by LGC Group strengthens national scientific infrastructure and signals long-term private sector commitment to UK public sector research and innovation capability.



Strengthening the capability that sustains UK leadership in measurement science

We have invested in state-of-the-art infrastructure to maintain the UK's world leading position at the forefront of measurement science, ensuring the UK remains equipped to evolve as new challenges emerge.

Supported by a grant from the Department for Science, Innovation and Technology (DSIT) to enable research and innovation organisations to upgrade core instrumentation, we have improved and expanded our core purity capabilities. Purity determination of analytes is essential for developing high-quality standards and reference materials, used to identify and/or quantify unknown samples, calibrate instruments, and develop new measurement capabilities. In the DSIT-initiated 2023 International Review of Science¹, our core purity and calibration facility was deemed critical, not just for UK infrastructure resilience but also for maintaining the UK's international metrology standing.

This investment to replace core instrumentation and strategically extend capability ensures a robust, effective, and efficient calibration and measurement traceability system, providing our experts with the infrastructure they require to perform high-quality measurement science.

The benefits are already tangible. In addition to our core purity capabilities, the investment in novel technology (DNA synthesiser) has supported our work on emergency response for UK biosecurity and resilience.

A leading voice for UK science: NML joins the NRO Group



The National Measurement Laboratory has joined an alliance of around 40 organisations dedicated to advancing science for the benefit of people, communities, the economy and national priorities under the [National Research Organisations \(NRO\) Group](#).

The NRO Group was formed in 2025 to address fragmentation across the UK research landscape. It aims to bring greater coherence and collaboration to the ecosystem, allowing the whole to be greater than the sum of the parts. This ensures that the unique capabilities of the UK's national research organisations deliver maximum impact, making research matter. By focussing efforts, the NRO can play an important role in improving lives and driving growth across the UK.

“We [the NML] are excited to bring our expertise in chemical and biological measurement to the table. By working alongside other leading research organisations, we can tackle major national challenges and ensure science delivers a real, positive impact. The NRO Group provides a trusted, unified and authoritative voice that ensures science-based insight informs national decisions, strengthens resilience, and drives progress”

- Professor Julian Braybrook, Director of the NML

¹[2023 International Review of Science - NML](#)

A background image showing two scientists in a laboratory. A woman in the foreground wears safety glasses and a white lab coat over a red and white striped shirt, holding a tablet. A man with glasses and a beard is partially visible behind her. The image has a blue tint.

02

Our international role

The need for accurate measurement becomes ever more important as technology evolves and global challenges grow increasingly complex.

The NML leads the advancement of chemical and biological measurement science, ensuring accurate and globally comparable data that underpins scientific progress, trade and decision-making. Through global collaboration, we deliver real-world impact.

A century and a half of scientific collaboration

2025 marked 150 years of the signing of the Metre Convention, which established international cooperation in measurement. From protecting public health to ensuring fair trade and promoting scientific discoveries, the legacy of the Metre Convention continues to shape our world.

Working in close partnership with organisations across the UK and internationally, we are advancing measurement research to support scientific collaboration, enable smoother trade, inform evidence-based regulation, and deliver better outcomes for the public, the economy and the environment.



The 150th anniversary, hosted by the BIPM in Paris, provided an opportunity to reflect on the remarkable achievements made possible by international cooperation.

We were honoured to be invited to showcase how our core inorganic (elemental) capabilities contribute to improving the recycling of technology critical elements from e-waste, through the MetroCycle project (funded by the European Metrology Programme for Innovation and Research).



Strengthening UK measurement capability on the global stage

Our expert scientists lead and participate in global measurement research initiatives (through [BIPM CCQM](#)) and international documentary standardisation efforts (ISO). Through coordination roles, publications and active participation in comparison studies we provide evidence for the quality of our UK measurement capabilities and support our global positioning.

Through global measurement task groups (through BIPM CCQM), we are providing expertise and leadership to support focus areas aligned with UK stakeholder needs including cancer genomics, particle characterisation, nano- and microplastics, food safety, infectious disease diagnosis and proteomics.

NML representatives on CCQM
Working Groups and Task Groups

13

Participation in

9 of 12

CCQM Working Groups

* Leading on 2

Participation in

6 of 8

CCQM Task Groups

* Additional 4 Task Groups at Working Group level

Fostering international collaboration in biological metrology

Collaborating with our Korean counterparts (KRISS), we are strengthening biological measurement science globally, developing traceable, comparable methods for DNA and RNA analysis. Through our renewed Memorandum of Understanding and secondment programme, we are helping to harmonise analytical approaches, support the development of high-quality reference materials, and contribute to key international working groups. This work drives forward global standardisation in nucleic acid measurement, supporting more accurate diagnostics, precision medicine, and improved health outcomes worldwide.



Setting a new benchmark for sample analysis

We are coordinating the first international metrology comparison for direct sample analysis using laser-ablation mass spectrometry (ICP-MS). This study uses a well-characterised bio-printed gelatin droplet that contains multiple evenly distributed elements. As the sample mimics human tissue, it will be invaluable to underpin quantitative imaging measurements in the areas of gene and drug delivery systems, as well as novel therapeutics.

Reinforcing metrology as a key player in diagnostic readiness

Despite being central to pandemic preparedness, diagnostics remain one of the most underfunded and poorly coordinated areas in global health. The 100 Days Mission (100DM) aims to change that, better preparing the world for the next pandemic by proactively driving the development of safe, effective and affordable diagnostic tools within 100 days of a declared Public Health Emergency of International Concern (PHEIC).

The International Pandemic Preparedness Secretariat (IPPS), in collaboration with the Brown University Pandemic Center and FIND, the global alliance for diagnostics, performed a [gap assessment](#) to identify the most urgent and systemic barriers that must be addressed to enable diagnostic readiness.

Following input from the NML, based on our nucleic acid measurement expertise and global leadership, metrology has now been recognised by the IPPS as necessary for the rapid provision of safe, effective, and affordable diagnostics.

Demonstrating metrology capability for public health emergencies

Through coordinated international efforts, we have been addressing recommendations set out in the CCQM Roadmap to Metrology Readiness for Infectious Disease Pandemic Response.

In 2025, we led a pandemic ‘fire drill’ in collaboration with the National Institute for Standards and Technology (NIST) as part of the CCQM Nucleic Acid Working Group to demonstrate the ability of the metrology community to rapidly produce reference measurement procedures for viral RNA (CCQM-P232) when needed. We also demonstrated our ability to value assign and characterise viral proteins (CCQM-P257) as part of the Protein Analysis Working Group. Alongside these studies, we led a key comparison study with NIST and the Medicine and Healthcare products Regulatory Agency (MHRA) to demonstrate the UK’s capability to accurately determine RNA copy number concentrations.

Together, these efforts highlight the strength of international collaboration and the metrology community’s ability to respond at pace to support governments, policy makers, and control material manufacturers and suppliers to deploy accurate and effective diagnostics during a public health emergency.

European collaboration and leadership

The NML plays a significant role coordinating projects in the European Metrology Partnership. Recently awarded projects include supporting the development of nanomedicines for advanced therapeutics (QuanTheriac), improving molecular testing in cancers and precision medicine (GenomeMET2), and strengthening clinical diagnostics and infectious diseases (XMet).

Within the European Metrology Networks, designed for long-term European measurement collaboration around specific themes, we provide technical expertise in the areas of mathematics and statistics, safe and sustainable food, traceability in laboratory medicine, and pollution monitoring, alongside policy and communications expertise to enhance the visibility and impact of metrology in Europe.

Our involvement in these initiatives helps enhance Europe's scientific capability and competitiveness, contributes to wider societal impact, and delivers high economic return, as demonstrated in an evaluation of [European metrology research projects](#).

Representation in

4 of 12

European Metrology Networks

03

Supporting government priorities

NML supports UK government priorities by strengthening industry, enabling innovation, and providing trusted measurement infrastructure. By connecting science with real-world application, we help organisations scale with confidence and accelerate the translation of research into impact.

Working closely with academia, industry and government, our activities drive economic growth, advance health and life sciences, and support the safe development of novel technologies to contribute to resilient, future-ready sectors across the UK.



RESILIENCE



Growth: supporting industry across the UK

The NML plays a key role in driving UK economic growth by strengthening connections between science, infrastructure and industry, enabling innovation to translate into real-world applications with confidence.

Breaking down barriers to translation with measurement infrastructure

The NML is connecting local regions across the UK with trusted measurement infrastructure, through close collaboration with our Centres of Excellence, bridging the gap between academia and industry. This enables researchers, SMEs and spinouts to scale faster and translate science into market impact, supports skills development and provides access to placement opportunities.

In 2025, we further strengthened these links through the appointment of Academics in Residence at our [Centre for Excellence in Agriculture and Food Integrity at Queen's University Belfast](#) and our [Northern Cell Metrology Hub at the University of Leeds](#). These roles have been established to strengthen visibility of measurement science within research in the food and feed, and clinical sectors, enabling faster and more robust translation.

By providing trusted, evidence-based measurement science expertise and strengthening technical confidence we are supporting start-ups to secure local investment and grant funding.

CadenceDX, a start-up founded by one of our PhD students based in our Centre for Advanced Measurement Science and Health Translation, a partnership with the University of Strathclyde, secured a British Heart Foundation grant to advance the development of a rapid point-of-care biomarker test for heart attacks.

We are supporting the BRITE project in partnership with the Liverpool School of Tropical Medicine (LSTM), an initiative that aims to grow skills and create an ecosystem for the scale up of advanced biologic medicines in the Liverpool City Region. We are providing methods and materials to evaluate biological performance (critical quality attributes) and harmonise manufacturing and scaling. A formal partnership to be established with LSTM in early 2026 will build on this project to support the safe, effective, and rapid development of cutting-edge health technologies.

“By bringing together Liverpool School of Tropical Medicine’s translational research expertise with the NML’s world-leading measurement science capabilities, we are creating new opportunities for innovators and partners across the UK and internationally.”

- Professor Jonathan Ball, Deputy Vice Chancellor, LSTM



Advancing innovation through early-stage instrument testing: from development to adoption

The NML is actively strengthening the UK's growth in innovation through collaborative partnerships with instrument manufacturers to support the development, testing and adoption of innovative technologies.

Strengthening AI-enabled technology for cell analysis

Collaborating with DeepCell in 2025, we evaluated their AI enabled, label-free cell imaging and sorting instrument, designed to unlock deeper insights into cell morphology and health.

To support the technology's development, we provided the opportunity for DeepCell to evaluate the instrument in a laboratory environment in partnership with Nexus. Using our cell metrology expertise we rigorously tested the instrument using diverse biological samples to assess the performance and robustness of the technology.

Through this approach, we identified opportunities to enhance workflows for our academic collaborators and provided critical feedback for further instrument development to improve user experience. The validated proof-of-concept data generated will support DeepCell in grant applications and stakeholder interactions.

Strengthening imaging technology to improve routine testing of microplastics

Working closely with Agilent Technologies, we have evaluated a novel platform combining rapid imaging with infrared spectroscopy to support analysis of microplastics in the size range from 20-5000 μms .

To achieve high-quality data, precise control of the instrumental settings and most importantly the laboratory environment (i.e. background particle levels) are crucial. We worked with Agilent to evaluate the Laser Direct Infra-Red (LD-IR) method for size, size distribution, number and chemical identification of microplastics. We also developed quality control materials to underpin optimisation of the technology and support method validation.

Together with Agilent Technologies and the international metrology community (through the European Metrology Partnership project PlasticTrace), we are supporting analytical testing laboratories to implement the method through e-learning modules, practical guidance, and webinars.

Through our collaboration with Agilent, we identified opportunities to enhance workflows and provided critical feedback for further software development. We are also working to implement AI-based algorithms, which could further improve and extend this measurement capability to more complex systems and particles.

Driving growth in the sustainable medicines manufacturing ecosystem

Through Innovate UK's Sustainable Medicines Manufacturing Innovation Programme (SMMIP), we are collaborating with stakeholders across the medicines manufacturing industry to support the development of technologies to enhance the manufacturing innovation ecosystem and promote sustainable practice.

In 2025, the SMMIP launched the Analysis for Innovators SMMIP-CEP (Critical Enabler Programme) in collaboration with Innovate UK. This model offers industry stakeholders within the programme access to our chemical and biological measurement expertise to support scalability and innovation. By aligning expertise with academia, industry and government we are optimising efficiency, minimising waste and reducing emissions across the sector, while enhancing the UK global competitiveness for investment in medicines manufacturing.

In this preliminary round of the SMMIP-CEP programme, we have partnered on projects across plant-derived medicines, RNA vaccine technologies and advanced bioprocessing, supporting innovation in the development and scalable manufacture of next-generation therapeutics.



Innovate
UK

Business
Connect

Scaling UK supply of Alzheimer's treatment through measurement science

Agroceutical Products Ltd is developing a reliable UK-grown source of galanthamine, a licensed medicine used to treat Alzheimer's disease, extracted from daffodils. To scale production, accurate and consistent measurement is critical across complex plant-based samples, an area currently limited by a lack of suitable reference standards.

The NML is working with Agroceutical to develop robust, transferable methods to quantify galanthamine throughout the production process. This includes establishing reference materials, advancing mass spectrometry techniques, and validating methods for real-world samples, alongside training to support in-house and external use.

This collaboration is enabling faster process optimisation, strengthening regulatory confidence, and supporting the development of a scalable, UK-based supply of a vital medicine, while creating transferable expertise for other natural product innovators.

Health and life sciences

By underpinning earlier diagnosis and point-of-care technologies, the NML is helping drive a shift towards prevention-focused healthcare in line with government priorities.

Unravelling the science behind protein changes in Alzheimer's disease

In Alzheimer's disease, a protein called Tau builds up in brain cells and forms twisted clumps. These clumps interfere with how the cells work and are a defining feature of the disease. Understanding why these proteins change shape, and how this impacts their tendency to clump together, or aggregate, is essential for improving our ability to diagnose and monitor disease progression.

At the NML, we have developed a novel method to analyse structural changes in key proteins linked to neurodegenerative disease, in collaboration with partners at the National Metrology Institute of Germany (PTB) and the University of Virginia. Using advanced cross-linking mass spectrometry and a new analytical framework, we can track how these proteins (Tau and phosphorylated Tau) fold, misfold and aggregate with far greater accuracy. These insights help to understand early molecular events associated with Alzheimer's and related disorders, supporting the development of improved biomarkers and diagnostic tools.

By advancing measurement science in protein structure, we are enabling earlier, more reliable identification of disease – ultimately contributing to better patient outcomes and targeted therapeutic innovation.

Bringing together healthcare regulation and measurement to deliver benefits for patients faster

Led by the NML, the Healthcare Scientists (HCS) Knowledge Transfer Partnership (KTP) programme strengthens relationships and exchange of expertise between the UK's National Measurement System, the United Kingdom Accreditation Service (UKAS) and healthcare systems across the four nations. Supporting the UK government's vision for innovation-driven, technologically enabled, and prevention-focused healthcare systems, the HCS KTP programme accelerates the identification, development, and dissemination of high value innovations to improve patient care and service delivery.

Explore Round 4 projects addressing key challenges in clinical measurement quality and consistency, knowledge sharing, and the use of advanced technologies – [Healthcare Scientists Knowledge Transfer Partnership \(HCS KTP\) - NML](#)

Several collaborations established through earlier rounds of the HCS KTP Programme have evolved into sustained partnerships, supporting ongoing knowledge exchange, wider engagement activities and alignment between healthcare and national measurement priorities.



Standardising gene sequencing technologies to improve diagnosis of culture-negative infections

The NML partnered with NHS healthcare scientists from Barts Health NHS Trust, London and the Medicines and Healthcare products regulatory Agency (MHRA) to support the standardisation of a novel gene sequencing method that offers promising improvements in speed, accuracy and reproducibility for bacterial identification.

Diagnosis of culture-negative infections pose a significant challenge for the clinical laboratory. Alternative approaches for diagnosis typically use molecular approaches and these protocols can have low sensitivity, be time-consuming and vary widely across the NHS.

We developed a robust end-to-end protocol for assessing performance, including reference materials, extensive method validation and comparative studies. Working with UKAS we successfully supported Barts Health NHS Trust to become the first ISO15189 accredited laboratory in the UK for this sequencing method. This project has enabled faster, more reliable and consistent identification of bacterial pathogens.

In partnership with UK NEQAS, we are now exploring the route to develop a quality assurance programme for this approach to roll out nationally across NHS laboratories. This shift will allow NHS clinicians to initiate earlier, targeted antimicrobial therapy, reducing morbidity and mortality and supporting better overall patient outcomes.



Engineering biology

Engineering biology is one of the most transformative technologies of our time: revolutionising how we address society’s most urgent challenges – from sustainable food systems and cutting-edge biomedicines to clean growth and environmental resilience.

A connected national measurement network in engineering biology to strengthen the UK’s bioeconomy

The NML plays a critical national role in ensuring innovation in engineering biology is responsible, safe, and trustworthy. Through developing documentary standards, physical control materials, and operating unique national infrastructure, we are ensuring accuracy, traceability and reproducibility across the sector.

Supported by funding from Cabinet Office through the DSIT, we are leading a connected national network of measurement expertise, capable of driving responsible innovation in areas such as synthetic vaccine development, nanomedicines, infectious disease diagnostics, environmental detection and monitoring, pollution mitigation and tracking engineered organisms.

Collaborating with a range of key stakeholders from government, academia and industry including UK Health Security Agency (UKHSA), BioIndustry Association (BIA) Engineering Biology Advisory Committee (EBAC), Environmental Biotechnology Innovation Centre (EBIC), the Pirbright Institute, Edinburgh Genome Foundry, GitLife Biotech and Bristol University, we are embedding metrology across the engineering biology ecosystem to ensure innovations are robust, reproducible and regulation ready.

Find out more ➔



A scientist wearing a white lab coat and safety glasses is operating a DNA synthesis machine. The machine has a large glass window and a control panel. The scientist is holding a small vial and looking at the machine. The background is a solid purple color.

Establishing a critical sovereign DNA synthesis infrastructure for national biosecurity and supply chain resilience

The UK is committed to fostering responsible innovation in engineering biology, with DNA synthesis seen as an essential factor driving UK leadership in bioengineering and genomics applications. Following on from a successful RIO grant in 2025, the NML has actively been working on both regulation and screening of synthetic DNA synthesis to mitigate the risks associated with any potential misuse related to sequences of concern. In parallel we are establishing a national DNA synthesis facility to strengthen the UK's stewardship and resilience in life sciences.

Operating within a trusted national infrastructure, it supports rigorous standards, quality control and testing, reinforcing biosecurity (healthcare, environment, food chain, defence), regulatory confidence, and patient safety. Underpinned with biological measurement science expertise, the facility will provide detailed and robust quality metrics supporting reference materials for applications across engineering biology, helping to translate innovation more safely and efficiently.

The NML is supporting the acceleration of responsive innovation by aiding rapid development of vaccines, diagnostics and advanced therapeutics while strengthening national preparedness for potential biological threats.

04

Real world impact

While measurement science is often invisible, its impact underpins safety, innovation and trust across many areas in society.

Our advanced chemical and biological measurement capabilities ensure data, products and services are accurate, reliable and internationally comparable across borders, helping to protect human health, safeguard the environment and assure the quality and safety of our food.



Impact on our environment

From identifying pollutants and chemical contaminants in the environment to monitoring biodiversity, we are supporting our stakeholders to take action on challenges facing our environments.

Quantifying greenhouse gas emissions from livestock production

The agricultural sector is a significant contributor to Europe's anthropogenic emissions and as a result, the European 'Farm to Fork' strategy aims to reduced greenhouse gas emissions from food production in agriculture by 2030. To support this ambition and comply with policy, farmers require accurate and traceable emission inventories.

The European Metrology Partnership project, QuantiAgremi, addresses this challenge by providing an SI-traceable field measurement infrastructure for accurate determination of emissions from animal houses as well as nitrogen footprints.

As partners in the project, the NML performed analysis on the isotopic nitrogen composition in bulk soil, and in ammonia and nitrate ions of soil extracts following ammonia release experiments. The data supported the development of Good Practice Guides on quantification methods and uncertainty of ammonia (NH_3) deposition from livestock housing and tracing nitrogen deposition in managed soils. This work supports the assessment of mitigation measurements, ultimately supporting farmers and policy makers to develop clear policies, meet environmental targets and reduce the effects of agriculture emissions on the environment.



Transforming biodiversity monitoring with airborne eDNA

The UK is one of the most nature-depleted countries in the world, with biodiversity in sharp decline. Traditional biodiversity monitoring methods are often inconsistent and biased and not supported by measurement science.

The NML is addressing these challenges by pioneering a cross-disciplinary approach using environmental DNA (eDNA) detected in air samples. By developing standardised methods, reference materials, conducting an interlaboratory comparison and adapting dispersion models to simulate different conditions in collaboration with the National Physical Laboratory, we are addressing key metrology gaps and enhancing the accuracy and consistency of biodiversity measurements.

This collaborative National Measurement System project is strengthening the role of measurement science in biodiversity monitoring, connecting grassroots efforts with rigorous scientific standards and ultimately driving more reliable and robust biodiversity surveys, creating real-world impact.

Advancing environmental pollution monitoring of our seas

Monitoring pollutants in air, water and soil is critical for protecting ecosystems and public health. The European Metrology Partnership project, MetroPOEM, aims to bridge the gap between radiometric techniques and mass spectrometry for isotopic characterisation of elements to improve sensitivity, accuracy and precision of measurements.

As a partner in the project, the NML contributed to the development of new and improved measurement methods for SI-traceable isotope amount ratios of a series of elements (Li, B, Cr, Ni, Sb, Pb and U). Using this approach we characterised a first-of-its-kind seawater reference material with certified isotopic composition, and provided guidance for constructing uncertainty frameworks for isotopic analysis.

As a result, the project enhanced the ability of environmental testing laboratories to detect ultra-low concentrations of pollutants, developed a better understanding of pollution sources, and supports stronger environmental protection by informing existing EU environmental and nuclear safety legislation.

Impact on our food

From providing traceable measurement standards and reference materials to developing innovative methods, the NML supports the food sector to ensure that food is safe, authentic, high quality and compliant with regulations. Providing measurement tools and expertise we are de-risking innovation in the food sector, ensuring that new processes and novel technologies are safe and reproducible.

Tackling hidden contaminants in food packaging

Food safety goes beyond what we eat, it also depends on the materials that package and protect it, and our ability to detect harmful contaminants in both. The European Metrology Partnership project, ScreenFood, is developing internationally harmonised standards for identifying and measuring contaminants in food and food packaging, with a focus on recycled materials.

As a project partner, the NML is screening potential contaminants in bio-based and reusable packaging for use in migration studies. We are also leading on the development of reference methods and materials for detecting and quantifying contaminants such as per- and polyfluoroalkyl substances (PFAS) and mineral oil aromatic hydrocarbons (MOAH).

By strengthening the measurement tools used to detect and quantify contaminants in food and food packaging materials, this work will aid laboratories in the food industry to guarantee the delivery of safe foods and sustainable packaging with confidence.

Supporting trust in the food system with the Government Chemist

The NML contributes chemical and biological measurement expertise to provide evidence and analysis that supports the advisory and statutory functions of the Government Chemist, an independent laboratory delivering expert arbitration to resolve scientific dispute in the food and feed sector.

We help provide the measurement infrastructure that supports the Government Chemist develop new analytical capabilities to address emerging challenges. This supports trusted, evidence-based decisions in the food sector, ensuring regulatory compliance and safeguarding food safety for the public.

Impact on our health

Critical healthcare decisions rely on accurate, reproducible and comparable measurements. The chemical and biological measurement expertise of the NML enables earlier and more reliable diagnosis, monitoring and treatment of disease, and gives policymakers and healthcare providers confidence in the decisions they make, ultimately contributing to safer, more effective patient care.

Advancing diagnostic accuracy for iron disorders

Accurate measurement of protein biomarkers is essential for reliable diagnosis and personalised treatment. In conditions linked to iron metabolism, such as haemochromatosis, where the body absorbs and stores too much iron, there is a recognised need for quality control materials in biochemical tests to be traceable to SI units. Without this traceability, results can vary between different testing methods, limiting confidence in results for key diagnostic biomarkers such as ferritin.

The NML has developed a novel, SI-traceable methodology to quantify human serum ferritin light chain (FTL) using sulfur species-specific isotope dilution analysis (SS-IDA) to improve accuracy and comparability of results. This approach helped assign an SI-traceable value to FTL in a World Health Organization reference standard, marking the first time sulfur SS-IDA has been used for this type of biomarker.

This work strengthens the reliability of biomarker measurement, improving accuracy and comparability of diagnostic tests for iron-related disorders across laboratories, and ultimately supports confidence in clinical decisions and improved patient care.

[Species-Specific Isotope Dilution Methodology for the SI Traceable Quantification of Serum Human Ferritin Light Chain \(FTL\) | Analytical Chemistry](#)



05

Skills for the future

We empower laboratories worldwide with expert training in quality assurance, helping them meet accreditation and regulatory standards with confidence.

Analytical quality training programme

Our courses cover essential topics like method validation, measurement uncertainty, and statistical analysis – equipping analytical scientists with the skills they need to excel.

With flexible training options available online and in-person, we offer scheduled programmes and tailored solutions for organisations. Our approach ensures lasting impact, with strong repeat engagement and consistently positive feedback from participants.

over 95%
of respondents feel our training courses
meet or exceed their expectation

Courses 32

Delegates 528

Organisations 54

Book our training courses at www.uknml.com

06

Our people

Our impact is driven by our people, whose expertise, leadership and collaborative approach are our greatest strength. Through leadership, collaboration and technical excellence, they help deliver the advanced measurement infrastructure that underpins trust and confidence in measurements.

Celebrating our expertise

Our scientists are recognised nationally and internationally for their expertise. This is recognised in part through joint appointments with leading academic institutions, invitations onto committees, and awards.

Notable achievements

Dorota Bartczak was elected the new Chair of the BSI NTI/1 committee on Nanotechnologies.

Malcolm Burns was invited to become one of the core founding members of the DETECTIVE Community of Practice.

Eloise Busby completed a 6-month secondment at the Korea Research Institute of Standards and Science.

Chloe Deaves was invited to join the IFCC Emerging Technologies Metabolomics Working Group.

Phil Dunn was elected as Secretary of the IUPAC Commission on Isotopic Abundances and Atomic Weights and Chair of the Subcommittee on stable isotope reference material assessment.

Heidi Goenaga Infante was re-elected Chair of the Editorial Board of JAAS for another 3-year term.

Sarah Hill was selected to present at BIPM 150th Anniversary of the signing of the Metre Convention.

Luise Luckau was selected to join the FST Foundation Future Leaders Programme for 2025.

Denise O’Sullivan was appointed Chair of the IFCC Committee on Molecular Diagnostics in Infectious Diseases.

Susan Pang accepted the invitation to join the IUPAC Wearable sensors task group.

Caroline Pritchard was elected to the AIRTO Board of Directors

Visiting academic roles

Kharmen Billimoria (Honorary Research Fellow, University of Warwick)

Julian Braybrook (Visiting Professor, University of Surrey; Visiting Scholar, Queen’s University Belfast)

Daniel Evans (Visiting Fellow, University of Surrey)

Heidi Goenaga Infante (Visiting Professor, University of Strathclyde; Honorary Senior Research Fellow, University of Liverpool)

Paul Hancock (Visiting Scholar, Queen’s University Belfast)

Jim Huggett (Visiting Professor, University of Surrey)

Denise O’Sullivan (Visiting Fellow, University of Surrey)

Secondments

* Including student placements and PhDs

13

Publication highlights

The quality and credibility of our science is demonstrated in part through our publications in peer reviewed journals. This year, our scientists published 47 peer review publications. Here is a short selection.

Bartczak, D., Nuñez, S.C., Kubicka, A., Ojeda, D., Cachero, A.S., Cowen, S., Ellison, S., Holcombe, G. and Goenaga-Infante, H. SI-traceable characterisation of the first reference material for nanoparticle number concentration in suspension to support regulatory compliance. *Analytical and Bioanalytical Chemistry*. doi: [10.1007/s00216-025-05789-0](https://doi.org/10.1007/s00216-025-05789-0).

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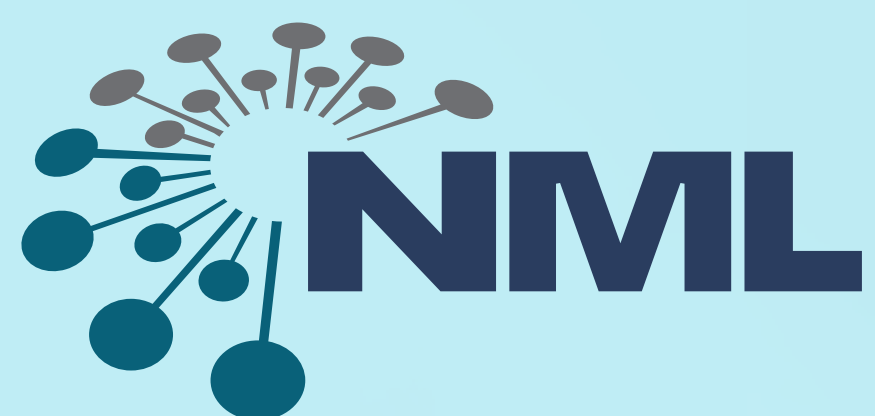
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