



# Annual Review 2023

## Measurement matters

Thousands of decisions that affect our everyday lives are based on measurements.

To be able to rely on these decisions, there must be confidence in the measurements themselves.



Department for  
Science, Innovation  
& Technology

LGC

# Executive Summary

At the National Measurement Laboratory hosted at LGC (NML at LGC) measurement matters. We are proud of our heritage in providing world-leading chemical and biological measurement research capable of solving some of the biggest challenges of our time to support a greener, safer, healthier and more prosperous future.

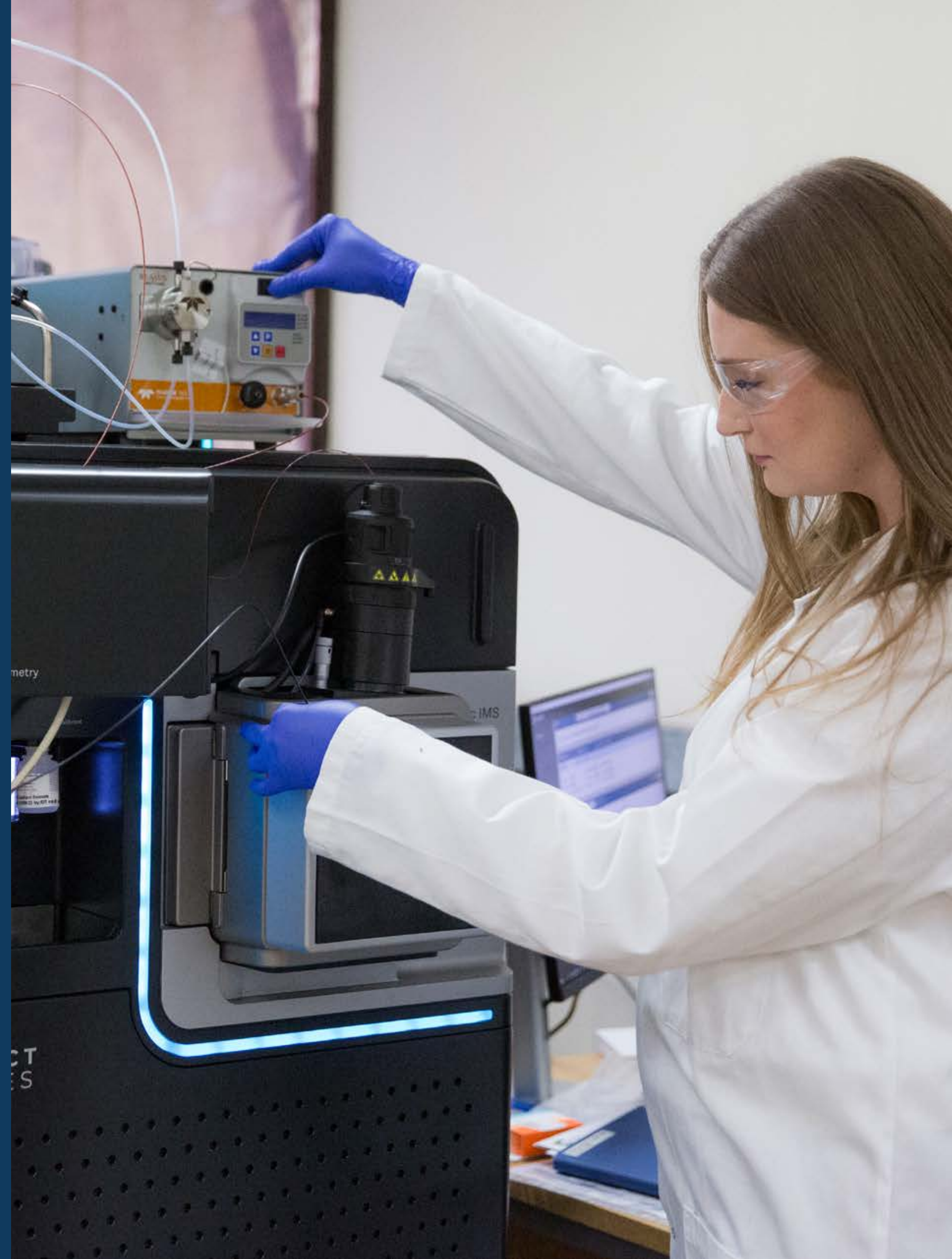
Our continued work to support innovation and reliable measurement for the future was recognised in the International Review of Science 2023 which affirmed our leading expertise as an indispensable component of the National Measurement System (NMS). This year we continued to lead within the global measurement and standards committees, establishing international recommendations in the form of a roadmap for the measurement community to support pandemic preparedness.

We have worked closely with the engineering biology community to provide metrology training and standards, helping to upskill the community, de-risk innovation and ensure confidence in engineering biology processes and products, supporting the UK government's Vision for Engineering Biology.

In collaboration with our stakeholders from across a wide variety of sectors, we are facilitating productivity and growth by addressing current and future measurement needs for the benefit of the UK.

## **Julian Braybrook**

Director, National Measurement Laboratory



# Key messages and our numbers

We are the UK's designated institute for chemical and biological measurement and support the work of the Government Chemist

We are sponsored by the Department for Science, Innovation and Technology (DSIT) as part of the National Measurement System

We ensure trust and confidence by providing access to the highest quality chemical and biological measurements in the UK to support government and industry needs

We address measurement challenges of the future to foster innovation, promoting productivity and economic growth

## In 2023, we were successfully awarded a £2.4M infrastructure grant

from the UK government's Public Sector Research Establishment Infrastructure Fund (supported by DSIT) which enables continued investment in key UK infrastructure for National Laboratories. This fund facilitated the upgrade of instrumentation and allowed us to expand our capacity and capability within our measurement science research.



Our numbers  
2023

**32** PEER-REVIEWED PUBLICATIONS

**2** NEW ISO ACCREDITATION

**122** REFERENCE MATERIALS

**22** CONTRIBUTIONS TO ISO STANDARDS

Our leveraged income from all services was  
**£3.5 MILLION**



We work with different organisations from  
**INDUSTRY, ACADEMIA, REGULATORY, GOVERNMENT AND HEALTHCARE SECTORS**



Join the measurement conversation:

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## Setting the Scene

# The International Review of Science 2023

As part of the National Measurement System, funded by the Department for Science, Innovation and Technology, we must ensure we provide work of high quality and value for money to the UK and are prepared for future challenges. This year the International Review of Science was commissioned by DSIT to evaluate the quality of science and the impact of the NML at LGC function over the period 2016-2023.

The evaluation was performed by an international panel of 15 experts from academia, industry, government, metrology institutes, NHS and non-profit organisations who were asked to draw conclusions on the progress made since the last Review, assess the current standing of the NML at LGC and provide recommendations for future consideration.

The Board concluded, following a review of extensive written evidence and a 2-day visit to our laboratories, that the NML at LGC is a strategic national asset that is uniquely placed and fulfils a critical national role serving the public interest.

The Board assessed each scientific area (Inorganic Analysis, Organic Analysis and Molecular and Cell Biology) and concluded that the quality and impact of each area was either world-leading (the best in the world) or internationally competitive (comparable with other world-class laboratories internationally).

**Download the [International Review of Science Public Summary](#)**

**“The NML at LGC is a strategic national asset that is uniquely placed and fulfils a critical national role serving the public interest”**

The International Review of Science 2023

## Contents

**“The National Measurement Laboratory at LGC is an integral and indispensable component of the UK’s National Measurement System, addressing the UK’s measurement needs in chemical and bio-metrology in an impactful and cost-effective way.”**

The International Review of Science 2023

01 | Our leading role internationally

**We are setting the future strategic direction internationally in the chemical and biological measurement fields**



## We work globally to standardise measurement science

As part of our role representing the UK to ensure international standardisation, we regularly coordinate and participate in inter-comparison studies with other countries' National Measurement Institutes, under the auspices of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM). We are regarded as one of the top institutes for our designation within the global measurement community. Successful participation in these studies supports us in maintaining our core Calibration and Measurement Capabilities (CMCs).

**16** CCQM STUDIES

**6** AS STUDY LEAD

## Metrology readiness for future infectious disease outbreaks

Working closely with the wider measurement community, and national and global policy and healthcare officials, we led on the development of the [CCQM Pandemic Roadmap](#) which sets out recommendations for specific measurement interventions that could enable a more rapid response and enhance clinical outcomes in a future infectious disease outbreak.



## Metrology for nanomaterial characterisation

We coordinated an international comparison study (CCQM-K166) on nanoparticle number concentration in suspension with 17 other global measurement institutes. This builds on our work coordinating the first pilot study of this kind and producing the only existing reference material with an assessed value for nanoparticle number concentration (LGCQC5050). Our reported values from these comparisons using an SI traceable methodology based on single particle ICP-MS measurements agreed well with the key comparison reference value, formally demonstrating our capability in this area.

Using this capability and expertise, we are leading on the re-writing of an international standard document dedicated to single particle ICP-MS measurements (ISO19590) and are extending the scope of the ISO17025 accreditation\* to the area of nanomaterials to support our work on the characterisation of new nano-reference materials.

\*accreditation is held by host company LGC

## European projects

We have continued to retain our engagement in European-wide initiatives. The **European Partnership on Metrology** builds on the progress achieved under the previous [European Metrology Research Programmes](#), and aims to break new ground by contributing to the development of self-sustaining, coordinated metrology infrastructures, with the capacity to continue joint research and innovation after 2030. This year we have secured our participation in projects that address issues such as the increased strain on Europe's healthcare systems, pollution monitoring and food safety, and touches on the ever-growing areas of concern for the environmental footprint of plastics.

### Metrology to support novel treatment methods- nanotherapeutics (MetrINo)

The median age of the population in Europe is increasing, resulting in increased strain on the healthcare system. Novel treatment methods could help to leverage this strain to maintain healthcare quality in Europe.

Nanotherapeutics possess unique chemical, physical and biological properties due to their small size, offering great therapeutic potential.

MetrINo aims to develop the metrological framework, including traceable methodologies for determining size, lipid composition and surface proteins, that is needed to determine standardised safety method for nanotherapeutics. Overall, this project will establish the basis of a metrological network for the administration of nanotherapeutics, and it will be the foundation for further standardisation projects for nanotherapeutics in Europe.

### Metrology for the recycling of technology critical elements (MetroCycleEU)

Technology critical elements (TCE) are key materials required for modern and developing technologies, such as communications or computing. They are considered 'critical' because of their economic importance and the concerns around supply chains or long-term availability.

A sustainable solution to solve this problem is through recycling, but this presents a complex analytical challenge.

MetroCycle EU aims to develop new reliable methods for Technology Critical Elements measurements. These methods are urgently needed to determine the economic value of urban mine waste and final recycling products, as well as decide on recycling routes to support new R&D for recycling and environmental impact assessment. This will support the EU's Circular Economy Action Plan (CEAP) and help to reduce future supply risks as well as to reinforce Europe's resilience and autonomy.

### Metrological traceability of nano- and microplastics for a greener environment and food safety

Nano- and microplastics present a risk to our environment, food and health but are difficult to isolate and detect in complex backgrounds.

PlasticTrace aims to address the urgent need for development and harmonisation of methods for the chemical identification, physical characterisation and quantification of released small micro/nanoplastics (SMPs/NPs) in drinking water, food and environmental matrices, as required by the EU's Circular Economy Action Plan (CEAP). Analytical methods are being developed and compared to establish the necessary metrology infrastructure to underpin this emerging area. In addition, novel and environmentally relevant SMP/NP reference materials will be developed to support stakeholders.

This will enable traceable monitoring of SMP/NPs, supporting decision-making and mitigation measures around plastic pollution and providing confidence in future technologies, such as biodegradable bioplastics.

#### Our most recent project

[Metrology for genomic profiling to support pioneering cancer treatments](#)



02 | Unique function for the UK

**We provide a unique function for the UK to ensure comparability and facilitate trade**



## Core capabilities

Our core research involves performing high accuracy measurements with known uncertainties. We play a leading role in **standardisation** of measurements across the world.

We provide **traceability** for routine chemical and biological measurements within the UK to support comparison of measurement results between laboratories, and inform product development and current and future regulation. We provide standardisation and traceability through the development of reference methods and materials.

Across our four main laboratories, our core chemical and biological capabilities support analysis of consumer products, food, environmental and clinical samples for the detection, identification, and quantitative measurement of trace level concentrations of organic and inorganic compounds, elements, species, organo-metals, nucleic acids and cell response in a variety of matrices.

## Extensions of accreditation

Many of our methods are within our scope for United Kingdom Accreditation Services (UKAS) accreditation\*. Recently, we have received extensions to our ISO 17025 accredited capabilities for calibration methods. Methodology using a state-of-the-art inductively coupled plasma mass spectrometry (ICP-MS) instrument, combined with our high accuracy approach, has been added to our flexible scope of accreditation. This latest technology provides significantly increased measurement precision, enhancing our capability to support industries where analytes are expensive or limited.

Additionally, a high accuracy method for the determination of inorganic arsenic in rice materials has been added to our flexible scope to underpin our work supporting safe food.

These capabilities have been employed to support the certification of new LGC certified reference materials underpinned by our participation in international inter-comparisons (CCQM K158, CCQM K160 and CCQM K166, the latter two of which we coordinated).

\*accreditation is held by host company LGC

## Reference materials

Reference materials are the cornerstone of accurate and traceable measurements – they are measurement standards which can be used for many purposes including validation of analytical methods, establishing metrological traceability and to support quality control. We maintain a dynamic portfolio of around 120 materials covering high purity standards, carbon isotope ratios, food, environmental and clinical materials, and alcohol standards.

This year we released 4 replacement materials to help ensure accurate measurements of blood alcohol monitoring, for supporting alcohol determinations related to duty payments in the food and beverage industry and for widespread measurements of enthalpy of fusion and melting temperature.

[LGC5005](#)

**Lager, certified for alcohol content**

[LGC2405](#)

**Benzoic acid, certified for melting temperature**

[LGC2609](#)

**Tin, certified for enthalpy of fusion and melting temperature**

[LGC5409](#)

**Ethanol solution, certified for ethanol content**

### Reference materials

03 | Expertise and advice for government

**Our expertise and advice is relied on by government to underpin standards, develop regulation and support innovation, facilitating productivity and growth**



As part of the UK National Measurement System we support the development and maintenance of world-leading and internationally recognised measurement capability, standards and practices. Our work ensures confidence and trust in measurements across the UK, underpins key policies, regulations and operational requirements across government, provides independent expert advice to the public and private sectors, and supports creation and adoption of new technology.

## Metrology for engineering biology

Engineering biology has the potential to offer solutions to a range of societal challenges, including agriculture & food, biomedicines, clean growth and the environment. Standards and metrology are critical for creating more reliable engineering biology products, services, and production processes, helping to de-risk innovation and facilitate translation into industry.

As experts in chemical and bio-metrology, we are an integral part of supporting the [UK Government's National Vision for Engineering Biology](#) which sets out to make the UK a world leader in responsible innovation by 2030. We have led on establishing metrological tools, methods, materials and standards to support confidence in engineering biology processes used to develop transformative new products and processes. The ability to accurately manipulate the genes and genomes of living systems to perform new functions or synthesise new products is fundamental to engineering biology and is currently creating transformative improvements across many industries, including healthcare and medicine, food and agriculture, environmental biotechnology, industrial biotechnology, and energy.

Find out more about our work to support [engineering biology](#)

## Documentary Standards

Recent standards activities have been focused on the areas of biotechnology, in vitro diagnostics and nanotechnology. The technical work and pre-determined timeframe for producing a documentary standard spans over a period of 2 to 3 years.

### Standards for cell line authentication

Cell line authentication is a critical quality control procedure, which aims to verify a cell line's identity and show that it is free of contamination from other cell lines which could result in potentially misleading or non-repeatable data. Using our cell metrology expertise, we contributed to developing an American National Standards Institute (ANSI)/ATCC consensus standard (Human Cell Line Authentication. Standardization of Short Tandem Repeat (STR) Profiling). This document was cited in an international documentary standard for cell line authentication published in 2023 ([ISO/TS 23511:2023](#)). This standard describes the general principles, detection strategies and analytical methods for cell line authentication. It supports the quality control of cell lines from basic research to translational studies and product manufacturing.

### Nanoparticle characterisation standards for analytical testing laboratories

We are leading on the revision of a documentary standard on nanoparticle characterisation using single particle mass spectrometry (spICP-MS), which includes particle number concentration and particle size measurements ([ISO/TS19590](#)). The standard has been revised to include a new approaches, including one we have recently developed (dynamic mass flow spICP-MS). This documentary standard will support analytical testing laboratories, instrument manufacturers, nanomaterials providers and other end users who wish to implement spICP-MS based methodologies.



**We work in partnership with our stakeholders to address current and future measurement challenges across the life sciences, green industries and food sectors**



## Our regional partnerships

We work with partners across the UK to maximise expertise and generate the best environment to support and encourage innovation, improving chemical and bio measurements for the benefit of the public.

Through our regional partnerships we are connected to the breadth of the UK ecosystem. By our implementation of a model of open-system orchestration centred around regional centres of excellence (as shown in the map) that reflect government science policy and our science priorities, we are getting closer to our end-users. This supports sustained productivity improvements at a local level e.g. through improved access to our partnership programmes, training and products/services.

Our partnerships have allowed us to expand our research networks and acquire complementary skills and capabilities, increase scientific recognition and further our access to academic posts and students to indirectly support knowledge flow. We are now in a stronger position to drive regional innovation agendas that deliver our measurement experience directly to the local economy.

**“Partnering with the National Measurement Laboratory has been an excellent experience for myself and the wider research team. Having access to a range of international metrology experts has been hugely beneficial to our research centre with us being able to win sizeable multi-partner interdisciplinary research grants focused on improving diagnosis of health conditions which involve academics, industry, clinicians and scientists from NML. The science team at NML is first class and we look forward to developing even closer links in the coming years.”**

Professor Damion Corrigan, LGC Chair in Measurement Science for Health, Centre for Measurement Research and health Translation, University of Strathclyde



Click on icon or blue circle to view the institute



Explore our regional partnerships at [lgcgroup.com/our-partnerships](https://lgcgroup.com/our-partnerships)

## The Northern Cell Metrology Hub

This year we officially launched the Northern Cell Metrology Hub, based at Nexus, Leeds. This new centre of innovation for clinical diagnostics and medical technology is the first step in the long-term partnership between the University of Leeds and the NML at LGC.

The Leeds City Region (LCR) is a leading UK location for healthcare research and innovation, competing internationally as a health technology start-up hub. Partnering our internationally leading cell metrology capabilities with the University of Leeds', bio-imaging facility research interests, with close proximity to the University campus and Leeds teaching Hospitals NHS Trust, the hub supports health and life science industries to achieve safe, reliable and productive solutions through innovative technology.



**“The Laboratory’s Northern Cell Metrology Hub is a novel epicentre of innovation in clinical diagnostics and medical technology to which Nexus members have access”**

Health Innovation Leeds Pursuing excellence - [an independent analysis of Leeds' health and care research and innovation](#). Appendices P74

05 | Real-world impact

**Our work makes a difference, helping to solve some of the biggest challenges of our time, protecting the public and improving quality of life**





## Improving diagnostics to support the UK's pandemic preparedness

We are supporting the UK's leading efforts to provide timely and accurate diagnostics for future infectious disease outbreaks.

Diagnostic tests were seen as crucial in the identification and management of the COVID-19 pandemic, and it is now widely accepted that better prioritisation of early diagnostic testing and earlier access to more robust tests may have reduced disease spread and saved lives.

Working closely with partners across the diagnostic space we are supporting the UK's pandemic preparedness by establishing a sustainable framework for assurance of accurate diagnostic tests within the UK that will guarantee robust and reliable diagnosis to support and inform wide-scale public health.

At the Parliamentary event hosted by Stephen Metcalf MP and hosted by the NML, representatives from the NML, FIND, the Medicines and Healthcare products Regulatory Agency and UK Health Security Agency recognised the effort of the measurement community in developing the underpinning reference measurement system during COVID-19 to support test accuracy and discuss how this learning is already providing support for future infectious disease outbreaks. We are grateful for the participation by FIND, the Medicines and Healthcare products Regulatory Agency and UK Health Security Agency.

We are continuing to work with our partners in this space to embed measurement across the system, ultimately supporting to a wider range of diagnostic challenges we are currently facing, including antimicrobial resistance, precision medicine and cancer detection.

**[Find out more about how we are supporting the UK's pandemic preparedness](#)**

## Selenoprotein cancer trial

Chemotherapy drugs have been shown in pre-clinical studies to be more effective in the presence of increased levels of selenium (Se). Due to the many different forms (species) of Se that can be present in food supplements, it is challenging to determine conclusively the impact of specific forms of Se in supplementation trials.

Using our expertise in speciation analysis, in collaboration with Waikato Hospital and the University of Waikato in New Zealand and the University of Surrey in the UK, we analysed plasma samples from patients supplemented with three different forms of Se. We observed their effects on the distribution of Se between Se-containing proteins and selenoproteins (SELENOP, SeAlb, GPx3) and low molecular weight selenium. The aim was to identify which form is most efficient at restoring the seleno protein pool without having toxic effects.

The results have the potential to help define the optimal dose and compound for use in clinical trials and cancer therapies.



# Healthcare Scientist Knowledge Transfer Partnership Programme



Our commitment to improving the UK measurement infrastructure for healthcare has evolved naturally into a strong partnership with NHS England, and to a joint programme being established, managed by the NML at LGC. Since the launch of a pilot round in 2018, the Healthcare Scientist Knowledge Transfer Partnership (HCS KTP, formerly Chief Scientific Officer's Knowledge Transfer Partnership) Programme has been gaining popularity and support for its bespoke offering: enabling clinical practitioners to access the UK's measurement and regulatory infrastructure and expertise to address the measurement challenges they are facing. The latest round of the Programme (Round 4) was extended beyond NHS England to include all four nations of the UK.

This unique partnership initiative between NHS England and devolved nations (Scotland, Northern Ireland and Wales), the UK's National Measurement System (NMS) and the United Kingdom Accreditation Service (UKAS) brings together knowledge, skills and expertise from the regulatory sector, leading scientific research institutes, and clinical practice.

It offers an opportunity for healthcare scientists to build long-term partnerships between clinical, research and industry teams; facilitates exchange of ideas; fosters creation, implementation, and adoption of innovative approaches all aimed at improving patient outcomes. The early involvement of UKAS helps ensure that regulatory aspects of new or improved measurement practices are considered from the beginning, thus ensuring the rapid translation of innovations into routine use for the benefit of patients.

**[Find out more about the Healthcare Scientist \(HCS\) Knowledge Transfer Partnership \(KTP\) Programme](#)**



## Supporting standardisation of genomic medicine across UK Genomic Laboratory Hubs

In Round 3 of the Healthcare Scientist Knowledge Partnership programme, we partnered with Dr Mary Alikian, Principal Clinical Scientist at Birmingham Children's and Women's NHS Trust.

The project aimed to bridge the gap between the technical advances seen in clinical genomics following the legacy of the 100K Genomes Project and their standardised implementation into clinical service. The rapid implementation of technologies such as Next Generation Sequencing (NGS) is currently shifting routine testing from disease-based to technology-focused approaches. This shift is streamlining the delivery of genomic medicine. However, validation and implementation of technology-focused approaches remains uncoordinated.

This project addressed the need for quality control and standardisation of novel technologies adopted into routine clinical practice by exploring the challenges, facilitating communication and coordinating benchmarking efforts across UK Genomic Laboratory Hubs (GLH). This involved creating a long-term vision for establishing knowledge transfer forums and integrating them with their respective Genomic Networks of Excellence, forming a collaborative community that promotes knowledge transfer and provides expert guidance in evaluating and standardizing novel genomic technologies.

We supported delivery of workshops to discuss measurement challenges and provided our expertise in bio-metrology and inter-laboratory study coordination to support establishment of cross-GLH studies comparing new testing modalities such as liquid biopsies. We further offered our expertise in value of assignment of control materials for use in such studies.

**“This project was a fantastic opportunity to bring together NHS scientists and external experts with complementary skills, fostering collaboration, knowledge transfer, and long-term partnerships.”**

Dr Mary Alikian, Principal Clinical Scientist at Birmingham Children's and Women's NHS Trust

## Innovate UK Analysis for Innovators

We are a partner in the Innovate UK Analysis for Innovators programme. The programme provides companies with access to state-of-the-art measurement and analytical technologies and focuses on solving measurement problems within existing businesses to improve competitiveness and productivity.

In 2023 we continued to explore numerous opportunities to enhance our relationship and to offer measurement expertise to UK companies in the areas of biotechnology, medical diagnostics and purification. Rounds 8 and 9 were launched this year and we are involved in 6 successful projects with UK companies.



TOUCLIGHT

### Targeting DNA as next generation therapies

Touchlight Genetics, a biotechnology company operating in the genetic medicines market and dedicated to advancing innovations in DNA production, have established a cutting-edge DNA platform with improved features. This new platform has many applications in the fields of DNA nanotechnology and advanced genetic medicines.

We partnered with the company to help them further characterise and analyse their DNA constructs within human mammalian cells to determine how their improved nuclear targeting element impacted on RNA transcript copy number and, therefore, in protein expression. We used our digital PCR expertise to quantify different vectors and monitor their copy number. Our expertise in nucleic acid measurements were indispensable in providing Touchlight's team of scientists with a greater understanding of how DNA behaves in a cellular context, thus allowing them to proceed with the production of improved DNA products and platforms.

**“Working with NML has enabled Touchlight to perform cutting edge analysis on the efficacy of our DNA products. Furthermore, the resulting data acquired has supported relevant product development processes. Ultimately, this collaboration will translate in accelerated commercialisation of new DNA platforms in the coming future.”**

Find out more about the [Innovate UK Analysis for Innovators programme](#)



## Analysing elemental impurities with cutting-edge measurement science

We partnered with Advanced Furnace Technology as part of the Analysis for Innovators programme to help provide accurate measurement data on their impurity profile of high purity graphite in order to meet their customers' requirements. Our scientists developed a microwave assisted acid extraction method for sample preparation and applied expertise in mass spectrometry (ICP-MS) to obtain previously undetermined data on the concentration of extractable elemental impurities and valuable information regarding the graphite purification process, providing much greater understanding of the process total impurity content alone.



## Characterising a 3D printing platform for biological products

We worked with BiologIC through the Innovate UK Analysis for Innovators Programme to support their creation of a bioprocessing platform. Using our specialist organic mass spectrometry capability, we helped BiologIC to investigate the nature of their devices and how they interacted with the chemical and compounds they planned to use them with.

**Find out more in this [case study](#)**



## Printing of biogels for enhanced antibiotic susceptibility measurements

Antimicrobial resistance is a major global health problem and has the potential to return healthcare to a pre-antibiotic age, putting patients at risk from drug-resistant infections. The misdirected use of antibiotics is one of the drivers of antibiotic resistance. Microplate Dx Limited specialises in rapid antibiotic susceptibility testing diagnostics, enabling clinicians, at the point-of-care, to confidently select the best choice of antibiotic to treat a patient's infection in a matter of minutes. We partnered with Microplate Dx Limited to address measurement challenges to support manufacturability and scalability of their innovative technological solution. We demonstrated the benefits of 3D printing to the manufacturing process of their novel point of care device, which has led to Microplate purchasing their own printer and transferring the method development in-house.

Utilising our expertise in mass spectrometry imaging (LA-ICP-MS) we produced datasets to improve understanding of the homogeneity of the gel-based component providing further insight into the consistency and reproducibility of the antibiotic susceptibility measurement which Microplate Dx had pioneered, ultimately supporting them to scale-up their technological development from concept to reality.

Building on the partnership established through the Analysis for Innovators programme, Microplate Dx Limited are now located within our Centre for Advanced Measurement Science and Health Translation at the University of Strathclyde.

**We transfer knowledge and skills to advance and equip a new generation of scientists**



## Analytical quality training programme

For more than 25 years we have provided a programme of courses focused on laboratory quality assurance to support skills development and ensure laboratories across the world meet accreditation and regulatory requirements. Our courses cover the core topics that support laboratory quality assurance, including method validation, evaluating measurement uncertainty and statistical tools for analytical scientists. With training available online and in-person, we provide a programme of scheduled courses as well as delivering training for individual organisations. We have a high level of repeat customers and the feedback on both our online and in-person courses is consistently positive.

**OVER 25 YEARS** 

**EXPERIENCE DELIVERING TRAINING PROGRAMMES TO CLINICAL, ENVIRONMENT, PHARMACEUTICALS, CHEMICAL, FOOD AND BEVERAGES, FORENSICS, UTILITY SERVICES, ACADEMIA SECTORS**

**512**   
**DELEGATES TRAINED**

**61**   
**ORGANISATIONS**

**30**   
**COURSES**

**OVER 95%**   
**OF RESPONDENTS FEEL OUR TRAINING COURSES MEET THEIR EXPECTATIONS**

Details of all our training programmes are available at [lgcgroup.com/training](https://lgcgroup.com/training)

## UKRI-BBSRC funded metrology and standards programme for engineering biology

In 2023, we partnered with the Biotechnology and Biological Sciences Research Council (UKRI-BBSRC) to provide training on the importance of good measurement practice, metrology and standards to early-stage researchers at 15 UKRI-BBSRC-funded Engineering Biology Centres of Excellence. This work will support skill development for the next generation of researchers, enabling them to deliver more robust, reproducible science as they address the complex challenges within engineering biology. An additional part of this project is the proposal and development of an international documentary standard to support Engineering Biology.

**Have a listen to our [webinars](#)**

## 07 | Our people

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

### Visiting academic roles

- **Jim Huggett** (Visiting Professor, University of Surrey)
- **Denise O'Sullivan** (Visiting Lecturer, University of Surrey)
- **Kharmen Billimoria** (Honorary Research Fellow, University of Warwick)
- **Heidi Goenaga Infante** (Visiting Professor, University of Strathclyde)
- **Julian Braybrook** (Visiting Professor, University of Surrey)

### Achievements

**Rebecca Nash** was awarded the Bordoli Prize for the best early career scientist's poster at the 43rd Annual British Mass Spectrometry Society (BMSS43) meeting for her poster exploring rapid speciation analysis of processed meat via deployable QDa.

**Kharmen Billimoria** was appointed to the position of Honorary Research Fellow at the University of Warwick.

**Denise O'Sullivan** completed the Foundation Future Leaders Programme orchestrated by the Foundation for Science and Technology.

**Malcolm Burns** was invited to join the EU Network on Food Allergens Detection Laboratories and was requested by the Belgian Accreditation Authority to become auditor for GMO activities, recognising his expertise in this field.

**Dmitriy Malinovskiy** was invited to join the Royal Society of Chemistry Journal of Analytical Atomic Spectrometry Advisory Board based on his expertise.

**Jim Huggett** received Bio-Rad's Positive Droplet Award for championing the use of PCR in metrology.

**Heidi Goenaga-Infante** received 2023 European Award for Plasma Spectrochemistry in recognition to her continuous contribution to the field of atomic spectrometry.

**Sarah Hill** was recognised by the Royal Society of Chemistry (RSC) for her long-standing service on the Atomic Spectroscopy Group (ASG), an Interest Group of the RSC.



## Publication highlights

The quality and credibility of our science is demonstrated in part through our publications in peer reviewed journals. In 2023 our scientists published 32 peer review publications. Here is a short selection:

Bartczak, D., Cuello-Nuñez, S., Pálmai, M., Hill, S., Petrov, P., Varga, Z., Szalay, R. and Goenaga-Infante, H., 2024. Determination of the Nanoscale Silica Mass Fraction by AF4/ICP-MS with Isotope Dilution Analysis Using <sup>29</sup>Si-Enriched Silica Nanoparticles. *Analytical Chemistry*. DOI: [10.1021/acs.analchem.4c00021](https://doi.org/10.1021/acs.analchem.4c00021)

Busby, E.J., Doyle, R.M., Leboeiro Babe, C., Harris, K.A., Mack, D., Méndez-Cervantes, G., O'Sullivan, D.M., Pang, V., Sadouki, Z., Solanki, P. and Huggett, J.F., 2023. Evaluation of Matrix-Assisted Laser Desorption Ionization–Time of Flight Mass Spectrometry for Molecular Typing of *Acinetobacter baumannii* in Comparison with Orthogonal Methods. *Microbiology Spectrum*, 11(3), pp.e04995-22. DOI: [10.1128/spectrum.04995-22](https://doi.org/10.1128/spectrum.04995-22)

Devonshire, A., Jones, G., Gonzalez, A.F., Kofanova, O., Trouet, J., Pinzani, P., Gelmini, S., Bonin, S. and Foy, C., 2023. Interlaboratory evaluation of quality control methods for circulating cell-free DNA extraction. *New Biotechnology*, 78, pp.13-21. DOI: [10.1016/j.nbt.2023.09.005](https://doi.org/10.1016/j.nbt.2023.09.005)

Gogishvili, D., Illes-Toth, E., Harris, M.J., Hopley, C., Teunissen, C.E. and Abeln, S., 2024. Structural flexibility and heterogeneity of recombinant human glial fibrillary acidic protein (GFAP). *Proteins: Structure, Function, and Bioinformatics*, 92(5), pp.649-664. DOI: [10.1002/prot.26656](https://doi.org/10.1002/prot.26656)

Strekopytov, S., Billimoria, K. and Goenaga-Infante, H., 2023. A systematic study of high resolution multielemental quantitative bioimaging of animal tissue using LA-ICP-TOFMS. *Journal of Analytical Atomic Spectrometry*, 38(3), pp.704-715. DOI: [10.1039/D2JA00402J](https://doi.org/10.1039/D2JA00402J)

Vierbaum, L., Wojtalewicz, N., Grunert, H.P., Zimmermann, A., Scholz, A., Goseberg, S., Kaiser, P., Duehring, U., Drosten, C., Corman, V. and Niemeyer, D., 2023. Results of German external quality assessment schemes for SARS-CoV-2 antigen detection. *Scientific Reports*, 13(1), p.13206. DOI: [10.1038/s41598-023-40330-2](https://doi.org/10.1038/s41598-023-40330-2)



Contact us to access expertise in a range of chemical and biological measurement technologies and related topics such as analytical quality assurance, method validation, measurement uncertainty, reference materials and proficiency testing.

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Science for a safer world

