



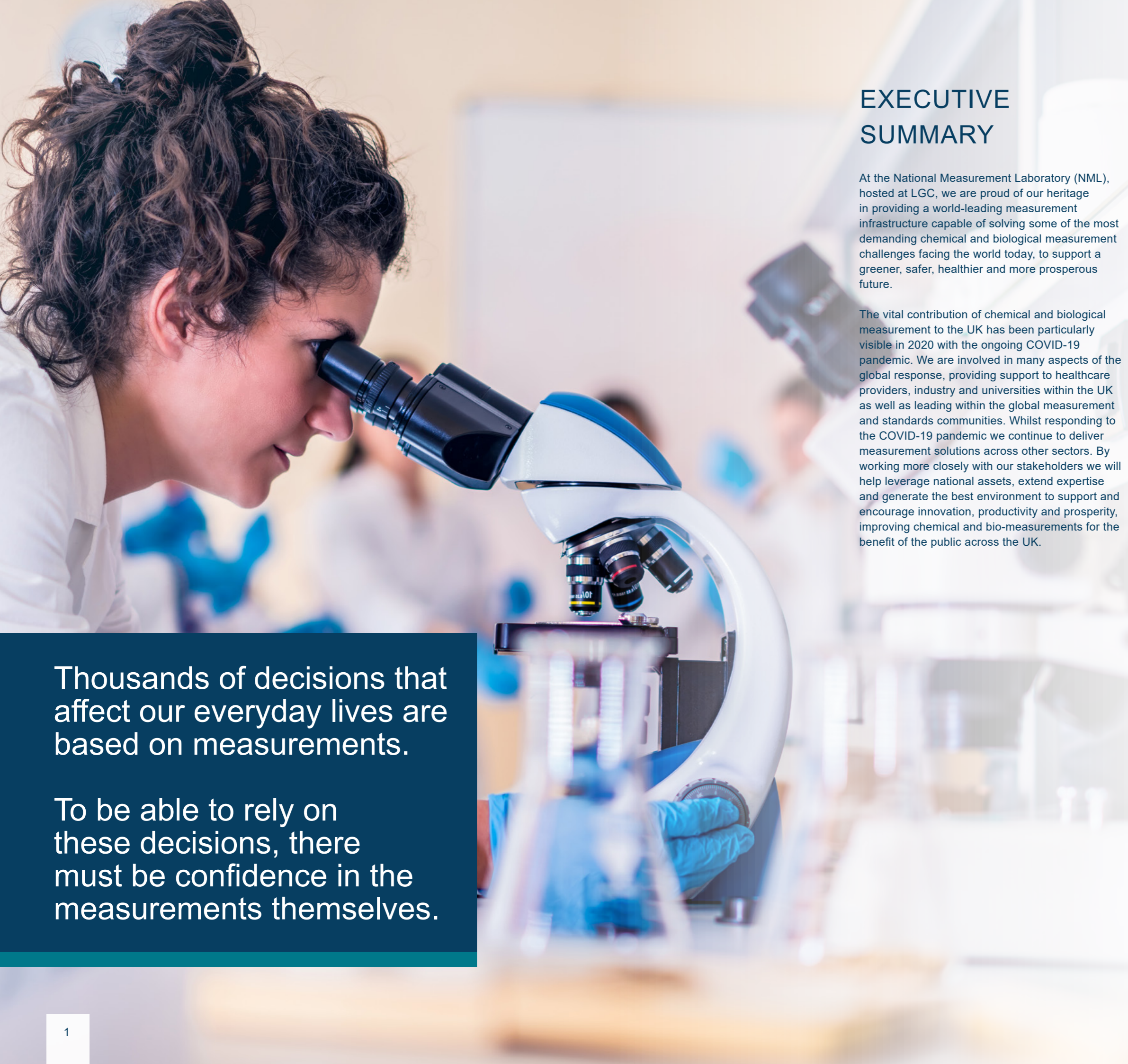
ANNUAL REVIEW | 2020



Department for
Business, Energy
& Industrial Strategy

FUNDED BY BEIS





EXECUTIVE SUMMARY

At the National Measurement Laboratory (NML), hosted at LGC, we are proud of our heritage in providing a world-leading measurement infrastructure capable of solving some of the most demanding chemical and biological measurement challenges facing the world today, to support a greener, safer, healthier and more prosperous future.

The vital contribution of chemical and biological measurement to the UK has been particularly visible in 2020 with the ongoing COVID-19 pandemic. We are involved in many aspects of the global response, providing support to healthcare providers, industry and universities within the UK as well as leading within the global measurement and standards communities. Whilst responding to the COVID-19 pandemic we continue to deliver measurement solutions across other sectors. By working more closely with our stakeholders we will help leverage national assets, extend expertise and generate the best environment to support and encourage innovation, productivity and prosperity, improving chemical and bio-measurements for the benefit of the public across the UK.

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.



This year the importance of fast and reliable testing has received unprecedented public attention in light of the global response to the SARS-CoV-2 pandemic. As we complete this review, I am immensely proud of our contributions in helping establish important elements of the quality framework that assured the reliability of data for infection monitoring and for supporting therapeutic development. The demand for reliable chemical and biological measurement increases year on year. As the UK commits to sustainable economic growth by investing in innovation, aims to achieve net zero carbon by 2050, and completes EU transition, the NML will continue to strive to support the associated regulatory frameworks and the effective translation of research for societal benefit.

Derek Craston
Chief Scientific Officer



OUR NATIONAL ROLES

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

We are sponsored by BEIS as part of the National Measurement System group.


We ensure trust and confidence by providing access to the highest quality chemical and bio-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.

Through improved chemical and bio-measurements we support manufacture and trade, protect consumers, enhance skills and improve quality of life.

JOIN THE MEASUREMENT CONVERSATION:

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www.lgcgroup.com/nml



WE WORK IN **PARTNERSHIP** WITH INDUSTRY, NHS, GOVERNMENT AND ACADEMIA



OUR LEVERAGED INCOME FROM ALL SERVICES WAS **£3.3 MILLION**

OUR **NUMBERS** 2020

WE WORK WITH **OVER 860** DIFFERENT ORGANISATIONS

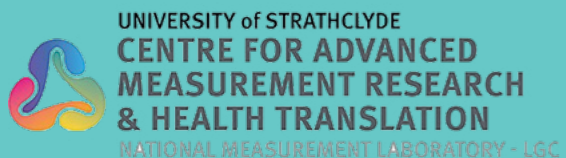
40 PEER-REVIEWED PUBLICATIONS

3 NEW ISO ACCREDITATIONS

9 REFERENCE MATERIALS

24 CONTRIBUTIONS TO ISO STANDARDS
(5 PUBLISHED)

OUR STRATEGIC PARTNERSHIPS



After a successful launch, through our Centre for Advanced Measurement Research and Health Translation at the University of Strathclyde we are providing our expertise in measurement to inform applied research in areas including point of care testing for drug induced liver injury and analytical measurements for biopharmaceutical production. We are also extending the capabilities within the Centre for the benefit of industry, underpinned by good measurement practice.

Through a partnership with the National Manufacturing Institute of Scotland (NMIS), we are bringing together high-calibre scientists and technicians working at the boundaries of advanced measurement research both at NMIS and the Centre to provide industrial partners with a coordinated response to their measurement challenges.

PARTNERSHIPS FOR THE FUTURE



The University of Manchester

Building on our partnership activities in the North of England with the University of Leeds and Nexus, this year we signed a Memorandum of Understanding with the University of Manchester. This will enhance our ability to translate biomarkers into commercially relevant, nationally recognised and standardised tests to identify disease and determine treatments and therapies. A key collaborator in building this partnership will be the Stoller Biomarker Discovery Centre.

THE NML ACROSS THE UK

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.

- Centres of excellence
- Academic collaborations/joint PhDs



THE NML AND THE GLOBAL MEASUREMENT COMMUNITY

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 our Calibration and Measurement Capabilities (CMCs) claims which underpin our measurement services.

Excellent performance at CCQM this year has led to 2 new CMC claims, one for low polarity organic compounds with a molecular weight below 500 Da and another for high polarity organic analytes with molecular weight below 500 Da, in a single or multicomponent aqueous solution. These broad claims underpin our traceability and calibration for solutions, which supports analytical results and methods for laboratories.

10
(3 LEADING) | **CCQM STUDIES**

2 | **NEW CMC CLAIMS**



WE WORK GLOBALLY TO STANDARDISE MEASUREMENT SCIENCE

EUROPEAN METROLOGY NETWORKS

This year we were part of successful bids to establish two new European Metrology Networks (EMNs) under the European Metrology Programme for Innovation and Research (EMPIR). EMNs provide strategic frameworks to evaluate European and global metrology needs and address these needs in a coordinated manner.

The proposed EMNs, covering pollution monitoring and food safety will provide a single point of contact for information, underpinning regulation and standardisation, promoting best practice, and establishing a comprehensive, longer-term infrastructure. They will provide an important opportunity to build on our collaborations across the measurement

science community and address the measurement challenges faced by the different stakeholders.

Pollution monitoring
Pollution affects both human health and the environment. In order to effectively regulate and reduce pollution, the presence, effect or level of any polluting substance in air, water or soil must be monitored. The proposed EMN will provide an important opportunity to build on our collaborations across the measurement science community and address the measurement challenges faced by the different stakeholders on pollution monitoring, for example in mercury monitoring. This will support innovation, competitiveness and regulatory decision-making in this area.

Food safety
Safe, high-quality food is a fundamental prerequisite for human health. Preventing food-related emergencies caused by food contamination or fraud requires close co-ordination across countries and between reference laboratories. In particular, novel foods containing nanomaterials and pathogens in foods present complex measurement challenges in ensuring food safety. The proposed EMN will help improve the links between the measurement community and stakeholders in the food manufacturing and food safety sector, addressing their challenges and ensuring traceability to the SI for more reliable measurements along the food chain.



The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States

INTERNATIONAL DOCUMENTARY STANDARDS AND GUIDANCE

One of our recently completed European projects (EMPIR Bio-stand) contributed to the development of five international (ISO) standards for counting biological entities, important for diagnosing respiratory infections and identifying microbial pathogens. One

of these (ISO 20395:2019 Requirements for evaluating the performance of quantification methods for nucleic acid target sequences – qPCR and dPCR) was made freely available by ISO to support the development and implementation of effective COVID-19 testing. This standard was used

in the implementation of the quality assurance for UK field labs testing for coronavirus. The European Commission also highlighted this work as one of their research and innovation initiatives to help tackle the spread of coronavirus and preparedness for other outbreaks.

SUPPORTING ANALYTICAL SCIENCE ACROSS EUROPE



Eurachem (www.eurachem.org) is a network of organisations in Europe that supports international traceability of chemical measurements and the promotion of good quality practices. It provides a focus for analytical chemistry and quality related issues and publishes a range of authoritative guidance documentation in this field.

The work of Eurachem is delivered through its Working Groups on Education and Training, Method Validation, Measurement Uncertainty and Traceability, Proficiency Testing, Reference Materials, Uncertainty from Sampling, and Qualitative Analysis.

We have supported active UK participation in Eurachem and its working groups over

many years and until May 2022 NML staff will hold both the Chair and Secretary positions. This will help maintain our leading position in supporting the delivery of fit-for-purpose measurement results across Europe.

NML RESPONSE TO COVID-19 PANDEMIC

Throughout the pandemic, we are keeping essential laboratories open and re-scoping work to directly support the UK and the global measurement community response to the COVID-19 pandemic.

LEADING GLOBAL EFFORTS TOWARDS SI TRACEABLE SARS-COV-2 GENOMIC MEASUREMENT

We led an inter-laboratory study for SARS-CoV-2 genome measurement to develop a reference measurement procedure through the CCQM Nucleic Acid Analysis Working Group (NAWG) to support SARS-CoV-2 molecular diagnostic testing. The study was supported by the National Institute of Biological Standards and Control (NIBSC), the National Institute of Standards and Technology, USA (NIST) and the National Institute of Metrology, China (NIM), and involved 21 national measurement laboratories and approved guest laboratories from 16 countries.

The study demonstrated unprecedented reproducibility for absolute molecular

measurement of the amount of the SARS-CoV-2 viral RNA using reverse transcription PCR (RT-dPCR) without the need for calibration. The outcomes provide capabilities to support quality of routine SARS-CoV-2 diagnostic tests and ensure standardised measurement across the globe. The availability of calibration-independent reference measurement procedures has far wider implications as they can provide a global foundation for rapid implementation of diagnostic standards that are able to be tailored to a wide area of applications, for example in future pandemics, cancer testing and antibiotic resistance.

SUPPORTING STANDARDISATION OF VIRAL DIAGNOSTICS IN TESTING LABORATORIES

In our role as a nominated expert laboratory for external quality assurance provider INSTAND eV, we assigned values for virus quantification and homogeneity evaluation for SARS-CoV-2 proficiency testing schemes. Over 600 laboratories participate in these quarterly schemes to evaluate their performance, meet accreditation requirements and to support international standardisation of diagnostic results.

We are a leading partner in developing and revising written standards guidance to support the accuracy of COVID-19 diagnostic testing. We participated in the SARS-CoV-2 collaborative study which led to the development of the WHO SARS-CoV-2 international standards produced by NIBSC.

The reference methods we developed for

SARS-CoV-2 have given numerous stakeholders confidence in their use of in vitro diagnostic tests for COVID-19. Such methods offer a rapid and dynamic solution to add confidence when using new and untested diagnostic methods in response to an evolving pandemic.

SUPPORTING THE UK COVID-19 TESTING STRATEGY

We are supporting the UK COVID-19 testing strategy in various ways through the provision of technical advice and validation testing around molecular and non-molecular method performance assessment. As well as providing regular ad hoc advice to the NHS around validation of specific test method performance, we have been working together with Public Health England (PHE) to support technical input into the

Department of Health and Social Care (DHSC) Viral Technology Group to evaluate the performance of commercial COVID-19 molecular diagnostic viral test approaches used within the NHS and Lighthouse laboratories.

As part of the COVID-19 National Diagnostic Research and Evaluation Platform (CONDOR), funded by the National Institute for Health Research (NIHR)

and UK Research and Innovation (UKRI), we are supporting the independent validation of molecular point of care tests. The initiative has created a national route for evaluating new diagnostic tests in hospitals, GP surgeries and care homes and is one of a number of COVID-19 studies given urgent public health research status by DHSC.

SUPPORTING NHS TEST AND TRACE COVID-19 MASS SPECTROMETRY PILOT STUDY

Alongside molecular testing, mass spectrometry offers a potential route to support the UK mass population testing strategy. Through our partnership in the Mass Spectrometry COVID-19 coalition, a global initiative led by the University of

Manchester, UK, and as part of the expert advisory group for the NHS Test and Trace Mass Spectrometry Pilot Study, we are assisting in the translation from academia to NHS clinical laboratories of a fit-for-purpose diagnostic method for

COVID-19 testing. This will help validate the use of mass spectrometry as a diagnostic screen and support scaling up of the methodology to help achieve the ambition of mass population testing.

REFERENCE MATERIALS AND UNDERPINNING MEASUREMENTS



OUR QUALITY ACCREDITED TO
ISO/IEC 17025
ISO17034
ISO9001

Reference materials are the cornerstone of accurate and traceable measurements – they are measurement standards which can be used to validate analytical methods, establish traceability and support quality control.

We have a portfolio of 140 materials covering high purity standards, carbon isotope ratios, food, environmental and clinical materials, and alcohol standards. This year we released a material to support the determination of sulfur dioxide concentration in drink samples and underpin its regulatory limits, ensuring safe products for consumers.

NEW MATERIALS

LGC7113 Fruit squash – Total SO₂

REPLACEMENT MATERIALS

LGC5404 5 % alcohol solution characterised for alcohol concentration

LGC5402 107 mg/100 mL aqueous ethanol characterised for ethanol concentration

LGC2601 Indium characterised for enthalpy of fusion and liquefaction point

LGC7220 to LGC7226 Seven pure meat materials for authenticity testing

LGC7420 to LGC7428 (even numbers) five meat mixtures for authenticity testing

RE-CHARACTERISED REFERENCE MATERIALS

LGC6115 Contaminated soil

LGC6182 Sewage sludge

LGC6188 River sediment

In 2020 we extended our UKAS (United Kingdom Accreditation Service) scope of accreditation for reference material production to ISO 17034:2016 in three areas of measurement, including allergen food proteins, enthalpy of fusion for metals and elemental analysis.

This allows us to support measurement in three separate areas of analysis. The first is to support method development to determine 'true' allergen content for the food industry to ensure consumer safety; the second is to support operating and calibration procedures for differential scanning calorimetry for metals and elemental analysis; and the third is to support validation and ongoing monitoring of methods used in elemental analysis of blood. This accreditation provides independent reassurance to our customers of our ability to produce reliable reference materials that they can have confidence in.

WORLD FIRST MULTI-ALLERGEN QUANTIFICATION KIT GETS ACCREDITATION

Our first multi-allergen reference material kit containing five common allergens (milk, egg, almond, hazelnut and walnut) was confirmed within the scope of our ISO 17034 accreditation.

Food allergy is a serious problem, with up to 2 million people in the UK estimated to be affected. Avoidance of allergenic foods can be difficult to achieve in

practice, as they are often basic food ingredients and can find their way into foods unintentionally, e.g. through use of common utensils and processing lines. Even very small quantities (as little as 1/100 of a gram) of a food such as peanut can cause an unwanted reaction in a person with peanut allergy. Being among the first laboratories in the world to hold ISO 17034 accreditation for this type

of product is very important, as the new reference material kit will be used to support method development to determine 'true' allergen content, and assist laboratories in monitoring the performance of methods on a day-to-day basis. This reference material kit will ultimately improve the safety of food products and quality of life for allergen sufferers.



It is a fact that not many allergen reference materials have this accreditation and this is confirmation that the kit has been prepared according to very exacting requirements.

Gill Holcombe, Head of the Reference Material Production Team

SUPPORTING THE NHS

COLLABORATION TO SUPPORT IMPROVED NEWBORN SCREENING

In the first round of the NHS England Chief Scientific Officer's Knowledge Transfer Partnership (KTP) we partnered with Dr Rachel Carling, Consultant Clinical Scientist, Director of Service and Clinical Lead, Viapath, Guys & St Thomas' NHS Foundation Trust. During this project we helped further improve the methodology underpinning the Newborn Blood Spot Screening programme, supporting harmonisation of results across the UK.

Since the KTP project officially finished, we have continued to collaborate with NHS England on this work. An inter-laboratory study using the optimised methods developed under the KTP, has been run with some of the newborn screening labs with a view to transferring the outcomes into best practice guidance on how to improve measurements. An additional study with the European Research Network for evaluation and improvement of screening, Diagnosis and treatment of Inherited disorders of Metabolism (ERNDIM) is underway. On the basis of this work, the advisory board for the

national Inherited Metabolic Disorders (IMD) screening programme that provides independent advice to Public Health England (PHE), are discussing the need for a national procurement of traceable standards.

Together, we are helping to deliver greater certainty for the Newborn Blood Spot Screening programme, impacting on every child born in the UK. The continued outcomes of this project will provide a framework within which more analytes can be added to the UK's screening programme to increase the range of diseases that can be tested for at birth.

The KTP is a very successful programme that helps increase efficiencies within the NHS, speeds up the identification and dissemination of healthcare innovations and improves patient outcomes. Following two successful rounds of the KTP a further programme will be launched post-Covid-19 to continue building long term partnerships between clinical, research and industry teams.



SUPPORTING INDUSTRY

Smith+Nephew

Patients with chronic or acute wounds, such as diabetic ulcers, burns and post-operative wounds, need advanced wound care to help reduce infection and improve healing. With an ageing population that is more prone to chronic illnesses, and where natural healing processes are slower and less efficient, wound care is becoming ever more important.

We are working closely with Smith + Nephew (S+N), a global medical devices company, to support the development of their novel wound treatment products. Using our unique mass spectrometry capabilities (spICP-MS, A4F-ICP-MS) we have provided invaluable data for material characterisation and stability studies of the nanomaterials in the wound dressing.

This work will support S+N to comply with EU and FDA regulatory requirements and to reduce the human and economic cost of wounds, improving patient outcomes and conserving resources for health systems.

A4I Analysis for Innovators

We are a partner in the Innovate UK programme 'Analysis for Innovators' (A4I). A4I provides companies with access to state-of-the-art measurement and analytical technologies. It focuses on solving measurement problems within existing businesses to improve competitiveness and productivity.

This year we have been working with 7 UK companies. These projects address challenges in healthcare, water management, wearable technology, bioscience development, x-ray technology and cell and gene therapeutics.

Puraffinity

The pollution of water supplies is a global risk of highest concern that can adversely affect human health. One group of contaminants are poly- and perfluoroalkyl substances (PFAS) that can cause significant environmental damage to freshwater and marine fauna, contaminating surface and groundwaters that supply drinking water and have been associated with a host of health effects, including cancer, liver damage, decreased fertility and increased risk of asthma and thyroid disease (C8 Science Council).

Puraffinity, a company that specialise in designing and manufacturing novel advanced materials for environmental benefit, have

developed a new class of targeted adsorbent media to selectively capture PFAS for commercial water purification applications. Using our mass spectrometry expertise (LC-MS and UV-Vis), we are working with Puraffinity to accurately characterise the molecular receptor structure that binds the target molecules and develop methods to give insight into the complex reaction monitoring process. This will help Puraffinity to make product formulation improvements to improve performance and will also generate data to support certification of the product for drinking water applications, a critical step to accelerating their route to product validation and commercialisation.

“ Through the A4I project, we tapped into world leading characterisation data with high data integrity, allowing us to scale up UK based manufacturing to the tonne/year scale and significantly improve our new product development cycles.

Puraffinity



Current solid-state X-ray detectors are expensive to manufacture and are restricted in terms of scaling to large areas. SilverRay have developed a new detector technology for the next generation of high-sensitivity X-ray sensors, which will have extensive applications in the areas of healthcare, non-destructive testing and security. This proprietary technology has demonstrated its sensitivity to be two to three orders of magnitude higher than conventional detectors with the ability to conform to any desired shape whilst operating at low power consumption.

Challenges lie within the production of a homogenous coating of

nanoparticles across the device, specifically for the optimisation of large area X-Ray imagers. Using our knowledge and capabilities in solid state analysis (LA-ICP-MS) and high accuracy elemental analysis (ICP-MS), we are providing quantitative results on the nanoparticle content of the studied devices, as well as valuable information about the distribution of the nanoparticles on selective regions. These results will provide SilverRay with a better understanding of the correlation between the coating technique and the nanoparticle distribution, a critical point to overcome in order to progress the potential of their technology and open new market opportunities.



The results of this A4I project supported by the NML impacts SilverRay Ltd. in their advance of new generation solution processable large area flexible detectors to create a safer and a more sustainable world that uses less power and reduced X-ray doses.

SilverRay Ltd.

Measurement for Recovery #M4R
Building confidence in the future

NPL NML BSI NIBSC UKAS

In response to the COVID-19 pandemic, a new industry programme, Measurement for Recovery (M4R), was launched to help businesses recover and drive growth for UK industry for the future. Along with the other UK National Measurement System laboratories, we are a partner in this programme, providing companies with access to our world class measurement research, expert advice and facilities free of charge. Working with companies across the UK, we are helping them address measurement problems in innovative ways to boost resilience and competitiveness.



Through tapping into NML's world-class expertise in mass spectrometry analysis we have been able to develop highly complex methods that will streamline the development of our product.

Sixfold



Given their high specificity and selectivity for gene-silencing, small interfering RNA (siRNA) have the potential to provide powerful treatment options for a variety of genetically-driven diseases, including cancer. The major limiting factor for their clinical and commercial success is the lack of safe and effective systems for systemic delivery of siRNAs to specific organs and cells. To address this drug delivery challenge Sixfold Bioscience has developed the MergoTM platform, an oligonucleotide-based delivery system.

Preclinical data indicates a highly competitive safety profile of siRNA-

conjugated MergoTM against cancer, however further characterisation is required. Using our mass spectrometry expertise (LC-MS and SEC-MS) we are working with Sixfold to help determine and optimise the body's effect on the MergoTM platform and its pharmacokinetic profile, to enable preclinical studies to be completed in line with the requirements of the regulatory agencies to quickly progress through preclinical development. This will expedite commercialisation, allowing this novel product to improve drug delivery challenges and bring true precision medicine to patients.



We are delighted to be working together with the NML, using their combined expertise and experience to test and enhance the measuring and efficiency of our forensic marker, to give us the confidence to trial the product with the Police and Security Services.

Crime Solutions Ltd

Crime Solutions Ltd

Crime Solutions have developed a security device that includes visual, audio and molecular methods for the identification of individuals who have committed a crime. However, further work is required to optimise their patented technology as a forensic marker for the security industry.

Our expertise in item examination, real-time PCR and probe-based assays will assist in developing and measuring the efficiency of the technology in order for the company's system prototype to be trialled with potential customers. If successful, their devices could be installed in thousands of locations, leading to a testing requirement in diagnostic laboratories and the ability to remove doubt by combining evidential technologies with a forensic marker, providing efficiencies to all sectors of the security market.



The development and commercialisation of rapid tests is vital to assist the government's test, trace and isolate strategy to help contain the COVID-19 pandemic.

Highfield Diagnostics are working to develop a lateral flow test for the rapid and cost-effective detection of SARS-CoV-2 at point-of testing. The test allows for the detection of the SARS-CoV-2 nucleoprotein within swab samples collected from a patient's throat and nose.

Using our expertise in method validation we have been optimising the existing method, and working with Highfield Diagnostics to streamline their processes to improve assay performance. Highfield Diagnostics were one of the twenty finalists in the \$6 million XPRIZE Rapid Covid Testing prize, a competition to create newer, higher standards of COVID-19 testing to help society safely return to normal activities.



Getting critical feedback and support from a subject expert at the National Measurement Laboratory, we believe will be absolutely valuable and will help accelerate the development of our SARS-CoV-2 rapid antigen test.

Highfield Diagnostics

bridge farm group



Accurate analysis of CBD is highly complex, and for Bridge Farm Group it is critical to ensure we bring safe and trusted CBD products to market. Our collaboration with the NML has given us access to the very highest standard laboratory testing and analytical expertise to help us optimise our own in-house methodology and testing standards.

Bridge Farm Group

Product integrity and accurate analysis is critical to underpin the confidence in Cannabidiol (CBD) products with regulators, businesses and consumers. Bridge Farm Group are developing a novel technique for CBD purification for novel food applications aligned

around the health benefits of natural plant extracts. Our expertise in method development and specifically development of bespoke methods for CBD analysis will assist to optimise their methods in order to achieve the high sensitivity and robustness required

to determine controlled cannabinoid content. Within this highly focused project we are helping Bridge Farm address the measurement challenges to enable their entry into a fast growing and expanding market of CBD based consumer products worth £300 million annually.

SKILLS FOR INDUSTRY

KNOWLEDGE TRANSFER & DISSEMINATION

For more than 20 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.

In 2020 our Knowledge and Skills Exchange activities have embraced virtual learning with all our courses successfully adapted for live online delivery. Moving online after many years of face-to-face training not only allows the continued delivery of our Analytical Quality Training Programme throughout the global pandemic, but also supports the delivery of bespoke training requests from industry, academia and government in the UK and overseas.

Our courses cover the core topics that support laboratory quality assurance, including method validation, evaluating measurement uncertainty and statistical tools for analytical scientists. We consistently receive excellent feedback from delegates and we have a high level of repeat customers.

SECTORS

CLINICAL, ENVIRONMENT, PHARMACEUTICALS, CHEMICALS, FOOD AND BEVERAGES, FORENSICS, UTILITY SERVICES, ACADEMIA

DELEGATES TRAINED

171 DELEGATES
36 ORGANISATIONS
18 COURSES

OVER 95%

OF RESPONDENTS FEEL OUR TRAINING COURSES MEET THEIR EXPECTATIONS

Details of all our training programmes are available at www.lgcgroup.com/training.



It was a very well delivered course by very well trained and expert teachers. The whole statistics and validation routine will add value to my work and will, for sure, be a great addition for my career.

Online method validation course delegate



Would recommend this as an automatic course for anyone going into laboratory supervision.

Online statistics course delegate



DEVELOPING KEY LABORATORY SKILLS

Technological developments and regulatory changes require scientists to develop and adapt their skills throughout their careers. Over the last year we have developed Praxis (<https://www.lgcgroup.com/praxis>) in collaboration with Learning Science, an interactive web based e-Learning course that addresses core laboratory skills for analytical scientists. Praxis allows laboratory staff to perfect their practical

skills online through a mixture of videos, interactive simulations and assessments. Successful completion allows analytical scientists to demonstrate competence that will enable them to continue to progress in their careers. After the successful completion of this project we are exploring other options for virtual learning delivery, with a particular focus on app-based microlearning.



CAMS is an industry-led initiative, co-founded by the NML, aimed at promoting world-class analytical measurement science training, research and innovation by bringing together a network of industrial and academic partners with interests in these fields.

In 2020 CAMS hosted its inaugural conference and poster competition. Running as a live virtual event, over 200 participants joined the conference sessions and

engaged with guest speakers from across industry, academia and government.

To date, thanks to contributions from the Analytical Chemistry Trust Fund, the Department for Business, Energy & Industrial Strategy and the Community's industry and academic members, CAMS has committed funding for 21 academic awards in the field of analytical measurement science that address specific industry challenges.

- 14 INDUSTRY MEMBERS
- 14 ACADEMIC MEMBERS
- 21 CO-FUNDED AWARDS (LECTURESHIPS, POSTDOC AND FELLOWSHIPS)
- 5 FELLOWSHIPS
- 25 SUPPORTED ANALYTICAL CHEMISTRY SUMMER STUDENTSHIPS

SELECTED PUBLICATIONS

The quality and credibility of our science is demonstrated in part through our publications in peer reviewed journals. In 2020 our scientists published 40 peer reviewed publications. Here is a short selection:

Bharucha et al. STROBE-metagenomics: a STROBE extension statement to guide the reporting of metagenomics studies. *Lancet Infect Dis.* 20(10):e251-260. DOI: 10.1016/S1473-3099(20)30199-7

Cuello-Nunez S. The accurate determination of number concentration of inorganic nanoparticles using spICP-MS with the dynamic mass flow approach. *J Anal Atom Spectrom.* 35:1832-1839. DOI: 10.1039/C9JA00415G

Ellison SLR & Woolfe M. Reducing the cost of nitrogen factor studies by use of fractional and algorithmic designs. *Food Contr.* 123:107825. DOI:10.1016/j.foodcont.2020.107825

Giagrande C et al. Development of a primary calibrator and candidate reference method for metrological traceability of tau protein results. *Alzheimer's Dement.* 16(Suppl.5):e043036. DOI:10.1002/alz.043036

Grant R et al. Applying uncertainty analysis to assess the variation of operator performance when manually gating Flow Cytometry data. *Cytotherapy.* 22(5):S38. DOI:10.1016/j.jcyt.2020.03.034

Huggett JF et al. The Digital MIQE Guidelines Update: Minimum Information for Publication of Quantitative Digital PCR Experiments for 2020. *Clin Chem.* 66(8):1012-1029. DOI:10.1093/clinchem/hvaa125

McCullough BJ et al. Atmospheric solids analysis probe coupled to a portable mass spectrometer for rapid identification of bulk drug seizures. *J Am Soc Mass Spectrom.* 31(2):386-393. DOI:10.1021/jasms.9b00020

Ward-Deitrich CL et al. Systematic study of the selenium fractionation in human plasma from a cancer prevention trial using HPLC hyphenated to ICP-MS and ESI-MS/MS. *Anal Bioanal Chem.* 413(2):331-344. DOI:10.1007/s00216-020-02988-9

OUR PEOPLE

Elena Sanchez has been appointed Secretary of Eurachem for a two year period.

Heidi Goenaga-Infante has been awarded the 2020 Lester W. Strock Award from the Society for Applied Spectroscopy (SAS) in recognition of her contributions to the field of analytical atomic spectrometry. Heidi has also been appointed as chair of the Journal of Analytical Atomic Spectroscopy (JAAS).

Jim Huggett is a partner in the establishment of the Coronavirus Standards Working Group.

Michael Walker has been appointed Honorary Professor in the Institute for Global Food Security at Queen's University Belfast.

Philip Dunn has been appointed as a member of the Analytical Division Council of the Royal Society of Chemistry.

Selvarani Elahi has been awarded an MBE for Food Measurement Science in the Queen's 2020 Birthday Honours list. Selvarani has been invited on to the Safe to Trade Scheme Governance Board. The Safe to Trade Scheme (STTS) was launched in direct response to the Coronavirus (COVID-19) pandemic, to help businesses instil consumer and worker confidence that they can reopen and trade safely complying fully with the government recommendations.

Vicki Barwick has been appointed chair of Eurachem for a two-year term.

Victoria Moore and David French were selected as one of the teams for the Newton Prize Award 2020 in recognition of excellent science, research and innovation in support of economic development and social welfare in Newton Fund partner countries for their work on the development of a rapid detection method for breast cancer (BRCA) and non-communicative diseases (NCD).

80 SCIENTISTS
75% PhD



DO YOU HAVE A MEASUREMENT-RELATED QUESTION?

ARE YOU LOOKING FOR MEASUREMENT SUPPORT TO ADDRESS YOUR MEASUREMENT CHALLENGES?

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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