



National Measurement Laboratory International Review of Science 2023

Public Summary



Executive Summary

The National Measurement Laboratory at LGC (NML at LGC) is the UK's measurement institute for “chemical and bio-metrology”, delivering the underpinning chemical and biological measurement excellence needed for a healthier, safer, greener, and more prosperous nation. The Government Chemist (GC), also based at LGC, is a unique statutory function laid down in multiple acts of UK Parliament, that focuses on public protection, value for money and consumer choice, resolving scientific disputes and fulfilling an advisory role for government. Both functions form part of the wider UK National Measurement System (NMS), funded by the Department for Science, Innovation & Technology (DSIT).

Monitoring and evaluation of national infrastructure by government is a crucial part of ensuring the systems it funds continue to provide work of high quality and value for money to the UK and are prepared for future challenges. This International Review of Science was commissioned by DSIT to evaluate the quality of science and the impact of the NML at LGC and GC function over the period 2016 to 2023.

The evaluation was performed by an international panel of 15 experts who were asked to draw conclusions on the progress made since the last Review, assess the current standing of the NML at LGC and the Government Chemist, and provide recommendations for future consideration. The Review Board assessed each of the scientific areas (Inorganic Analysis, Organic Analysis, Molecular and Cell Biology) and the Government Chemist role in detail, as well as looked closely at the wider impact and benefits.

Following the Review, which involved extensive written evidence and a 2-day visit to the laboratory, the Board has concluded that both the quality of the science and its impact is either world-leading (the best in the world) or internationally competitive (comparable with other world-class labs internationally) across the breadth of the scientific disciplines covered.

The Board concluded that the NML at LGC and the Government Chemist role is a strategic national asset that is uniquely placed and fulfils a critical national role serving the public interest. It 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. Increased stakeholder engagement and focus has led to the NML at LGC and the Government Chemist delivering greater impact. Excellent examples include partnership programmes to enhance collaboration with the NHS (CSO Knowledge Transfer Partnership) and industry (Analysis for Innovators, Measurement for Recovery), and the new Centres of Excellence established with strategically selected universities since the last international review.

The NML at LGC and the Government Chemist role continues to maintain a highly respected international position and achieves significant international influence, and the enthusiasm of the staff, their expertise and commitment to their work is extremely impressive. In many areas the NML at LGC and the Government Chemist has become the 'go to' facility for a range of complex scientific challenges. The work on infectious disease, most recently in the response to Covid-19, is of particular note; core competencies in nucleic acid measurement, combined with effective leadership, ensured that the NML at LGC had real impact on the quality of the viral measurements made both in the UK and globally. Global firsts were observed in the nanoparticle and absolute carbon isotope ratio areas, where ground-breaking work led to the development of novel reference materials whose impact stretches far beyond the UK.

Recommendations

The Review Board made nine general recommendations for the four scientific areas assessed, to enable maintenance of their current position and equip themselves for the future:

The UK should continue to recognise and promote its excellent metrology assets and their value across the research, development, and innovation ecosystem to embed them further into the ecosystem. This will help the NML at LGC, and wider NMS, achieve yet more impact in the future.

The achieving of that impact requires continued public sector support. Investment should increase so that existing areas of excellence can continue, future challenges be addressed, and support for UK business and quality of life maintained over the longer term.

The NML at LGC should continue, and increase, its important international work.

The NML at LGC should continue to develop and maintain a balanced portfolio of activities, one that both delivers on its current remit and prepares it for future challenges and emerging areas.

The NML at LGC should increase its strategic scientific focus in the areas of net zero, sustainability and the environment.

The NML at LGC should increase the visibility of its decision-making criteria and use them in the development of its portfolio of future work.

The NML at LGC should continue to develop its use of metrics and targets further, and deploy these in management decision-making, prioritisation and organisational performance evaluation.

The NML at LGC should continue to invest in staff development and training across its programme areas, enhancing both individual and team expertise, and making the organisation more resilient to the future movement of high performing individuals. In addition, the NML at LGC should further develop its organisational identity and extend the excellent work on gender inclusion to create an inclusive and engaging culture.

The NML at LGC should enhance its communication activities to widen the audience that understand the benefits and value of measurement.

The Board commended the team at the NML at LGC and the Government Chemist and is confident that, if its recommendations are fully implemented, the well-respected position of the UK within the global metrology community is assured.



I would like to give my sincere thanks to the Board for their work in carrying out this International Review of Science. The Board provided a robust review of our chemical and bio-measurement capabilities and the impact that our measurement science is having both nationally and internationally. I welcome their conclusions, which again show that all our science and its impact is internationally-leading or internationally-competitive. This is testament to the on-going hard work and recognised expertise of our scientists, and our ability to rapidly turn our fundamental measurement capabilities into practice to underpin responses to unprecedented global challenges. I welcome the constructive recommendations of the Review Board supporting our future strategic plans. Whilst always a pleasure to receive such positive and constructive feedback, the hard work continues so that we remain best placed to deliver against the next national challenges and ensure we maintain and build on our highly respected international position across our fields of measurement science.

Julian Braybrook

Director of Measurement Science, National Measurement Laboratory and UK Government Chemist

My sincere thanks to the Review board for their encouraging words and constructive feedback. We found the close interaction of the members of the Board with our scientists at different levels very helpful in providing valuable advice and stimulating discussions. We will strive to maintain our internationally-leading position and to take the internationally-competitive areas to a leading level Worldwide. The enthusiasm, engagement and top quality of our scientists are key pillars of our sound science and metrology leadership and we will continue building on those. Whilst maintaining our core metrology areas we will also continue developing our emerging metrology capabilities to help the UK meet its future strategic measurement challenges. This will be supported and enhanced by our strategic partnership programmes and the established Centres of Excellence with key academic partners.

Heidi Goenaga-Infante
Chief Scientist, National Measurement Laboratory





The Process

The 2023 International Review of Science, commissioned by DSIT, provided the opportunity for a more detailed evaluation of the individual science areas across the NML at LGC and GC.



Review Board appointed

A Review Board of 15 independent, highly respected individuals within their fields, was approved and appointed by DSIT. The Board covered a balance of gender, geographic coverage and expertise addressing the breadth of work covered by the NML at LGC and Government Chemist.



Written evidence

Evidence packs submitted to the Board covered the national role, detailed responses to the Recommendations from the previous Review (2015), science area specific submissions and case studies.



Review conference

A 2-day in person Review Conference was held at the Laboratories in Teddington. During the visit, the Board spoke to 20% of the individuals working within the NML at LGC and GC and visited the major laboratories to review the quality of work and extent of expertise.



Synthesising the evidence

After evaluating the breadth of evidence, the Review Board drew conclusions on the quality of science, its impact and value for money since the last Review. The Board was asked to rank the quality of science and its impact with respect to its position in either the national or international arena and put forward recommendations to ensure the future of the roles in addressing the challenges and needs for the UK.



Output

The results of the conference discussion sessions and Board submissions were consolidated into the International Review of Science.

The Review Board

Inorganic

Paola Fisicaro, Head of Chemical Metrology, LNE, France

Paul Gunning, Principal Scientist, Head of Surface Analysis,
ex. Smith & Nephew, UK

Frank Vanhaeke Senior Professor, Dep of Analytical Chemistry,
Belgium

Organic

Jose Ignacio Garcia Alonso, Professor of Analytical Chemistry, Dep
of Physical and Analytical Chemistry, University of Oviedo, Spain

Lindsey Mackay, General Manager, Chemical and Biological
Metrology, National Measurement Institute Australia, Australia

Melissa Hanna-Brown Global External Strategic Innovation Lead,
Pfizer, UK

Molecular & Cell Biology

Angela Dougas, Deputy Chief Scientific Officer, NHS England, UK

Mike Messenger, Senior Regulatory Affairs Advisor, FIND & Visiting
Professor, School of Medicine, University of Leeds, UK

Adam Corner, Market Development Manager, Bio-Rad Laboratories, UK

Dr Peter Vallone, Group Leader, Applied Genetics, NIST, USA

Statutory and advisory food and feed analysis

Della Sin, ex-Government Chemist, Government Laboratory, Hong Kong
Special Administrative Region, China

Policy/impact

David Barr, Head of Governance, Royal Society of Chemistry, UK

Dr Sarah Main, Executive Director, Campaign for Science &
Engineering, UK

Paul Mason (Chair), Director Innovation Policy, UKRI Innovate UK, UK

Observer

Piera Carugno, Head of Cross-Government R&D Strategy,
Government Office for Science, UK





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