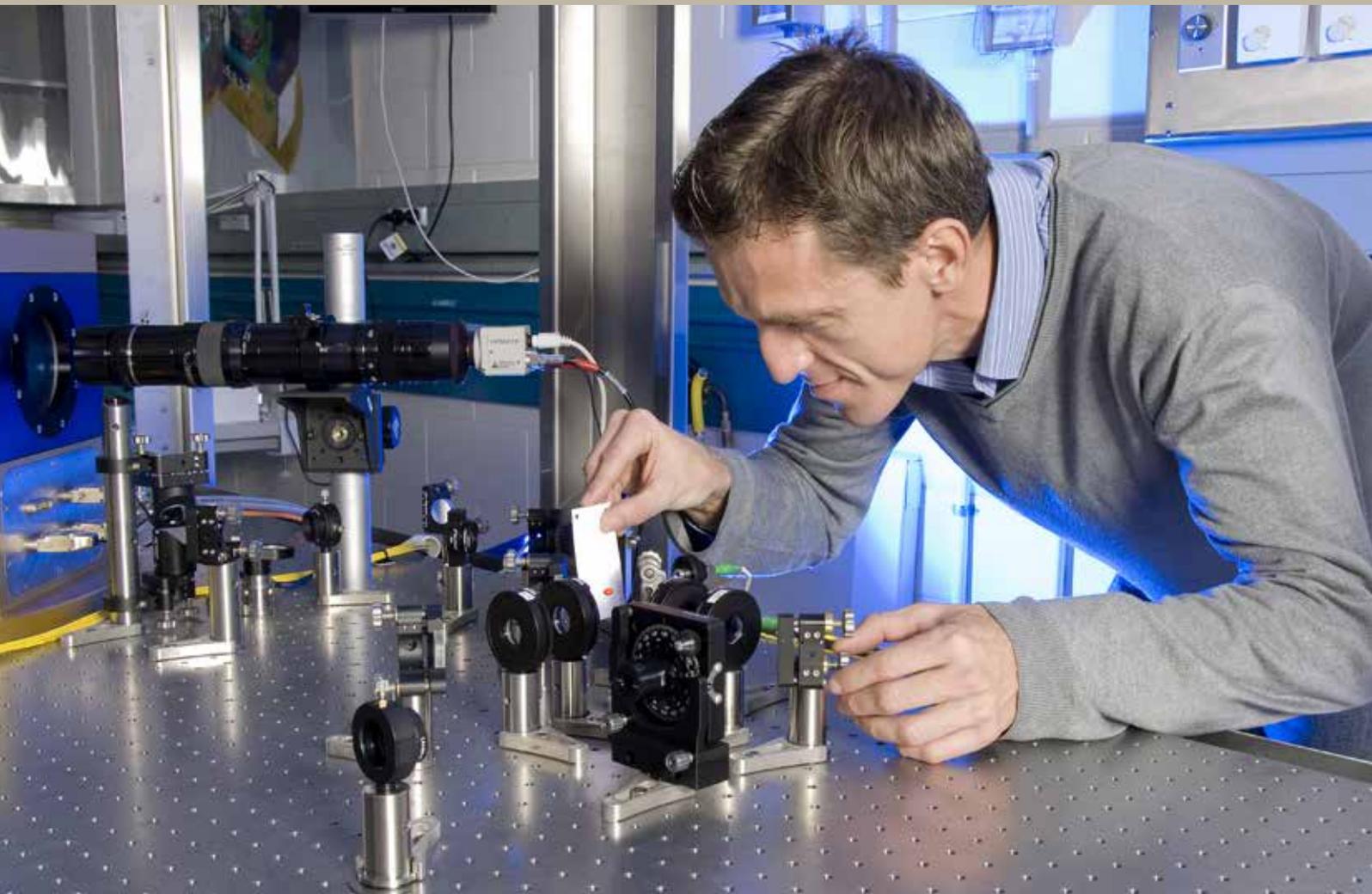




Australian Government  
Department of Industry,  
Innovation and Science

**National  
Measurement  
Institute**



**WORLD-CLASS MEASUREMENT STANDARDS  
AND SERVICES FOR AUSTRALIA**

**MEASUREMENT.GOV.AU**

# Our Vision

*To deliver a facility for measurement in Australia that is world-class, increases industrial efficiency, enhances export trade, supports sound regulation and effective social and health policies.*

## ABOUT NMI

The National Measurement Institute (NMI) is Australia's 'one-stop shop' for measurement and sits at the peak of Australia's measurement system. Through the breadth of our activities, we help realise the potential of measurement to enhance Australia's economic prosperity and well-being.

NMI's measurement expertise, infrastructure, standards and services are simultaneously world-class and practically oriented. We develop and maintain Australia's primary measurement standards to deliver internationally recognised measurement services to Australian industry covering calibrations, chemical and biological analyses such as food and environmental testing, sports drug and forensic drug testing, and training in specific measurement techniques. We also provide support and advice on measurements made for legal purposes; assist industries to develop new measurement methods and administer Australia's national trade measurement system.

We are a multidisciplinary team of more than 400 people across Australia that delivers practical measurement solutions to help address Australia's societal and economic challenges in areas including health, environment, energy, food and agriculture, security and trade. We work collaboratively with researchers and industry to support Australia's competitive edge using measurement to improve productivity through enhanced process efficiency and control, waste reduction, and product research, development and optimisation.

## OUR SERVICE

Our aim is to work with you to identify your needs and develop practical fit-for-purpose solutions. Using our expertise and state-of-the-art technology we can provide tailored solutions to improve the performance, safety, efficiency and regulatory compliance of your business. Our clients in government, industry and the community rely on our wide range of standard and tailored measurement solutions. We understand that measurement needs are often multi-dimensional, and our breadth of expertise allows us to provide comprehensive, multi-disciplinary approaches to solving your measurement challenges.

## INNOVATIVE RESEARCH

Research underpins all aspects of NMI's work. High-level research and collaborations deliver scientific return on investment, international credibility for measurements made in Australia, and provide support for emerging technologies. Research activities include:

- participating in international collaborations aimed at improving the definition of the kilogram, the accuracy of time and frequency measurements, and the standard of direct voltage.
- developing leading-edge approaches to improve the accuracy of DNA and RNA measurements for clinical diagnostics.
- developing improved detection methods and producing chemical reference materials to underpin the accuracy of measurements of performance-enhancing drugs in athletes. Development of techniques for detecting gene doping is a priority.
- improving accuracy of physical measurement standards and techniques that are essential to advances in technology and products.
- emerging areas such as food allergens, genetically modified organisms, designer illicit drugs, newly identified pollutants and greenhouse gases which require new analytical methods and reference materials. We are working with our partners towards those goals.



*NMI's North Ryde Facility.*



*Blocks of illicit drugs seized by the Australian Federal Police have to be broken down and homogenized prior to analysis.*

*(Photo: AFP Forensic and Data Centres)*



*Nanoparticles of zinc oxide in zinc creams make them invisible. Materials at different sizes have different physical properties that can make them beneficial or harmful. NMI's nanoparticle laboratory can ensure that size of particles is accurate.*

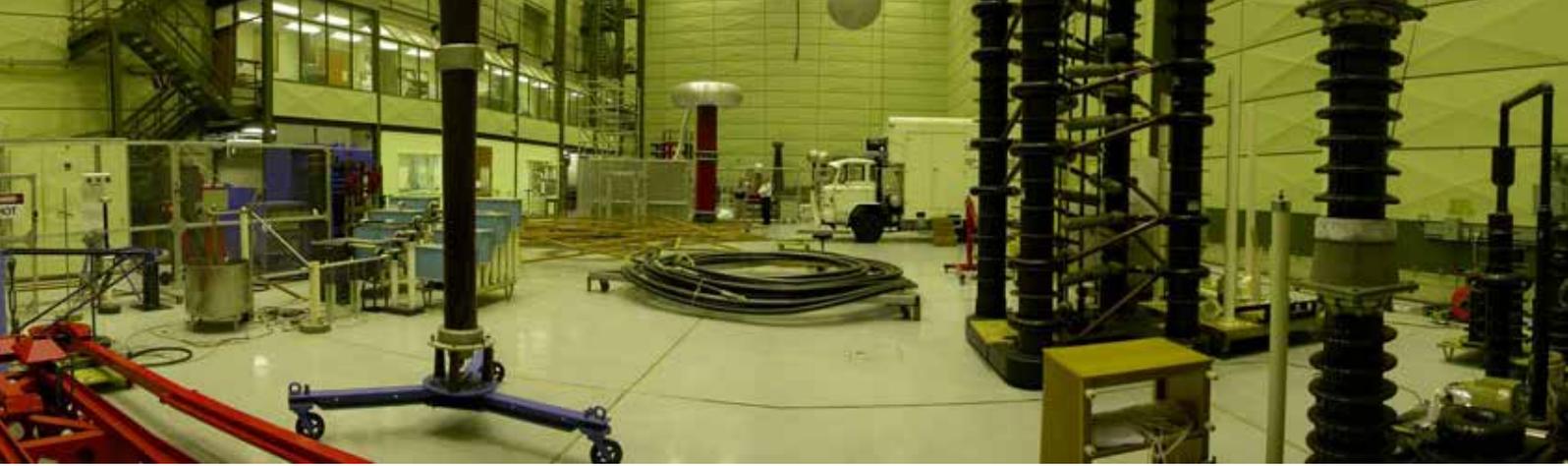


*An image of 60 nanometre gold particles. Particles such as these are used to calibrate particle sizing instruments.*

## COLLABORATIVE PARTNERSHIPS

Partnerships with other organisations are essential to NMI's ability to serve Australia's interests effectively. These partnerships range from multi-lateral scientific collaborations to work conducted under contract. Transfer of expertise and technology to industry is facilitated. Some examples are:

- NMI is a member of CRC-CARE the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment. The technical expertise of NMI and other research collaborators is helping to solve significant environmental issues.
- worked with the National Water Commission on a metering framework for suppliers and users of irrigation water. Adequate legal validity to underpin extraction and trading regimes of irrigation water is important.
- working with the WA Water Corporation to characterise treated wastewater and its subsequent injection into the depleted aquifer of the Gnangara Mound in WA. NMI provides continual support in method development, validation, measurement uncertainty and QA/QC.
- new quantum standards for direct (dc) and alternating (ac) voltage are being developed by NMI together with the metrology institutes of Japan and the USA. The new standards will lead to increased accuracy and reliability in the measurement of voltage and related quantities such as electrical power.
- working with international metrology institutes on new, highly accurate methods and instruments for measuring dimensions of nanoparticles.
- conducting chemical profiling of illicit drugs and providing information about geographical origin, trafficking routes and chemicals used in production, thereby assisting law enforcement agencies with strategic intelligence to restrict the illicit drug trade in Australia.



*NMI regularly analyses fish for dioxins and has analysed fish caught in Sydney Harbour for ultra low levels of dioxin.*



*A new irrigation metering system being tested. Together with the water industry, NMI has developed a new irrigation meter standard to help manufacturers and users ensure consumption of irrigation water is measured accurately.*  
*(Photo: AWMA Pty Ltd)*

## **SPECIALIST CAPABILITIES**

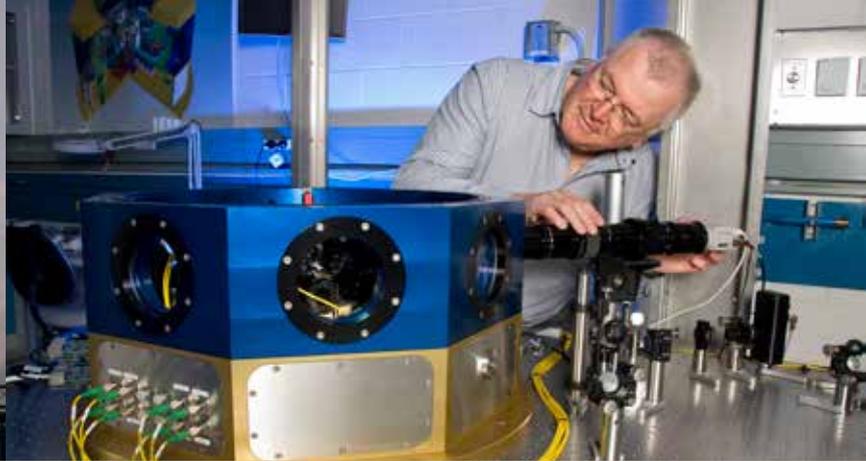
NMI offers a broad range of scientific and technical capabilities that address all sectors of measurement at the highest levels of precision and integrity. Our capabilities in action include:

- a high-voltage laboratory to test a wide range of precision instrumentation and major infrastructure used in power generation and distribution.
- dissemination of accurate time into ICT systems and remote operation of time servers on clients' infrastructures.
- running a key laboratory for analysis of vitamins and functional components of food and beverages e.g. total antioxidant capacity of juices.
- NMI's metrological scanning probe microscope uses five laser interferometers to measure the motion of a sample surface relative to a fixed sensor. The resulting image of the sample can be used to measure the distance between features on the sample surface with nanometre accuracy, with the result directly traceable to the SI unit of length, the metre.

## **GROWTH INTO THE FUTURE**

NMI undertakes cutting-edge research that anticipates new measurement technologies and applications. This research is the foundation of our support for Australian measurement, including Australian Government initiatives such as energy efficiency and resource management. NMI provides policy and practical measurement advice, together with services, to a number of government agencies to enhance their application of fit-for-purpose measurements in important areas such as the environment, resource management, health, food safety and biosecurity. Growth areas include:

- NMI's nanoparticles work helps industry and regulators understand and manage potential risks associated with the nanotechnology industry, thereby supporting the global competitiveness of a rapidly growing industry in Australia.
- working with stakeholders to provide measurement solutions in environment, health and energy sectors.
- working with stakeholders to provide greater certainty in measurement of the quality and volume of water.



*Petrol bowsers need to be examined for compliance to specifications. One of the tests is to ensure that their measurements are not susceptible to electromagnetic interference.*



*Drug testing laboratories, NMI included, use antibody-based tests such as this ELISA plate to detect the abuse of protein-based drugs such as EPO and hGH in athletes.*



*NMI is developing novel measuring systems to quantify DNA and RNA, thereby linking these measurements to SI units. This can then be used support the development of medical diagnostics for some cancers.*

## NOVEL PRODUCTS

NMI's products serve the needs of a range of clients: commercial testing providers, service industries, research institutes and other national metrology institutes. Some of our more novel products are:

- international best-practice certified reference materials to facilitate accurate analyses in laboratories for sports drugs, forensic drugs, genetic testing and agricultural and veterinary chemicals.
- specialised high accuracy time and frequency dissemination systems serving the needs of a wide range of clients, including the national 'Speaking Clock' service.
- training programs in measurement and uncertainty analysis, tailored to particular sectors of industry.

## ENABLING SERVICES

NMI's broad suite of measurement expertise is available to government, industry and the community through a wide variety of services delivered by our laboratories across Australia. Issuing over 100 000 test and measurement reports to approximately 3 000 clients, NMI is well-placed to deliver customised analytical and calibration services such as:

- determination of food contaminants, agricultural residues, functional components and food safety indicators.
- calibration of high accuracy measurements demonstrating traceability to the international system of units (SI).
- testing of measuring instruments under fluctuating environmental conditions to ensure that they perform to specifications.
- proficiency testing programs in target areas of public concern: trade, public health, law enforcement and the environment.
- chemical analyses for organic and inorganic pollutants to meet statutory requirements, including specialised facilities for providing high accuracy reference values, low-level and speciation analysis.
- development of new measuring instruments, systems and solutions to meet industrial and scientific needs.
- measurement of nanoparticle size, size distribution and shape.

## **National Measurement Institute**

A division of the Department of Industry, Innovation and Science.

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