

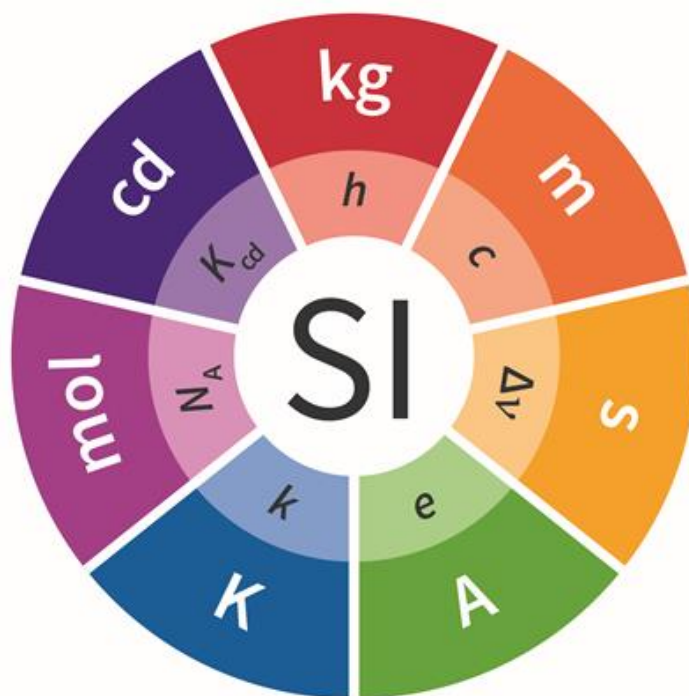


➤ **October 2017**

Welcome to the latest edition of Elaborate

MSL is gearing up for the redefinition of the International System of Units (the SI) in 2019 and will be launching a communications programme to let you know what it means for you. I'm also happy to announce that MSL is expanding and we are recruiting for three new permanent positions to help us with our succession planning and resilience. Please encourage any bright physics or engineering graduates, or early career scientists, to apply.

Ngā mihi
Fleur Francois
Director, MSL



MSL is the New Zealand Home for the International System of Units, the 'SI'.

Touted as the most extensive and exciting development in Metrology, the redefinition of the SI marks an important and historic leap forward.

In the revised SI, four of the base units (kilogram, ampere, kelvin and mole) will be redefined in

terms of fundamental physical constants; the new definitions will be based on fixed numerical values of the Planck constant, the elementary charge, the Boltzmann constant, and the Avogadro constant, respectively. This results in a simpler and more fundamental definition of the entire SI, and dispenses with the last of the definitions based on a material artefact. World Metrology Day 2019 is the official date for the redefined SI to come into practice. There is a worldwide awareness campaign being launched in 2018, and MSL will lead activities in NZ. There is an excellent presentation explaining the changes on the [Protons for Breakfast Blog](#), or read more and keep up to date on our website.

[Find out more](#)



MSL is recruiting!

We are excited to have 3 new permanent roles at MSL and are on the hunt for suitable people:

- Research Scientist, Humidity
- Research Technician, Electricity and Time
- Research Technician, Length and Dimensional Measurement

The scientist role would suit someone with a PhD in a physical science or a MSc degree, with research experience, and who is adept at instrument control and data analysis. The ideal candidates for the Research Technician positions will have a BSc or other technical qualification in physics or engineering and/or have engineering experience. Previous experience in instrument control and programming would be an advantage. For more information and to apply click below to visit the Callaghan Innovation Vacancies page.

[READ MORE](#)



Third Clock

If you have one clock, it's always right. The time is whatever the clock says. Having two clocks invites uncertainty - if they don't agree which one is right? This is why a National Time Standard needs a minimum of 3 clocks; if one fails we can still know what time it is. Last year MSL's oldest clock stopped after more than 20 years' service. In line with MSL's continued investment in future-proofing our Time capability, our newest caesium atomic clock was installed in September, so we're now back to full strength. The next step is characterising exactly how this new clock 'keeps time'. An atomic clock, just like any other clock, will be fast or slow compared to the true time. The big difference is that with an atomic clock the differences are a lot, lot, smaller! Click below to read more on our website.

[READ MORE](#)



MSA Conference 2017

MSA 2017 was held in Brisbane last month and from all reports was an enormously successful event. The full and varied programme covered a multitude of pertinent metrology topics from the new SI, the new 17025, forums covering Temperature, Pressure, LED measurement, 'Trust or Test' (posing the question 'is there public confidence in consumer products?') and getting membership feedback into future MSA focus in the 'On Your Feet' forum.

The MSA continues to be a great platform to increase awareness of our industry, and MSL fully supports MSA initiatives and local events. During the conference the new International Committee was elected at the AGM, and we're pleased to have the following representing NZ interests:

[Anne Evans](#) - **Vice President.** Laboratory Manager, Teltherm Instruments - Anne was pivotal in the establishment of the NZ MSA charter, provides significant input leading the NZ Committee and was MSA Secretary for the past two years.

[Cynthia Lendrum](#) - **Secretary.** Science Support Coordinator at MSL - Cynthia has been involved with the NZ MSA Committee since 2014, coordinating MSA events in NZ, including MSA2015 in Queenstown.

[Geoff Clark](#) - **Committee.** Manager Air NZ Calibration Services - Geoff has been an MSA member since 2000 and represented NZ members' interests on the international committee since 2013.

Click below to read more on the [MSA website](#). We urge members to participate in the discussion forums as these are a great place to start in identifying an issue and working with others towards a solution.

[Find out more](#)

B D HALL AND D R WHITE

AN INTRODUCTION
TO MEASUREMENT
UNCERTAINTY



MEASUREMENT STANDARDS LABORATORY OF NEW ZEALAND

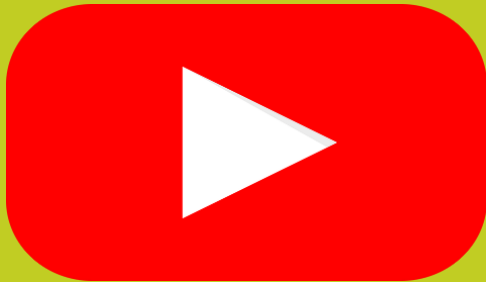
New Book

An Introduction to Measurement Uncertainty, by Blair Hall and Rod White

The Measurement Standards Laboratory has published a new booklet about measurement uncertainty. It's an introduction to the subject with an emphasis on the fundamental role played by measurement models. The booklet is intended for metrology professionals working in calibration laboratories and metrology institutes, as well as students in tertiary-level science and engineering programmes.

For ordering info please read more on our [website](#).

 [Find out more](#)



MSL on YouTube

We're getting more creative with our promotional activities. We have four educational videos uploaded to our YouTube Channel and have more in the pipeline. Subscribe to our YouTube Channel and check out our YouTube stars. Let us know if you have any ideas of what you'd like to see in future videos.

 [READ MORE](#)



Staff Profile

My name is [Yin Hsien Fung](#) (more commonly known as Fung) and I joined MSL in August 2016 as a research scientist. I am a member of the Mass and Pressure Standards team, which is responsible for the maintenance of the primary standards and their disseminations to the measurement users and industry in New Zealand. My role also involves developing measurement capabilities and conducting research in mass and its related quantities, such as pressure and density.

Prior to joining MSL, I was doing a doctorate degree in atomic physics at University of Otago. One of my first tasks in MSL surrounds the measurement of liquid volume and density. Requested by Trading Standards, we came up with a simple cost-effective method to determine the density and volume of carbonated beverages, which can then be used by

small-scale beverage manufacturers to check the net contents of bottled products. We have also upgraded the hydrostatic weighing rig to enable more efficient measurements of liquid and solid density and calibrations of hydrometers. Please click [here](#) to see the hydrostatic weigher in action.

The project I am most proud to be part of is assisting in the development of the MSL Kibble balance, which is a key apparatus for implementing the new SI definition of the unit of mass (the kilogram) in terms of a fundamental physical constant, the Planck's constant. Once completed, an MSL-designed Kibble balance will mean that we can realise the new kilogram standard here in New Zealand and then disseminate it in the Asia-Pacific region.

Outside of research, I have a strong interest in science communication, particularly on the effective and interactive ways to talk about science to the community. While at varsity, I had been regularly organising optics and physics educational outreach programmes for schools, especially those in rural areas around Otago and Southland.

 [Find out more](#)

Callaghan Innovation student/research grants

Does your business want a smart and enthusiastic student to help with R&D at minimal cost?

You should put this on your radar for 2018, as applications for this summer intake are now closed. But some thought and planning could line you up with the next intake. Businesses get \$7,200 for employing an undergraduate student over their summer break (November to February). Students can be studying science, technology, engineering, design or business. Your business gets the benefit of increased R&D capacity, while helping New Zealand undergraduate students gain skills and experience in commercial research.

Last month saw Callaghan Innovation break all records, approving 139 businesses to offer 358 students paid work over the summer break. Getting more Metrology research happening in the Tertiary space meets our strategic goal of building New Zealand's skills and capability.

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