

Mathematics-in-Industry NZ Study Group 2016

Victoria University, Wellington, New Zealand

4–8 July 2016

Graeme Wake* and Seumas McCroskery**

The combined power of New Zealand's best and brightest mathematical scientists was engaged in solving significant business challenges at New Zealand's second annual Mathematics-in-Industry NZ event, 4–8 July 2016, at Victoria University, Wellington.

Successfully implemented in about 20 countries worldwide, these intensive week-long workshops offer a collaborative environment to solve problems arising in industry. Scientists participate from a range of mathematical disciplines such as dynamical systems, statistics, and operational research.

This unconventional model sees companies paying \$6000 each up-front for the rare opportunity to have their meatiest challenges tackled by mathematicians from across the country.

New Zealand businesses that participated in 2016, include:

- NZ Steel: *Improving how the steel finishing rolling through modelling*
- Compac Sorting Equipment: *Estimating the weight of a moving article across multiple weigh points*
- Transpower: *Understanding how home solar electrical generation affects the national grid*
- Fonterra: *Predicting the length of time milk powders can be stored in elevated temperatures and humidity*
- Zespri: *Predicting fruit quality in the supply chain from harvest to market.*

This year a new dimension was added with representatives from Japan's Institute of Mathematics in Industry in Kyushu attending MINZ, and NZ mathematicians joining Japan's Study Group week later in July. This has come about with funding from the NZ Royal Society and the Japan Society for the Promotion of Science. We also had a challenge from the Japan Agency for Marine-Earth Science and Technology entitled

- Jamstec: *Smoother probabilistic distributions in climate prediction models.*

The New Zealand event was initiated by Professor Emeritus Graeme Wake of Mathematics-in-Industry New Zealand (MINZ), who co-directed the workshop with Professor Mark McGuinness from Wellington. Professor Wake has been involved in the concept since his time as a Postdoctoral Fellow in Oxford where it was first

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launched. Professor Wake is passionate about the impact of applied mathematics noting, ‘These events are often the launch pad for long term partnerships between mathematicians and businesses, powering up innovation within industry’.



Mike Wilson, right, with co-director, Professor Emeritus Graeme Wake, centre

The event was opened by government Minister Hon. Steve Joyce and Pro-VC Science VUW Mike Wilson (pictured above, with co-director, Professor Emeritus Graeme Wake), and had invited speakers Professor Andrew Fowler from Limerick/Oxford Universities, Dr Mary Quinn CEO of Callaghan Innovation, and Japanese Ambassador to NZ: His Excellency Toshihisa Takata (pictured below).

Compac is a keen supporter of the concept, having seen the power of Mathematics in Industry in action. Compac’s R&D Manager, Nigel Beach comments: ‘The



Toshihisa Takata

support of the math group helped us transform how we sort products into fixed weight packaging. This avenue was fast, effective and productive for our team.’

Global dairy giant, Fonterra, has been involved in several Mathematics-in-Industry events in Australia. Fonterra’s Calibration Technologist, Jo Simpson, comments: ‘The support of the math group increased our confidence that the procedures we have in place met or exceeded international best practice. This event is an efficient process to have a large group of experts looking at a specific industry issue.’

New Zealand mathematicians and businesses have previously taken part in joint events run by the Australia and New Zealand Industrial Applied Mathematics (ANZIAM). Professor Wake comments: ‘Kiwi businesses have previously had to travel across the Tasman to participate in these events, but now we are running this event right in our back yard.’

This year’s MINZ initiative was supported by the Centre for Mathematics-in-Industry in Massey University, ANZIAM (A/NZ Industrial and Applied Mathematics Group), KiwiNet (NZ’s national network of Universities and Crown Research Institutes and Entities), New Zealand Mathematical Society and Victoria University where the event was held.



Bram Smith

Dr Bram Smith (pictured above), General Manager of the Kiwi Innovation Network (KiwiNet) believes the model is highly compelling. Smith comments: ‘There is a wealth of world leading mathematics and statistical capability in Universities and Crown Research Entities across New Zealand that are hungry to solve industry problems. It’s great to see mathematicians working together to provide this creative new approach to drive business innovation.’

More than 100 mathematicians, a number of whom were postgraduate students, participated. A summary and technical report will be prepared with aim of future publication in the *ANZIAM Journal Series E*.

‘Mathematics-in-Industry is an extremely powerful and effective initiative to solve industry challenges. It enables businesses to focus on operations and lets mathematicians focus on what they do best — solve industry problems’, notes Professor Graeme Wake. ‘NZ will benefit immensely from the greater use of clever mathematics in these organisations’.

To see more information, visit www.minz.org.nz