Australian Branch of Institute of Mathematics for Industry Kyushu University

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In 2013, the Institute of Mathematics for Industry[1], based at Kyushu University, was selected for federal funding under the national Joint Use Institutes Program. This is the second Joint Use Institute in mathematics, after the RIMS Kyoto, which has been funded by the national government for 48 years. Kyushu University is one of the original four Imperial Universities, and it now has the largest mathematics department in Japan.

IMI has established an Australian Branch, based at La Trobe University.

Honourable Adem Somyurek, Professor Wakayama and Professor Keith Nugent, 12 March

IMI was conceived by Professor Masato Wakayama, the founding Director, who is now the university's Executive Vice-President (Research). Japan produces many more PhDs in mathematics than there will be academic positions in the future, as the nation's student population is decreasing. Therefore, these highly trained

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[1]URL of home page of IMI-Kyushu-U: http://www.imi.kyushu-u.ac.jp/eng/pages/about.html

graduates in mathematics should better understand the possibilities of applying their skills to add a competitive edge to industry.

For the IMI to produce industry-attuned graduates, it has required a change in mindset of the university's mathematicians, something that has been achieved in just two years. Note the use of preposition 'for' rather than 'in', in the title. Most members of IMI are accomplished in fundamental mathematics. They still conduct curiosity-driven basic research but they also manage to apply their knowledge to a range of interesting industry problems, including automated combinations of facial images for the movie industry, location of the free phase boundaries during fabrication of steel, cryptographic systems for computer security, optimising surface shapes in engineering design, and predicting energy levels of atomic-scale devices that may be used as qubits in quantum computers.

Among the divisions of IMI, there is the Division of Fujitsu Social Mathematics. IMI collaborates with a range of major Japanese companies, some of whom host student interns. It runs an annual Forum for Mathematics in Industry (FMI) as well as a regular industry Study Group Workshop (SGW), and it produces a sequence of books that is published by Springer. Invited speakers at FMI have included Bob Anderssen, Frank de Hoog, John Hearne, Murray Cameron, Graeme Wake, Robert McKibbin, Winston Sweatman, Kerry Landman, Troy Farrell, Reinout Quispel, Robert Norman and myself. It is a pleasure to visit Fukuoka, a medium-sized city with a reputation for good food, hospitality, sports and good climate.

IMI has a strong international outlook, generating regular collaborations around the Asia-Pacific region, as well as with Europe and the Americas. It has quickly established the reputation of being a regional leader in mathematics for industry, helping to form the Asia-Pacific Consortium for Mathematics-for-Industry, under the guidance of Bob Anderssen, the late Professor Geoff Mercer of ANU as founding consortium president as well as Graeme Wake, Robert McKibbin and Winston Sweatman of Massey University. The inaugural APCfMI committee wrote about this earlier in the *Gazette*.[2] Part of the Japanese interest in our region stems from our good track record in hosting successful events such as the Mathematics in Industy Study Group.[3] One of the problem presenters at SGW2014 was the Melbourne Brain Institute's Dr Paul Abbott, who had previously presented a problem at MISG. This year in late July, one of the presenters at SGW 2015 will be Dr Jeff Hawkins of Pivot Maritime, a Hobart company that specialises in ship motion simulators.

On 12–13 March in 2015, the Australian Branch held a very successful kick-off event, a workshop, 'Mathematics Bridge over the Pacific for Competitive Edge in Industry'. Over 30 Kyushu staff and students made the trip south. Invited speakers included Yasuhide Fukumoto (Director of IMI), Peter Van der Kamp, Monique Chyba, Stan Miklavcic, Yoshihiro Mizoguchi, Robert McLachlan, Hirokazu Anai,

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[2]Inaugural APCMfI Committee, 'The Asia Pacific Consortium of Mathematics for Industry', *Gazette* of the Australian Mathematical Society 41(2), 85–86, May 2014.

[3]URL of MISG special interest group of ANZIAM:
http://www.anziam.org.au/Mathematics+in+Industry+Study+Group.

Marcel Jackson, Kate Smith-Miles, Zainal Abdul Aziz, Osamu Maruyama, Mary Myerscough and Graham Weir. As well as the talks and student poster session, the social program included an Aussie barbecue in the La Trobe Wildlife Reserve.

Participants at Mathematics Bridge over the Pacific for Competitive Edge in Industry

On the afternoon of 12 March, there was a ceremony in the Victorian Government's showcase room, the Sir Redmond Barry Room in Collins Street. The Australian Branch of IMI was formally opened by the then Minister for Small Business, Innovation and Trade, the Honourable Adem Somyurek. Other speakers included Professor Masato Wakayama (Executive Vice President Research at Kyushu University), Professor Keith Nugent (Deputy Vice Chancellor Research at La Trobe University) and Ms Keiko Haneda (Consul-General of Japan in Melbourne). Others in attendance included Professor Reiko Aoki (Executive Vice-President International Relations, IP and Gender Equality, Kyushu University), Professor Geoff Prince (Director Australian Mathematical Sciences Institute), Professor Tim Marchant (President Australian Mathematical Society), Ms Alexandra Hogan (Hon Secretary APCMfI) and Professor Larry Forbes (President Australia New Zealand Industrial and Applied Mathematics). Guests enjoyed spectacular views of Melbourne and Port Phillip Bay from the panoramic windows.

There have recently been two joint appointments made. These are Dr Dimetre Triadis (Level B Research Fellow) and Dr Pierluigi Cesana (Level C Senior Research Fellow). IMI set out to appoint English-speaking academics who can later work in Kyushu after fixed-term appointments at La Trobe. This will be not only a home for the new appointees, but will become a base for visiting Kyushu professors and students. This has required good will and support from all levels of our governments and universities' administrations.

Readers will see from the list of Australians and New Zealanders who have already been involved with IMI, that this is much more than a relationship between two universities. We hope to facilitate the mutually beneficial involvement of many more from our region. For example, there is a special Joint Institute funding scheme for short working groups and workshops on a mathematical topic of general interest to an industry collaborator or partner. AustMS members are encouraged to contact me if you have ideas of that type.