The Formation and Launch of the Asia Pacific Consortium of Mathematics for Industry (APCMfI)

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The evolving dynamics of the interaction between society and industry is recorded in the language of mathematics.

Abstract   The Forum "Math-for-Industry" 2014 (FMfI 2014) represented the first opportunity to formally showcase the concept and formation of the Asia Pacific Consortium of Mathematics for Industry (APCMfI). This new initiative is intended to support the development of mathematics and its applications, and to enhance innovation and technology, in order to explore new research fields and improve the quality of life. A primary goal is to develop industrial mathematical research in the common Asia Pacific time zone of the East Asia and Oceania countries and to stimulate the two-way interaction between mathematics in academia and industry.

Keywords   Mathematics-for-industry · Industrial problems · Two-way interaction

1 The Formation of APCMfI

The initial meetings for the planning of the Asia Pacific Consortium of Mathematics for Industry (APCMfI) took place in Canberra, Australia, from 31 March

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to 2 April, 2014. Those present were a small group of colleagues from Japan, Malaysia, New Zealand and Australia, in order to provide representation across the Asia Pacific region. The meetings formalized a planning structure for the formation of APCMfI: formulated a management structure; discussed opportunities for seed funding; planned a membership base; and considered future activities that would benefit APCMfI members.

A central idea that emerged from the meetings was the need to emphasis the 'for' in Mathematics *for* Industry, so as to reflect how, in the solution of industrial problems, one must turn to the utilization of mathematics in the answering of the questions under consideration. It is of crucial importance to recognize the impact that industrial applications are having and can have on the development of fundamental mathematical concepts, and how solving practical complex problems can stimulate ideas for new mathematics.

2 Earlier History

Before the Canberra meeting, there were various discussions about the need to have an Asia Mathematics-for-Industry (MfI) consortium similar to the European Consortium for Mathematics in Industry (ECMI). The first meeting to test the water about the merits of such a collaboration occurred in Fukuoka prior to the Forum "Math-for-Industry" (FMfI) 2009. There was strong support for the idea with different colleagues agreeing to assist. The possibility of having such a consortium was again discussed and supported among the participants at the FMfI 2010 Forum in Hawaii. The next discussion occurred at Joint Workshop of the Institute for Mathematical Sciences (IMS) in the National University of Singapore and Institute of Mathematics for Industry (IMI) in Kyushu University on Mathematics for Industry "Biological and Climatic Prospects", held at the IMS meeting in 2012. It was on this occasion that it was agreed that the consortium, when formalized, should be called the Asia Pacific Consortium of Mathematics *for* Industry (APCMfI). During these various discussions, there was always strong support for the concept from colleagues across the Asia Pacific region including Australia, China, Indonesia, Japan, New Zealand, Singapore, South Korea and Vietnam.

Even though the support was strong that such a consortium should be formed, it was not until March of 2014 that the first formal organizational meeting occurred. The subsequent announcement about the decisions made at that meeting to have an APCMfI has since been circulated [1].

3 Management Structure and Membership

An interim management committee will provide direction for APCMfI for a two year establishment phase (starting April 2014). Following this phase, APCMfI manage-

ment will consist of an elected board, as well as a council of representatives made up from APCMfI members. The operations of APCMfI will be in accordance with our constitution, which is currently being developed.

Current planning is that there will be three membership categories: full members (which include university departments or centers, and learned societies); industry and agency members; and individual members.

4 Planned Activities

A feature of APCMfI will be the practical activities undertaken to benefit its members. These planned activities include the following: participation in FMfI; student participation in the student poster session at FMfI; APCMfI prizes at the student poster session; internships for graduate students; regular Mathematics-for-Industry Study Groups (MISG), Math-for-Industry workshops and forums; the exchange of information and new research via a regular newsletter; and the organization of joint lectures and programs. Annual meetings will be held at a different Asia Pacific location.

The overall aim is to foster a fruitful two-way interaction between mathematical and statistical individuals and institutions on one side, and the needs of industry on the other. A special focus will be on encouraging and supporting students involvement in MfI activities, such as the FMfI students' poster session and internships.

Announcements about the establishment of APCMfI have recently been published in several international mathematical bulletins and we are pleased with the strong support and encouragement from our colleagues in China, Hawaii, South Korea, Malaysia and Singapore as well as Australia, New Zealand and Japan.

An official website for APCMfI has also been launched [2]. Here, interested parties can find information about the Consortium including information about how to become an industry, academic, or individual member. In addition, the plan is to make the Website available to colleagues throughout the Asia Pacific region to circulate information about industrial mathematics opportunities. This can be done by submitting information to the APCMfI website administrator.

5 The Importance of APCMfI

A key goal for APCMfI is to become a central body in the Asia Pacific region that not only connects people, but strengthens and highlights the excellent research being done in mathematics for industry in this region. There are many benefits in taking an international approach in building this new network. There are opportunities in sharing international experiences and benefits in linking junior and senior mathematicians. The broader geographical focus that APCMfI will stimulate will enhance industrial mathematics innovation in the Asia Pacific region (Fig. 1)
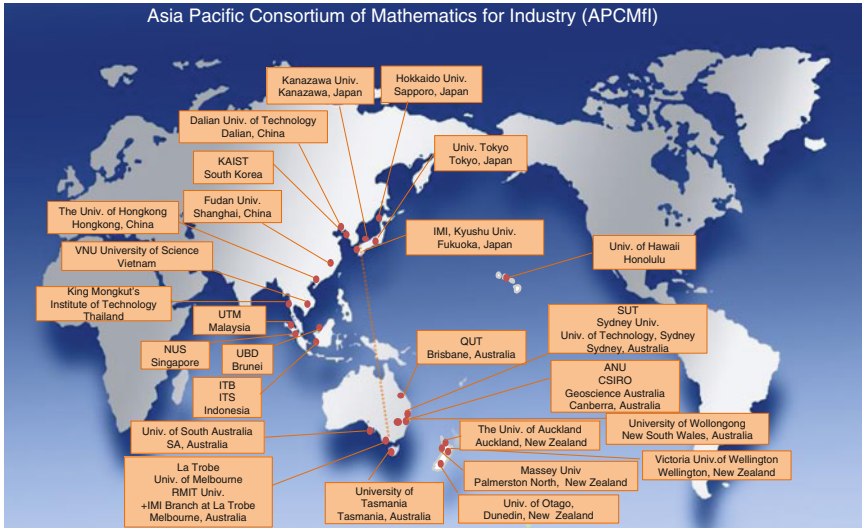
Fig. 1 The map shows the geographical region envisaged for APCMfI members, and highlights the opportunity provided by adjacent time zones

One way of stressing the future importance of APCMfI is to look at reinterpretations of the APCMfI acronym from various mathematical perspectives. The theme for FMfI 2014 was:

$$Applications \, + \, Perceptive \, Conceptualizations + Mathematics$$
$$= fruitful \, Innovation.$$

As motivation for the study of mathematics, one possibility is:

$$Active \, Participation \, (in) \, Challenging \, Mathematics = future \, Intelligence.$$

6 APCMfI and Industrial Mathematics

The annual FMfI events have illustrated the growing importance of industrial mathematics for mathematics and innovation, and has fostered strong Asia Pacific collaboration and involvement, as well as international. The annual FMfI events started in Fukuoka in Japan, attracting guests from many countries. In order to support the APCMfI initiative, the plan is to extend this event throughout the Asia Pacific region, with plans for FMfI to be held in Brisbane, Australia, in 2016 and in Hawaii in 2017.

The different ways in which industrial mathematics performs a fundamental linking of the two way interaction between applications and mathematics have been the themes for the Forums in recent years. The details can be found using the links on the APCMfI website.

References

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2. APCMfI website. http://www.apcmfi.org/