

# **IMA Strategy**

## **2012-2016**

# IMA Strategy: 2012-16

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## Introduction

The purpose of this paper is to define a strategy for the Institute of Mathematics and its Applications for the period 2012-2016.

The strategy is set out in terms of a *vision*, a *mission* and a set of *goals*.

The *vision* captures the ambition of the Institute in terms of its position at the heart of the application of mathematics in the United Kingdom. The *mission* defines the intentions of the Institute in terms of the value it intends to bring its membership and mathematics. The *goals* of the Institute are set out as a set of measures it intends to take to deliver on that mission, organised under various headings. Each measure is accompanied by a summary justification and desired outcome.

The overarching objective of the strategy is for the Institute to grow its membership by a significant number. It will do this by providing services that are highly relevant to its membership, and which will provide a means to extend its reach to new members largely outside of academia.

## Background

The strategy is the result of a “Strategy Review Weekend” that was held on the campus of the University of Birmingham in March 2011. Champions were assigned to the various aspects of the strategy, and they captured the agreements reached at the review in a set of *Strategy Review Output Papers* that were considered at the IMA Executive Board and Council meetings in June 2011. This paper grew out of those output papers and discussions at subsequent meetings of the Executive Board and with members of the Council.

The most important themes arising from the weekend were the need to increase the membership, and to ensure that the Institute uses its resources to provide services required by the different types of member. Additionally, it was recognised that any new work would need to consider the implications for finance, staff, infrastructure and governance of the Institute.

## Next Steps

The list of measures recorded in this document will be prioritised by the Executive Board.

Means to implement the strategy will be devised by the Institute under the leadership of its President, and progress will be reviewed at forthcoming Executive Board meetings at regular intervals to be determined by the President. It is expected that the implementation will draw upon the Strategy Review Output Papers.

## **Vision**

The IMA will come to be recognised as the biggest, most effective and most influential mathematics institute in the United Kingdom.

As the professional and learned society for mathematicians working in academia, commerce, education, government and industry, it will be:

- The first organisation of choice for advice on mathematical matters, for everyone from Government to the general public;
- The institute that all those with an interest in mathematics will wish to join;
- A driving force for society to appreciate the ubiquity, usefulness and enjoyment of mathematics.

## **Mission**

The IMA intends to benefit society through:

1. Providing a suite of member focused services commensurate with its position as the principal professional and learned body for mathematics and its applications in the United Kingdom;
2. Being a driving force for the use of mathematics in industry and commerce;
3. Ensuring that the importance of mathematics is well represented to Government;
4. Being a major contributor to the promotion of mathematics within the education systems of the United Kingdom, and helping further improve the quality of mathematics teaching;
5. Being an influencing voice for the use of mathematics in science, technology, engineering, economics and other fields of endeavour;
6. Advancing its reputation as a major contributor to mathematics research initiatives;
7. Engaging proactively at all levels with the full spectrum of the media and society for the promotion of mathematics in the UK;

8. Adding value to the worldwide mathematics community by providing a range of services, conferences, publications and events that are fulfilling and beneficial for its membership and for mathematics;
9. Promoting high standards of professional conduct for members;
10. Regulating the Chartered Mathematician and Chartered Mathematics Teacher designations;
11. Working with other mathematical organisations to develop a unified voice for mathematics in the UK;
12. Collaborating with organisations in other countries to promote mathematics at an international level.

## Membership - Goals

Growing membership is the most important objective for the Institute. As such, all measures described in this paper may be seen as primarily furthering that aim, irrespective of how they may be classified in subsequent sections.

The overriding strategy for increasing membership may be summarised as “*moving from a nice to have to an essential to have*”. In terms of numbers, the IMA aims to increase its membership threefold by 2014, largely by streamlining its membership process, and by making membership open and more appealing to a broader portion of society, especially people outside academia.

Specific elements of the membership strategy are:

1. Any person with an interest in mathematics or its applications will be eligible to apply to be a Corporate Member – this will significantly open up membership;
2. All the current grades of membership and the chartered designation will be retained but every fee paying member of the IMA will become a Corporate Member;
3. The current e-Student designation will be extended to any person at school or college who is studying Mathematics at A-level or equivalent, and who is at least 16 years of age – thereby encouraging membership from those going on to higher education to read subjects where mathematics plays a role, and to widen the appeal of the Institute to schools.
4. At all levels of membership, effort will be made to encourage more women to join.

Under the Royal Charter, Corporate Members have full voting rights. Extending this designation to all fee-paying members of the IMA will require an amendment to the Byelaws. (This must be subject to Privy Council approval.)

Additionally:

5. The benefits of membership will be promoted to those working in industry, commerce and the public sector, and to their employers – these sectors are under-represented within the Institute, and measures will be devised to attract membership from these sectors, where the majority of people who graduate in disciplines with a high mathematical content are to be found;
6. Means will be found to increase participation in Branches – the main value of Branches is that they provide an opportunity for members to meet and interact, and for the Institute to have a presence in local communities; however, only around 5% of the membership participate in Branch activities, and this needs to be increased significantly if Branches are to survive;
7. Vigorous means will be used to ensure positive attitudes to the Institute.

## **Engagement with Industry and Commerce - Goals**

Mathematics, from elementary to advanced, is used widely across industry and commerce. Most people who use mathematics in their professional lives are to be found there. There are many more graduate mathematicians or people with a mathematical background working in industry and commerce than in academia, but relatively few of them are members of the Institute, and relatively little time, effort and resource of the Institute is directed to them. As the only professional and learned body in the United Kingdom for the application of mathematics, the Institute must correct this and draw significantly more of its membership from industry and commerce.

At every level and wherever it may be found, the Institute will ensure its appeal and relevance to a membership throughout industry and commerce – to mathematicians, to those who use mathematics and to the organisations that employ them. To this end the Institute will devise measures and use its resources to increase engagement with and membership from industry and commerce. The measures will include the following:

1. Engaging senior industrialists to help the Institute focus much more on the use and application of mathematics, and to inform IMA position statements to Government, research councils and other influential bodies where the opinion of those using mathematics to advance the economic wealth of the country is insufficiently heard;

2. Providing a value proposition for CMath – with a view to achieving recognition of the designation as equivalent to that enjoyed by the chartered designation in engineering professions;
3. Providing a value proposition for the Corporate Affiliate Scheme;
4. Making it easier and more attractive for industrial and commercial organisations to become Corporate Affiliates, including removal of fees in favour of recognising an organisation as one that employs mathematicians and supports their professional development; inviting all companies that are represented on Council and other IMA committees to become Corporate Affiliates;
5. Establishing a forum for sharing best practice in relation to employment and professional development of mathematicians;
6. Facilitate cooperation between the academic and the commercial sectors, including helping with visiting or honorary chairs and industrial advisers to university advisory committees, and supporting early career conferences.

## **Engagement with Government - Goals**

Many areas of public policy should be better informed by mathematics, and in particular the use of mathematics. As the leading institute in the UK for the use of mathematics, the IMA will engage with political and other makers of public policy to show them how mathematics can help underpin their arguments and decisions.

1. The Institute will bring together a team of mathematicians who will support the work of Government Chief Scientific Advisers;
2. The Institute will look for champions, within the Civil Service and the Houses of Parliament, to promote the value of mathematics and to underpin the Institute's position as an organisation which promotes the value and use of mathematics;
3. The Institute will develop means to enable users of mathematics in industry and commerce to inform Government, research councils and education departments of the role of mathematics in wealth creation, so that these policy makers are better able to appreciate the importance of the subject and prioritise funding;
4. The Institute will continue to build on the highly successful *Mathematics Matters* initiative to publicise the impact of mathematics;
5. The Institute will undertake a programme of work to identify where and how it might usefully interact with other strong influencers of public policy and opinion,

such as the serious end of the media - including working with the Campaign for Science and Engineering in the UK (CaSE) as appropriate.

In all cases, engagement will be proactive.

## **Engagement with Academic Research and Funding - Goals**

Academic mathematical research is performed in 58 UK universities (RAE2008 data) and has been recognised as of high quality, for example by the 2011 International Review of Mathematical Sciences. Funding sources include HEFCE QR (and analogues in Scotland, Wales and N.Ireland), EPSRC (Mathematics programme and others), other UK research councils, Technology Strategy Board, UK government departments, industry, commerce, charities, the EC and various other international bodies.

The Institute will engage with academic research through its:

1. Journals;
2. Conference series;
3. Annual conference and branch meetings;
4. Small grants and prizes;
5. Articles in Mathematics Today;
6. Involvement in international initiatives and discussions.

It will engage with funding bodies by:

7. Working with the Council for Mathematical Sciences as a united voice with other mathematical societies on mathematics research policy matters with the government, HEFCE et al, and UK research councils;
8. Providing evidence of impact of mathematics research such as the Mathematics Matters series and Science in Parliament articles;
9. Facilitating communication between the academic mathematics research community and EPSRC;
10. Encouraging companies to support academic research.

Following the comments in the 2010 International Review of Mathematical Sciences, the Institute will be more active in the support of academic research career development of women.

## **Engagement with the Teaching Profession in Schools and Colleges - Goals**

The Institute has some influence over mathematics teaching through its Schools & FE Committee, support of bodies like ACME and JMC, and with the teaching profession through CMathTeach. The Institute intends to engage more directly, and so increase its membership from the teaching profession. To that end:

1. The Institute will make itself more attractive for mathematics teachers to choose to become members;
2. The Institute will proactively promote CMathTeach as a professional qualification to heads of mathematics and head teachers. CMathTeach should be regarded as an essential qualification for every mathematics teacher. As a start, the Institute will work to promote the qualification as essential for every head of mathematics, and therefore every teacher aspiring to such a position.
3. The Institute will engage with teachers and those in training.

## **Engagement with Teaching in Academia - Goals**

The Higher Education Service Area takes the lead in handling issues to do with academic teaching on behalf of the Institute.

Strategic issues arising include the following:

1. The Higher Education Academy is reorganising itself, including its subject discipline level work. There is consequent uncertainty concerning the work of the Maths, Stats and OR subject network, including valued initiatives such as the new lecturer course, postgraduate tutor courses, MSOR Connections and the annual conference. The new lecturer course is particularly valued as it offers a refreshing discipline-level perspective to teaching and learning issues, in contrast to less valued generic provision.
2. The IMA will continue to offer support for this provision, both moral and practical as appropriate, as the HEA situation develops. The Institute will work in consort with other bodies, taking a lead where necessary, to help ensure that the valued initiatives and experience of the MSOR Network are not lost to the community, and that discipline specific provision for improving teaching and learning, as valued by the community, is given priority.
3. There is growing recognition in the light of the More Maths Grads project, and the current National HE STEM Programme, of the need to take into account the diversity of staff and student attitudes and aspirations, in a context where the



Institute seeks to improve the breadth of its membership amongst younger people.

4. The Institute will seek opportunities explicitly to encourage and reinforce positive attitudes in teaching towards mathematics in all mathematical graduates, from the highest to more modest achievers, recognising for example that staff preoccupations with discipline developments per se may be contrasted amongst most students with the desire for a good job.
5. The Institute will seek to encourage respect both for the diversity of students' aspirations, and for the range of mathematical activity from the practical to the theoretical, with the aim of being inclusive towards all those who are potential members of the mathematical community.

## **Engagement with Students - Goals**

The Institute has traditionally engaged with undergraduate and postgraduate students of mathematics, encouraging them to become members of the IMA, with the University Liaison Officer playing a leading role, and the e-Student membership category providing a quick and inexpensive way for students to gain entry. However, many more pupils study mathematics in schools and colleges at A-level or equivalent, and by opening e-Student membership to them (as noted as point 3 under the section entitled Membership) there is the potential for students studying science, engineering or economics to become members of the Institute. To this end:

1. The Institute intends to appeal to a much wider portion of the student population, especially those studying subjects where mathematics plays a significant role – a task which furthers the aim of growing membership by opening it up to all with an interest in mathematics.
2. The Institute will aim to enrol at least 25% of undergraduate and postgraduate students of mathematics as e-Students.
3. The Institute will vigorously support students and university student mathematics societies.

## **Women in Mathematics - Goals**

It has been observed in the 2010 International Review of Mathematical Sciences that the proportion of female mathematicians in academia is "strikingly small". Within the IMA, although women represent some 40% of the membership at the student entry level, the proportion declines with grades to a mere 7% of the Fellows being female.

The Institute therefore needs to determine whether it is failing to retain its female membership, and take measures to address it if needed.

1. The Institute accepts that there is a problem regarding the level of women in academic research, and will support actions to restore the balance.
2. The Institute will determine if there is a decline in its female membership, and if needed devise a strategy intended to counter it – knowing if the Institute is less attractive to women than men is important if it is to expand its membership to all who practise or have an interest in mathematics.
3. In the wider context of women working in mathematics, the Institute will determine appropriate policies in collaboration with others.
4. The Institute will use the existing Council Fellow invitation scheme to increase the number of female Fellows.

## **Publications - Goals**

The Institute, in its learned society role, provides an important service to the community through its publications. It is vital that the IMA continues to promote and support an active publishing policy, particularly in journal publications. As with other societies, revenue from publications is a major income stream and the Institute needs to maintain or grow it. To this end:

1. The Institute will continue to publish through an established academic publishing house and provide governance and direction through the IMA Journals Board of Management.
2. The Institute will look to identify new and profitable publishing possibilities and will explore the challenges and opportunities presented by the changes in publishing media and models.

## **Conferences - Goals**

The Institute will take greater steps to ensure that its conference programme is run with full economic costing (FEC) in mind. A properly constituted permanent Conference Committee will be established to oversee the activity. Four different types of conference will be identified, with different expected funding models. In each conference season, the Conference Committee will classify each proposed conference into one of these four types, having strategic oversight of its portfolio. An FEC-type “profit and loss” conference report will be given at the end of each year that reflects the real operating cost of the conference activity but excludes

overheads. Strategic ideas for conferences will be commissioned, and EPSRC strategic themes may be used.

The Conferences Committee will also consider other ideas for pure cash generation, for example commissioning CPD courses as profit-making enterprises.

## Communications -Goals

The Institute needs to communicate with many different audiences. This includes the media; the mathematics community; scientists and engineers; other learned societies; existing and future members; the general public; and policy makers. This is in addition to industrialists, academics, students and teachers considered in other parts of this paper.

At least 10 different mechanisms are used by the Institute to communicate its messages: *Mathematics Today*; IMA Website, MathsCareers Website, *Mathematics Matters*; University Liaison, Branches, Journals, Conferences, Maths Promotions and Outreach Activities.

The current communications strategy will be reviewed with a view to increasing its impact, seeing that it best uses modern technology, and ensuring it reaches the intended audience.

## Finance

The main issues on finance are the forecast negative budget in 2013 and the problems with projected falling income streams. In order to fund new initiatives, the Institute may have to consider which existing activities to drop. Priority will be given to activities that are aimed at increasing membership or generating additional income.

A review of the reserves policy to a possible six-month standard income level for liquid reserves will help with one-off expenditure for particular projects.

Other ideas will be evaluated in line with strategic priorities.

## Infrastructure

This is a key area to help execute the strategy to increase membership.

1. A new database must be purchased as a matter of priority;
2. All members of staff are heavily committed at present, so increased activities must be accompanied by reduction in other activities with priority given to those that increase membership or are the most profitable to the Institute;

3. Growth in staff numbers will be planned for in parallel with strengthening membership and revenue, and in line with strategic priorities with reference to the financial position.

## Governance

In order to execute the strategy it will be necessary to modify aspects of the way in which the Institute operates.

1. Executive Board will focus its attention on and prioritise overseeing execution and development of the strategy and high impact issues<sup>1</sup>;
2. Other topics currently handled by the Executive Board<sup>2</sup> will be delegated to “subject area” Committees, formed of members of Council, Officers and members of the IMA who are actively involved with these matters, with a remit to respond on behalf of the IMA and report back to the Executive Board;
3. There is the need for a task force to be set up to focus on increasing membership from those working in industry, commerce and the public sector (outside education);
4. Some committees such as the Finance Committee, the Membership Committee and the Board of *Mathematics Today* have a defined output, are effective and there is no need to change their activity. Others are evolving. The Executive Board will consider the committee structure from time to time to ensure that it is always fit for purpose.
5. The role of Trustees will be examined as to whether it may be more effective to have a smaller number of Trustees, perhaps the Executive Board, working under the guidance of Council.

Michael Walker, President

December 2011

Minor edits by Robert MacKay, President May 2012

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<sup>1</sup> chartered designations, Science Council, mathematics careers, CMS, interaction with other societies, publicity, fund raising, membership - recruitment retention and fees, public, industry and Government engagement, civil honours, medals and awards, nominating committee, finance

<sup>2</sup> university funding, EPSRC, IMA journals, teaching, HoDoMS, research committee, HEFCE, HE STEM, university liaison, CMathTeach and all other educational matters

## Glossary

This glossary intends to give either a brief explanation of a term or the full name of an established abbreviated format.

### Term or Abbreviation Definition or full name

|                     |  |
|---------------------|--|
| ACME                | Advisory Committee on Mathematics Education  |
| CMath               | Chartered Mathematician designation<br>Further information is available at the following web-link:<br><a href="http://www.ima.org.uk/viewitem.cfm?cit_id=383128">http://www.ima.org.uk/viewitem.cfm?cit_id=383128</a>  |
| CMathTeach          | Chartered Mathematics Teacher designation<br>Further information is available at the following web-link:<br><a href="http://www.ima.org.uk/membership/becoming_chartered.cfm">http://www.ima.org.uk/membership/becoming_chartered.cfm</a>                        |
| CMS                 | Council for the Mathematical Sciences (comprising the IMA, the London Mathematical Society, the Royal Statistical Society, the Operational Research Society and the Edinburgh Mathematical Society).   |
| Corporate Affiliate | An opportunity for organisations which support mathematics to become involved.<br>Further information is available at the following web-link:<br><a href="http://www.ima.org.uk/viewitem.cfm?cit_id=383280">http://www.ima.org.uk/viewitem.cfm?cit_id=383280</a> |
| Council             | The governing body of the Institute.   |
| CPD                 | Continuing Professional Development  |
| EPSRC               | Engineering and Physical Sciences Research Council   |
| e-Student           | A non-corporate membership level available to eligible students.<br>Further information is available at the following web-link:<br><a href="http://www.ima.org.uk/viewitem.cfm?cit_id=383337">http://www.ima.org.uk/viewitem.cfm?cit_id=383337</a>               |
| Executive Board     | The operational control of the Institute is managed through the Executive Board.   |
| FEC                 | Full Economic Cost   |
| HE STEM             | National Higher Education STEM Programme   |
| HEFCE               | Higher Education Funding Council for England   |
| HoDoMS              | Heads of Departments of Mathematical Sciences  |
| JMC                 | Joint Mathematical Council of the United Kingdom   |

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|---------------------|---|
| Mathematics Matters | Case studies designed to promote the ubiquity of mathematics research to a wide audience.<br>More information available at the following web-link:<br><a href="http://www.ima.org.uk/i_love_maths/mathematics_matters.cfm">http://www.ima.org.uk/i_love_maths/mathematics_matters.cfm</a> |
| Mathematics Today   | IMA members' publication (six issues produced per year)   |
| MSOR                | Maths, Stats and OR Network   |
| OR                  | Operational Research  |
| QR                  | Quality-related Research (QR) funding   |
| RAE                 | Research Assessment Exercise  |
| Stats               | Statistics  |
| STEM                | Science, Technology, Engineering and Mathematics  |