

PROPOSAL FOR A NEW UNIFIED MATHEMATICS SOCIETY

Appendix A: Terms of reference and membership of the Joint Planning Group (JPG)

The Councils of the IMA and LMS in March 2006 passed the following resolution.

Council authorizes the preparation of detailed plans for a route to unification of the IMA and the LMS. The plans shall be on the lines of the 'inverted-Y framework' described in the FSI Report (April 2005). The planning process will be subject to regular review by the Council. In due course Council will decide whether it wishes the plans to be implemented, with the proviso that final decisions must involve the membership, as laid down in the articles of governance.

The following objectives for the activities of a unified organization shall be observed in the preparation of the plans.

- 1. To maintain and enhance support for mathematical research, by making grants and by other means.*
- 2. To recognize and support the professional status and activities of mathematicians working in all sectors of employment.*
- 3. To speak as a national voice on behalf of mathematics.*
- 4. To represent the UK in the international mathematical community, building on the existing reputations of the two organizations.*

The following served on the Joint Planning Group at various points in its work.

David Abrahams (from March 2007) – President-Designate and then President, IMA

Norman Biggs (to November 2006) – General Secretary, LMS

Dorothy Buck (from January 2007) – Member of Council, LMS

Peter Cooper – Executive Secretary, LMS

Brian Davies (from January 2007) – President-Designate and then President, LMS

Charles Evans – Member of Council, IMA

Charles Goldie (from September 2006) – Member of Council and then General Secretary, LMS

Peter Grindrod – President and then Past-President, IMA

David Larman (from February 2008) – Vice-President, LMS

Chris Linton, (from December 2007) – Member of Council IMA

John McWhirter (to July 2007) – Past-President, IMA

Alice Rogers – Vice-President, LMS

Nina Snaith (to November 2007) – Member of Council, LMS

Nigel Steele – Honorary Secretary, IMA

Dan Tilley – Member of Council, IMA

John Toland (to November 2007) – President, LMS

Nick Woodhouse – Treasurer, LMS

David Youdan – Executive Director, IMA

The Group also received invaluable assistance from Keith Lawrey, Foundation for Science and Technology.

The Group delegated to several working groups the tasks of investigating the various aspects of the New Society and preparing reports for incorporation into the Group's report. In addition to members of the JPG itself, the Group gratefully acknowledges the contributions made by: Lis Goodwin (Treasurer, IMA), Kenneth Falconer (Publications Secretary, LMS), Iain Duff (Chair of the Journals Management Board, IMA), Susan Hezlet (Publisher, LMS).

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Appendix B: Acronyms and glossary of terms

ACME	Advisory Committee on Mathematics Education
AMET	Association of Mathematics Education Teachers
AMS	American Mathematical Society
ATM	Association of Teachers of Mathematics
BA	British Association for the Advancement of Science
BAMC	British Applied Mathematics Colloquium
BMC	British Mathematical Colloquium
CDE	Commission on Development and Exchange, a sub-commission of IMU
CEIC	Committee on Electronic Information and Communication (of the IMU)
CMath	Chartered Mathematician
CMathTeach	Chartered Mathematics Teacher
CMS	Council for the Mathematical Sciences
CPAM	Conference of Professors of Applied Mathematics
CPD	Continuing Professional Development
CRH	Catherine Richards House
CSci	Chartered Scientist
CUP	Cambridge University Press
DCSF	Department for Children, Schools and Families
DIUS	Department for Innovation, Universities and Skills
DMH	De Morgan House
EBME	Executive Board Member with responsibility for Education
ECCOMAS	European Community for Computational Methods in the Applied Sciences
ECMI	European Consortium for Mathematics in Industry
EGM	Extraordinary General Meeting
EPC	Engineering Professors' Council
EPSRC	Engineering and Physical Sciences Research Council
EUROMECH	European Mechanics Society
FE	Further education
FHE	Further and higher education
FSI	Frameworks Study Initiative
FTE	Full-Time Equivalent
GCSE	General Certificate of School Education
HE	Higher education
HEA	Higher Education Academy
HEFCE	Higher Education Funding Council for England
HoDoMS	Heads of Department in the Mathematical Sciences
ICIAM	International Council for Industrial and Applied Mathematics
ICM	International Congress of Mathematicians
ICME	International Congress on Mathematical Education
ICMI	International Commission on Mathematical Instruction
ICMS	International Centre for Mathematical Sciences, Edinburgh
ICSU	International Council for Science
IMA	Institute of Mathematics and its Applications
IMU	International Mathematical Union

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INI	Isaac Newton Institute, Cambridge
IOP	Institute of Physics
IoPP	Institute of Physics Publishing
IPD	Initial Professional Development
IUTAM	International Union for Theoretical and Applied Mechanics. Part of ICSU.
JLMS	<i>Journal of the LMS</i>
JMC	Joint Mathematical Council
JPG	Joint Planning Group
LMS	London Mathematical Society
MA	Mathematical Association
More maths grads	HEFCE-funded project of the IMA, LMS, RSS, MSOR and HoDoMS to attract more into mathematics-related courses at HE
MP	Member of Parliament
MPU	Mathematics Promotion Unit
MSOR	Mathematics, Statistics and OR Network
NANAMIC	National Association for Numeracy and Mathematics in Colleges
NCETM	National Centre for Excellence in the Teaching of Mathematics
NSI	Next Steps Initiative
ODE	Ordinary Differential Equation
OR	Operational Research
OUP	Oxford University Press
PDE	Partial Differential Equation
PR	Proportional Representation
PUP	Princeton University Press
QAA	Quality Assurance Agency for Higher Education
QCA	Qualifications and Curriculum Authority
RAE	Research Assessment Exercise
RAEng.	Royal Academy of Engineering
RS	Royal Society
RSS	Royal Statistical Society
SIAM	Society for Industrial and Applied Mathematics
SORP	Statement of Recommended Practice in respect of the presentation of charity accounts
STEM	science, technology, engineering and mathematics
TDA	Teacher Development Agency
TMMS	Transactions of the Moscow Mathematical Society
TUPE	Transfer of Undertakings Regulations 2006
UCL	University College London
USS	Universities Superannuation Scheme

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Appendix C: Concerns raised in the first consultation

Based on an analysis conducted by H G Dales and N C Snaith in January 2006 of the written responses to the Frameworks Study Initiative Consultation document.

The majority of those who responded to the FSI Consultation document support some sort of merger between the IMA and the LMS. Broadly speaking, of those who gave a clear opinion one way or the other, those supporting the merger outnumbered those against it by more than a factor of three. There is some evidence that those who attended meetings held around the country, but who did not respond individually, were less favourable to the proposal.

However, even amongst those supporting further movement towards a merger many expressed concerns over whether it might result in the loss of some aspect of one or both of the current societies which the correspondent held to be important and worth preserving.

1. A merger will not achieve a unified voice for mathematics. Many responses expressed concern that a merger of the IMA and LMS would not provide a unified voice for mathematics if it did not include the RSS (and maybe the Edinburgh Mathematical Society, etc.). The point was raised that if the RSS is not included in this merger then some of the current problems of delays caused by decisions having to be taken to the Councils of more than one Society would still remain. Some correspondents also mentioned other groups they would like to see involved, such as SIAM UK and the Mathematical Association. The argument presented in several responses was that a new merged IMA/LMS could not properly represent the full mathematics community without including statisticians (RSS) and school teachers (MA).

In the JPG's report we discuss the benefits of a single mathematics society, and the distinct difference between a society for mathematics on the one hand and the role of the CMS on the other. It is the division between the two mathematics societies that diminishes our voice, not the lack of including other related societies. The Institute of Physics is not reduced by its separation from the Royal Astronomical Society and Association for Science Education.

2. Loss of 'blue-skies' research support. Many respondents were worried that support for mathematics without immediate apparent applications would decline as a result of the merger. This was expressed concretely in several comments as a worry over the potential loss of the small grants given by the LMS Programme Committee. However, in several cases this last concern was mitigated somewhat by the proposed ring-fenced LMS fund. Several responses expressed strong support for this fund and for ring-fencing, although one thought that this might be tricky to manage and that ring-fencing might not survive long after the merger.

This concern (and the following two) reflect a concern that one faction within the New Society will be able to exert its will over the whole. The constitution of Council is designed to ensure as good a balance of interests as possible. The Learned Activities Fund has been retained in our model for the New Society to ensure that the learned activities continue at least at their current levels. Ultimately, it is dependent on the members themselves taking part in the activities and direction of the New Society to deliver the range and balance in the programme that reflects their wishes.

3. Loss of support for the applications of mathematics. On the other hand, grave concern was expressed that the IMA would lose its "applications" in a merger and become more academically oriented. Many IMA mathematicians who do not work in an academic setting indicated the benefits they have received from IMA membership and hoped this support would survive a merger.

See answer to point 2.

4. The dominance of one society. These included a general concern that it would not really be an equal merger with the interests both Societies considered. It worried one correspondent that the LMS might dominate by reason of it being the richer Society. It worried others that the IMA might dominate by reason of its having more members.

See answer to point 2.

5. Concerns about the consequences of merging the publications of the two societies. The concern was that publishing is a large part of the income of the LMS and that any perceived decrease in the standard of

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the journals might cause this income to decline. The opinion expressed was that the IMA journals did not have the same reputation as those of the LMS and that merging might affect the quality of the whole enterprise. There is also the problem of journal names: to lose the name 'LMS' in the titles would be damaging, but can there be a JLMS without an LMS?

We believe that the concerns about a possible mismatch of products or standards are unfounded. The creation of a larger publishing enterprise brings new strength and opportunity, and does not need inevitably to require the individual journals to change, as we explain in our report.

6. Loss of attention on the bigger issues. Another issue commented on was whether the process of merging the societies would leave scope for raising our sights to somewhat grander goals. One correspondent saw the current common interests of the LMS and IMA as parochial and of little relevance to the important international community, and others saw the future of the LMS as being more international (like the AMS), improving its mathematical reputation and offering something valuable for non-UK members.

We agree that it is important that the New Society maintains its concerns for international and the 'bigger' issues for mathematics. The creation of the 'Constituencies' with their clear areas of responsibility, including external relations and links with the international community, is designed to ensure that the New Society has this wider perspective.

7. The effects on the various IMA membership grades. The loss of the membership grades that the IMA currently offers is certainly a concern. The message came through very clearly from many IMA members that the grades of membership and the CMath designation are very valuable to them and they fear these would be lost in a merger. On the other hand, in a couple of responses, LMS members indicated that they had no interest in membership grades or the CMath title, and said that the idea of Chartered Mathematician would be meaningless to anyone outside the UK.

The membership model has been designed to ensure that those members who value their current grades are able to retain an equivalent grade, while not requiring all members to sign up for a different professional grade or Chartered designation.

8. Concerns at the effect on LMS membership subscription rates. A related issue is that of the difference in the membership fees of the two societies and the worry of whether it would mean a greatly increased cost for current LMS members.

The analysis in the report shows that the difference between the two levels is not as great as perceived. The economics of the New Society do allow membership rates to be kept to an acceptable level for LMS members.

9. The location of the offices. One correspondent said that if the new Society had two offices, should one not be in the north of the country? Another worried that the Southend branch would become a secondary, less important headquarters. Others doubted the economic sense of maintaining two offices.

The New Society must work with the assets it inherits from the two societies, it would make little sense (and have significant effects on staffing and costs) to consider moving to different premises. Both locations have benefits (such as DMH's proximity to Whitehall and its convenience for meetings, and CRH's benefits of lower running costs), and the New Society will have the opportunity to develop each to take advantage of those benefits.

10. Concern at the effects on the staff. A correspondent said, 'the harsh reality is that efficiency savings would come from reducing staff numbers and a proposal that is not prepared to face this fact... is not grounded in reality.' Another correspondent said, 'I think that a fairly detailed plan on how overall savings can be achieved is essential before a merger takes place and a period of gradual amalgamation over a period of, say, five years would have to include a visible improvement in the efficiency of how the societies are administered.'

The two Councils have indicated that the objectives of creating a single society should be to improve the efficiency and effectiveness of its activities, not to reduce staffing costs. We have designed the model to achieve the enhancement in the scope and scale of the New Society's activities while also delivering, over time, improved efficiency of the administration.

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11. The name of the new Society. This was a concern to some respondents.

The issue of the name of the New Society will be the subject of a separate ballot of members, as the view of the Group and of the two Councils is that the decision on the future of the two societies should be driven by considerations of the best interests for mathematics, not on individuals' personal preferences on the name.

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Appendix D: The New Society and public benefit

PRIMARY		
BENEFIT	Nature of activity leading to benefit	Who benefits?
Advancement of the arts, culture, heritage or science	Dissemination of mathematical knowledge	Individuals in the UK qualified to undertake mathematical research benefit from the dissemination of mathematical knowledge; the public at large benefits from the consequent advancement of mathematical knowledge
	Organization and support of mathematical dialogue through meetings, workshops conferences and the internet	Qualified individuals in the UK benefit from these opportunities; the public at large benefits from the consequent advancement of mathematical knowledge
	Making grants for the support of mathematical activities	Qualified individuals in the UK benefit from the grants; the public at large benefits from the consequent advancement of mathematical knowledge
	Establishing and upholding the standards of qualification, competence and conduct of professional mathematicians in the United Kingdom	Individual professional mathematicians benefit from this upholding of standards; the public at large benefits from the consequent development of professional expertise in mathematics
	Informing and influencing policy makers and advisers in respect of public policies relating to mathematics, education and research	Policy-makers benefit from having expert advice on specialist matters; individual citizens benefit from a stronger and culturally-enriched nation.
Advancement of education	Support of mathematical education in schools, colleges and universities.	Individual students benefit from this activity; the public at large benefits from the consequent improvement in understanding in mathematics, and of the skills base
	Promotion of high standards of mathematical education in schools and colleges, directly and by making grants.	Individual students benefit from this activity; the public at large benefits from the consequent improvement in understanding in mathematics, and of the skills base
	Promotion of public appreciation of mathematics and an understanding of its scientific, economic, and social benefits	Individual mathematicians benefit from the improved appreciation of their field; the public at large benefits from the consequent advancement of mathematics
	Encouragement of public and private bodies to support mathematical research	Individual mathematicians benefit from the improved appreciation of their field; the public at large benefits from the consequent advancement of mathematics
	Representation of the views of the national mathematical community and contribution to the public debate on issues related to mathematics	Members of the mathematical community benefit from wider understanding of their work, while the public at large benefits from an improved appreciation of the power of mathematics and its use in a wide field of application

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SECONDARY		
BENEFIT	Nature of activity leading to benefit	Who benefits?
Advancement of health or the saving of lives	Support for the professional development and achievements of mathematicians working in appropriate fields (e.g. epidemiology, biology, medical physics, the development of medicines) and others who apply mathematics to forward this goal.	Individuals working in this field benefit from direct support of their work, while the public at large benefits from this application of mathematics
Advancement of environmental protection or improvement	Support for the professional development and achievements of mathematicians working in appropriate fields (e.g. climate modelling, weather forecasting, flood protection, seismology, volcanology, efficient combustion, pollution) and others who apply mathematics to forward this goal.	Individuals working in this field benefit from direct support of their work, while the public at large benefits from this application of mathematics
Advancement of animal welfare	Support for the professional development and achievements of mathematicians working in appropriate field (e.g. animal epidemiology and modelling of disease control)	Individuals working in this field benefit from direct support of their work, while the public at large benefits from this application of mathematics
Promotion of the efficiency of the armed forces of the Crown, of the efficiency of the police, fire and rescue services and ambulance services	Support for professional development and achievement of mathematicians working in appropriate fields (e.g. cryptography and secure communications, military strategy and logistics; forensic science, modelling of crowd behaviour, combustion and explosions; scheduling and OR) and others who apply mathematics to forward this goal.	Individuals working in this field benefit from direct support of their work, while the public at large benefits from this application of mathematics
Promotion of amateur sport	Support for the professional development and achievements of mathematicians working in appropriate fields (e.g. modelling, measuring and improving performance in various sports including, swimming, athletics and ball and projectile based activities).	Individuals working in this field benefit from direct support of their work, while the public at large benefits from this application of mathematics

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Appendix E: The futures of the two societies

This appendix reviews the options and implications if the two societies decide not to merge. To some degree these were addressed in the report of the Frameworks Studies Initiative (available from the societies' web sites) and it is not intended to repeat that here, but it is worth outlining the main issues.

The FSI looked at two alternatives besides the merger – separate development of the two societies as independent entities along the current model, and (b) an "H-model" in which two separate societies operate both through their direct operations and through a set of joint activities supported by a common administrative structure.

Separate development within the current framework

The FSI report said of this option:

There is no doubt that the last decade has seen great progress in our relationship. Each Council recognises the value of working openly and collaboratively with the other, in order both to enhance its own effectiveness and to provide better support for the community as a whole. This collaboration is reflected at various levels – the joint IMA–LMS Working Group at Presidential and senior Officer level, cross-representation on some committees, and good relations and discussion at a managerial and staff level. The decision of the IMA to rent a room in De Morgan House is demonstrative of this relationship and itself aids good communication. In addition to the joint Working Group there is one joint committee – the joint IMA–LMS David Crighton Medal Committee, established to recognise the contributions of David Crighton, a past-President of the IMA and, on his untimely death, President-Designate of the LMS.

But, encouraging as these developments have been, they fail to address the fundamental weakness of having two major organizations operating within the same community. This generates confusion almost everywhere: in government circles, in the scientific world, and with the public at large. Furthermore it risks enabling rivals to marginalise mathematics and exploit any disagreements that might arise. At a practical level there is much unnecessary duplication, and the cost of communication, coordination and coherence is disproportionately high.

The FSI group considered that if both societies wished to build further on these informal linkages, then each society will be driven primarily by their own plans, opportunities and finances, with no assurance that progress will be made.

It went on to look at the financial positions and trends in both the societies. The IMA had been and remained reasonably stable with a balanced budget. The LMS, on the other hand, had seen significant changes in its objectives and finances over the previous 10 years, the consequences of which were far reaching and not yet complete. It said

“...the LMS will have to take measures to stabilize its current trajectory. It may be necessary to put the brakes on expenditure, and to look for new sources of income, for example by expanding publishing activities. Given the current uncertainties about academic publishing, this would probably entail moving into new areas. The Society has been increasing its subscription rate above the RPI, and might also consider expanding its membership base, in order to increase income from subscriptions.”

In summary, the main points about this model are:

- Retaining the two separate societies, whilst ensuring that both sets of objectives and activities would be maintained, would lead inevitably to a less efficient operation than a single body.
- The two societies would continue to be run by Councils which inevitably will have different objectives and policies. While in many cases a common approach can be developed, that will be done only at the cost of additional time and effort to negotiate joint positions. It still leaves open the probability that on various issues the two organizations will be seen to be working at cross purposes, sending a mixed or contradictory message to the outside world.
- Both societies would need to maintain and operate their own Councils, committees, premises and staffing. The task of running any organization is considerable nowadays, with increasing legislation covering all areas of charity law, property law and employment law. An increasing proportion of the LMS's finances were going into this aspect. The increasing complexity of running organizations and the inherent increases

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in staff and agents costs would eat ever further into the finances of both societies, restricting their activities to promote and support mathematics itself.

- There is no indication from their current plans and positions that either Society is likely see a major increase in its activities or influence. Both are constrained by scale and finances. The degree of development and ability to address the basic issues facing mathematics in the world will be severely limited.

The H framework

The FSI report examined this option. It said of it

The main advantage of this framework is that the creation of further links could be regarded as a natural evolution, and would require no legal changes in the position of the societies. In principle, the situation could be reversed at any stage. Thus change would be minimal, with the two societies retaining their separate charters (possibly with minor revision), councils and character.

Clearly, the H framework offers the potential for gradual evolution of the management structure, by changing the length and width of the horizontal bar. It could lead to improvements in operational efficiency, by allowing the combination or rationalisation of activities rather than duplication. The number of organizational meetings might be reduced by forming joint committees, with some saving of travel and service costs. In the limit (the X framework) there could be a unified management team operating under two Councils.

In summary, the main points about this model are:

- There still remain two separate organizations with separate Councils. The Councils of the IMA and the LMS are independent bodies and must each act within the constraints and purposes of their separate Charters, and use their resources and staff accordingly. This limits the degree of joint governance or delegation that can take place. The two Councils cannot formally be bound by the decisions of a joint body, nor can the Councils delegate key responsibilities as trustees or pool their assets. The problems of unity of policy, a united approach and a single voice for mathematics will still remain as in the current framework (see above).
- Certain functions could be combined and single administrative departments set up to run such matters as processing grants, accounting, membership administration, buildings and services. Those units would be reporting to both the societies' Councils and executive secretaries, a possible but far from ideal way of working.
- The model offered no benefits in terms of the financial viability of either body and in particular would not allow for a major drive on membership, say, to start to address the numerical membership of the two societies .
- The two Councils, when considering this model, concluded that it had value only as an interim stage on the way to a full merger, and that, if that were the intention, then moving direct to a merger would avoid a difficult and costly interlude.

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Appendix F: Council constitution

Post	Term of Service	Nomination	Election	Notes
President	Two years; extendable by one year in exceptional cases.	One name put forward by Nominating Committee. Members able to add additional names.	By all full Members through a simple majority of votes cast confirming the election or, if more than two candidates, by PR	Mechanisms by which Nominating Committee identifies and selects nominees left undefined.
General Secretary, Treasurer	Five years; may be extended by one extra term of up to five years.	One name put forward for each vacant post by Nominating Committee. Members able to add additional names.	By all full Members through a simple majority of votes cast confirming the election or, if more than two candidates, by PR	Mechanisms by which Nominating Committee identifies and selects nominees left undefined.
Vice Presidents (4)	Four years; may be extended by one extra term of up to five years.	One name put forward for each vacant post by Nominating Committee in consultation with relevant Constituency Committee. Members <u>not</u> able to add additional names.	By all full Members through a simple majority of votes cast confirming the election.	For each Constituency: – Learned Activities, – Professional Affairs, – Education, – External Relations.
Chair of Publications Committee	Four years; may be extended by one extra term of up to five years.	By Council.	Appointed by Council.	
General members (7)	Three years; may be extended by one extra term of two years.	Nominating Committee to put forward more candidates than there are vacancies. Members able to add additional names.	By all Members using PR.	If a Constituency Cttee fails to put forward sufficient candidates for its Constituency members, then those "spare" places are added to the 7 other members.
Constituency members (2 per Constituency Committee, 8 in all)	Three years; may be extended by one extra term of three years.	Each Constituency Committee to put forward at least as many (and preferably more) candidates than there are vacancies in its places. Candidates need not necessarily be members of the relevant Constituency Committee. Members <u>not</u> able to add additional names.	If unopposed, by all Members through a simple majority of votes cast confirming the election or, if there are more candidates than vacancies, using PR	Mechanism for election/appointment to Constituency Committees to be left undefined. Council and/or Constituency Committees to determine appropriate process from time to time – this may vary between Constituency Committees.
Co-opted members (up to 3)	Reconfirmed annually for a maximum period of six years.	By Council.	Appointed by Council.	Optional

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Appendix G: Overseas societies with which reciprocity agreements currently exist

American Mathematical Society
Australian Mathematical Society
Belgian Mathematical Society
Canadian Mathematical Society
Dansk Matematisk Forening
Deutsche Mathematiker-Vereinigung
Finnish Mathematical Society
Indian Mathematical Society
Koninklijk Wiskundig Genootschap
Mathematical Society of Japan
New Zealand Mathematical Society
Nigerian Mathematical Society
Norsk Matematisk Forening
Real Sociedad Matemática Española
Schweizerische Mathematische Gesellschaft/ Société Mathématique Suisse
Société Mathématique de France
South East Asian Mathematical Society
Svenska Matematikersamfundet
Unione Matematica Italiana

Appendix H: Meetings, conferences and lectures

The LMS organizes a programme of half- day Society meetings and associated 3–4 day workshops. The Society also has a number of programmes under which distinguished international mathematicians visit the UK (or UK mathematicians visit overseas countries) and the lecturers deliver a series of lectures at various universities. It is involved in the selection and assessment of Durham Symposia.

The IMA promotes and encourages the organization of high quality conferences on a wide range of topics relevant to members in industry, commerce, education and academic research on mathematics and its applications. Given the needs of members working in industry and commerce, the Institute provides a cost-effective service for organizing professional conferences and meetings. This service aims to recover its costs - if a surplus is made on an event then that is recycled into the conference programme to support subsidized academic conferences. Eight to ten conferences are organized each year. Some are one day events but most are residential and last between two and four days.

Regular IMA conference themes:

Conferences to promote mathematics:

- Mathematics 2008
- Mathematics Works II
- Younger Mathematicians VI

Research Conferences:

- Mathematics of Surfaces XII
- Coding and Cryptography XI
- Mathematics in Signal Processing VIII
- Younger Mathematicians VI
- Modelling in Industrial Maintenance and Reliability VI
- Mathematical Education of Engineers VI
- Modelling Permeable Rocks V
- Quantitative Modelling in the Management of Healthcare V
- Mathematics in Transport IV
- Computational Finance II

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Appendix I: Grant schemes

The IMA provides two modest grant schemes.

The IMA Small Grants Scheme has an annual budget of £12,000 to facilitate research activity in all areas of applicable mathematics. Further information can be found at http://www.ima.org.uk/learned_soc/grant.htm.

The IMA Education Grants Scheme has an annual budget of £6,000 to help individuals in secondary schools, Colleges of Further Education (FE) and Higher Education Institutes (HEIs) with the costs of running or attending an educational activity relating to mathematics. Further information can be found at http://www.ima.org.uk/Education/education_grant.html.

The LMS has a substantial programme of grant schemes to help mathematicians to collaborate or work intensively with another person on a specified research project. Its support is limited in scope and it does not attempt to compete with the Research Councils. Any mathematician working in the UK is eligible to apply for a grant but for some schemes if they are not a member of the Society then the application must be countersigned by a member who is prepared to support the application. It also provides grants to support the activities of the INI and ICMS.

Details of the LMS grant schemes are available at www.lms.ac.uk/grants. The scale of awards (2006/07) is as follows:

- Conference Grants (Scheme 1) – 50 grants awarded to a total value of £134,629.
- Visitors (Scheme 2) – 33 grants awarded to a total value of £34,752.
- Support of joint research groups (Scheme 3) – 26 grants awarded to a total value of £29,797.
- Collaborative small grants (Scheme 4) – 28 grants awarded to a total value of £14,417.
- International Short Visits (Scheme 5) – 4 grants awarded to a total value of £5,100.
- Computer Science Small Grants (Scheme 7) – 5 grants awarded to a total value of £2,490.
- Young British and Russian Mathematicians Scheme – 1 grant awarded to a total value of £1,500.
- LMS Workshop-Symposia – 1 grant awarded to a total value of £14,290.
- LMS Grace Chisholm Young Fellowships – 1 grant awarded to a total value of £500.
- LMS Childcare Grants – 15 grants awarded to a total value of £1,800.

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Appendix J: International relations

The LMS and IMA have a substantial number of international links through international bodies or bilateral arrangements.

International non-governmental bodies

- **International Council for Science (ICSU)**, the umbrella organization for the international unions including the IMU and IUTAM, and various commissions and committees, including ICMI. The Royal Society is the UK adhering body; its Scientific Unions Committee (SUC) advises the RS Council and contains representatives of each union to which the UK adheres. The LMS, as the UK adhering body to the IMU, nominates the IMU representative to the SUC.
- **International Mathematical Union (IMU)**, the international non-governmental organization for mathematics within the ICSU family. It runs the four yearly International Congress of Mathematics (ICM). The LMS is the UK adhering body to IMU (and its Commissions and Committees), having taken this over from the RS a few years ago. The RS provides about half the annual subscription (determined by category, not by numbers of members). The LMS has an IMU Advisory Committee which it consults and informs on ICSU and IMU issues.
- **International Commission on Mathematical Instruction (ICMI)**, a sub-commission of IMU which runs the four-yearly International Congress on Mathematical Education (ICME). The LMS nominates the ICMI UK representative and assists in the raising and distribution of travel funds to ICMEs.
- **Commission on Development and Exchange (CDE)**, a sub-commission of IMU. The LMS makes an annual contribution (around \$5000) to support mathematicians from developing countries participate in IMU activities.
- **International Union for Theoretical and Applied Mechanics (IUTAM)**. An international union, part of ICSU. The RS has offered to lead adherence with supporting funding from the IMA, the IoP and the RAEng.
- **International Committee on Industrial Applied Mathematics (ICIAM)**, runs a four yearly international congress (in Zurich in 2007). Both societies are members and pay subscriptions. The IMA was active in the formation of ICIAM and has representation on its governing body and was involved in the organization of ICIAM 99 (Edinburgh).

European bodies (non-governmental)

- **European Mathematical Society.** The European Mathematical Society was primarily pure mathematical in focus but in recent years has extended its remit to cover more applied mathematics and education. It holds a four-yearly major European Conference. Both societies are members as societies, as well as collecting individual subscriptions from their members who are also members of the European Mathematical Society on behalf of the European Mathematical Society.
- **European Community for Computational Methods in the Applied Sciences (ECCOMAS).** The IMA was active in the formation of ECCOMAS and has representation on its governing body and was involved in the organization of ECCOMAS CFD 2001 (Swansea). The IMA pays a subscription to ECCOMAS.
- **European Mechanics Society (EUROMECH).** This body is primarily engaged with the organization of informal colloquia (some 15 p.a.) across Europe and four regular large conferences. It has individual membership with selective admission. The IMA is a member and also collects individual subscriptions from IMA/EUROMECH members on behalf of EUROMECH.
- **European Consortium for Mathematics in Industry (ECMI).** Membership is principally university departments. The IMA is running the administration of, and sponsoring, the 300 plus conference at UCL in June 2008.

Bilateral links with mathematicians/mathematics bodies in other countries

- **USA** – The LMS has strong links with the AMS, and to a lesser extent with SIAM. It jointly publishes the History of Mathematics Series with the former. It has held a joint meeting with AMS.
- **Russia** – The LMS publishes several Russian translation journals. Its grant schemes include enabling Russian Mathematicians to undertake research in the UK, and *vice versa*.

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- **Africa** – The LMS has a fund to encourage collaboration with African mathematicians; it makes a grant available to the African Institute of Mathematical Sciences (AIMS). It manages two grants (from the Nuffield Foundation and Leverhulme Trust) to establish mentoring arrangements between UK and African mathematics departments.
- **New Zealand** – Continuing until 2010, the LMS nominates and meets the international travel costs of a Forder Lecturer to New Zealand, in cooperation with the New Zealand Mathematical Society.
- **'Mathematically-disadvantaged' countries** – The LMS Scheme 5 (International Short Visits) supports mathematics in Africa, or countries in which mathematics is in a similar position. The status of countries is determined case by case. Success of an application depends mainly and crucially on the likelihood of potential benefit to mathematics in the country concerned.

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Appendix K: Current publications of the two societies

LMS Journals	Scope	pp per annum	Title ownership/ copyright	Editorial & Management/ Production & Distribution
<i>Proceedings of the London Mathematical Society</i>	Three general journals covering all areas of pure mathematics. Papers assigned by length – <i>Bulletin</i> up to 13pp, <i>Journal</i> up to 20pp, <i>Proceedings</i> longer papers. The <i>Bulletin</i> also contains a few pages of book reviews, LMS prize citations and obituaries.	1632	LMS/LMS	LMS/OUP
<i>Journal of the London Mathematical Society</i>		1632	LMS/LMS	LMS/OUP
<i>Bulletin of the London Mathematical Society</i>		1056	LMS/LMS	LMS/OUP
<i>Journal of Topology</i>	New in 2008. Publishes high quality papers of significance in topology, geometry and adjacent areas of mathematics.	1040	LMS/LMS	LMS/OUP
<i>Journal of Computation and Mathematics</i>	An open access journal with no fees to authors; covers all areas where mathematics and computation meet.	~ 350	LMS/author	LMS
<i>Nonlinearity</i>	Nonlinear mathematics and physics, and other areas where nonlinear phenomena are of fundamental importance.	3100	LMS & IoPP/LMS & IoPP	IoPP (smaller LMS contribution)/ IoPP
<i>Compositio Mathematica</i>	General journal, focusing on algebra, number theory, topology, algebraic and analytic geometry and (geometric) analysis.	1632	Foundation CM/author	LMS/LMS & CUP
<i>Transactions of the Moscow Mathematical Society (translation journal)</i>	Covering areas in pure mathematics	350	TMMS/AMS	AMS (smaller LMS contribution)/ AMS
<i>Russian Mathematical Surveys (translation journal)</i>	Covering all areas of pure mathematics; includes obituaries and broader survey articles.	1150	RAS & LMS & Turpion/ RAS & LMS & Turpion	RAS & LMS & Turpion/ Turpion Ltd
<i>Izvestiya: Mathematics (translation journal)</i>	Covering Algebra, Logic, Number Theory, Analysis, Geometry, Topology, Function Theory and Differential Equations.	1250		
<i>Sbornik: Mathematics (translation journal)</i>	Covering Analysis, ODEs, PDEs, Mathematical Physics, Geometry, Algebra and Functional Analysis.	1800		
IMA Journals	Scope	pp per annum	Title ownership/ copyright	Editorial & Management/ Production & Distribution
<i>Journal of Applied Mathematics</i>	Analytic and numerical treatments of applied mathematical problems, including those arising in industry.	960	IMA/IMA	IMA/OUP/ OUP
<i>Journal of Numerical Analysis</i>	All fields of numerical analysis; theory, development or use of practical algorithms; occasional survey articles.	832	IMA/IMA	IMA/OUP/ OUP
<i>Journal of Mathematical Control and Information</i>	Mathematical control theory, systems theory and applied information sciences. Encourages the interplay between control and information theory and other mathematical sciences.	544	IMA/IMA	IMA/OUP/ OUP

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<i>Journal of Management Mathematics</i>	Publishes papers in which mathematics and mathematical modelling play a central role in addressing problems of industry, commerce, business or government.	400	IMA/IMA	IMA/OUP/OUP
<i>Mathematical Medicine and Biology</i>	Mathematics in medical and biological research with emphasis upon the special insights and enhanced understanding that arise from mathematical modelling.	384	IMA/IMA	IMA/OUP/OUP
<i>Teaching Mathematics and its Applications</i>	The journal provides a forum for the exchange of ideas and experiences which contribute to the improvement of mathematics teaching and learning for students from upper secondary/high school level through to university first degree level.	224	IMA/IMA	IMA/OUP/OUP

LMS Book Series	Scope	pp per annum	Title ownership/copyright	Editorial & Management/Production & Distribution
<i>LMS Lecture Notes</i>	347 volumes, pure and some applied maths.	3,000	LMS/CUP	LMS & CUP/CUP
<i>LMS Student Texts</i>	72 vols, graduate level texts in pure maths.	750	LMS/CUP	LMS & CUP/CUP
<i>LMS Monographs</i>	33 vols, expository works on current research that has reached a first stage of maturity.	300	LMS/PUP	LMS & PUP/PUP
<i>History of Mathematics</i>	33 vols, general history of mathematics aimed at mathematicians	450	LMS & AMS/AMS or LMS	LMS & AMS/AMS

IMA Conference Proceedings

10 volumes in print, produced with various publishers on an *ad hoc* basis

IMA Monographs

2 volumes

IMA Books

1 volume (still in print)

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Appendix L: Education in the two societies

The IMA

1. The IMA sees as a major task its contribution, in a variety of ways, to the development and maintenance of a first-class mathematical education provision in the UK.
2. Matters concerning education make up a large part of the IMA's activities. There is a full time Education Officer, who as well as sharing in the total administrative work of the Institute, specialises in monitoring the whole educational scene and servicing the two committees. (See 10)
3. All members of the IMA's Executive Board have delegated responsibility for the various service areas. Currently education matters are delegated to one of the Honorary Secretaries.
4. The Honorary Secretary and the Education Officer report to both Executive Board and Council on education matters.
5. The Executive Director also takes an interest in education matters and frequently plays a significant role when appropriate. Other officers become involved from time to time, particularly, but not exclusively, when education matters might impinge on other areas of activity.
6. The IMA liaises closely with the other CMS bodies' education personnel as well as a number of other organizations including EPC, IOP, the Science Council JMC, NCETM, the Specialist Schools and Academies Trust, QAA, HoDoMS, ACME, QCA and the HEA-MSOR Network. Work on the Chartered Mathematics Teacher designation has been carried out largely through the Membership Department, supported by the Education Officer. This work has increased the contact with certain teacher and lecturer organizations, notably the MA, ATM and NANAMIC.
7. The education activity is wide-ranging, covering schools, colleges and Universities. The IMA endeavours to respond to government and other agencies and to submit evidence to inquiries. It takes a view on the school/college curriculum and associated assessment matters, including those leading to qualifications. It has maintained close contact with the government's chief advisor for mathematics whilst in post. The actions of QCA, DCSF and DIUS are monitored closely. The work of the TDA in respect of mathematics teachers is also an area of great interest.
8. At HE level, the Institute works with other bodies to try to ensure that there is an adequate supply of students in the STEM disciplines. It also approves degree programmes as being appropriate for subsequent advancement of graduates to CMath status. In this connection it participates in the work of quality assurance, notably in the production of Benchmark Statements for the MSOR area.
9. The IMA is the awarding body for the Polymaths course, which is currently running at two universities. It also operates a University Affiliates scheme.
10. Given the diversity of its work in education, the IMA has two education committees, one concerned with Schools and FE and the other with Higher Education matters (including programme approval). Both these committees regularly have large agendas, and although there is sometimes overlap in areas of interest, it has not yet been necessary to arrange a full joint meeting. Generally, when necessary a unified approach is obtained by the establishment of a task-specific working group.
11. The Executive Board Member with responsibility for Education (Honorary Secretary – Education) has delegated authority for action in this area. This authority is extended to the committee Chairs who are empowered to speak on behalf of the Institute in matters relevant to their committee. However, it is the norm for the committee Chairs and the EBME to liaise with the Education Officer and the Executive Director before acting on sensitive or high-profile matters.
12. The IMA has an Education Grants scheme, administered by the Education Officer, with decisions taken by a panel normally made up from the Chairs of the committees and the EBME.
13. There is an IMA Journal (*Teaching Mathematics and its Applications*) devoted to Education matters and aimed at teachers. Schools are also supported through the school speaker scheme.
14. The IMA has worked closely with the LMS, RSS and other bodies in the setting up and running of the **more maths grads** project to encourage more young people to do degrees with a high mathematical content

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and for them and their teachers to be aware of the career opportunities for those who have studied mathematics.

The LMS

1. The LMS is committed through its policy objectives to support mathematical education in schools, colleges and universities and to encourage the public and young people to appreciate and engage in mathematics.
2. The LMS is specifically concerned with those aspects of mathematics education that have a direct or indirect influence on HE. These include the teaching of GCSE (including functional maths), A-level and the new diplomas, the effect of the Bologna agreement and the training of new mathematics lecturers.
3. Most education matters are the responsibility of the Education Committee. This committee deals with all schools and HE matters and has a broad cross section of membership drawn mainly from HE including both mathematics and mathematics education. It has an Honorary Secretary who serves on, and reports to, Council. The Executive Secretary is also actively engaged with this committee. The committee has been proactive in helping to launch some new education initiatives and is also busy in reacting to a number of changes of government education policy.
4. The LMS works closely with HoDoMS, ACME, CMS and the IMA and RSS. It has representatives on QCA, MSOR, JMC and the EPC and an education committee member also serves on the NCETM.
5. The LMS supports initiatives in mathematics education and public engagement through the small grants scheme which is administered by the Education Committee.
6. The Education Committee runs a number of schemes to promote the public engagement with mathematics, including the LMS Popular Lectures and the Holgate Lecturers scheme which allows schools to invite visiting maths lecturers. Recently it has collaborated with Gresham College to deliver a joint popular lecture.
7. Mathematics is also promoted to the public through the support of the LMS for the BA Festival of Science and the full membership of the LMS in the Maths Promotion Unit of the CMS.
8. The LMS has worked closely with the IMA, RSS and other bodies in the setting up and running of the **more maths grads** project to encourage more young people to do degrees with a high mathematical content and for them and their teachers to be aware of the career opportunities for those who have studied mathematics.
9. The LMS has taken a keen interest in raising the issue of the Bologna agreement in policy circles, and understanding its implications for mathematics courses in universities.
10. The LMS has a particular concern for the nature and quality of Masters and PhD training, especially in the light of the International review of Mathematics which concluded that postgraduate training in the UK was not comparable with countries overseas.

Appendix M: Current medals and prizes of the two societies

The IMA

- A Gold Medal for outstanding achievement (biennial)

The LMS

- The De Morgan Medal for contributions to mathematics (triennial)
- The Pólya Medal in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to, mathematics within the United Kingdom (two years out of three)
- The Senior Berwick and Berwick Prizes in recognition of an outstanding piece of mathematical research actually published by the Society (each biennial)
- The Senior Whitehead and Whitehead Prizes for work in, influence on or service to mathematics, or recognition of lecturing gifts in the field of mathematics (The Senior award is made biennially; up to four Whitehead Prizes are awarded annually)
- The Naylor Prize and Lectureship in Applied Mathematics for work in, and influence on, and contributions to applied mathematics and/or the applications of mathematics, and lecturing gifts (biennial)
- The Fröhlich Prize for original and extremely innovative work in any branch of mathematics (biennial).

The LMS and the IMA jointly

- The David Crighton Medal for service to mathematics and the mathematical community (triennial).
- The Christopher Zeeman Medal for excellence in the promotion of mathematics to the public or engagement with the public in mathematics in the UK (triennial)