

Annual Report to Members 2020



Glossary

ACME — Advisory Committee on Mathematics Education

AR — Academic Representative(s)

BEIS — Department for Business, Energy and Industrial Strategy

BMI — Big Mathematics Initiative

BSHM — British Society for the History of Mathematics

CMath — Chartered Mathematician

CMS — Council for the Mathematical Sciences

DfE — Department for Education

ECM — Early Career Mathematicians

EdMS — Edinburgh Mathematical Society

EPSRC — Engineering and Physical Sciences Research Council

EuMS — European Mathematical Society

FE — Further Education

GCSE — General Certificate of Secondary Education

HE — Higher Education

HEdSA — Higher Education Services Area

HEI — Higher Education Institutions

HoDoMS — Heads of Departments of Mathematical Sciences

ICIAM — International Council for Industrial and Applied Mathematics

ICMS — International Centre for Mathematical Sciences

IF — Impact Factor

IMA — Institute of Mathematics and its Applications

InFOMM — Industrially Focused Mathematical Modelling

LMS — London Mathematical Society

MA — The Mathematical Association

MEI — Mathematics in Education and Industry

NANAMIC — National Association of Numeracy and Mathematics in Colleges

NCETM — National Centre for Excellence in the Teaching of Mathematics

ORS — Operational Research Society

OU — Open University

OUP — Oxford University Press

PAC — Professional Affairs Committee

RSS — Royal Statistical Society

S&FE — Schools and Further Education

SET — Science, Engineering and Technology

SIAM — Society for Industrial and Applied Mathematics

SIAM UKIE — UK and Republic of Ireland Section of SIAM

SORP — Statements of Recommended Practice

STEM — Science, Technology, Engineering and Mathematics

STFC — Science and Technology Facilities Council

UCL — University College London

UKRI — UK Research and Innovation

INTRODUCTION

2020 was dominated by the COVID-19 pandemic. January and February were typical, after which we began to arrange our activities with all staff working from home and all activities being run online. We were fortunate that we had begun using more remote working in 2019 associated with the Scholarships scheme and so were in a good position to expand our remote / virtual working. Trustees are very appreciative of the huge team effort that enabled this. There was a dramatic reduction of face-to-face activities, in particular conferences, but in other areas services were maintained and in some places expanded.

Our conference team ran one face-to-face event, 13 virtual events, postponed six events and cancelled one event. The rapid expansion of virtual events was commendable.

To compensate for the reduced programme and to provide increased services to members who had been furloughed, we launched a series of Maths Teas virtual events that were established by our Social Media Taskforce. These Maths Teas proved to be very popular with members and non-members joining from across the UK and internationally. It is planned that these Maths Teas will continue in 2021.

We ran the Department for Education Mathematics Teacher Training Scholarships scheme for an eighth successful year recommending 333 outstanding applicants for scholarship funds.

A large number of Branch events were held online, allowing members in much greater numbers to attend these regional events from any location.

We played the leading role with the CMS in the inclusion of mathematics within STEM for Britain at Parliament; the final of the 2020 competition took place in Parliament on 9 March.

All issues of Mathematics Today were printed and posted on time - a simple statement that hides a great deal of work behind the scenes!

The membership eBulletins were issued every two months, alternating with Mathematics Today.

The popular IMA MathsCareers website was redesigned during the year; attracted 390,000 visits and increased its followers on Twitter to 7,267. We also issued six more editions of our e16plus newsletter.

Our eStudent offer continues to be highly popular, and following a refresh of our eStudent population, we had 7,000 eStudents at the end of 2020.

Our grant programmes for research, education and university activities were under-utilised because so few face-to-face activities, which are the mainstay of our grant programmes, could be held.

And on top of this we ran our regular activities including, education, journals, and mathematics consultations.

Our year-end membership numbers were at the highest level ever. We are grateful to all our members who support the Institute and to the Volunteers and Secretariat that kept our Services to Mathematics so vibrant in 2020.

We hope that you enjoy reading the comprehensive details in the rest of this report.

IMA AND GOVERNMENT

Both in its own right and as a member of CMS the IMA has been involved with a wide range of engagement activities in Parliament this year.

We continued to run the DfE Mathematics Teacher Training Scholarships scheme.

IMA Council members are in regular contact with DfE and UKRI.

On 9 March a panel of CMS judges, chaired by Tim Pedley, selected the Parliamentary and Scientific Committee STEM for Britain mathematics winners. Once again we are very grateful to the Clay Mathematics Institute and the Heilbronn Institute for their generous sponsorship of these prizes. STEM for Britain is the largest science event held in the Houses of Parliament on an annual basis and helps to strengthen our dialogue with Parliamentarians.

The Parliamentary Links Day took place virtually on 14 July on the theme of ‘Trust in Science’. The IMA was represented at this event.

Our Executive Director, David Youdan, has continued to serve as an Advisor to the Parliamentary and Scientific Committee.

SERVICES TO MATHEMATICS

Research Committee

Professor Helen Wilson, Vice President Learned Society, chaired the Research Committee in 2020. The full membership of the Committee can be viewed on the IMA website:
<https://ima.org.uk/roles/research-committee/>

These researchers contribute to our discussions with the research funding councils and policy makers, and work to promote the benefits of fundamental and applied mathematical research to the economy and to society. The Research Committee also assess applications for Small Grants.

Throughout the year, Research Committee worked on behalf of the community in many ways, including the following:

- The working group which was formed by the Committee in 2018 to consider IMA responses to Professor Bond’s Review, “The Era of Mathematics, an independent review of knowledge exchange in the mathematical sciences”, continued to meet in 2020 and worked to advance publicity of knowledge exchange. For example, the group initiated a special issue of ‘Mathematics Today’ with Knowledge Exchange as its theme. The working group and the Committee also continued to liaise with the two CMS Committees which were set up to take forward recommendations of the ‘Bond Review’ on behalf of the community.
- Committee Chair, Helen Wilson wrote to Amanda Solloway, MP and Parliamentary Under Secretary of State at BEIS (Minister for Science, Research and Innovation,) to welcome the Government’s Research and Development Roadmap, which was published on 1 July, and to highlight the effectiveness

and economic benefits of the Mathematical Sciences.

- The Committee responded, on behalf of the IMA, to the House of Commons Science and Technology Committee inquiry into the “The role of technology, research and innovation in the COVID-19 recovery”.
- The Committee launched a call for nominations for the inaugural award of the ‘IMA Hedy Lamarr Prize for Knowledge Exchange in Mathematics and its Applications’. Nominations are invited until 31 January 2021, after which the award panel will consider entries for this new IMA prize.
- Helen Wilson worked with IMA and LMS colleagues to organise a further joint IMA-LMS scientific meeting, which took place on 1 and 2 October, on the theme of ‘Topological Methods in Data Science’. This meeting was held virtually which enabled a large audience to attend. Thanks are given to ICMS for hosting the event as part of its online Mathematical Sciences Seminars, the Presidents of both societies for chairing the event, all speakers, participants, attendees and organisers.

Journals

The Institute’s eight academic journals are published by Oxford University Press (OUP). Five of these are traditional hybrid print journals:

- *IMA Journal of Applied Mathematics*
Editors: Alan Champneys, (Bristol), and Demetrios Papageorgiou, (Imperial);
- *IMA Journal of Numerical Analysis*
Editors: Arie Iserles, (Cambridge), Endre Süli, (Oxford) and Charles Elliot (Warwick);
- *Information and Inference: A Journal of the IMA*
Editors: Robert Calderbank, (Duke); David Donoho, (Stanford); John Shawe-Taylor, (UCL) and Jared Tanner, (Oxford);
- *IMA Journal of Management Mathematics*

Editors: Philip Scarf, (Salford); Aris Syntetos, (Cardiff) and Rogemar Mamon, (Western Ontario);

- *Teaching Mathematics and its Applications: an International Journal of the IMA*
Editors: Duncan Lawson, (Coventry); Christopher Sangwin, (Edinburgh) and Cathy Smith (OU).

Two are online only hybrid journals:

- *IMA Journal of Mathematical Control and Information*
Editors: Christophe Prieur (Grenoble) and Sarah Spurgeon OBE, (UCL);
- *Mathematical Medicine and Biology: A Journal of the IMA*
Editors: Oliver Jensen, (Manchester); John King, (Nottingham) and James Keener, (Utah);

One is an open access only online journal:

- *Transactions of Mathematics and its Applications*
Editor in Chief: Arieh Iserles (Cambridge) and Dominic Vella (Oxford);

Five journals currently have impact factors (IF). During the most recent assessment period the IF increased for *IMA Management Mathematics* to 1.529.

Conferences

The lockdown in March made a significant impact on our conferences programme, with an initial decision to postpone all events until at least September. It was soon apparent that in-person events would not resume in 2020, so the conference team worked swiftly to facilitate running remote conferences, purchasing and testing appropriate software, and building a new online conference programme. We delivered the first of a series of online talks in July, with the IMA Presidential Address by Dr Nira Chamberlain, and continued with three other sessions. Together these events were badged as the IMA 2020 Mathematics Series. The revised programme for 2020 was as follows:

- *New Year IMA 16+ Lecture Day*
8 January 2020, University of Liverpool

- *IMA Mathematics 2020 Online series*
 - Week 1 – 14 July - “Building a Powerful Mathematical Identity!”
 - Week 2 – 22 July - “Open Mathematical Questions to Illuminate Quantum Machine Learning” and “Maths & Stats for Effective Regulation”
 - Week 3 – 30 July - “V-KEMS: The Virtual Forum for Knowledge Exchange in the Mathematical Sciences” and “Privacy-enhancing Technologies”
 - Week 4 – 12 August - “Robots and Maths: Are they related?” and “Tensors, graphs, and deep networks: Convergence of concepts and ideas”
- *Topological Methods in Data Science*
Joint conference with LMS – online
1 & 2 October 2020
- *IMA Early Career Mathematicians’ Autumn Conference 2020 – online*
24 & 25 October 2020
- *Black Heroes of Mathematics Conference – online (with BSHM, ICMS and LMS)*
26-27 October 2020
- *16plus Careers Lecture – online*
10 November 2020
- *Maths in Music Christmas Edition - online*
11 December 2020
- *Mathematics of Big Data: Lessons from COVID-19 - online*
15 December 2020

All of the above events were free to attend. For events in 2021, a moderate fee will be charged for attending online sessions.

The feedback from delegates has been very positive, and numbers attending have been generally in excess of 100. We have noted that going online has resulted in an upward trend in female participation, participation from international delegates, and an overall accessibility of the conferences.

We give our thanks to the mathematical organising

committees and the conference team for working so diligently to ensure a smooth transition to online delivery within a very short space of time. We anticipate a mix of online and in-person events in the future.

IMA Lectures

IMA President, Dr Nira Chamberlain, gave his Presidential Address, “Building a Powerful Mathematical Identity!”, as the inaugural session of the *IMA Mathematics 2020 Online series*.

Two 16plus lectures are reported within the conference events section.

Small Grants

The IMA’s Small Grants Scheme is designed to be flexible, so that it can be used to facilitate any research activity within the scope of mathematics and its applications. Grants are available up to a value of £600 for individuals and up to £1,200 when enabling an event to take place.

The budget for 2020 was £12,000. As many events were affected by COVID-19 application numbers were reduced. The Scheme received 18 applications, requesting a total amount of £14,305. Eight applications were declined, seven were awarded in full, one was withdrawn, and two were awarded a reduced amount. Awards for 2020 are shown on the IMA website.

Education

During 2020, our contribution to mathematics education was led by Dr Michael Grove (Honorary Secretary with responsibility for Education), supported by Professor Nigel Steele (Deputy Honorary Secretary Education), Professor Andrew Osbaldestin (Chair, HEdSA), Mr Christopher (Chris) Chipperton (Chair, S&FE) and Vanessa Thorogood (Education Manager) together with all our education committee members.

The Education Service Area actively promotes the engagement of the Institute's members in education with its work through communications by email, on the website, and in *Mathematics Today*. For instance:

- notification of the publication of key reports;

- invitations to participate in events and / or contribute to external initiatives;
- opportunity to provide feedback on specific issues;
- invitations to contribute to Institute responses to consultations;
- publication of the Institute's submissions to consultation exercises.

Due to the COVID-19 pandemic in 2020, some of our regular activities, such as the Big Bang Fair, were postponed, and we look forward to the ability to resume most activities in 2021.

Higher Education

HE Teaching and Learning Series

A fourth call for the *Higher Education Teaching and Learning Series* was not released in early 2020/21. The COVID-19 pandemic resulted in the workshops due to take place in 2020 from the 2019/20 call to be postponed until 2021.

We have agreed with the successful applicants to our third call in 2019/20 that their workshops can be held in 2021 (subject to government advice on COVID-19):

- University of Birmingham - *Making Mathematics Accessible to All*
- Cardiff University & University of Bristol - *Reflection? Action? Research: Enhancing Mathematical Research and Scholarship*
- University of Glasgow - *Assessment strategies for mathematical sciences in the digital era*
- University of Nottingham - *Project-based and synoptic modules*
- University of Plymouth - *Involving employers in the development of the mathematical sciences curriculum*

- University of Sheffield - *Effectively teaching small classes as a postgraduate demonstrator*

Induction Course for New Lecturers

The Induction Course for New Lecturers was postponed until 2021.

Teaching and Learning Mathematics Online

The IMA endorsed TALMO; a two-day workshop which consisted of short online presentations on pedagogical and technological issues and practices associated with online delivery.

IMA John Blake University Teaching Medal

The IMA John Blake University Teaching Medal is awarded to individuals who have made a significant and sustained contribution to the teaching of the mathematical sciences at university-level (Level 4 and above). The award is named in honour of Professor John Blake (1947-2016) who, in addition to his research profile in bubble dynamics and low Reynolds number biological flows, was amongst the first true champions of teaching and learning within higher education.

Nominations for the inaugural award of the IMA John Blake University Teaching Medal opened on 1 October 2020.

Programme Accreditation

The Institute's Programme Accreditation scheme accredits university degree programmes from which all its graduates will meet the educational requirements for the CMATH designation. A total of 60 universities currently have degrees accredited by the Institute.

HEdSA has continued to revise the guidelines for Programme Accreditation, which will be fully implemented in 2021.

A list of accredited degree programmes can be found on the Programme Accreditation page of the Institute's website.

Schools and Further Education

Stella Dudzic (Programme Leader, Curriculum and Resources, MEI) attended a meeting of the S&FE Committee to discuss MEI's report: A new mathematics GCSE curriculum for post-16 resit

students.

The Committee responded to Ofqual's Consultation - Exceptional arrangements for exam grading and assessment in 2020.

School Speakers

In 2020 requests for School Speakers were handled regionally, where appropriate, by IMA Branches.

Polymaths

Polymaths is a part-time open access course validated by the Institute offered by the University of Bolton. A total of seven people was awarded the Polymaths certificate in 2020.

Education Grants

Individuals in schools, FE and HEIs in the UK can apply for a grant, normally up to a maximum of £600, to help with the costs of running or attending an educational activity relating to mathematics.

The Education Grants Judging Panel, consisting of the Institute's Honorary Secretary with Responsibility for Education and the Chairs of the education committees, decides on each application.

During 2020, the Education Grants scheme received 13 applications; of which four were awarded grants for the full amount requested, and nine were declined.

The Education Grants awarded a total of £2,356 in 2020.

Applications approved for 2020 are shown from the on the Institute's website.

IMA MathsCareers

Site development work was completed in November 2020 and the redesigned version of the MathsCareers site launched on 1 December. Despite the site being under development for much of the year it regularly received over 30,000 visits per month. During 2020 MathsCareers received 390,000 visits. The site is one of the top websites of its kind within the STEM community and continues to be popular among undergraduates seeking career advice as well as secondary education audiences. New content planned for 2021 includes articles on GCSE maths topics, as well as content on a variety of mathematical careers.

Two contests are run every year where entrants submit posters on a mathematical theme.

Social Media is used to raise the profile of IMA MathsCareers, and it now has 7,267 followers on Twitter including several ‘verified’ followers. The profile of the site, as well as mathematics generally, is raised via the distribution of classroom posters.

Mathematics Teacher Training Scholarships

The IMA, working with LMS, MA, MEI, STEM Learning and RSS, delivered the Mathematics Teacher Training Scholarships on behalf of the Department for Education. The overall aim of the Scholarships scheme is to improve the quality, and widen the pool, of applicants for secondary teacher training by attracting highly qualified graduates and career-changers who might not normally consider teaching as a career.

The 2019/20 (year eight) scheme was announced and opened for applications in October 2019, with a target of awarding 270 Scholarships to those who commence secondary mathematics teacher training in the 2020/21 academic year. This was the most successful year we have had, receiving 620 applications and awarding 333 Scholarships.

The pandemic during 2020 brought significant challenges and changes to the Maths Scholarships scheme. We continued to support our 2019/20 Maths Scholars, Alumni and recruit Maths Scholars for 2020/21 by taking all our activities online.

The ninth year (2020/21) of the Mathematics Teacher Training Scholarships was launched on 11 January 2021. There is a change to the financial incentives for those going into mathematics initial teacher training for both the government bursary and the Scholarships. The Maths Scholarship is now a £26k tax-free bursary during the initial teacher training year.

There are 270 Maths Scholarships available for individuals commencing secondary mathematics teacher training in the 2021/22 academic year.

Undergraduate and Postgraduate Liaison

The University Liaison activity increases membership, awareness of, and participation with the IMA amongst undergraduate and postgraduate students, and the university community. This is achieved through newsletters to our nearly 7,000 strong eStudent community, grants to student mathematical societies, careers talks for mathematics undergraduates and supporting careers events and student conferences. In 2020 there were seven issues of the eStudent newsletter and we continued posting general skills articles to the IMA Student Blog. From April 2020 events transferred online, though a number of conferences were postponed to 2021. An autumn Early Careers Mathematicians (ECM) conference was held online in October and was very successful with over 100 attendees on both days.

In 2020, £6,800 was paid in grants. Undergraduate awards were made to the Mathematical societies of the Universities of Aston, Birmingham, Bristol, Heriot-Watt, Manchester, Newcastle, Sheffield Hallam, University College London, University of East Anglia and Warwick. Awards were made to the IMA-SIAM Joint Student Chapters of the universities of Cardiff, Dublin, Edinburgh/Heriot-Watt, Manchester and Southampton. Sponsorship of £850 was also given for prizes for the Oxford Industrially Focused Mathematical Modelling (InFoMM) Graduate Camp and speaker costs at the SIAM UKIE annual conference. Society activities supported included conferences, competitions, talks and participation in IMA conferences. The University Liaison Officer (ULO) delivered 28 careers talks, 22 of which were delivered remotely, and two workshops, supported two careers fairs, five conferences and the InFoMM camp. Three events were delivered by IMA ambassadors.

Academic Representatives

The Academic Representatives’ scheme was established by the Institute in 2017, and we currently have 57 Representatives at 55 universities. Representatives are members of academic staff and they support the Institute by highlighting the work of the IMA in the community and beyond, to their students and colleagues, as well as providing feedback on the priorities of academic members. During 2020

three AR Newsletters were sent to help to grow the full membership of students and academics. It is planned that the scheme will develop further over the next year.

Early Career Mathematicians' Group

The Early Career Mathematicians' (ECM) Group aims to provide those starting out in the profession with opportunities to develop their skills and network with peers. An ECM conference took place online over two days in October. The conference was well-attended and offered early-career members a varied programme of engaging talks and time to network with other attendees. These conferences were organised with assistance from the Secretariat.

The ECM Group works closely with the University Liaison project to recruit student members and is also highly active on a range of social networking sites.

Professional Affairs

The Professional Affairs Committee (PAC) met three times during 2020 via remote conference facilities, chaired by Richard Pinch. The key agenda item throughout the year was consideration of and engagement with progress on the Bond Review/ Big Mathematics Initiative (BMI). Discussions about an Academy for the Mathematical Sciences moved quickly and, by the beginning of July, an open meeting (online) about the creation of an Academy had been held. This was well attended and garnered general support for the Academy. The two BMI working groups were dissolved, to be replaced by a single working group to make a definite proposal and to "make the Academy happen". A number of Council members had agreed to join the group so that the interests of the IMA are represented, including PAC members to provide industrial insight.

The Employers' Forum did not take place this year due to the ongoing COVID-19 crisis; however, the committee is aiming to host a virtual event in the first half of 2021.

The committee considered an initiative from The Royal Society regarding Data Science Professionalisation, which has been led by The Royal Statistical Society with other professional bodies, including the IMA, working alongside. The initiative highlights the government's desire for a major

increase in data skills with the establishment of industry-wide professional standards. The Chair of PAC is on the steering group and working group.

Details of our Corporate Affiliate members can be found at:

<https://ima.org.uk/affiliates/corporate-affiliates/>

We are very grateful for the involvement of these organisations with mathematics and with the Institute.

Mathematics Today

In October the Knowledge Exchange special issue celebrated the power of mathematics to make a real impact. We also explored the diverse career paths that our members have followed with a series of eight interviews focused on knowledge exchange that are available on the Mathematics Today section of the IMA website.

The Graham Hoare Prize 2020 was awarded to Luca Panconi for his uplifting article 'A Mathematician's Guide to the Perfect Mug of Tea', which was published in the December 2020 issue.

The Catherine Richards Prize continues to select the best article published each year. The 2020 prize was awarded to Adrian Rice for his article, 'Srinivasa Ramanujan (1887–1920): The Centenary of a Remarkable Mathematician', from the April 2020 issue.

IMA Website and Social Media

In March, Council agreed that a small working group (the Social Media Task Group) should be established, to support the IMA's Marketing Officer with guidance on making mathematical social media posts; and discuss what content the IMA should be releasing during the pandemic, and how we could connect with our membership during this time. Further information on the work of the group is contained under "Membership Development".

The IMA's presence on social media has increased over the year. We have gained over 3,300 followers on Twitter, bringing our total to 17,100. Our LinkedIn company page has over 19,976 likes. Our Facebook page has 978 followers and Facebook group has over 4,443 members.

To foster engagement and raise awareness of the IMA our Communications Committee is encouraging regional branches to record talks. In 2020 17 talks were recorded, published, and embedded on the IMA website. These talks have received 2,146 views.

Google estimates demographic information about its users which it partially shares with us via our Google Analytics account. This demographic information extends to age and gender. Demographic information provided by Google Analytics of the visitors to the IMA website has been informative: in 2020 more than half of the visitors to the IMA site have been under 34 years of age (56.49%); and the gender distribution of total visitors is around 62/38 split of male to female (in comparison to the current total IMA member split of 76/24 male to female).

Sessions to the IMA website are up this year. Each month of 2020 resulted in more site visits than in 2019, with 1-2k sessions more than the corresponding month in 2019. Visits to the IMA website are up eight per cent on 2019.

IMA e16plus Newsletter

The e16plus Newsletter published six full editions in 2020. It is designed to inspire and raise interest in mathematics amongst 16 to 19-year-olds and has 1,449 subscribers. The regular puzzle feature continues to be popular with readers, and the links in the newsletter are designed to encourage engagement with MathsCareers and the IMA website.

Branches

Branches continue to be an important feature of the IMA, providing regional networking opportunities. They are run by committees of local members, with administrative support provided by the Secretariat.

The six active branches have held varied programmes of events for their members during 2020 and plans for the 2021 programme of talks are underway. Branches adapted well to the COVID-19 pandemic, and an interesting selection of talks was provided online, which enabled members who might usually be unable to attend in-person meetings, to engage with their local branch.

In November the West of England branch was

relaunched as the South West and Wales branch, which was received positively by members. Some areas of the UK remain unrepresented by branches; members are encouraged to consider establishing new branches (or reviving dormant ones) in these areas, for which Secretariat assistance continues to be a high priority.

Diversity

The IMA is a signatory of the Science Council Declaration on Diversity, Equality and Inclusion, and Council has appointed champions to lead the IMA in this important agenda. Jenny Macey is thanked for her valuable contributions during her term as Diversity Champion, during which she oversaw the development of the IMA's diversity webpages for the benefit of members. The end of Jenny's term coincided with the end of her term as IMA Councillor in July 2020, when she was succeeded by Snezana Lawrence.

By identifying diversity as a cross-cutting theme in all IMA committee meetings many improvements have been identified and achieved. A benchmarking exercise, led by the Science Council, was started in late November and will continue into 2021.

MEMBERSHIP and CHARTERED REGISTERS

The Membership Committee, chaired by Dr Charles Evans, is delegated, by Council, to assess individual membership applications. The Membership Committee is made up of Chartered Mathematicians who are Fellows of the Institute. They have a background in at least one of the following major areas of employment for mathematicians; academic research and teaching, schools and further education, industry, commerce, finance and IT.

In 2020 we have had the privilege to welcome over 900 new members and assist 113 existing members in transferring to a higher grade. We have also recruited 24 new Chartered Mathematicians and/or Chartered Scientists.

Membership figures at 31 December 2020:

Honorary Fellow	17
Fellow	1,444
Member	1,316
Associate Member	1,831
Affiliate	574
Student	525
Total	5,707

Of the above memberships, 1,527 are registered as Chartered Mathematicians and 229 as Chartered Scientists.

Trustees wish to acknowledge the long service of Dr Charles Evans as he steps down from the position of Honorary Secretary Membership.

The Institute has continued to support UK University Mathematics Departments by offering over 140 IMA Graduate Prize Memberships in 2020.

Chartered Mathematics Teachers

The Chartered Mathematics Teacher Registration Authority consists of representatives from IMA, Association of Teachers of Mathematics, Mathematical Association, and National Association of Numeracy and Mathematics in Colleges. Dr Charles Evans, the chair of the Institute's Membership Committee, also chairs the Chartered Mathematics Teacher Registration Authority. At 31 December 2020, we had 45 registered Chartered Mathematics Teachers.

Membership Development

We continued to deliver and update the Communications and Marketing Plan with input from the Membership Development Task and Finish Group in the first few months of the year; however, the onset of the pandemic led to a switch in focus to ensuring that we maintained close connection with, and provided support to our membership during the crisis.

At its meeting in March shortly after lockdown, Council agreed that a small working group (the Social Media Task Group) should be established, to support the IMA's Marketing Officer with guidance on making mathematical social media posts; and discuss what content the IMA should be releasing during the

pandemic, with a focus on providing existing members with services and information of value to them and in their careers. This led to the launching of the "Virtual Maths Teas" in April, which have proved very successful, enabling members to join informal discussions on a range of topics. The Social Media Task Group has decided to continue them on a monthly basis into the new year.

The Membership eBulletin continues to be issued every two months, alternating with *Mathematics Today*. The last edition of 2020 was issued in early November.

GOVERNANCE

Dr Nira Chamberlain, who became IMA President on 1 January 2020, chaired Council as it considered all the issues in this report.

In 2020, nominations did not exceed vacancies on Council, so there was no need for a ballot. Council was pleased to welcome the following members: Professor Rachel Bearon (re-elected), Professor Edward Rothead (elected, formerly co-opted) and Mr Nathan Turner (re-elected).

Additionally, Dr Francisco de Melo Virissimo and Professor Graham Niblo were co-opted to Council with effect from 1 July 2020.

Throughout the year Council discussed the response to COVID-19, the actions to maintain activities and the initiatives to increase services where appropriate.

All who sit on Council are the Trustees who approved this report. A full list of Council can be seen at the Governance web page.

Executive Board

The Executive Board involves all Honorary Officers of the Institute together with Professor Nigel Steele, as well as selected staff members from the Secretariat. The Executive Board continues to work very well with a role that is clearly complementary to that of Council.

IMA Committees

Details of leading IMA Committees are shown on the Governance webpages.

EXTERNAL RELATIONS

UK Mathematics Organisations

Council for the Mathematical Sciences (CMS)

CMS is composed of IMA, LMS, RSS, EdMS, and ORS, and has been chaired by Professor Sir Ian Diamond since September 2018. Many outside mathematics do not see the need for so many mathematics organisations. Those who only wish to deal with one authoritative organisation often deal with CMS.

A number of activities that relate to education and research were advanced together with our sister societies within CMS.

CMS continues to receive briefings from Royal Society ACME, which is funded by the IMA and others

CMS continued to promote the needs of mathematics to BEIS, DfE, UKRI, the House of Commons Science and Technology Committee, the House of Lords Science and Technology Committee, and the Scottish Funding Council.

The work of the CMS ‘Big Mathematics Initiative’ continued in 2020 and included a virtual community meeting on the proposal of the Bond Review Report, The Era of Mathematics, regarding the establishment of an Academy for the Mathematical Sciences and other agenda items.

London Mathematical Society (LMS)

Throughout 2020 we continued to work with the LMS in many areas including research, Mathematics Initial Teacher Training Scholarships and mathematics promotion.

Together we also award the David Crighton Medal for Services to Mathematics and the Mathematics Community, and the Christopher Zeeman Medal for Mathematics Promotion. In 2020, Matt Parker was awarded the Christopher Zeeman Medal, and both his prize winner’s lecture and that of Professor Ken Brown, who was awarded the 2019 David Crighton Medal, are planned to take place when COVID-19 distancing measures have been relaxed.

As documented in the Research Committee section of this report, a well-attended, fourth scientific meeting of the current IMA-LMS series, titled ‘Topological Methods in Data Science’ took place online, on 1 and 2 October.

The IMA Council continues to affirm that it wishes to fully embrace the concepts and principles of a New Unified Mathematics Society, and hopes that through constructive engagement the LMS and the IMA will be able to achieve this goal jointly at an agreed date in the future.

Other UK Mathematics Organisations

We continue to work closely with the Association of Teachers of Mathematics, the Mathematical Association and NANAMIC in the management of the Chartered Mathematics Teacher Registration Authority.

We also work closely with many sister organisations, Royal Society ACME, NCETM, and the Joint Mathematical Council to promote and support mathematics whenever possible.

The IMA has a representative who is an invited observer to the HoDoMS meetings and activities. The IMA always seeks to develop its higher education strategy in agreement with HoDoMS and the LMS.

UK SET and Others

Science Council

The IMA is a member of Science Council and continues to work cooperatively with Science Council to promote science, including mathematics, to Government.

Throughout 2020 the Chartered Scientist designation has continued to be popular with members with 229 holding the designation.

International

SIAM

IMA members who live in the UK may receive a discounted SIAM membership fee under our reciprocity agreement. (A reciprocal arrangement exists for SIAM members who live in the US). We have joint promotional campaigns and co-operative

activities with SIAM and SIAM UKIE.

EuMS

The IMA is a member of the EuMS. IMA members pay their discounted subscriptions directly to EuMS.

ICIAM

The IMA has continued its membership and support of the International Council for Industrial and Applied Mathematics. Activities of ICIAM have been reduced during 2020 because of the Pandemic.

A list of members who represented the IMA to STEM organisations in 2020 is presented in Appendix B.

SECRETARIAT

The Institute staffing at 1 /1/ 21 was:

Executive Director – David Youdan;

Assistant Director – Alan Peacock;

Conference and Administration Assistant – Cerys Thompson;

Conference Officer – Maya Everson;

Editorial Officer – Rebecca Waters;

Education Manager and Project Manager,
Scholarships – Vanessa Thorogood;

Executive Manager – Alison Penry;

Membership Assistant – Sabeen Hansraj;

Membership Manager – Caroline Irwin;

Services Officer – Gemma Reeves;

Services Officer – Joanna Baldacci;

Services Officer – Eugene Kidwell;

University Liaison Officer (part-time) – Erica Tyson;

Administration Officer (part-time) – Karen Hedderley;

Administration Assistant (part-time) – Debbie Sullivan;

Conferences and Administration Officer (part-time) – Pamela Bye;

Marketing Officer (part-time) – Nikki Barnes;

Membership Officer (part-time) – Natalie Stanton.

FINANCE

The final result was an unrestricted surplus of £157,522, compared with a budget deficit of £17,575. At the end of 2020 the total assets less current liabilities was £1,412,247. In 2019 the equivalent figure was £1,181,104.

Funds were used to support our charitable aims. There is a clear public benefit in our activities to support education, run educational conferences, to support mathematics to Government, and to regulate the professions of Chartered Mathematician and Chartered Mathematics Teacher.

Members receive a membership publication: Mathematics Today, six times a year. The revenue received from members' subscriptions exceeds the cost of providing membership services. The subscription surplus is spent on meeting our charitable objectives.

Notes to the Financial Statements for the year ended 31 December 2020

The accounts given in Appendix A represent an extract from the full formal financial statements, and should be read in conjunction with the 'accompanying notes'.

This Annual Report was approved by the Trustees at the Council meeting of March 2021.

The IMA Trustees

TRUSTEES' RESPONSIBILITIES IN THE PREPARATION OF FINANCIAL STATEMENTS

The Trustees (Council members) are responsible for preparing the Trustees' Annual Report and the Financial Statements in accordance with applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

The Royal Charter of Incorporation and the law applicable to charities in England & Wales requires the Trustees' (Council members) to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the Institute and of the incoming resources and application of resources of the Institute for that period. In preparing these financial statements, the Trustees (Council members) are required to:

- select suitable accounting policies and then apply them consistently;
- observe the methods and principles in the Charities SORP;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable accounting standards have been followed, subject to any material departures disclosed and explained in the financial statements and;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Institute will continue in business.

The Trustees (Council members) are responsible for keeping proper accounting records that disclose with reasonable accuracy at any time the financial position of the Institute and to enable them to ensure that the financial statements comply with the Charities Act 2011, the Charity (Accounts and Reports) Regulations 2008 and the provisions of the Royal Charter of Incorporation. They are also responsible for safeguarding the assets of the Institute and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

ACCOUNTING POLICIES

The financial statements have been prepared in accordance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard in the UK and Republic of Ireland (FRS102) (Charities SORP (FRS102)) as updated by the Charities SORP (FRS 102) update bulletin 1, and the Charities Act 2011 and applicable regulations.

Stock is valued at the lower of cost and net realisable value. Net realisable value is based upon estimated selling price less further costs expected to be incurred to completion and disposal. Provision is made for obsolete and slow moving items.

Fixed assets include properties valued by Chartered Surveyors on an existing use/open market basis. Other fixed assets are stated at historical cost. No fixed asset under £250 is capitalised.

Depreciation is provided on all tangible fixed assets other than freehold land at rates calculated to write each asset down to its estimated residual value evenly over its expected useful life, as follows:-

Freehold buildings	2%
Fixtures, fittings and equipment	15%
Computer equipment	33%

All leases are "operating leases" and the annual rentals are charged to the Statement of Financial Activities on a straight line basis over the lease term.

Turnover represents the net amount charged to members and other customers net of Value Added Tax, for subscriptions and other services.

The Institute operates a defined contribution pension scheme. The amount charged to the Statement of Financial Activities in respect of pension costs and other post-retirement benefits are the contributions in the year.

APPENDIX A

INDEPENDENT AUDITORS' REPORT TO THE TRUSTEES OF THE INSTITUTE OF MATHEMATICS AND ITS APPLICATIONS

We have audited the financial statements of The Institute of Mathematics and its Applications for the year ended 31 December 2020. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice), including FRS 102 – (Charities SORP (FRS 102) as updated by the Charities SORP (FRS 102) update bulletin 1).

This report is made solely to the charity's trustees as a body, in accordance with the Charities Act 2011. Our audit work has been undertaken so that we might state to the charity's trustees those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the charity and the charity's Trustees as a body, for our audit work, for this report, or for the opinions we have formed.

RESPECTIVE RESPONSIBILITIES OF TRUSTEES AND AUDITOR

As explained more fully in the Statement of Trustees' responsibilities set out on page 14 the trustees are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view.

We have been appointed as auditors under section 144 of the Charities Act 2011 and report in accordance with regulations made under section 154 of that Act. Our responsibility is to audit and express an opinion on the financial statements in accordance with applicable law and International Standards on Auditing (UK and Ireland). Those standards require us to comply with the Auditing Practices Board's (APB's) Ethical Standards for Auditors.

SCOPE OF THE AUDIT OF THE FINANCIAL STATEMENTS

A description of the scope of an audit of financial statements is provided on the Financial Reporting Council's website:

<https://www.frc.org.uk/auditors/audit-assurance/standards-and-guidance/current-auditing-standards>.

OPINION ON FINANCIAL STATEMENTS

In our opinion the financial statements:

- give a true and fair view of the state of the charity's affairs as at 31 December 2020 and of its incoming resources and application of resources for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Charities Act 2011.

MATTERS ON WHICH WE ARE REQUIRED TO REPORT BY EXCEPTION

We have nothing to report in respect of the following matters where the Charities Act 2011 requires us to report to you if, in our opinion:

- the information given in the Trustees' Annual Report is not consistent with the financial statements; or
- the charity has not kept sufficient accounting records; or
- the financial statements are not in agreement with the accounting records and returns; or
- we have not received all the information and explanations we require for our audit.

Croucher Needham (Essex) LLP
Statutory Auditor
Market House
10 Market Walk
Saffron Walden
Essex
CB10 1JZ

24 March 2021

Note: Croucher Needham (Essex) LLP is eligible to act as an auditor in terms of section 1212 of the Companies Act 2006.

THE INSTITUTE OF MATHEMATICS AND ITS APPLICATIONS
INCOME AND EXPENDITURE ACCOUNT
FOR THE PERIOD 1st January - 31 December 2020

APPENDIX A

	Unrestricted Funds 2020	Restricted Funds 2020	Total Funds 2020	Total Funds 2019
	£	£	£	£
Incoming resources				
Entrance/Transfer fees	3,513		3,513	4,193
Subscriptions	328,752		328,752	327,210
Publications	620,343		620,343	584,675
Miscellaneous Income	435		435	2,853
Appeal fund and bequests	250		250	410
Interest Received	8,523	1	8,524	8,580
Conference income	(3,226)		(3,226)	145,816
Careers in M & 50th Ann	-		-	1,700
Scholarships & HE STEM	128,053		128,053	137,789
	<u>1,086,642</u>	<u>1</u>	<u>1,086,643</u>	<u>1,213,226</u>
Resources expended				
Salaries, pension & NHI	571,733		571,733	552,698
Other staff expenses	2,859		2,859	11,798
Office overheads	23,640		23,640	31,725
Telephone	4,458		4,458	5,483
General printing, post. & stat.	6,649		6,649	14,937
Office equipment hire & maint.	4,515		4,515	2,389
Council and committee	10,159		10,159	51,910
Branches and groups	1,000		1,000	3,340
Education	2,356		2,356	11,233
Publications (inc. Maths Today)	68,190		68,190	70,152
General expenses	3,247		3,247	14,782
Bank charges	1,831		1,831	8,159
Legal and professional	-		-	2,500
Audit and accounts	50,800		50,800	32,391
Depreciation	8,702		8,702	10,231
Overseas activities	-		-	-
Amortisation of property	3,066		3,066	4,600
Subscription to other bodies	20,577		20,577	17,293
Repairs and renewals	-		-	6,592
Web-site expenses	8,309		8,309	10,501
Presidential Address	2,309		2,309	-
Conference Direct Costs	3,518		3,518	105,840
Grants/Donations	34,302		34,302	65,856
Strategy Review Weekend	-		-	-
Information Technology	-		-	2,387
I. T. Consultancy	1,771		1,771	1,320
Careers in M & 50th Ann	6,634		6,634	15,751
Scholarships & HE STEM	42,192		42,192	59,080
Irrecoverable VAT	13,377		13,377	14,769
Suspense Account	-		-	92
Bad Debt	-		-	-
De Morgan House Rental	13,449		13,449	8,991
De Morgan House furnishing	-		-	-
De Morgan House Other	6,624		6,624	4,428
18 Nelson Street Rental	3,503		3,503	5,521
18 Nelson Street Other	2,102		2,102	3,313
Development - SRW	126		126	7,590
Development - Membership Growth	52		52	3,027
Development - Database & Web	4,285		4,285	3,000
Development - Services	2,784		2,784	-
	<u>929,119</u>	<u>-</u>	<u>929,119</u>	<u>1,163,677</u>
Unrestricted Surplus/(Deficit)	<u>157,524</u>	<u>-</u>	<u>157,525</u>	<u>49,549</u>
Incoming resources				
Publications		80,000	80,000	80,000
	<u>-</u>	<u>80,000</u>	<u>80,000</u>	<u>80,000</u>
Resources expended				
Publications		6,289	6,289	33,939
	<u>-</u>	<u>6,289</u>	<u>6,289</u>	<u>33,939</u>
Restricted Surplus/(Deficit)	<u>-</u>	<u>73,712</u>	<u>73,712</u>	<u>46,061</u>
Overall Surplus/(Deficit)	<u>157,524</u>	<u>73,712</u>	<u>231,236</u>	<u>95,610</u>

APPENDIX A**THE INSTITUTE OF MATHEMATICS AND ITS APPLICATIONS
BALANCE SHEET AS AT 31 December 2020**

	Unrestricted	31-Dec-20 Restricted	Total	31-Dec-19 Total	Total
	£	£	£	£	£
FIXED ASSETS					
Freehold Property	96,624			101,224	
Fixtures and equipment	<u>15,357</u>			<u>13,526</u>	
			111,981		114,750
CURRENT ASSETS					
Stocks	1,485			1,522	
Trade debtors	317,324			3,889	
Prepayments and accrued inc.	31,464			41,925	
Cash at bank and in hand	<u>1,378,603</u>			<u>1,478,791</u>	
	1,728,876	-	1,728,876	1,526,127	
 CREDITORS due within 1 year	 <u>428,610</u>		 428,610	 <u>459,865</u>	
NET CURRENT ASSETS/(LIABILITIES)			<u>1,300,266</u>		<u>1,066,262</u>
			<u>1,412,247</u>		<u>1,181,014</u>
 CAPITAL AND RESERVES					
Income and expenditure account			1,261,149		1,103,624
Restricted income and expenditure account			151,099		77,388
			<u>1,412,247</u>		<u>1,181,014</u>
 NOTES					
Creditors due within 1 year					
Trade creditors	3,642			33,250	
Social security and other taxes	63,693			59,264	
Accruals and deferred income	<u>361,275</u>			<u>367,351</u>	
	<u>459,865</u>			<u>459,865</u>	
 INCOME AND EXPENDITURE ACCOUNT					
Balance as at 1st January 2020	1,099,451	77,388	1,176,840		
Surplus for the 12 months	<u>157,525</u>	<u>73,711</u>	<u>231,237</u>		
Balance as at 31 December 2020	<u>1,256,976</u>	<u>151,099</u>	<u>1,408,077</u>		

APPENDIX B

The IMA continues to work with many organisations in Mathematics, Science and Engineering. The Institute's representatives were:

UK Maths

- **CMS**

Dr N. Chamberlain (SNC Lavalin Atkins)
Professor H. Wilson (University College London)
Mr D. Youdan (Executive Director)

- **Heads of Departments of Mathematical Sciences**

Dr M. Grove (University of Birmingham)

- **Joint Mathematical Council**

Professor P. Glaister (University of Reading)

- **sigma**

Dr M. Grove (University of Birmingham)

International

- **ICIAM**

Professor I.D. Abrahams (Isaac Newton Institute for Mathematical Sciences)
Professor I. Duff (STFC)

UK SET and Others

- **Engineering Professors' Council**

Professor C. Hobbs (University of the West of England)

- **Engineering UK and Engineering Council**

Mr A. Peacock (Assistant Director)

The Institute is a Professional Affiliate of the Engineering Council.

- **EPSRC**

Professor N. Chamberlain (SNC Lavalin Atkins)
Professor H. Wilson (University College London)
Mr D. Youdan (Executive Director)

- **Science Council**

Mr A. Peacock (Assistant Director)
Mr D. Youdan (Executive Director)