

INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOSCIENCES
Annual Report to the International Union of Geological Sciences for 2022

1. Overall objectives

The mission of the International Association for Mathematical Geosciences (IAMG) is to promote, worldwide, the advancement of mathematics, statistics and informatics in the geosciences. The main duty of the IAMG is to further the development of methods and disseminate the results of new research in its fields of interest with outreach within the geoscience, mathematics and geoinformatics communities. This includes sponsoring students and young scientists by means of research and travel grants.

2. Relate goals to overall IUGS scientific objectives

By means of its four scientific journals, the annual IAMG meeting and many other projects including travel by its Distinguished Lecturers, the IAMG aims to further the quantification of three-dimensional geoscientific mapping, numerical time-scale development, geological process modelling, spatial and spatiotemporal modelling and estimation. Its contributions to predictive geology are concerned with natural disasters as well as the delineation of mineral, hydrocarbon and water deposits in the crust of the Earth. Mathematical and geometrical estimates are accompanied by estimates of their uncertainty.

3. Structure and organization

The IAMG is governed by a Council consisting of its Executive Committee (President, Vice-President, Secretary General and Treasurer), the immediate Past President, six Ordinary Council Members, a special IGC Councillor, and seven non-voting members comprising Editors-in-Chief and Co-Editors-in-Chief of its publications. It has seven standing committees for Awards, Curriculum Quality, Lectures, Meetings, Outreach, Publications and Student Affairs, respectively, and various commissions for shorter term concerns.

4. Interaction with other International organizations and projects

Currently IAMG membership represents 63 countries across the globe. The IAMG is affiliated with IUGS, IUGG, EAGE and ISI. It is a Scientific International Partner of the Earth Science Matters Foundation (ESM). IAMG has eight Student Chapters and co-organizes international meetings for Young Earth Scientists (YES). In addition, the IAMG has a booth and co-organizes sessions at the annual AGU Fall Meeting which, in 2021, was in New Orleans, USA. The immediate Past President of the IAMG (Jennifer McKinley) continues to act as Communications Officer for the IUGS Initiative on Forensic Geosciences (IUGS-IFG). Professor McKinley was elected as a Council member of the IUGS Executive Council and is acting as the Interim President of the Governing Council of the Deep Time Digital Earth (DDE) Science Programme. Professor Qiuming Cheng is a member of the IUGS Nominating Committee.

IAMG continues to collaborate with other international associations including the International Union of Geological Sciences (IUGS), International Union of Geodesy and Geophysics (IUGG), American Geophysical Union (AGU), European Geoscience Union (EGU), European Association of Geoscientists and Engineers (EAGE), Earth Science Matters (ESM), Southern African Institute of Mining and Metallurgy (SAIMM), International Association for Young Earth Scientists (YES), Joint Statistical Meetings (JSM), Future Earth Coast (former LIOCZ), Geological Society of London (GSL), the Royal Irish Academy (RIA), China Union of State Key Laboratories in Solid Earth Sciences, the UNESCO International Centre for Global-scale Geochemistry (ICGG) and the Chinese Academy of Geosciences.

The IAMG continues to be involved in the Global Deep-time Digital Earth initiative (DDE), the first IUGS-recognized Big Science Programme officially launched during the 73rd IUGS Executive Council Meeting held in Beijing (February 2019). Currently the IAMG is contributing \$10,000 USD per year to this project. This involvement further strengthens the IAMG relationship with IUGS and other associations.

Due to the COVID pandemic the IAMG had virtually no participation in conferences that were planned for 2020 and 2021, almost all of which were cancelled or postponed. This includes the 36th IGC, which was postponed from 2020 to August 2021. The annual IAMG conferences scheduled for 2021 and 2022 have been moved to 2022 and 2023 respectively. The IAMG will continue its record of providing financial support and sponsorship for relevant meetings and conferences once it is safe to hold these events.

5. Chief products

The IAMG publishes four scientific journals (*Mathematical Geosciences*, *Computers and Geosciences*, *Natural Resources Research*, and *Applied Computing and Geosciences*) in partnership with Elsevier and Springer. In 2021, 189 papers were published in *Computers and Geosciences*, 255 papers in *Natural Resources Research*, 93 papers in *Mathematical Geosciences* and 22 articles in *Applied Computing and Geosciences* for a total of 437 articles. Annually IAMG publishes two newsletters and the proceedings of its annual meeting on CD and/or book-form. It sponsors the publication of books including those in the IAMG Monograph Series in partnership with Oxford University Press. IAMG maintains one primary public website: <http://www.iamg.org> that contains general information including Statutes and By-Laws and Minutes of General Assemblies as well as IAMG Council meetings.

Mathematical Geosciences published 93 articles in eight issues in 2021. Issue 2 was a special issue in honour of André Journel and Issue 3 was a special issue on Petroleum Geostatistics. The 2020-2021 impact factor is 2.576.

Computers and Geosciences published 189 papers in the 12 issues in 2021. The 2021-22 impact factor is 3.372, an increase from 2.991 2020. The acceptance rate is currently 70.6%. There were no special issues in 2021.

Natural Resources Research published 255 papers in six issues in 2021. The two-year 2021-22 Impact Factor is 5.146 and the current real-time Impact Factor is 6.4. There was one special issue in 2021 on ISME-XV: Toward Sustainable Society with Natural Resources – Development of Resource Exploration Technology in the Past Thirty Years and for the Future.

Applied Computing and Geosciences is a relatively new, on-line only, open access journal published by Elsevier and focused on all aspects of computing in the geosciences. As the first issue was published in 2018, it does not yet have any published metrics. To date there have been 63,000 downloads of published papers. Four volumes were published in 2021 including a special issue on remote sensing and GIS applications in Geosciences. A total of 18 papers were published in 2021.

The Golden Anniversary open access book, *Handbook of Mathematical Geosciences: Fifty Years of IAMG*, edited by B.S. Daya Sagar and co-edited by Qiuming Cheng and Frits Agterberg, and published by Springer continues to be a valuable international resource and has achieved 721,000 downloads as of 30th January 2021.

An Encyclopaedia of Mathematical Geosciences, an extensive reference work, is currently in progress. It is edited by Prof. B. S. Daya Sagar, Prof. Qiuming, Prof. Jennifer McKinley, and Prof. Frits Agterberg, and will be published by Springer Nature Publishers.

Student and post-doctoral research are financially supported by research and travel grants including the *Mathematical Geosciences*, *Computers & Geosciences* and *Natural Resources Research* scholarships. In 2021, a payment of \$1200 was made to the student chapter in Freiberg - Dresden. No travel grants were awarded in 2020 or 2021 because of COVID-19.

Financial support is also provided in the form of professional awards and recognition, namely, the Krumbein Medal, Chayes Prize, Griffiths Teaching Award, Vistelius Award, Georges Matheron Lecturer Award and the IAMG Distinguished Lecturer. The recipients of the awards determined in 2020 would normally have received travel funds to attend a conference or meeting in 2021 at which they would make a presentation and be formally presented with their award. As the COVID pandemic has delayed this process, the award will be sent to the recipients and arrangements for their presentations will be made when it is safe to hold appropriate events. The awards determined in 2021 for award in 2022 are:

- 1) The William Christian Krumbein Medal awarded to a senior scientist for career achievement. Awarded to Professor John Carranza, Professor of Economic Geology at the University of the Free State, South Africa.
- 2) The Griffiths Teaching Award, awarded biannually for outstanding teaching, was awarded to Associate Professor Philippe Renard, Leader of the Stochastic Hydrogeology Group, University of Neuchâtel, France.
- 3) The Founders Scholarship awarded annually to an outstanding student or post-graduate scientist. Awarded to Ms Zhe Wang, a PhD candidate in Geography at the University of Idaho.

More detailed information on the IAMG and its activities is available on the IAMG website (<http://www.iamg.org>).

6. Chief accomplishments in 2021 and plans for 2022

Face to face events were significantly reduced due to the pandemic. The 21st annual IAMG Conference, scheduled for 2021 in Nancy, France was postponed and will now be held in Nancy in September 2022. The 22nd annual IAMG conference scheduled for 2022 in Trondheim has been deferred to 2023.

To make up for the lack of face-to-face interaction and communication, a virtual on-line IAMG conference, comprising presentations from recent award recipients, was held on Monday 23rd August, Wednesday 25th August and Friday 27th August, with each session lasting 2.5 hours. Whilst initial interest was relatively high (115 expressions of interest in attending, equivalent to 19% of the IAMG membership), the actual attendance was low. The maximum number attending the first event was 50, for the second event it was 36 and for the third event it was 32. However, the actual numbers may have been more as the totals do not allow for some members leaving the event and others joining. The low participation was almost certainly affected by the difficulty of joining at hours from mid-night to dawn for some members depending on their location around the World. A suggestion for any future such events is to pre-record the presentations and then present them in two segments, one for eastern hemisphere times and one for western hemisphere times, which would be more suitable for all. The speakers could be present for both segments and answer questions at each, with the advantage that the talks would not have to be presented twice.

Development of a new IAMG website has been underway for several months and is expected to be launched early in 2022.

7. Specify how any IUGS Allocation for 2021 was used

No IUGS Allocation was requested for 2021.

8. Budget request with justification for 2022 (only applicable to low income affiliates)

No IUGS Allocation for 2022 is requested.

9. Does your website have a link to IUGS?

YES.

<https://iamg.org/links-and-datasets.html>