

# **INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOSCIENCES**

## **Annual Report to the International Union of Geological Sciences for 2015**

### **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 method development and disseminate 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 three 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 and geological process modelling. 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. The 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, Executive Vice President, Secretary General and Treasurer), two Vice Presidents, Past President, four Ordinary Council Members, special IGC Councilor, three Editors-in-Chief, and Newsletter/Website Editor. 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**

The IAMG is affiliated with IUGS, IUGG and ISI. It is Scientific International Partner of the Earth Science Matters Foundation (ESM). IAMG has eight Student Chapters and co-organizes international meetings for young earth scientists with YES. IAMG maintains a joint booth with ESM and the International Lithosphere Program. Additionally, the IAMG annually has a booth and co-organizes sessions at the AGU Fall Meeting in San Francisco, U.S.A. Booth space has been reserved at the forthcoming 35<sup>th</sup> IGC in Cape Town, South Africa. The IAMG Executive Vice President is Communications Officer for the IUGS Initiative on Forensic Geosciences (IUGS-IFG). Two IAMG members (Ricardo Olea and Nishi Nishiwaki) serve on the IUGS Nominating Committee.

At the IUGS Executive Meeting in Vancouver, Canada, 27-29 January, 2015, IAMG President Qiuming Cheng reported on the main activities of IAMG in 2014 including our annual meeting, student activities and interactions with other associations, and gave highlights of scientific progress. He introduced several large-scale (continental to global) projects in the areas of mineral resources and energy assessments conducted during the

past few years. IAMG contributions to Society include not only theories and methodologies, but also computer techniques and case studies as well as training of Highly Qualified Personnel. Theories invented and techniques developed by IAMG members are commonly applied in mathematical geoscience as well as in other fields of the geosciences. These techniques include but are not limited to basin simulation and application in oil/gas exploration, 2D to 3D GIS techniques and applications, new models for modeling singularity for geodynamics, new models and methods for mineral and other resource appraisals, new geostatistical and statistical analysis including multiple point geostatistics, image regeneration and compositional data analysis. IAMG has been and will be closely collaborating with IUGS and other organizations to promote and to support the new initiative of resourcing future generations.

## **5. Chief products**

The IAMG publishes three scientific journals (*Mathematical Geosciences*, *Computers & Geosciences* and *Natural Resources Research*) in partnership with Elsevier and Springer. In 2015, about 270 scientific articles were published in these three journals. 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. IAMG maintains two websites: <http://www.iamg.org> is publicly available and contains general information including Statutes & By-Laws and Minutes of General Assemblies as well as IAMG Council meetings; the other website is for members only. Student and postdoctoral research is financially supported by research and travel grants including the Mathematical Geosciences, Computers & Geosciences and Natural Resources Research scholarships first granted to nine recipients in 2013. Seven such journal-named research scholarships totalling \$ 37,500 US were awarded in 2015. More detailed information on the IAMG and its chief products is available in the updated IAMG brochure that is available on the IAMG website (<http://www.iamg.org>).

## **6. Chief accomplishments in 2015 and plans for 2016**

In addition to scientific papers, the three IAMG journals (53 articles in *Mathematical Geosciences*; 192 articles in *Computers & Geosciences*; and 27 articles in *Natural Resources Research*) published various short notes, book reviews and other information such as laudations for IAMG Award winners.

A successful 17<sup>th</sup> annual meeting (IAMG2015) with about 300 participants from 34 countries was held in Freiberg, Germany, 5-13 September, 2015. It included a celebration of the 250<sup>th</sup> anniversary of co-organizer Technical University Bergakademie Freiberg (TUBAF), the oldest university of mining science and technology in the world. Exhibitions of 3D software and information technology were organized on Day of Geological Surveys.

A well-attended session on “Multifractal modeling and local singularity analysis in mineral exploration and environments” was held at EGU2015 in Vienna, April 14-18, 2015; IAMG also co-sponsored CoDA-2015, the 6<sup>th</sup> international workshop on compositional data analysis held in Girona, Spain, 1-5 June, 2015; the international

workshop on "Marginal Seas and their coastal areas – transit and buffer zones in continent – ocean interaction" hosted by the Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences, in Yantai, China, 18-19 September, 2015; and the Danie Krige Geostatistical Conference "Geostatistical geovalue — rewards and returns for spatial modelling" hosted by SAIMM in Johannesburg, South Africa, 17-19 August, 2015.

The IAMG will actively participate in the 35<sup>th</sup> IGC in Cape Town, South Africa, 27 August – 4 September, 2016, particularly with symposia under the Theme "Mineral Resources, Evaluation and Mathematical Geosciences". Christien Thiart, University of Cape Town is the IAMG's IGC Councilor. The IAMG will co-sponsor (1) Session NP3.4 on "Multifractal modeling and local singularity analysis in mineral exploration and environmental assessment" at EGU2016 in Vienna, 17-22 April, 2016; (2) the 10<sup>th</sup> International Geostatistical Congress to be held in Valencia, Spain, 5-9 September, 2016; and (3) a compositional data analysis session at the 2016 International Conference of the Royal Statistical Society to be held in Manchester, U.K., 5-6 September, 2016.

**7. Specify how any IUGS Allocation for 2015 was used**

No IUGS Allocation for 2014 was requested.

**8. Budget request with justification for 2016 (only applicable to low income affiliates)**

No IUGS Allocation for 2015 is requested.

**9. Does your website have a link to IUGS?**

YES.