No. 102 June 2021

IAMG Newsletter

Official Newsletter of the International Association for Mathematical Geosciences

Contents

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From the Editor

With the Covid-19 pandemic far from over, most scientific meetings have been postponed or converted to a digital format. While there are certainly benefits to online meetings (I definitely don't miss multiple flights each way and jetlag) they tend to lose the personal interactions. It is difficult for an online conference to replicate the conversations in the hallways between sessions or during a meal that can bring a community together and build new connections and ideas. If you have any ideas or examples of how the IAMG could work to bring the community together, please feel free to email any suggestions to me. For now, I'm looking forward to seeing everyone again at IAMG2022 in Nancy, France.

Congratulations to the winners of the 2021 IAMG awards!

Nominations are currently open for the 2022 Founders Scholarship; the John Cedric Griffiths Teaching Award; and the William Christian Krumbein Medal. Please consider nominating a colleague or student for an award. Details are on page 3.

Katie Silversides

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Announcement of the 2021 IAMG Awards

Prof. Grethe Hystad from Purdue University Northwest, USA is the recipient of the 2021 Felix Chayes Prize. Dr. Vanessa A. Godoy from Universitat Politècnica de València, Spain and Dr. Francky Fouedjio from AngloGold Ashanti, Australia are recipients of the 2021 Andrei Borisovich Vistelius Award. Mr. Shoubin Zhou from China University of Geosciences, Beijing is the recipient of the 2021 Founders Scholarship. Congratulations to all the awardees! The Awards Committee coordinates the publication of award laudations on IAMG journals. Dr. Hystad's laudation was recently published at: https://doi.org/10.1016/j.cageo.2021.104743. The other laudations are in press.

Xiaogang (Marshall) Ma

IAMG is on LinkedIn, Twitter and Facebook!

Join the conversation using @IAMG_Math_Geo for news, journal and conference updates

Dr. Grethe Hystad

Dr. Vanessa Godoy

Dr. Francky Fouedjio

Mr. Shubing Zhou

International Association for Mathematical Geosciences

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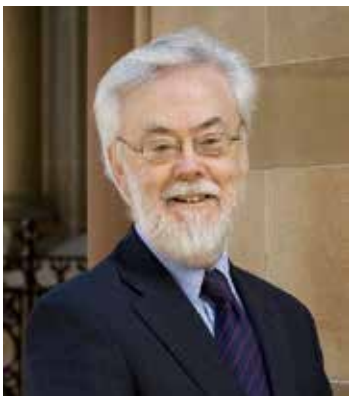
PRESIDENT'S FORUM

Dear IAMG Members,



I am pleased to inform members that the IAMG has signed an Agreement of Association with the European Association of Geoscientists and Engineers (EAGE). The benefits of this Agreement for the IAMG are, *inter alia*, a subscription to the EAGE on-line *First Break* magazine and the *EAGE Newsletter*; on request, a reduced fee subscription to the EAGE scientific journals (*Geophysical Prospecting, Near Surface Geophysics, Petroleum Geoscience* and *Basin Research*); subject to the approval of the editor, inclusion of items or announcements in *First Break* or the *EAGE Newsletter*; and one lecture per year from the EAGE Distinguished Lecturer Programme via a live-stream webinar. In return, EAGE will be able to announce its events in the IAMG newsletters and on the IAMG website; EAGE will receive a subscription to IAMG Newsletters; and, on request, an EAGE member will receive a reduced fee subscription to the IAMG scientific journals (*Mathematical Geosciences, Natural Resources Research, Computers and Geosciences,* and *Applied Computing and Geosciences*); and receive a copy of the IAMG annual report. I know that many of you are active in EAGE I thank Eric Grunsky for his work in securing this Agreement on behalf the IAMG.

We are currently exploring ways to upgrade the IAMG website. This will include a comprehensive overhaul and re-design including an outreach section to engage relevant communities and promote the mathematical geosciences.

The *Encyclopedia of Mathematical Geosciences*, to be published by Springer, is well underway with an expected publication date of July/August 2022. This initiative is led by Behara Seshadri Daya Sagar, Qiuming Cheng, Jennifer McKinley and Frits Agterberg.

Council has agreed to provide funding to support the Deep-time Digital Earth (DDE) Eurasian Marginal Seas project. This is part of the ongoing support for IAMG/DDE linked, or sponsored, projects. Information on this project can be found on the website for the December 2020 virtual conference: https://baltic.earth/EMS2/.

Professor Pengda Zhao, one of the pioneers of mathematical geology and mineral exploration in China, will celebrate his 90th birthday in May. Professor Zhao was awarded the William Christian Krumbein Medal in 1990 and he was elected to honorary life membership of the IAMG in 2011. I am sure that I speak for all of you in extending our best wishes to Professor Zhao for a happy birthday and we look forward to his continuing involvement in the mathematical geosciences.

The review of committee chairs and memberships has largely been completed and the updated membership will be posted on the website within the next few weeks.

IAMG has signed a Memorandum of Understanding with the Association for Compositional Data (CoDa Association). The purpose of the Memorandum is to document the intent and basis for an initial, non-binding collaboration to allow both parties to assess whether to enter into a formal binding agreement.

Yours sincerely,

Professor Peter Dowd, FREng, FTSE

President, International Association for Mathematical Geosciences

Member News

Nominations for three IAMG awards are due on October 31, 2021

The Association invites all members to submit nominations for the Founders Scholarship, the John Cedric Griffiths Teaching Award and the William Christian Krumbein Medal. Please note the Deadline: October 31, 2021.

For details about prerequisites for nominations please see the IAMG web site http://www.iamg.org/ and click on Awards&Honors. There is also a list of past recipients and their laudations on the web site. Please have a look at it before sending your nominations! The (informal) documents which should accompany a proposal are:

• A short statement summarizing the relevant qualifications of the nominee

• A curriculum vitae of the nominee

The Founders Scholarship is a new IAMG award. The IAMG Bylaws state that, "The Founders Scholarship shall be presented annually to an outstanding student or post-graduate scientist." However, to avoid overlap with the Vistelius award, preference will be given to an outstanding undergraduate, Masters, or Ph.D. student. A motion will be put before the membership in a General Referendum in the near future to make this change official in the Bylaws.

Nobody gets an award without a nomination, so please support your colleague when you believe he/she deserves an award by submitting a nomination. Nominations can be submitted by a single person or by a group. The laudations written over the last few years and published in Mathematical Geosciences are a good source of inspiration on how to write a nomination.

Nominations can be submitted via e-mail <max@uidaho.edu> or sent to:

Xiaogang (Marshall) Ma - Chair, IAMG Awards Committee
Department of Computer Science, University of Idaho
875 Perimeter Drive MS 1010, Moscow, ID 83844-1010, USA

Nominations for other Awards may also be submitted at any time.

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Memorandum with CoDa Association

The Association for Compositional Data (CoDa Association) and the IAMG signed a memorandum of understanding last January. The document is intended to reinforce collaboration between the two organizations that goes back to the founding of the CoDa Association.

Last February, the CoDa Association had internal elections for selecting the members to serve in the 2021−25 Council. The elected officers to be installed on 7 June 2021 are:

Antonella Buccianti (University of Florence, Italy), president

Javier Palarea-Albaladejo (Biometrics and Statistics Scotland, Edinburgh, UK), vice president

Germà Coenders (University of Girona, Spain), secretary general

Josep A. Martín-Fernández (University of Girona, Spain), treasurer

Berta Ferrer (University of Lleida, Spain), councilor

Gianna Monti (University of Milan, Italy), councilor

Because of the pandemic, the CoDa Association has decided to postpone the 2021 workshop to June 2022, and instead the Toulouse School of Economics is organizing an online only event in 2021. It will consist in five invited talks and will take place on Thursday June 17, 2021, 14h-17h (UTC+1). Registration is free but compulsory at https://www.tse-fr.eu/fr/conferences/2021-online-coda-day!

Research Center for Solid Earth Big Data founded at the China University of Geosciences

The first solid Earth big data symposium was held at the China University of Geosciences, Wuhan, China, on March 28, 2021. More than 200 colleagues (including online audiences) attended this symposium. The main subject of this symposium is on how to efficiently explore and integrate solid earth big data for innovating the research paradigm of geosciences.

In this symposium, the Research Center for Solid Earth Big Data (RCSEBD) at the China University of Geosciences was founded. The RCSEBD will build a storage center, computing center and visualization center for studying solid earth big data. The focus of the RCSEBD is to use diverse solid earth big data and novel artificial intelligence algorithms to study the spatiotemporal evolution of the earth, deep geological processes, and the impacts of geological resources and environments, with the aim of well understanding the evolution of the earth and planets, and predicting and assessing geological resources and environments. Prof. Qiuming Cheng is the chairman of the academic committee of the RCSEBD, and Prof. Renguang Zuo is the founding director of the RCSEBD.

Some of the attendees of the first solid earth big data symposium (from https://voice.cug.edu.cn/info/1032/17794.htm)

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Remembering Dr. Peter Fox - A titan in the Earth science informatics community

https://en.wikipedia.org/wiki/Peter_Fox_(professor)

Dr. Peter Fox, a titan of the Earth and space science informatics community, passed away on March 27. The news was shared by Rensselaer Polytechnic Institute (RPI), where he was Tetherless World Constellation Chair, Director of the Information Technology and Web Science program, and Professor of Earth and Environmental Sciences, Computer Science, and Cognitive Science.

Dr. Fox made significant contributions to the Earth and space science informatics community. From 1991 to 2008, Fox was at the High Altitude Observatory (HAO) of NCAR in Boulder, Colorado, as Scientist until 1995, and Chief Computational Scientist from 1995 to 2008. As a Tetherless World Constellation senior chair and professor of Earth and Environmental Science, Computer Science and Cognitive Science and director of the Information Technology and Web Science Program at RPI, Peter made significant contributions to both domain science and informatics as he and his group supported distributed scientific repositories and addressed “the full life-cycle of data and information within specific science and engineering disciplines as well as among disciplines (Source:Wikipedia).”

In the United States, Dr. Fox partnered with NASA, NOAA, USGS, and the US Global Change Research Program. Dr. Rahul Ramachandran, Project Manager and Senior Scientist, NASA said "Peter's contributions to the NASA Earth Science Data community have been immense. His research in Informatics and Data Science has had a lasting impact in defining the direction of science data and information system evolution. But more importantly, he was genuinely selfless in sharing his knowledge and touched so many lives. He taught so many of us to be good researchers, gracious colleagues, supportive mentors, and above all, to be generous human beings."

Full text at
https://connect.agu.org/essi/about/history/memoriam

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Professor Noel Cressie named a Fellow of the Royal Society of New South Wales

Distinguished Professor Noel Cressie has been recently named a Fellow of the Royal Society of New South Wales (FRSN). Her Excellency, The Honourable Margaret Beazley AC QC, Governor of New South Wales and a Patron of The Royal Society of New South Wales, announced Prof. Cressie’s election on 9 December 2020. The Royal Society of New South Wales recognises the substantial contribution made by NSW leaders in their fields in science, art, literature, and philosophy.

Noel Cressie is a statistical scientist who develops world-leading statistical methodology for analysing spatial and spatio-temporal data with applications to the geosciences. He is Director of UOW’s Centre for Environmental Informatics in the National Institute for Applied Statistics Research Australia (NIASRA) at the University of Wollongong, Australia.

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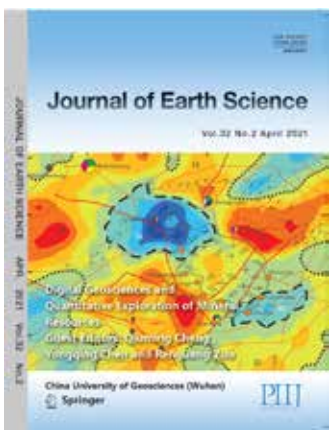
A special issue of Journal of Earth Science in honor of Prof. Pengda Zhao’s 90th birthday

Prof. Pengda Zhao, an Academician of China Academy of Science and a professor of China University of Geosciences, is a pioneer in the fields of mathematical geology and mineral exploration in China. Professor Zhao was the fifteenth recipient of the William Christian Krumbein Medal by the International Association for Mathematical Geosciences (IAMG) in 1990. He was further elected as the fifth Honorary Life Member of IAMG in 2011.

On the special occasion of celebration of Prof. Pengda Zhao’s 90th birthday, a special issue entitled “Digital geosciences and quantitative exploration of mineral resources”, was published in Journal of Earth Science and co-edited by Qiuming Cheng, Yongqing Chen, and Renguang Zuo (https://www.springer.com/journal/12583) This special issue contains 17 research papers and 1 report. The topics of these papers range from fundamental mathematical geoscientific studies to mineral exploration such as geochemical anomaly recognition, deeply seated prospecting information mining, and multiple prospecting information integration. The authors of the papers in the special issue would express their sincere appreciation and respect to Prof. Zhao for his long-term dedication to scientific study of mineral exploration and outstanding contribution to the field of quantitative geosciences.

Prof. Pengda Zhao



A cover of the special issue of Journal of Earth Science

Upcoming Meetings

Due to Covid-19 many meetings are being postponed! Please check the relevant websites for updated details.

2021

Geostats2020, 12-16 Jul, Toronto, Canada. http://www.geostats2020.com/home.html

36th International Geological Congress (IGC), 16-21 Aug, Delhi, India. http://www.36igc.org/

ISEH 2020, ICEPH 2020 & G16 2020, Aug, Galway, Ireland. http://www.nuigalway.ie/iseh2020/

APCOM 2021, Sept, Johannesburg, South Africa. https://apcom.info/apcom-2021/

2022

21th Annual Conference of the IAMG, 28 Aug - 3 Sep, Nancy, France. http://www.iamgconferences.org/iamg2022

IAMG2022

Dear Colleagues,

The 21th Annual Conference of the IAMG will be a major event in Mathematical Geosciences, and expected to gather international participants from academia, industry and government organizations. It will be hosted at the Centre Prouvé in the beautiful city of Nancy, France.

Nancy is home of one of the largest geoscience communities in France, and the birthplace of the French Mathematician Henri Poincaré, who wrote in 1901: “Mathematicians do not study the objects but the relationships between objects” in La Science et l’hypothèse. There is no doubt that this statement accurately applies to mathematical geoscientists!

IAMG 2022 sessions will cover all aspects of mathematical geosciences and their applications, including classical and emerging subfields of statistics and geostatistics, artificial intelligence, machine learning, geoinformatics, geomodeling and computational methods.

We are looking forward to a productive and enjoyable IAMG 2022 Conference, and we look forward to welcoming you to Nancy in Summer 2022!

The Organizing Committee


Gløshaugen Campus Trondheim Photo Lars Strømmen NTNU

IAMG2023 in Trondheim, Norway

www.iamgconferences.org/iamg2023

NTNU
Norwegian University of Science and Technology

We look forward to seeing you in Q3 2023!

Distinguished Lecturer Updates

Distinguished Lecture 2021

Jaime Gómez-Hernández, the 2021 Distinguished Lecturer still believes that he could travel to deliver his lecture in person during the last quarter of the year. Interested institutions should get in touch with him to organize his visit. The following three talks are offered, all of them oriented to the larger public.

My name is Filter, Kalman Filter

In this talk, Jaime will introduce the Kalman filter and how it has evolved into the ensemble Kalman filter and its variants. From the original work by Kalman to the Extended Kalman filter to the Ensemble Kalman filter (EnKF) and beyond. He will comment on the similarities with cokriging, and will demonstrate the application of the EnKF for parameter identification in hydrology.

Inverse modeling in hydrogeology

A review of methods and practices for inverse modeling in hydrogeology. Jaime will start introducing the problem and will present a journey of how inverse modeling has evolved in hydrogeology in the last forty years.

Who is to blame?

Contaminant source identification whether in an aquifer, a river or a water distribution system is a hard problem to solve. On many occasions, contamination is detected in the system but when, where and how much contaminant was introduced is unknown. Forensic methods have been used for the identification of the source and its parameters. Jaime will make a historical review contaminant source identification in hydrogeology and present some cases from hydrology, hydrogeology and water distribution systems.

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IAMG Distinguished Lecturer 2020 Report

Peter M. Atkinson, Lancaster University

The following talks were advertised as part of the DL series.

*12-16.07.2021 Distinguished Lecture (IAMG), Geostats 2020 Conference, Toronto, Canada (postponed)
20/20 Hindsight Talk (title to be confirmed)

*16-18.06.2021 Distinguished Lecture (IAMG), GeoENV 2020, Parma, Italy
Implications of the PSF for Downscaling and Image Fusion in Remote Sensing

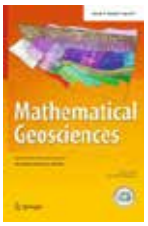
*26.05.2021 Distinguished Lecture (IAMG), Indian Statistical Institute, India
The Importance of Representations for Spatial Data Science

*15.04.2021 Distinguished Lecture (IAMG), GISRUK 2021 conference, Cardiff University, Wales, UK
A Novel Paradigm for Simultaneous Land Use and Land Cover Classification

*26.11.2020 Distinguished Lecture (IAMG), International Geospatial Week, National Geographic Institute of Colombia, Columbia
Trends in Geospatial Data Science and Remote Sensing

*12.11.2020 Distinguished Lecture (IAMG), IAMG Student Chapter, University of Freiberg, Germany
Implications of the PSF for Downscaling and Image Fusion in Remote Sensing

IAMG Journal Reports



Editorial Excellence in Natural Resources Research

Natural Resources Research has been rated as a top Springer Nature journal for editorial excellence, placing in the top percentile of journals based on data collected from the Journal Author Satisfaction Survey.

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IAMG Journal Contents

Mathematical Geosciences

MG - Volume 53, Issue 1, January 2021

Discriminant Analysis for Compositional Data Incorporating Cell-Wise Uncertainties — S. Pospiech, R. Tolosana-Delgado, K.G. van den Boogaart

Improving Automated Geological Logging of Drill Holes by Incorporating Multiscale Spatial Methods — E.J. Hill, M.A. Pearce, J.M. Stromberg

A Critical Comparison of Three Methods for Time-Lapse Time-Shift Calculation — L. Ji, C. MacBeth, M.-D. Mangriotis

Mathematical Optimization Problems for Particle Finite Element Analysis Applied to 2D Landslide Modeling — L. Wang, X. Zhang, F. Zaniboni, E. Oñate, S. Tinti

Sample Truncation Strategies for Outlier Removal in Geochemical Data: The MCD Robust Distance Approach Versus t-SNE Ensemble Clustering — R. Leung, M. Balamurali, A. Melkumyan

Three-Dimensional Prospectivity Modeling of Honghai Volcanogenic Massive Sulfi de Cu–Zn Deposit, Eastern Tianshan, Northwestern China Using Weights of Evidence and Fuzzy Logic — J. Tao, F. Yuan, N. Zhang, J. Chang

Entropy and Information Content of Geostatistical Models — T.M. Hansen

MG - Volume 53, Issue 2, February 2021

Special Issue in Honor of André G. Journel

Guest Editors: J.J. Gómez-Hernández, R.M. Srivastava

Introduction to the Special Issue in Honor of André G. Journel — J.J. Gómez-Hernández, R.M. Srivastava

One Step at a Time: The Origins of Sequential Simulation and Beyond — J.J. Gómez-Hernández, R.M. Srivastava

Geostatistical Seismic Inversion: One Nugget from the Tróia Conference — A. Soares

Implementation of Geostatistical Algorithms — C.V. Deutsch

From Natural Resources Evaluation to Spatial Epidemiology: 25 Years in the Making — P. Goovaerts

Multiple-Point Statistics Simulation Models: Pretty Pictures or Decision-Making Tools? — S. Strebelle

Conditional Simulation for Mineral Resource Classification and Mining Dilution Assessment from the Early 1990s to Now — G. Verly, H.M. Parker

MG - Volume 53, Issue 3, April 2021

Special Issue: Petroleum Geostatistics

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Journal Statistics

Mathematical Geosciences:

2019 ISI Impact factor: 2.471

5-Year Impact Factor: 2.183

Ave. review time: 53 days (submission to first decision 2020)

261 days (submission to final decision 2020)

Computers & Geosciences:

2019 ISI Impact Factor: 2.991

5-Year Impact Factor: 3.339

Ave. review time: 7.7 weeks (submission to first decision 2020)

12.2 weeks (submission to final decision 2020)

Natural Resources Research:

2019 ISI Impact Factor: 3.708

Ave. review time: 32 days (submission to first decision 2020)

128 days (submission to final decision 2020)

MG continued from p. 6

Guest Editors: Leonardo Azevedo, Jo Eidsvik

A Special Issue on Petroleum Geostatistics — L. Azevedo, J. Eidsvik

Boolean Spectral Analysis in Categorical Reservoir Modeling — N. Ismagilov, V. Borovitskiy, M. Lifshits, M. Platonova

Geophysics-Based Fluid-Facies Predictions Using Ensemble Updating of Binary State Vectors — M.K. Loe, D. Grana, H. Tjelmeland

Adaptive Ensemble-Based Optimisation for Petrophysical Inversion — R. Moyen, T. Gentilhomme

p-Kernel Stein Variational Gradient Descent for Data Assimilation and History Matching — A.S. Stordal, R.J. Moraes, P.N. Raanes, G. Evensen

Comparison of Recursive Neural Network and Markov Chain Models in Facies Inversion — E. Talarico, W. Leão, D. Grana

Connectivity in Pixel-Based Facies Models — D.A. Walsh, T. Manzocchi

Prestack Bayesian Linearized Inversion with Decorrelated Prior Information — B. Yu, H. Zhou, L. Wang, W. Liu

Acknowledgement for Reviewers for 2020

MG - Volume 53, Issue 4, May 2021

Modeling and Simulating Depositional Sequences Using Latent Gaussian Random Fields — D. Allard, P. Fabbri, C. Gaetan

Spatiotemporal Precipitation Estimation from Rain Gauges and Meteorological Radar Using Geostatistics — E. Cassiraga, J.J. Gómez-Hernández, M. Berenguer, D. Sempere-Torres, J. Rodrigo-Ilarri

MIN3P-HPC: A High-Performance Unstructured Grid Code for Subsurface Flow and Reactive Transport Simulation — D. Su, K.U. Mayer, K.T.B. MacQuarrie

Temperature Dependence of the Permeability of Sandstone Under Loading andUnloading Conditions of Confining Pressure — Y.-H. Huang, S.-Q. Yang, S.-Y. Teng

Is Cell-to-Cell Scale Variability Necessary in Reservoir Models? — H. Osman, G.H. Graham, A. Moncorge, C. Jacquemyn, M.D. Jackson

A New Type of Conditioning of Stationary Fields and Its Application to the Spectral Simulation Approach in Geostatistics — N.S. Ismagilov, M.A. Lifshits, A.A. Yakovlev

Clarifications and New Insights on Conditional Bias — G. Bourgault

Weighted Symmetric Pivot Coordinates for Compositional Data with Geochemical Applications — K. Hron, M. Engle, P. Filzmoser, E. Fišerová

Risk Reduction in Line Grid Search for Elliptical Targets — D.A. Singer

An Analytical Microcrack-Based Rock Model with Implications for Earthquake Mechanisms Induced by Stress Changes — X. Li, C. Qi, L. Ban, Z. Shao

A Comparison of Extremal Optimization, Differential Evolution and Particle Swarm Optimization Methods for Well Placement Design in Groundwater Management — F. Redoloza, L. Li

Uncertainty Integration in Dynamic Mining Reserves — J. Neves, C. Araújo, A. Soares

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