No. 99 December 2019

IAMG Newsletter

Official Newsletter of the International Association for Mathematical Geosciences

Contents

2020 Founders Scholarship

Congratulations to Behnam Sadeghi (Australia), who is the first recipient of the Founders Scholorship of the International Association for Mathematical Geosciences!

The Founders Scholarship is presented annually to an outstanding student or post-graduate scientist. This scholarship is given in honor or memory of individuals who participated in the founding of IAMG in 1968 at the 23rd International Geologic Congress in Prague and who subsequently gave significant service to the Association.

2020 William Christian Krumbein Medal

Congratulations to Professor Jaime Gómez-Hernández (Universitat Politècnica de València), who is the recipient of the 2020 William Christian Krumbein Medal of the International Association for Mathematical Geosciences.

The William Christian Krumbein Medal is the highest award given by the Association. The award is given for recognition of outstanding career achievement, which includes distinction in application of mathematics or informatics in the earth sciences, service to the IAMG, and support to professions involved in the earth sciences.

As is our custom, Professor Jaime Gómez-Hernández will be a keynote speaker at the 36th International Geological Congress (IGC), 2-8 March, Dehli, India.

The IAMG gives multiple awards each year, from the student awards to the William Christian Krumbein Medal, the highest award that the association gives. In 2020 the first founders award will be presented to Behnam Sadeghi at the 36th IGC in New Dehli. This new award will be presented annually to an outstanding student or post-graduate scientist. This scholarship was announced at the 50th anniversary of the IAMG, and is given in honor or memory of individuals who participated in the founding of IAMG in 1968.

You may have noticed that this is the 99th edition of the newsletter. Although the 50th anniversary of the IAMG was last year, the regular biannual publication of the newsletter did not start until 1989. Before that the newsletter was published between zero and four times a year, depending on the availablility of content and the choice of the editor. The newsletter has had five editors: #1--4 (1970--1972) G. Lea, #1--38 (1973--1989) J. C. Davis, #39--49 (1989--1994) J.R. Carr, #50--94 (1994-2017) H.S. Poelchau, and #95 to present (2017 to present) K. Silversides. Do you have a favourite article, picture or cartoon from the newsletter? Please let me know so that it can be included in the 100th edition as we look back on the newletter's history.

Katie Silversides

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IAMG is on LinkedIn, Twitter and Facebook!

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

2020 Griffiths Teaching Award

Professor Gang Liu (China University of Geosciences (Wuhan)) has been announced as the recipient of the 2020 Griffiths Teaching Award of the International Association for Mathematical Geosciences. Congratulations for this well-deserved recognition!

The John Cedric Griffiths Teaching Award is presented to honor outstanding teaching. The award is given for recognition of outstanding teaching that involves application of mathematics or informatics to the Earth's nonrenewable natural resources or to sedimentary geology.

As is our custom, Professor Gang Liu will be a keynote speaker at the 36th International Geological Congress (IGC), 2-8 March, Dehli, India.

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PRESIDENT'S FORUM

Four years into the IAMG President role and I am struck by how much progress has been made across so many fronts. The IAMG continues to develop as a diverse and global network and has been instrumental in advancing so many areas of mathematical geoscience. To date, this includes developments in classical geostatistics; machine learning; compositional data analysis; multifractal modelling and multiple point statistics. Other areas addressed include geoinformatics, 2D and 3D modelling, inverse modelling, geometry and topology to name a few.

Many of us have witnessed how effective the IAMG conferences are at facilitating cross discipline networking and have observed first-hand how new and innovative learning is brokered through healthy challenge and active engagement between participants in sessions. All of which leads to a positive transfer of ideas and increased collaboration which in turn helps drive innovation and the nurturing of new directions in mathematical geoscience.

Supporting and encouraging our early career researchers has been a personal interest for me and is vital to securing the relevance of mathematical geoscience in the longer term. The new Founder's award established to mark our 50th Celebration aims to do just that – to provide greater recognition and opportunities to grow and excel for those setting out in the field of mathematical geoscience. Our annual conferences have been excellent opportunities to showcase the innovative work of PhD students and early career scientists. Many thanks to the local organisers of IAMG2019 which was held in Penn State University 12-16 August, chaired by Sanjay Srinivasan and all IAMG members who offered short courses and our sponsors Aramco and IUGS who also assisted with the early career workshop on careers in geoscience.

IAMG2019 was also a great example of growing existing and developing new collaborative research partnerships and we are grateful to our conference sponsors Aramco, the US Geological Survey (USGS), Chevron, and Penn State University through the Institute for CyberScience, Institutes of Energy and the Environment (IEE), Energy Institute and the College of Earth and Mineral Sciences and for the inspiring and considered keynotes given by Susan Agar, Aramco Global Research Centre, Lee Kump, Dean of the Penn State College of Earth and Mineral Sciences and IUGS President and past IAMG President, Qiuming Cheng. I would like to congratulate Qiuming on the recent news of his very well deserved honour and recognition on becoming a member of the Chinese Academy of Sciences.

Congratulations to all of our award IAMG2019 keynotes, IAMG Distinguished lecturer, Phillipe Renard, University of Neuchâtel, Felix Chayes prize awardee, Peter Filzmoser, Vienna University of Technology, Matheron Lecturer Vera Pawlowsky-Glahn and Visitelius awards recipients, Alessandra Menafoglio, Politecnico di Milano and Wenlei Wang, Chinese Academy of Geological Sciences. Look out for breaking news of our 2020 IAMG award recipients in this newsletter.

As always our unseen heroes of the IAMG community Regina van den Boogaart, in the IAMG Office, Katie Silversides, our Newsletter and website editor and David Collins as Treasurer all deserve our sincere thanks and deep appreciation for all their hard work.

It was a personal regret for me that many IAMG colleagues from across the globe were unable to join us in Penn State this year. Your contributions and insights were missed and would have added further richness and depth to our debate.

Looking ahead, the Council is working to establish more recognized affiliations and agreements with a number of our established partners including the IUGS, IUGG, EAGE, CoDA and AAG. We aim to interact more actively with our partners through the Outreach committee, chaired by the Secretary General. The IUGS-recognized 'Big Science Program' Deep Time Digital Earth Initiative (DDE) - in which the IAMG is a founding member - is another exciting example of how we can expand the influence and maximize the impact of the IAMG.

The IAMG is actively involved in the 36th IGC (2020), 2-8 March 2020 in Delhi, India 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing). Please see the web site https://igc2020.org/en/ for the latest details and visit us at the IAMG booth at the 36th IGC.

Our IAMG journals continue to demonstrate excellence in scientific research and provide a useful means for influencing the advancement of research in mathematical geoscience. Mathematical Geosciences (MATG), Computer and Geosciences (CAGEO) and Natural Resources Research (NRR), continue to increase in quality and citations due to the hard work and dedication of all of the EICs and the Associate Editors. I'm very pleased to announce that Jaime Gomez-Hernandez has taken on the role of Chair of the Publications committee. The editorial team for CAGEO is changing as Grégoire Mariéthoz will step down as EIC at the end of the year. Thank you Grégoire for your outstanding contribution to CAGEO over many years. Thank you also to Pauline Collon from University of Lorraine, France for agreeing become the new EIC for C&G.

A new IAMG affiliation with Elsevier through the open access journal Applied Computing and Geoscience will also provide an opportunity to extend the opportunity for IAMG members to publish in applied fields in mathematical geoscience. Eric Grunsky, the IAMG Secretary General has been appointed as the Founding Editor-in-Chief. I'm also delighted that the latest publication in the IAMG monograph series Geology Studies in Mathematical Geology is Matheron's Theory of Regionalised Variables, edited by Vera Pawlowsky-Glahn and Jean Serra. We are grateful to the insights of Vera and Jean as they take a deeper look at Matheron's original notes and draw out his thoughts and motivation behind his research.

Thank you once again for your continued commitment to IAMG and for your contribution to promoting the development and application of mathematics, statistics and geoinformatics in geoscience.

Jenny McKinley

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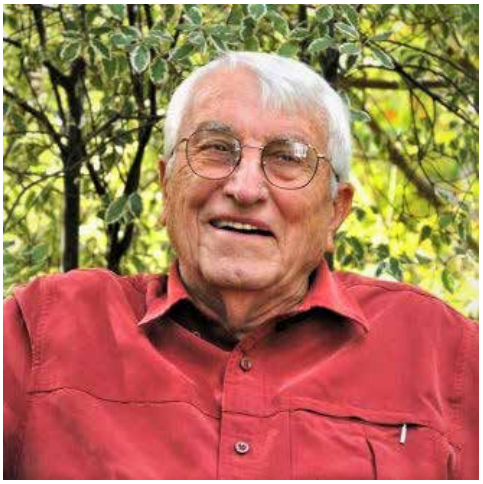
Member News

John Harbaugh (1926-2019)



John Harbaugh was one of the 20 founding members of IAMG who played a prominent role in the early days of geomathematics.
Apart from a short spell with the oil industry in California, he spent his career as a professor, and then emeritus, at Stanford University. His Ph.D. thesis from University of Wisconsin in 1955 was entitled "Geology in the Shasta Lake Country of Northern California". His early interests were in field geology (he later published a Northern California Field Guide), and carbonate sedimentation and stratigraphy. John undertook a series of studies sponsored by the Kansas Geological Survey on the Pennsylvanian marine algal banks in southeastern Kansas. In the early 1960s John was a pioneer in applying computers to a variety of geological problems. He used a version of ALGOL called BALGOL on a Burroughs computer at Stanford.

I spent three years in the 1960s as a PDF with John. He was a stimulating mentor, and my initial year stretched to three, culminating in writing a textbook with him on simulation modelling, published by John Wiley in 1970. Besides benefitting from Stanford's supportive research environment, I greatly enjoyed John's hospitality at his house in Stanford village (he had a wonderful woodworking shop) and going on field excursions with him—his old field area near Lake Shasta became a favourite camping destination for my family.

From the late 1960s, John's research was focused mainly on sedimentary basin modelling and oil exploration risk analysis. He started a research group, largely funded by industry, that developed a widely used sedimentary simulation system named SEDSIM. He also published extensively on probability methods applied to oil exploration.

John began the geomathematics program at Stanford: his undergraduate course on computer applications was a model of clarity and focus. He mentored over 40 master and PhD students and wrote over a dozen textbooks.

John was heavily involved in the early days of IAMG. He attended the founding meeting of IAMG at the ill-fated IGC conference in Prague in 1968. He was an active participant at the computer application meetings organized by Dan Merriam at the Kansas Survey where most of the attendees subsequently became IAMG members. He was an active member of the editorial boards of both the Journal of the International Association for Mathematical Geology (now Mathematical Geosciences) and Computers & Geosciences. He was awarded the 1985 Krumbein Medal and IAMG elected him as an Honorary Member in 2013.

John was also an active member of the American Association of Petroleum Geologists (AAPG). He served as vice president of AAPG and received its A.I. Levorsen Memorial Award in 1971, Distinguished Service Award in 1987 and Grover E. Murray Memorial Educator Award in 2001. In University of Kansas' rock garden, a Pennsylvanian limestone boulder is named the Harbaugh Rock in recognition of his fieldwork in Kansas and for his contributions to mathematical geosciences.

Graeme Bonham-Carter

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Dave Watson (1936- July 28 2019)

Dave passed away in Tweed Heads, New South Wales, Australia in mid 2019. Dave was an innovator in the use of computational topology to study and model many geological processes and was the author of a well-known text "Contouring: A Guide to the Display and Analysis of Spatial Data".

On leaving high school after the second year he spent the next ten travelling the world - the Americas, Europe, Africa, India and Asia. On this journey he spent time as a draftsmen for Delhi Oil in North Africa, where he became acutely aware of the problems associated with the contouring of drill hole data. Returning to Canada he attended night school to complete his high school training and then was accepted in UofT's prestigious MPC program from which he graduated as a BSc in 1973. His M.Sc., completed in 1974, concerned a combination of computing and topology of crystal structures, under the supervision of Prof. F. Gordon Smith. Afterwards he completed his PhD at the U. Sydney, Australia in 1981. Subsequently he worked in both the Mathematics Department of the U. Western Australia and Western Australia's department of the CSIRO (Commonwealth Scientific and Industrial Research Organization).

His fascination with the problems of contouring continued, and many years of research eventually led to the publication of his unique book which was published in 1992. He published more than 80 peer-reviewed papers.

To quote Christopher M. Gold of the Geomatics Research Centre, Quebec, Canada:

"There are a few books in this world that are known universally by a single word. Within the domain of those interested in the subject, David Watson's "Contouring" may become one of these, by virtue of being cited, checked, and quoted by those struggling with the problem of representing supposedly continuous surfaces defined by a few arbitrarily distributed data."

Emeritus Professor Henry Halls
of the University of Toronto,
Department of Earth Sciences
for the department's Alumni News magazine

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Frank Harary Endowment Lecture – 2019

Prof. B. S. Daya Sagar delivered "Frank Harary Endowment Lecture – 2019" on 8th June 2019 at the International Conference on Discrete Mathematics - 2019 (ICDM - 2019) held at the Christ University, Bangalore. More details could be seen at:

https://www.icdm19.in/speakers.

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Springer Encyclopedia of Mathematical Geosciences

"Encyclopedia of Mathematical Geosciences" by B. S. Daya Sagar, Qiuming Cheng, Jennifer McKinley and Frits Agterberg is being published by the Springer International Publishers during the end of 2021. The three Section Editors include Eric Grunsky, John Schuenemeyer, and Xiaogang (Marshall) Ma. Some preliminary details about this planned project can be seen at: https://meteor.springer.com/math_geosciences The chapters in the Encyclopedia of Mathematical Geosciences will be listed and organized in an alphabetical order. We are planning to finalize the list of chapters under Category-A, B and C by last week of December 2019. Typically, under Category A, there will be around 35 Chapters, each of which will be in between 5000 and 9000 words. There will be around 250 Chapters under Category B, each of which will be in between 1000 and 3000 words. Under Category-C, there will be around 50 brief biographies of eminent Mathematical Geoscientists, each of which will be in between 50 and 500 words. We expect that it provides concise explanation on each term that is related to Mathematical Geosciences.

B. S. Daya Sagar, Qiuming Cheng,
Jennifer McKinley and Frits Agterberg

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The International Conference on Geoethics 2019

October 30 to November 4, 2019:
Prague and Příbram (Czech Republic)

The regular ICG was arranged on behalf of the Association of Geoscientists for International Development (AGID) – Working Group for Geoethics headed by the AGID Vice-president for Europe Ing. RNDr. Václav Němec, Ph.D. in a cooperation with the State Enterprise DIAMO – division Příbram, in the same framework and under similar conditions as in 2015 and 2017, i. e. friendly to all colleagues supporting regular meetings associated with the historical origin of the discipline.

Václav Němec

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Student Chapter News

Nancy Student Chapter

Our IAMG Student Chapter in Nancy organized early July a great field trip in Italy. We were 6 PhD students, all IAMG members, + 2 permanent researchers (including Guillaume Caumon) of the RING Team. Wonderful Italian colleagues from Milano, Padova and Parma universities accompanied us.

The main objectives of this trip were to observe geological outcrops (the team's main focus is on their numerical representation), to create an emulation environment with our Italian colleagues for scientific discussions, and to discover our co-workers in a different context. We especially focused on the complex dolomitization of limestones in the Vajont valley and on the calcareous platforms uplifted and undeformed of Latemar.

Corentin Gouache

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New Chair of the Publications Committee

I am very pleased that Jaime Gómez-Hernández has agreed to take on the role of Chair of the Publications committee, This change will come into effect from now onwards. Thank you Jaime for agreeing to take on this important role. Many thanks also to Eric who has been covering this role as well as Secretary General. Quite a task!

Jenny McKinley

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Distinguished Lecturer Reports

Distinguished Lecturer 2021

The IAMG is pleased to announce that the distinguished lecturer for 2021 is Jaime Gómez-Hernández.

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Distinguished Lecturer visits 2020 and 2021

The purpose of the IAMG Distinguished Lecture series is to demonstrate to the broader geological community the power of mathematical geology to address routine geological interpretation and to deliver this knowledge to audiences in selected parts the world. To achieve this, the Distinguished Lecturer prepares a series of lectures on subjects in the mathematical geosciences that are to be presented in places where IAMG Annual Meetings are not normally held.

If you would like Peter Atkinson (in 2020) or Jaime Gómez-Hernández (in 2021) to present a lecture at your institution, please contact support@iamgmembers.org.

Once lectures have been arranged, the details can be found at https://iamg.org/special-lectures/current-distinguished-lecturer.html

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Philippe Renard 2019 Distinguished Lecturer

Being the 2019 IAMG lecturer was a great honor. It gave me a chance to look back at 30 years of my academic life and try to exchange some key ideas accumulated during these years with students, researchers and professors of various cultures and background. I had the chance and privilege to travel in Asia, Europe and America and talk about geostatistics, groundwater and karst modeling, or data integration through Bayesian inversion. I was thrilled by the energy that I could feel in Southern University of Science and Technology in Shenzhen or Hong-Kong University. The quality of the research and people there is remarkable. Not to say that the immersion in virtual reality in RWTH Aachen with was an impressive experiment. Venice International University was a must. But coming back to places where I studied 30 years ago in France (Montpellier and ENSG Nancy) was quite emotional. I also should not forget the wonderful hospitality of Sanjay Srinivasan in Penn State during the 2019 IAMG conference, or the passionate discussions with Luca Colombera and Nigel Mountney on fluvial systems in Leeds. For all of that I am very grateful to the IAMG and just regret that this year was too short.

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IAMG Journal Reports

Mathematical Geosciences Special Issue from IAMG 2019

Guest Editors: Juliana Leung, Liangping Li, Eugene Morgan and Hamid Emami-Meybodi

IAMG 2019 has taken place at State College, PA, USA in August 2019. The conference covered topics in geo-mathematics, geostatistics, geoinformatics and geomodeling, and, in particular, brought to fore geomodeling issues at the intersection of food, water, and energy.

Papers are expected to cover:

- Contributions to geo-mathematics, geostatistics, geomodeling and related data science
- Mathematical modeling, algorithms and computational frameworks
- Publications on big data, computational intelligence and machine-learning modeling for geoscientific studies
- Other related aspects

The timeline for the special issue is the following:

- Paper submission before December 1, 2019
- Return of reviews to authors before March 15, 2020
- Submission of final papers by July 30, 2020
- Publication in December 2020.

Note: Accepted manuscripts that may not be included in the SI will be published in regular issues of Mathematical Geosciences. **Submit Papers on-line through the journal`s website** http://www.springer.com/journal/11004 following the Instructions for Authors.

For inquiries please contact the Guest Editor: Juliana Leung at juliana2@ualberta.ca

Mathematical Geosciences

Editor-in-Chief: R. Dimitrakopoulos

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Announcement - Mathematical Geosciences Best Paper Award 2018

Mathematical Geosciences is fortunate to publish many outstanding research papers each year, which makes the selection of the Best Paper Award recipient a challenging undertaking. This award recognizes research that has made an especially significant contribution toward expanding and enriching knowledge in our field. We are pleased to announce that the winner of the 2018 Best Paper Award is:

Yuzhu Wang, Christoph H. Arns, Sheik S. Rahman, Ji-Youn Arns, “Porous Structure Reconstruction Using Convolutional Neural Networks,” Volume 50(7): 781–799

Congratulations to the authors!

Mathematical Geosciences

Editor-in-Chief: R. Dimitrakopoulos

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Applied Computing and Geosciences now online

The first issue of the new IAMG affiliated journal, Applied Computing &Geosciences is now live. Open Access papers can be obtained from:

https://www.journals.elsevier.com/applied-computing-and-geosciences

Several manuscripts are still under review and will be published in 2019.The journal is also publishing a special issue from CodaWork19. Manuscripts are currently being reviewed and additional manuscript are being submitted.

Eric Grunsky

Editor-in-Chief

Applied Computing and Geosciences

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Mathematical Geosciences Special Issue on Petroleum Geostatistics

Guest Editors: Leonardo Azevedo (Instituto Superior Tecnico, Portugal) and Jo Eidsvik (NTNU, Norway)

Following the Fourth EAGE Conference on Petroleum Geostatistics in Florence in September 2019 (https://events.eage.org/en/2019/petroleum-geostatistics), we are organizing a special issue on Petroleum Geostatistics in Mathematical Geosciences.

The special issue aims to include high-quality papers on new modeling approaches, methodologies and applications in the field of geostatistics for the petroleum industry. This field has traditionally had a strong focus on geo-modeling, integration of various data sources and uncertainty quantification, but has gone broader the last years - and papers on machine learning and data science approaches are expected.

Main topics:

- Geo-modeling
- Inversion of geophysical data
- Resevoir characterization from production data
- New methods for uncertainty quantification
- Data integration
- Spatial and spatio-temporal statistics
- Machine learning and data science applied to petroleum geostatistics

Timeline:

- Paper submission before: January 31st, 2020
- Return of reviews to authors before: March 31st, 2020
- Submission of final papers deadline: June30st, 2020
- Publication in the Late 2020/Early 2021

Submit Papers on-line through the journal`s website http://www.springer.com/journal/11004 When submitting you must choose the SI: “Petroleum Geostatistics”. Submitted manuscripts must fully comply with the journal’s Instructions for Authors in preparing manuscripts.

For inquiries please contact the Guest Editors:
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Mathematical Geosciences

Editor-in-Chief: R. Dimitrakopoulos

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Journal Statistics

Mathematical Geosciences:

2018 ISI Impact factor: 1.966

5-Year Impact Factor: 2.071

Ave. review time: 53 days (submission to first decision 2018)

Computers & Geosciences:

2018 ISI Impact Factor: 2.721 (SJR=0.648)

5-Year Impact Factor: 3.153 (SNIP=1.431)

Ave. review time: 7.8 weeks (submission to first decision 2018)

Natural Resources Research:

2018 ISI Impact Factor: 2.000

Ave. review time: 26 days (submission to first decision 2018)

IAMG Journal Contents

Natural Resources Research

NRR - Volume 28, Issue 3, July 2019

Keith R. Long (1957–2019)

Recognition of Significant Surface Soil Geochemical Anomalies Via Weighted 3D Shortest-Distance Field of Subsurface Orebodies: A Case Study in the Hongtoushan Copper Mine, NE China — Lifang Wang, Xiangbin Wu, Baoyi Zhang, Xuefeng Li, Anshuo Huang, Fei Meng, Pengyao Dai

New Tabu Algorithm for Positioning Mining Drillholes with Blocks Uncertainty — Gilles Eric Zagré, Denis Marcotte, Michel Gamache, François Guibault

Trend Analysis of Groundwater Levels and Assessment of Regional Groundwater Drought: Ghataprabha River Basin, India — Abhishek A. Pathak, B. M. Dodamani

Maximum Entropy and Random Forest Modeling of Mineral Potential: Analysis of Gold Prospectivity in the Hezuo–Meiwu District, West Qinling Orogen, China — Shuai Zhang, Keyan Xiao, Emmanuel John M. Carranza, Fan Yang

Geometallurgical Domaining by Cluster Analysis: Iron Ore Deposit Case Study — Babak Rajabinasab, Omid Asghari

A Retrospective of Oil and Gas Field Development in the U.S. Outer Continental Shelf Gulf of Mexico, 1947–2017 — Mark J. Kaiser, Siddhartha Narra

Forecasting of Horizontal Gas Well Production Decline in Unconventional Reservoirs using Productivity, Soft Computing and Swarm Intelligence Models — Eric Thompson Brantson, Binshan Ju, Yao Yevenyo Ziggah, Perpetual Hope Akwensi, Yan Sun, Dan Wu, Bright Junior Addo

Self-Learning Random Forests Model for Mapping Groundwater Yield in Data-Scarce Areas — Maher Ibrahim Sameen, Biswajeet Pradhan, Saro Lee

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Waste Mica as Alternative Source of Plant-Available Potassium: Evaluation of Agronomic Potential Through Chemical and Biological Methods — B. B. Basak

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Mixing of Crude Oil with Organic ZnO Nano-Particles from Rice Bran to Improve Physical Properties of Crude Oil: A Novel Agent for Enhanced Oil Recovery — Fatemeh Kalantari, Farshad Farahbod

Discriminating Weathering Degree by Integrating Optical Sensor and SAR Satellite Images for Potential Mapping of Groundwater Resources in Basement Aquifers of Semiarid Regions — Luís André Magaia, Katsuaki Koike, Tada-nori Goto, Alaa Ahmed Masoud

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Spatio-Temporal Analysis of Land Use/Land Cover Changes in an Ecologically Fragile Area—Alappuzha District, Southern Kerala, India — Geena Prasad, Maneesha Vinodini Ramesh

Development of Land Resources in Transitional Zones Based on Ecological Security Pattern: A Case Study in China — Wenfu Peng, Jieming Zhou

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Geographical Analysis of Agro-Environmental Measures for Reduction of Chemical Inputs in Tuscany — F. Riccioli, E. Gabbrielli, L. Casini, E. Marone, J. P. El Asmar, R. Fratini

Valorization of Agricultural By-Products Within the “Energyscapes”: Renewable Energy as Driving Force in Modeling Rural Landscape — Dina Statuto, Pia Frederiksen, Pietro Picuno

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Multi-region Modeling of Daily Global Solar Radiation with Artificial Intelligence Ensemble — Vahid Nourani, Gozen Elkiran, Jazuli Abdullahi, Ala Tahsin

Novel Hybrid Integration Approach of Bagging-Based Fisher’s Linear Discriminant Function for Groundwater Potential Analysis — Wei Chen, Biswajeet Pradhan, Shaojun Li, Himan Shahabi, Hossein Mojaddadi Rizeei, Enke Hou, Shengquan Wang

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Compositional Balance Analysis: An Elegant Method of Geochemical Pattern Recognition and Anomaly Mapping for Mineral Exploration — Yue Liu, Emmanuel John M. Carranza, Kefa Zhou, Qinglin Xia

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An Improved Data-Driven Multiple Criteria Decision-Making Procedure for Spatial Modeling of Mineral Prospectivity: Adaption of Prediction–Area Plot and Logistic Functions — Reza Ghezelbash, Abbas Maghsoudi, Emmanuel John M. Carranza

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Supergene Mass-Balance Study Assuming Zero Lateral Copper Flux Using Geostatistics to Recognize Metal Source Zones in Exotic Copper Deposits — Alireza Arabpour, Omid Asghari, Hassan Mirnejad

Tigris River Sediments as Abrasive for Polishing Marble — Salih Muhammad Awadh, Sara Ali Khalid

Forecasting Copper Prices Using Hybrid Adaptive Neuro-Fuzzy Inference System and Genetic Algorithms — Zakaria Alameer, Mohamed Abd Elaziz, Ahmed A. Ewees, Haiwang Ye, Zhang Jianhua

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Sampling Strategies for Uncertainty Reduction in Categorical Random Fields: Formulation, Mathematical Analysis and Application to Multiple-Point Simulations — Felipe Santibañez, Jorge F. Silva, Julián M. Ortiz

Inference of Global Reservoir Connectivity from Static Pressure Data with Fast Coarse-Scale Simulation Models — Morteza Khodabakhshi, Behnam Jafarpour, Michael J. King

Variable Selection in Compositional Data Analysis Using Pairwise Logratios — Michael Greenacre

The Most Recent Cascadia Earthquake and Native American Narratives — Andrew Solow, Andrew Beet, Shauna McManus

Book review: Pinliang Dong and Qi Chen: LiDAR Remote Sensing and Applications — Matthew Lato

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Implicit Structural Modeling by Minimization of the Bending Energy with Moving Least Squares Functions — Julien Renaudeau, Emmanuel Malvesin, Frantz Maerten, Guillaume Caumon

A Deep-Learning-Based Geological Parameterization for History Matching Complex Models — Yimin Liu, Wenyue Sun, Louis J. Durlofsky

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High-Order Block Support Spatial Simulation Method and Its Application at a Gold Deposit — Joao Pedro de Carvalho, Roussos Dimitrakopoulos, Ilnur Minniakhmetov

Series Expansion-Based Genetic Inversion of Wireline Logging Data — Norbert Péter Szabó, Mihály Dobróka

Book Review: Michael Greenacre: Compositional Data Analysis in Practice — Raimon Tolosana-Delgado

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Updating Mining Resources with Uncertain Data — João Neves, Maria João Pereira, Nelson Pacheco, Amilcar Soares

Value of Information Introduced by a Resource Model Updating Framework — Cansın Yüksel, Corinna Minnecker, Masoud Soleymani Shishvan, Jörg BenndorfMike Buxton

Popular Raster-Based Methods of Prospectivity Modeling and Their Relationships — H. Schaeben, S. Kost, G. Semmler

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Euro-Cordex Regional Projection Models: What Kind of Agreement for Europe? — Ana Martins, Sandra Rafael, Alexandra Monteiro, Manuel Scotto, Sónia Gouveia

Fast Upscaling of the Hydraulic Conductivity of Three-Dimensional Fractured Porous Rock for Reservoir Modeling — Tawfik Rajeh, Rachid Ababou, Manuel Marcoux, Israel Cañamon

Fractal Properties of Greenland Isolines — Soroush Rezvanbehbahani, C. J. van der Veen, Leigh A. Stearns

Structural Interpretation of Sparse Fault Data Using Graph Theory and Geological Rules — G. Godefroy, G. Caumon, G. Laurent, F. Bonneau

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Computers & Geosciences

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Automated segmentation of gravel particles from depth images of gravel-soil mixtures — Hossein Rahmani, Craig Scanlan, Uzair Nadeem, Mohammed Bennamoun, Richard Bowles

TracTrac: A fast multi-object tracking algorithm for motion estimation — Joris Heyman

IGUG: A MATLAB package for 3D inversion of gravity data using graph theory — Saeed Vatankhah, Vahid Ebrahimzadeh Ardestani, Susan Soodmand Niri, Rosemary Anne Renaut, Hojjat Kabirzadeh

Fast assimilation of frequently acquired 4D seismic data for reservoir history matching — Zhen Yin, Tao Feng, Colin MacBeth

Efficient training image selection for multiple-point geostatistics via analysis of contours — Mohammad Javad Abdollahifard, Mohammad Baharvand, Grégoire Mariéthoz

FFLSD - Fast Fog and Low Stratus Detection tool for large satellite time-series — Johannes Drönner, Sebastian Egli, Boris Thies, Jörg Bendix, Bernhard Seeger

A new user-friendly tool for rapid modelling of ground deformation — Flavio Cannavò

A hybrid immersed boundary-lattice Boltzmann/finite difference method for coupled dynamics of fluid flow, advection, diffusion and adsorption in fractured and porous media — Xu Yu, Klaus Regenauer-Lieb, Fang-Bao Tian

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Analysis of server-side and client-side Web-GIS data processing methods on the example of JTS and JSTS using open data from OSM and geoportal — Marcin Kulawiak, Agnieszka Dawidowicz, Marek Emanuel Pacholczyk

A fractal model of granitic intrusion and variability based on cellular automata — Yihui Xiong, Renguang Zuo, Keith C. Clarke

Evaluation of artificial neural networks for the prediction of deep reservoir temperatures using the gas-phase composition of geothermal fluids — D. Pérez-Zárate, E. Santoyo, A. Acevedo-Anicasio, L. Díaz-González, C. García-López

A new multiple-point grade estimation method by implicit volterra series — Arman Mohammadi Gonbadi, Seyed Hasan Tabatabaei, Nader Fathianpour

Towards better traceability of field sampling data —

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Big data and natural disasters: New approaches for spatial and temporal massive data analysis — F. Martínez–Alvarez, A. Morales–Esteban

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A multiscale morphological algorithm for improvements to canopy height models — Li Liu, Samsung Lim, Xuesong Shen, Marta Yebra

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A novel method for extracting information on pores from cast thin-section images — Shaoqun Dong, Lianbo Zeng, Chaoshui Xu, Peter Dowd, Zhiyong Gao, Zhe Mao, Ai Wang

Mineral grains recognition using computer vision and machine learning — Julien Maitre, Kévin Bouchard, L. Paul Bédard

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Self-adaptive load-balancing strategy based on a time series pattern for concurrent user access on Web map service —

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An optimized parallelized SGFD modeling scheme for 3D seismic wave propagation

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An application of vector wavefield decomposition to 3D elastic reverse time migration and field data test — Bingluo Gu, Zhiming Ren, Qingqing Li, Jianguang Han, Zhenchun Li

Remote sensing image classification based on semi-supervised adaptive interval type-2 fuzzy c-means algorithm — Jindong Xu, Guozheng Feng, Tianyu Zhao, Xiao Sun, Meng Zhu

Automated high accuracy, rapid beam hardening correction in X-Ray Computed Tomography of multi-mineral, heterogeneous core samples — Carla Romano, James M. Minto, Zoe K. Shipton, Rebecca J. Lunn

Efficient parallel random field generator for large 3-D geophysical problems — Ludovic Räss, Dmitriy Kolyukhin, Alexander Minakov

Article(s) from the Special Issue on Quantitative understanding of natural phenomena in Earth Sciences: concepts and tools for data analysis; Edited by Antonella Buccianti, Peter Filzmoser and Karel Hron

GeoBeam: A distributed computing framework for spatial data — Zhenwen He, Gang Liu, Xiaogang Ma, Qiyu Chen

Ensemble smoother with multiple data assimilation for reverse flow routing — Valeria Todaro, Marco D'Oria, Maria Giovanna Tanda, J. Jaime Gómez-Hernández

Statistical methods for the geochemical characterisation of surface waters: The case study of the Tiber River basin (Central Italy) — Caterina Gozzi, Peter Filzmoser, Antonella Buccianti, Orlando Vaselli, Barbara Nisi

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Master Recession Curve Parameterization Tool (MRCPtool): Different approaches to recession curve analysis — T. Carlotto, P.L.B. Chaffe

Numerical study of tsunami wave run-up and land inundation on coastal vegetated beaches — Hongxing Zhang, Mingliang Zhang, Yongpeng Ji, Yini Wang, Tianping Xu

Automatic classification of hydrocarbon "leads" in seismic images through artificial and convolutional neural networks —

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The BonaRes metadata schema for geospatial soil-agricultural research data – Merging INSPIRE and DataCite metadata schemes — Xenia Specka, Philipp Gärtner, Carsten Hoffmann, Nikolai Svoboda, Markus Stecker, Udo Einspanier, Kristian Senkler, M.A. Muqit Zoarder, Uwe Heinrich

3D non-conforming mesh model for flow in fractured porous media using Lagrange multipliers — Philipp Schädle, Patrick Zulian, Daniel Vogler, Sthavishtha R. Bhopalam, Maria G.C. Nestola, Anozie Ebigbo, Rolf Krause, Martin O. Saar

Chemical identification of metamorphic protoliths using machine learning methods — D. Hasterok, M. Gard, C.M.B. Bishop, D. Kelsey

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Efficient transformation from Cartesian to geodetic coordinates — S.J. Claessens

Cartesian to geodetic coordinates conversion on an oblate spheroid using the bisection method — Georgios Panou

Virtual BUOY: A video-based approach for measuring near-shore wave peak period — Andrés F. Osorio, Sebastian Montoya-Vargas, Cesar A. Cartagena, Jairo Espinosa, Alejandro Orfila, Christian Winter

Adaptive Importance Sampling Unscented Kalman Filter based SAR image super resolution — Sithara Kanakaraj, Madhu S. Nair, Saidalavi Kalady

Stable recurrent calculation of isotropic Gaussian filter coefficients — Dimitrios Piretzidis, Michael G. Sideris

Bayesian Biclustering by dynamics: A clustering algorithm for SAGD time series data — Helen Pinto, Ian Gates, Xin Wang

Direct Numerical Simulations of turbidity currents with Evolutive Deposit Method, considering topography updates during the simulation — Luísa Vieira Lucchese, Leonardo Romero Monteiro, Edith Beatriz Camano Schettini, Jorge Hugo Silvestrini

Dynamically Optimized Unstructured Grid (DOUG) for Analog Ensemble of numerical weather predictions using evolutionary algorithms — Weiming Hu, Guido Cervone

An interval Type-2 fuzzy sets generation method for remote sensing imagery classification — Haihua Xing, Hui He, Dan Hu, Tao Jiang, Xianchuan Yu

Measuring rock surface strength based on spectrograms with deep convolutional networks — Shuai Han, Heng Li, Mingchao Li, Xiaochun Luo

Modelling fluid flow in karst reservoirs using Darcy Model with estimated permeability distribution — AbdAllah A. Youssef, Abeeb A. Awotunde

CT-image of rock samples super resolution using 3D convolutional neural network — Yukai Wang, Qizhi Teng, Xiaohai He, Junxi Feng, Tingrong Zhang

Noisy Dispersion Curve Picking (NDCP): A Matlab package for group velocity dispersion picking of seismic surface waves — Iván Granados, Marco Calò, Valente Ramos

A library of BASIC scripts of reaction rates for geochemical modeling using phreeqc — Yilun Zhang, Bin Hu, Yanguo Teng, Kevin Tu, Chen Zhu

An automatic recognition method of microseismic signals based on EEMD-SVD and ELM — Jinyong Zhang, Ruochen Jiang, Biao Li, Nuwen Xu

Using Delaunay triangulation and cluster analysis to determine the orientation of a sub-horizontal and noise including contact in Kraków-Silesian Homocline, Poland — Michał P. Michalak, Waldemar Bardziński, Leslaw Teper, Zbigniew Małolepszy

Modelling of soil moisture retention curve using machine learning techniques: Artificial and deep neural networks vs support vector regression models — Kevin O. Achieng

5D geostatistics for directional variables: Application in geotechnics to the simulation of the linear discontinuity frequency — L. Katherine Sánchez, Xavier Emery, Serge A. Séguret

Producing marine geophysical archive files from raw underway data — Michael Hamilton, Paul Wessel, Brian Taylor, Joaquim Luis

Generation of unstructured meshes in 2-D, 3-D, and spherical geometries with embedded high-resolution sub-regions — Jorge M. Taramón, Jason P. Morgan, Chao Shi, Jörg Hasenclever

A new algorithm for redundancy minimisation in geo-environmental data — Mohamed Laib, Mikhail Kanevski

Landslide susceptibility mapping using an automatic sampling algorithm based on two level random sampling — Hakan Aktas, Bekir Taner San

ASFit - An all-inclusive tool for analysis of UV–Vis spectra of colored dissolved organic matter (CDOM) — Dario Omanović, Chiara Santinelli, Saša Marcinek, Margherita Gonnelli

An algorithmic framework for investigating the temporal relationship of magnetic field pulses and earthquakes applied to California — K.N. Kappler, D.D. Schneider, L.S. MacLean, T.E. Bleier, J.J. Lemon

Low field frequency dependent magnetic susceptibility inversion — Ustra Andrea, Carlos Mendonça, Aruã Leite, Plinio Jaqueto, Valdir Felipe Novello

Small baseline InSAR time series analysis: Unwrapping error correction and noise reduction — Zhang Yunjun, Heresh Fattahi, Falk Amelung

Gradient-based deterministic inversion of geophysical data with generative adversarial networks: Is it feasible? — Eric Laloy, Niklas Linde, Cyprien Ruffino, Romain Hérault, Gilles Gasso, Diederik Jacques

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Applied Computing & Geosciences

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Statistical analysis of mineral evolution and mineral ecology: The current state and a vision for the future — Grethe Hystad, Shaunna M. Morrison, Robert M. Hazen

A mathematical model for a steady-state seepage flow of groundwater under a reinforced concrete dam — Miltiades C. Elliotis

Advanced wind speed prediction using convective weather variables through machine learning application — Bhuiyan Md Abul Ehsan, Fatema Begum, Sheikh Jawad Ilham, Raihan Sayeed Khan

A competitive ensemble model for permeability prediction in heterogeneous oil and gas reservoirs — Ahmed A. Adeniran, Abdulrauf R. Adebayo, Hamza O. Salami, Mohammed O. Yahaya, Abdulazeez Abdulraheem

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IAMG 2019

More than 175 researchers, students and industry professionals attended the 20th Annual Conference of the International Association for Mathematical Geosciences (IAMG) at Penn State University on Aug. 10-15.

The topics covered included geostatistics, classical statistics, compositional data analysis, modelling, geoinformatics, geometry and topology, geophysical data, geohydrology, subsurface systems, marine geosciences, machine learning and optimization methods, and atmospheric and earth system science.

Keynotes were presented by award winners Phillipe Renard, Peter Filzmoser, Vera Pawlowsky-Glahn, Alessandra Menafoglio and Wenlei Wang, as well as Susan Agar, Lee Kump and Qiuming Cheng.

Many thanks to Sanjay Srinivasan and the organising committe for arranging such a great conference!

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IAMG2019 organising committee

Delegates from some of the sponsoring institutions with Jenny McKinley and Sanjay Srinivasan

Matheron Lecturer Vera Pawlowsky-Glahn with Jenny McKinley and K. Gerald van den Boogaart

Peter Filzmoser presented the Felix Chayes prize by Jenny McKinley

Student awards presentation

Upcoming Meetings

2020

36th International Geological Congress (IGC), 2-8 March, Dehli, India. http://www.36igc.org/

SEPM International Sedimentary Geosciences Congress – 2020, 26-29 April, Flagstaff, AZ, USA. https://www.sepm.org/SEPM2020

6th International Conference on Geographical Information Systems Theory, Applications and Management, 7-9 May, Prague, Czech Republic. http://www.gistam.org

82nd EAGE Conference & Exhibition 2020, 8-11 June, Amsterdam, Netherlands. https://eage.eventsair.com/82nd-eage-conference-and-exhibition/

AAPG 2020 Annual Convention & Exhibition, 7-10 June, Houston, Texas, United States. https://www.aapg.org/events/aapg-conferences/ace/details/Articleid/51230/aapg-2020-annual-convention-exhibition

CoDaCourse'2020, 6-10 July, University of Girona, Spain. http://www.compositionaldata.com/codacourses.php

13th International Conference on Geostatistics for Environmental Application (geoENV2020), 1-3 July, Parma, Italy. https://2020.geoenvia.org

10th International Conference of the African Association of Women in Geosciences, 27 - 31 July, Luanda / Angola.

2020 Joint Statistical Meetings, 1-6 Aug, Philadelphia, Pennsylvania. https://www.amstat.org/ASA/Meetings/Joint-Statistical-Meetings.aspx

ISEH 2020, ICEPH 2020 & G16 2020, 2-9 Aug, Galway, Ireland. http://www.nuigalway.ie/iseh2020/

Geostats2020, 17-21 Aug, Toronto, Canada. http://www.geostats2020.com/home.html

2021

IAMG2021, 31 Aug - 3 Sept, Nancy (Centre Prouvé), France. https://www.iamgconferences.org/

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

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36TH INTERNATIONAL GEOLOGICAL CONGRESS
2 - 8 MARCH 2020, DELHI, INDIA

Come and visit the IAMG booth at the 36th IGC!

The IAMG is collaborating in symposiums 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing).

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CodaCourse'2020

The CoDaCourse'2020 is a week-course on compositional data (CoDa) analysis that will be held in the University of Girona (UdG) from July 6 to 10, 2020. It is organized by the CoDa-research group at UdG. This course is officially accredited by the IAMG (https://www.iamg.org) and the CoDa-Association (https://www.coda-association.org/en/). This year the course is promoted by ECAS (European Courses in Advanced Statistics: http://ecas.fenstats.eu) and SEIO (Spanish Society of Statistics and Operations Research: http://www.seio.es/).

The course teaching staff is composed by members of the CoDa-research group. You can find more information at our website http://www.compositionaldata.com/codacourses.php

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IAMG Annual Conferences

With this note I would like to update on the perspective of our next Annual Conferences.

- IAMG2020 will be part of the 36 th International Geological Congress (https://www.36igc.org/) to take place in New Delhi, India, March 2-8, 2020, just half a year to go. The IAMG is collaborating in symposiums 35.1 (Mathematical Geosciences and Mineral Resource Evaluation) and 45.10 (Advances in Global Geological Data Sharing and Processing). More information on the sessions is available at (https://www.iamg.org/images/File/documents/IAMG-Sessions-at-IGC2020.pdf).

- IAMG2021 will be hosted by Guillaume Caumon and his team at Ecole Nationale Supérieure de Géologie (ENSG), Laboratoire GeoRessources, Université de Lorraine, Nancy, France, Aug 31 to Sep 3, 2021.

Now it is about time to think of IAMG2022. We have started the search process for the selection of a site to hold IAMG's 21th annual scientific and technical conference sometime in the fall of 2022. Parties interested in hosting and co-organizing the event together with IAMG are welcome to visit the web site www.iamg.org/index.php/publisher/articleview/frmArticleID/150 for detailed guidelines. Even though it may appear way ahead of us, I would like to encourage proposals to host IAMG2022 to be submitted not later than March 2020.

Helmut Schaeben,

Meetings Committee (Chair)

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geoENV JULY 1-3 PARMA 2020

13th International Conference on Geostatistics for Environmental Application (geoENV2020)

The conference will be held in Parma (Italy) from July 1-3, 2020. The sessions will cover geostatistical methodologies applied, for instance, to: ecology, natural resources, surface and subsurface hydrology, climate change, soil applications, health and remote sensing.

Participants will have the chance to know the city selected by UNSECO as City of Gastronomy and which will be the Italian Capital of Culture in 2020.

Registration and abstract submission are now open.

For further information please visit:

https://2020.geoenvia.org/

Don't miss any geoENV2020 deadlines - mark important dates on your calendar!

January 15th, 2020: Abstract submission deadline

March 15th, 2020: Notification of abstract acceptance

April 20th, 2020: Last day for early registration

April 30th, 2020: Full paper submission deadline (optional)

May 15th, 2020: Author registration deadline

June 1st, 2020: Final program

July 1st - 3rd, 2020: Conference

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(IAMG)

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