

IAMG

Newsletter

Official Newsletter of the International Association for Mathematical Geosciences

Contents

PRESIDENT'S FORUM	3
ASSOCIATION BUSINESS	5
CANDIDATES FOR THE 2020-2024 IAMG COUNCIL	5
MEMBER NEWS	13
NOMINATIONS FOR 2021 IAMG AWARDS	13
SEVERAL VISTELIUS AWARDEES MET AT THE IAMG 2019 CONFERENCE	13
DISTINGUISHED LECTURER REPORTS	13
TEASER ON JAIME GÓMEZ-HERNÁNDEZ 2021 DISTINGUISHED LECTURE TOUR.....	13
SWISS NATIONAL SCIENCE FOUNDATION FELLOWSHIPS.....	13
INVITED TALK ON MATHEMATICAL MORPHOLOGY.....	14
A BRIEF SUMMARY OF EIGEN LORE.....	14
REPORTS FOR 2018 RESEARCH GRANTS	15
IAMG JOURNAL REPORTS	16
MATHEMATICAL GEOSCIENCES	16
JOURNAL STATISTICS.....	16
IAMG JOURNAL CONTENTS	16-19
UPCOMING MEETINGS	19
36TH IGC	19

IAMG is on LinkedIn, Twitter and Facebook!

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



Welcome to the 100th edition of the IAMG newsletter! The newsletter was first published in 1970 with the brief 'to carry news of the IAMG's activities'. It has continued to do that with Graham Lea, John C. Davis, James R. Carr, and Harald S. Poelchau all taking their turn as the editor. While the first editions were published sporadically as enough material was collected



for an edition, eventually the newsletter grew into a regular bi-annual publication with winter and summer editions. Which editions you would consider as winter or summer probably

depends on the hemisphere that you live in. The newsletter has covered the association's news and milestones - celebrating 25 then 50 years, new journals, award winners and more.

This edition is earlier than normal to include the information on the candidates for the IAMG 2020-24 council. During May 2020, all members of the association will have the opportunity to participate in electing the new council. Please consider the information in this newsletter (also on the website) and vote. The composition of the council will be changing, so information about the different positions is included in page 5.

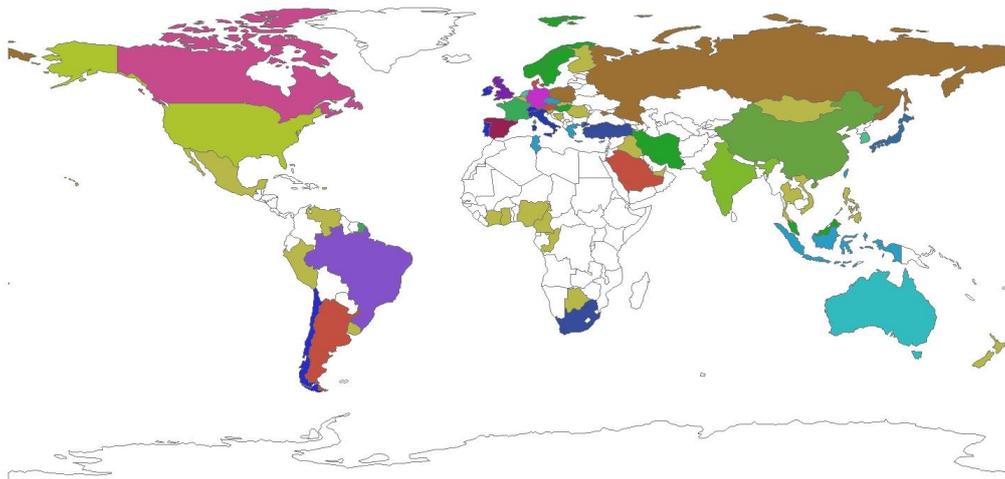
Lately the world seems to have gone crazy with the Covid-19 pandemic. Lockdowns and travel restrictions have changed the world, our lives and plans drastically. While it is a relatively small thing, cancelled conferences, field trips and other research can have a big impact on careers, particularly for postgraduate students and postdocs. Some members will have had to suddenly adjust to teaching online, or fitting work around caring responsibilities. We need to look out for each other. We need to consider new methods of keeping in touch with our networks and disseminating our research.

Stay safe!

Katie Silversides

The international Association of Mathematical Geosciences
IAMG - A Global Network

Currently approx. 700 IAMG members come from 63 countries across the world



The mission of the IAMG is to promote, worldwide, the advancement of mathematics, statistics and informatics in the Geosciences

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PRESIDENT'S FORUM

The IAMG in 2020: Making Global Connections Count

2020 began with the expectation of the 36th IGC and initial preparations for the 37th IGC in Busan, South Korea. I was pleased to present the IAMG at the IUGS executive meeting and see first-hand the impressive Bexco Conference Centre where IGC2024 will be held. The IAMG was described as a "success story" by the IUGC Council. Two things stood immediately out for me from our report: our strong support for early career scientists and our vibrant developing collaborative network of other international associations.

In this 100th edition of the IAMG newsletter (IAMG Newsletter#100), I'm very pleased to announce that Behnam Sadeghi has been selected as the first recipient of the 2020 Founders Scholarship. This scholarship, which will be presented annually, is given in honour or memory of individuals who participated in the founding of IAMG in 1968 at the 23rd IGC in Prague and who subsequently gave significant service to the Association. It is in keeping with the forward-looking spirit of the IAMG that early career scientists should benefit from the legacy of our founders.

To date there are 19 international associations with whom we are actively developing closer working collaboration. This is so important to promote further method development and disseminate results of new research in mathematical geoscience with outreach within the geoscience, mathematics and geoinformatics communities. Of course these relationships need to be realised through IAMG members in these organisations and managed to ensure that the collaborations are meaningful and beneficial. We aim to do this through the Outreach committee which is currently chaired by Eric Grunsky.

As an applied mathematical geoscientist I value highly the importance of addressing critical global challenges with mathematical geoscience. Our network of approximately 700 members from 63 countries across the world provides a unique, global opportunity to apply mathematics, statistics and informatics in geoscience to address the UN Sustainable Development Goals (SDGs) (<https://sustainabledevelopment.un.org/sdgs>). The SDGs are recognised globally as fundamental to addressing global issues. The application of mathematics, statistics and informatics in geoscience is essential to fulfil the SDGs and the topics covered in the goals chime well with challenges addressed in our IAMG conferences (IAMG2019: The challenge of the food, water and energy nexus and resultant stress on our geo-sphere).

We can also see how mathematical geoscientists are working to address these global challenges in our Journal publications and special issues. Look out for the Mathematical Geoscience IAMG2019 Special Issue: Geomodeling issues at the intersection of food, water and energy (<https://www.springer.com/journal/11004/updates/17252926>) and current calls for Special Issues in Computers & Geoscience on Big Data Analytics and Natural Disasters; Data and Information Services for Interdisciplinary Research and Applications in Earth Science; and Big data and natural disasters (<https://www.journals.elsevier.com/computers-and-geosciences/call-for-papers>).

Such critical global geo-environmental issues do not recognise political boundaries – demonstrated currently by the impact of the Covid-19 pandemic. It is people who advance science and make the IAMG a community rather than just a membership. As a global community we are mindful of all our members, their families and loved ones in all affected countries.

The postponement of the 36th IGC was a difficult but courageous decision by the 36th IGC council and IUGS. I would like to acknowledge the considerable efforts of IAMG IGC councillor

Hari Pandalai, Daya Sagar and all IAMG Session Chairs in putting together a very active IAMG programme for IGC2020.

Congratulations to Jaime Gómez-Hernández as the recipient of the 2020 William Christian Krumbain Medal, Marc Genton, the 2020 Georges Matheron Lecturer, Gang Liu, as the recipient of the 2020 Griffiths Teaching Award and Peter Atkinson as the 2020 Distinguished Lecturer. It was unfortunate that our IAMG awards winners were not able to receive their awards and present keynotes at IGC2020 as scheduled for March 2019. However, the IAMG will endeavour to be actively involved in future collaborative conferences such as Geostats2020 and the rescheduled 36th IGC, now planned for November 2020. As a



resilient and adaptable community, we may need to consider how we can meet in a virtual space. We will work with our award winners to work out a schedule and opportunity for all the keynotes over the next few years.

As I reflect on the last four years I'm impressed by the progress that we have achieved together through our collective efforts as part of a healthy and impactful IAMG.

The most recent publications and special issues in all our journals, Mathematical Geosciences (MATG), Computer and Geosciences (C&G), Natural Resources Research (NRR) and Applied Computer and Geosciences (AC&G), showcase innovative research - including that presented at IAMG conferences IAMG2018, IAMG2019 and IAMG sponsored conferences such as geoENV2018 and CoDawork2019. Machine learning, big data analytics and deep learning have come to the forefront in society over the last 5 years. However, these have been important themes initiated by IAMG members over many years (see MATG: A Special Issue on Data Science for Geosciences <https://link.springer.com/article/10.1007/s11004-019-09846-0>) with more recent advances exploring the connections between Geostatistics and Machine Learning (Upcoming MATG SI <https://www.springer.com/journal/11004/updates/17564504>). For geoscientists, the ability to estimate the spatial dependence of observations, their properties and to model spatial uncertainty remains crucial. The Importance of Geostatistics in the Era of Data Science is discussed in the upcoming MATG geoENV2018 Special Issue (<https://link.springer.com/journal/11004/52/3>).

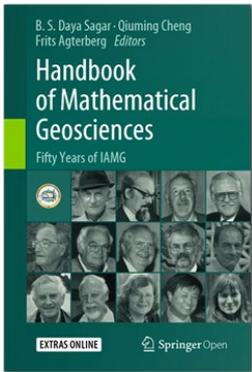
Where does the IAMG go to from here? What are the strategic opportunities over the next four years? These are key questions for the next IAMG Council. In this IAMG Newsletter#100 the slate of candidates for the new Council is published. I'm grateful to the Nominating Commission for ensuring that we have a geographical and gender balance in the slate. I've been honoured to be the IAMG President and would like to take this opportunity to thank everyone in the current Executive, Council and to all IAMG members for all your hard work, encouragement and support. Please take this opportunity to vote to select the new Council and support your new Council to ensure that the IAMG remains impactful and able to continue to advance mathematics, statistics and informatics in the geosciences.

These are unprecedented and challenging times for all of us but the IAMG has demonstrated resilience and flexibility over the last 50 years that will equip it to continue to flourish now and in future. Our foremost thoughts are with our members globally and I encourage you to use our IAMG virtual network to support colleagues as we continue to advance collaborative mathematical geoscience together.

Warmest regards
Jenny McKinley, IAMG President

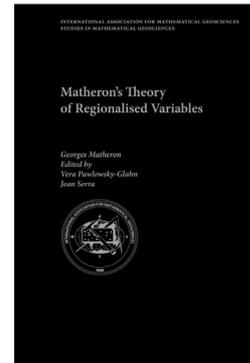
Advancing science

The IAMG stratigraphic column
(created by IAMG2019)



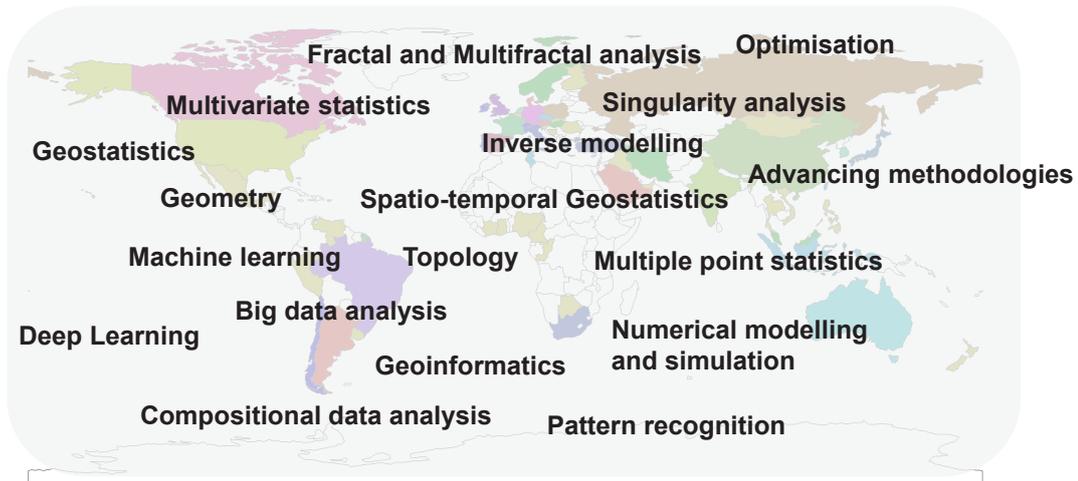
50th Celebration
Open access book
>335k downloads

- IAMG 1994 Mount Tremblant
- IAMG 1995 Osaka
- IGC 1996 Beijing
- IAMG 1997 Barcelona
- IAMG 1998 Ischia
- IAMG 1999 Trondheim
- IGC 2000 Rio de Janeiro
- IAMG 2001 Cancun
- IAMG 2002 Berlin
- IAMG 2003 Portsmouth
- IGC 2004 Florence
- IAMG 2005 Toronto
- IAMG 2006 Liege
- IAMG 2007 Beijing
- IGC 2008 Oslo
- IAMG 2009 Stanford
- IGC 2010 Budapest
- IAMG 2011 Salzburg
- IGC 2012 Brisbane
- IAMG 2013 Madrid
- IAMG 2014 New Delhi
- IAMG 2015 Freiberg
- IGC 2016 Cape Town
- IAMG 2017 Perth
- IAMG 2018 Oulmouc/Prague
- IAMG 2019 State College, Pennsylvania
- IGC 2020 Delhi
- IAMG 2021 Nancy



Matheron's Theory of Regionalised Variables
Georges Matheron
Edited by Vera Pawlowsky-Glahn and Jean Serra
IAMG Studies in Mathematical Geology

Advancing mathematics, statistics and informatics in the geosciences.



SUSTAINABLE DEVELOPMENT GOALS



Addressing Critical Global Challenges with mathematical geoscience



<https://sustainabledevelopment.un.org/sdgs>

- Food, water and energy nexus
- Natural resources
- Renewable energy
- Hydrology, groundwater modelling
- Geohazards
- Geotechnical engineering
- Geophysical data processing
- Fracture modelling
- Soil and water geochemistry
- Health, epidemiology and the environment
- Contaminated land and risk assessment
- Weathering processes
- Landscape change and resilience
- Forensic geoscience
- Forestry, wetlands, agriculture
- Climate change
- Remote sensing
- Atmospheric and earth system science
- Marine geosciences
- Coasts and Gateways

Association Business

Candidates for the 2020-2024 IAMG Council

During the month of May 2020, the Association will have an election to decide ten voting members of the 2020–24 Council. This new Council will serve from 1 September 2020 until the 37th International Geological Congress at the end of August 2024. A Nominating Commission worked hard selecting meritorious candidates, caring at the same time to have geographical and gender balance in the slate. The following members have agreed to serve if elected:

President	Peter Dowd (Australia), with Juliana Leung (Canada) as running mate for Secretary General
	Jaime Gómez-Hernández (Spain), with Dario Grana (USA) as running mate for Secretary General
Vice-President:	Ute Mueller (Australia) Christien Thiart (South Africa)
Treasurer:	Madalyn Blondes (USA) Mark Engle (USA)
Ordinary Councilor:	Natalie Caciagli (Canada) Pauline Collon (France) Jan Harff (Germany) June Hill (Australia) Dionissios Hristopulos (Greece) Karel Hron (Czech Republic) Josep Martín-Fernández (Spain) Alessandra Menafoglio (Italia) Maria João Pereira (Portugal) B.S. Daya Sagar (India) Sanjay Srinivasan (USA) Jie Zhao (China) Renguang Zuo (China)

The 12 voting members will be completed with the current President, Jennifer McKinley (UK), serving as Past President, and Jonggeun Choe (South Korea), who did not have a challenger for serving as IGC Councilor. The duties of each office are mostly dictated by tradition and need, rather than by regulations. Below is a description of what time has shown to be the main responsibilities of each office.

President. The IAMG President is the head of the organization and chair of the governing Council. She/he cannot be reelected. The president appoints chairs of committees and commissions in consultation with Council; serves as an ambassador to other professional organizations; acts as legal representative of the Association in dealing with publishers and other groups; and, as a Solomonian judge, resolves conflicts when disputes become personal. The President also discusses and assigns duties to other Council members who may represent the President as non-voting ex officio members on IAMG committees and commissions. A good president should foresee opportunities and difficulties, rather than react when situations have reached a crisis level.

Secretary General. The duties of the IAMG Secretary General have not fundamentally varied since the foundation of the Association, but the way of electing the Secretary General has seen the most changes. The Secretary General is the operational officer of the Association. The main duties are the making of arrangements and preparing minutes for every live or electronic session of Council, and for every General Referendum or Delegate Assembly. Each year the Secretary General has to schedule the presentations of major IAMG awards. The Secretary General also prepares

an annual report of the main Association activities for the International Union of Geological Sciences (IUGS). Moreover, the Secretary General is responsible for preparing and collecting ballots for amendments to the Constitution, if any. Up until 2008, the President and the Secretary General were elected separately. The last two secretary generals were chosen personally by the President after the Council elections with the idea of securing loyalty and maximizing coordination. Council modified the Statutes last year to requiring the candidates for President to disclose the choice of Secretary General ahead of the elections, thus preserving the idea to have a collaborator of the president's liking yet allowing the IAMG members to ponder the qualifications of alternative teams. Hence, for the first time, the IAMG members will have to vote for a pair of candidates, this year, the alternatives being Dowd and Leung or Gómez-Hernández and Grana. Cross voting for Gómez-Hernández and Leung or Dowd and Grana is not possible.

Vice-President. Like in many organizations, the clearest and main duty of the Vice-President is to complete the term of the President if she/he cannot or does not want to complete her/his term in office. Additional duties for using the Vice-President's time and talents have varied greatly through the years.

Treasurer. The IAMG Treasurer serves either directly or indirectly as bookkeeper, accountant, comptroller, financial planner and tax expert for the organization. She/he works in close contact with the IAMG Office and most committees, particularly the Awards, Student Affairs, and Meetings Committees as well as the organizing committees of IAMG conferences. The IAMG is a non-profit organization, originally established in the United States in 1968. According to the laws of the United States, the Treasurer can only manage the financial assets of the IAMG if she/he is a United States citizen. This circumstance makes it necessary for the IAMG Treasurer to be a citizen of the United States.

Executive Committee. In addition to their individual duties, the President, the Vice-President, the Secretary General and the Treasurer form the Executive Committee of the Association in charge, jointly with committees and commissions, of the routine operational activities of the Association.

Ordinary Councilor. There are six Ordinary Councilors in the IAMG Council. To a large extent, they play a dual role. As legislators, they have a saying and vote on every new initiative or proposed amendment to the Statutes, Bylaws and guidelines. As directors, they are in charge of assuring that the entire organization is run honestly and efficiently.

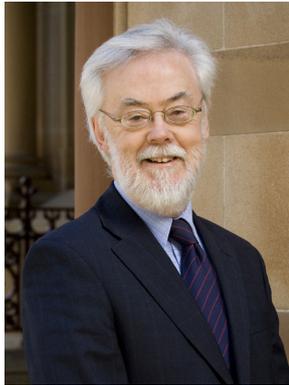
IGC Councilor. In addition to sharing the same regular responsibilities as the Ordinary Councilors, the IGC Councilor bears the responsibility of organizing IAMG sponsored sessions at the International Geological Congress at the end of the Council term, the 37th IGC in this case. This is another position tied to a specific country by the nature of the responsibilities.

Past President. Although some of the Council members may have served in the same or different seats in previous Councils, the serving President continues automatically as Past President in the incoming Council for assuring continuity in the management of the Association. Hence, although the president cannot serve two terms in such a capacity, the candidate who is elected president remains as a voting member of Council for eight years.

Following are biographical notes that have been prepared to assist the voters if they do not know well or do not identify by name some of the candidates for the different positions described above.

For President and Secretary General

Peter Dowd is Professor of Mining Engineering at the University of Adelaide and Director of the Australian Research Council Industrial Transformation Training Centre for Integrated Operations for Complex Resources. He has a PhD in Geostatistics from the University of Leeds in the UK and an MScA from Ecole Polytechnique de Montréal in Canada. He is a Chartered Engineer (UK Engineering Council) and a Chartered Professional Mining Engineer (Australasian Institute of Mining and Metallurgy). Peter's research interests include



geostatistical modelling and prediction in mineral resource and environmental applications; geological modelling and mathematical geology; stochastic modelling and quantified risk assessment in natural resource and environmental applications; rock mass characterisation for geothermal energy resources and the in-situ recovery of mineral resources; operational research; and computer-aided mine design. Much of his work over the past 15 years has focused on inter-disciplinary approaches to complex inter-disciplinary problems, which has led to the recent award of an Australian Research Council Training Centre in which mining engineers, geologists, mineral processors, mathematicians, computer scientists, chemical engineers, mechanical engineers and electrical engineers will work together on integrating and optimising complex mining systems.

Peter has been an IAMG member for 35 years. He has published widely and is a regular contributor to Mathematical Geosciences and Computers and Geosciences and is a member of the Editorial Board of Mathematical Geosciences. He has attended, and presented at, every International Geostatistics Congress since the original congress in Frascati in 1975. Peter's work has been recognised by the award of the 2016 Krumbein Medal; the 2015 APCOM Recognition Award for contributions to APCOM; the 2013 Award for Industry Engagement in University Education (Institute of Engineers Australia and Australasian Association for Engineering Education); and the 2013 Georges Matheron Lecturer award. In 2006 he was elected Fellow of the Australian Academy of Technological Sciences and Engineering and in 1998 he was elected Fellow of the Royal Academy of Engineering. He is also a Fellow of the Royal Society of Arts.

Over the past 25 years, Peter has held several senior executive and managerial roles that would bring relevant experience to the role of IAMG President. These include Executive Director of Mining Education Australia (2013-15), Executive Dean of the Faculty of Engineering, Computer and Mathematical Sciences at the University of Adelaide (2004-12), Head of the School of Process, Environmental and Materials Engineering at the University of Leeds (1997-2003), and Head of the Department of Mining and Mineral Engineering, University of Leeds (1995-2001). His service to professional organisations includes Chair of the Australian Group of Eight Universities Engineering Deans and Associates (2007 – 2012), President of the Australian Council of Engineering Deans (2009 – 2010), Vice-President of the Australian Council of Engineering Deans (2007 – 2008), President (1998-99) and Vice-President (1996-98) of the Institution of Mining and Metallurgy (UK). He also led the 2009 review and ranking of Engineering Sciences research outlets for the Australian national research assessment exercise. Peter is particularly interested in informing political policies with relevant science and is a member of the Science meets Parliament group for the South Australia State Government.

Peter would welcome the opportunity to bring, and to adapt, his experience to the role of IAMG President. As an example, he would use his experience with the Science meets Parliament initiative to assist the IAMG Council to increase collaboration with government agencies and to advance the mathematical geosciences as a resource that can inform policy decisions on natural resources and the environment as well as promoting

the individual disciplines that comprise the mathematical geosciences. His extensive industry-funded research would assist the IAMG Council in interacting and engaging with relevant industry partners.

Juliana Leung is an associate professor in the Civil and Environmental Engineering Department and the School of Mining and Petroleum Engineering at the University of Alberta. She holds a BSc degree in chemical engineering from the University of Calgary (Canada), and MS and PhD degrees in petroleum engineering from the University of Texas at Austin (USA). Her professional experiences include working as a reservoir engineer for over 2 years at Shell Canada Ltd. and summer internships at the Sandia National Laboratories and ExxonMobil Upstream Research Company in Houston.



Her research interests are in the areas of data analytics and modeling of multi-scale flow processes in heterogeneous subsurface media. She is an associate editor for the Journal of Petroleum Science and Engineering and the Journal of Natural Gas Engineering. She has served on many program committees and session chairs for various international conferences/workshops, including those organized by the Society of Petroleum Engineers (SPE) and the International Society for Porous Media. For example, she is currently serving on the program committees for both the SPE Canada Unconventional Resources Conference and the Subsurface Data Analytics Workshop. Recently, she served as the conference co-chair for the IAMG 2019 annual conference that was held at the Pennsylvania State University, as well as the lead guest editor for the IAMG 2019 special issue to be published in the Mathematical Geosciences.

If elected as a secretary general, she would support a wide range of activities in relation to award presentation and annual reporting. She is eager to enhance the visibility of IAMG to the wider geosciences and engineering communities. In particular, she would like to increase the participation of early-career researchers and students. She is also passionate about promoting diversity within the STEM communities.

J. Jaime Gómez-Hernández

(1960, Requena, Spain) is a full professor of Hydrogeology at the Universitat Politècnica de València in Spain, where he received a Civil Engineering degree, with honors, in 1983. He graduated from Stanford University, as Ms. Sc. on Applied Hydrogeology in 1987 and as Ph. D. on Geostatistics for Natural Resources Evaluation —under the guidance of André Journel— in 1990. His research focuses on the use of stochastic methods to analyze the behavior of fluids in the subsurface, having developed leading techniques, algorithms and computer codes in the areas of upscaling, simulation of stochastic processes and inverse modeling, with application both in the field of hydrogeology (with particular relevance in the geological storage of nuclear waste) and in petroleum engineering. He has worked for most of the large oil companies and virtually for all nuclear waste disposal agencies in the world. He has key contributions in the fields of geostatistical simulation, upscaling, and inverse modeling; some examples are the first openly available code implementing sequential indicator simulation, the first paper questioning the use of Gaussian random functions to simulate aquifer/reservoir heterogeneity, or a number of stochastic inverse simulation algorithms such as the Normal-Score Ensemble Kalman filter or the Ensemble Pattern Matching Inverse Method. The recognition of his



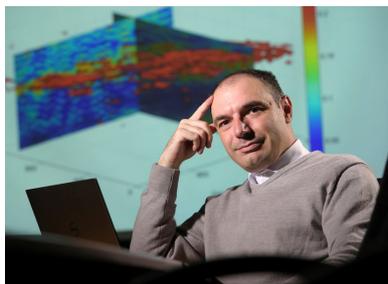
research has made him become member of the editorial boards of the most important journals in his field such as Journal of Hydrology, Hydrogeology Journal, and Mathematical Geology. He is currently an editorial board member of Advances in Water Resources, Water, Springer Nature Applied Science, Frontiers in AI in Food, Agriculture and Water, and Mathematical Geosciences. Jaime has organized several congresses in Valencia, namely geoENV98, IAHR2010, geoENV2012, CIAS2014, 2015 AGU Chapman on Aquifer Heterogeneity, GEOSTATS2016, InterPore2019 and 2019 AGU Chapman on Aquifer Sustainability, which have attracted the most relevant experts in the field. Apart from his academic activity, he has held the positions of Secretary of the Hydrology Section of the European Geophysical Society, founder and President of the geoENVia Association, President of the Spanish Chapter of the International Association of Hydrogeologists, and member of the European Research Council Starting Grant panel in the field of Earth Sciences. He is currently the past President of the Spanish Chapter of the International Association of Hydrogeologists, the geoENVia president, elected Councilor of the International Association of Mathematical Geology, and the Head of the Group of Hydrogeology of the Institute of Water and Environmental Engineering at the Universitat Politècnica de València. His involvement with IAMG dates back to his time as a doctorate student, since then he has been actively involved in the association; he has served as Guest Editor of several issues of Mathematical Geosciences, and as member of the Lecture Series Committee, the Strategic Plan Commission, the Distinguished Lecture Committee, the Meetings Committee, and the Publications Committee.

Jaime has been recognized by the IAMG as the 2020 William Christian Krumbein medal and as the 2021 Distinguished Lecturer.

As a candidate to President, Jaime brings his experience as a manager at the highest level: he has acted as Vice-Rector for the Universitat Politècnica de València during two terms, in the areas of Graduate Studies and Faculty Affairs, and has served also a term as Director General of Technological and Scientific Infrastructures for the Regional Ministry of Enterprise, University and Science of the Valencian Regional government. He plans to continue working on the outreach activities started by the current president, with special attention to the Deep time Digital Earth initiative by the IUGS, of which IAMG is a founding member. He also plans to continue the growth of the student chapters and to promote their ability to network and interact among them and with Young Earth Scientists (YES). Gender and geographical diversity will continue to be a goal, with the support of Council and the specific commissions created for this purpose. In an era of big data and deep learning, the use of internet and the social media is a key factor to promote the visibility of the Association and its activities. There is a need to revamp the digital image of the IAMG through a renewed webpage, and a stronger presence in social media; and, for this purpose, the help of our early career members is crucial. Finally, there is a need to consider how to adapt IAMG publications to the new paradigm already enforced in Europe by most European Funding Agencies and under scrutiny elsewhere in the world, which requires that publications resulting from publicly funded projects should be in open access format.

Jaime is also well known as an amateur magician and as a choir tenor singer. He has also run (and finished) four editions of the Valencia marathon.

Dario Grana is an associate professor in the Department of Geology and Geophysics at the University of Wyoming. He received a MS in Mathematics at University of Pavia (Italy) in 2005, a MS in Applied Mathematics at University of Milano Bicocca (Italy) in 2006, and a Ph.D. in Geophysics at Stanford University in 2013. He worked four years at Eni Exploration and Production in Milan. He joined the University of Wyoming in 2013. He is coauthor of



the book 'Seismic Reflections of Rock Properties', published by Cambridge University Press in 2014. He is the recipient of the 2017 EAGE Van Weelden Award, the 2016 SEG Karcher Award, the 2015 Best Paper Award in Mathematical Geosciences, and the 2014 Eni award with Gary Mavko, Tapan Mukerji, and Jack Dvorkin for "pioneering innovations in theoretical and practical rock physics for seismic reservoir characterization". His main research interests are rock physics, seismic reservoir characterization, geostatistics, data-assimilation, and inverse problems for subsurface modeling. Dario joined IAMG in 2011 and he was a member of the Stanford IAMG student chapter. In 2013, after joining the University of Wyoming, he started the UW IAMG student chapter, of which he is the faculty advisor. Dario served as reviewers and associate editor for several journals for more than ten years and he contributed to the organizations of special issues for Mathematical Geosciences and Computers and Geosciences. He is currently one of the three Editor-in-Chief of Computers and Geosciences and he is a member of the Editorial Board of Mathematical Geosciences. Dario is also an active member of the European Association of Geophysicists and Engineers (EAGE), the Society of Exploration Geophysicists (SEG), and the Society for Industrial and Applied Mathematics (SIAM).

Vice-President

Ute Mueller is an associate professor in the School of Science at Edith Cowan University in Perth, Australia. She was born in Germany and completed her PhD in Mathematical Physics in 1987. She has been employed at Edith Cowan University since 1994 and has extensive experience in governance through membership of ECU's governing Council and academic board and associated subcommittees. Since her move to Australia she has shifted her research focus to Geostatistics. In the last ten years she has been working on the integration of geostatistics and compositional data analysis and their practical implementation in mining contexts and the spatial modelling of geochemical survey data. As part of her work in this area she has also been instrumental in developing a very successful on-line course in geostatistics which will have its 20th anniversary in 2021. In 2018 she was awarded the IAMG John Cedric Griffiths Teaching Award in recognition to her contribution to the teaching of geostatistics.



Ute has been a member of the IAMG since 2002 and has served as a member on the Student Affairs Committee since 2014 and became chair in 2016. She has actively participated in IAMG conferences through talks and poster presentations. In 2017 she was on the organising committee of the annual IAMG conference in Perth where, jointly with June Hill, she had responsibility for the scientific program. She has also served on the scientific committee of IAMG2015, IAMG 2018, and currently Geostats2020. In addition, she regularly reviews papers for the four IAMG journals and is an associate editor for Computers and Geosciences. If elected, Ute will work to enhance the visibility of mathematical geosciences outside the Association and to promote the Association to mathematical geoscientists who are not yet members to strengthen the Association and to ensure that the IAMG remains a vibrant community of mathematical geoscience practitioners.

Christien Thiart is an Associate Professor Emeritus in Statistical Sciences at the University of Cape Town, South Africa, and an Honorary Professor in the African Earth Observatory Network (AEON)-Earth Stewardship Science Research Institute at the Nelson Mandela University, South Africa. Christien's research



interests are mainly in the fields of geostatistics, spatial statistics and spatial modelling. At AEON, she plays a central role in the GIS-based research unit, with a focus on the statistical analysis and modelling of Earth System resources and data mining.

Christien has been actively and continuously involved in participation of IAMG activities. She joined the IAMG in 2002 after a research visit to the Geological Survey of Canada (Ottawa, with Graeme Bonham-Carter and Frits Agterberg). She served on the Student Award Committee of the IAMG, as well as the Meeting and Award Committees. Since 2008 she has been Councilor, the Special IGC Councilor (for the IGC Conference in Cape Town), and since 2016 she has been one of the Vice Presidents of the IAMG. She has also chaired the Lectures Committee of the IAMG since 2016. Christien would like to continue as Vice President and in so doing support the President and the IAMG community.

Treasurer

Madalyn Blondes, Ph.D. is a Research Geologist in the U.S. Geological Survey Eastern Energy Resources Science Center in Reston, Virginia, USA, where she runs the Oil & Gas Waters Project. Her research focuses on the geochemistry of water from oil and gas production, geologic CO₂ storage through mineralization, compositional data analysis (CoDa) in the earth sciences, development of probabilistic assessment methodologies, and using geochemistry to understand CO₂ flow in natural systems. Madalyn obtained her B.A. from the Pomona College Geology Department in 2003 and her Ph.D. from the Yale University Department of Geology & Geophysics in 2008. She did postdoctoral research at the University of Maryland before joining the USGS in 2010.



Madalyn is currently on the Editorial Board of Mathematical Geosciences, and has been a session convener and co-instructor for IAMG conferences and short-courses. Her experience with other committee and management work includes being Vice President of the USGS LGBTQ+ group, Program Chair of the Geologic Society of Washington, and the Acting Deputy Director of the USGS Eastern Energy Resources Science Center. Though she is loath to admit how adept she is at making organized, color-coded spreadsheets because people ask her to do too many things, she would be excited to use these skills as Treasurer toward keeping the IAMG solvent and expanding its reach.

Mark Engle received his Ph.D. in hydrogeology from the University of Nevada in 2005, followed by a Mendenhall Postdoctoral Fellowship with the U.S. Geological Survey (USGS). He worked for the USGS as a research scientist and project chief, in both Virginia and Texas, for ~14 years. Last fall Mark joined the faculty of the Department of Geological Sciences at the University of Texas at El Paso (UTEP) as Professor. His current research interests include: 1) the controls and composition of groundwater from brackish and saline groundwater systems; 2) the application of multivariate compositional data analysis to derive hydrogeochemical conceptual models of groundwater systems; and 3) modification of isotopic and elemental chemical methods to the analysis of saline waters. He has authored or co-authored more than 50 journal articles and has given dozens of invited talks across the U.S. and abroad.



Mark has been a member of IAMG for roughly 5 years. He had the honor of serving as one of the keynote speakers at the 2018

meeting and co-taught a short course on compositional data analysis at the 2019 IAMG meeting. He is currently working to develop an IAMG student chapter at UTEP. He previously held the positions of Chair and Vice-Chair of the Coal Geology Division (now Energy Geology Division) of the Geological Society of America and of Secretary for the Geological Society of Washington (D.C.). If elected, he will continue excellent financial stewardship of the Association.

Ordinary Councilor

Natalie Caciagli is the Senior Manager of Resource Geochemistry at Barrick Gold Corp and an Adjunct Professor with the Mineral Exploration Research Centre at Laurentian University, Canada. She received her PhD in Geology (Experimental Petrology) from the University of Toronto, Canada and her MSc in Geology from the University of California, Los Angeles, USA. Her work focuses on the application of machine learning to integrate geological, geochemical and metallurgical data to support the development and testing of geological, geo-metallurgical and resource models. Her work has broad application in exploration, mineral resource estimates, feasibility studies, and environmental permitting efforts, and the workflows she developed have been incorporated into several commercial software applications.



She has given numerous short courses and lectures on the application of ML and computational tools to the analysis of geochemical data in mineral exploration and mining. She served as an industry member of the Canadian Mining Innovation Council's multi-year Footprints project, which brought together 35 mining industry partners and 40 researchers from 24 Canadian universities. She has been invited to chair sessions on Data Analytics and Geochemistry at the Annual Convention of the Prospectors and Developers Association of Canada, and the Resources for Future Generations and Exploration 2017 conferences.

She also serves on the editorial board of Applied Computing and Geosciences and on the Commission on Women in IAMG and on the IAMG Awards Committee. She has published several papers on experimental igneous petrology and machine learning applications for mining.

If elected, Natalie would bring a unique industry perspective to the Council and would actively work towards greater representation of women in the IAMG and geosciences in general.

Pauline Collon is Associate Professor (Lecturer) of Geomodelling and Hydrogeology at the Nancy Engineering School of Geology (ENSG), Université de Lorraine, France.



She obtained her Engineering degree (2000), Msc (2000) and PhD in Hydrogeology & Civil Engineering (2003) from INPL, Nancy (France), where she worked on reactive fluid transport modeling applied to the water quality after the flooding of iron mines in Lorraine. She was a teaching assistant in Hydrology, GIS and Geosciences at ENGEES engineering school in Strasbourg, France (2004-2005) and became associate professor in the Université de Reims-Champagne-Ardennes, France (2005-2007). In 2007, she moved as associate professor of geomodelling and hydrogeology to ENSG, Nancy. She is part of the research team in integrative numerical geology (RING) led by G. Caumon in the GeoRessources laboratory.

Her work is dedicated to the development of novel

methodologies for the modelling of reservoirs characterized by a complex geometry, like flooded mines, karstic networks or channelized systems. Her research activities are thus at a crossroads between Numerical Geology, Geomodeling, Hydrogeology and Hydrochemistry, Geostatistics.

Pauline is a lifetime member of IAMG. She has been guest editor of a special issue of *Mathematical Geosciences* (2014), associate editor of *Computers & Geosciences* (2016) and has become an Editor in Chief of *Computer & Geosciences* in January 2020. She is a member of the recent IAMG Commission on Women lead by June Hill, and will co-organize the upcoming IAMG annual conference in Nancy in 2021. As a councilor, Pauline wants to help improve the visibility of IAMG and enlarge its community, especially towards young scientists and women.

Jan Harff is currently Professor for Marine Geology at the University of Szczecin, Institute of Marine and Environmental Sciences, Poland. He joined the University of Szczecin after his retirement (2008) as Professor and Section Chief for Marine Geology at the University of Greifswald and the Leibniz Institute for Baltic Sea Research Warnemünde, Germany. His main interest is the integration of marine geosciences and modeling of geoprocesses. Jan received his academic degrees, and did his first steps in science in the former German Democratic Republic (GDR), East Germany. He received his PhD from the University of Greifswald in Mathematical Geology and his DSc in geology from the former Academy of Sciences of the GDR Potsdam, where he had established a department of Mathematical Geology at the Central Institute for Physics of the Earth dealing mainly with sedimentary basin modeling. Vaclav Nemeč' former Eastern European group of the IAMG had paved the road for co-operation with mathematical geologists in the former Soviet Union such as Dimitrii A. Rodionov and Andrej B. Vistelius. After the political changes in Europe, Jan used the new opportunities to extend the co-operation to the West, in particular to North America with partners such as Frits Agterberg, John Davis, John Harbaugh, Dan Merriam, and Ricardo Olea. The changes in the political landscape of Europe allowed Jan also to realize his long-lasting dream to become a marine geologist applying his modeling tools to the marine realm. From his new work locations at the Baltic Sea in Warnemünde and Greifswald he followed the IAMG network and started new co-operation with Zhou Di at the South China Sea Institute of Oceanology in Guangzhou who opened the gate to China for him. Still to this day, Jan is continuing this co-operation with China, including Academy institutes and Universities.



Jan joined the IAMG still during the phase of opening the borders between East and West Europe, ca. 30 years ago. In 1990, he organized at Güstrow, Germany, a symposium "Computerized Basin Analysis", the first international conference ever that the IAMG co-organized in Europe after the fall of the East-West border. From 1996-2000 Jan served as Chairman of the Membership Committee of the IAMG. After he focused his main research field on marine geosciences, he also sought to visibly integrate this research direction into the profile of the IAMG. From 2013 onwards, he regularly organized lectures and topical sessions on modeling issues in marine geosciences at the annual conferences of the IAMG. In 2015 he convened together with Qiuming Cheng an international workshop co-organized by the IAMG in Yantai, China, on marginal seas and their coastal areas. In 2018 he started an international initiative "Eurasian Marginal Seas – past and future (EMS)" as part of the planned co-operation between IAMG and the new DDE Big Science program of the IUGS and tied a network with ca. 40 members from 11 countries. In case of his election as IAMG Councilor he sees excellent opportunities to continue his integration plan of marine geosciences into the IAMG. As he will retire from his position at the University of Szczecin after the summer semester 2020, he will even have more time to

realize these plans. The support and development of the young generation of scientists has a firm place in this plan. Jan has authored and co-authored more than 100 papers, and edited numerous books and International Journals' Special Issues. He received several awards. Most important for him are the William Christian Krumbein Medal 1996, that he was granted by the IAMG in 1998, and the 2013 International Science and Technology Cooperation Award of the People's Republic of China that he received in 2014.

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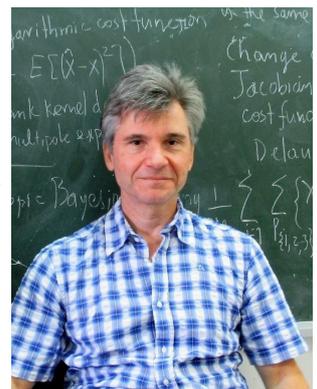
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June Hill is a senior research scientist at CSIRO in Western Australia. Her PhD was in structural and metamorphic geology. Her current research focuses on mathematical, statistical and machine learning methods applied to the interpretation of drill hole data and drill core images for minerals exploration and mining. She is an enthusiastic supporter of compositional data analysis and spreading the word to Australian geologists.



June has had a long history of involvement in the IAMG. She served as the IAMG's councillor for the 34th IGC in Brisbane in 2012 and subsequently as Ordinary Councillor until 2016; as Chair of the IAMG Publication Strategy Commission in 2014 and Chair of the Commission on Women in IAMG in 2018. In addition, she was part of the organising committee of the 18th Annual Conference IAMG2017 in Fremantle, Western Australia. June values integrity and diversity in the IAMG.

Dionissios Hristopoulos is Professor of Geostatistics in the School of Mineral Resources Engineering at the Technical University of Crete (TUC) in Greece. He holds a Diploma in Electrical Engineering from the National Technical University of Athens (1985) and a PhD in Physics from Princeton University (1991). Dionissios worked at the University of North Carolina at Chapel Hill and the Pulp and Paper Research Institute of Canada (currently, FPIInnovations). He moved to the Technical University of Crete in Greece in 2002. Dionissios teaches courses in Engineering Probability and Statistics, Geostatistics, Time Series Analysis, and Physics. His research focuses on new mathematical models for spatiotemporal data. He is the coauthor of 76 peer-reviewed journal publications and the book "Spatiotemporal Environmental Health Modelling" (1998), and the author of "Random Fields for Spatial Data Modeling" (2020).



Dionissios is a lifetime IAMG member since 2014. He serves as Associate Editor for the journals *Stochastic Environmental Research and Risk Assessment* and *Computers and Geosciences*. He also served as Director of Graduate Studies in the School of Mineral Resources Engineering from 2004 to 2009 and as a member of the University Council (board of trustees) of the Technical University of Crete from 2012 until 2017. He has been on the organizing and scientific committees of conferences such as *Spatial Statistics*, *Sigma Phi (International Statistical Physics)*, *Spatial Accuracy and Interpore* and co-organized sessions at the *European Geophysical Union General Assembly* and IAMG conferences. He has coordinated and participated in national and European research projects, and he regularly reviews papers on spatiotemporal statistics and stochastic modeling for various scientific journals.

If elected, Dionissios will seek to promote interdisciplinary collaborations and to further develop links between IAMG and other scientific communities that share mathematical and computational problems with the Geosciences.

Karel Hron is an associate professor of applied mathematics at the Palacky University in Olomouc, Czech Republic, where he also serves as Deputy Head of the Department of Mathematical Analysis and Applications of Mathematics and Vice Dean for External Relations at the Faculty of Science. He holds a Ph.D. in applied mathematics (2007). His research activities focus on statistical analysis of compositional data and its applications, with primary interest in geochemical applications. Karel published over 60 peer-reviewed journal publications since 2007 and co-authored a book in Springer Series in Statistics. He is involved in several projects on national and international level where he promotes compositional data analysis; e.g., he currently leads a project (jointly with the Czech Academy of Sciences) from the Czech Science Foundation called "Separation of geochemical signals in sediments: application of advanced statistical methods on large geochemical datasets" (2019-2021).



He has been a member of the IAMG since 2013 and has attended most IAMG meetings since then. He is an active reviewer for all IAMG journals. In 2018 he received The Editor's Best Reviewer Award from the Mathematical Geosciences. He was the main organizer of the IAMG2018 conference in Olomouc on the occasion of the 50th anniversary of the Association. In 2017-2019 he also served as Secretary General of the Association for Compositional Data which has a strong link to the IAMG.

If elected, he would like to strengthen the collaboration (sharing experiences) between geologists and mathematicians/statisticians and awareness of novel data science approaches through IAMG activities, because everybody needs to use mathematics/statistics for data processing today, and to encourage young researchers to apply for grants and other opportunities provided by the Association.

His name is **Josep-Antoni**

Martín-Fernández, but everybody calls him Martin. Martin has a degree in Mathematics (U. Autònoma de Barcelona, 1986) and received his PhD from the U. Politècnica de Catalunya (2001) working on "Measurements of difference and non-parametric classification of Compositional Data", that was voted the best PhD-thesis in mathematics in 2003. Currently, Martin is Full Professor at the Dept. of Computer Science, Applied Mathematics and Statistics of the U. de Girona, working in the area of Statistics and Operational Research.



Prof. Martín-Fernández's interests lie primarily in the statistical analysis of compositional data (CoDa), with more than 60 publications related with the topic and its applications in geosciences, including work as Guest Editor of several special issues and books. Martin focuses his research on the topics of Cluster Analysis of CoDa and Rounded Zeros and Missing Data. He is leading the CoDa-research group at his university in Girona, where he has conducted several research projects. Since 1997, Martin is working on CoDa-research and collaborating in related activities such as CoDaWork, CoDaCourse, CoDaWeb and CoDaPack (<http://www.compositionaldata.com>). In addition, he is treasurer of the CoDa-Association since 2015 (<http://www.coda-association.org/en/>). The reader is invited to visit <http://imae.udg.edu/~jamf/> for additional information on Martin's activities.

Martin attended his first IAMG-conference in 1997 (Barcelona). Since then, he is a member and an active reviewer of IAMG-journals. According to the statutes the aim of our Association

is "To promote international cooperation in the application and use of mathematics in geoscience research and technology". Prof. Martín-Fernández fully shares this idea and, if elected, he would like to contribute to helping IAMG to promote the dissemination of mathematical geosciences to the wider scientific community.

Alessandra Menafoglio is an Assistant Professor in Statistics at the Department of Mathematics of the Politecnico di Milano, within the laboratory for modeling and scientific computing (MOX). She received her PhD in Mathematical Models and Methods in Engineering in 2015 at Politecnico di Milano. Her research interests focus on the study of innovative statistical models and methods for the analysis of complex and large data (such as curves and images) with spatial dependence, in the context of Object-Oriented Spatial Statistics. Her doctoral thesis was awarded in 2016 with the "Eni Award, Debut in Research Prize". More recently, she was awarded the 2019 Andrei Borisovich Vistelius Research Award by the IAMG.



Alessandra is Associate Editor of the journals Stochastic Environmental Research and Risk Assessment and Applied Computing and Geosciences, and she is a member of the Editorial Board of the journal Mathematical Geosciences. She is member of IAMG since 2014. She has been part of the scientific and organizing committee of several conferences and workshops since 2013, in particular for IAMG 2017, IAMG 2018. She has been active member of Rotaract (an international non-profit organization) since 2005, for which she served as part of a local council for the years 2012–2018 (among the roles covered: president, treasurer, councilor). She served as member of the Statutes Commission for the CoDa Association in 2018-2019; she is part of the Meeting Commission for the same organization since 2019.

Maria João Pereira (born in 1967 in Lisboa, Portugal) is a full professor of Mining and Georesources with the Instituto Superior Técnico, Universidade de Lisboa in Portugal. She received a Mining Engineering degree in 1990, a Ms. Sc. in Mine Planning and Minerlurgy in 1993 and a PhD in Mining Engineering with a thesis on Geostatistics in 1999, from Instituto Superior Técnico. Her scientific interests include development of geostatistical methodologies for application to a wide range of problems in mining, petroleum and the environment, especially those involving industry and societal challenges.



She has a long record in coordinating research and academic activities, she is president of CERENA-Centro de Recursos Naturais e Ambiente, since 2013, a multidisciplinary research center for Natural Resources and Environment with over 80 PhD researchers. She is also the coordinator of the Master in Petroleum Engineering at Instituto Superior Técnico since 2013. She joined the IAMG in 2003 and served as Ordinary Councilor in 2008–2012. She co-chaired the organizing committee of the geoENV 2006 and geoENV 2016 conferences, and also chaired the organizing committee of the ELFMIIII-3rd International Symposium on Enhanced Landfill Mining.

B. S. Daya Sagar is a full professor at the Indian Statistical Institute, Bangalore, India. He served as a Grade-A Research Scientist at the Centre for Remote Imaging, Sensing and Processing (CRISP), The National University of Singapore (1998-2001), and as an Associate Professor at the Faculty of Engineering, Multimedia University-Malaysia (2001-

2007). He received a BSc (1987) majoring in Earth Sciences from Andhra University, followed by an MSc (1991) and PhD (1994) in Geoenvironment and Remote Sensing from the Faculty of Engineering, Andhra University, India. For about three decades, Prof. Daya Sagar has ingeniously used several mathematical tools—Mathematical Morphology, Fractal Geometry and Chaos Theory—to develop powerful algorithms for spatial and spatiotemporal data, most notably Digital Elevation Models (DEMs), covering the following intertwined fields of modeling dynamic earth process behavior: (i) terrestrial pattern retrieval, (ii) terrestrial pattern analysis, (iii) simulation and modeling, (iv) reasoning and (v) visualization of terrestrial phenomena and relevant geoscience processes. Prof. Daya Sagar has to his credit ninety high impact journal publications, and has authored or edited eleven books or journal special issues. His, sole-author, monograph (B.S.D. Sagar “Mathematical Morphology in Geomorphology and GISci”, (CRC Press-Taylor & Francis: 546 pp., 2013)) addresses basic challenges of relevance to the geosciences; for the remote sensing and GIS communities. Prof. John Harbaugh of Stanford University in a letter to the IAMG Newsletter (No. 89, p. 5, 2014) summarises the depth and ingenuity of Daya Sagar’s research - “Today in the hinterlands, there are some mathematical geoscientists doing very original work involving applications that we’d barely thought about earlier.... Daya Sagar of the Indian Statistical Institute at the Bangalore Centre. Notably he’s been at it for two decades... So do you still want to make predictions? Take heart, though, because there are some new tools to help you, and that’s where Daya’s work is relevant”.



He has been highly involved in the activities of the IAMG and other associations. He is a life member of IAMG, has been involved in various IAMG activities since 1999. He guest edited the special Mathematical Geology issue in memory of the Late Professor SVLN Rao (33(3):245-396, 2001). He has reviewed for both Mathematical Geosciences and Computers & Geosciences. He is on the Editorial Advisory Boards of Computers & Geosciences, and Mathematical Geosciences. He was one of the four members of the selection committee for the 2015-Computers & Geosciences research scholarships. Recognizing the importance of IAMG, he has advocated strong interactions within the IAMG, and was successful in establishing the first IAMG student chapter in India in 2014, organized pre-IAMG Conference short courses during IAMG2014, IGC-2016, IAMG2017, IGC-2020. He was and is a member of the International Scientific Committees for IAMG conferences in 2014, 2016, 2018, 2020. Prof. Sagar, as the symposium convener, organised eight sessions for the theme Symposium on “35.1 Mathematical Geosciences and Mineral Resource Evaluation” as part of the 36th International Geological Congress (IGC) - 2020 to be held in Delhi, India. During the last ten years, he has invited several IAMG members including Distinguished Lecturers to India to deliver lectures, and these highly visible activities have helped in significantly popularizing the IAMG in India. He brought increased visibility to the IAMG, IAMG Activities, IAMG Journals, IAMG Awards and Special Lectureships, IAMG award recipients, and IAMG presidents by the way of taking the initiative in the creation and maintenance of Wikipedia web pages by spending hundreds of hours of effort. He was the principal editor of the Golden Anniversary book—B.S.D. Sagar, Q. Cheng, and F. Agterberg, eds., “Handbook of Mathematical Geosciences-Fifty Years of IAMG” Springer-Cham, 942 pp., 2018—launched during the 50th anniversary of the IAMG Congress held at the Czech Republic in 2018, and to date, this book has received over 385,000 downloads. He is currently editing with Prof. Frits Agterberg, Prof. Qiuming Cheng, and Prof. Jennifer McKinley the ‘Encyclopedia of Mathematical Geosciences’ for Springer International Publishers.

As a founding head of the Systems Science and Informatics

Unit (SSIU) that was set up in 2009 at the Indian Statistical Institute-Bangalore Centre, he established Spatial Informatics and Quantitative Geomorphology Research Groups. He has founded the Bangalore Section IEEE Geoscience and Remote Sensing (GRSS) chapter in India, under the auspices of which he arranged several IEEE-GRSS Distinguished Lecture talks, and ten short courses/conferences/workshops conferences / workshops / summer schools on the topics of Mathematical Morphology in Geosciences, Spatial Statistics, and Spatial Data Sciences. He has popularized the subject of mathematical morphology and spatial data sciences and through it motivated some of the best students in India and abroad to pursue this subject in the earth sciences. As Deputy Chair of the Centre for Applied Electromagnetics (CAEM), at Multimedia University-Malaysia, he has organized a group of young researchers engaged in developing algorithms for surficial mapping and terrestrial characterization. He was the principal investigator for several government-funded projects related to earth sciences, and lunar sciences. Of notable importance are the DST-SERB and ISRO projects on Chandrayaan I and II, and the Indo-Trento Projects on Advanced Research (ITPAR). He has guest-edited several special issues of relevance to the geosciences and informatics for International Journal on Pattern Recognition and Artificial Intelligence (17(2):163-330, 2003), Chaos Solitons & Fractals (19(2):237-462, 2004), IEEE Geoscience and Remote Sensing Letters (2(4):375-408, 2005), International Journal of Remote Sensing (31(22):5747-6032, 2010), IEEE Journal of Selected Topics in Signal Processing (6(7):737-886, 2012), IEEE Journal on Selected Topics in Remote Sensing and Applied Earth Observation (10(12) 5149-5328, 2017). He has served and/or is serving as editor / associate editor / editorial board member / chief editor for several journals including Image Analysis & Stereology, Environmental Informatics-Frontiers, Discrete Dynamics in Nature and Society, and he has delivered over 300 invited talks.

Prof. Sagar has received several honours and awards. He was elected as a member of New York Academy of Sciences in 1995, as a Fellow of Royal Geographical Society in 2000, as a Senior Member of IEEE Geoscience and Remote Sensing Society in 2003, as a Fellow of the Indian Geophysical Union in 2011. He is also a member of American Geophysical Union since 2004, and a life member of International Association for Mathematical Geosciences (IAMG) since 2006. He delivered the “Curzon & Co - Seshachalam Lecture - 2009” at Sarada Ranganathan Endowment Lectures (SRELS), Bangalore, and the “Frank Harary Endowment Lecture - 2019” at International Conference on Discrete Mathematics - 2019 (ICDM - 2019). He was awarded the ‘Dr. Balakrishna Memorial Award’ of the Andhra Pradesh Academy of Sciences in 1995, the Krishnan Medal of the Indian Geophysical Union in 2002, the ‘Georges Matheron 2011 Lecture’ of the IAMG, and the IAMG Certificate of Appreciation - 2018. For more details about him, following webpages may be referred at: <http://www.isibang.ac.in/~bsdsagar>, https://en.wikipedia/wiki/B._S._Daya_Sagar.

He, whether elected or not, would continue working in collaboration with IAMG Council to bring increased and sustained visibility to the IAMG and its activities particularly in the global south, and to increase the membership strength of the IAMG.

Sanjay Srinivasan is a professor and the holder of the John and Willie Leone Family chair in Energy and Mineral Engineering and the department head. He is also a faculty researcher affiliated with the EMS Energy Institute. Prior to joining Penn State, Sanjay was a professor in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin. There, he was a focus area lead with the Center for Subsurface Energy Security – a Department of Energy funded Energy Frontier Research Center. His research interests are in spatial statistics, development of geostatistical techniques for data



integration and modeling of complex geological systems and development of heavy oil recovery processes. He has pioneered techniques for monitoring the migration of the carbon dioxide plume during geologic sequestration, for identifying sweet spots in unconventional plays synthesizing information from multiple sources and at multiple scales and for investigating the subsurface couplings that result in natural hazards such as sinkholes. Sanjay completed his Bachelor's in Petroleum Engineering from the Indian School of Mines, Master's in Petroleum Engineering from the University of Southern California and Ph.D. in Petroleum Engineering from Stanford University.

Sanjay Srinivasan served on the Technical Advisory board for the Alberta Ingenuity Center for In Situ Energy at the University of Calgary, is a member of the Editorial Committee of the Society of Petroleum Engineering Journal and is a member of the Editorial Board of the journal Mathematical Geosciences. He was the Chair of the Organizing Committee of the IAMG2019 conference hosted by Penn State University. If elected, he will work with IAMG accelerating the application and development of new methods for quantitative modeling in the geosciences and engineering.

Jie Zhao is an associate professor of Geomathematics and remote sensing in the school of the Earth Sciences and Resources, China University of Geosciences, Beijing (CUGB), where she gives remote sensing, geostatistics, and field courses to graduate and undergraduate students. In 2013, she obtained her PhD degree in the Earth and Space Science from the York University (Canada) with the dissertation on mineral exploration supported by multi-sources geo-information, under the supervision of Dr. Qiuming Cheng. She entered CUGB in the same year of graduation, and became a master supervisor in 2015 and an associate professor in 2016. Her research mainly focuses on mineral exploration modeling, GIS based multi-source geoinformation integration, and remote sensing in geology and environmental applications. Her work has been published in IAMG journals and other journals. She has received several financial supports from the National Natural Science Foundation of China.



She became a lifetime member of IAMG in 2012 and participated actively in the annual meetings from 2016 with oral and posters. In the spring of 2017, she was recommended to serve as a member of the Student Affairs Committee and continued fulfilling the duties including voting on student travel grants, evaluation on student chapters, and discussion with other committees on student affairs until now. Last year, she had co-organized and been the contact person of IAMG session in the international conference on silk-road disaster risk reduction and sustainable development, which enlarged the influence of IAMG on other majors. Based on the serving experiences, she wants to help increasing the visibility of IAMG to non-members, especially the young geologists from other majors to make the association stronger, at the same time, to extend the communication and collaboration among not only IAMG members but also other associations of earth sciences.



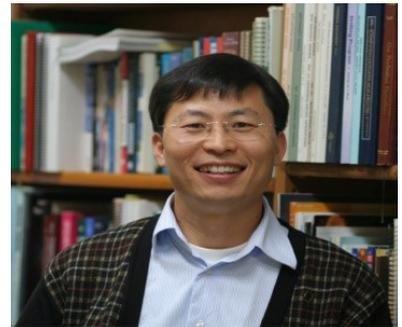
Renguang Zuo is a full professor at the China University of Geosciences (CUG). Dr. Zuo received his Ph.D degree in mathematical geosciences from the CUG in 2009. As a jointly supervised Ph.D candidate by CUG and York University (Canada), Renguang studied for one year at the York University during 2007-2008. In

2014, as a senior visiting scholar, he worked for four months at the James Cook University (Australia). Dr. Zuo has made significant contributions on studying of the spatial distribution of mineral deposits, identification of geochemical anomalies, and integration of multi-source prospecting information. Dr. Zuo has published more than 100 peer-reviewed papers in various journals. He also organized four special issues devoted to Journal of Geochemical Exploration (JGE), Natural Resources Research (NRR), and Geochemistry: Exploration, Environment, Analysis (GEEA). Dr. Zuo has actively participated in the International Association for Mathematical Geosciences (IAMG) activities and contributed to the development of IAMG. Since 2013, Dr. Zuo acted as an associate editor for NRR. In 2017, he acted as an associate editor for Computers & Geosciences. He has supervised more than 20 master and Ph.D students, who are fresh blood and new generation for IAMG.

Dr. Zuo was the first recipient of Kharaka Award by the International Association of GeoChemistry (IAGC) in 2015. He was also awarded the Changjiang Scholar Award in 2018 and the New Century Excellent Talents in University grant of China in 2013 by the Ministry of Education of People's Republic of China. He also was awarded by the Gold Metal Prize of Young Geoscientists by the Geological Society of China. Dr. Zuo was a principal investigator on a research project awarded the Second-class Prize of National Science and Technology Progress Award of People's Republic of China. Meanwhile, Dr. Zuo was elected to the council for International Association of Applied Geochemists (AAG) in 2017, and has become an AAG Fellow in 2016 and Society of Economic Geologists (SEG) Fellow in 2017 for recognition of his outstanding research into the mineral resource exploration.

IGC Councilor

John (Jonggeun) Choe is a full professor at the Department of Energy Resources Engineering at Seoul National University (SNU), Korea. He got his PhD in 1995 from Texas A&M University majoring in Petroleum Engineering after his MS and MS from SNU in Mineral and Petroleum Engineering.



John has been a lifetime member of IAMG and also closely worked with SPE (Society of Petroleum Engineers). He is currently serving as the Program Chairperson of SPE Korea Section since 2010 and has served as technical sub-committee of APOGCE (Asia Pacific Oil & Gas Conference and Exhibition) in 2007, 2009, 2015 to 2019 and also IPTC (International Petroleum Technology Conference) in 2011 to 2017, 2019 to 2020. John also served as an Associate Editor of Journal of Energy Resources Technology from ASME (American Society of Mechanical Engineers).

John's research area includes reservoir characterization and optimal oil field development. His research is supported by many geostatistical methods and optimization schemes for data integration using inverse schemes. He also conducts optimal oil and gas field development with and without considering the uncertainty of reservoir models. Recently professor Choe extended his research interest in utilizing machine learning for reservoir characterization and optimal field development.

John was the recipient of AIME Raymond Memorial Award in 2000 recognizing the best paper published by SPE, ISS, TMS, & SME in a given period written by a member under 33 years old. John has published more than 360 papers, has 5 co-patents, and written 4 textbooks (single authored 3 of them) including a Geostatistics book.

Member News

Greeting from Vaclav Nemeč

On the occasion of this 100th issue of the IAMG Newsletter, founding member Vaclav Nemeč (currently celebrating his 90th year in his hometown of Prague) has sent his best wishes for good health during the coronavirus pandemic to the membership of IAMG with special acknowledgement of his many friends and colleagues.

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Nominations for 2021 IAMG Awards

The Association invites all members to submit nominations for the Founders Scholarship, the Felix Chayes Prize and the Andrei Borisovich Vistelius Award. Please note the Deadline: November 30, 2020.

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 be submitted at any time.

Xiaogang (Marshall) Ma

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Several Vistelius Awardees met at the IAMG 2019 Conference



During the IAMG 2019 conference at State College, PA, USA, I discovered that several Vistelius awardees were present. At a coffee break I managed to ask several of them to come together for a picture. From left to right: Alessandra Menafoglio (2019), Guillaume Caumon (2009), Mohan Srivastava (1993), Xiaogang Ma (2015), Karl Gerald van den Boogart (2003). Other two awardees Qiuming Cheng (1995) and Wenlei Wang (2019) were also at the conference but did not show up at the coffee break. A few months later, at another workshop I met the 1992 awardee Ute Herzfeld – such a small world. Mohan is leading the Geostats2020 conference, to be held in Toronto, Canada, Aug.17-21, 2020. Guillaume is leading the IAMG2021 conference to take place at Nancy, France, Aug. 31 – Sept. 03, 2021.

Xiaogang (Marshall) Ma

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Distinguished Lecturer Reports

Teaser on Jaime Gómez-Hernández 2021 Distinguished Lecture Tour

Our 2021 Distinguished Lecturer, Jaime Gómez-Hernández visited Delhi during the week of the canceled International Geological Conference. Given that the conference did not take place, Jaime got in contact with Prof. N. Janardhana Raju, from the School of Environmental Sciences at Jawaharlal Nehru University (JNU) and organizer of the successful 2014 IAMG Annual Conference to organize a seminar. The talk, which can be considered as a teaser of the upcoming 2021 DL Tour, versed on the ten mistakes to avoid when writing a scientific paper and is based on Jaime's experience as a member of the Editorial Board of Mathematical Geosciences since 2012. The seminar was given on Friday, March, the 6th to a full room of students and professors from JNU and other universities.



Jaime Gómez-Hernández with Prof. Raju and some of the attendees at the door of the School of Environmental Sciences



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Swiss National Science Foundation Fellowships

Through the Ambizione scheme, the Swiss National Science Foundation offers competitive fellowships for young promising researchers (1 to 4 years after the PhD). This scheme supports young researchers both from Switzerland and abroad, for a 4-years project carried out in a Swiss host university. An Ambizione project offers generous funding (CHF 400'000 for 4 years), the possibility to hire a PhD student, and freedom in the research directions. Deadline for applications is the 1st of November 2020, but these should be prepared well in advance, especially to contact a suitable host institution. More details here: <http://www.snf.ch/en/funding/careers/ambizione>

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Invited Talk on Mathematical Morphology

An invited talk on "Mathematical Morphology in Spatial Data Sciences" was delivered on 27th December 2019 at the "National Conference on Data Sciences: A Statistical Perspective", organized to honor Prof. C. R. Rao, FRS on his 100 Years, Osmania University, Hyderabad, India. A YouTube Link of this talk is available at <https://www.youtube.com/watch?v=nRPjoui00>.

B. S. Daya Sagar



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A Brief Summary of Eigen Lore

The record of the history of the Association makes the IAMG Newsletter a valuable resource. But there are other themes that pop up every so often. The history of digging up details of the life of Rudolf Gottlieb Viktor Eigen (1833-1876) "the father of mathematical geology" (or better, grandfather) is one such interesting thread that started early on in 1975 (in NL 6). The origin of the idea is shrouded in the mists of time but most likely, the editor, John Davis, had been looking for material to fill empty space in the newsletter and picked up a remark of a scientist from Austria visiting the Kansas Geological Survey. At coffee break they discussed the origin of the terms "eigen vector" and "eigen value" used in matrix algebra and he mentioned a little known Austrian mathematician named Eigen. Search for more information soon turned up all kinds of interesting details which were published in the newsletter. Most contributors were part of the Kansas computer geology group: Dan Merriam, John Doveton, John Davis, Jo Anne DeGraffenreid, etc., but soon other researchers around the world (e.g Andrej Vistelius, Wolfdietrich Skala) added to the lore, often with contradictory material. And Richard Howarth in his Dictionary of Mathematical Geosciences (2017) claims (without proof!) that the term Eigenvalue "has no connection with the elusive Rudolf Gottlieb Viktor Eigen".



Portrait of R. G. V. Eigen

For our readership, especially our younger ones, not up to date on this topic, we are republishing some excerpts. The full articles can be found on the IAMG website in the Newsletter archive <https://iamg.org/iamg-publications/newsletter.html>. Some of the story was summarized in 1993 by John Doveton and John Davis in the last chapter of the book "Computers in Geology--25 Years of Progress".

The Beginning of the Story (NL6 – 1975)

"Rudolf Gottlieb Viktor Eigen (1833-1876) is remembered by all mathematical geologists for his elucidation of the matrix properties that bear his name. Less well known are his pioneer mathematical investigations of glacial topology that distinguish him as possibly the true "father of mathematical geology." Eigen was born in the Austrian mountain village of Heiligenblut, the second son of a local pastor and, following a brilliant student career at the University of Göttingen, became the youngest professor of mathematics in the history of that illustrious university. The stocky young professor was highly popular with his students although his stringent academic demands earned him the nickname of "Eiger" {ogre}. Eigen's somewhat bohemian lifestyle resulted in conflict with the university authorities and ultimately led to his enforced resignation following a scandal that rocked the university and purportedly involved no less than five professors' daughters. The embittered Eigen returned to Heiligenblut and devoted himself to his second love, mountaineering. The mathematician eked out a modest living by acting as mountain guide for rich Victorian climbers and supplemented his income by delivering invited lectures to mathematical societies in England and France.

"Eigen was acquainted with many of the prominent European mathematicians of the day, including Charles Dodgson ("Lewis Carroll") who may have used him as the inspirational basis for the

Alice character, "the White Rabbit." The Austrian was also a gifted amateur chess player who drew with Morphy in an exhibition match in Paris, using a highly unorthodox opening (still known as the "Eigen Gambit") that anticipated Réti's hypermodern school by some fifty years. Eigen published little and is chiefly remembered for his monumental "Überbrückungsschlüsse der Zahlen" (out of print for many years) and his fragmentary and vituperative correspondence with Cayley (originator of matrix algebra). Eigen's life was prematurely cut short when he fell to his death in a crevasse on the Pasterzen glacier following a successful ascent of the Grossglockner."

More about Eigen... (NL7 - 1975)

"The interest prompted by the announcement of the Eigen centennial has encouraged the publication of more details of the life of this sadly neglected genius. As a young man, Eigen was an ardent, if highly unorthodox, chess player. His interest in the game stemmed partly from a belief that chess could be approached as an 8 x 8 matrix problem and positional play mathematically analyzed in terms of Kernvektoren. Eigen's greatest moment in chess occurred when he met Paul Morphy (considered by some to be the greatest chess player of all time) in Paris in 1858. A casual game between the two men at the Cafe Royal resulted in a draw following an aggressive, if bizarre, opening by Eigen: 1. white (Eigen) Kt - QB3, black (Morphy) P - K4, 2. P - B4, P x P, 3. Kt - Q5!

Although the opening was appropriately christened the "Eigen Gambit," Eigen himself invariably referred to it as "die Primzahlen im Reigen" (dance of the prime numbers). During his brief acquaintance with Morphy, the young New Orleans lawyer introduced Eigen to the mint julep which became one of Eigen's enduring passions and one which he found difficult to satisfy in his native Austria. The Eigen Gambit remains a chess oddity and is rarely, if ever, used in grandmaster play. However, it acquired a mild notoriety in the chess world when it was selected as a central case study in Sigmund Freud's "Die Psychopathologie des Schachspiels" (Vienna, 1925). It would seem that Freud mistook Eigen's matrix approach to chess as symptomatic of an advanced patricidal-anal rejection syndrome."

Conflicting Information - Eigen's Death and Later Life (NL8 - 1975)

"According to our distinguished correspondent A.B.V. (Vistelius) in the Soviet Union, the true story of Prof. Eigen's fate is known only in Russia. This authoritative source relates that Prof. Eigen was not killed by his fall into a crevasse on the Pasterzen glacier, but was rescued through an ice tunnel by the famous Russian writer Kuz'ma Prutkov, who was drinking beer and meditating in an Alpine meadow at the time of Eigen's accident. Mr. Prutkov, after plying Eigen with restoratives, offered him the opportunity to accompany him to Russia as his guest. For personal reasons, Prof. Eigen found it expeditious to accept this generous offer. Unbeknownst to both men, an earlier unfortunate had also fallen on the Pasterzen glacier near the same site. The body subsequently recovered from the ice was mistakenly identified as that of the eccentric geomathematician.

"Later, in Russia, Prof. Eigen embraced the Russian Orthodox faith and traveled widely in Siberia. In the frozen north he worked as a missionary among the wild tribe known to Russian anthropologists as the "chepookha." Prof. Eigen, no doubt sustained by the spiritual wholesomeness of his later lifestyle, survived to the grand age of 111."

EIGEN LIVES! (No. 54 June 1997)

".....his great-grandson Viktor Eigen is very much alive and well and, like his venerable forebear, is a gifted algebraist and essayist with all the intellectual passions and hot-blooded lifestyle that are the birthright of a true Eigen. It appears that Viktor was born in the central European town of Vysherad and attended colleges in Prague and Budapest, before working on a doctorate at the Universitat Berlin. He came to grief with the authorities when he took part in the student uprising of 1953 in the streets of East Berlin. Readers who are familiar with the Eigen temperament and erratic life history should not be surprised to learn that Viktor found himself on a Soviet military plane bound for Siberia, that it was shot down over Alaska, and that he was the only survivor. He laid low so as not to attract the attention of overzealous bureaucrats back in Moscow, and worked on the gold dredges outside Fairbanks. He shares a financial interest in the Bar X Casino on Lake Tahoe with two other rogue mathematicians, which supports some of his far-ranging projects.

"Interested readers are invited to visit Viktor Eigen's page on the web at <http://icecube.acf-lab.alaska.edu/~fsgrb/viktor/viktor.htm> (or use the keywords: Viktor Eigen on one of the search engines). Among other things, you will learn something of Viktor's life history, his love of gambling (but not for gambling), and his sheared rotation of the opening passage of the book of Genesis as documented in the Dead Psi Scrolls."

NL56 1998 - from an anonymized contributor:

"My long-ago, first genealogical endeavor was that of tracing back, from dot to dot, the line of my paternal grandmother. This led eventually to Fagersta and thence to Söderberke—by way of STHLM (Stockholm)! My petition for an audience with RAR (Richard

Reports for 2018 Research Grants

Reyment), the exalted scholar whom I can only regard as Keeper of the Holy Ancient Briefcase, was favorably received. Soon I held in my gloved and trembling hands the actual Eigentum of R.G.V. Miraculously and almost unaccountably, the extraordinary trove of Eigen documents recovered from the dusty garret in Sthlm included a letter presumed to be from English mathematician and writer, Charles Lutwidge Dodgson (1832–1898), intended for his German collaborator, Antonie Zimmermann. How this came to pass we can only speculate, but it is well known that Aloysius Jacobi was an ardent admirer of Queen Victoria and lavished vicarious attention upon Her Majesty's young daughter. Could the letter have inadvertently slipped between the pages of Princess Beatrix's "Alice..." Übersetzung, of which Dodgson (Lewis Carroll) was so proud, thereby falling into the hands of Aloysius? (See IAMG News Letter no. 6.)

Except for a few pleasantries and the initials L.C., the letter to Antonie (written in Dodgson's unmistakable hand) contained nothing but the words of Carroll's rather indifferent poem, "A Game of Fives," of which Verse 5 was doubly underlined:

Five dashing girls, the youngest Twenty-one:

But, if nobody proposes, what is there to be done? — 1869

This is doubtless an allusion to Eigen's Göttingen coterie, the notorious Nachtfalterfünflinge, and its junior member, Annchen von Vysherad.

Although the Rudolf Gottlieb Viktor Eigen Memorial Committee has referred briefly to the incident at Göttingen University (ca. 1860) that forced the resignation of young Prof. Eigen,

"a scandal that rocked the university and purportedly involved no less than *five* [italics mine] professors' daughters" (IAMG News Letter no. 6) there has been no published account of this tumultuous phase of R.G.V.'s early life—a life cut short by the tragic accident on the Pasterzen glacier.

Sentiments expressed by the mid-19th century Göttingen intelligentsia echo in the description of the modern-day Viktor (JD, Newsletter no. 54), who is said to possess "all the intellectual passions and hot-blooded lifestyle that are the birthright of a true Eigen." It is these traits that account for the irresistible, moth-to-the-flame reaction of the fair sex to men such as R.G.V. Eigen and his predecessor, Gordon Lord Byron. Byron wooed his conquests with poetry, Eigen with song. We can imagine the exquisite, golden tenor of young Eigen as he serenaded the Gänseliesel:

I bin a jungs Bürscherl, kann lesn und schreibn,
drei ho da ro, drei ho da ro,
und kann a mein Dianderl die Langweil vertreibn,
drei ho da ro und schneids å!
Man's intellect, through weary toil, grown stale,
besieged by numbers, words, unanswered mail,
finds respite twixt the skirts of fair companions,
and tops it off with several pints of ale! "

IAMG 2011 in Salzburg: Conference and R. G. V. Eigen

"During the Conference field trip to the Penninic Tauern window our group stopped at the Pasterze glacier for a view of the majestic Grossglockner peak and the deep valley carved out by the glacier. There, a brief memorial minute was observed by some members of IAMG, recalling the life of the father of Mathematical Geology.

"This year marks the 135th anniversary of the death of Rudolf Gottlieb Viktor Eigen (1833-1876). For this, and several other reasons it was quite appropriate to hold the 2011 Annual Meeting in Salzburg, Austria: Eigen is said to have died "when he fell to his death in crevasse of the Pasterzen (sic) glacier following a successful ascent of the Grossglockner." Apparently, Eigen worked at that time as a Bergführer (Alpine guide) employed by Cook's Tours (IAMG News Letter # 21-22). Eigen lived in Heiligenblut, where he also spent his youth, a small town not too far from the Pasterze glacier. Perhaps it was no coincidence that the venue chosen for the IAMG meeting, the Natural Science Department of the University of Salzburg, lies just across the Salzach river from a small town on the outskirts of Salzburg, named Aigen. Several participants of the meeting stayed at the Gasthof Überfuhr in Aigen. It is quite possible that the forebears of Rudolf Eigen originally came from this area. When they migrated eventually to Heiligenblut the name of their place of origin became their family name. In the early years spelling of this name was not very consistent, and probably was changed from Aigen to Eigen after a few generations."



Pasterze Glacier and Grossglockner

Harald S. Poelchau

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MG-2018-13: Tong Li - Title: Investigating fluid-rock interaction at the hand-specimen scale via ITRAX

Accessing geochemical compositions on the hand-specimen scale provides important clues towards understanding fluid-rock interaction in mineralization. In this study, we used the ITRAX core scanner to detect the geochemical composition of a hand specimen obtained from Yangshan skarn-type Iron deposits in China. In order to investigate fine-scale nature of element immigration during the fluid rock interaction, the discrete wavelet leader transform combined with log-cumulants was utilized to calculate the multifractal spectrum which can describe the degree of the irregularity and heterogeneity of the distributions. The present results show that the iron, manganese, aluminum, europium, silicon and calcium are multifractally distributed with different singularity spectrum. Among them iron and manganese hold narrower singularity spectrum than other elements, indicating that their distribution are more regular or homogeneous. By comparing the multifractal characteristics between the vein area and the wall-rock area, we show that the distributions of the strongly affected sections (near the vein area) would be more homogeneous than those of the weakly affected sections. This fact demonstrates that the fluid-rock interaction (isomorphism between Fe²⁺ and Mn²⁺) homogenized the nature stochastic distribution of original hydrothermal systems. The multifractal characteristics described by the first two log-cumulants provides a valid way to investigate the intensity of fluid-rock interactions through measuring the heterogeneity of geochemical distributions on the hand-specimen scale.

CG-2018-2: Emma Pearce - Glaciological Applications of Seismic Full Waveform Inversion: Insight from a Novel Approach to Evaluating the Seismic Properties of Ice

The density of snow and ice is an important component of glacier mechanics. Glacier ice is formed from the progressive compaction and densification of snow, hence the density structure through the upper ice column (termed 'firn') preserves a record of climate processes. Therefore the ability to characterise the firn accurately can help to provide information into past climate conditions, along with helping to analyse the stability of an ice shelf. Traditional techniques to model firn require either labour intensive, spatially limited borehole techniques, or the use of empirical conversion. Full waveform inversion (FWI) is a seismic technique that has the potential to mitigate these limitations within glaciology. Initial results from the use of Full Waveform Inversion (FWI) show that velocity layers from ice lenses and firn aquifers that previously were hidden when using the Herglotz-Wiechert technique, can now be modelled through FWI, therefore mitigating the use of intrusive or empirical dependent techniques.

CG-2018-10: Katherine Sánchez Caballero - Geostatistical Modelling of Geotechnical and Hydrogeological Variables

Geotechnical modelling is one of the essential components for the planning and development of open pit and underground mining projects. A particular characteristic of many geotechnical variables is to be direction-dependent, i.e., the measurement of a core sample not only depends on the in-situ position of this sample but also on its in-situ orientation. To take into consideration the direction-dependent nature of geotechnical variables, we proposed to regionalize such variables in a five-dimensional space corresponding to the product on the three-dimensional geographical space and the two-dimensional sphere. In this way, each measurement is labelled by its easting, northing, elevation, azimuth and dip. This approach allows interpolating geotechnical variables at any place in the geographic space and for any direction, instead of making predictions and simulations conditioned in a particular direction. The spatial correlation structure can be inferred and modelled by using separable covariances or combinations of separable covariances, under an assumption of stationarity in the geographical space and isotropy on the sphere. Also, conditional simulation can be performed by turning bands, based on products of stationary random fields in the geographic space and isotropic random fields on the sphere. The proposed methodology illustrated with the modelling of the linear discontinuity frequency (P10).

NNR-2018-5: Yu Wang - Mapping zircon Hf isotope of Yanshanian felsic magmatic rocks of SE South China Block: implications for relationship of regional crustal architecture and metallogensis

The SE South China Block (SE-SCB) holds major records of the transition of tectonic regimes from Indosinian Tethys to Yanshanian subduction of the paleo-Pacific Plate. However, consensus has yet to be reached regarding of Yanshanian geological debates. This paper combines comprehensive Hf isotope data of Yanshanian felsic magmatic rocks and the spatial distribution of mineral deposits, together with synthesized geochemical characteristics of these rocks, to review the SE-SCB crustal architecture and metallogeny. The statistics of recent zircon U–Pb ages indicate three distinct periods of magmatic quiescence: ca. 205–180, ca. 150–140, and ca. 120–110 Ma. The Hf isotopic counter map identifies the Jiangshan–Shaoxing suture as the notable tectonic boundary between the Yangtze Craton



IAMG Journal Reports



Mathematical Geosciences

“Special Issue on the Importance of Geostatistics in the Era of Data Science” for Mathematical Geosciences, Vol. 52, Issue 3 - Springer has kindly made all papers freely available in electronic form until 10 May 2020. The link to the journal issue is <https://link.springer.com/journal/11004/52/3>.

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IAMG Journal Contents

Natural Resources Research

NRR - Volume 29, Issue 1, February 2020

Mineral Resources: The Bread and Butter of NRR — Emmanuel John M. Carranza

ArcFractal: An ArcGIS Add-In for Processing Geoscience Data Using Fractal/Multifractal Models — Renguang Zuo, Jiale Wang

Co-simulated Size Number: An Elegant Novel Algorithm for Identification of Multivariate Geochemical Anomalies — Nasser Madani, Emmanuel John M. Carranza

Geochemical Anomaly and Mineral Prospectivity Mapping for Vein-Type Copper Mineralization, Kuhsiah-e-Urmak Area, Iran: Application of Sequential Gaussian Simulation and Multivariate Regression Analysis — Amirabbas Karbalaei Ramezani, Faranak Feizi, Alireza Jafarirad, Mohammad Lotfi

Boosting for Mineral Prospectivity Modeling: A New GIS Toolbox — Melanie Brandmeier, Irving Gibrán Cabrera Zamora, Vesa Nykänen, Maarit Middleton

Prospectivity Mapping for Porphyry Cu–Mo Mineralization in the Eastern Tianshan, Xinjiang, Northwestern China — Fan Xiao, Kaiqi Wang, Weisheng Hou, Zhenghai Wang, Yongzhang Zhou

Mineral Occurrence Target Mapping: A General Iterative Strategy in Prediction Modeling for Mineral Exploration — C.-J. Chung, A. G. Fabbri

Local and Target Exploration of Conglomerate-Hosted Gold Deposits Using Machine Learning Algorithms: A Case Study of the Witwatersrand Gold Ores, South Africa — Glen T. Nwaila, Steven E. Zhang, Hartwig E. Frimmel, Musa S. D. Manzi, Christina Dohm, Raymond J. Durrheim, Mark Burnett, Leon Tolmay

Discrimination of Mineralized Rock Types in a Copper-Rich Volcanogenic Massive Sulfide Deposit Through Fast Independent Component and Factor Analysis — Saeid Hajsadeghi, Omid Asghari, Mirsaleh Mirmohammadi, Seyed Ahmad Meshkani

Mineral Potential Mapping Using a Conjugate Gradient Logistic Regression Model — Nan Lin, Yongliang Chen, Laijun Lu

Mapping Mineral Prospectivity via Semi-supervised Random Forest — Jian Wang, Renguang Zuo, Yihui Xiong

Prospectivity Mapping for Tungsten Polymetallic Mineral Resources, Nanling Metallogenic Belt, South China: Use of Random Forest Algorithm from a Perspective of Data Imbalance — Tongfei Li, Qinglin Xia, Mengyang Zhao, Zhou Gui, Shuai Leng

Assessment of Various Fuzzy c-Mean Clustering Validation Indices for Mapping Mineral Prospectivity: Combination of Multifractal Geochemical Model and Mineralization Processes — Mehrdad Daviran, Abbas Maghsoudi, David R. Cohen, Reza Ghezlbash, Huseyin Yilmaz

A Bat Algorithm-Based Data-Driven Model for Mineral Prospectivity Mapping — Yongliang Chen, Wei Wu, Qingying Zhao

Practical Implementation of Random Forest-Based Mineral Potential Mapping for Porphyry Cu–Au Mineralization in the Eastern Lachlan Orogen, NSW, Australia — Arianne Ford

A Predictive Geospatial Exploration Model for Mississippi Valley Type Pb–Zn Mineralization in the Southeast Missouri Lead District —

Nathan D. Williams, Brent A. Elliott, J. Richard Kyle

Using Clustered Heat Maps in Mineral Exploration to Visualize Volcanic-Hosted Massive Sulfide Alteration and Mineralization — Leonardo Feltrin, Martina Bertelli

From 2D to 3D Modeling of Mineral Prospectivity Using Multi-source Geoscience Datasets, Wulong Gold District, China — Zhiqiang Zhang, Jiaojiao Zhang, Gongwen Wang, Emmanuel John M. Carranza, Zong Pang, Hao Wang

Three-Dimensional Mineral Potential Mapping for Reducing Multiplicity and Uncertainty: Kaerqueka Polymetallic Deposit, Qinghai Province, China — Yang Wang, Jianping Chen, Donghui Jia

3D Mineral Prospectivity Mapping with Random Forests: A Case Study of Tongling, Anhui, China — Jie Xiang, Keyan Xiao, Emmanuel John M. Carranza, Jianping Chen, Shi Li

Multi-scale Numerical Simulation and 3D Modeling for Deep Mineral Exploration in the Jiaojia Gold District, China — Leilei Huang, Gongwen Wang, Emmanuel John M. Carranza, Jingguo Du, Junjian Li, Zhangbing Zhou, Zhiqiang Zhang, Hao Wang, Xiaoning Liu, Yongming Peng, Fulei Gao, Xianyong Zhao

Exploring Spatially Non-stationary Relationships in the Determinants of Mineralization in 3D Geological Space — Jixian Huang, Xiancheng Mao, Jin Chen, Hao Deng, Jeffrey M. Dick, Zhankun Liu

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Correction to: Projection of Iron Ore Production — Steve Mohr, Damien Giurco, Mohan Yellishetty, James Ward, Gavin Mudd

NRR - Volume 29, Issue 2, April 2020

Prediction of Blast-induced Air Over-pressure in Open-Pit Mine: Assessment of Different Artificial Intelligence Techniques — Xuan-Nam Bui, Hoang Nguyen, Hai-An Le, Hoang-Bac Bui, Ngoc-Hoan Do

Estimation of Blast-Induced Air Overpressure in Quarry Mines Using Cubist-Based Genetic Algorithm — Qiancheng Fang, Hoang Nguyen, Xuan-Nam Bui, Quang-Hieu Tran

Prediction of Flyrock in Mine Blasting: A New Computational Intelligence Approach — Hima Nikafshan Rad, Iman Bakhshayeshi, Wan Amizah Wan Jusoh, M. M. Tahir, Loke Kok Foong

Use of Intelligent Methods to Design Effective Pattern Parameters of Mine Blasting to Minimize Flyrock Distance — Jian Zhou, Mohammadreza Koopialipoor, Bhatawdekar Ramesh Murlidhar, Seyed Alireza Fatemi, M. M. Tahir, Danial Jahed Armaghani, Chuanqi Li

ORELM: A Novel Machine Learning Approach for Prediction of Flyrock in Mine Blasting — Xiang Lu, Mahdi Hasanipanah, Kathirvel Brindhadevi, Hassan Bakhshandeh Amnieh, Seyedamirhesam Khalafi

Random Forest and Bayesian Network Techniques for Probabilistic Prediction of Flyrock Induced by Blasting in Quarry Sites — Han Han, Danial Jahed Armaghani, Reza Tarinejad, Jian Zhou, M. M. Tahir

A Fuzzy Rule-Based Approach to Address Uncertainty in Risk Assessment and Prediction of Blast-Induced Flyrock in a Quarry — Mahdi Hasanipanah, Hassan Bakhshandeh Amnieh

continued on next page

Journal Statistics

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2018 ISI Impact Factor: 2.721 (SJR=0.648)

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NRR continued from p. 16

Prediction of Blast-Induced Ground Vibration in an Open-Pit Mine by a Novel Hybrid Model Based on Clustering and Artificial Neural Network — Hoang Nguyen, Carsten Drebenstedt, Xuan-Nam Bui, Dieu Tien Bui

Novel Soft Computing Model for Predicting Blast-Induced Ground Vibration in Open-Pit Mines Based on Particle Swarm Optimization and XGBoost — Xiliang Zhang, Hoang Nguyen, Xuan-Nam Bui, Quang-Hieu Tran, Dinh-An Nguyen, Dieu Tien Bui & Hossein Moayed

A Novel Artificial Intelligence Approach to Predict Blast-Induced Ground Vibration in Open-Pit Mines Based on the Firefly Algorithm and Artificial Neural Network — Yonghui Shang, Hoang Nguyen, Xuan-Nam Bui, Quang-Hieu Tran, Hossein Moayed

Intelligent Prediction of Blasting-Induced Ground Vibration Using ANFIS Optimized by GA and PSO — Haiqing Yang, Mahdi Hasanipanah, M. M. Tahir, Dieu Tien Bui

Computational Intelligence Model for Estimating Intensity of Blast-Induced Ground Vibration in a Mine Based on Imperialist Competitive and Extreme Gradient Boosting Algorithms — Ziwei Ding, Hoang Nguyen, Xuan-Nam Bui, Jian Zhou, Hossein Moayed

Prediction of Blast-Induced Ground Vibration Intensity in Open-Pit Mines Using Unmanned Aerial Vehicle and a Novel Intelligence System — Xuan-Nam Bui, Yosoon Choi, Victor Atrushkevich, Hoang Nguyen, Quang-Hieu Tran, Nguyen Quoc Long, Hung-Thang Hoang

Prediction of Blast-Induced Ground Vibration in Open-Pit Mines Using a New Technique Based on Imperialist Competitive Algorithm and M5Rules — Qiancheng Fang, Hoang Nguyen, Xuan-Nam Bui, Trung Nguyen-Thoi

Prediction of Vibration Velocity Generated in Mine Blasting Using Support Vector Regression Improved by Optimization Algorithms — Haiqing Yang, Hima Nikafshan Rad, Mahdi Hasanipanah, Hassan Bakhshandeh Amnieh, Atefeh Nekouie

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Prediction of Blast-Induced Rock Movement During Bench Blasting: Use of Gray Wolf Optimizer and Support Vector Regression — Zhi Yu, Xiuzhi Shi, Jian Zhou, Xin Chen, Xiaohu Miao, Bing Teng, Timo Ipangelwa

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Copper Ore Quality Tracking in a Belt Conveyor System Using Simulation Tools — Piotr Bardzinski, Leszek Jurdziak, Witold Kawalec, Robert Król

3D Design of Optimum Complementary Boreholes by Integrated Analysis of Various Exploratory Data Using a Sequential-MADM Approach — Moslem Fatehi, Hooshang H. Asadi, Amin Hossein Morshedy

Integrated Data Assimilation and Distance-Based Model Selection with Ensemble Kalman Filter for Characterization of Uncertain Geological Scenarios — Seojin Lim, Changhyup Park, Jaejun Kim, Ilsik Jang

Assessment of Experimental Semivariogram Uncertainty in the Presence of a Polynomial Drift — Oktay Erten, Eulogio Pardo-Igúzquiza, Ricardo A. Olea

Analysis of Drivers of Trends in Groundwater Levels Under Rice-Wheat Ecosystem in Haryana, India — Omvir Singh, Amrita Kasana, Krishan Pal Singh, Arjamadutta Sarangi

Modeling the Influence of Groundwater Exploitation on Land Subsidence Susceptibility Using Machine Learning Algorithms — Mahtab Zamanirad, Amirpouya Sarraf, Hossein Sedghi, Ali Saremi & Payman Rezaee

Hydrogeologic Characterization of a Fault-Related Dome Using Outcrop, Borehole and Electrical Resistivity Data — Mohamed Attwa, Ahmed Henaish, Sara Zamzam

Critical Zone Assessments of an Alluvial Aquifer System Using the Multi-influencing Factor (MIF) and Analytical Hierarchy Process (AHP) Models in Western Iran — Kamal Taheri, Thomas M. Missimer, Milad Taheri, Hossein Moayed, Fathollah Mohseni Pour

Robust Rule-Based Aggradational Lobe Reservoir Models — Honggeun Jo, Michael J. Pyrcz

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Sampling Methane-Bearing Coal Seams by Freezing Method: Coalbed Methane Desorption and Inhibition Characteristics Under Freezing Temperature — Fakai Wang, Yongjiang Luo, Yunpei Liang, Jianming Peng, Baijun Li

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Han, Guorui Feng, Ao Zhang, Guocai Hao, Lanqing Hu, Liping Zhu, Bo Li

Geological Control of Fold Structure on Gas Occurrence and Its Implication for Coalbed Gas Outburst: Case Study in the Qinan Coal Mine, Huaibei Coalfield, China — Kaizhong Zhang, Liang Wang, Yuanping Cheng, Wei Li, Jin Kan, Qingyi Tu, Jingyu Jiang

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Comparison of the Ability of ARIMA, WNN and SVM Models for Drought Forecasting in the Sanjiang Plain, China — Yuhu Zhang, Huirong Yang, Hengjian Cui, Qihua Chen

Comment on "Comparison of the Ability of ARIMA, WNN and SVM Models for Drought Forecasting in the Sanjiang Plain, China" by Yuhu Zhang, Huirong Yang, Hengjian Cui, and Qihua Chen, in *Natural Resources Research* DOI: 10.1007/s11053-019-09512-6 — Eyyup Ensar Başakin, Ömer Ekmekcioğlu

Response to "Comment on Comparison of the Ability of ARIMA, WNN and SVM Models for Drought Forecasting in the Sanjiang Plain, China" by Eyyup Ensar Başakin and Ömer Ekmekcioğlu — Yuhu Zhang, Huirong Yang, Hengjian Cui, Qihua Chen

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Mathematical Geosciences

MG - Volume 52, Issue 1, July 2020

A Special Issue on Data Science for Geosciences — Vasily Demyanov, Erwan Gloaguen, Mikhail Kanevski

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GPU-Accelerated Simulation of Massive Spatial Data Based on the Modified Planar Rotor Model — Milan Zuković, Michal Borovský, Matúš Lach, Dionissios T. Hristopoulos

MG - Volume 52, Issue 2, February 2020

Downscaling Images with Trends Using Multiple-Point Statistics Simulation: An Application to Digital Elevation Models — Luiz Gustavo Rasera, Mathieu Gravey, Stuart N. Lane, Gregoire Mariethoz

Correction to: Downscaling Images with Trends Using Multiple-Point Statistics Simulation: An Application to Digital Elevation Models — Luiz Gustavo Rasera, Mathieu Gravey, Stuart N. Lane, Gregoire Mariethoz

A Random Features-Based Method for Interpolating Digital Terrain Models with High Efficiency — Chuanfa Chen, Yanyan Li, Changqing Yan

NRR continued from p. 17

Automatic Determination of Sedimentary Units from Well Data — Anna Bubnova, Fabien Ors, Jacques Rivoirard, Isabelle Cojan, Thomas Romary

Efficient Uncertainty Quantification of Reservoir Properties for Parameter Estimation and Production Forecasting — Sean A. McKenna, Albert Akhriev, David Echeverría Ciaurri, Sergiy Zhuk

A Three-Dimensional Analytical Solution for Reservoir Expansion, Surface Uplift and Caprock Stress Due to Pressurized Reservoirs — Magnus Wangen, Gotskalk Halvorsen

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MG - Volume 52, Issue 3, April 2020

A Special Issue on the Importance of Geostatistics in the Era of Data Science — Jennifer M. McKinley, Peter M. Atkinson

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Optimization of a SAG Mill Energy System: Integrating Rock Hardness, Solar Irradiation, Climate Change, and Demand-Side Management — Julian M. Ortiz, Willy Kracht, Giovanni Pamparana, Jannik Haas

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Acknowledgement of Reviewers for 2019 — Petra van Steenberg Pages 443-445

<>

Computers & Geosciences

C&G - Volume 134, January 2020

Optimization of geochemical anomaly detection using a novel genetic K-means clustering (GKMC) algorithm — Reza Ghezlbash, Abbas Maghsoudi, Emmanuel John M. Carranza

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Adaptive step-size fast iterative shrinkage-thresholding algorithm and sparse-spike deconvolution — Shulin Pan, Ke Yan, Haiqiang Lan, José Badal, Ziyu Qin

The CHIMAERA system for retrievals of cloud top, optical and microphysical properties from imaging sensors

Galina (Gala) Wind, Steven Platnick, Kerry Meyer, Tom Arnold, Nandana Amarasinghe, Benjamin Marchant, Chenxi Wang

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C&G - Volume 135, February 2020

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C&G - Volume 136, March 2020

Assessment of the accuracy of several methods for measuring the spatial attitude of geological bodies using an android smartphone — Jue Wang, Nengpan Ju, Chaoyang He, Junchao Cai, Da Zheng

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Imputation of values above an upper detection limit in compositional data — D. Mikšová, P. Filzmoser, M. Middleton

C&G - Volume 137, April 2020

Identifying microseismic events in a mining scenario using a convolutional neural network — Andy H. Wilkins, Andrew Strange, Yi Duan, Xun Luo

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Comparing RSVD and Krylov methods for linear inverse problems — Nick Luiken, Tristan van Leeuwen

continued on next page

NRR continued from p. 18

A 3D model for chimney formation in sedimentary basins — Magnus Wangen

Semi-automated component identification of a complex fracture network using a mixture of von Mises distributions: Application to the Ardeche margin (South-East France) — Arezki Chabani, Caroline Mehl, Isabelle Cojan, Robin Alais, Dominique Bruel

3D modeling of ground-penetrating radar data across a realistic sedimentary model — Philipp Koyan, Jens Tronicke

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ResIPy, an intuitive open source software for complex geoelectrical inversion/modeling — Guillaume Blanchy, Sina Saneiyani, Jimmy Boyd, Paul McLachlan, Andrew Binley

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Applied Computing & Geosciences

AC&G - Volume 2, November 2019

O2S2: A new venue for computational geostatistics — Alessandra Menafoglio, Piercesare Secchi

AC&G - Volume 3-4, December 2019

Improved supervised classification of bedrock in areas of transported overburden: Applying domain expertise at Kerkasha, Eritrea — Shawn B. Hood, Matthew J. Cracknell, Michael F. Gazley, Anya M. Reading

Considerations in the application of machine learning to aqueous geochemistry: Origin of produced waters in the northern U.S. Gulf Coast Basin — Mark A. Engle, Benjamin Brunner

AC&G - Volume 5, March 2020

Compaction trend estimation and applications to sedimentary basin reconstruction (BasinVis 2.0) — Eun Young Lee, Johannes Novotny, Michael Wagneich

Using three dimensional convolutional neural networks for denoising echosounder point cloud data — David Stephens, Andrew Smith, Thomas Redfern, Andrew Talbot, Andrew Lessnoff, Kari Dempsey

Amalgamations are valid in compositional data analysis, can be used in agglomerative clustering, and their logratios have an inverse transformation — Michael Greenacre

Evaluating the classification of images from geoscience papers using small data — Jéssica S. Santos, Rodrigo S. Ferreira, Viviane T. Silva

A plugin for computing the pore/grain network tortuosity of a porous medium from 2D/3D MicroCT image — Waldir L. Roque, Richelieu R.A. Costa

TwinCalc: A multitool for calcite twinning based stress analysis — Jiří Rez

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

2020

GISTAM 2020, 7-9 May, Prague, Czech Republic / streaming online, <http://www.gistam.org/Home.aspx>

AAPG 2020 Annual Convention & Exhibition, 7-10 June, Houston, Texas, United States. <https://ace.aapg.org/2020>

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

13th International Conference on Geostatistics for Environmental Application (geoENV2020), check website for dates, Parma, Italy. <https://2020.geoenvia.org>

Spatial Accuracy 2020, 7-10 July, Buffalo, New York State. <https://sites.google.com/view/spatialaccuracy2020/home>

10th International Conference of the African Association of Women in Geosciences, 27 - 31 July, Luanda / Angola. <http://aawg.org/>

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

36th International Geological Congress (IGC), 9-14 Nov, Delhi, India. <http://www.36igc.org/>

82nd EAGE Conference & Exhibition 2020, December, Amsterdam, Netherlands. <https://eage.eventsair.com/eageannual2020/>

2021

Geostats2020, 11-16 Jul, Toronto, Canada. <http://www.geostats2020.com/home.html>

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

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

The 36th IGC has been postponed until November 9-14, 2020

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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Research Grant Reports continued from p. 15

and the Cathaysia Block. This suture separates two distinct high $\epsilon\text{Hf}(t)$ and comparatively old TDMc domains along the Gan–Hang and segmental southwestern Shi–Hang belts (SH–1), which might indicate reworking of Proterozoic continental crust in an arc setting from the low $\epsilon\text{Hf}(t)$ and old TDMc domain mainly within the interior Cathaysia Block. The Hf isotopic counter map also highlights the Zhenghe–Dapu fault as a lithospheric-scale feature that, separates the juvenile high $\epsilon\text{Hf}(t)$ and young TDMc Coastal Magmatic Belt from the ancient Cathaysia inland. The Yanshanian felsic magmatism and related metallic metallogenic system are well constrained by regional fault zones. The Middle–Late Jurassic porphyry-skarn Cu–Mo–(Au) deposits are correlated mainly with reworked ancient arc-sourced crustal components, and they might be affected locally by mantle-derived material along the Shi–Hang Belt and adjacent areas. Granite-related Pb–Zn–Au–Ag vein deposits cluster mainly in the old crustal block in the interior Cathaysia Block. Most of the Late Jurassic granite-related W–Sn polymetallic deposits are located in a region of reworked ancient crustal components with low $\epsilon\text{Hf}(t)$ and old TDMc values, especially in the Nanling Range and Wuyishan Magmatic Belt. The Early Cretaceous to early Late Cretaceous porphyry-skarn Cu–Mo–(Au) and porphyry-epithermal Cu–Au–Ag deposits are located mainly in a coastal volcanic belt and a locally active area in the Cathaysia inland with high $\epsilon\text{Hf}(t)$ and young TDMc values.

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