



# IAMG

# Newsletter

Official Newsletter of the International Association for Mathematical Geosciences

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It's fantastic to see conferences and events being organised again. Next year in August we will have the IAMG conference in Nancy, France. Other events include CoDoWork 2022 in June, the next Compositional Data Analysis (CoDa) course in July 2022 and the World Mining Congress (WMC) in July 2023.

Qiuming Cheng, our 2022 Distinguished Lecturer, is currently organising his lectures for next year. The topics are listed on page 4, please contact him if you are interested in including your event or institution as part of the series. Please consider nominating someone for the 2022 Georges Matheron Lecturer or the 2023 IAMG Distinguished Lecturer.

I'm looking forward to getting to some of these events and catching up in person.

*Katie Silversides*

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## It's time to nominate candidates for the 2022 IAMG Awards!

The Association invites all members to submit nominations for the 2022 Georges Matheron Lecturer and the 2023 IAMG Distinguished Lecturer.

**Please note the Deadline for all awards:  
January 10, 2022**

For details about prerequisites for nominations please see the IAMG web site (<https://www.iamg.org/special-lectures.html>) 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 documents which should accompany a proposal are:

- A nomination letter/email
- A short statement summarizing the relevant qualifications of the nominee
- A curriculum vitae of the nominee, or link to webpage.

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 for the awards can be submitted via e-mail to [christien.thiart@uct.ac.za](mailto:christien.thiart@uct.ac.za)

*Christien Thiart – Chair of the IAMG Lectures Committee*

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## IAMG is on LinkedIn, Twitter and Facebook!

Join the conversation using  
@IAMG\_Math\_Geo for news,  
journal and conference updates



International Association for Mathematical Geosciences

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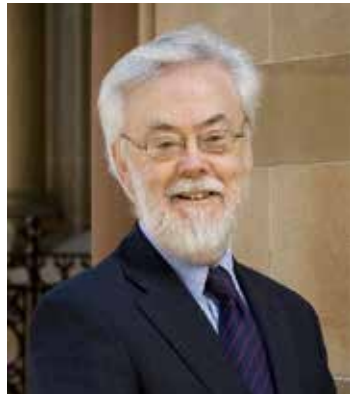
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## PRESIDENT'S FORUM



Dear IAMG Members,

I write this letter as we move toward the end of the second year of the COVID-19 pandemic, which has continued to disrupt our normal activities. In the past, the President's Report has included a list of places visited and events attended, and summaries of the activities that have accompanied them. Given the strictly enforced restrictions on travel this has not been possible over the past year. Whilst some conferences are planned to have in-person participation by early 2022, it is likely that local restrictions and high travel costs will continue to prevent many of us from attending in person. IAMG2022 will proceed as an in-person conference in Nancy, France (30<sup>th</sup> August to 2<sup>nd</sup> September) with remote participation being considered. The deadline for abstract submissions is 1<sup>st</sup> February 2022.

In an attempt to make up for the lack of face-to-face interaction and communication, a virtual online IAMG conference, comprising presentations from recent award recipients, was held on Monday 23<sup>rd</sup> August, Wednesday 25<sup>th</sup> August and Friday 27<sup>th</sup> August. Whilst initial interest was relatively high (115 expressions of interest in attending, equivalent to 19% of the IAMG membership), the actual attendance was low. The maximum number attending the first event was 50, for the second event it was 36 and for the third event it was 32. However, the actual numbers may have been more as the totals do not allow for some members leaving and others joining. The low participation was almost certainly affected by the difficulty of joining at hours from mid-night to dawn for some members depending on their location around the World. A suggestion, from Eric Grunsky, for any future such events is to pre-record the presentations and then present them in two segments, one for eastern hemisphere times and one for western hemisphere times, which would be more suitable for all. The speakers could be present for both segments and answer questions at each, with the advantage that the talks would not have to be presented twice. I encourage all members to submit their views on continuing with such online events and the format in which you would prefer to have them conducted. Many other professional institutions have regular webinars and some of these are made available to the general public, which may be a useful way of promoting IAMG and increasing our membership. Thank you to Regina van den Boogaart for arranging the on-line conference sessions. Videos of most of the presentations are available at: <https://www.iamgconferences.org/IAMGDays2021.html>.

In my first letter I said that I wanted to ensure as wide a participation as possible in IAMG activities in terms of regions/countries, gender, diversity and disciplines and I would welcome suggestions from members on how we could promote and achieve this aim. The ensuing e-mail calling for expressions of interest in joining the various IAMG committees for the tenure of the new Council did not elicit many replies. I encourage all members to engage with Council and to contribute their suggestions for engaging with the membership, promoting the mathematical geosciences and the types of on-line events and other activities they would like Council to consider.

Thank you to Eric Grunsky for his work in securing an Agreement between the IAMG and the European Association of Geoscientists and Engineers (EAGE). The benefits of this Agreement for the IAMG are, *inter alia*, a subscription to the EAGE online *First Break* magazine and the *EAGE Newsletter*; on request, a reduced fee subscription to the EAGE scientific journals (*Geophysical Prospecting*, *Near Surface Geophysics*, *Petroleum Geoscience and Basin Research*); subject to the approval of the editor, inclusion of items or announcements in *First Break* or the *EAGE Newsletter*; and one lecture per year from the EAGE Distinguished Lecturer Programme via a live-stream webinar. In return, EAGE will be able to announce its events in the IAMG newsletters and on the IAMG website; EAGE will receive a subscription to IAMG Newsletters; and, on request, EAGE will receive a reduced fee subscription to the IAMG scientific journals (*Mathematical Geosciences*, *Natural Resources Research*, *Computers and Geosciences*, and *Applied Computing and Geosciences*); and receive a copy of the IAMG annual report. The Newsletter editor, currently Katie Silversides, will review the content of the magazine and newsletter and provide a summary of items that are relevant to the IAMG.

Council has agreed to provide funding to support the Deep-time Digital Earth (DDE) Eurasian Marginal Seas project. This is part of the ongoing support for IAMG/DDE linked, or sponsored, projects. Information on this project can be found on the website for the December 2020 virtual conference: <https://baltic.earth/EMS2/>. The third Marginal Seas conference, *Marine Geology: Marginal Seas - Past and Future*, will be held on-line from the 16<sup>th</sup> to the 19<sup>th</sup> November 2021.

The *Encyclopedia of Mathematical Geosciences*, to be published by Springer, is well underway with an expected publication date of July/August 2022. This initiative is led by Behara Daya Sagar, Qiuming Cheng, Jennifer McKinley and Frits Agterberg. A total of 375 of the 440 chapters have either been submitted or are in production. Authors for the remaining chapters are being sought.

In February, your Council agreed to a proposal to upgrade the IAMG website. A group, comprising myself, Juliana Leung, Katie Silversides and Hron Karel, was formed to implement the proposal. Work on this upgrade began in July with a contracted professional web developer and we expect the new website to be operating by the end of the year. The upgrade includes a comprehensive overhaul and re-design including an outreach section to engage relevant communities and to promote the mathematical geosciences. We would welcome any original, high-quality geological or mathematical geology images to be considered for inclusion on the website.

Congratulations to Professor Qiuming Cheng for being chosen as the IAMG Distinguished Lecturer for 2022. Qiuming is the founding director of the State Key Laboratory for Geological Processes and Mineral Resources at the China University of Geosciences and is a former recipient of the Krumbein Medal.

Thank you for your contributions to IAMG and I look forward to receiving your suggestions for engagement and promoting the mathematical geosciences.

Yours sincerely,

Professor Peter Dowd, FEng, FTSE

President, International Association for Mathematical Geosciences

# Distinguished Lecturer Updates

## Distinguished Lecturer 2021

### Jaime Gómez-Hernández

Jaime Gómez-Hernández has given five Zoom lectures as part of 2021 Distinguished Lecture (Virtual) Tour:

- At the 10th International Geostatistics Congress, on July 15th, "Hindsight talk", organized by Mo Srivastava from Toronto, Canada.
- At the IAMG Days, on August 25th, "The (short) history of contaminant source identification in aquifers", organized by IAMG
- At the Technological University of Uruguay, on September 15th, "Geostatistics, what for?", organized by UTEC, Uruguay
- At the Technological University of Uruguay, on October 19th, "Understanding the kriging equations", organized by UTEC, Uruguay
- At the Climate and Water Security Forum, on October 25th, "The importance to account for hydraulic conductivity heterogeneity", organized by the King Faud University of Petroleum and Minerals, Dhahran, Saudi Arabia.

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## Distinguished Lecturer 2022

### Qiuming Cheng

Qiuming Cheng is a professor at School of Earth Science and Engineering, Sun Yat-Sen University, Zhuhai, China and the founding director of the State Key Lab of Geological Processes and Mineral Resources (China University of Geosciences).

Qiuming Cheng obtained his PhD in Earth Science at the University of Ottawa in 1994. After spending a year as PDF at the Geological Survey of Canada he became a professor with cross appointments in the Department of Earth and Space Science and Engineering, and Department of Geography at York University, Toronto. Cheng became a full professor in Jan 2002 and a professor emeritus in 2016. In 1998 Professor Cheng with other colleagues developed a cross-faculty GIS/RS undergraduate program and state-of-the-art GIS Research and Teaching Labs at York. In 2004 Professor Cheng served as founding director and developed the State Key Lab of Geological Processes and Mineral Resources hosted on the campuses of China University of Geosciences in Wuhan and Beijing. Professor Cheng is currently setting up an International Research Center for Big Data and Geomathematics for Extreme Geological Events on Zhuhai campus, Sun Yat-Sen University.

Qiuming Cheng's research on the new fractal density and local singularity theory and geomathematical models made major impacts on studying hydrothermal mineralization and other disciplines. He has authored or co-authored more than 300 refereed journal papers and 20 book chapters and delivered over 100 invited keynote or plenary presentations. Professor Cheng has received several prestigious awards including the Krumbein Medal, the highest award bestowed by the International Association for Mathematical Geosciences (2008), the National Science and Technology Progress Award awarded by the Chinese Government (2013), and the AAG Gold Medal, the highest award bestowed by the International Association of Applied Geochemists (AAG) (2020). Professor Cheng served as associate editor for Computers & Geosciences and the Journal of Exploration Geochemistry. Professor Cheng co-chaired two IAMG Annual Conferences (Toronto, 2005, Beijing, 2007). He has served as President of the International Association for Mathematical Geosciences (2012-2016), President of the International Union of Geological Sciences (IUGS) (2016-2020) and member of the Committee of Science Planning of International Science Council (ISC) (2019-). Professor Cheng was elected a Member of Chinese Academy of Sciences (MCAS) (2019) and a foreign member of Academia European (MAE) (2020).

Professor Cheng has prepared the following topics and he is willing to discuss possibilities if there are other topics of interest.

1. Mathematical geoscientist at earth science frontiers
2. Data-driven earth science and knowledge discovery
3. Mathematical modeling of plate tectonics geodynamics
4. Big data analytics for mineral resources quantitative assessments
5. Fractal density and local singularity theory and applications in geosciences
6. Geomathematical models and tools for modelling extreme geological events

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## Distinguished Lecturer 2020

### Peter Atkinson

Peter Atkinson gave these lectures as the delayed 2020 Distinguished Lectures:

- 25.08.2021 - IAMG Virtual Conference, Adelaide, Australia. The Importance of Representations for Spatial Data Science
- 13.07.2021 - Geostats 2020 Conference, Toronto, Canada. 20/20 Hindsight Talk
- 18.06.2021 - GeoENV 2020, Parma, Italy. Implications of the PSF for Downscaling and Image Fusion in Remote Sensing
- 26.05.2021 - Indian Statistical Institute, India. The Importance of Representations for Spatial Data Science
- 15.04.2021 - GISRUK 2021 conference, Cardiff University, Wales, UK. A Novel Paradigm for Simultaneous Land Use and Land Cover Classification
- 26.11.2020 - International Geospatial Week, National Geographic Institute of Colombia, Columbia. Trends in Geospatial Data Science and Remote Sensing
- 12.11.2020 - IAMG Student Chapter, University of Freiberg, Germany. Implications of the PSF for Downscaling and Image Fusion in Remote Sensing
- 2020 - Spatial Accuracy conference, Buffalo, USA (invited, cancelled)

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## Student News

### Student Grants 2021

CG-2021-6: Ismael Dawuda, The Pennsylvania State University. History matching of data for point bar reservoirs: a two-step ensemble-based data assimilation approach

CG-2021-8: Bojun Yin, China University of Geosciences (Wuhan). Mineral prospectivity mapping via the recurrent neural networks

CG-2021-11: Mingliang Liu, Stanford University. Upscaling of Properties in Digital Rock Physics using Deep learning and Computational Modeling

CG-2021-13: Georg Semmler, TU Bergakademie Freiberg. GeoHub: Sustainable Geomodeling

MG-2021-1: Teeratom Kadeethum, Cornell University. Data-driven model hyper-reduction for nonlinear multiphysics

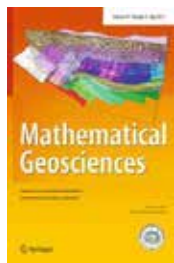
MG-2021-5: Janire Uribe Asarta, Polytechnic University of Valencia (UPV). Data-driven ensemble surrogate modeling to solve forward problems in groundwater management

MG-2021-9: Detao Wang, State Key Laboratory of Geological Processes and Mineral Resources. Intelligent Seismic Stratigraphic Interpretation Using Temporal Convolutional Network

NRR-2021-1: Zhiqiang Zhang, School of Earth Sciences and Resources, China University of Geosciences, Beijing. Uncertainty quantification algorithm via machine learning in three-dimensional mineral potential mapping

NRR-2021-5: ZiJing Luo, China University of Geosciences. Detection of Geochemical Anomalies Related to Mineralization Using the GANomaly Network

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# IAMG Journal Reports



## Call For Papers

### Mathematical Geosciences Special Issue on data-driven discovery in Geosciences

#### Guest Editors:

- Guoxiong Chen (China University of Geosciences, Wuhan, China)
- Qiuming Cheng (Sun Yat-sen University, China)
- Steve Puetz (Progressive Science Institute, USA)

As a typical data-intensive discipline, the geosciences (in both academic and industrial communities) are seeing unprecedented opportunities in the era of big data and artificial intelligence (AI). This special section of Mathematical Geosciences will explore scientific research on Data-driven Discovery in Geosciences and will provide a timely presentation of critical progresses in the applications and developments of machine (deep) learning and other data science, as well as AI approaches to a wide range of Earth science topics. We welcome relevant contributions as review or research papers that provide new ideas, models and methods regarding the use of data-intensive scientific paradigm for addressing fundamental questions of Earth science, as well as assisting in mineral and oil/gas exploration and prediction.

#### Main topic:

- Data-driven discoveries focusing on major Earth science questions for exploring the Earth's past, present, and future,
- Big data discovery for resources prediction and assessment, and
- Intelligent geophysical and geological modeling using machine (deep) learning.

#### Timelines:

A tentative title and an abstract (300–500 words) should be sent to the Guest Editors by November 30th, 2021. Full manuscripts should respect the journal's guidelines for authors and be submitted online using the Editorial Manager system.

- Paper submission before: March 31st, 2022
- Return of reviews to authors before June 30th, 2022
- Submission of final papers deadline: September 30th, 2022
- Publication: Late 2022

Submit Papers online through the journal's website  
<http://www.springer.com/journal/11004>

When submitting, you must choose, under 'Select Article Type,' the SI: "Data-driven Discovery in Geosciences."

Submitted manuscripts must fully comply with the journal's Instructions for Authors in preparing manuscripts.

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*Editor-in-Chief: R. Dimitrakopoulos*

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### New Editor-in-Chief for Computers & Geosciences

Derek Karszenberg has stepped down as an Editor-in-Chief of Computers & Geosciences. Ute Mueller has stepped up to join Pauline Collon and Dario Grana as a joint Editor-in-Chief.

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### Free Open Access Publication in Applied Computing and Geosciences

Applied Computing & Geosciences is the IAMG's newest journal, and a companion to Computers & Geosciences. Published by Elsevier, it is an online-only, open access journal focused on all aspects of computing in the geosciences.

Until 30<sup>th</sup> September 2022, all special issue papers, invited articles, and transferred articles from Computers & Geosciences will be published free of charge.

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### Fee changes for Computers & Geosciences

The open access publication fee in CAGEO will increased 3% from \$3,520 to \$3,630 from 1st January 2022.

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## Journal Statistics

### Mathematical Geosciences:

- 2019 ISI Impact factor: 2.471
- 5-Year Impact Factor: 2.183
- Ave. review time: 53 days (submission to first decision 2020)
- 261 days (submission to final decision 2020)

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### Computers & Geosciences:

- 2019 ISI Impact Factor: 2.991
- 5-Year Impact Factor: 3.339
- Ave. review time: 7.7 weeks (submission to first decision 2020)
- 12.2 weeks (submission to final decision 2020)

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### Natural Resources Research:

- 2019 ISI Impact Factor: 3.708
- Ave. review time: 32 days (submission to first decision 2020)
- 128 days (submission to final decision 2020)

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## Member News

### Hutton Series Final Report

IUGS President Prof. John Ludden has been leading a series of workshops in identifying ten priorities for tackling climate change. This was undertaken in Panmure House, Edinburgh, the home of Adam Smith the economist. James Hutton the famous geologist worked with Smith and the series is named the Hutton Series and follows an Enlightenment style debate which brings together science and engineering, business and government and the concerned public. The outputs are in a final report. We hope that the actions will be implemented and we expect IUGS as a geoscience organisation to contribute to thinking about how we as geoscientists will underpin the energy transition.

To review the final report, please see: <https://www.panmurehouse.org/programmes/hutton-series/series-reports-perspectives/hutton-series-on-climate-change-final-report/>

*IUGS Secretariat*

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# Upcoming Meetings



**IAMG 2022**

International Association  
for Mathematical Geosciences  
21<sup>th</sup> annual conference  
August 29 - September 3, 2022  
**NANCY, FRANCE**

## Abstract submission now open!

Our 21st annual conference, IAMG 2022, will take place in Nancy, France from Aug 29 to Sept 3, 2022. We welcome contributions from all areas of Mathematical Geosciences and Geoinformatics either to one of our 15 focal topical sessions or to one of the general conference themes around common methods and topics. We expect the conference to mainly take place in person, but we are also considering the option for a hybrid event to accommodate for possible evolutions of the pandemic situation. As always, the conference will feature special events for young scientists, like the best student presentation awards and a Hackaton. We expect one-page abstracts with an optional figure as explained on the conference web page:

<https://iamgconferences.org/iamg2022/authors.php>  
before **February 28th 2022**.

In case of questions, please contact [iamg2022@iamgmembers.org](mailto:iamg2022@iamgmembers.org).

We are looking forward to meeting you in Nancy!

### World Mining Congress (WMC)

The World Mining Congress (WMC) is the leading international forum for the global mining and resources sectors. It will be held in Brisbane, Australia, in June 2023. <https://wmc2023.org/>

Abstract submission closes 1 March 2022.

#### AI Session:

The meeting will demonstrate how digital technologies, including artificial intelligence and automation, are transforming workplaces generally and the minerals industry specifically. We will explore the latest advances in deep learning relevant to mining as well as specific applications of AI to mining currently in development. We will look at the evolution of time series and spatial models through the application of AI while also considering the architecture and data governance arrangements necessary to underpin the use of AI technologies.

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Universitat de Girona, July 4-8 2022

The week-CoDaCourse

### 9<sup>th</sup> Course and Open Seminar on Compositional Data Analysis



The **one-week Compositional Data Analysis** course (the week-CoDaCourse) is scheduled to be back face-to-face in 2022. This will be the 9th edition of the course to be held in Girona (Spain) from the 4th to the 8th of July 2022.

Please visit <http://www.compositionaldata.com/codacourses.php> for registration and further details.

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## Jobs

### Assistant Professor (tenure track) in 4D digital field and structural geology

The Faculty of Geosciences and the Environment (FGSE) of the University of Lausanne invites applications for a professorship in 4D digital field and structural geology, to be based in the Institute of Earth Sciences (ISTE).

We are looking for a candidate capable of leveraging remote sensing technologies (e.g., UAV mapping, structure from motion, LiDAR, hyperspectral and thermal cameras, inSAR, airborne imagery, geophysics) to advance field-focused structural geology research. We are particularly interested in research aiming at understanding the formation of mountains, their transformations and rock deformation through space and time (4D) by linking surface observations with, for example, deep structural constraints offered by geophysics, structural geology concepts or process-based modelling. The ideal candidate has a strong collaborative spirit and is willing to develop scientific collaborations over multiple domains of expertise within the Earth sciences. Knowledge about geology of the Alps and/or future research plans for this region is desirable. We are also interested in candidates addressing societal challenges related to the environment, resources or infrastructure. A willingness to contribute to structural geology teaching including field-based courses is expected.

Candidates must demonstrate a capacity to undertake high quality research, to obtain research funding, and to publish in peer-reviewed international research journals. A demonstrated potential for teaching and for supervising master and doctoral theses is required. A good command of French and English is preferable. If French is not the native language, teaching ability in French has to be acquired within two years of the appointment.

Application deadline: 15th of December, 2021 (23:59 Swiss time GMT+1)

The PDF application can only be submitted through this website: <https://bit.ly/2XOa7zz>

Or [www.unil.ch/central/en/home.html](http://www.unil.ch/central/en/home.html) -> Careers at UNIL -> Emplois -> Postes ouverts -> English -> structural geology (or ad 18207)

# CoDaWork 2022



From an image of ©Grafton Architects 2019

## The 9th International Workshop on Compositional Data Analysis June 28 to July 1, 2022 Toulouse, France



Organized within the



with the endorsement of the

**CoDa Association**

and of the



### Contact

Organizing Committee

[OC-codawork2022@tse-fr.eu](mailto:OC-codawork2022@tse-fr.eu)

CoDaWork 2022 is the ninth edition of the International Workshop on Compositional Data Analysis. This forum is intended for discussion of research issues related to theory and applications of the statistical analysis of Compositional Data. The fields of applications involve in particular economics, official statistics, medicine, biology, genetics, microbiome, chemistry, earth and environmental science.

Prior to the Workshop, a one-day course on Compositional Data will be organized. During the Workshop, there will be invited talks, oral and poster contributions. There will be no parallel sessions.

### Venue

The Workshop will take place at the Université Toulouse 1 Capitole within Toulouse School of Economics (TSE).

### Organizing Committee Chair

Christine Thomas-Agnan, TSE, Université Toulouse 1 Capitole

### Scientific Committee Chair

Vera Pawlowsky-Glahn, Universitat de Girona, Spain

### Register on

<https://www.coda-association.org/en/codawork2022/>

### Important dates

January 16, 2022: **abstract due**

February 28, 2022: **notice of abstract acceptance**

April 19, 2022: **early registration**

May 2, 2022: **extended abstract due**



Visit the website for updated information

<https://www.coda-association.org/en/codawork2022/>

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(IAMG)

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