15TH JULY 2024 | #1

9TH EUROPEAN CONGRESS OF MATHEMATICS

ECM Sevilla2024

July 15th to 19th

9ECM Daily News

Information and current events from the Congress

Let's start!

Dear Participants of the 9th European Congress of Mathematics. It is a great pleasure, as president of the Organizing Committee, to welcome you to the University of Seville. Together with the EMS and all the committees involved, we did our best to offer you an attractive program: conferences, panel discussions, activities and exhibitions, from all areas of Mathematics and their applications, so you can learn interesting new mathematics and, at the same time, meet and discuss with your colleagues from all around the world.

We are particularly happy that we were able to offer financial support to 120 mathematicians having difficulties to attend the congress. We thank our sponsors and exhibitors, and we are so grateful for the amazing response of the mathematical community.

We hope that you will spend a wonderful week, and that you will remember with pleasure your stay in Seville. Thank you so much for coming. **Enjoy the 9ECM!**

Juan González-Meneses, president of the Organizing Committee

“Organizing the congress is a recognition of the enormous development of Spanish mathematical research in the last 30 years”

Juan González-Meneses, president of the 9ECM Organizing Committee

Juan González-Meneses López (Seville, 1973), graduated in Mathematics from the University of Seville in 1996 and received his doctorate from the universities of Burgundy (France) and Seville in 2000. His entire professional career is linked to University of Seville, where he is Full Professor of Algebra since 2020, although he has carried out research stays in New York (USA), Rennes (France), Singapore, Lisbon (Portugal), Sydney (Australia), Amiens (France) and Providence (USA). He studies braid groups and their generalizations (Artin groups, Garside groups and mapping class groups) from a theoretical and also algorithmic point of view, as well as algebraic and homological invariants of knots and links. Seven of his articles are among the 100 most cited in the world in their category, an area in which he has collaborated with renowned international experts such as Joan S. Birman, Luis Paris, Volker Gebhardt and Bert Wiest. Among other positions, he has been chair of the Algebra Department of his university and coordinator of the Spanish Topology Network. In the field of mathematics education, he created the web intermatia.com, which has received several awards. He is the president of the 9th European Congress of Mathematics (9ECM) Organizing Committee.

How and why did you decide to launch the candidacy to host the 9ECM?
The idea arose about 10 years ago from the Mathematics Research Institute of the University of Seville, IMUS. The director at the time, Luis Narváez, brought a few young people together to launch the idea of presenting a candidacy to organize the next ECM. We are not so young anymore, but in the end we have succeeded.

Was it complicated? Who were the other candidates?
The first time we tried, the other candidate was from Portoroz, Slovenia, and they were the ones that won. They organized the 2020 event, which unfortunately had to be moved to 2021 due to the pandemic. The second time, with more experience, we applied to get the 2024 congress and we faced the Lisbon candidacy, which was also very strong. And this time we got it.

What relevance does having organized this Congress have for Spanish Mathematics?
It is a very important recognition of the enormous development that mathematical research has had in Spain in the last 30 years. We went from having little importance in mathematical research to being a very powerful country. In Spain, the same is true for Andalusia, and specifically for the University of Seville. That they have chosen us to organize this congress is truly a very important recognition.

What have been the most difficult moments in organizing the congress?
Well, perhaps the biggest difficulty has been convincing the authorities about the importance of this event, of the exceptional nature of this congress, compared to others held throughout Spain. It wasn't easy, but I think we succeeded.

I imagine that, as usual, the main problem is getting enough funding, right?
Yes, of course. This is not a good time to get a lot of funding. But we have effectively managed to have some funding at all levels: national, regional, provincial and local. But what we are really very grateful for is the impressive response that the Spanish mathematical community, mathematical societies, research centers, faculties, or even individual mathematicians, have given us. They have supported us financially and with help of all kinds in the organization of this congress. We're really grateful for that.

The number of participants right now is estimated at around 1,300. Is it in line with previous editions?
Yes, just over 1,200 participants and 100 volunteers, plus their companions, who can also attend. In the end there are more than 1,300 people participating in the congress activities. I think that in the last in-person one, which was in Berlin in 2016, there were about 1,100 participants. It cannot be compared to 2021, because a good part of that congress was online.

Is it a handicap to do it in Seville in July?
Well, it may be that for some people it is. We have tried to convince the participants that, if there is a place that can deal with high temperatures, that place is Seville. There are other European cities that, in the event of a sudden heat wave, as has happened sometimes, are probably not prepared to deal with it, making it really difficult to be there. But hey, Seville is a very attractive city. It is true that there are high temperatures in July, but let's see if we are lucky and they are slightly lower than we are used too. In any case, we will try to make sure that participants are comfortable and can enjoy the congress without any problem.

Let's talk about the scientific content. Is it on par with other conferences?
Well, the scientific level is well above that of most congresses. And compared to other conferences of this magnitude, it is up to par, because some of the best mathematicians in the world are coming. We could begin to list the many awards that every one of them has won, such as the Abel Prize or the Fields Medal, but it is not just about that. The quality of the plenary sessions, of the guest speakers, and many of those participating in mini symposia and other lectures given at the Congress, is absolutely exceptional.

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Is there a topic right now that is, let's say, fashionable within the world of mathematics, and that therefore attracts the most attention?
Well, now everyone is talking about artificial intelligence, of course, and how it can be applied to different aspects of life or even within mathematics. In fact, there will be a round table on artificial intelligence. But there are many other interesting debates about which there will also be round tables, such as open scientific publications or mathematics education. Then there are areas of mathematics that will be more present at this congress because of the research tradition that exists in Spain, such as partial differential equations or mathematical analysis, although it is very distributed. There are also several mini symposiums on applications of mathematics to biology, for example, or round tables on the role of women in mathematics, the relationship between more and less developed countries, young people and their future... Well, there are many topics, all very interesting. Some are more fashionable than others sometimes, but I think that in the end they will all be very interesting.

Sometimes there are surprises at conferences, presentations that suddenly make that conference memorable. I imagine that such a surprise cannot be anticipated, but do you suspect any issue that could cause a stir?

The prize winners are exceptional mathematicians, who have managed to win one of these prestigious awards thanks to their important discoveries

Well, we can't know, as you say. It is something that we will have to see as we go along and, perhaps, it will not be in one of these big lectures where the rest of the congress stops to listen, but rather, where you least expect it, a result is announced that leaves everyone surprised. It wouldn't be the first time. We will be very attentive to see if we have some of these surprises that really make science go forward.

Perhaps the surprise will come from the hand of one of the prize winners.
It is very possible. The prize winners are exceptional mathematicians, who have managed to win one of these prestigious awards thanks to their important discoveries. Their names will be revealed at the opening ceremony, and during the congress they will tell us about their great achievements.

You have mentioned the issue of women before. There will be an exhibition and a round table on the topic. Is the presence of women and men balanced?
Well, in the plenary speakers we are in a 30-70 ratio, which is similar to the two previous editions. We try to take this criterion into account and in the Organizing Committee we are nine women and nine men, and in the public lectures there are two and two.

And what about the participants?
In the registration form there is a section to indicate gender, but it is not mandatory. According to the current data, there are 265 women and 467 men, that is a 36% of women, but there are a lot of participants that have not indicated their gender. I do not have that information from previous congresses.

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Bologna will host the next ECM that will take place in 2028

This weekend the EMS Council held its biennial meeting in Granada

Last weekend, the Council of the European Mathematical Society (EMS) met in Granada. Among the most anticipated decisions was the selection of the next ECM headquarters, set for 2028. Out of the two candidates, London and Bologna, a significant majority of the 66 Council members present and eligible to vote **chose the Italian city.** This information was provided by Luis Narváez, professor in the Department of Algebra at the University of Seville and member of the Executive Committee of the EMS. The Council meeting, which traditionally occurs before each ECM, will be held in Venice.

New members of the Executive Committee were also elected or re-elected. George Buescu of the University of Lisbon was confirmed as vice-president; Victoria Gould of the University of Kent was appointed vice-president, replacing Beatrice Pelloni of the University of Edinburgh; and secretary Jirí Rákosník, from the University of Prague, was also re-elected. Susanna Terracini, University of Turin, and Barbara Kaltenbacher, University of Klagenfurt, Austria, were also confirmed as members of the Committee and three new members were elected, the Spanish Mª Ángeles García Ferrero, from the Institute of Mathematical Sciences (ICMAT) and the Autonomous University of Madrid; Adam Skalski, Institute of Mathematics of the Polish Academy of Sciences; and Alain Valette, University Neuchâtel. They will incorporate on the 1st of January, when Frédéric Hélein, University of Paris Diderot, and Luis Narváez, University of Seville, will cease as members.

The Executive Committee is made up of ten people: president, two vice presidents, secretary, treasurer and five members. It is **responsible for the regular management of the institution** and meets two or three times a year. The presidency can only be held for four years and the term of the current president, Jan Philip Solovej, ends in 2026. The Council is the supreme authority of the organization. It meets at least once every two years, and its powers include admitting new corporate members, setting dues, approving budgets, and electing the president and other members of the Executive Committee. In addition, the EMS has committees dedicated to various activities: Applied Mathematics Committee; Committee for developing countries; Committee to support mathematicians in Eastern Europe; Education Committee; Electronic Publications Committee; Committee for the popularization of Mathematics; Women and Mathematics Committee; and ERCOM (European Research Centers on Mathematics.

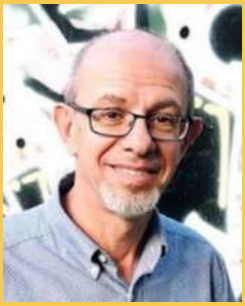
ON TODAY'S MENU

Opening and Award Ceremony

10:00. TEATRO DE LA MAESTRANZA. Paseo Cristóbal Colón, 22

Today at 10 in the morning the opening ceremony of the Congress will take place with the attendance of various national, regional and local authorities as well as members of the organizing committee and the president of the European Mathematical Society. The highlight of the session will be the presentation of the ten EMS awards to mathematicians under 35 years of age, and the Felix Klein Prize, for applied mathematics; Otto Neugebauer Prize, for history of mathematics; Lanczos Prize, for mathematical software; and Paul Lévy Prize, for probability theory. The event will include a musical performance by (David) Dorantes, an internationally famous Sevillian pianist, specialized in flamenco and jazz.

PUBLIC LECTURE

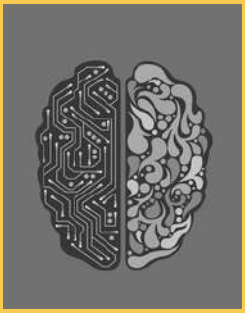


José Ferreirós: Tales of (mathematical) Paradise

16:00. SCHOOL OF ENGINEERING ROOM A

José Ferreirós, professor of Logic and Philosophy of Science at Universidad de Sevilla, specialist in the history and philosophy of mathematics. His conference will start remembering what Hilbert said, a century ago: nobody shall expel us from the Cantorian paradise. The theory of sets had emerged rather suddenly, exactly 150 years ago, with a surprising paper of Cantor that has a peculiar inner story. In this history talk, Ferreiros will present three key moments from the early history of set theory: 1874 and the birth of transfinite cardinalities under funny circumstances; 1905, when the schism between constructivists and 'formalists' emerged; and 1925, with the debate between critics (Weyl, Brouwer, Skolem) and partisans of the higher infinite.

PANEL DISCUSSIONS



Mathematics & Artificial Intelligence

17:30. SCHOOL OF ENGINEERING ROOM 301

In recent years, artificial intelligence has imploded, a technology that has actually been in the making since the 1950s and that has a common base: mathematics. What can AI do to help solve math problems? And vice versa, what can be the fundamental contributions of mathematics to the development of AI? Can these make these new AI tools trustworthy and prevent threats and risks? This panel organized by the Basque Center for Applied Mathematics (BCAM) will seek to answer these questions to understand what steps the mathematical community must take to address these challenges. Among the speakers there will be experts such as Luis Vega, from BCAM; Matti Lassas, from the University of Helsinki; and Begoña Vitoriano, from the Complutense University of Madrid.

How to Enhance Mathematical Competence? Lessons from great-scale assesments

18:30. SCHOOL OF ENGINEERING ROOM 304

The Royal Spanish Mathematical Society (RSME) and the European Mathematical Society (EMS) organize a round table to address the challenges and strategies in teaching university mathematics, motivated by the worst historical results of Spanish students in Mathematics according to the PISA 2023 Report. The event will feature the participation of experts such as Luis J. Rodríguez-Muñiz, second vice president of the RSME and professor at the University of Oviedo; Nuria Climent, president of the SEIEM and professor at the University of Huelva; Susana Carreira, from the University of Algarve in Portugal; Giorgio Bolondi, of the Free University of Bozen-Bolzano in Italy; and Andreas Eichler, from Universität Kassel in Germany. Panelists will discuss active methodologies that encourage critical thinking and conceptual understanding, adapting traditional principles to the needs and diversity of today's students.

INVITED LECTURES

Michael Wemyss

15:00. SCHOOL OF ENGINEERING ROOM 7

University of Glasgow (UK). LMS Whitehead Prize (2017), Adams Prize (2020), currently holds an ERC Consolidator Grant. His main research interest lies at the interface between noncommutative and homological algebra on one hand, and the minimal model program on the other, and he remains perpetually puzzled as to the precise relationship between the two.

David Hernandez

15:00. SCHOOL OF ENGINEERING ROOM 207

Université Paris Cité (France). Jacques Herbrand Prize, an ERC Consolidator grant and France-Berkeley Fund award. His research domain is representation theory, currently in relation to cluster algebras, quiver varieties and quantum integral models.

Matti Lassas

15:00. SCHOOL OF ENGINEERING ROOM 301

University of Helsinki (Finland), director of Centre of Excellence on Inverse Modelling and Imaging. Calderon Price, Vaisala Prize, E.J. Nyström Prize and an ERC advanced grant. His research comprises inverse problems, partial differential equations, and mathematics of machine learning.

Svitlana Mayboroda

15:00. SCHOOL OF ENGINEERING ROOM 304

ETH Zürich and University of Minnesota (USA). Director of the Simons Collaboration on the Localization of Waves (interdisciplinary project devoted to the behavior of waves in disordered media). US Blavatnik National Award (2023), AWM-Sadosky Prize in Analysis (2014), Alfred P. Sloan Research Fellowship (2010) and invited speaker at the ICM 2018.

Mario Salvetti

15:00. SCHOOL OF ENGINEERING ROOM 312

University of Pisa (Italy). Full professor of Geometry since 1994. ‘Ricercatore’ at the Scuola Normale Superiore, associate professor in Pisa, full professor at the University of Basilicata, then at L'Aquila and finally in Pisa. Director of the Department of Mathematics from 2003 to 2010.

YESTERDAY AT A GLANCE

Participants arrival and registration

Yesterday afternoon, the delivery of accreditations to the congressmen began at the Faculty of Fine Arts of the University of Seville, between 6 and 8 in the afternoon, with a large influx of participants. Those who were not able to register yesterday **will be able to do it today**, **between 8 and 10 am**, **at the Teatro de la Maestranza**, where the opening ceremony of the 9ECM will take place.

5 mathematical talks and a panel discussion by the European Women in Mathematics

On Sunday, about 60 people attended one of the parallel activities of the congress at the Faculty of Fine Arts. It was organized by the **International Association European Women in Mathematics** (EWM), with Diane Mclagan, Sylvie Paycha and Laura Saavedra in charge.

It first consisted of **five talks by five women mathematicians.** Elena Gaburro, from the University of Bordeaux, talked about advanced numerical methods for simulations in fluid-dynamics and astrophysics. Tara Brendle, from the University of Glasgow, talked about symmetries of surfaces. Jessica Fintzen, from the University of Bonn, made an introduction to representations of p-adic groups. Maria Yakerson, from the University of Oxford, give her talk called 'The beauty of the beast' about the moduli spaces called Hilbert schemes. Finally, Chiara Saffirio, from the University of Basel, went into the effective evolution equations of many interacting particles.

Afterwards all of them participated in a panel discussion where they told their **personal experiences on how to build a career and to overcome obstacles**, such as dealing with pressure and stress, organizing time and how not to feel frustrated. Throughout the day there were also plenty of networking opportunities and time for sightseeing, for example the Pantheon of Illustrious Sevillians.

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Exhibitions

Evolution of Cartography in the Modern Age

Until July 20 you can visit the exhibition *Maps. Cartographic heritage in Seville from the 15th to the 18th centuries*, which shows a selected collection of maps and books with maps from the period ranging from the end of the Middle Ages and the beginning of the Renaissance to the Enlightenment, from the Archive of the Indies, the Library Colombina and the University of Seville. It consists of 29 works, of

which 7 are incunabula (published until 1500), 12 were published in the 16th century and the remaining ten in the 17th and 18th centuries. Some of these pieces are of exceptional value and in some cases have not previously been shown to the public. The exhibition is installed at the Cajasol Foundation (Plaza de San Francisco, entrance on Álvarez Quintero Street), from Monday to Saturday **from 11 a.m. to 2 p.m. and from 6 p.m. to 9 p.m**.

Enjoying Seville

Real Alcázar

Declared a World Heritage Site by UNESCO, the Real Alcázar of Seville is the **oldest palace** in use in Europe. Its origins date back to the 11th century, when the Muslim authorities decided to build a fortress in a strategic area of Seville to guarantee their security. It is one of the most complex and important buildings in the world; the diversity and uniqueness of its almost-labyrinthine rooms are of extraordinary value and has experienced key moments in Spanish History like the arrival of the Taifa kingdoms, the Almohad Caliphate and the conquest of the Christian tropos of Castille. It has been residence of Al-Mutamid, Ferdinand III "The Saint", Peter I "The Just", Isabella of Castille, or Emperor Charles, between others.

The 9ECM has organized a **cultural visit to the Real Alcázar on July 15th, 16th and 17th from 20:00 to 21:00** for participants who wish it. If you are interested, please register in the web of the Congress.

STAFF

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The content of this magazine does not necessarily reflect the opinion of the organisation.

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