ICIAM Dianoia. Volume 11, Issue 2 April 2023

This issue of ICIAM Dianoia comes to you in April - Spring in the Northern Hemisphere. And Spring is a reminder that Summer is not far away, and with it the upcoming ICIAM Congress: ICIAM 2023 in Tokyo. You will find important reminders for people who plan to attend the Congress in this issue. Spring is also a time when prizes are announced - news on that, also, in this issue. Happy reading and happy travels.

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Message from the President of ICIAM

The ICIAM 2023 congress is approaching. It will be held in Tokyo, the capital of Japan, from August 20 to 25, 2023. According to the congress organizers, it is expected that the number of participants will reach about 5000, which will make ICIAM 2023 bigger than any previous ICIAM congresses. The number of submissions for mini-symposia has also reached a new record, above the previous Beijing and Valencia congresses. That shows the interest of the community to attend the congress and participate in its scientific program. Apart from the mini-symposia, we will have a beautiful series of invited talks, selected by a high-level international scientific committee, led by Professor Yasumasa Nishiura. There will also be the Olga Taussky-Todd Lecture lecture delivered this time by Professor Ilse C.F. Ipsen and two public lectures, by Prof. Noboru Kikuchi and Prof. Padmanabhan Seshaiyer respectively. There will also be all the conferences organized within CSIAM, JSIAM and SIAM annual meetings, that will be embedded into the congress. The ICIAM prize lectures will complete the scientific program, and I assume that there will also be prize lectures organized by SIAM, corresponding to its prizes. All that certainly means a large number of very interesting talks. The complete program, that contains also an industry day, can be consulted in the congress website (http://iciam2023.org).

This year's ICIAM Board meeting will take place on August 26th 2023, right after the end of the congress. Several important decisions will be made in this board meeting, including the election of four Officers (the Treasurer and three officers at large) and the choice of the Scientific Program Committee (SPC) for the next congress (The Hague, 2027), whose chair will be Professor Barbara Wohlmuth. The organizing committee of ICIAM 2023 will also present a first report about the congress.

Similar to what ICIAM has been doing in previous congress years, the day before the beginning of the congress, there will be a meeting of the presidents of member societies present in Tokyo. This meeting is naturally less formal than the Board meeting, has no particular rules for its agenda, and the main goal is to discuss ICIAM matters of interest to every society, as well as to find possible new activities that could enrich the current list. That meeting will take place on August 20th, 2023.

I am sure that ICIAM 2023 will be a great success, and I look forward to seeing many of you in Tokyo in August!
Ya-xiang Yuan
President of ICIAM

Ya-xiang Yuan

Ya-xiang Yuan is the current President of ICIAM (2019-2023). He is a professor at Academy of Mathematics and Systems Sciences, Chinese Academy of Sciences. His research focuses on optimization.

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ICIAM Reminders: April 2023

Members are reminded to update their Society's information:

ICIAM maintains a self-service membership directory at https://www.iciam.org/members. Please take this opportunity to check your membership information, and update it if appropriate. Instructions on how to update your entry or to add new information can be found in our membership FAQ, https://www.iciam.org/faq-members.

Members may also be interested in ICIAM's Conference Support Program for Applied and Industrial Mathematics in Developing Countries:

In addition to in-person meetings, ICIAM currently offers support for virtual meetings, for example by sponsoring waivers of registrations fees for participants from developing countries, or by supporting streaming or recording services. ICIAM encourages conference organizers to apply for support for virtual meetings using the general principles outlined in the announcement. Click here (https://iciam.org/iciam-conference-support-applied-and-industrial-mathematics-developing-countries) for details.

Here's a reminder that you can download a PDF file of any issue of ICIAM Dianoia (as long as the editor has remembered to set it up). Clicking on the "Downloads" button at the top of the browser view of the newsletter will bring up a screen that offers you a choice of A4 or US Letter to fit your printer.

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The 2023 ICIAM Officers

Ya-xiang Yuan (President), Wil Schilders (President-Elect), Suzanne Shontz (Secretary), Heike Fassbender (Treasurer), Luis Vega and Liliane Basso Barichello (Officers-at-large)

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Four Important Topics Related to ICIAM 2023

We would like to inform you about four important topics related to ICIAM 2023:
[1] Registration
[3] Hotel Reservations

[1] Registration Fee
Please note that registration has already started, and that the Early Bird deadline is April 20, 2023 (AoE).
Please refer to the following web page for registration details:
Registration
(https://urldefense.com/v3/__https://iciam2023.org/571__;!!KGKeukYl06FAJPh5NcNoQJu9wgD0XYNYfrxPTLjHbagGNuizT5K8alXT8zrPkJg$)

If you require visa support, you can find information on the web page linked below. Please note that the cost of the visa support is included in the registration fee, but you will need a registration number in order to obtain an invitation letter.
Visa Acquisition Support
(https://urldefense.com/v3/__https://iciam2023.org/1519__;!!KGKeukYl06FAJPh5NcNoQJu9wgD0XYNYfrxPTLjHbagGNuizT5K8iXSFj-hsvw$)

[3] Hotel Reservations
Hotels in Tokyo are expected to be crowded during the conference time period. We encourage you to make hotel reservations by yourself, as soon as possible. We have asked Waseda University Academic Solutions, Inc. (WAS) to keep rooms at a discounted rate. As a subsidiary of Waseda University, WAS has been providing solutions for university administration for many years.
The hotel reservation application page, provided by WAS, is accessible from the ICIAM 2023 Web site. The number of rooms is limited. If you would like to make a reservation, please contact WAS after carefully reading the cancellation policy and acknowledging your responsibility for any cancellations. Please note that many of the rooms offered at the discount price will be closed by the end of March 2023.
Hotel Information
(https://urldefense.com/v3/__https://iciam2023.org/578__;!!KGKeukYl06FAJPh5NcNoQJu9wgD0XYNYfrxPTLjHbagGNuizT5K8alXTZZmmBjg$)

We have asked WAS to offer flight reservation support. If you would like to reserve flights using WAS, please contact them after carefully reading the cancellation policy and assuming responsibility for any cancellations.
Flights
(https://urldefense.com/v3/__https://iciam2023.org/2364__;!!KGKeukYl06FAJPh5NcNoQJu9wgD0XYNYfrxPTLjHbagGNuizT5K8iXRzfzpLtw$)
The main ICIAM 2023 web page
(https://urldefense.com/v3/__https://iciam2023.org__/!!KGKeukYl06FAJPh5NcNoQJu9wgD0XYNYfrxPTLjHbagGNuizT5K8aMX1XQ87sEs6A$).
We are looking forward to meeting you at ICIAM 2023 Tokyo.
With best regards,
Shin'ichi Oishi
ICIAM2023 Congress Director
Professor, Waseda University, Tokyo, Japan

Shin'ichi Oishi
Shin'ichi Oishi is a Professor at Waseda University, and is the Director of the ICIAM 2023 Congress. He is also the director of Japan Society for Industrial and Applied Mathematics and Japan Society for Simulation Technology.
The Quarterly Online Meeting with the ISC President - January 25, 2023

Comments by D. Armbruster and M.J. Esteban on the quarterly online meeting with the ISC president - 25 janvier 2023

The International Science Council (ISC) is currently going through an intense transformation, trying to define better what the organization is and what it wants to be in the future. In this direction, the ISC Board is having long discussions about strategic priorities.

The ISC wants to engage with the multilateral system: it has started meetings with the UN secretary’s office, with UN agencies, with UNESCO and with the World Bank. After those conversations, the global system is better understood, which allows for a better view of how the ISC could work and contribute as the global voice of science. The ISC will soon sign MOUs with UN organizations on specific topics, and has just signed a MOU with the World Health Organization (WHO). The collaboration with the WHO started thanks to the excellent report prepared by ISC about COVID; that report was highly appreciated by the WHO.

Some of the topics of interest and goals for the ISC and the scientific community at large:

- How to enhance trust in scientific knowledge
- Boost the involvement of ISC in the evolution of the science system. A new science policy committee has been set up (Dieter Armbruster sits on this committee following a nomination by ICIAM). This will allow ISC to develop new insights about how to evolve, what to modify in current practices, etc. The goals are more efficiency and better visibility.
- Reflection about where and how to be active in the area of science education. At the global scale this is a difficult topic but maybe there is room for some action concerning teachers’ education. There is ongoing exploration of the possibilities in this direction.

Some current actions of ISC:

- Increase the ISC Fellowship: after the recent nominations there are 120 ISC fellows (M.J. Esteban was elected ISC fellow following the nomination by ICIAM). A fellowship council has been created and is invited to Board meetings. An ISC Officer is involved in looking for ways to involve the fellows in important activities within ISC or in collaboration with other partners.
- Help in creating an academy of the Pacific Islands.
- The ISC has recently issued a statement about women excluded from university in Afghanistan. A dialogue has been proposed to the Afghan authorities about women’s education. But it is not easy to get concrete results from those conversations. What can be done? Maybe somebody should be appointed in science diplomacy.
- The ISC is involved in the promotion of science and technology for sustainability. This is an important topic in the discussions with the UN.
- The 2023 Mid-term Meeting of ISC Members will take place in Paris in May.
- The ISC is thinking about launching an online platform to facilitate discussions and collaboration between ISC members. Maybe the DiSCORD tool could be used for this purpose. This issue will be discussed in Paris in May.
- A number of young academies have already accepted the invitation to join the ISC, and a current ballot is going on to increase their number. Being able to hear the younger voice in commissions, discussions, etc, is very important for the ISC.

Some recent publications:

- Conference on the Ukraine Crisis: Responses (https://council.science/events/conference-on-the-ukraine-crisis-responses-from-the-european-higher-education-and-research-sectors/) from the European higher education and research sectors:
Finally we listened to a brief presentation about the recent ISC Global Knowledge Dialogue which took place in South Africa. Many African organizations participated, discussed and spoke about future actions. A new Knowledge Dialogue meeting will take place in Latin America / Caribbean later in the year.

At the end of the meeting a Q&A session was opened. ISC members present in the meeting were able to comment and ask questions about the actions organized by the ISC and about its plans for the future.

Dieter Armbruster and Maria J. Esteban
Dieter Armbruster is Emeritus professor at Arizona State University and Member of the ISC Standing Committee for Science Planning 2022-2025; Maria J. Esteban is Emerita senior researcher at C.N.R.S, and past-president of ICIAM.

ISC Statement on the Exclusion of Women from University Education in Afghanistan


Latin American Congress on Industrial and Applied Mathematics (LACIAM2023)

The School of Applied Mathematics of the Getulio Vargas Foundation (FGV EMAP), in partnership with the Brazilian Society of Applied and Computational Mathematics (SBMAC), held, between January 30 and February 3, 2023, at FGV, in Rio de Janeiro, the first edition of the Latin American Institute of Industrial and Applied Mathematics (LACIAM). The main goal was to unify efforts to consolidate and strengthen the advances achieved by Mathematics and its applications, in addition to the growth in the use of Applied and Computational Mathematics in different areas of activity. In particular, with a focus on Latin American researchers.

LACIAM aimed to bring together researchers, students and other professionals from different centers in Latin America and other parts of the world that are working with Applied Mathematics and related areas. The program included plenary talks, thematic sessions, short courses, poster presentations and panel discussions. In this edition, special emphasis was given to the participation of young researchers, with financial assistance for travel and accommodation, in addition to prizes for the three best poster presentations, and for the creation of collaborative networks between existing research groups.
There were more than 250 participants from different 25 nationalities, including researchers from Europe, United States, Russia and Canada, in addition to Latin America. The areas of interest of the event were all disciplines related to Applied, Computational and Industrial Mathematics.

Due to the success of the event, the next edition of LACIAM was also announced at the closing ceremony by the next Coordinator, Prof. Luis Briceño, and will be held at the Universidad Tecnica Federico de Santa, Valparaíso, Chile from January 19 to 23, 2026. The idea is to turn LACIAM into an itinerant event in the area of Applied Mathematics, with a new edition every three years.

There is an event website (http://eventos.fgv.br/laciam-2023) with more information and the full schedule.

There one can find more details, including the organizing and scientific committees, and a list of the plenary talks.

The event was organized by the School of Applied Mathematics (FGV EMAp) and the Brazilian Society of Applied and Computational Mathematics (SBMAC) and had financial support from FGV EMAp, SBMAC, the Coordination for the Improvement of Higher Education Personnel (CAPES, Brazil), the Center for Mathematical Modernization in Key Areas for Development (MODEMAT, Ecuador), the Center for Mathematical Modeling (CMM, Chile), the Center for Mathematical Sciences Applied to Industry (CeMEAI, Brazil), the International Mathematical Union Comission for Development Countries (IMU-CDC), the Carlos Chagas Filho Foundation of Research Support of the State of Rio de Janeiro (FAPERJ, Brazil) and the National Institute of Mathematics Science and Technology (INCTMat, Brazil).

The event consisted of 11 plenary lectures, two short courses, two discussion panels, 14 thematic sessions with more than 100 lectures, two poster sessions with more than 35 presentations, 8 coffee breaks, a cocktail and a lunch offered by FGV EMAp. In addition, the conference social dinner was held at the restaurant Fogo de Chão Botafogo. The slides and posters of the presenters are available at the conference website.

Current and recent ICIAM officers were featured at the meeting. Wil Schilders gave an address titled "Mathematics: Key Enabling Technology for Scientific Machine Learning", and also participated in a round table on New Challenges in the Modern Industrial Mathematics, shown in the figure; Liliane Basso Barichello spoke at a round table on Policies focusing on Gender Equality in Applied Math across Latin American Countries, Volker Mehrmann, Maria Esteban and Poti Cuminato were members of the organizing and scientific committees.

The conference counted 254 participants, 61 from foreign institutions, distributed in 25 countries, and 33 from Brazilian institutions. Given the diversity of topics addressed in the Plenary Talks and Thematic Sessions, the event was an excellent opportunity to disseminate to the Latin American mathematical community (researchers and graduate students) some of the most important recent advances in the various areas of mathematics and their applications.

Group Picture of the LACIAM 2023 Conference.
The Mathematical Congress of the Americas 2025: First Announcement

The fourth Mathematical Congress of the Americas, MCA 2025, will take place in Miami, Florida, USA; the dates are July 21-25, 2025. The Congress web page (https://www.math.miami.edu/mca/) has more details about the venue and the organization of the Congress.

A Call for Proposals (https://www.math.miami.edu/mca/docs/call-for-proposals.pdf) for Special Sessions has been announced.

This will be the first time that the Congress will take place in the United States.

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Congratulations from SIAM to ICIAM's President-Elect

April is Mathematics and Statistics Awareness Month in the United States. Each year, the Joint Policy Board for Mathematics—a collaboration between SIAM, the American Mathematical Society, the American Statistical Association, and the Mathematical Association of America—holds a month-long celebration to enhance public understanding and appreciation of mathematics and statistics. Mathematical and statistical research drives technological innovation and leads to discoveries of broad societal importance across many scientific fields.

In honor of Mathematics and Statistics Awareness Month, SIAM will be highlighting influential mathematicians and statisticians from our community, starting with Dr. Wil Schilders.


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Luis A. Caffarelli Awarded the 2023 Abel Prize

The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2023 to Luis A. Caffarelli of the University of Texas at Austin, USA.
Differential equations are tools scientists use to predict the behaviour of the physical world. These equations relate one or more unknown functions and their derivatives. The functions generally represent physical quantities, the derivatives represent their rates of change, and the differential equation defines a relationship between the two. Such relations are common; therefore, differential equations play a prominent role in many disciplines including engineering, physics, economics, and biology.

Partial differential equations arise naturally as laws of nature, to describe phenomena as different as the flow of water or the growth of populations. These equations have been a constant source of intense study since the days of Isaac Newton and Gottfried Leibniz. Yet, despite substantial efforts by numerous mathematicians over centuries, fundamental questions concerning the existence, uniqueness, regularity, and stability of solutions of some of the key equations remain unresolved.

**Technically virtuous results**
Few other living mathematicians have contributed more to our understanding of partial differential equations than the Argentinian–American Luis Caffarelli. He has introduced ingenious new techniques, shown brilliant geometric insight, and produced many seminal results. Over a period of more than 40 years, he has made groundbreaking contributions to regularity theory. Regularity – or smoothness – of solutions is essential in numerical computations, and absence of regularity is a measure of how wildly nature can behave.

“Caffarelli’s theorems have radically changed our understanding of classes of nonlinear partial differential equations with wide applications. The results are technically virtuous, covering many different areas of mathematics and its applications,” says chair of the Abel Committee Helge Holden.

A large part of Luis A. Caffarelli’s work concerns free-boundary problems. Consider, for instance, the problem of ice melting into water. Here the free boundary is the interface between water and ice; it is part of the unknown that is to be determined. Another example is provided by water seeping through a porous medium – again the interface of water and the medium is to be understood. Caffarelli has given penetrating solutions to these problems with applications to solid–liquid interfaces, jet and cavitational flows, and gas and liquid flows in porous media, as well as financial mathematics.

**Enormous impact on the field**
Caffarelli is an exceptionally prolific mathematician, with more than 130 collaborators and more than 30 PhD students over a period of 50 years.

“Combining brilliant geometric insight with ingenious analytical tools and methods he has had and continues to have an enormous impact on the field,” says Helge Holden.

Luis A. Caffarelli has won numerous awards, among them the Leroy P. Steele Prize for Lifetime Achievement in Mathematics, the Wolf Prize and the Shaw Prize.

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**The Wolf Prize in Mathematics for 2023 is Awarded to Ingrid Daubechies**

Ingrid Daubechies is awarded the Wolf Prize for her work in the creation and development of wavelet theory and modern time-frequency analysis. Her discovery of smooth, compactly supported wavelets, and the development of biorthogonal wavelets transformed image and signal processing and filtering. Her work is of tremendous importance in image compression, medical imaging, remote sensing, and digital
photography. Daubechies has also made unparalleled contributions to developing real-world applications of harmonic analysis, introducing sophisticated image-processing techniques to fields ranging from art to evolutionary biology and beyond.

Daubechies’s most important contribution is her introduction in 1988 of smooth compactly supported orthonormal wavelet bases. These bases revolutionized signal processing, leading to highly efficient methods for digitizing, storing, compressing, and analyzing data, such as audio and video signals, computed tomography, and magnetic resonance imaging. The compact support of these wavelets made it possible to digitize a signal in time linearly dependent on the length of the signal. This was a critical ingredient for researchers and engineers in signal processing to be able to rapidly decompose a signal as a superposition of contributions at various scales.

In subsequent joint work with A. Cohen and J.C. Feauveau, Daubechies introduced symmetrical biorthogonal wavelet bases. These wavelet bases give up orthonormality in favor of symmetry. Such bases are much more suitable for treating the discontinuities arising at the boundaries of finite-length signals and improving image quality. Her biorthogonal wavelets became the basis for the JPEG 2000 image compression and coding system.

Ingrid Daubechies is a Belgian mathematician and physicist at Duke University in Durham, North Carolina. She earned her bachelor’s degree in physics from the Free University of Brussels in 1975. She then continued her research at the same university, earning her doctorate in physics with a thesis on the Representation of quantum mechanical operators by kernels on Hilbert spaces of analytic functions.

Ingrid Daubechies’ love for math and science was nurtured from a young age. Her father fostered her curiosity and interest in these subjects while she was in school. As a child, she was fascinated by how things worked and how to construct them, as well as the mechanisms behind machinery and the truth behind mathematical concepts. She would even calculate large numbers in her head when she couldn’t sleep, finding it captivating to see the numbers quickly grow.

Professor Ingrid Daubechies has made significant contributions to the field of wavelet theory. Her research has revolutionized the way images and signals are processed numerically, providing standard and flexible algorithms for data compression. This has led to a wide range of innovations in various technologies, including medical imaging, wireless communication, and even digital cinema.

The Wavelet theory, as presented by the work of Professor Daubechies, has become a crucial tool in many areas of signal and image processing. For example, it has been used to enhance and reconstruct images from the early days of the Hubble Telescope, to detect forged documents and fingerprints. In addition, wavelets are a vital component of wireless communication and are used to compress sound sequences into MP3 files.

Beyond her scientific contributions, Professor Daubechies also advocates for equal opportunities in science and math education, particularly in developing countries. As President of the International Mathematical Union, she worked to promote this cause. She is aware of the barriers women face in these fields and works to mentor young women scientists and increase representation and opportunities for them.

Press Release

The ICIAM newsletter was created to express the interests of our membership and partner organizations and the views expressed in this newsletter are those of the authors and do not necessarily represent those of ICIAM or the Editorial team. We welcome articles and letters from members and associations, announcing events, on-site reports from events and industry news.

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