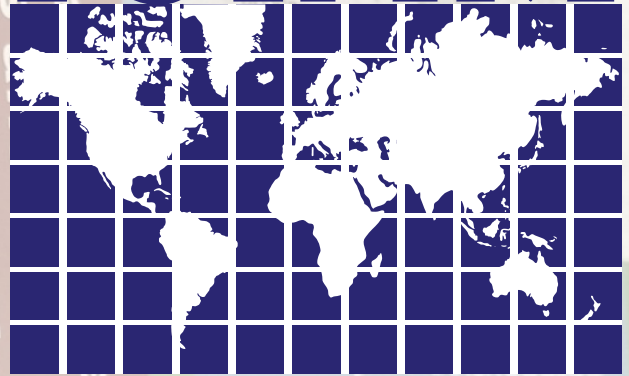


ICIAM



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On the cover: the cover of this issue reflects the diversity of industrial mathematics. With its emphasis on real-world problems, the discipline is focussed on furthering the establishment and dissemination of links between mathematics and the physical world.

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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. www.iciam.org
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ICIAM Announcements

by MARIA J. ESTEBAN

The 2017 ICIAM Board meeting in Valencia

Two days prior to the Board meeting, a workshop was held on industrial and applied mathematics, which was the occasion for many of the participants of the Board meeting to give presentations either about their research or about interesting experiences in industrial mathematics in their countries. These presentations also included local Spanish participants.

The Board meeting was very well attended this year. As is always the case two years before the congress, the agenda included many important topics, that attracted most of the ICIAM members. Apart from the regular topics, reports and discussions, the main three topics for this year were the election of the next president, the choice of the ICIAM 2023 venue and the discussion and vote of the list of invited speakers for ICIAM 2019. Three of the most important topics for our council.

Concerning the election of the next president, the only candidate was professor Ya-Xiang Yuan, from China, who is currently member of the Board as president and representative of the Chinese Mathematical Society. He gave a short presentation of his career and, upon the request of the Board, presented some ideas about the possible actions that he would like to pursue as the next president. The Board of Directors elected him as the next President soon after his presentation.

Concerning the list of invited speakers for the next congress that was proposed by the Scientific Program Committee (SPC), the discussion was interesting, and some concerns were expressed about balances and presence or absence of topics and of countries or regions. Professor Alfio Quarteroni, the chair of the SPC answered questions and explained the process that led to their decisions. It is natural that the examination of such a list always leads to lively discussions, since all of us have ideas about other possible people to be invited and other “better” choices. But overall the list was well appreciated and it will become public as soon as it gets confirmed. This list is one of the big pillars of any congress, and its approval, a very important step.

Probably the most important discussion of this year’s Board meeting was the one concerning the venue for ICIAM 2023. Two bids were presented, one from South Korea and the other one from Japan. Both of the teams came with excellent proposals, a good and enthusiastic team and lots of hope. They had prepared very well for the presentation, the discussion and the meeting. The two presentations were excellent, and they were followed by

the site visits reports. In March four Officers went to Seoul and Tokyo to assess the two bids, the proposed venues, and held in depth discussions with the two teams, and got an idea about the infrastructure and the conditions proposed by both countries. After the two presentations, the Japanese and the Korean teams left the room and a final discussion took place among the Board members. The choice was difficult, since the two bids were of high quality but a choice had to be made, and it was the Japanese bid to organize ICIAM 2023 at Waseda University, in Tokyo, that was chosen. Of course, we can imagine the disappointment of the Korean team, but there will be other occasions for them. Their community is really making great efforts towards strengthening Applied and Industrial Mathematics in their country, and they have the official support needed for that. It is certain that they will be excellent candidates for a future Congress. I would like to thank and congratulate both teams for their excellent proposals and presentations.

The Board meeting was not only a long day of discussions, we had the chance to be taken out at mid-day for a visit of the “Palau de la Musica,” a beautiful modern building where the inauguration of ICIAM 2019 could take place. The visit was interesting, and gave us the opportunity to go out, and have a glimpse of the beauty of Valencia. The lunch in the garden of the Palau was also a nice relaxing moment, which helped us to go through the long day.

The Board meeting, as well as the previous workshop, were extremely well organized by the Valencia team who is behind the organization of ICIAM 2019. They are enthusiastic about their project and already getting organized. While I am writing this article, I am participating in the 2017 SEMA conference, where the whole Applied Mathematics Spanish community is represented, and it is obvious that the organization of ICIAM 2019 is very much on their minds, and that many of their activities are already directed towards that goal.

The last decision of our 2017 Board meeting was to accept SIAM’s invitation to host the next Board meeting. It will take place in Philadelphia on May 12th, 2018, with an attached workshop on the 10th and 11th of May.

Let me finish by saying that in the name of the Officers I would like to again thank the team from Valencia for their generosity and efficiency concerning the organization of the Board meeting and the workshop. Many moments from these few days spent in Spain will leave imprint on the memories of those in attendance. And we will come back in 2019!

Maria J. Esteban, ICIAM President



On the Way to ICIAM2019 — Summer 2017 Update

by TOMÁS CHACÓN

The organization of the ICIAM2019-Valencia (Mon. July 15 – Fri. July 19, 2019) congress continues its steady progress. It is being enthusiastically supported by the industrial and applied mathematics community in Spain, as well as by the Spanish society in general, and especially by King Felipe VI, who has accepted the Honour Presidency of the Congress.

The organization is in charge of the “Asociación ICIAM2019-Valencia,” which is the legal entity created by SEMA with this purpose. The Asociación has created an Organizing Committee split into 11 thematic committees (see Appendix 1).

In our preceding report (January 2017) we mentioned some of the main activity of the Organizing Committee, that we briefly recall now:

- **Appointment of Sub-Venues:** These will be five Spanish cities or regions (Bilbao, Málaga, Galicia, Sevilla, Zaragoza) that will host eight satellite meetings, on both industrial and applied mathematics (iciam2019.org/sub-venues).
- **Scholarship Program:** Banco Santander will provide funding for 150 scholarships for young researchers attending ICIAM2019. Also, the crowd-funding program (P2B) is supported by 28 sponsors that will likely provide funding for some 40 scholarships (iciam2019.org/sponsors).
- **Appointment of a Professional Congress Organizer:** This will be Grupo Pacifico that has launched the website of the Congress: iciam2019.org
- **Publicity Program:** A program for publicity of ICIAM2019 in the upcoming congresses has been approved and has started to be implemented.
- **Academic Calendar:** We reproduce it in Appendix 2 (iciam2019.org/important).

In addition to these activities, in the last months we have begun the following:

- **Launching of Satellite Meetings Program:** We have launched a call for proposals of Satellite Meet-

ings (iciam2019.org/satellite-meetings). The **SciCADE2019** (International Conference on Scientific Computation and Differential Equations: July 22–26, 2019, Innsbruck, Austria) candidacy has been approved. Potential satellite meetings include:

- **CIMPA School** on “Mathematical tools for management and valorization of household waste.” Kenitra-Rabat, Morocco, July 9–17, 2019. Chairpersons: Zoubida Mghazli and Elena Vázquez.
- **CIMPA School** on “Data Science for engineering and technology.” Tunisia, Tunis, July 2–12, 2019. Chairpersons: Nabil Gmati and Mejdi Azaiez.
- **ICCOPT 2019**, “International Conference on Continuous Optimization” July 22–26, 2019 Berlin, Germany. Chairpersons: Michael Hintermüller and Dietmar Hoemberg.
- **Joint SBM-SBMAC-SEMA-RSM Congress**, Dec. 2018. Chairpersons: Paulo Mancera, Francisco Ortégón, Mercedes Siles.
- Joint meeting within EU project **ModComp-Shock**. Chairpersons: L. Formaggia, C. Parés, G. Russo.
- **Appointment of ICIAM2019-Valencia Press Office:** We have launched a call to select and appoint the Press Office of the congress, that will start its work by the end of 2018.

In addition, the 2019 SIAM Meeting will very likely take place as an embedded meeting in ICIAM2019-Valencia.

In parallel, the Scientific Panel Committee, chaired by Prof. Alfio Quarteroni, has approved the selection of the 27 invited speakers that was approved by the ICIAM Board meeting held on May 20, 2017. Once all the speakers have accepted the list will be published on the ICIAM2019 website.

We will continue our organizing work to make ICIAM2019-Valencia a great scientific event, to support the overall development of the research in industrial and

applied mathematics. You are all kindly invited to participate in it!

Appendix 1: Organizing Committee of ICIAM2019-Valencia Congresses.

Chairman: Tomás Chacón (Univ. Sevilla)

Thematic Committees

1. Academic: Amadeu Delshams (Technical Univ. Catalonia).
2. Finance: Eduardo Casas (Univ. Cantabria).
3. Fundraising: Carlos Vázquez (Univ. La Coruña).
4. ICIAM Liaison. Tomás Chacón (Univ. Sevilla).
5. Industrial Advisory: Peregrina Quintela (Univ. Santiago de Compostela).
6. Local Arrangements: Rosa Donat (Univ. València).
7. Publications and Promotions: Inmaculada Higuera (Univ. Pública de Navarra).
8. Public Relations: Henar Herrero (Univ. Castilla-La Mancha).
9. Satellite & Embedded Meetings: María Paz Calvo (Univ. Valladolid).
10. Outreach: Henar Herrero (Univ. Castilla-La Mancha), Juan I. Montijano (Univ. Zaragoza).
11. Travel Support: Elena Vázquez Cendón (Univ. Santiago de Compostela).

Appendix 2: Academic Calendar of ICIAM2019

Minisymposia

Submissions open on: Sun., March 04, 2018

Notification of early decisions: Mon., July 30, 2018

Closing date for the submission of proposals: Mon., November 05, 2018

Notification of final decisions: Mon., November 19, 2018

Submissions due of accepted minisymposium abstracts: Mon., March 04, 2019

Contributed Papers

Submissions open on: Sun., July 01, 2018

Notification of early decisions: Mon., October 01, 2018

Closing date for submissions: Mon., January 7, 2019

Notification of decisions: Mon., February 04, 2019

Posters

Submissions open on: Sun., July 01, 2018

Closing date for submissions: Mon., April 1, 2019

Notification of decision: Mon., May 6, 2019

Satellite Conferences

Submissions open on: Sun., 18 June 2017

Closing date for submissions: Mon., October 1, 2018

Notification of decision: within one month of submission

Embedded Conferences

Submissions open on: Sun., December 03, 2017

Closing date for submissions: Mon., October 1, 2018

Notification of decision: within one month of submission

Submission due of accepted embedded meeting abstract: Mon., March 04, 2019

Conference Registration

Early bird registration: Sun., November 11, 2018 – Mon., March 04, 2019

Regular registration: Tue March 05 – Mon., May 20, 2019

Late & On-site registration (only for non-paper-presenting participants):

Tue., May 21 - Mon., July 15, 2019

Accommodation

Hotel registration opens: Sun., December 02, 2018

Hotel registration closes: Sun., June 09, 2019

Program

Block program online: Mon., November 06, 2017

Final program online: Mon., May 06, 2019

Financial Aid for Participants from Developing Countries

Applications open: Sun., July 22, 2018

Closing date for applications: Mon., February 25, 2019

Notification of early decisions: Mon., March 18, 2019

Notification of final decisions: Mon., April 01, 2019

ICIAM2019 Congress

Mon., July 15 – Fri., July 19, 2019

Subscribing to the ICIAM Newsletter

The ICIAM Newsletter appears quarterly, in electronic form, in January, April, July and October. Issues are posted on the ICIAM website at iciam.org/dianoia. If you would like to be notified by e-mail when a new

issue is available, please subscribe to the Newsletter. There is no charge for subscriptions. To subscribe or unsubscribe, visit the website given above.

Press Release: The 10th ICIAM in Tokyo in August 20–25, 2023



Okuma Auditorium of Waseda University. —Image used with permission.

The Japan Society for Industrial and Applied Mathematics (JSIAM) and the Mathematical Society of Japan (MSJ) are very happy that our bid for ICIAM 2023 was chosen and would like to express our deep gratitude to those who kindly favored our proposal. We, the two societies, are now preparing the way for the 10th ICIAM Congress to be held in Tokyo, Japan, from August 20–25 in 2023. We understand that we could not have been awarded the honor of hosting the ICIAM congress without the strong support from industry, academia and the Japanese government, in addition to the kind assistance from the Tokyo Convention & Visitors Bureau (TCVB). We plan to attract the largest number (in the history of ICIAM) of mini-symposia of high quality, dedicated to mathematical problems in science, engineering and industry. ICIAM 2023 will showcase the enhanced collaboration between mathematics and industry.

Tokyo is one of the largest cities in the world, but it is

immune from many defects of megacities. Its cleanliness and safety are well known and it is full of attractions, historic and modern. Tokyo is home to many anime-related attractions. It is also a city known for its array of gourmet food options. The Congress timing falls within a period of numerous festivals giving participants an opportunity to witness local festivals and fireworks displays.

Waseda University, the planned venue, was established in 1882 and is considered to be one of the best universities in Japan. It has experience hosting various international congresses on scales involving many thousands of participants. The president of Waseda University guaranteed that its modern facilities and conference equipment will be used for ICIAM without fee. This offer will be reflected in the registration fee.

JSIAM and MSJ will deliver a successful and unforgettable 10th ICIAM in Tokyo in 2023. We look forward to welcoming you.



The fireworks in Tokyo. —Image used with permission.

Announcing GRAID: a new graduate program to provide modest stipends for graduate students in mathematics in developing countries.

The Commission for Developing Countries of the International Mathematical Union launched on June 1 the GRAID program (GRAduate Assistantships In Developing countries). The program is targeted to students working with research-active professors with international contacts, in countries where no other graduate support

exists for Masters or Ph.D. studies. It will give priority to those regions where the modest GRAID stipend (max. USD 3,500 per year) would suffice to support a student full-time. More information can be found at URLs www.mathunion.org/cdc and www.mathprograms.org

ICIAM Conference Support for Applied and Industrial Mathematics in Developing Countries

CALL FOR APPLICATIONS

ICIAM has a small budget (up to USD 10,500 per year) that is available to help organizers of conferences, workshops and research schools to include additional delegates from developing countries. Organizers of meetings, who wish to take advantage of this support, are encouraged to apply by sending an e-mail to the ICIAM Secretary (secretary@iciam.org). The level of support is USD 3,500 per conference, to be used to provide ICIAM Fellowships to selected participants from developing countries.

Applications may be submitted at any time. There are two rolling deadlines per year (30 April and 31 October);

the ICIAM Officers decide on which applications to support within a month of each deadline. To allow for orderly budgeting and planning, proposals should be submitted a year in advance of the event. Preference is given to events held in developing countries, and applicants should indicate how they plan to use the fellowship funds.

Full details can be found on the ICIAM website, at www.iciam.org/iciam-conference-support-applied-and-industrial-mathematics-developing-countries

ICSU Gender Gap Project Update

by JEAN TAYLOR

The ICIAM contingent was very active at the initial workshop of the ICSU Gender Gap Project, held in Paris, June 1–3, 2017 at UNESCO and the Henry Poincaré institute. This contingent consists of me as coordinator, ICIAM President Maria Esteban, and Sayara Beg as our management and outreach expert. There is now an engaging website for the project, icsugendergapinscience.org. The photo of the workshop participants is cropped on its home page, but if you click on it, the full photo appears, with the ICIAM contingent on the far left. I urge everyone to read through the website to get a good idea of what the project is about.

ICSU is the International Council for Science, of which ICIAM is a member. The full name of the project is “A Global Approach to the Gender Gap in Mathematical and Natural Sciences: How to Measure It, How to Reduce It?” To quote from the website:

“Members of all participant scientific unions, as well as experts and the project’s advisory board and executive committee, gathered during three days to discuss a global approach to narrowing the gender gap in mathematics and natural sciences as well as to share gender statistics from regional perspectives, and to define new indicators used to measure gender equality.

The objective of the workshop was to identify sources of good practices; specify methodologies; discuss gaps in research on gender; identify data sources and discuss management, or-

ganization and communication between partners. The agenda for the sessions included the global presentation of the project, presentation of the partners activities with respect to gender gap or women in science, presentation of specific situations in France and Russia, definition of the gender gap in science, organization of the regional meetings, and organization of the three project tasks.”

Maria is the ICIAM contact for Task 1, which is to conduct and analyze a global survey of professionals in the natural sciences and mathematics. The group working on Task 1 is composing a questionnaire, patterned after one used by the international physics community. To refine the questionnaire there will be a series of three regional meetings this November. Maria is assembling a list of people from ICIAM in each region to attend this meeting.

Jean is the ICIAM contact for Task 2, which will gather data on publishing by gender. This data collection effort is being led by Helena Mihaljevic-Brandt and Lucia Santamaria. It will be built on an earlier survey, primarily in core mathematics, that they conducted using data from zBMATH.

Sayara is the ICIAM contact for Task 3, which is assembling a list of best practices. She is also assisting in efforts to acquire databases for Task 2.

I will try to keep the ICIAM community informed as this 3-year project develops, and welcome input.

News from the International Council for Science (ICSU)

by BARBARA KEYFITZ & TOM MITSUI



Board members at the 2017 Board meeting, in front the Palau de Musica in Valencia; this is the venue of the opening and prize ceremonies of the ICIAM 2019 Congress. — Image used with permission.

Renewal of the ICSU Committee

At the board meeting in Valencia in May, the ICIAM Board approved three new appointments to our committee: Ruben D. Spies from Instituto de Matematica Aplicada del Litoral IMA, Argentina; Christopher Essex from



Officers enjoying the workshop. —Image used with permission.

Western University, Ontario, Canada; Gabriella Puppo from Universita degli Studi dell'Insubria, Italia. We welcome them and look forward to their contributions to the dialogue on ICSU. Continuing members are: Olavi Nevanlinna from Aalto University, Finland; Christiane Rousseau from Universite de Montreal, Canada; along with the co-chairs, Barbara Keyfitz and Tom Mitsui. The Board offered a vote of thanks to the members who have completed their terms: Alain Damlamian, Bjorn Engquist, Helge Holden, Rolf Jeltsch, and Abul Hasan Siddiqi.

The Upcoming General Assembly

In October, 2017, ICSU will hold its triennial General Assembly, in Taipei, Taiwan, China. This is a particu-

larly important meeting, because a principal topic will be the proposed merger between ICSU and ISSC (the International Social Science Council). Tom Mitsui plans to represent ICIAM at this meeting. In preparation, ICIAM is planning to update the poster we presented three years ago at the previous General Assembly. (See the separate article in this issue requesting input into the design and content of the poster.)

ICSU Activities

In a press release in June, ICSU called upon the US to support global efforts to combat climate change, expressing concern about current US plans to withdraw from the Paris climate accords. (It should be noted that the actual US withdrawal, if it takes place, will not happen before November, 2020, because of existing commitments.) The ICSU website, icsu.org, contains detailed information about the organization and its current activities. ICIAM members are encouraged to consult the ICSU website and to subscribe to the newsletter, which is accessible from the website.

Barbara Lee Keyfitz is the Dr. Charles Saltzer Professor of Mathematics at the Ohio State University. She has a PhD from New York University, and works in partial differential equations. She is the Past-President of ICIAM.



Taketomo (Tom) Mitsui is Professor Emeritus of Nagoya University, Nagoya, Japan. He received his doctoral degree from Kyoto University and has been engaged with several universities, the last one was Doshisha University, Kyoto, Japan. His main research interest is numerical analysis of ordinary differential equations and related topics. He is a Fellow of the Japan Society for Industrial and Applied Mathemat-

ics, and is currently serving ICIAM as Officer-at-Large.





The International Council for Industrial and Applied Mathematics (ICIAM)

ICIAM Worldwide organisation for professional applied mathematics societies, and for other societies with a significant interest in industrial or applied mathematics.

The Council works to advance the applications of mathematics in all parts of the world.

The ICIAM Congresses, held every 4 years, are run under the auspices of the Council.

The aims of the council are to

- promote industrial and applied mathematics globally;
- promote interactions between member societies;
- promote the goals of these member societies;
- and coordinate planning for periodic international meetings on industrial and applied mathematics.

ICIAM is a Scientific Associate Society of ICSU

In 2014 ICIAM has 22 full members and 20 associate members, based in five continents. Members pay annual dues, which support the organisation, and vote at the annual Board Meeting.

Congresses: Paris (1987), Washington DC (1991), Hamburg (1995), Edinburgh (1999), Sydney (2003), Zürich (2007), and Vancouver (2011). *The eighth congress will be held in Beijing (2015), and the ninth in Valencia (2019).*

Other Activities:

- Developing Countries Support (awarded to scientific conferences for fellowships)
- “Citation Statistics” report with IMU and IMS
- “Educational Interfaces between Mathematics and

Full members:

ANZIAM (Australia and New Zealand Industrial and Applied Mathematics)
 ASAMACI (Asociación Argentina de Matemática Aplicada Computacional e Industrial)
 CAIMS-SCMAI (Canadian Applied and Industrial Mathematics Society – Société Canadienne de Mathématiques Appliquées et Industrielles)
 CSCM (Chinese Society for Computational Mathematics)
 CSIAM (China Society for Industrial and Applied Mathematics)
 ECMI (European Consortium for Mathematics in Industry)
 ESMTB (European Society for Mathematical and Theoretical Biology)
 GAMM (Gesellschaft für Angewandte Mathematik und Mechanik)
 IMA (The Institute of Mathematics and its Applications)
 ISIAM (Indian Society of Industrial and Applied Mathematics)
 JSIAM (The Japan Society for Industrial and Applied Mathematics)
 KSIAM (The Korean Society for Industrial and Applied Mathematics)
 MOS (Mathematical Optimization Society)
 NORTIM (Nordiska Örtningen för Tillämpad och Industriell Matematik)
 ROMAI (Societatea Română de Matematică Aplicată și Industrială)
 SBMAC (Sociedade Brasileira de Matemática Aplicada e Computacional)
 SEMA (Sociedad Española de Matemática Aplicada)
 SIAM (Society for Industrial and Applied Mathematics)
 SIMAI (Società Italiana di Matematica Applicata e Industriale)
 SMAI (Société de Mathématiques Appliquées et Industrielles)
 SPMAC (Société Peruviana de Matemática Aplicada y Computacional)
 VSAM (Vietnamese Society for Applications of Mathematics)

Associate members:
 AIRO (Associazione Italiana Ricerca Operativa)
 AMS (American Mathematical Society)
 AWM (Association for Women in Mathematics)
 ChinaMS (Chinese Mathematical Society)
 CMS-SMC (Canadian Mathematical Society – Société Canadienne de Mathématiques)
 DMV (Deutsche Mathematiker Vereinigung)
 EMS (European Mathematical Society)
 IMS (Institute of Mathematical Statistics)

ICIAM 2015

ICIAM 2015 program:
 Awarding ceremony of ICIAM prizes
 Award lectures of ICIAM, SIAM, AWM
 Invited lectures
 Thematic minisymposia
 Industrial minisymposia
 Contributed papers
 Poster sessions
 Embedded and satellite meetings
 Public outreach sessions
 Exhibits
 Social events

August 10-14, 2015, Beijing, China

<http://www.iciam2015.cn/>



IMU (Israel Mathematical Union)
 LMS (London Mathematical Society)
 MSJ (Mathematical Society of Japan)
 ÖMG (Österreichische Mathematische Gesellschaft)
 PTM (Polskie Towarzystwo Matematyczne)
 RSME (Real Sociedad Matemática Española)
 SingMS (Singapore Mathematical Society)
 SMF (Société Mathématique de France)
 SMG-SMS (Schweizerische Mathematische Gesellschaft – Société Mathématique Suisse)
 SMM (La Sociedad Matemática Mexicana)
 SPM (Sociedade Portuguesa de Matemática)
 UMI (Unione Matematica Italiana)

<http://www.iciam.org>

Industry” (EIMU), Springer book with ICMI
 • Scientific partner of CIMPA

Prizes ICIAM awards five prizes (Collatz, Lagrange, Maxwell, Pioneer, Su Buchin) at each International Congress. They are sponsored by member societies.

Newsletter ICIAM publishes a quarterly on-line newsletter, **DIANOIA** with news of the Council, member societies, and applied mathematics

Governance Non-profit corporation (US). Executive:
President Barbara Keyfitz (US) 2011-2015
President-Elect Maria J Esteban (France) 2013-2015
Secretary Alistair Fitt (UK)
Treasurer Jose A Cuminato (Brazil)
Members-at-Large Mario Primicerio (Italy) - membership
 Taketomo Mitsui (Japan) – ICSU representative
Website: <http://www.iciam.org>



The Board and Officers of ICIAM, May 2014

Calling All Designers

by BARBARA KEYFITZ

Every three years, when ICSU holds its General Assembly, ICIAM has the opportunity to display a poster in the public area of the meeting. This is a way of drawing attention to our organization, describing its mission and its vision for applied and industrial mathematics, and claiming space for the applications of mathematics in this community of distinguished scientific councils.

For the 2014 General Assembly, we made a last-minute attempt to produce a poster. You will find the result as the “centerfold” of this issue of *Dianoia*. In 2017, the General Assembly takes place in October, and an ICIAM officer will represent us there (see the report on ICSU elsewhere in this issue). We are eager to update our poster and to produce a more polished announcement. For example, the accompanying figure shows the IMU’s poster. (Our poster was also accidentally folded, and that did not improve its appearance — but we think we can prevent this mistake in the future.)

The officers welcome any assistance that anyone would like to provide. Whether you are artistic, have a good sense of public relations, or just some ideas about what features of ICIAM would make good material for a poster, Please let us know. You may contact any of the officers, preferably before the end of August.



Press Release: A New European Industrial Doctorate Program (EID)

Under the leadership of MATHEON, an international consortium of eleven academic and eleven industrial partners has been awarded a “European Industrial Doctorate Program” (EID). Under the title “Reduced Order Modeling, Simulation and Optimization of Coupled Systems” eleven doctoral students will develop mathematical methods that play an important role in the increasingly virtual development of industrial products and processes. The program is financed for a period of four years by the European Union within the framework of Horizon 2020.

Product development today is increasingly based on simulation and optimization of virtual products and processes. Mathematical models serve as digital twins of the real products and processes and are the basis for optimization and control of design and functionality. The models have to meet very different requirements: Deeply refined mathematical models are required to understand and simulate the true physical processes, while less refined models are the prerequisites to handle the complexity of control and optimization. To achieve best performance of mathematical modeling, simulation and optimization techniques (MSO), in particular in the industrial environment, it would be ideal to create a complete model hierarchy.

Currently the most favored way in industrial applications to achieve such a model of hierarchy is to use a sufficiently fine parameterized model and then apply model order reduction (MOR) techniques to tune this fine level to the accuracy, complexity and computational

speed needed in simulation and parameter optimization.

Although the mathematical models differ strongly in different applications and industrial sectors, there is a common framework via an appropriate representation of the physical model in the form of equations and functions. The main objective of this European Industrial Doctoral program is to further develop this common framework and, driven by industrial applications as optical and electronic systems, material engineering, or economic processes, to lift mathematical MSO and MOR to a new level of quality. The development of high dimensional and coupled systems presents a major challenge for simulation and optimization and requires new MOR techniques.

The EID will run for four years. In order to train the eleven young researchers for the challenges of multidisciplinary and international co-operation, their scientific work is embedded in a jointly organized doctoral program, in which lectures and workshops address both scientific content and soft skills. The researchers are supervised by expert tandems, each consisting of an academic and an industrial representative. They spend at least half the time in a company, the rest in a research facility.

The consortium leader is the Research Center MATHEON (TU Berlin). Further academic Partners are WIAS (HU Berlin), U. Bremen, FAU Erlangen-Nürnberg, INRIA Paris, U. Linz, Polytechnico di Milano, Technological Institute of Industrial Mathematics (ITMATI) Santiago, SISSA Trieste und die BU Wuppertal. In addition, eleven industrial partners from seven countries, as well as the European service network EU-MATHS-IN are involved.

Series: Brief Interviews with Young Mathematicians: #5

by ROBERTO NATALINI

DIANOIA is publishing a series of interviews with young applied mathematicians. Here Roberto Natalini interviews Martin Wechselberger, a mathematician at the University of Sydney, Australia, and an expert in canard theory.

Q: How did you decide to become a mathematician? What has been the influence of your parents?

A: There was no particular influence from my parents or teachers. I simply had an affinity towards maths and decided to study it.

Q: Could you mention some people who have been important for your education?

A: Clearly, my PhD supervisor Peter Szmolyan. He introduced me to the field of dynamical systems. It was only then that I decided to stay in academia and pursue a PhD.

Q: What is your main focus in mathematics, the main direction in your research?

A: My research focuses on nonlinear dynamics. In particular, I develop mathematical tools to understand the genesis of complex patterns and rhythms observed in physiology. One of my aims is to provide a more rigorous mathematical underpinning to the approximations used in the modelling and analysis of many physiological problems to identify key parameters which control these patterns and rhythmic processes and how they can be dynamically changed.

An important feature of most physiological rhythms is that they evolve on different time scales. That is, most physiological rhythms consist of slow and fast components – think of the heartbeat or neuronal firing. Such multiple time-scale problems are usually modelled by singularly perturbed systems and the mathematical analysis of such systems is challenging. I have developed geometric methods which overcome some of these difficulties, most notably in canard theory.

There are many applications to canard theory in rhythm generation: For example, a class of complex oscillatory behaviour observed in neuroscience is mixed-mode oscillations (MMOs). These oscillations correspond to switching between small-amplitude oscillations and relaxation oscillations-patterns that have been frequently observed in experiments. Canard theory combined with an appropriate global return mechanism has been used based on the multiple time-scale structure of the underlying models to explain these complicated dynamics. This is now one widely accepted explanation for MMOs.

Canards have also the potential to significantly shape the nature of solutions in non-autonomous multiple time-scale systems. Here, the take-home message lies in the realization that canards create local transient “attractor” states in multiple scales problems. In the context of neuronal excitability, such canards have been identified as firing threshold manifolds.



Martin Wechselberger. —Image used with permission.

Q: Why have you chosen to devote your research to physiological problems?

A: In 2002, I was offered a postdoctoral position at the newly opened Mathematical Biosciences Institute (MBI) at the Ohio State University. The first emphasis year at MBI was on Mathematical Neuroscience and I met many of the leading experts in this field. I also had a mentor at the neurophysiology department at the Ohio State University. So, my interest in neuroscience and physiological problems stems from that time.

Q: Could you explain in few sentence the so-called “canard theory?” Why do you use the word “canard?”

A: The aforementioned canards are exceptional solutions in multiple time-scale systems (which are often modelled as singular perturbation problems) that have the ability to delay the relaxation mechanism from the slow to the fast dynamics — this is a delayed bifurcation phenomenon. The term “canard” was introduced by French mathematicians who studied this peculiar delay phenomenon originally in two dimensions where the corresponding canard limit cycle trajectory in phase space resembles the shape of a duck (a “canard”).

Q: What are the main skills that are necessary to be a good applied mathematician?

A: I don’t think that there is a simple answer to that question. Good communication skills are necessary for sure. You must be able to explain your approach in non-technical terms to the scientists. Otherwise, no scientist will listen to you or understand your ideas. Persistence is probably another important skill set. The working time scale with experimentalists might be much slower than you expect. Lab work is tedious and they won’t change their working schedule for you.

Q: Are you able to directly interact with clinicians or biologists?

A: As a postdoc at Ohio State, I interacted with an Ohio State neuroscience lab on a daily basis to develop a model for temperature sensitivity of hypothalamic neurons that are responsible for keeping our body temperature under control. The head of the lab was very suspicious at the

beginning about my ideas, but he got really excited later on when he realised that experimental data confirmed my ideas. Currently, my neuroscience connections are through fellow research collaborators. Recently, I started to work with clinicians at the University of Sydney on a problem related to saliva transport in the trachea. This work is still in its infancy.

Q: How do you spend your time when you are not working?

A: Currently, my new born daughter occupies most of my time. I really enjoy being a dad and spending sufficient time with her.

Q: Have you other interests or hobbies?

A: Well, we live in Sydney. So, the beach is an important part of our life. I combine this with a bicycle ride to my favourite beaches — I call this my personal duathlon. In general, I love the outdoors since I grew up in the mountains.

Q: Finally, a last general question. What do you wish for mathematics in in the next few years?

A: I hope that national funding agencies don't forget to appreciate the importance of mathematical research. Mathematics is of central importance to modern society and provides the vital underpinning of the knowledge economy.

Roberto Natalini received his PhD in Mathematics from the University of Bordeaux (France) in 1986. He is director of the Istituto per le Applicazioni del Calcolo "Mauro Picone" of the National Research Council of Italy since 2014. His research themes include: fluid dynamics, road traffic, semiconductors, chemical damage of monuments, and biomathematics. He is Chair of the Raising Awareness Com-

tee of the European Mathematical Society, and coordinates the website Mathematics in Europe mathematics-in-europe.eu.



Call for nominations: Olga Taussky-Todd Lecture 2019

by OLGA TAUSSKY-TODD LECTURE COMMITTEE

The Olga Taussky-Todd Lecture is held every four years at the International Congress on Industrial and Applied Mathematics (ICIAM). This honor is conferred on a woman who has made outstanding contributions in applied mathematics and/or scientific computation. The lecture is named in tribute to the memory of Olga Taussky-Todd, whose scientific legacy is in both theoretical and applied mathematics, and whose work exemplifies the qualities to be recognized.

The Officers and board of ICIAM now call for nominations for the Olga Taussky-Todd Lecture, to be given at ICIAM 2019 congress, to take place in Valencia (Spain) from July 15 to July 19, 2019.

A nomination will consist of:

1. Full name and address of person nominated;
2. Website if any;
3. Justification for nomination (in at most two pages, cite nominator's reason for considering candidate to be deserving, including explanations of the scientific and practical influence of the candidate's work and publications);
4. 2–3 letters of support from experts in the field (not mandatory). Each of them having a maximum length of two pages;
5. CV of the nominee;

6. Name and contact details of the proposer.

Nominations should be made electronically through the website iciamprizes.org. The deadline for nominations is September 30, 2017.

Please contact president@iciam.org if you have any questions regarding the nomination procedure.

The selection process is conducted by the Olga Taussky-Todd Lecture Committee. The Committee for the 2019 Lecture consists of:

Liliana Borcea, (Chair) University of Michigan;
 Raymond Chan, The Chinese University of Hong Kong;
 Ingrid Daubechies, Duke University;
 Nick Higham, University of Manchester;
 Sofia C. Ohlede, University of College London;
 Anna Karin Tornberg, KTH, Stockholm.

ICIAM, the International Council for Industrial and Applied Mathematics, is the world organization for applied and industrial mathematics. Its members are mathematical societies based in more than 30 countries. For more information, see the Council's website at www.iciam.org

Maria J. Esteban, ICIAM President

Book Review

 by BARBARA KEYFITZ

A review of “*What’s Happening in the Mathematical Sciences*,” Volume 10, by Dana Mackenzie and Barry Cipra, American Mathematical Society, 111 pages, 2015.

When I picked up this book, the 2014 edition of a series published by the AMS, it was written for “anyone with a high-school mathematics background,” I had a vague thought that it might make good “light reading.” Good, it is. Light, it is not. If you meet any high-school students who have been inspired by books in this series, I suggest that you offer them a college scholarship right away.

The volume at hand comprises nine chapters, each written by either Mackenzie or Cipra. Both authors are PhD mathematicians who have made their careers as science writers. Cipra may be better known to the applied mathematics community, as he frequently contributes articles to *SIAM News*. On the other hand, Mackenzie has written a book called *The Big Splat*, which expounds the theory that the earth’s moon was created in a cataclysmic collision with another planet; for an arresting title, that is hard to beat.

This should be enough to give you the idea that the authors are talented writers, with excellent judgment about what makes a good story, and the ability to tell it convincingly. The stories in this collection have opened my eyes to a number of new mathematical dramas. In fact, the very first article, which is about origami, provides a good illustration. Most likely I am not alone in having the impression that origami is “cute;” a suitable occupation for children’s little fingers; and anyone who tries to make more of it than that is wasting my time. Well, I owe the masters of the subject an apology for having thought that. First of all, there are charming illustrations of origami figures well beyond the capacity of those little fingers, designed in fact by a computer program, backed up by theory still in process of development. (To avoid writing a digest of what is already a digest, I am omitting attributions here. One attractive feature of this book is that the articles include a fair amount of material about the people who have been responsible for the advances described in each piece.) Beyond this theory of classical origami, the article focuses on counterintuitive possibilities, such as making curved folds, and designing collapsible figures. It is with these last advances that the subject becomes “applied,” and this reader’s amazement begins. Origami folding has led to insights into the structure of viruses, and to a project to create a treatment for macular degeneration. Now, try to fit that into a “classical applied mathematics” pigeonhole!

I will mention two other stories that grabbed my attention by their unexpected subjects and surprising conclusions. The first, called “The Truth Shall Set Your Fee”

(read that carefully) explores the question of “Who you gonna trust?” This has become an important concern in today’s climate of accusations of “fake news.” Admittedly, I embarked on reading the article in the hope that it might provide an algorithm for sorting out the false from the true in internet news. No such luck. However, the article outlines a clever application of rational choice theory combined with results on NP-hard problems to suggest a method of rewarding the most honest contractors who produce results for you, albeit in a limited setting. Perhaps the researchers whose work is described here will set their sights on politics in the future.



Marjorie Rice’s first tile pattern. —Image used with permission.

The final article in the series, “The Brave New World of Sports Analytics” explores another topic that I had long felt I could happily ignore: mathematical models in athletics. This is a fascinating tale of the still-controversial use of big-data analytics, combined with some mechanical understanding of the processes and rules

in major-league sports, to make tactical decisions and assess the value of players in America's favorite games. (This article, like most in the book, is perhaps overly focused on what's happening in the US. It would be interesting to know whether any of these sports trends have become popular in other countries.)

The remaining six articles in this volume cover topics that are equally fascinating: Yitang Zhang's recent breakthrough on the twin prime conjecture; a summary of mathematical investigations into climate change; a curious article on planimetry (if you don't know what planimetry is, then read the article); Hales's investigations into the nature of proof, inspired by his proof of the Kepler conjecture; solution of a problem in making balanced partitions, known as the Kadison-Singer problem; and progress in the continuing quest for all the convex pentagons that can tile the plane. If you have ever visited the top floor of my department at Ohio State, you have seen one example, famous as the discovery of Marjorie Rice, whose connection with professional mathematics was that her son subscribed to the *Scientific American*.

So, there may be an additional value of books like "What's Happening . . ." Besides supplying airplane reading for mathematicians, information on unexpected developments in and applications of mathematics, and inspiration for talented high-school students, perhaps someone will pick up and read this engaging book and discover the "next great thing." If so, I hope it appears in a future volume.

Barbara Lee Keyfitz is the Dr. Charles Saltzer Professor of Mathematics at the Ohio State University. She has a PhD from New York University, and works in partial differential equations. She is the Past-President of ICIAM.



Announcement

Are You Interested in the IPCC Special Report on Climate Change?

The IPCC (Intergovernmental Panel on Climate Change) will be issuing a special report, "Global Warming at 1.5°C," and they have invited the community to comment on a draft of it during the next six weeks.

If you feel you have some expertise, then you are invited to apply for this opportunity by registering at

www.ipcc.ch/apps/comments/sr15/fod/register.php

You will be asked for your credentials (interests, expertise, publications), and then may be invited to comment. This avenue is provided to ICIAM members owing to our membership in ICSU, and gives us a chance to have some influence on the IPCC's work. More information is available at

www.ipcc.ch/report/sr15/pdf/information_note_expert_review.pdf

If you register, then please let the ICIAM officers know, whether or not you are actually invited to participate in the review.

About ICIAM

The International Council for Industrial and Applied Mathematics (ICIAM) is a worldwide organization for professional applied mathematics societies. Its members are national and regional societies dedicated to applied and industrial mathematics, and other societies with a significant interest in industrial or applied mathematics.

ICIAM is governed by a Board comprising representatives of its member societies. Programs run by ICIAM, and the By-Laws of the organization, can be found on the ICIAM website, www.iciam.org.

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