ICIAM Dianoia. Volume 7, Issue 3-4 October 2019

The final issue of ICIAM Dianoia for 2019 represents the second iteration of the online newsletter. We have straightened out some difficulties - readers might have noticed that a Table of Contents was missing from our first issue. My own experience has been that reading the e-mail on an iPhone or using a laptop's e-mail reader works well, but we are interested in learning what readers think. We are also looking forward to a future when production will be smooth enough that we can focus on content! To that end, please send us news and suggestions for articles. And please help ICIAM by designating an editor/reporter who will keep communication lively.

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A Word from the Incoming President

The 9th ICIAM Congress was successfully held in Valencia on July 15-19, 2019. Over 4000 people registered for this week-long congress, which offered invited lectures, minisymposia talks and contributed talks by mathematicians from academia and industry from around the world. I would like to congratulate the local organizing committee on organizing such a brilliant event; without your hard work it would not have been possible.

The opening ceremony of the Congress was held in the Valencia Conference Centre on the morning of July 15th. We are honored that the Spanish King Felipe VI attended the opening ceremony and delivered an excellent speech to the guests and attendees of the congress. The ICIAM president, Professor Maria J. Esteban, gave the opening address and the president of the organizing committee, Professor Tomás Chacon, gave the welcome speech to the
congress. ICIAM prizes were awarded at the end of the opening ceremony. The 2019 ICIAM prize recipients are Siddhartha Mishra (Collatz prize), George Papanicolaou (Lagrange prize), Claude Bardos (Maxwell prize), Yvon Maday (Pioneer prize), and Giulia Di Nunno (Su Buchin prize). After a short coffee break, laudations of the prize winners were presented. Then, the ICIAM Olga Taussky Todd lecture was given by Françoise Marie Louise Tisseur before the lunch break.

The ICIAM Prize winners presented their research in lectures scheduled in the afternoon of July 15th and in the morning and afternoon of July 18th. The annual meeting of SIAM 2019 was embedded into the congress, and two SIAM prize recipients delivered lectures in the evenings: Weinan E (Henrici prize winner) on July 15th and Margaret Wright (von Neumann prize winner) on July 16th. The AWM Sonia Kovalevsky Prize lecture was given by Catherine Sulem on the evening of July 17th. Víctor M. Pérez-garcia delivered a public lecture on the evening of July 18th.

On July 14th, an informal meeting of the Presidents of the member societies of ICIAM was held. At the beginning of the meeting, Maria Esteban gave a presentation of the activities of ICIAM, including the congresses, prizes, funding activities in developing countries, etc. Then, the participants of the meeting discussed various issues on the developments of Industrial and Applied mathematics, such as strengthening the “industrial” connection (the second “I”) in ICIAM, promoting collaborations between member societies of ICIAM, dealing with the open-access transition and National Research Data Infrastructure, and attracting the younger generation to applied mathematics societies and ICIAM.

The annual Board meeting of ICIAM took place on July 20th, the day after the closing of the Congress. Elections of the secretary, the treasurer and two officers-at-large were made at the Board meeting. Sven Leyffer was re-elected as Secretary. Three new officers were elected: Heike Fassbender as Treasurer, Luis Vega and Wil Schilders as Officers-at-Large. The former treasurer, Jose Alberto Cuminato, and former officer-at-large, Taketomo Mitsu, left office after serving two consecutive terms. The other former officer-at-large, Volker Mehrman did not run for a second term owing to his role as president of the European Mathematical Society.

According to the bylaws ICIAM, October 1st 2019 is the day that the new team of officers starts their terms: Maria Esteban as Past-President, Sven Leyffer as Secretary, Heike Fassbender as Treasurer, Wil Schilders and Luis Verga as Officers-at-Large and myself as President. Thus, October 1st is a special day for me and the new team of the officers, as it marks the beginning of our joint effort in running this society for the next four years. We will work together, spare no efforts, and do our best to serve ICIAM. We believe that we will be able to do a good job by taking advice and suggestions from member societies and following recommendations and resolutions made at the ICIAM Board meetings.

As president of ICIAM, I would like to take this opportunity to congratulate the re-election of the Secretary, to welcome the three new officers, and to thank the three former officers for their contributions. I am particularly happy that Sven Leyffer continues to be our Secretary. Sven Leyffer is very experienced, very capable and very devoted. In the past two years, I have come to a full appreciation of his important role in the operation of ICIAM. The previous President, Maria J. Esteban, will continue to stay in the office of ICIAM for another two years as Past-President. In the past two years, she has helped bring me up to speed on the various aspects of running ICIAM, from chairing the office meetings and board meetings to utilizing the web platform. I am glad that she will continue to be by my side to give me advice and suggestions. I also want to express my sincere gratitude to Barbara Keyfitz, who was the President of ICIAM before Maria Esteban, for her long-time service and contributions to ICIAM, in particularly for her great efforts in the editing of the ICIAM newsletter Dianoia where this article appears.

As I mentioned in the closing ceremony of the Congress on July 19th, ICIAM is very special to me. I have attended all the ICIAM congresses, starting from the very first one in Paris in 1987. Though I have known ICIAM well in the capacity of many different roles over the years - from contributed-talk presenter to plenary lecture speaker, from minisymposium organizer to member of scientific committee, from president of member society to board member - being the president of ICIAM is undoubtedly a great challenge to me. It will not be an easy job, but I pledge to give my best to serve ICIAM and the greater industrial and applied mathematics community.

Mathematics plays an increasingly important role in our society today, and that is not limited to natural sciences anymore. For example, machine learning and data science relies on mathematical modelling and efficient computational methods. ICIAM should continue promoting the applications of mathematics in industries and
strengthening the collaborations between academia and industry. In addition to the "I" for "industrial", we should not overlook the other "I" in ICIAM - "international". We should focus on promoting international exchanges and collaborations, working with the member societies from different countries and regions. In the board meeting in Valencia, we were very happy to have 3 new member societies joining ICIAM: they are the Chilean Applied Mathematical Society as a full member (small society), South African Mathematical Society as an associate member (small society) and the Colombian Mathematical Society as an associate member (small society). However, although the list of member societies of ICIAM grows steadily, the number still lags behind that of IMU. We should acknowledge the potential for future progress. Today, ICIAM still has no member from Russia, only one member from Africa, and very few members from East Europe, South-East Asia, and South America. ICIAM should explore the possibility of including more mathematical societies from these regions. Moreover, ICIAM should help promote the study of applied mathematics and help establish local societies in countries and regions currently without them.

With the joint effort of our member societies, I am confident that we can make ICIAM a stronger international organization. It is my great honor to be part of this great endeavor, and I look forward to the next four years.

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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How to Change Your Society's Membership Information

Update Your Membership Information on iciam.org (http://iciam.org)

ICIAM maintains a self-service membership directory at http://www.iciam.org/members (http://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, http://www.iciam.org/faq-members (http://www.iciam.org/faq-members)

Sven Leyffer
ICIAM Secretary
secretary@iciam.org (mailto:secretary@iciam.org)

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The 2020 ICIAM Officers

Ya-xiang Yuan, Maria J. Esteban, Heike Fassbender, Sven Leyffer, Wil Schilders, Luis Vega
ICIAM Board Meeting 2020

The next ICIAM Board meeting will take place in Glasgow (UK) on Saturday, 23 May, 2020. As usual, there will be a 2-days workshop for attendants to the Board meeting on May 21-22.

Representatives of member societies in the Board: book those dates in your agendas!

http://www.iciam.org/board-meetings

CALL FOR APPLICATIONS: Conference Support

ICIAM Conference Support

for

Applied and Industrial Mathematics

in

Developing Countries

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
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


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**International Science Council: Letter from the President**

Dear ISC Members, Dear Colleagues,

One year after the launch of the International Science Council (ISC), it is worth taking stock of how far we have come in putting into operation the Council’s ambitious vision and mission. The Governing Board (GB), which has met four times since its election in July 2018, has regularly communicated progress made and will continue to do so after each Board meeting; our latest Communiqué follows below.

In the past year, the Council has continued to roll out an impressive set of scientific activities, has generated new partnership opportunities, and has responded energetically to requests for new engagements, including within the UN system. Many of these activities, which I encourage you to follow via the ISC website and our regular newsletters, demonstrate the steadily growing visibility of the Council, and attest to the interest of the wider scientific, policy and practice communities in supporting our vision of science as a global public good, and our mission to be the global voice for science.

In addition, the ISC has interacted with members to develop an integrated ISC Action Plan, which will launch the Council on a new trajectory. This Action Plan, which members will receive shortly, integrates concrete strategies for the development and delivery of a largely new set of scientific activities in four domains of impact, as well as the Council’s work on outreach and engagement, freedom and responsibility, its regional presence, and resource mobilization.

While maintaining and developing these efforts, the ISC achieved four additional milestones:

- The ISC governance system, including four new Standing Committees, and an Ad Hoc Committee on Dues is now in place
- The restructuring of the previous ISSC and ICSU Secretariats into a new Headquarters (HQ), as well as the integration of financial operations, has been completed
- The first two Patrons of the ISC have been appointed
- The role of a Special Envoy for Science in Global Policy has been created and is opening up new opportunities for the Council

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These achievements are all thanks to the intensity of effort and commitment of all my GB colleagues, of our CEO and her HQ team and the staff of our Regional Offices, as well as to the ongoing and, often, challenging reflections and feedback we receive from you, our members.

We now move into a phase of implementing new ideas and new modes of operating. As we do so we will seek to expand further our engagement with members, widen our partnership networks and streamline essential functions. It is an exciting work in progress, and for its success we continue to rely on your support.

The GB’s July 2019 Communiqué provides important information on two primary items of business, namely: the appointment of ISC advisory bodies and the conclusion of current ISC action planning processes. With regard to the former item, I sincerely thank all members who responded to our April 2019 call for nominations for the Council’s new Standing Committees, and all those who were willing to be considered for appointment. Faced with a substantial number of high-quality nominations and the need to ensure an appropriate balance, for example with regard to discipline, geographical area, and gender, there were some difficult choices that the GB had to make.

In addition to addressing these two important items, the GB set aside time during its June 2019 meeting for a first exchange with Ismail Serageldin, one of our two newly appointed Patrons. Our CEO and Science Director have subsequently met with Mary Robinson, our other Patron. Both meetings have been extremely encouraging, confirming the undeniable value for the ISC in gaining access to the substantive advice and outreach support of individuals of this calibre. We are very grateful to Ismail and Mary for their commitment and look forward to working with them and also to finding opportunities for our members to benefit from their engagement with the Council.

With warm regards,

Daya Reddy
ISC President

Obituary for Professor Dr. Reinhard Mennicken, 1935-2019

Professor Dr. Reinhard Mennicken, born March 16, 1935, in Cologne passed away on Thursday, June 13, 2019, at the age of 84 years. He received his PhD in 1963 under the supervision of Professor Dr. Friedrich Wilhelm Schaeckle and his Habilitation in 1968 at the University of Cologne. From 1971 until his retirement in 2000 he held a chair at the University of Regensburg and in between, in 1974/75, at the Technical University Braunschweig. As a mathematician his research focused on differential equations and spectral theory, with special emphasis on applications in engineering and physics.

Reinhard Mennicken gained wide international recognition by serving as Secretary, President and Vice-President of the Gesellschaft fuer Angewandte Mathematik und Mechanik (International Association of Applied Mathematics and Mechanics), GAMM, from 1988 to 1998, as President of the International Council for Industrial and Applied Mathematics, ICIAM, from 1995 to 1999, as Editor of GAMM Mitteilungen and ZAMM, and as Editor-in-Chief of...
Mathematische Nachrichten for 20 years from 1992 to 2011. He organized and co-organized numerous large international and national conferences, including the Annual Meetings of the GAMM in 1984 and 1997, of the Deutsche Mathematiker Vereinigung (German Mathematical Association), DMV, in 1988, the International Symposium on the Mathematical Theory of Networks and Systems, MTNS, in 1993, the International Workshop on Operator Theory and Applications, IWOTA, in 1995, all held in Regensburg with several hundreds of participants and peaking with ICIAM 1995 in Hamburg with more than 2000 participants, jointly with Professor Dr. Oskar Mahrenholtz. Reinhard Mennicken enjoyed the work for ICIAM/CICIAM because of its interdisciplinarity and internationality and dedicated a lot of time and energy to it. Together with the first President of ICIAM, Professor Roger Temam, he succeeded in adding several other societies as members and associate members of ICIAM.

After the fall of the Iron Curtain in 1989 Reinhard Mennicken was a key player in establishing fruitful collaborations with mathematicians from the former Soviet Union with the support of Deutsche Forschungsgemeinschaft, DFG, and Deutscher Akademischer Austauschdienst, DAAD. He attracted three Humboldt Prizes to the University of Regensburg, awarded to Professors F.V. Atkinson, I.C. Gohberg and M.A. Krasnosel'skii.

Reinhard Mennicken had one daughter and three sons, one of whom holds a PhD in mathematics as well, as well as two adopted children. Academically, he had 15 PhD students four of which hold professorships, two in Germany, one in South Africa and one in Switzerland. My sincere thanks go to Professor Mennicken as my academic teacher, for all that I learned from him over many years since I first attended one of his seminars more than 30 years ago.

Upon requests from international colleagues, a condolence website has been set up to commemorate Reinhard Mennicken and share photos:
https://www.gatheringus.com/memorial/professor-dr-reinhard-mennicken/1078

Special thanks go to Dr. Marilene Balbi without whom I and many colleagues would not have learned about this loss and to Dr. Joerg Mennicken for finding the memorial site above.

About the author, Christiane Tretter: Christiane Tretter holds a Chair at, and is Director of, the Mathematical Institute at the University of Bern, Switzerland. She received her doctoral degree at the University of Regensburg, Germany, in 1992 under the supervision of Reinhard Mennicken. Her research areas include spectral theory, differential operators and mathematical physics. She is Editor-in-Chief of the journal Integral Equations and Operator Theory.

The ICIAM 2019 Congress and Me

https://iciam.org/node/371/archive
It was 6 years ago that Spain was chosen to organize the ICIAM 2019 congress. And that decision was made by the ICIAM Board the same year that I was elected ICIAM president for the period 2015-2019. It was an incredible coincidence, because I was born in Spain and even if I have not lived and worked there for many years, my links to that country and to the community of the Spanish mathematicians are naturally very strong. In particular I knew very well the people in charge of the organization of the ICIAM 2019 congress. That coincidence ensured that from the beginning I followed the preparations of the congress more closely than usual. And that has been going on actually until the congress started, and even during the week it took place. Unlike in previous cases, I have been associated with many decisions that in principle had to be made only by the organizers. Was it good or bad? I do not know, I hope it helped them, but in any case, I was happy to be able to help and to learn through that experience. Last year, when the preparations increased and accelerated, the rhythm of exchanges with the organizers also increased, and was kept at a very high level all year long. There were especially intense moments in the conversations, for instance when at some point, not far from the end of the call to organize mini-symposia, the organizers were worried by the low number of applications. But of course, as usual, just before the deadline, the applications arrived in large numbers and the registrations of participants also increased in such a way that it was soon clear that this congress would be the most attended one in the history of ICIAM. This was confirmed by an attendance of almost 4000 participants, a record.

The final weeks before the congress were exciting because everything became much more concrete. But at the same time, clouds appeared in the horizon, as when the organizers learnt that the venue for the Opening Ceremony was no more available due to important technical problems. That was a big source of stress, of course, that luckily quickly resolved itself after finding another large venue that fortunately was free for the desired dates. Also, until the last moment it was unclear who would be the authority presiding over the Opening Ceremony and awarding the prizes to the five prize winners. Would the King come or not? Would it be the Minister of Education or the President of the Region of Valencia? And during the uncertainties of those days, we started to learn about protocol, about who was ranked above whom, etc., etc. In the end, some days before the congress, the King announced his visit, and with that, a long negotiation started in order to remodel the Opening Ceremony: the timing, the structure, the need of a coffee break in the middle of it... all the details had to be negotiated and agreed on, both with the Royal House and with the Education and Research Ministry. Some of the changes proposed to us were acceptable, others more difficult to accept and implement, but in the end that intense period came to an end and we were ready for the opening of the congress.
For me the congress itself was a week of excitement, of happiness, of worries also at some moments, but all in all, a very positive and joyful week. And it passed swiftly. It took weeks and months of intense preparations and decision making, and then, it went so quickly…

It was great to see old friends, to witness the joy of the prize winners, to meet people that I knew only from papers and email communication. It was also a great joy to see so many young participants and in particular young people of all continents eager to learn and exchange, to meet more senior people, to feel like an important part of the community. The first day of the congress was a day of stress and nervousness, because we had to start going from building to building, from room to room, in a campus that was new for most of us. The first afternoon was complicated by some unexpected technical problems, and some people were unhappy. But the response of the organizers and of the technical staff of the university was quick and efficient, and all problems were happily solved. From Tuesday morning on, all went on smoothly, especially when we all finally understood which building was which, and we could move from session to session easily and rapidly.

The level of the talks I attended was very high, and it was very nice to acknowledge the big effort the invited speakers made to address large audiences and made their, sometimes technical, topics understandable and their talks enjoyable. I learned about very interesting new applications of mathematics, in many different areas. For more than one year I had been convinced that the Program Committee had made a great job. I was already convinced of that on paper, but looking at the program, struggling to choose which talks to attend, and listening to them, that conviction became real and strong: actually, it was not a conviction anymore, it was just acknowledging the reality.

I would say without being afraid of being ridiculously optimistic that the congress was a real success, showing the dynamism and diversity of our community and showcasing the importance of mathematics for our society. The organization of an industry day was also an excellent idea, especially because of the interventions of a good number of people working in industry, all acknowledging the importance of mathematical modelling, simulation and optimization for their companies.
A discussion that arises systematically at every ICIAM congress is whether we host too many mini-symposia. And there are arguments for and against this, because on one hand it becomes crazy to choose between 70 mini-symposia at a given time, but on the other hand, it facilitates the real participation in the congress of many members of our community, making the congress not only an event where carefully selected invited speakers present their work, but also the forum of the applied mathematicians from all over the world that can choose to organize a mini-symposium about their favorite topic and invite specialists to come and discuss about it together. This double component, the top-down and the bottom-up sides of the ICIAM congresses, make them very special, very different from the ICMs for instance. Here excellence is acknowledged by a selective program committee, of course, but at the same time, the community itself chooses also the topics that they want to present and discuss, most of them extremely emergent. The ICIAM congresses are not only a place where excellence is recognized, is not only a 'prize-giving event', but is also a place of intense scientific exchanges, of information passing and gathering, of science being made on the spot.

I would like to finish this little article by once again thanking the congress organizers for their great job, for their service to our community, for making this event a lively and intense moment for all of us. And I want also to thank all the participants for coming to Valencia and for sharing and making the congress such an important event for our community.

Maria J. Esteban

Maria J. Esteban is a senior researcher at CNRS and works at the University Paris-Dauphine. Her research area includes nonlinear partial differential equations, especially variational methods. Her term as President of ICIAM ended October 1, 2019.
ICIAM 2019 Panel on Careers in Mathematical Sciences to Academia and Industry

By Sven Leyffer (ICIAM, Argonne), Volker Mehrmann (EMS, TU Berlin), Jill Pipher (AMS, Brown), Amy E. Radunskaya (AWM; Pomona College), Wil Schilders (EU-MATHS-IN, TU Eindhoven), Carlos Vázquez (SeMA, A Coruña University)

This year’s ICIAM meeting in the Spanish city of Valencia featured a panel on careers in mathematical sciences in academia and industry. Panelists came from a broad range of backgrounds and institutions, representing the diversity of ICIAM: Volker Mehrmann, President European Mathematical Society; Jill Pipher, President of AMS, Department of Mathematics at Brown University; Ami E. Radunskaya, Past-President of the Association for Women in Mathematics; Wil Schilders, European Consortium of Mathematics in Industry (ECMI); Sven Leyffer, Secretary of ICIAM, who works at Argonne National Laboratory. The panel was organized by Carlos Vázquez, member of SEMA and professor at the University of A Coruña.

For two hours, panelists discussed the present and future role of mathematicians in academia and industry, as well as possible improvements in the training of applied mathematicians to ensure a successful career in academia or industry. The panel session started with the panelists providing a brief outline of their views on this topic, followed by a set of questions from the organizer.

Careers in the Mathematical Sciences: US

Jill Pipher reported on some of the data collected by the AMS: numbers and field distribution of Ph.Ds, career trajectories, demographic information, and trends in the mathematical and statistical sciences. This information is collected in annual surveys, is made available on the AMS website, and is published in the Notices. Notable trends included the slight but possibly significant decline over the past ten years in the percentage of Ph.Ds awarded to women, the continuing low numbers of under-represented minorities in the US receiving advanced degrees in mathematics, the growth in non-research faculty positions at research universities, and the surge of student demand for mathematics, computational and statistical sciences and computer science education relevant to careers in data science. For some years, the US job market for new Ph.Ds has offered many more postdoctoral positions in academia than it offers in follow-up tenure track positions. Some discussion was devoted to how mathematics departments could prepare students for the many rewarding non-academic careers. The SIAM Careers website was mentioned as a terrific resource for students eager to learn about specific sectors, jobs and companies that hire mathematicians.

Careers in the Mathematical Science: Europe

Volker Mehrmann reported on the large inhomogeneity in the job market on academic as well as industrial jobs in Europe. In some countries the market is almost empty so every candidate has many options in industry while in other countries there are no jobs at all. Similarly in academia in some countries it is generally very good on the assistant professor level but harder but good on the level of higher positions while in other countries there are almost no reasonably paid positions at all. EMS and EU-Maths-In[1] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn1) provide job portals and many of the national societies are very active in this respect. Many actions are taken to involve more young scientists in the societies and also to change the gender imbalance but also here the situation is very inhomogeneous in Europe and this leads to a lot of south-north movement, in particular of young scientists.

Careers in All Sectors

Ami Radunskaya noted that we need mathematicians everywhere, in all sectors of society. For example, teaching mathematics to young people is critical, and should be a valued career trajectory. Mathematicians also play a role in policy-making, medicine, the energy sector, and decision-making in almost every area of endeavour. It is our role as professional societies, and as individual mathematicians, to expose our broader community - our children, our
neighbors, our business-people, our politicians - to the usefulness and joyful playfulness of mathematics. A better awareness of the role of mathematics in society could also encourage more participation from those groups currently under-represented in the field.

**Careers at National Laboratories**

Sven Leyffer reported on careers with the US and European national laboratories networks. There are 14 Department of Energy labs within the US, and similar numbers of institutes such as the Max-Planck[2] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn2) and Frauenhofer[3] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn3) institutes in Germany, the INRIA[4] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn4) institutes in France, and Rutherford Appleton laboratory in the UK. The US labs offer a range of opportunities for young mathematicians (open to applicants from most countries) such as student internships and postdoc fellowships, including prestigious named fellowships such as the Alvarez[5] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn5), Householder[6] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn6), John von Neumann[7] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn7), and Wilkinson[8] (applewebdata://C1B5A475-898A-438C-82D4-AAC36D876B07#_ftn8) fellowships. Hiring of new staff is often done from the pool of former students and postdocs. Staff members tend to work on 100% soft-money projects, collaborating with domain scientists and computer scientists. These projects are often large multi-institutional, multi-disciplinary projects requiring the ability to both assimilate new information quickly and to communicate well with other domain scientists. Current applications include power-grid, data analysis for physics experiments and beamlines. Unlike academic job environments, the labs place special emphasis on developing open-source production-quality software running on HPC systems. Sven expects future projects to pivot towards artificial intelligence and machine-learning for physics-based models, as well as heterogeneous and emerging compute-architectures, such as quantum, neuromorphic, and low-precision devices.

**Careers in Mathematical Sciences to Industry in Europe**

Wil Schilders, president of EU-MATHS-IN (www.eu-maths-in.eu (http://www.eu-maths-in.eu/)) reported on the ways their organisation supports careers within industry. To this end, EU-MATHS-IN has a job portal on its website that is dedicated to mathematics jobs in industry. Here, students can browse job opportunities, and industry can post positions. Also, jobs related to the European Industrial Doctorate program of the European Union are posted here: these positions require that the PhD students stay a minimum of 50% of their time within industry. Wil, who spent 30 years in industry (Philips, NXP Semiconductors), also explains the dual ladder system that is used in industry: it is possible to pursue a career as a manager, but also as an expert (“fellow”).

Closely related to EU-MATHS-IN is the European Consortium for Mathematics in Industry (ECMI). This organisation has organized so-called the Studygroups Mathematics with Industry already for several decades and in many European countries. These cover one full week, starting with presentations of 5-6 industrial challenges. Then the mathematicians split into groups, working on the challenges all week, and presenting the results to the industries on Friday. It is one of the best ways to get involved with industry, and for the participating students it may lead to job offers and careers in industry.

Finally, Wil presented some scattered initiatives. One example is the “speed-dating with industry” event at the Dutch Mathematical Congress (each year), where students can talk to industry representatives about job opportunities and the type of mathematical work being used within the company. Also, the French network within EU-MATHS-IN, named AMIES, organizes job fairs each year, where 50-60 companies are present, as well as 1200-1400 students from all over France.

**Open Q&A Session**

Following the initial presentations, the panelists engaged with an active audience on a range of questions raised by Carlos Vázquez, as organizer, and grouped around three main topics: Careers in MS (Mathematical Sciences) in Academia, careers in MS in Industry, and comparison between careers in Academia and Industry. Here, we
summarize some questions and answers.

Carlos: Is the number of positions at Universities and Research Centers related to MS increasing worldwide? Could you identify special topics? Could you mention any special ones beyond AI, IoT and Robotics?

Sven: Yes, just look at the growth in artificial intelligence and machine learning at Google, Microsoft, and the university centers being established throughout the US, such as Georgia Tech and Lehigh. Applied mathematicians can also find opportunities in Industrial Engineering, Statistics, Operations Research and Computer Science Departments.

Carlos: Is a PhD degree required for the kind of applied math jobs that you describe? In view of new topics arising in the industry, should new skills be incorporated to training programs at BSc and MSc?

Volker: Negotiation skills are important, as well as confidence in looking and asking for jobs.

Sven: Yes. Labs typically require a PhD as evidence for independent thinking and an ability to become a principal investigator on research grants. Other important skills are communication skills to be able to work in a multi-disciplinary environment. Mathematicians are often hired for their analytical skills, not for specific knowledge in a narrow area. Over time, applied mathematicians in the national labs develop into Jacks of All Trades, branching out into new areas.

There was discussion, prompted by the audience, about gender bias in hiring. It was suggested that our community might "equify" the job-application process. For example, might job portals enable gender blind applications by only reporting first and last initials of applicants? Could recommendations be anonymous?

Carlos: Talking about money, are salaries in the industrial positions much higher than in academic ones? Is this important for the decision to follow either an industrial or an academic career? Is a career in academia less risky than in industry? How easy is it to move from industry back to academia? Can we help lower the barrier for moving back to academia and research?

Sven: Salaries at the national labs are typically competitive with industry, especially in applied mathematics, where salaries are closer to computer-science salaries. Coming back from industry to academia is often easier in Industrial Engineering departments or national labs, which have a culture that is more similar to industry.

Volker: In the EU there exist Industrial Mathematics Professorships which are often filled with candidates who have had industrial experience. Postdocs from labs also often move back to academia, and in some cases there exist joint appointments with emphasis on industry.

Wil: It is often difficult to move from industry to academia, and usually happens only late in one’s career. In many cases the academic appointments in The Netherlands are for 1-2 days per week (speaking from his own experience of coming back from Philips). If you want to come back to academia from industry, then it is important to keep your academic profile updated by attending conferences, and publishing papers whenever possible.

Audience: Philippe Tondour introduces a useful resource for preparing math students for industry, called BigMathNetwork.org.

In his closing remarks, Volker encouraged the audience to appeal to the ICIAM member societies to improve the situation for applied mathematics by putting more effort into support, advertisement, and education of young scientists. He mentioned that several recent studies have shown that the contribution of applied math to a country’s GDP is 15-25%, which should be a good basis for a healthy profession.

After two lively hours, Carlos closed the meeting by specially thanking all the panelists, as well as the audience for their presence and active discussions, providing interesting ideas and viewpoints.
Panel members from left to right: Wil Schilders, Sven Leyffer, Ami Radunskaya, Volker Mehrmann, Jill Pipher, and organizer, Carlos Vazquez


Report on Developing Countries Conference Support: IWCTA

The International Workshop and Conference on Topology and Applications (IWCTA 2018) was organized at Rajagiri School of Engineering & Technology, Cochin, India from December 5 to 11, 2018. The workshop was held from December 5 to 8, and the conference from December 9 to 11, 2018.

IWCTA featured 43 workshop lectures, 11 plenary talks, 14 invited talks and 82 contributed papers; 294 participants from 22 countries attended the meeting. The invited speakers at IWCTA included:

- Prof. A.N. Sharkovsky, Institute of Mathematics, National Academy of Science of Ukraine;
- Prof. Amit Chattopadhyay, International Institute of Information Technology, Bangalore, India;
- Prof. Andrei Tetenov, Gorno-Altaisk State University, Russia;
- Prof. Anima Nagar, IIT Delhi;
- Prof. Dan Burgheloa, Ohio State University, USA;
- Prof. Dominik Kwietniak, Jagiellonian University in Krakow, Poland;
- Prof. Govind Rangarajan, IISc Bangalore;
- Prof. Henk Bruin, University of Vienna, Austria;
- Prof. Hisao Kato, University of Tsukuba, Japan;
- Prof. James Yorke, University of Maryland, USA;
- Prof. Javier Camargo, Universidad Industrial de Santander, Colombia;
- Prof. Jose S. Canovas, Polytechnic University of Cartagena, Spain;
- Prof. Joseph Auslander, University of Maryland, USA;
- Prof. Karoly Simon, Budapest University of Technology and Economics, Hungary;
- Prof. Kit Chan, Bowling Green State University, USA;
- Prof. Krzysztof Lesniak, Nicolaus Copernicus University, Poland;
- Prof. Lubomir Snoha, Matej Bel University, Slovakia;
- Prof. P.G. Patil, Karnatak University, Dharwad, India;
- Prof. Parmeswaran Sankaran, Institute of Mathematical Sciences, India;
- Prof. Patrizio Frosini, University of Bologna, Italy;
- Prof. Robert Devaney, Boston University, USA;
- Prof. Roman Hric, Matej Bel University, Slovakia;
- Prof. Saber Elaydi, Trinity University, USA;
- Prof. Varadachiar Kannan, University of Hyderabad, India;
- Prof. Vijay Natarajan, IISc Bangalore;
- Prof. Vin de Silva, Pomona College, California, USA; and
- Prof. Wlodzimierz J. Charatonik, Missouri University of Science and Technology, USA.
The participants who received ICIAM Fellowships were

1. MAI THE DUY, HAI PHONG UNIVERSITY, VIETNAM
2. GODWIN OKEKE, FEDERAL UNIVERSITY OF TECHNOLOGY, NIGERIA
3. HARI TRIVEDI, THRIBHUVAN UNIVERSITY, NEPAL
4. YAMILIL LAMA, ROYAL UNIVERSITY OF BHUTAN, BHUTAN, and
5. DUROJAYE OLAYIWOLA, PHILLIP FEDERAL POLYTECHNIC, NIGERIA

A Personal Experience of This Year's Abel Week Events
The announcement of the 2019 Abel Prize on March 19th was a very exciting moment: for the first time a woman would be its recipient! Karen Uhlenbeck had been chosen by the Abel Committee and that was great news. The citation written by the committee said that she was getting the Abel Prize "for her pioneering achievements in geometric partial differential equations, gauge theory and integrable systems, and for the fundamental impact of her work on analysis, geometry and mathematical physics." I have known Karen Uhlenbeck for many years, and when her prize was announced, I remembered that at the beginning of my career I often read articles of hers.

The Abel ceremony and the Abel celebrations took place in Oslo on May 20-22. As president of ICIAM I was invited to all the events of the week and even if every time I have attended it I found the ceremony, the interviews and the lectures interesting, this time the event had an extra nice touch.

The first day, as usual, a wreath-laying at the Abel Monument in the Palace Park took place in the afternoon, and after that, there was a dinner for mathematicians in the beautiful abode of the Norwegian Academy of Sciences and Letters. Karen Uhlenbeck was there, certainly happy, but at the same time, unassuming and probably a little overwhelmed by all the attention she was getting. During the dinner I was seated between Robert F. Williams, mathematician and Karen's husband and Richard Palais, Karen's advisor, the Palais of the the famous Palais-Smale compactness condition that I have used so much in my research, and whom I had never met before. That was also exciting for me. Karen was sitting just in front of us.

The next day the Abel Ceremony took place in the University Aula in Oslo, a wonderful building whose main hall is covered with paintings by the famous Norwegian painter Edvard Munch. As usual, the ceremony was very beautiful, with a lot of nice touches. The King of Norway, H.M. King Harald V, presented the Abel prize to Karen and several people gave speeches (the president of the Academy, the chair of the Abel committee and Karen herself). In her speech Karen spoke about her life as a mathematician, and stressed that she had been lucky for two things: to grow in a family where, being a woman, she had had no problem to go into science; also, because the women's feminist movement of the 60's opened doors that made her career as a woman mathematician easier to develop. The ceremony's schedule and speeches and events were separated by pieces of music and singing. This year a modern Norwegian choir was in charge of these music interludes.
After the ceremony, a little reception in the nearby Det Norske Teatret was the occasion to listen to a conversation between the very well known science communicator Ionica Smeets and Karen Uhlenbeck. Several topics were raised during that interview, and Karen explained again some of her experiences, and talked about the "Women in Mathematics" summer program that she had helped to create in the Institute for Advanced Studies in Princeton. Again during this interview she gave an impression of modesty and of trying to be very patient despite the huge attention that was pouring over her.

The same evening the traditional dinner, organized by the Norwegian Government in the old and impressive halls of the Akershus Castle, was a very nice gathering of mathematicians, politicians and representatives of very diverse groups of Norwegian society. It was nice and lively mix, that got a little quieter when his majesty the King arrived. Again music and a speech created some animation during the dinner. The new president of the IMU, Carlos Kenig, delivered a touching speech, with some personal anecdotes and reminiscences about his interaction with Karen Uhlenbeck when they were colleagues in Chicago many years ago.

On Wednesday the main festivities were over, and it was time to work! The Abel lectures took place at Oslo University, in a quiet and very nice campus a little bit away from the city center. After the usual and mandatory speeches, Karen Uhlenbeck shared with all of us "Some Thoughts on the Calculus of Variations". After her, there were two talks related to her work, by Chuu-Lian Terng and Robert Bryant. The final lecture was a public lecture by the very funny and lively mathematician and you-tuber Matt Parker, whose title was "An Attempt to Visualise Minimal Surfaces and Maximum Dimensions". His talk was really informative, entertaining and amusing.
The day ended with the Abel party, a relaxed reception at the Academy, with music and less formality than the previous events.

The next day Karen Uhlenbeck was to travel to Bergen, where other events, including students this time, had been organized.

More information about the Abel week and about Karen Uhlenbeck, including a little movie, made for the occasion, can be found at the address http://www.abelprize.no/nyheter/vis.html?tid=74332

Maria J. Esteban  
ICIAM President

**CSIAM Holds "Women and Mathematics" Forum**

An education and development forum focused on "Women and Mathematics" was held in Beijing on Aug 11, attended by about 100 representatives in related fields from universities, middle schools, as well as other research institutes and enterprises. The forum was co-organized by China Society for Industrial and Applied Mathematics, the Association for Chinese Women Scientists and the Academy of Mathematics and Systems Science, a subsidiary of Chinese Academy of Sciences.
Professor Zhang Pingwen, an academician of CAS who is also the chairman of China Society for Industrial and Applied Mathematics, said in a speech that industrial and applied mathematics is an important subject to mathematical science and plays a significant role in national defense security, industrial development and comprehensive national power. Women, at the same time, have a unique social role in the development of mathematics and international affairs. He called on to create more opportunities for female researchers, fully consider their situation and adjust relevant policies.

Professor Xi Nanhua, a CAS academician and president of the Academy of Mathematics and Systems Science, said women have their unique characteristics. The world has seen many outstanding female mathematicians emerging but the great potential of female mathematicians in China has not yet been tapped. They need guidance from a national level and support from their own families and places of employment.

The Association for Chinese Women Scientists is the one and only social organization dedicated to female scientists and researchers. Its president Wang Zhizhen said "gender equality" is one of China's national policies. As the society is becoming increasingly diversified, it is necessary to help women develop positive values and outlook on life and encourage them to contribute to science and industrial technology development.

Professor Xu Ping, secretary-general of the Association for Chinese Women Scientists, told that one characteristic of today's academia is that women are of greater significance.

Professor Yan Guiying, secretary-general of China Society for Industrial and Applied Mathematics, introduced the program "Math-Shining Your Future" which is jointly set up by the society and China Women's Development Foundation. The program aims to help students from poverty-stricken areas grow interests over math, promote exchanges between students and mathematics teachers and build platforms that help enterprises solve problems in mathematics application while attracting more students to join project practices. It will be carried out in three stages: popularization of mathematics on campuses, mathematics camps and practices in mathematical application.

Recently, the Ministry of Science and Technology, the Ministry of Education, Chinese Academy of Sciences and the National Natural Science Foundation of China jointly formulated a plan on strengthening the country's mathematical research capabilities, fully recognizing the key role of mathematics in social development, technological innovation and human civilization. The forum is therefore of significance to encourage more women to study mathematics and pursue careers in this field of study.
Yan Guiying

Guiying YAN is a professor at the Academy of Mathematics and Systems Science, Chinese Academy of Sciences (CAS). She is a Vice-President of the National Center for Mathematics and Interdisciplinary Sciences, CAS and Secretary-general of CSIAM.

PRESS RELEASE: Canada's First-Ever European Girls' Mathematical Olympiad Team

STRONG SHOWING FROM CANADA'S FIRST-EVER EUROPEAN GIRLS' MATHEMATICAL OLYMPIAD TEAM

EGMO Team Canada 2018

OTTAWA, Ontario — The Canadian Mathematical Society is pleased to announce that its first-ever team to compete in the European Girls Mathematical Olympiad has returned from Italy, medals in hand. EGMO Math Team Canada earned one Silver medal, two Bronze medals and one Honourable Mention.

The two-day competition got its start in 2012 when it was first written in Cambridge, UK and has since grown to include more than 50 countries. Participation in the EGMO is by invitation only and Team Leader Professor Dorette Pronk (Dalhousie) says the solutions submitted by the Canadian Team were

"the most beautiful she has seen… that the students were encountering interesting problems with enough time to solve them and really appreciate the beauty in the ideas, fitting, in the environment of beauty and art in Florence."

Although the EGMO was certainly a competition, it had a different focus than on just medals and placement. The focus was on creating a community of female mathematicians that the participants could draw on in the future. Contestant Anna Krokhine says the competition was
“about community rather than being hostile or competitive, you could really think about interesting mathematics during the week.”

The team agreed that although challenging, the competition was also inspiring as they were encountering interesting problems.

Deputy Team Leader Sarah Sun (TD Bank, Data Strategy) says she was encouraged by the performance of the team noting:

“I get the uncanny feeling that I am seeing tomorrow’s global leaders today”.

Canada’s presence at the European Girls’ Mathematical Olympiad was made possible in large part due to the financial support of the University of Waterloo’s Faculty of Mathematics for which the Society is very grateful. The Society would also like to acknowledge the Leaders and organizers of the Winter Training Camp who assisted in identifying and training the members of the team.

Canada’s Team consisted of:
Elnaz Hessami Pilehrood - Silver Medalist - Marc Garneau C. I., North York, ON
Anna Krokhine - Bronze Medalist - University of Toronto Schools, Toronto, ON
Jingzhi Liang - Bronze Medalist - Marc Garneau C. I., North York, ON
Karen Situ - Honourable Mention - University Hill Secondary School, Vancouver, BC

The full results are available at https://www.egmo.org/egmos/egmo7/ (https://www.egmo.org/egmos/egmo7/)

About the European Girls’ Mathematical Olympiad (EGMO)
The European Girls’ Mathematical Olympiad is an international mathematics competition similar in style to the International Mathematical Olympiad, with two papers taken on consecutive days. Participating countries send teams of four female mathematicians of school age. EGMO 2019 will take place in Kyiv, Ukraine.

About the Canadian Mathematical Society (CMS)
Founded in 1945, the Canadian Mathematical Society (CMS) promotes the advancement, discovery, learning and application of mathematics. The CMS promotes mathematics through a rich array of activities including scientific meetings, publications, awards, prizes, grants, camps and competitions.

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FAIR Research Data

In many European countries, e.g. Germany, there is a strong movement that all research data should be freely available according to the FAIR principles (findable, accessible, interoperable and reusable). See https://libereurope.eu/wp-content/uploads/2017/12/LIBER-FAIR-Data.pdf

This is a major challenge for scientists who produce massive data, e.g. from numerical simulations, but also for mathematical research as a whole.

How and in which form can we standardize the way to find mathematical formulas or mathematical theorems, when different communities use different terminology for the same objects while the same formulas for different objects?

The German Science foundation DFG has just started a large call for building research data infrastructures to deal with this, see e.g.


Most people in the mathematical community seem to ignore these developments, but this may lead to real threats for the community if we do not join the movement right from the beginning.

Examples of such threats could be that standards will be fixed that are incompatible with our current way to produce mathematical articles (in LATEX) and PDF or that the way formulas are stored is just graphically. Another problem may be that standards for model generation, mathematical software, or simulation data are not as we like them. It is clear that commercial code providers are heavily lobbying with governments to make standards that are good for them and that IT companies and data analytics people have their own views of how data should be addressed.

The mathematical community must unite in a common quest to be on board right away in the developments (the German math community has already decided to do this and is participating in a joint consortium proposal) and to make these principles realistic for mathematics and the neighbouring sciences and to preserve and improve
established publishing standards to be able to deal with future developments. This may require also the construction of new and uniform concepts, such as semantic annotation of formulas or theorems.

Volker Mehrmann
Volker Mehrmann is Professor of Mathematics at TU, Berlin. He is editor-in-chief of Linear Algebra and its Applications, chair of MATHEON, member of the German academy of engineering (acatech), and president of the European Mathematical Society.

Editorial Statement: Travel Restrictions
In light of recent government decisions whose consequences will include restrictions on the international travel of scientists, the ICIAM Dianoia voices its support for mathematical scientists around the world.

Our international community flourishes because of our numerous contacts and collaborations. Whether we are speaking of short visits or immigration, this international communication has enriched the discipline and the host countries.

ICIAM is committed to sustaining the international mathematical sciences community, and policies that ensure open scientific borders are important. We encourage all mathematicians to support international mobility, and to oppose travel and visa policies that make it difficult for mathematical scientists to attend conferences, pursue collaborations and study in other countries.

DISCLAIMER: This editorial represents the opinion of the author and is not necessarily that of the ICIAM Board.

Barbara Lee Keyfitz
Barbara Lee Keyfitz is Professor of Mathematics at The Ohio State University. Her research area is the analysis of partial differential equations. She is a former president of ICIAM, and is Editor-in-Chief of the ICIAM Dianoia.

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announcing events, on-site reports from events and industry news.

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