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On the cover: The Palau de la Generalitat of Valencia became the seat of the Presidency of the Valencian Generalitat in 1982. Constructed in 1421, and located at coordinates $39.4767°$N, $0.3767°$W, it is in the Valencian Gothic style with Renaissance interventions dating from the fifteenth century.

The ICIAM Dianoia
Vol. 6, No. 3, July 2018

News on the Gender Gap Project

by Jean Taylor

The 2018 Global Survey of Scientists is now underway and will be open until October 31, 2018. All people in the fields of Mathematical, Computing, and Natural Sciences, including students, are encouraged to go to the link `statisticalresearchcenter.org/global18`, which redirects to a secure site. The survey is available in seven languages (English, French, Russian, Spanish, Arabic, Chinese, and Japanese); simply choose your language on the first page of the survey.

We need women and men in mathematical, computing and natural sciences at all levels, including students, to share their career and education experiences.

The survey is part of an interdisciplinary collaboration of eleven partners (including ICIAM) which aims to better understand the problems that mathematical, computing, and natural science academics and practitioners are facing around the world. One of the specific tasks for the project is to collect data across the world to inform policy makers from all countries, especially developing countries, about reducing the gap between men and women in mathematical, computing, and natural sciences. The survey data are being collected by the non-profit Statistical Research Center of the American Institute of Physics. Responses to this survey are voluntary, and individual information will be held in strict confidence. The project is primarily supported by the International Council for Science (ICSU).

The survey was honed through regional meetings, held over the past year in Taiwan, Capetown, and Bogota and involving scientists worldwide. These regional meetings also discussed another aim of the Gender Gap Project, which is to assemble a list of best practices and links to other sites that have such lists. The second coordination meeting for the whole project was held in Paris June 11–12, 2018; there will be two more meetings in 2019, where the project will be wrapped up and the results disseminated.

Jean E. Taylor, coordinator for ICIAM

ICIAM Announcements

2018 Meeting of the ICIAM Board in Philadelphia (USA)

The 2018 annual meeting of the ICIAM Board took place in the Club Quarters Hotel, Philadelphia, on May 12 and it was kindly organized and hosted by SIAM. It was attended by thirty-three Board members and six guests, including representatives of SIAM and IMU and organizers of the ICIAM 2023 congress. Twenty-three member societies were represented. As it is the case in Board meetings which do not coincide with the Congress or which do not contain important decisions or elections, the participation was lower than usual. And this was expected. But is precisely in years where no elections or decisions about Congress sites are made that there is time for important discussions on issues concerning the future of the society and its activities. And this was the case with this meeting.

This time, apart from the mandatory Officers' reports and the discussion and presentation of the financial accounts and the budget, which presented no problem, and were all approved unanimously, the Board dedicated a good amount of time to the discussion of some important changes in the rules of the ICIAM prizes. Indeed, in the last editions it has been noted that there are not always enough strong nominations for some of the prizes, and then the committee members have had to step in and add names during their discussions. This procedure can create tensions and even some of us see this practice as a possible source of conflicts of interest and tension. Following the example of other societies that have experienced the same kind of problems, the decision was made to create a Canvassing Committee, which will make sure that enough nominations of significant quality are made for the five ICIAM prizes. This new committee, appointed by the Board, will work prior to the official nominations' campaign. The nominations steered by the Canvassing Committee will be of course made following the same online procedure as the other spontaneous nominations. We think that the creation of this new committee will increase the level and quality of the ICIAM prizes.

The rules of the Olga Taussky-Todd (OTT) Lecture were also slightly modified, in order to make explicit de-

cisions that had been made by the Board in previous meetings. The Board was also informed of the ongoing campaign to raise the amount of the OTT Fund in order to increase the OTT honorarium given to OTT lecturers. The goal is to increase it to be of the same order as the ICIAM prizes, that is 5,000 USD. That would require that the Fund is increased by at least 50,000 USD. The current campaign is being taken care of by Frank Uhlig and Rolf Jeltsch in collaboration with the ICIAM President, and is addressed to corporations.

Concerning membership, ICIAM accepted three new members this year. The Dutch Mathematical Society, the Vietnam Mathematical Society and last, but not least, the first African member of ICIAM, the Southern African Mathematical Sciences Association (SAMSA). The Board wishes that efforts are made to have more African members in our Council. Some Board members proposed to make contacts with African mathematicians and associations they know.

There were also presentations of the next congresses, the ICIAM 2019 congress that will take place next year in Valencia, and the next one, that will take place in Tokyo in 2023. In the first case many details were given about the final preparations of the congress and its scientific activities. In particular it was stressed that the call for minisymposia is open until November 2018 and that ICIAM member societies should encourage their individual members to submit applications for minisymposia, thus allowing for a large variety of topics and of geographic balance of the attendees to the congress. Concerning the Tokyo congress, the organizers showed the Board members the beautiful logo they have chosen for their congress, featuring an elegant crane. The Board also accepted the proposition of JSIAM and MSJ to choose professor Yasumasa Nishiura as the chair of the Scientific Program Committee for the Tokyo congress.

At the end of the meeting there were presentations about the Dianoia newsletter, that will be called ICIAM Dianoia in the future, about the activities of the ICSU committee, which will change its name to ISC committee following the merge of ICSU with ISSC, and of IMU. In the case of ICIAM Dianoia, Barbara Keyfitz, Editor in chief, and Sean Bohun, Managing editor, presented some projects they had for the newsletter and asked members to propose new editors. The IMU representative, V. Jones, described the main activities of IMU and in particular, gave news about the upcoming ICM 2018 congress. Tom Mitsui announced the final merge of ICSU and ISSC and the first GA of the next organization, ISC, that will take place in Paris on 3–5 July, 2018. ICIAM will be represented there by Maria J. Esteban and Gabriella Puppo, member of the ICIAM ICSU (ISC) committee.

One of the last presentations of the meeting concerned the ICSU Gender Gap in Science project, run by the IMU, and where ICIAM has joined a number of other international unions. One of the main tasks of the project is a Global Survey that is currently open. ICIAM has asked all its members to disseminate the news about this Survey as much as possible.

Maria J. Esteban, June 25, 2018

Maria J. Esteban is a research director at CNRS and works at the University Paris-Dauphine. Her research themes include the study of nonlinear partial differential equations, especially by variational methods; relativistic and nonrelativistic quantum mechanics, with applications to quantum chemistry; fluid-structure interactions, etc. Until recently she was the President of SMAI (Société de Mathématiques Appliquées et Industrielles) and currently is the Chair of the Applied Mathematics Committee of the EMS.
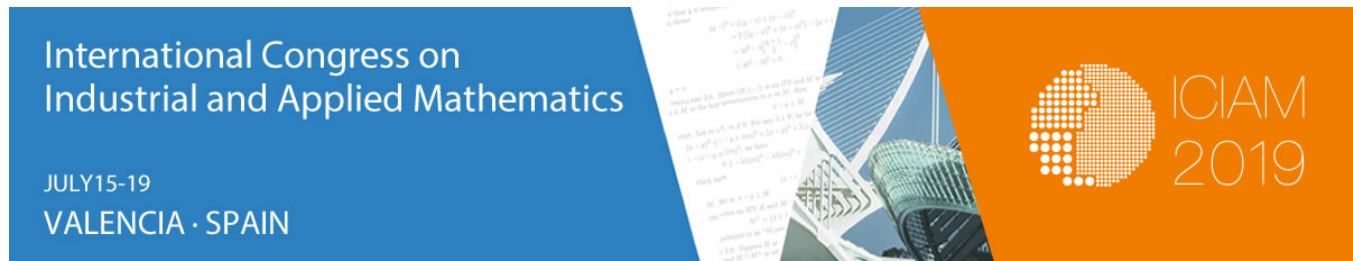
ICIAM 2019 Valencia: Call for Minisymposia

The organizers of ICIAM 2019-Valencia Congress are pleased to launch the call for Minisymposia.

A minisymposium consists of four, 25-minute presentations, with an additional five minutes for discussion after each presentation. Multiple part minisymposia may be submitted, but will be subject to careful review by the organizing committee before acceptance. Preference will be given to minisymposia that list all speakers and talk titles. Prospective minisymposium organizers are asked to submit a proposal consisting of a title, a description (not to exceed 100 words), and a list of speakers and titles of their presentations.

It is recommended that a minisymposium organizer makes the first presentation. Each minisymposium speaker should submit a 75-word abstract. The organizing committee will referee minisymposium proposals. The number of minisymposia may be limited to retain an acceptable level of parallelism in the conference sessions.

To ensure balance, ICIAM prefers that a single individual not be the organizer of more than one minisymposium. In addition, ICIAM discourages minisymposia in which most of the speakers come from the same organization or if all co-authors on the papers being presented in a minisymposium are from the same organization.

Participants are limited to presenting two talks at most during ICIAM in order to maximize the opportunity for all participants to speak. If you are invited to speak in more than one minisymposium, we suggest you use the opportunity to nominate a colleague or student to speak about your work.

Guidelines for preparing a minisymposium proposal are available at www.iciam2019.com

Topics list

- Applied Mathematics for Industry and Engineering
- Astronomy, Astrophysics and Geophysics
- Biology, Medicine and other Natural Sciences
- Chemistry, Chemical Engineering
- Computational Geometry
- Computer Science
- Control and Systems Theory
- Discrete Mathematics
- Dynamical Systems and Nonlinear Analysis
- Education
- Finance and Management Science
- Fluids, Physics and Statistical Mechanics
- Information, Communication, Signals
- Linear Algebra and Geometry
- Materials Science and Solid Mechanics
- Mathematics and Computer Science
- Numerical Analysis
- Optimization and Operations Research
- Ordinary Differential Equations
- Partial Differential Equations
- Probability and Statistics
- Real and Complex Analysis
- Simulation and Modeling
- Social Science
- Other Mathematical Topics and their Applications

Deadlines

Deadlines are midnight Central Europe Time Zone

- Closing date for the submission of proposals: November 05, 2018.
- Notification of final decisions: November, 2018.
- Submission due of accepted minisymposia abstracts: from November, 2018 until March, 2019.

Acceptance Notification

March 2019: All submitting authors will be notified by email.

May 2019: Schedule available.

If you want to follow the announcements, news and deadlines concerning the ICIAM 2019 congress, please sign-up at www.iciam2019.com
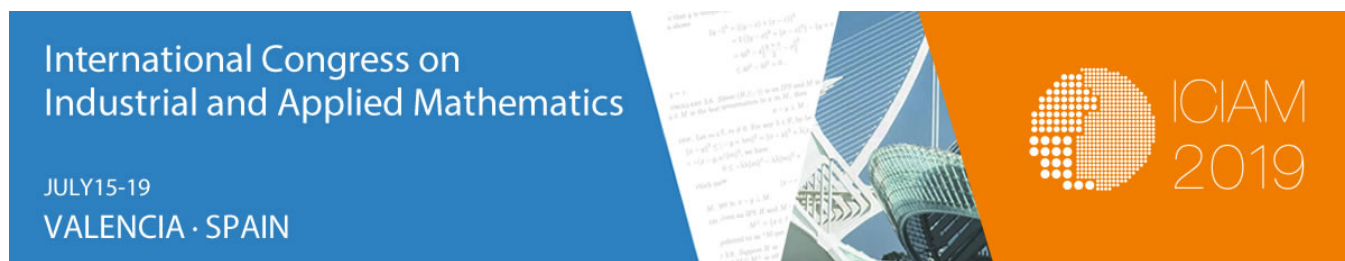
Víctor M. Pérez García, Public Speaker at ICIAM 2019

Professor Víctor M. Pérez García has been selected to deliver a Public Lecture at ICIAM 2019.

Víctor M. Pérez García, Professor of Applied Mathematics, is the Director of the Institute of Applied Mathematics in Sciences and the Head of the Mathematical Oncology Laboratory at University of Castilla-La Mancha (MôLAB) in Ciudad Real, Spain.

He is using mathematics to solve problems in oncology, specifically finding optimal treatments, identifying novel biomarkers, raising hypothesis of applicability in cancer, personalizing therapies and developing in-silico clinical trials. He also works on other biomedical problems such as diabetes. He and his research group collaborate with more than 25 hospitals and biomedical research institutes worldwide.

He has published more than 130 research papers and has received almost 5000 citations.

On the Way to ICIAM 2019 - Summer 2018 Update

ICIAM 2019 congress (Valencia, Spain, 15th–19th July, 2019) is only one year away.

During the last months the activity in the organization of the congress has increased frenetically. Like in previous reports, below we briefly collect some updated information about ICIAM 2019:

- **Public Speaker** at ICIAM 2019: **Víctor M. Pérez-García** (Mathematical Oncology Laboratory (MôLAB), University of Castilla-La Mancha, Ciudad Real, Spain) has been selected to give a Public Lecture at ICIAM 2019.

- The **call for Minisymposia** proposals is open. Detailed information about it is available at the congress website www.iciam2019.com. The deadline to submit minisymposium proposals is November 5th, 2018.

- The call for **Contributed Papers** and **Posters** was launched in July 2018. Further information is

available on the congress website. Deadlines for proposal submissions:

  - Contributed Papers: January 7th, 2019.
  - Posters: April 1st, 2019.

- For guidelines for preparing proposals, please visit the section **Submissions & Calls** within the navigator bar **Information for delegates** at the congress website www.iciam2019.com.

- Information on **Registration Fees** is available at the congress website within the navigator bar **Information for delegates**.

- Proposals for **Satellite and Embedded Meetings** should be submitted by October 1st, 2018. The current list of ICIAM 2019 Satellite Events is as follows:

 - AGACSE 2018, 7th Conference on Applied Ge-

ometric Algebras in Computer Science and Engineering, July 23–27 2018, Campinas, Brazil.

– Fifteenth International Conference Zaragoza-Pau on Mathematics and its Applications, September 10–12 2018, Zaragoza, Spain.

– FCPNLO 2018, 6th Workshop on Fractional Calculus, Probability and Non-local Operators: Applications and Recent Development, September 26–28 2018, Bilbao, Spain.

– BiDAS 3, Third Bilbao Data Science Workshop, November 8–9 2018, Bilbao, Spain.

– Second Spain-Brazil Joint Meeting of Mathematical Societies, December 11–14 2018, Cádiz, Spain.

– MEGA 2019, Effective Methods in Algebraic Geometry, June 17–21 2019, Madrid, Spain.

– CIMPA Research School "Data Science for Engineering and Technology," June 25–July 5 2019, Tunis, Tunisia.

– ECMI 2019 / VI Iberian Modeling Week, July 7–12 2019, Seville, Spain.

– ICCF 2019, International Conference on Computational Finance, July 8–12 2019, A Coruña, Spain.

– SIAM Conference on Applied Algebraic Geometry 2019, July 9–13 2019, Bern, Switzerland.

– I Conference on Transfer between Mathematics & Industry, July 22–24 2019, Santiago de Compostela, Spain.

– SciCADE 2019, International Conference on Scientific Computation and Differential Equations, July 22–26, 2019, Innsbruck, Austria.

• Some **important forthcoming dates** to keep in mind:

– **Financial Aid for Participants from Developing Countries**: applications opened on July 22nd, 2018.

– **Early bird registration** starts on November 11, 2018

• Information about ICIAM 2019 is posted constantly at www.iciam2019.com and all the updates are listed in the "ICIAM 2019 News" section. However, the best way to follow the announcements, news and deadlines concerning ICIAM 2019, is to **sign-up for e-alerts** at the congress website.

• E-Newsletter is distributed among those who signed up for e-alerts at the congress website.

• ICIAM 2019 has a Twitter account. Follow ICIAM 2019 news at @ICIAM2019.

We will continue our organizing work to make ICIAM 2019-Valencia a great scientific event.

We look forward to welcoming you to Valencia!
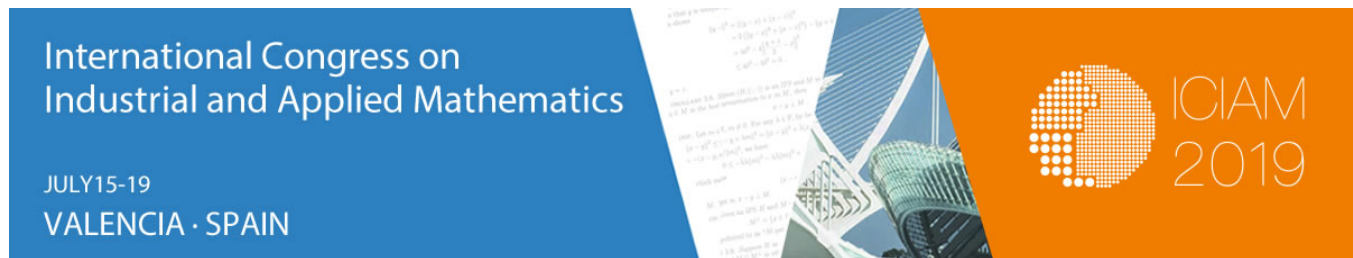
ICIAM 2019 Newsletter Announcement

Dear Colleagues,

We are pleased to announce that the next International Congress on Industrial and Applied Mathematics (ICIAM 2019) will be held in Valencia, Spain, on 15th–19th July 2019. Please visit www.iciam2019.com for information about the congress, including the list of invited iciam2019.com/index.php/scientific-program/highlighted-speakers.

We cordially invite you to signup for our Newsletter, which will keep you fully updated on ICIAM 2019-Valencia.

We look forward to welcoming you to Valencia in 2019!

ICIAM 2019 Organizing Committee

Comments on the "Bond Report"

by BARBARA KEYFITZ

ICIAM members will be interested in a new report on the interaction of mathematical sciences with industry, government, society. . . well, with everything that isn't mathematics. Under the title "The Era of Mathematics: An Independent Review of Knowledge Exchange in the Mathematical Sciences," Professor Philip Bond has compiled a study of how mathematics impacts the rest of life in the United Kingdom (UK), and how this exchange could be enhanced. The 68-page report can be downloaded from the site epsrc.ukri.org/newsevents/pubs/era-of-maths and is well worth an examination. Professor Bond, whose educational background includes mathematics and applied mathematics, has academic appointments at Bristol and Oxford (OCIAM), and has also worked in the finance and financial services industries. Thus, he has a foot in both the academic and the business worlds, and he was assisted by a review committee with representatives from a number of university departments, from industry, and from government.

Many observations and recommendations in the report are specific to the situation in the UK, and the report uses some terms that are unfamiliar in the United States, but the underlying ideas are universal. We read about "impactful mathematics." Quoting from the Preface, "a perspective on impact. . . emphasizes how a body of work can change understanding, change investment decisions, influence society and change policy." That is, the topic of discussion is the influence of the mathematical sciences beyond the mathematical sciences, a notion familiar to anyone making the case for support of mathematical sciences.

What may be less familiar is the point of the term "knowledge exchange," the main idea in this report. "Knowledge exchange" refers to the mechanism whereby one discipline is able to impact another. For example, knowledge exchange is enabled — although it is the fruit of the interaction, not the interaction itself, that constitutes the exchange — if a research hospital employs a person with a PhD in mathematics as a postdoctoral visitor, or a mathematics department hires an actuary as an adjunct to teach a specialized course. By and large, this report considers the first type of exchange in more depth than the second. One opportunity missed is documentation of the extent to which interaction with another discipline has an impact on research in mathematics itself. Within the mathematical community, greater understanding that the inspiration goes in both directions would be a powerful motivation for engaging in this effort, with or without other incentives.

The Bond report looks at a number of mechanisms for knowledge exchange that exist in the UK, gives some gauge of their effectiveness, and makes a number of recommendations. The report is intended to persuade organizations with power and money to use their resources to increase knowledge exchange and the impact of mathematics. Bond quotes from other studies that have documented the benefits of this, and adds a few anecdotes for flavor, but takes as given that this effort is worthwhile.

Although I have a few reservations about the approach taken by the report, one noteworthy conclusion is important to all mathematical scientists, no matter where they work. Bond emphasizes that "knowledge exchange" means putting people who identify as mathematical scientists, not merely people whose professional training included some quantitative or computational material, in touch with the institutions targeted for mathematical impact. The report recognizes that mathematicians whose full-time jobs are in organizations not focused on mathematics will often acquire job titles that don't emphasize (or even contain) a reference to mathematics, and points out that this has a negative effect. When the fact that mathematical thinking underlies a critical improvement in some technology is not recognized, this diminishes the inducement of organizations to employ mathematicians, or for mathematicians to consider employment there. In fact, Bond quotes the astonishing fact (from the tax code) that businesses are not permitted tax relief for research and development in mathematical areas, because "mathematical techniques. . . are not science!"

The report reminds its readers that investment in mathematics is relatively inexpensive, and generates an impressive rate of return. It quotes an EPSRC (the UK funding agency for science and engineering) report that the cost-benefit ratio for expenditures on mathematical research is 1:588, higher than any other discipline. The next closest is chemistry at 1:246.

Along with examples, some of them quite imaginative (Florence Nightingale and mortality during the Crimean War, the potential for mathematical analysis behind "smart cities") about half the report is devoted to describing the existing landscape for knowledge exchange in the mathematical sciences in the UK, and finding instances where it has succeeded. From this, the report distills a list of recommendations. Some of these are cogent; others seem superficial. Perhaps it is inevitable that a report written in response to institutional pressure should focus on institutions, but while the examples illustrating both the triumphs and the frustrations of knowledge exchange are rich in personality and anecdote, the recommendations themselves sometimes fail to focus on the fact that

work is done by people. To take an example, a situation that is a huge impediment in the US and in the UK as well is the difficulty of achieving significant interactions between researchers in different university departments. In the US, the term used is "discipline silos." This appears not to have entered British academic jargon, but the meaning is clear. The Bond report addresses this in recommendation 17:

17. Strong incentives should be put in place for cross-disciplinary work between the mathematical sciences and other disciplines.

The passive voice here conceals much. There are intellectual reasons behind these silos (it is difficult to find trusted experts to judge the quality of cross-disciplinary work and universities are mandated to strive for excellence), and there are practical, financial reasons (departments fight for their budgets and are not eager to lend a faculty member to another department; and students and postdocs are funded differently in different disciplines, in ways that are not easily coordinated). Mere goodwill and the perception that breaking out of silos would be valuable are not sufficient to counter this institutional reality. Even if someone were willing to inject money, it's not clear where and how.

I have chosen as an example a recommendation that I see as worthy of support, and which people are eager to see implemented. But the lack of current action is not merely institutional sluggishness and turf warfare. There is also a genuine tension between the educational goal of achieving sufficient mastery of a deep area of mathematics to be able to contribute something new to it and the goal of combining deep mathematics with sufficient understanding of another discipline to find links between the two. The report merely nibbles at the problem of adjusting the reward system, and at a more basic level the culture, so as to make cross-disciplinary interactions more achievable.

Some recommendations will most likely not be imple-

mented because, in fact, no one wants to do the work — or, perhaps, no one is capable of doing it. One recommendation is to put mechanisms in place to "make it straightforward for both industry and academics to find appropriate expertise," noting that this has been tried with university technology transfer offices, and that these are generally ineffective. But doesn't this example already show that what is missing is some idea, not some bureaucratic structure? The report does not consider what sort of person or what sort of training would allow making it "straightforward."

On the other hand, one of the most startling recommendations of the report is the creation of 100 additional PhD places for mathematical sciences students "looking to generate impact with their work." (Of course, this means impact in the sense of this report.) This is a great idea — we'd all like to have more students — but how, again, are we to identify the most qualified candidates for this? Without more evidence that asking graduate students to learn business and coding skills is the key to increasing their impact, it seems unlikely that the funding for this will be forthcoming.

One of the most valuable things in the report is its description of existing KE support mechanisms in the UK. Some of these are specific institutions or funding agencies, but analogous efforts exist in many other countries. One that is almost universal is the "Mathematics Study Groups" (known to some of us as "Industrial Problems Workshops"). It is informative to see these listed, and it would be fascinating to see some measure of their relative effectiveness.

These brief comments cannot do justice to the variety of insights and the wealth of constructive suggestions contained in the Bond report. While I have criticized a few as superficial or impractical, every recommendation invites more study. And while it is perhaps self-serving for our community to encourage that they be implemented, the report makes a firm statement that increasing the interaction of mathematicians with society will also serve society.

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.

Corporate Support for Olga Taussky-Todd Lecture

by MARIA J. ESTEBAN, ICIAM PRESIDENT

Since 2007 the Olga Taussky-Todd (OTT) lecture is given at each ICIAM congress by a distinguished woman mathematician working in the areas in which OTT worked, i.e., applications of number theory, linear algebra or numerical analysis.

The name of this lecture pays 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 lecture is sponsored by the congress organizers who take upon themselves to pay for the travel and local expenses of the OTT lecturer. ICIAM also contributes by paying an honorarium for the lecture, which is currently 1,000 USD. This honorarium is paid from the interest of the OTT Fund that was created thanks to the generosity of individual donors among the students, friends, and colleagues of Olga Taussky-Todd. The Fund creation and the organization of the first steps was in the hands of Barbara Keyfitz, Rolf Jeltsch, and Frank Uhlig.

Following an idea of F. Uhlig and R. Jeltsch, ICIAM has decided to launch a campaign to increase the Fund by asking corporations to donate. The goal of this new campaign is to increase the level of the fund so that the honorarium can reach the same amount of the ICIAM prizes, that is, 5,000 USD. Several requests have been sent to various corporations that could be sensitive to the existence and nature of the OTT lecture. We are happy to announce that we have already received two generous donations from Mathworks and from COMSOL. The two donations together make half of the initial goal of this campaign. We are now eager to hear from other companies that have been approached, hoping that we will be able to attain the originally sought amount.

Both Mathworks and COMSOL, and future donors, will be of course recognized as important sponsors of the OTT lecture. But they are not only donating, they are also willing to collaborate in giving this important lecture more visibility and recognition.

All ICIAM member societies are welcome to seek funding among companies with which they collaborate.

Maria J. Esteban is a research director at CNRS and works at the University Paris-Dauphine. Her research themes include the study of nonlinear partial differential equations, especially by variational methods; relativistic and nonrelativistic quantum mechanics, with applications to quantum chemistry; fluid-structure interactions, etc. Until recently she was the President of SMAI (Société de Mathématiques Appliquées et Industrielles) and currently is the Chair of the Applied Mathematics Committee of the EMS.

News from the ICSU

by BARBARA KEYFITZ & TOM MITSUI

This note is, in fact, the final update from ICSU. Beginning next month, with the first General Assembly of the new Council merging ICSU with its social science counterpart, ISSC, the organization will have the official acronym ICS - the International Council for Science. ICIAM's membership in the new organization will continue with the same status. The Founding General Assembly (GA) takes place in Paris July 3–5, 2018.

We will have more information to report after this meeting. But it is worth noting that mathematics features quite boldly in ICS and in the GA. To begin with, one of the two candidates for president is Daya Reddy, an applied mathematician from South Africa, and a number of mathematicians are among the candidates for the Governing Board of the new organization. Furthermore, the first scientific talk at the Inauguration of ICS, on July 5 following the election of the officers and governing board, will be given by the mathematician Cédric Villani (who is now also a Member of the French Parliament), on "A voice for science in the contemporary world." The International Council for Science may present a new opportunity for mathematicians to be involved in international issues of science and society.

ADDED IN PROOF: We are pleased to report that Daya Reddy has been elected President of the new Interna-

tional Science Council, ISC.

The following has been taken with permission from the special edition of the International Science Council newsletter.

International Science Council

International Science Council holds first General Assembly in Paris.

The International Science Council, formed from the merger of two organizations representing the natural and social sciences, held its inaugural General Assembly in Paris on July 4. In a historic meeting hosted by the French Académie des Sciences, the International Council for Science (ICSU) and the International Social Science Council (ISSC) merged to form the International Science Council, a unique global non-governmental organization representative of both the natural and social sciences.

The meeting opened with addresses from Catherine Bréchignac, Secrétaire Perpétuel of the French Académie des Sciences, and Prince Albert II. of Monaco.

The main item of business for the meeting was the election of a new President and a new Governing Board to lead the Council for the next three years. Representatives of the Council's members elected Daya Reddy, a mathematician from South Africa, to be the first President. Peter Gluckman, the former Chief Science Adviser to the Prime Minister of New Zealand, became the President-elect, and will assume the Presidency at the next General Assembly in 2021.

The other officers of the Board are Elisa Reis (Vice-President), Jinghai Li (Vice-President), Alik Ismail-Zadeh (Secretary) and Renée van Kessel (Treasurer). The ordinary members of the Board will be Geoffrey Boulton, Melody Burkins, Saths Cooper, Anna Davies, Pearl Dykstra, Sirimali Fernando, Ruth Fincher, James C. Liao, Natalia Tarasova and Martin Visbeck.

In his acceptance speech, Reddy spoke about the importance of inclusiveness, of involving all regions of the world in the work of the new Council. He called for the involvement of early career scientists in partnerships and agenda setting. "We have set ourselves an ambitious goal to be a powerful, visible, credible voice for science. There's no time to waste. Let's get to work!"

Participants also voted for the location of the next General Assembly of the Council, choosing between two bids, one from Montreal, Canada, one from Oman. The bid by the city of Muscat, Oman, carried the vote and it will host the 2nd General Assembly in 2021.

Earlier in the day, President-Elect Gluckman spoke about his vision for the Council in remarks to participants before the vote. He stressed that "The International Science Council must work to become the leading voice of science in leading fora of policy-making." He added that "this requires a coherent and focused strategy asking where the Council is uniquely positioned — asking what the council should do, and what it should not do."

The inaugural events concluded on July 5 with a public launch event at the Maison des Océans in Paris, with keynote addresses by Cédric Villani, Esther Duflo, Ismail Serageldin, Craig Calhoun and many others.

You can watch the speeches from the public event on YouTube `www.youtube.com/watch?v=RFEuO8ptWZQ&feature=youtu.be`. Photos of the General Assembly and the public launch event are available on Flickr `www.flickr.com/photos/icsu`.

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

9th Workshop on Differential-Algebraic Equations
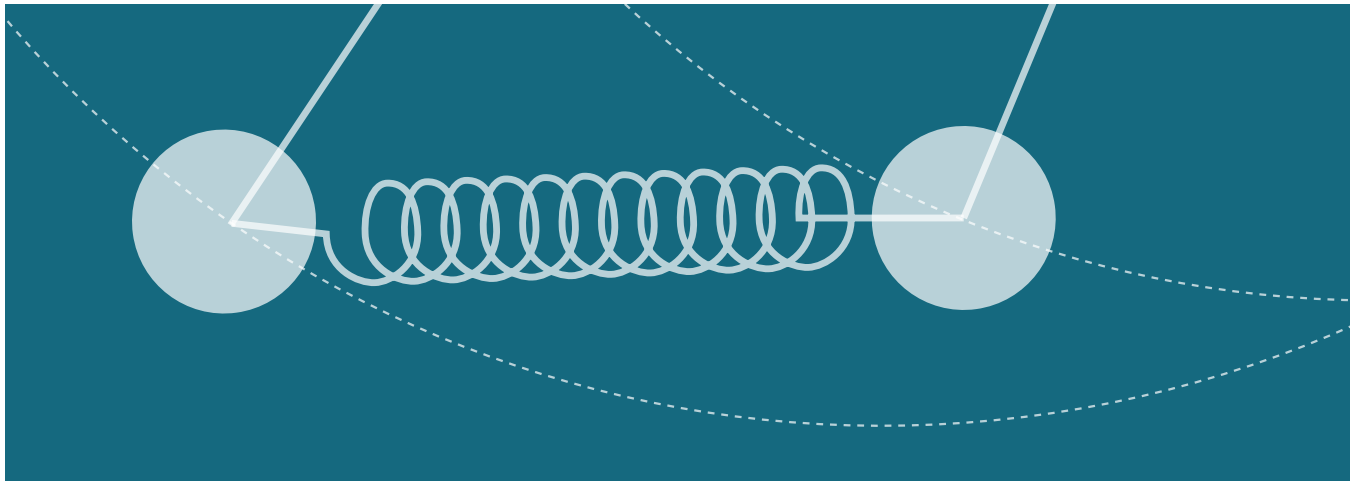
The organizers have the pleasure to announce the "9th Workshop on Differential-Algebraic Equations (DESCRIPTOR 2019)". The workshop continues the traditional series of Paderborn workshops organized by Professor P.C. Müller (Wuppertal) and is now open for international participants. It addresses researchers in differential-algebraic equations and is open for talks on any topics related to differential-algebraic equations, such as

- algebraic treatment
- analytic treatment
- applications
- modelling
- model reduction
- numerical analysis
- open and closed loop control

Organizing committee

- Sara Grundel (MPI Magdeburg)
- Timo Reis (U Hamburg)
- Sebastian Schöps (TU Darmstadt)

Programme
Arrival will be on Sunday evening, March 17, 2019. The talks will start on Monday, March 18, at 9:00 am. The workshop ends on Wednesday, March 20, noon.

Location
The workshop takes place in the "Waldhotel Nachtigall" in Paderborn (Germany). The cost for the hotel including full board is 440 € per person. The location has a capacity for 50 participants.


Registration and further information
No conference fees are charged. The deadline for registration is November 30, 2018. Further information (including registration) can be found at
www.mpi-magdeburg.mpg.de/descriptor2019.

Publication
In the aftermath of the workshop, participants will be invited to publish a peer-reviewed article in the new volume "Progress in Differential-Algebraic Equations II" within the Springer book series "Differential-Algebraic Equations Forum."
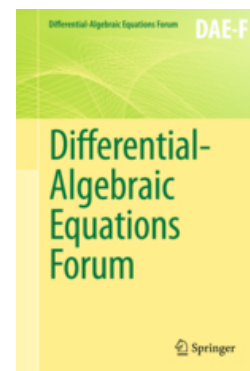
On Being a Representative

by BARBARA KEYFITZ

In 1987, I participated in the very first ICIAM Congress – ICIAM 1987 in Paris – and I have attended all of the others, except (for some reason I no longer recall) ICIAM 1991 in Washington. Later, I became involved with the ICIAM Council in October 2003, beginning a term as Treasurer. Before that, I had never been a representative on the ICIAM Board. In fact, I knew nothing about the governance structure of ICIAM. In 2003, I was just completing a third and final term as Vice-President for Programs at SIAM, and SIAM put my name up to replace Bob O'Malley as Treasurer of ICIAM. There was a feeling, then, that since SIAM was serving as banker and accountant for ICIAM it was appropriate for the Treasurer to be based in the US. Since then, of course, this perception has changed. Because all communication with the SIAM office is carried out by e-mail, there is really no geographic constraint on serving as Treasurer. However, in 2003 there was the additional consideration that SIAM, as one of the founding members of ICIAM, felt a responsibility to be sure there were nominations for all offices.

In any case, I was elected (as far as I know, I had no opponent), and served as Treasurer until October 2010, when Poti Cuminato was elected. During my final year of serving as Treasurer, I was also President-Elect. The year of overlapping duties was part of a compromise; the other accommodation was that the Treasurer election was advanced by a year and Poti's first term was extended by a year so that the election cycle was not further disrupted. While an officer of ICIAM, I also served at times as a representative for AWM (the Association for Women in Mathematics), after AWM became an associate member. The ICIAM Board and officers are sensitive to the fact that representatives and officers have different roles, which are potentially in conflict. It was always made clear that officers' first responsibilities are to ICIAM, and they must put their society's interests second.

But on October 1, 2017, after fourteen years, I ceased being an officer, and now can focus on being the representative of AWM. My first Board meeting in that role was the May 2018 meeting in Philadelphia. An official report on the meeting appears elsewhere in this issue of the ICIAM Dianoia; here, I want to muse on the atmosphere and purpose of these meetings as I see them for the first time from the floor rather than the podium.

The venue of this meeting had a certain distinctive charm, as we discovered on entering the appointed room on the top floor of the Club Quarters Hotel that it was set up for a banquet, the room filled with large round tables. The officers were momentarily dismayed, but we quickly moved the tables to the sides of the room, and in fact the arrangement was quite pleasant. You can see in the photos of the two sides of the room that we all had plenty of space for our laptops, notes and drinks. You can't see me, as I am hidden behind the Chinese representatives in front of the window, but you can see my bag hanging characteristically on the back of a chair. The room itself was lovely, with large windows giving a view of the Philadelphia skyline and admitting plenty of natural light. It was easy to communicate with our neighbors, and when we broke for lunch, served cafeteria-style at the back of the room, we were able to move around and visit with other representatives.

As part of the flavor of the meeting, I also enjoyed the two-day workshop at Drexel University that took place on Thursday and Friday before the Board meeting. It was an opportunity to talk to some of the other representative, and to the officers, and to hear some excellent talks. A number of the talks would make good articles for future issues of the ICIAM Dianoia, so this was an excellent scouting opportunity. And the meeting's host, SIAM, also sponsored an excellent dinner at a local restaurant, The Dandelion, with the atmosphere of a rather classy pub; this gave us a chance to unwind after a long day, and to talk about ICIAM business or about other things. (My table talked about other things.)

"My" organization, AWM, has a particular mandate — encouraging and supporting women's careers in the mathematical sciences — which has a clear relation to ICIAM's mission, and as we went through the day's agenda I was able to focus on some ways that AWM can be more involved in ICIAM's business. In particular, the AWM leadership is well positioned to suggest names of women for ICIAM activities — committees, officers, and so on. AWM is also available to offer support and give information about best practices to societies seeking to encour-

age women in their communities to become more involved and to succeed in careers in the mathematical sciences. In the other direction, ICIAM representatives also have the ability, and the obligation, to help their societies get the greatest benefit from their membership in ICIAM. With the ICIAM 2019 Congress coming up in a year, one obvious way for representatives to do this is to encourage members of their societies to propose minisymposia and contribute talks at the Congress, and of course to attend it. Most members of AWM also belong to a second society, typically also a member of ICIAM — but it seems like a good idea for me to remind them on behalf of AWM as well.

As a representative, I now see more clearly some communication difficulties that were not as apparent to me when I was an ICIAM officer. After the meeting, I find that I have something to report. Surely AWM wants to know what is happening at ICIAM. However, at present, AWM does not have a mechanism for disseminating a report that will be seen by AWM members, or even by the AWM leadership. The minutes of the Board meeting are eventually published, but they are intended for the eyes of Board members only, not for general circulation. When it comes to informing their societies about ICIAM's business, I wonder what other representatives do. The travel costs of many representatives have been paid by their societies, so one supposes that the society requests a report. Is this the case? What goes into the report, and who writes it? How does the report get circulated, if at all? Is it intended to inform society members about ICIAM, or is it just a financial report for accounting purposes? In my case, AWM does not have a budget to support travel to Board meetings, but it is not very expensive to travel to Philadelphia from Columbus, so I was able to pay for myself. Other representatives have told me that their societies can support travel to ICIAM Board meetings only once every three years or so. This is understandable, but it is bound to decrease the sense of involvement of that society in ICIAM. To the officers, what is important at a Board meeting is that a sufficient number of members send representatives so that ICIAM can carry out its responsibilities, primarily approving decisions about upcoming congresses. The particular interests of individual members do not weigh heavily in the agenda of most Board meetings.

So, I end this report with a question. As long as I was both an officer and a representative, I could be sure that the priorities of my society were known to ICIAM. Now I can see, with more urgency, that ICIAM needs to be sure that all its members feel that their concerns are registered. How can this be done?

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.

Dianoia is Now The ICIAM Dianoia

by Sean Bohun & Barbara Keyfitz

At the May 2018 meeting, the ICIAM Board engaged in a discussion of "our" newsletter. One excellent suggestion, which we are implementing immediately, is to change the name so that it contains a reference to our organization. Beginning with this issue, the newsletter is "The ICIAM Dianoia."

We began the discussion by summarizing our vision for the newsletter, and listing our successes and challenges. The intent, in starting a newsletter, was to foster communication between the ICIAM Council and member societies, and among member societies and individuals in those societies. At a deeper level, our hope was that this communication would help to build a community, world-wide, of applied and industrial mathematicians and those committed, in the words of ICIAM's mission statement, "to advanc(ing) the applications of mathematics in all parts of the world." Among our successes, we have now run quarterly issues for 5 1/2 years, and have established a steady supply of articles. Some minor bookkeeping hurdles remain: we need to apply for an ISSN number to secure our status. Our most serious problem is finding more editors and reporters — people willing to be involved with finding content and setting direction and goals for the newsletter.

The discussion has stimulated us to find some new topics and themes, which we hope you will find in future

issues. These include different reporting on the "Developing Countries Support" workshops, including asking the supported ICIAM Fellows to present reports on the event as seen through their eyes. We also have started (and will continue) to mine the ICIAM Workshops that now precede the Board meetings for talks that are suitable to be presented as articles for the newsletter. As excitement builds for the next Congress (ICIAM 2019 in Valencia), The ICIAM Dianoia will feature profiles of the careers and research of the invited speakers, and of course the October issue will carry news about the prize-winners, who will be announced in September.

The discussion made it clear that our good intentions in trying to start a conversation have butted against the modes of communication that younger applied mathematicians (and others) use in building their communities, professional as well as personal. The bitter truth was told to us honestly: "Don't expect the next generation to read a PDF newsletter." As editors of The ICIAM Dianoia, we are committed to producing a well-formatted, carefully copy-edited, reasonably aesthetic document. That is not going to change. But we are open to exploring better ways to use the newsletter to communicate and build community in the new generation of mathematical scientists. Within the limitations of the ICIAM website, we can experiment with a blog or with twitter messaging. Perhaps someone will volunteer to manage our social media, as a "social media director," and link social media with both the Congresses and The ICIAM Dianoia.

As the discussion concluded, we felt encouraged. Communication needs to go both ways, after all, and if there are messages beyond the medium we will find ways to transmit and to receive them.

C. Sean Bohun is a Professor of Mathematics at the University of Ontario Institute of Technology. He received his PhD from the University of Victoria (Canada), and works in Industrial and Applied Mathematics with a particular interest in partial differential equations that arise in natural processes. His research themes include: semianalytical techniques, chemical processes and crystal growth.

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.

Modelling, Simulation and Optimisation in a Data Rich Environment

by WIL SCHILDERS, PRESIDENT OF EU-MATHS-IN

At the end of 2013, the European Mathematical Society (viz. its Applied Mathematics Committee) and the European Consortium for Mathematics in Industry (ECMI) together founded a new organization: EU-MATHS-IN, the European Service Network of Mathematics for Industry and Innovation (`www.eu-maths-in.eu/EUMATHSIN`). Since then, mathematics in industry has gained new momentum in Europe, as demonstrated by the many activities and the significantly increased attendance of the biennial ECMI conferences. EU-MATHS-IN is lobbying in Europe to provide mathematics in industry and innovation a better position. To this end, it has set up an Industrial Core team, which is now accelerating these activities. In this article, we summarize recent activities.

Vision

On the one hand, the future development of industry and society exhibits strongly increasing complexity and at the same time ever-shorter innovation cycles. On the other hand, digitisation and the internet of things have led to an explosion of data and information. Without novel computational tools and paradigms we will not be able to manage these challenges. There is a clear need to strengthen our competitive advantage in industrial innovations and to start a new initiative to meet the associated societal

challenges ahead of us.

For almost all domains of science and engineering and in almost all industrial sectors, model based approaches are well established. A multitude of commercial and open source software for modelling, simulation, and optimization (MSO) based on mathematical models is available. At the same time increasingly large amounts of process and product data are available and strong artificial intelligence solutions have been developed to exploit these. All of this is fostered by computers becoming more and more powerful.

These developments lead to a vision that in the near future holistic approaches can be achieved that combine all these developments. A complete industrial product or process in its whole life cycle can be accompanied by a virtual representation, often called digital twin that allows design optimization, process control, lifecycle management, predictive maintenance, risk analysis and many other features.[1]

Digital twins are so important to business today, that they were named one of Gartner's Top 10 Strategic Technology Trends for 2017.[2] They are becoming a business imperative, covering the entire lifecycle of an asset or process and forming the foundation for connected products and services. Companies that fail to respond will be left behind.
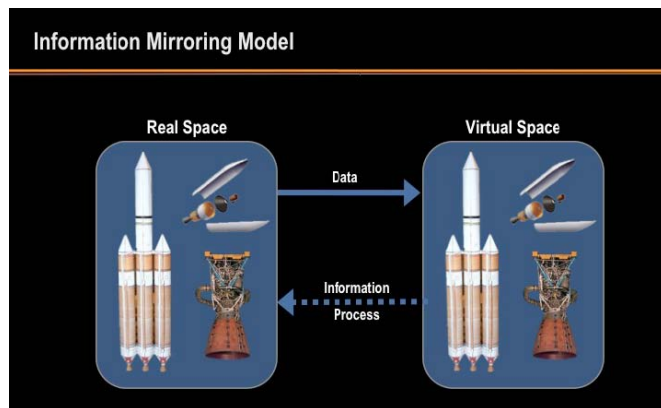
Concept of a digital twin (taken from footnote 4).

To establish this vision or to even come close to it, several new developments that involve different scientific communities have to take place and many obstacles have to be removed. A core need are novel mathematical technologies, to describe, to structure, to integrate and to interpret across disciplines. **Mathematics is the language of digital twins.**

History[3]

NASA was the first to dabble with pairing technology — the precursor to today's digital twin — as far back as the early days of space exploration. How do you operate, maintain, or repair systems when you aren't within physical proximity to them? That was the challenge NASA's research department had to face when developing systems that would travel beyond the ability to see or monitor physically.

Digital twin terminology as a concept was first written about by Michael Grieves at the University of Michigan in 2002.[4] The digital twin serves as a bridge between the physical and digital world. The components are connected to a cloud-based system that uses sensors to gather data about real-time status and working condition. This input is analysed against business and other contextual data. Lessons are learned and opportunities are uncovered within the virtual environment that can be applied to the physical world.

Digital twins are powerful masterminds to drive innovation and performance. It is predicted that companies who invest in digital twin technology will see a 30 percent improvement in cycle times of critical processes.

State-of-the-art

Although first successes are reported[5] and many claims are made[6], neither the classical MSO approaches based on mathematical models and their software implementations, nor the constantly improving techniques for data analysis and machine learning will be enough to achieve this visionary goal[7]. Even the rapid improvements in modern computing hardware and especially algorithms/software are not sufficient to achieve this. Currently, due to the high manual human effort[8], only major companies with large R&D departments can afford to build digital twins, but it would be desirable that companies on all scales can profit from the development. New generations of mathematical paradigms are required to

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[1]Siemens: Mindsphere White Paper www.plm.automation.siemens.com/global/en/topic/MindSphere-Whitepaper/8683/index.html; NASA: The Digital Twin Paradigm for Future NASA and US Air Force Vehicles ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20120008178.pdf

[2]Gartner: Top 10 Strategic Technology Trends for 2018 www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2018/

[3]//www.forbes.com/sites/bernardmarr/2017/03/06/what-is-digital-twin-technology-and-why-is-it-so-important/

[4]innovate.fit.edu/plm/documents/doc_mgr/912/1411.0_Digital_Twin_White_Paper_Dr_Grieves.pdf

[5]GE: www.ge.com/reports/scientists-built-a-digital-twin-of-a-car-battery-to-make-it-last-longer/

[6]ANSYS: www.ansys.com/products/release-highlights/digital-twin

[7]Engineering.com: Mission Impossible: The Digital Twin: www.engineering.com/DesignSoftware/DesignSoftwareArticles/ArticleID/15919/Mission-Impossible-The-Digital-Twin.aspx

[8]ORACLE: Digital Twins for IoT Applications www.oracle.com/us/solutions/internetofthings/digital-twins-for-iot-apps-wp-3491953.pdf

convey today's highly fragmented approaches in the various disciplines.

Technology challenges

To meet the future challenges, it is necessary to develop **novel MSO paradigms** allowing a systematic MSO based approach that allows us to build highly **automated modularized networks of model hierarchies** (from very high fidelity physics based models to very coarse, surrogate, or even purely data based models), and that can deal with multi-physics and multi-scale systems. Key will be a **convergence of artificial intelligence methods and first principle approaches** typically used in MSO by laying down novel mathematical principles as the **core language of digital twins**.
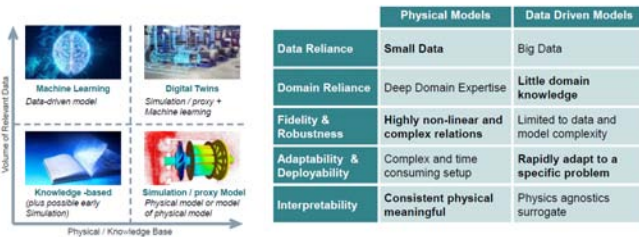
Goal of the EU-MATHS-IN initiative

The goal is to accelerate the development and optimisation of industrial processes and devices extending current Model-based Systems Engineering (MBSE) concepts to model-based assistance along the complete life cycle. What is needed is a high powered multi-disciplinary effort to bring mathematical MSO methods together with techniques for the treatment of big data and artificial intelligence methods as well as to make them efficient on modern hardware environments. All results should be made available within a European Open Source Ecosystem.[9]

Recent activities

In order to promote the initiative, especially to policy makers in Europe, several activities have been undertaken. On April 18, a meeting was organized in the French embassy in Berlin, where the booklet with the title "Modelling, Simulation and Optimisation in a Data Rich Environment — A window of opportunity to boost mathematics in Europe" was presented (a copy can be downloaded: www.eu-maths-in.eu/EUMATHSIN/wp-content/uploads/2018/05/MSO-vision.pdf). In April, a proposal for a FET Open CSA project was submitted, and then in early June a topic within the programme FET Proactive was proposed. Currently, the Industrial Core team is working in a Strategic Research Agenda, as well as a new booklet of success stories in industry that clearly show the economic benefit for companies. For up-to-date information on the process, please visit www.eu-maths-in.eu.

Wil Schilders (MSc, Radboud University Nijmegen, Netherlands, 1978; PhD, Trinity College, Dublin, 1980) worked 30 years in industry (Philips Research, NXP Semiconductors). Currently, he is professor of scientific computing for industry at TU Eindhoven, and executive director of the Dutch national platform for mathematics. He is currently president of EU-MATHS-IN, and chair of the Research and Innovation Committee within ECMI.

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[9]See also recommendations in the final report of the ESF Forward Look project on Mathematics for Industry: archives.esf.org/coordinating-research/forward-looks/physical-and-engineering-sciences-pen/current-forward-looks-in-physical-and-engineering-sciences/mathematics-and-industry.html

The MSC Codes: Who Needs Them?

by Barbara Keyfitz

Mathematical Reviews (also called MathSciNet) and Zentralblatt für Mathematik (known as zbMATH) are in the process of revising the "Mathematics Subject Classification" (MSC) codes, those combinations of five digits and letters that are supposed to organize and categorize the entire body of published mathematical literature — theoretical, applied, historical, research, and exposition. A revision is done every ten years. Right now, the mathematical community is using the MSC 2010 codes, and MSC 2020 is being designed. In 2016, the leaders of both organizations issued a request for input into the new design; they were particularly eager to hear from applied mathematicians, as we have a reputation for holding the MSC Codes in low esteem. The ICIAM Dianoia published the request (October 2016), and SIAM held an information session at the 2017 Annual Meeting in Pittsburgh, which I attended. Both of these probes elicited responses which made me think about the purpose and utility of the codes. Although my "survey" of the applied mathematics community has been far from systematic or complete, I'm writing this article, addressed to applied mathematicians, with some hope that it may be informative and with even more hope that it will stimulate constructive suggestions.

Many mathematicians' first contact with the codes comes when they begin publishing in mathematics (and many applied mathematics) journals, and are ordered by the editors to come up with a list of primary and secondary codes. We immediately discover that our concept of our research area bears little resemblance to any item on the list. For example, I work in Hyperbolic Conservation Laws, which is lucky enough to have its very own number — 35L65 — but when it comes to describing what I do with them — which is to use a number of techniques from analysis — nothing seems to fit, because "analysis used in PDE" is not a category. Other people's research has similar problems. Furthermore, once you choose a set of numbers to your paper, those numbers are seldom refereed or critiqued, so your self-assigned classification, even if eccentric, sticks with the paper. At least you know you are not going to be graded on this quiz.

Then why does the MSC exist, who uses it, and who does it help? It is a taxonomy, essential to assist the editors of Mathematical Reviews and Zentralblatt in finding reviewers for papers. The number and letter combinations determined a lexicographical order for publication of the reviews, in the days when "publication" meant committing the text to paper. The editors could not do their job without this underlying structural framework. And it does help them, despite inconsistencies in authors' use of codes. An imperfect classification is better than no classification at all.

Beyond its original intent, the MSC has now become ubiquitous in the mathematical workplace, at least in the United States. As anyone who has applied for a position in the US knows, stating your primary research area is part of a MathJobs application, and often search committee members will use the two-digit code as their first filter. For the most part, the two-digit classification is uncontroversial, at least among academics seeking and filling positions in mathematical sciences departments. Even at this level, though, there are problems in some applied areas, and possibly in some theoretical ones as well. Not all computational scientists think of themselves as "numerical analysts," and string theorists are simply out of luck. For the moment, the editors of the MSC have ruled out making changes at the two-digit level, but this can't be a permanent solution. Mathematical Reviews and its codes have existed since 1940, and no credible discipline would claim that its principal categories have not changed in eighty years.

But it's at the level of more detailed classification that the taxonomy poses more challenges. As emerged in the discussion at the SIAM session, there are conceptual questions. Do you classify a result by application area or by methodology? What are the criteria for calling a code "primary" or "secondary?" There do not appear to be consistent answers to these questions. Exploring topics like these, I began to see more clearly that taxonomy is itself a discipline, and, to the extent that we do not have expertise in it, we are probably not in the best position to suggest the best changes. Rather, there needs to be a dialogue between the people who find the current system confusing or incomplete and the people who might see how best to fit what is missing into the overarching structure. The team responsible for making changes in the current system might find comments along the lines of "This is what I work on and this is why it doesn't fit into 64T37" more helpful than "You need a new subcategory for XXX."

The MSC provides opportunities as well as challenges. For example, MathSciNet is an enormous and well-curated database that is available to the mathematical sciences community. It can chart the relative growth of some areas — we were told, for example, that between 1985 and 2016 the ratio of "pure" to "applied" articles has swung from 52%/47% to 42%/58%. (I do not know why the percentages in 1985 do not add to 100.)

Every article indexed with the MSC codes can include up to five separate codes, indicating primary and secondary areas. A fascinating question that came up in the

SIAM discussion was that of connections between different areas. The five-digit codes are sufficiently precise that there might be perhaps 20 papers a year that list a typical code as "primary." The 5000 codes form nodes in a network where the connections are cross-references. What is the structure of this network; what areas are closely connected, and how do these change over time? The search for patterns would be an interesting project in data analysis on a moderate-sized network. Results could also help in future revisions of the MSC.

We all benefit from understanding the structure of our discipline, and we are all in a position to help advance this understanding. You are invited to join the conversation at msc2020.org.

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.

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E-mail: earlycareer@owsd.net
Web: owsd.net

Call for Applications

The Early Career Women Scientists (ECWS) fellowship is a prestigious award of up to USD 50,000 offered to women who have completed their PhDs in Science, Technology, Engineering and Mathematics (STEM) subjects and are employed at an academic or scientific research institute in one of the listed Science and Technology Lagging Countries (STLCs): owsd.net/eligible-countries-early-career-fellowships. ECWS fellows will be supported to continue their research at an international level while based at their home institutes and to build up research groups that will attract international visitors.

- You will find all the information you need to prepare your application below and this same information is also available for download: owsd.net/career-development/early-career-women-scientists-ecws-fellowships.

- Deadline for completed online applications: 31 August 2018.

- All applications must be submitted online.

- The official language for the application is English.

- All information about the programme is also available in French.

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.

The Full Members and their representatives

ANZIAM (Australia and New Zealand Industrial and Applied Mathematics): Ian H. Sloan and Michael Plank

ASAMACI (Asociación Argentina de Matemática Aplicada Computacional e Industrial): Rubén Daniel Spies

CAIMS-SCMAI (Canadian Applied and Industrial Mathematics Society, Société Canadienne de Mathématiques Appliquées et Industrielles): Raymond Spiteri

CSCM (Chinese Society for Computational Mathematics): Xuejun Xu

CSIAM (China Society for Industrial and Applied Mathematics): Pingwen Zhang and Guiying Yan

ECMI (European Consortium for Mathematics in Industry): Michael Günther

ESMTB (European Society for Mathematical and Theoretical Biology): Andrea De Gaetano

GAMM (Gesellschaft für Angewandte Mathematik und Mechanik): Peter Benner and Sergio Conti

IMA (Institute of Mathematics and its Applications): Iain S. Duff and David Abrahams

ISIAM (Indian Society of Industrial and Applied Mathematics): Abul Hasan Siddiqi and Pammy Manchanda

JSIAM (Japan Society for Industrial and Applied Mathematics): Hiroshi Kokubu and Kenichi Maruno

KSIAM (Korean Society for Industrial and Applied Mathematics): Chang Ock Lee

MOS (Mathematical Optimization Society): Karen Aardal

ROMAI (Societatea Română de Matematică Aplicată și Industrială): Costica Morosanu

SBMAC (Sociedade Brasileira de Matemática Aplicada e Computacional): Paulo Fernando de Arruda Mancera

SEMA (Sociedad Española de Matematica Aplicada): Rosa Donat

SIAM (Society for Industrial and Applied Mathematics): Nicholas Higham and Cynthia Phillips

SIMAI (Società Italiana di Matematica Applicata e Industriale): Luca Formaggia and Giovanni Russo

SMAI (Société de Mathématiques Appliquées et Industrielles): Fatiha Alabau-Boussouira and Thierry Horsin

SPMAC (Sociedad Peruana de Matemática Aplicada y Computacional): Obidio Rubio Mercedes

VSAM (Vietnamese Society for Applications of Mathematics): Lê Hùng Són

The Associate Members and their representatives

AIRO (Associazione Italiana di Ricerca Operativa): Anna Sciomachen

AMS (American Mathematical Society): Catherine Roberts

AWM (Association for Women in Mathematics): Barbara Keyfitz

ChinaMS (Chinese Mathematical Society): Xiao-Shan Gao

CMS-SMC (Canadian Mathematical Society, Société Canadienne de Mathématiques): Elena Braverman

CzechMS (Czech Mathematical Society): Miroslav Rozloznik

DMF-DMS (Dansk Matematisk Forening - Danish Mathematical Society): Poul Hjorth

DMV (Deutsche Mathematiker-Vereinigung): Günther Leugering

EMS (European Mathematical Society): Pavel Exner

ENBIS (European Network for Business and Industrial Statistics): Rainer Göb

FMS-SMY-FMF (Finnish Mathematical Society, Suomen matemaattinen yhdistys, Finlands matematiska förening): Samuli Siltanen

IMS (Institute of Mathematical Statistics): Ben Hambly

IMU (Israel Mathematical Union): Amy Novick-Cohen

KMS (Korean Mathematical Society): Jin-Hwan Cho

LMS (London Mathematical Society): Stephen Huggett

MSJ (Mathematical Society of Japan): Motoko Kotani

NMF (Norwegian Mathematical Society): Elena Celledoni

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RSME (Real Sociedad Matemática Española): Mercedes Siles Molina

SingMS (Singapore Mathematical Society): San Ling

SMF (Société Mathématique de France): Marc Peigne

SMG-SMS (Schweizerische Mathematische Gesellschaft - Société Mathématique Suisse - Swiss Mathematical Society): Jean-Paul Berrut

SMM (Sociedad Matemática Mexicana): Jorge X. Velasco-Hernandez

SPM (Sociedade Portuguesa de Matemática): Fernando Pestaña da Costa

SvMS (Swedish Mathematical Society, Svenska matematikersamfundet): Åke Brännström

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