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**The ICIAM Dianoia**  
**Vol. 4, No. 3, July 2016**

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On the cover: the front and  
back covers together form a  
panoramic view of the Marina  
Real Juan Carlos I located  
in Valencia, Spain at coordi-  
nates 39.4555°N, 0.3289°W.

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The ICIAM newsletter was created to express the interests of our membership and partner organizations and the views expressed in this newsletter are those of the authors and do not necessarily represent those of ICIAM or the Editorial team. We welcome articles and letters from members and associations, announcing events, on-site reports from events and industry news. [www.iciam.org](http://www.iciam.org)  
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## 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 Web Page at [iciam.org/dianoia](http://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 webpage given above.

## From the Desk of the Secretary



### @ICIAMnews:

**Let's do Math in 140 Characters!** ICIAM is becoming hip, and now has a Twitter account (a short glossary can be found at the bottom of this article for those of us less familiar with social networking). ICIAM's Twitter handle is @ICIAMnews (@ICIAM was already taken by a very photogenic Patricia Hispano). Since May, we are communicating with our members in 140 characters at a time. We've written 43 Tweets, collected 56 Followers, and 24 Likes! We are following 112 other accounts, and have established a list for our members. So far, we are following those of our member societies whose Twitter handle we could find, or who are following us. If your society is not yet on our list, Tweet us, and we'll follow you! Our goal is to make this a vibrant site with instant updates, and exchanges of ideas.

### Picture Competition:

Help us to make our Twitter page (see below) better! The current design uses the ICIAM logo and a picture from a blood-flow simulation courtesy of Paul Fischer's group. We are holding an open competition to get a new design that better captures applied math and ICIAM. Please encourage your members to submit their design to [secretary@iciam.org](mailto:secretary@iciam.org), or tweet @ICIAMnews with the hashtag #ICIAMPicture (with a 140 character or less description). The deadline for submissions is September 30th 2016. The top three finishers will win a unique coffee mug with the winning ICIAM design!

### Glossary:

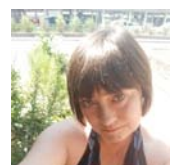
- Twitter is an online social networking service that allows user to read and send short 140-character messages, pictures, movies, and even Emoji (see [twitter.com](http://twitter.com)).
- A Twitter handle is a username (preceded by @). Used to direct messages at a specific user, such as @ICIAMnews.
- A Hashtag is used to index words (written with #). Allows keyword or topic searches. Anyone can define or use any hashtag, e.g. #ICIAMPicture for our competition.
- A Tweet is short 140-character message on twitter. Long URLs can be shortened, e.g. [goo.gl/](http://goo.gl/)
- A Twit is a person who is foolishly spends too much time on Twitter, e.g. Sven the author of this article ;-).



## The Dianoia copyeditor

One of the people behind the scenes and responsible for copyediting the newsletter is Carmen Celestini. Carmen is currently a PhD candidate in religious studies at the University of Waterloo. Focussing on politics and religion, with a concentration on millennialism

and on the role of religion in the public sphere, her research interests provide scholarship to contextualize the contemporary tension between religion and politics.



## ICIAM Announcements

The spring quarter is usually a busy time for the ICIAM Officers. We have a face-to-face Officers' meeting in March, to prepare for the Board meeting, and then that meeting itself in May. (A report on the Officers' meeting appeared in the April issue of DIANOIA, and there is a short report on the Board meeting elsewhere in this issue.)

It has now been a year since the ICIAM Congress in Beijing, ICIAM 2016, and the President's work does not end with the Board meeting: this is the period for setting up committees for the ICIAM Prizes. Although it will be more than three years until the next awards are made, choosing the selection committees and writing the call for nominations starts now.

This is also the year that members bid to host the Congress after the next one (that is, in 2023), and we anticipate two bids, due in the autumn.

Meanwhile, preparations continue for the Valencia Congress, ICIAM 2019, as the Scientific Program Committee begins its major task of selecting the invited speak-

ers for the Congress.

The new website continues to evolve. Members are encouraged to check the data for their societies, and to be sure it is up to date. The novelty here is that the members' pages are now essentially self-service. Only an editor nominated by the society president can edit the data, and, to do so, that person must also apply for an account on the site. This is explained in the "FAQ for Members" under the Membership tab on the main page. The Officers are eager to receive feedback on how members perceive the functioning of the new site, and suggestions are welcomed.

Now that this newsletter, DIANOIA, is in its fourth year, we are making plans to get more members involved and to broaden its scope. Society presidents and representatives should expect a letter soon asking for volunteers to write and solicit articles on their societies, on applied mathematics in their countries, and on topics of interest to applied mathematicians.

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## Call for Nominations for President-Elect of ICIAM

The ICIAM Board meeting in Valencia, Spain (May 20, 2017) will include the election of the next ICIAM President. According to the ICIAM bylaws:

The President-Elect is elected for a two-year term on years congruent to 1 mod 4. The President-Elect takes over as President and the President becomes Past-President (for two years) in years congruent to 3 mod 4.

The President-Elect's term will begin on October 1, 2017. The duties of the president are stated in the bylaws:

The President directs the activities of the organization; she/he is the official representative of the organization and should take an active role in promoting the goals of ICIAM internationally.

Nominations for this position are solicited. Nominations may be made by any member society. While nominations may be made at the Board meeting itself, nominators are encouraged to send material to any of the current Officers before April 20, 2017, so that information may be circulated to the Board in advance. While there is no specific form for a nomination, Board members (who vote by secret ballot) will be interested in seeing a brief biographical sketch and a statement that the candidate is willing to serve. Questions about possible nominations may be addressed in confidence to any of the current Officers.

ICIAM Officers serve without remuneration; however, reasonable Officer expenses in carrying out their duties are reimbursed from ICIAM funds. A list of the current Officers and their countries may be found at [www.iciam.org/iciam-officers](http://www.iciam.org/iciam-officers); a complete list of past Officers is at [www.iciam.org/early-history-iciam](http://www.iciam.org/early-history-iciam).

# How to Strengthen the Second I in ICIAM

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by VOLKER MEHRMANN

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## The stance of industrial mathematics

It is common wisdom that mathematics drives innovation in most areas of science and engineering, but also economics and social sciences. Mathematical modeling, Simulation and Optimization (MSO) provides the language and the tools for progress that goes beyond classical trial and error. As the reports from several countries, e.g., the UK, the Netherlands or France, see [www.eu-maths-in.eu/index.php?page=reports](http://www.eu-maths-in.eu/index.php?page=reports) for a large number of such reports, indicate that mathematics has a huge economic impact, on the GNP and on the job market. Although much of this is indirect via work that uses mathematical methodology, there is a clear branch of mathematics, where the impact is direct and immediately recognizable, this is the area of industrial mathematics. This is reflected in the names of many national and international societies, including ICIAM or SIAM.

So, do we need to talk about it? Yes we should, and we need to spread the word to the public much more than we currently do. Furthermore, there are not many people that are actually doing industrial mathematics. If one looks at ICIAM meetings or at funding by national or international funding agencies, industrial mathematics is rather negligible.

Why is an area of mathematics that is so important, attracting so little attention and acknowledgement? Where are we failing?

How can we as industrial and applied mathematics societies improve industrial mathematics?

## Attitudes towards industrial mathematics

Before I give some suggestions how to improve industrial mathematics, let me quote some citations that I have overheard and noted at recent ICIAM/SIAM etc. meetings.

- Industrial mathematics is not as beautiful as doing analysis or discrete mathematics.
- This person has not proved a theorem in years, why is he giving a plenary talk?
- Industrial mathematics is weak mathematics.
- There is nothing really new, it is just application of well-known results. We should leave this to the engineers.
- My numerical method has been proven to converge for the model problem, why should I care to work on an industrial problem.

- These industrial mathematics people only go after the money, they prostitute themselves.

We should ask ourselves: Is this the attitude of a minority or does it represent a mainstream opinion?

## What makes industrial mathematics difficult?

The number of joint research projects with industry in most countries is very low. Why?

One reason is certainly that industry projects have very short time lines, where delivery of an MSO product or the solution of a problem on time is essential. Furthermore, in the industrial context mathematical software needs to work, i.e., give a solution, all the time, even if the problem is ill-posed. Data are often secret and the codes become intellectual property rights of companies. Legal problems are often hard to solve.

But, in particular, most of us (including myself) are not trained to do this kind of work or have the staff to do this in a short timeline.

## What all of us can do!

We definitely should change our attitude towards industrial mathematics. We need to learn to discuss with industrial partners (this means to learn their language) and we have to talk to governments and funding agencies to support the cooperation in topics that are relevant for industrial mathematics. We should also enter funding streams in high technology funding as proposers, and evaluators.

We should try to do work on the mathematics that is needed in practice and not just on the mathematics that we know how to do. We should educate young researchers that can do the whole life cycle of MSO and transfer to industry. We should go out to the public and talk about the great things that mathematics can do for society and then do it.

## What mathematical societies can do!

Mathematical societies should discuss with governments and funding agencies to set up programs where industry and academia can do joint research, (such as initiatives that exist in France, Germany, Italy, Japan, Spain, etc.)

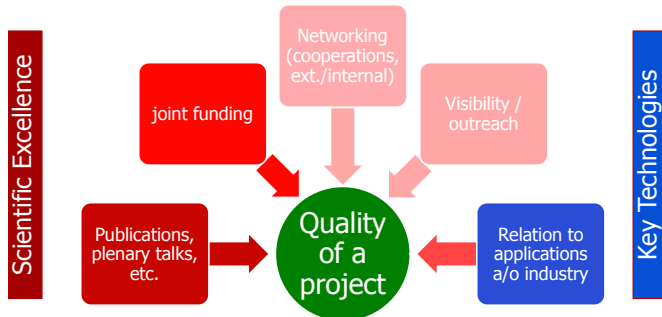
They should help to create funding programs that cover the whole chain (which I would call the incubator model): from an application driven problem, implementation of fundamental mathematics to obtain needed insight, development of algorithms, solution strategies and software implementation and finally, closing the loop to transfer these developments to industry.



They should convince the mathematical community that mathematical challenges from industry are serious scientific challenges.

They should convince governments that new curricula are needed where young researchers are trained in the mathematical technologies that are needed for industrial mathematics.

They should support the community to change their evaluation strategies of mathematical research, as illustrated in the following graphics.



Quality Criteria for Industrial Mathematics —Image used with permission.

They should help to set up research centers that proceed in this direction, where there is permanent staff of mathematical translators, MSO experts, mathematical engineers.

### What governments and funding agencies can do!

Interdisciplinary research and collaborations between mathematics and other sciences as well as industry should be supported. For this it is essential that the evaluation procedures need to be adapted.

Mathematical MSO should be included as a key technology in high technology research areas and experts in this area should become evaluators in the calls in these areas.

Governments should help to set up research centers in industrial mathematics.

### What can ICIAM do?

The challenges and measures to deal with how to improve industrial mathematics are not new. The procedures have been installed in several countries and not in others. Here ICIAM should give support to communities that are not so well established in industrial mathematics. But that can only be a start. Success stories should be collected and published to show the impact of industrial mathematics on the well-being of society. We should discuss this topic more often and also as a Society help to change the attitude towards industrial mathematics. The reward will be multifold, it will be great for the whole mathematical community, it will bring research projects, money and jobs. It will lead to a lot of young people choosing this exciting field for their careers.

Volker Mehrmann received his PhD from the University of Bielefeld (Germany) in 1982. He is a recently appointed ICIAM Officer-at-Large and his research interests are in the areas of numerical mathematics/scientific computing, applied and numerical linear algebra, control theory,

and the theory and numerical solution of differential-algebraic equations.



# ICIAM Conference Support for Applied and Industrial Mathematics in Developing Countries

## CALL FOR APPLICATIONS

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

Applications may be submitted at any time. There are three deadlines per year (31 March, 31 July and 30 November); the ICIAM Officers decide on which applications to support within a month of each deadline. Preference is given to events held in developing countries, and applicants should indicate how they plan to use the fellowship funds.

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

# ICIAM Supports a CIMPA Research School

by BARBARA LEE KEYFITZ

For a number of years now, ICIAM has been offering partial support for workshops and research schools organized in developing countries, under a “Developing Countries Support” (DCS) program. (See the call for proposals in this issue of DIANOIA, and the full description of the program at “ICIAM Conference Support” under “Events” on the ICIAM website.) This program had its genesis when the organizers of ICIAM 2003 in Sydney generously returned a part of their surplus to the Council, and it has been approved by the ICIAM Board as a continuing program, with a total budget of \$10,500 USD each year, with up to \$3,500 for each event, to be used for “ICIAM Fellowships” to support participants.

Recently, ICIAM has received applications for support for some events organized by CIMPA (in English, the International Center for Pure and Applied Mathematics) an international organization of which ICIAM is a Scientific Associate. CIMPA’s main activity is organizing research and educational activity in mathematical sciences for the benefit of developing countries, so their mission and our support project mesh quite nicely. This article reports on one of ICIAM’s efforts.



Picture at Marchica Laguna of some participants supported by ICIAM to the CIMPA Research School in Nador (Morocco) 9-19 May, 2016, with the organizers: Alain Brillard (University of Mulhouse, France, second from left), Zakaria El Allali (Multidisciplinary Faculty of Nador, Morocco, right) —Image used with permission.

In May, ICIAM lent support to a CIMPA-organized research school, held in Nador, Morocco. The topic of the program was “Modeling and mathematical and numerical analyses of problems with partial derivatives”. The organizers were Alain Brillard (University of Mulhouse, France) and Zakaria El Allali (Multidisciplinary Faculty of Nador, Morocco); the website for the meet-

ing (in French) can be found at [cimpa2016.fpn.ma](http://cimpa2016.fpn.ma). The school comprised lecture series, invited talks and contributed papers. There were five series:

R. Aboulaich (Ecole Mohammadia d’Ingénieurs, Rabat, Morocco) on the topic of PDE models in biomathematics; M. Pierre (Ecole Normale Supérieure de Bretagne, Rennes, France) on Reaction-diffusion systems with positivity and control of the total mass: global existence, singular perturbations, approaches  $L^\infty$ ,  $L^p$ ,  $L^1$ ,  $L^2$ ; M. Ghilani (Université Moulay Ismail Meknès, Morocco) on Finite element methods using the SCILAB software; M. Saad (Ecole Centrale de Nantes, France) on Finite volumes-finite elements schemes for a diffusion-convection equation and M. Sofonea (Université de Perpignan, France) on Mathematical modeling in contact mechanics.

There were two lectures each morning for the 11 days of the conference, (May 9–19), and one or two plenary talks each day, with the rest of the time for parallel sessions consisting primarily of short communications. Among the themes emphasized, the organizers’ report draws special attention to some that show the breadth of topics: nonlinear partial differential equations (image restoration, singularities, p-Laplace operator, etc.), elliptic and parabolic (reaction-diffusion) equations, modeling using partial differential equations (diphase flow, fluid-structure coupling, glaciology, homogenization), numerical schemas (error estimates, shallow water flows).

Most of the participants (55 out of 65) were from Morocco. The ICIAM funds were used for partial support of participants from Algeria, Cameroon, Ivory Coast, Mauritania, and Tunisia. The meeting itself took place in a hotel in Nador, the Hotel Mercure Rif. The picture shows the organizers and some of the students during an expedition to Marchica Laguna. ICIAM thanks the organizers for their very complete report (in English) on the meeting, and for permission to use the photograph.

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.



# ICIAM International Workshop & Board Meeting

by BARBARA LEE KEYFITZ

The annual meeting of the ICIAM Board took place on May 7, 2016, on the campus of Campinas University. The Board meeting was preceded by a two-day workshop, also on the campus, organized by José Alberto (Poti) Cuminato, ICIAM's Treasurer, with support from SBMAC (Sociedade Brasileira de Matemática Aplicada e Computacional) and CeMEAI (the Center for Mathematical Sciences Applied to Industry), and funding from FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo), the science funding agency of the state of Sao Paulo. The program for the workshop is available at [www.cemeai.icmc.usp.br/IWIMath16](http://www.cemeai.icmc.usp.br/IWIMath16)



—Image used with permission.

The CeMEAI team produced a short movie (in Portuguese) about the workshop, (go to [goo.gl/X3xYQU](https://goo.gl/X3xYQU)); it gives some flavor of the event.

In running the workshops that now usually accompany ICIAM Board meetings, the organizers and speakers are faced with the challenge of running a small meeting, with distinguished speakers, but typically without a “theme.” In this case, the theme became “the diversity of applied and industrial mathematics,” and the audience experienced an exciting blend of presentations on analysis, optimization, computing, and the experience of working with industry. About one-third of the speakers and most of the poster presenters were recruited from Brazil, and this gave the visiting representatives an excellent opportunity to meet researchers they had not known before.



Most representatives and Officers were housed in the campus residence, Casa do Professor Visitante, a pleasant and comfortable location familiar to those who have visited Campinas before, notable for the wonderful display

of bougainvillea, in full bloom at this time of year. The hotel is also where the Board meeting, the main event of the trip, took place on Saturday, May 7. There were over 30 representatives, Officers and guests, representing 22 member societies (including all ICIAM's members from South America). This was the first Board meeting chaired by the new President of ICIAM, Maria J. Esteban, and it went very smoothly. (This included completing a long agenda and finishing on time.) The formal business of the meeting will be reported in the minutes; informally, it was a grand occasion to see old friends and make new ones, to socialize and to discuss the state of applied mathematics. Of particular note: ICIAM welcomed a new associate member, the Danish Mathematical Society, heard exciting reports on the planning for the 2019 Congress in Valencia, and requested two bids to host the 2023 ICIAM Congress. The day closed with dinner at a nearby restaurant, generously hosted by the organizers. As an additional gesture of hospitality, our transfers to the airport on Sunday were efficiently orchestrated by our hosts.



The ICIAM Officers: Tom Mitsu (Officer-at-Large), Barbara Keyfitz (Past President), Poti Cuminato (Treasurer), Sven Leyffer (Secretary) and Maria Esteban (President). —Image used with permission.

ICIAM Board meetings face many challenges, among them the long and expensive travel for most representatives, the compressed and intense meeting itself, unfamiliar languages and environments for a number of attendees, and of course the disruption of one's research or teaching schedule. These are intrinsic to the enterprise. The best that the Officers and hosts of the meeting can do is to try to optimize the scientific interest, the cultural experience, the comfort of the surroundings, and the logistics of the meeting room. As Officers, we try our best. And in the case of the 2016 meeting, our warmest thanks go to our hosts, SBMAC, Poti and the staff of CeMEAI, whose care and thoughtfulness ensured a wonderful trip.



## Series: Brief Interviews with Young Mathematicians: #2

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by ROBERTO NATALINI

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DIANOIA is publishing a series of interviews with young applied mathematicians. After Annalisa Buffa, Roberto Natalini interviews Emmanuel Trélat. Trélat is a Professor at Université Pierre et Marie Curie (Paris 6), laboratoire Jacques-Louis Lions, and is the director of the Fondation Sciences Mathématiques de Paris.

*Q: How did you decide to become a mathematician?*

A: When I was a student I hesitated between mathematics and physics, and I was maybe slightly more attracted towards physics, actually. But then I studied mathematics at Ecole Normale Supérieure de Cachan and I discovered so many fascinating subjects... among which many of them were motivated by physics!

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

A: My mother, who was a schoolteacher, undoubtedly developed my taste for mathematics when I was a child. Much later on, it was my teachers at ENS who opened many issues, and in particular Jean-Michel Coron who introduced me to control theory. Then, my PhD advisor Bernard Bonnard taught me much and has become a close friend.

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

A: I have a special interest in control theory. This branch of mathematics is concerned with the analysis of systems on which one can act by means of a command, a control. Control problems emerge in any situation where one would like to perform some guidance procedure, steering a system from some initial configuration to some final one: vehicle, satellite, chemical reaction, biological planning, economical issue, etc. Optimal control theory is concerned with control problems in which one wishes moreover to minimize some cost functional. Many mathematical problems have also a strong intersection with control theory, such as Riemannian or sub-Riemannian geometry, optimal transport, mean field theories, etc.

*Q: Could you single out your best achievement in mathematics?*

A: I am proud of having pointed out the important role of the so-called singular trajectories in optimal control theory. In various contexts, I proved that the absence of singular minimizers is the main assumption allowing one to derive theoretical results (like smooth regularity for the value function, solution of the Hamilton-Jacobi equation), but also to prove convergence of numerical algorithms in optimal control, and of combined homotopy methods, in

relation with conjugate point theory. I have studied extensively the relevance of such an assumption, proving that it is generic, that is, valid for some large classes of systems.



*Q: You have a strong focus on applications. Why are you interested in this direction and, also, is there a sort of neat line between applied and industrial math?*

A: It has always been a kind of challenge for me to try to go at the extreme point of the scientific chain of a given problem of mathematics motivated by a concrete application. Solving the Ariane launchers problem and implementing the real-life code was a personal challenge that I would like to solve, at least once in my life. I am not sure that now I would still have time to develop the whole chain as I did at that time. This is my personal taste: to be, in general, motivated by applications. But I also strongly and proudly support mathematics that does not seem to have an immediate application



— note that this word “application” is in itself very difficult to define... and a bit dangerous to use. There is room for all mathematicians, for all tastes. Myself, I have recently deeply invested in the fascinating area of investigating spectral and geometric properties of sub-laplacians. Should it have some industrial application? Who knows... To answer your question about applied and industrial mathematics: I would rather speak of relationships between mathematics (at large) and industrial issues. For sure, they certainly feed each other. Not only should new mathematics be transferred to an industrial context, in view of applications and of creating innovation, but conversely, industrial problems raise difficult challenges that open new interesting mathematical issues. This is a two-way interaction that is very fruitful.

*Q: In 2012 you received the Felix Klein prize from the European Mathematical Society. This prize is awarded every four years to a young scientist for using sophisticated methods to give an outstanding solution, which meets with the complete satisfaction of industry, to a concrete and difficult industrial problem. In the motivation for your prize, we can read that it was awarded to you “for combining truly impressive and beautiful contributions in fine fundamental mathematics to understand and solve new problems in control of PDEs and ODEs” What kind of problems have you solved and how was your contribution important to them?*

A: I developed for Airbus Defence & Space (formerly, EADS Astrium Space Transportation) software that computed automatically and instantaneously the optimal trajectories for the problem of minimal consumption for the last stage of an Ariane launcher, and did this for any chosen terminal conditions, and any configuration of launcher. The main challenge of this problem was in the word “instantaneously,” and moreover error is not allowed. It was of course already known how to provide a fair solution to the problem, but computing only one flight required at least several hours, and even several days. The code I designed is able to provide the optimal solution within one second. This work, realized in collaboration with Thomas Haberkorn, took me around five years. The approach is based on a combination of the classical Pontryagin Maximum Principle in optimal control with numerical continuation methods and with a refined geometric analysis of the extremal flow, using quite recent results that are of a geometric nature (this is part of the so-called geometric control theory). Successfully integrated to the global optimization tools of Airbus, this real-time algorithm brought a big improvement for Ariane 5 trajectory planning. It also permits the design of new strategies for the forthcoming Ariane 6 launchers. I am proud of this success story which shows that mathematics plays a crucial role in technological innovation.

*Q: Are you able to directly interact with your industrial partners, or do you need some intermediate collaborators to translate math in practical implementations?*

A: I have experimented both ways.

- With Airbus I implemented by myself the code in its final form, that they now use. As I said before, this was a personal challenge to achieve the complete chain, at least once. Frankly, I would not have the time now to do that again.
- I have also experimented, with CEA (the French atomic agency) or with CNES (the French space agency), collaborations where an engineer turns the mathematical part into a final code. Both ways are fine; after all what is important is the final success of the overall scientific issue. In the case of my work with Airbus the second solution would have been impossible because some code issues (parameter tuning) were too closely related to fine mathematical aspects.

When there is a collaboration with someone doing the practical implementation, what is also very important is that anyone in the chain finds his/her own interest and has pleasure in performing the work and that should be as rewarding as possible.

*Q: Recently you have been appointed as Director of the Fondation Sciences Mathématiques de Paris. Could you explain succinctly the role of this foundation and your main goal as director?*

A: The Fondation Sciences Mathématiques de Paris (FSMP), hosted at (and partner of) Institut Henri Poincaré, is a network of excellence covering all mathematics and theoretical computer science departments centered in Paris, several INRIA teams and departments in engineering schools — around 1500 permanent people. This is the largest concentration of mathematicians in the world. The role of FSMP, as a gathering structure, is to guarantee the visibility of the community of mathematicians, and to search for collective funds (region, country, Europe, industries) in order to implement all programs with these financial supports: funding for master students, PhD students, postdoctoral positions, and invited researchers that hold specific chairs. The FSMP animates many other programs and, thanks to its flexible structure, is able to organize actions that would not be possible in the universities because of administrative constraints. My role as a director is to animate all programs and direct the committees, and search and attract new funding sources to ensure durability of our main actions. I am fortunate to have at FSMP a fantastic team, very devoted and efficient. The mathematics community is a wonderful one; it is very well organized and has been able to make emerging structures like FSMP in order to ensure better cohesion and international visibility. In the very complex Paris scientific landscape (there are around

20 universities in Paris), FSMP ensures a unification of mathematical sciences around big programs.

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

A: Well, I love cutting the grass and bushes, tilling the ground in my garden and watching tomatoes grow, and after that, drinking a beer on my balcony! Before quickly coming back to mathematics, of course...

*Q: Have you other interests or hobbies? Who are your favorite writers?*

A: A great pleasure is to run with my wife, with our three children accompanying us by bike. My favorite writer is Jacques-Louis Lions. I'm joking... I am not much versed in literature but before sleeping I like reading mystery novels, for instance I enjoyed several books by Harlan Coben. I also read a lot of French history, actually any local historical issues or anecdotes attract my attention. I live in Orléans, in the Loire Valley, which is an incredibly rich country from a historical and architectural point of view. I like looking at things, buildings, places with, you know, different eyes, various points of view. You travel so much when you simply look at everyday things with different eyes...

*Q: Finally, a last general question. What do you wish for Mathematics in 2017?*

A: We are certainly attending the advent of Data Science. We can expect that in the next years there will be a real explosion of jobs related to connected objects, may it be at home, in our (soon autonomous) cars, or at work.

Mathematics has a great role to play, in order to provide and develop powerful tools to calibrate and face the enormous challenge brought by big data, massive information and measurements. "Prediction" is likely to be the guideline of many forthcoming studies and projects. I believe that "Data Science" will soon emerge as a new very visible branch of mathematics, full of exciting open issues, and raising new questions combining probability and statistics, PDE analysis, modeling and model reduction, linear algebra, computing issues, etc. This will be the advent of the Data Science age. So many challenges are about to be solved, for instance in the domain of Math-Health. Just think of all we can do with a simple smartphone... I wish Mathematics to proudly carry the torch of Data Science in 2017. Why not a forthcoming year of Data Science?

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

trial and Applied Mathematics and is Chair of the Raising Awareness Committee of the European Mathematical Society.



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## News from ICSU

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by BARBARA LEE KEYFITZ

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ICIAM is a Scientific Associate member of ICSU, the International Council for Science, an independent body whose members are national scientific bodies (academies of science) and international scientific unions (like the IMU). As an associate member, ICIAM has a voice but lacks a vote in ICSU. We are currently exploring the possibility of acquiring full membership, but it would appear to require a much greater financial commitment — about ten times our current dues of about USD 500 per year — which may put this goal out of our range at the moment.

ICSU puts out a regular newsletter, and posts frequent updates at its website, [www.icsu.org](http://www.icsu.org); notable recent items include negotiations to merge with ISSC (the International Social Science Council). A working group with members from both councils was announced in February,

and the ICSU President Gordon McBean has called an extraordinary session of the ICSU General Assembly, to be held in Oslo, Norway, on 24 October, 2016 (coinciding with the ISSC General Assembly) where members will vote on this.

A substantial new initiative has just been announced: an agreement with SIDA (the Swedish International Development Cooperation Agency) to operate a five-year, five million Euro program to strengthen research capacity for sustainability in Africa. A call for pre-proposals will be launched in July. The initiative is seeking projects that reach across disciplines and support early-career scientists in Africa.

As an example of the reach of ICSU into science policy, let me mention a letter ICIAM received recently: ICSU

has received a call from the IPCC to nominate experts to participate in the Scoping Meeting (to take place in the week of 5 December, 2016) for the IPCC Special Report on Climate Change and Oceans and the Cryosphere. Nominations are due by Friday, 29 July, 2016. ICIAM's committee on ICSU has not yet developed a way to respond quickly to such opportunities, but we continue to think about how to do this. (And if any readers want to suggest a nomination before the deadline, they are most welcome to contact Tom or me.)

Let me close this column by repeating the theme that has been expressed in Board meetings and other communications. We believe that mathematics and mathematicians should be more involved in ICSU. And although ICSU, as a long-established international organization is hard to move, the timing may now be good, as three mathematicians — Daya Reddy as President-Elect,

Manuel de Leon and John Ball as Ordinary Members, are on its Executive Board.

In cooperation with the IMU, ICIAM has already increased its involvement, by successfully applying for ICSU grants: the AIMS Workshop that took place in May in South Africa (it went very well and we will have a report in a future issue), and the Mexico workshop in 2013. ICSU may begin offering larger grants of EUR 150,000 each.

But undoubtedly if mathematicians are to have more impact within ICSU it will be by responding to calls for nominations by ICSU. As we gain experience with the way ICSU functions, we will become more proficient at identifying projects that are ripe for mathematical input, and at finding people who want to devote time to such projects. We welcome any suggestions for ways to carry out this mandate.

## The 2021 Mathematical Congress of the Americas Call for Bids to Host

### To Interested Mathematical Organizations in the Americas

The MCofA — Mathematical Council of the Americas invites the mathematical organizations based in the continent to bid to organize the 3rd Mathematical Congress of the Americas, which will take place in July – August 2021 in some mathematical center in North America, Central America, South America, or the Caribbean. The first MCA was held in Guanajuato, Mexico in August 05–09, 2013 and the second Congress will take place in Montreal, Canada in July 20–24, 2017.

The goal of the Mathematical Congress of the Americas is to highlight the excellence of mathematical achievements in the Americas within the context of the international arena and to foster the scientific integration of all mathematical communities in the continent.

The Congress will take place over 5 days and will include plenary lectures, invited lectures and special sessions, selected by a Program Committee appointed by the Executive Committee of the MCofA.

The bids to host the MCA2021 are requested to include the following relevant information:

- the exact location and size of the facilities, conference rooms and expected hotel space;
- the names of the main local organizers and some of their relevant organizational experience;

- an approximate budget for the Congress scaled for an anticipated registration between 500 and 2,000 people;
- anticipated local sources of external funding for the Congress at this location;
- relevant discussion of the ease of access of the location for international participants;
- suggestions for 5 day periods between mid July and mid August 2021 when the Congress could take place;
- other factors that might make this a particularly appealing site for the Congress.

The bids are to be sent to the Executive Committee of the MCofA by email, to [mcofamericas@gmail.com](mailto:mcofamericas@gmail.com), by March 15, 2017. The Executive Committee will arrange site visits to some of the proposed locations for the Congress and the decision on the host and location of the MCA2021 will be taken at the MCofA meeting to take place in Montréal during the MCA 2017.

Thank you very much for your attention.

The Executive Committee of the MCofA  
S. Friedlander, J. Hurtubise, J. A. de la Peña, A. Solotar,  
M. Viana



A N N O U N C E M E N T

# MATHEMATICAL CONGRESS OF THE AMERICAS JULY 24-28 2017 MONTREAL



The Mathematical Council of the Americas, which federates the Mathematical Societies of the Americas, invites you to join us in Montreal for the 2017 Mathematical Congress of the Americas, from July 24<sup>th</sup> to July 28<sup>th</sup> 2017

#### PLENARY SPEAKERS

Shafira Goldwasser (MIT) • Andrew Granville (Université de Montréal)  
Manuel del Pino (Universidad de Chile) • Peter Ozsvath (Princeton University) • Yuval Peres (Microsoft Seattle)

#### INVITED SPEAKERS

Nicolas Andruskiewitsch (Universidad Nacional de Córdoba) • Lia Bronsard (McMaster University)  
Krzysztof Burdzy (University of Washington) • Rustom Choksi (McGill University)  
Maria Chudnovsky (Columbia University) • Juan Davila (Universidad de Chile)  
Luz de Teresa (UNAM) • Yacov Eliashberg (Stanford) • Pablo Ferrari (Universidad de Buenos Aires)  
Harald Helfgott (Université Paris Diderot) • Jeremy Kahn (Brown University)  
Matt Kerr (Institute for Advanced Study) • C. Gustavo Moreira (IMPA) • Robert Morris (IMPA)  
Paolo Piccione (Instituto de Matemática e Estatística da Universidade de São Paulo) • Jill Pipher (Brown University)  
Jeremy Quastel (University of Toronto) • Bernardo Uribe (Universidad del Norte)  
Shmuel Weinberger (University of Chicago) • Dani Wise, McGill University

#### STEERING COMMITTEE

Susan Friedlander (University of Southern California) • Jacques Hurtubise, McGill University  
Jose Antonio de la Pena (Matemáticas Research Center, AC CIMAT)  
Andrea Solotar (Universidad de Buenos Aires) • Marcelo Viana (IMPA)

#### PROGRAM COMMITTEE

Noga Alon (University of Tel Aviv) • Luis Cafarelli (University of Texas at Austin - Chair)  
Guillermo Cortiñas (University of Buenos Aires) • Mario Eudave, (Universidad Nacional Autónoma de México - UNAM)  
Irene Fonseca (Carnegie-Mellon University) • Servet Martínez (Universidad de Chile)  
Wellington de Melo (IMPA) • Kumar Murty (University of Toronto) • Yuri Tschinkel (New York University)

There will be a large number of special sessions. Proposals to organise are being accepted until July 2016.

For details, plus information on financial support of participants,  
please see the web page. <https://mca2017.org/>



**CENTRE INTERNATIONAL DE MATHÉMATIQUES PURES ET APPLIQUÉES**  
**INTERNATIONAL CENTRE FOR PURE AND APPLIED MATHEMATICS**

## 2018 CIMPA Research Schools call for projects

- Proposals in applied mathematics or related to applications of mathematics are especially welcome.
- The proposals for the most mathematically or economically deprived areas are encouraged and will be given priority.
- A project of a Research School should not coincide with one of a conference.
- We receive many projects. The selection by the Scientific Council and the Steering Council of CIMPA takes into account firstly the scientific value, but also thematic and regional balance. Read the road-map ([cimpa.info/ecoles-de-recherche/feuille-de-route/article/roadmap](http://cimpa.info/ecoles-de-recherche/feuille-de-route/article/roadmap)) before filing a project. Anticipate that a project could be moved aside despite its significant qualities.

The aim of the International Centre for Pure and Applied Mathematics CIMPA is to promote international cooperation in higher education and research in mathematics and their interactions, as well as related subjects, for the benefit of developing countries. Our activities are concentrated at the places where mathematics emerges and develops, and where a research project is possible.

CIMPA is an UNESCO centre based in Nice, financed by France, Switzerland, Norway and Spain, including the support of the University of Nice Sophia-Antipolis and the University of Montpellier.

We organize research schools ranging in the length of two weeks in developing countries. The purpose of these schools is to contribute to the research training of the next generation of mathematicians, women and men.

The research schools are organized locally with the help of CIMPA. CIMPA's financial contribution is essentially for young mathematicians from neighbouring countries to be able to attend the research school. CIMPA can also help with obtaining funds from other sources. Additional and essential information can be found in the roadmap (available on the web site of CIMPA). You can also write to CIMPA for further information.

### Research schools call for projects begins on March 1st, 2016.

The deadline for a (non-mandatory) pre-proposal is June 15, 2016.

The complete proposal is due October 1st, 2016.

The application form can be found on the CIMPA website: [proposals.cimpa.info](http://proposals.cimpa.info)





## 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 web page, [www.iciam.org](http://www.iciam.org).

The Full Members and their representatives

**ANZIAM** (Australia and New Zealand Industrial and Applied Mathematics): Ian H. Sloan and Larry Forbes  
**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 Xiao-Shan Gao  
**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  
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**SIAM** (Society for Industrial and Applied Mathematics): Pam Cook and Cynthia Phillips  
**SIMAI** (Società Italiana di Matematica Applicata e Industriale): Alessandro Speranza and Giovanni Russo  
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**AWM** (Association for Women in Mathematics): Barbara Lee Keyfitz  
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**CMS-SMC** (Canadian Mathematical Society, Société Canadienne de Mathématiques): Elena Braverman  
**CzechMS** (Czech Mathematical Society): Zdeněk Strakoš  
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**DMV** (Deutsche Mathematiker-Vereinigung): Günther Leugering  
**EMS** (European Mathematical Society): Franco Brezzi  
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The current Officers of ICIAM  
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**Secretary:** Sven Leyffer, USA  
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