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On the cover: The venue for the 2019 ICIAM Congress is Valencia, known as "The Orchard of Spain". Sweet oranges grow in groves along the coastline and in the summer the air is filled with the heavy scent of orange blossom.



# The ICIAM Dianoia Vol. 3, No. 4, October 2015

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

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# ICIAM and the Future: An Exchange

On October 1, 2015, Maria J. Esteban became the ninth President of ICIAM. Her letter to the ICIAM community elicited responses which display widespread interest in the development of industrial mathematics. DIANOIA is pleased to reprint this exchange, with the permission of the authors.

#### From Maria Esteban, October 1, 2015:

Dear Presidents and Representatives of member societies of ICIAM,

It is a pleasure to write to you right after I became president of our society. Before continuing, let me warmly thank the officers that are leaving (A. Fitt and M. Primicerio) for the wonderful service they have provided for our community, and those newly elected (S. Leyffer and V. Mehrmann) for their generous decision to start serving. And of course my warmest thanks to Barbara Keyfitz, the previous President, who ran the society with strength and wisdom for the last four years.

During my presidency I will try to do my best to serve our community and our society, to strengthen its potential and to develop new projects, specially in the direction of the industrial applications of mathematics and also increasing of our exchanges and collaborations. Together we can all go further in our projects.

Whatever ICIAM becomes, it has to be based on the work and the impulse of the community that it represents. ICIAM's largest asset is its members and the fact that it covers many countries in all continents. Diversity is sometimes a source of heterogeneities and difficulties, but it can also be very fruitful. Let us celebrate this diversity and work together to make ICIAM stronger and more useful every year.

Please do not hesitate to contact me/us whenever you have questions or ideas or suggestions that could be helpful to our society and our community. You can write to me (or any other of the ICIAM Officers) and with the help and the advice of the other Officers, I/we will try to answer as best as possible.

Best wishes, Maria J. Esteban

# From Hyung-Chun Lee, President of KSIAM, October 3, 2015:

Dear Maria,

We strongly support ICIAM and your project. Industrial mathematics is now a very important issue within the government and mathematical society in Korea.

We also want to cooperate strongly with ICIAM.

Best regards, Hyung-Chun Lee

### From I. David Abrahams, IMA representative, October 3, 2015:

Dear Maria,

On behalf of IMA and others supporters of ICIAM in the UK, I too would like to pass on my best wishes to you and your team. We wish you all success in achieving your aims in coming years.

I realize how large a job it is to steer ICIAM, with all its various member societies, and I too pass on my sincere thanks to Barbara, Alistair and Mario for their very hard work. They leave ICIAM in excellent shape. As Hyung-Chun Lee states, we are delighted that you are taking over as President, especially because of your commitment to industrial mathematics in Europe. I personally believe strongly that we need to break down barriers with other disciplines and enhance the links with industry, and this is one of my main priorities as Scientific Director of the International Centre for Mathematical Sciences (ICMS) in Edinburgh. We had an interesting meeting over the last couple of days at ICMS, which brought together mathematicians from most of the UK mathematics departments interested in industrial mathematics, or more broadly knowledge exchange. This was perhaps the first such forum we have ever had in the UK, with the purpose of meeting each other, hearing about the variety of mechanisms being employed, and discussing the range of national and international overarching efforts to enhance industrial mathematics.

Europe came up a lot in the sessions, from the ESF Forward Look to EU-MATHS-IN and the EU CoST grant. Hilary [Ockendon] and Jo Jordon spoke about these, and there was general agreement about the importance of what you have been doing in Europe to raise the profile of mathematics knowledge exchange.

With best wishes, David

# 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. 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.

# A Word from the President

The ICIAM 2015 Congress was held in August, in Beijing, at the China International Convention Center. The Congress was a great success, with the largest registered participants for an ICIAM Congress as of yet. The Congress provided many informative talks and presentations from mathematicians from across the globe. The China committee was very organized and quickly handled the normal little organizational glitches which are inevitable with events of this size. The opening ceremony included an incredible performance by a troupe of hearing and visually impaired dancers. A formal congress opening ceremony then proceeded led by the Vice-President of the People's Republic of China, M. Li Yuanchao. Apart from his very inspired speech, the ICIAM President, Professor Barbara Keyfitz, and the Congress President, Professor Lei Giuo, also addressed the attendants. The ceremony ended with the prize ceremony, where the ICIAM Prizes 2015 were delivered to this year's recipients, Annalisa Buffa (Collatz prize), Andrew J. Majda (Lagrange prize), Jean-Michel Coron (Maxwell prize), Bjørn Engquist (Pioneer prize) and Tatsien Li (Su Buchin prize).

Among the novelties of this years's Congress, laudations of the prize winners were presented and the prize winners themselves could also present their research in lectures scheduled the next two mornings. The annual conference of SIAM 2015 was embedded into the congress and the SIAM and AWM prizes' recipients delivered lectures in the evenings. The first evening was devoted to the ICIAM Olga-Todd-Taussky lecture, which was given by Professor Eva Tardös.

Prior to the beginning of the Congress an informal meeting of the Presidents of the member societies of ICIAM was held. This was an opportunity to discuss past and current activities, and also possible future developments. Moreover, the annual Board meeting of ICIAM took place the day after the closing of the Congress. Elections of two officers-at-large, the secretary and the treasurer took place at this meeting. José Alberto Cuminato was re-elected as Treasurer, and Taketomo Mitsui as Officer-at-Large. Two new officers were elected, Sven Leyffer for the position of Secretary and Volker Mehrmann as Officer-at-Large. This meeting was also the last one for Alistair Fitt, former Secretary, and Mario Primicerio, Officer-at-Large.

As per the bylaws, on October 1st, the new team of officers started their terms: Barbara Keyfitz as Past-President, Sven Leyffer as Secretary, Jose Alberto Cuminato as Treasurer, Taketomo Mitsui and Volker Mehrmann as Officers-at-Large and me as President. Toby Maria J. Esteban

gether we will run the society as best as we can, following the advice and recommendations of the ICIAM Board and the member societies.

This is my first article in Dianoia as President, and before continuing, let me warmly thank the officers that are leaving (A. Fitt and M. Primicerio) for the wonderful service they have provided for our community, and those newly elected (S. Leyffer and V. Mehrmann) for their generous decision to start serving. And of course my warmest thanks to Barbara Keyfitz, the previous President, who ran the society with strength and wisdom for the last four years. Among other things Barbara Keyfitz had the idea to create this newsletter and has invested incredible energy making it lively and interesting. She has accepted to continue working on Dianoia, and with the help of the societies and the editors, she will surely manage to raise Dianoia to still higher levels of quality and interest.

During my presidency I will try to do my best to serve our community and our society, to strengthen its potential and to develop new projects, specially in the direction of the industrial applications of mathematics and also increasing of our exchanges and collaborations. Together we can all go further in our projects.

Whatever ICIAM becomes, it has to be based on the work and the impulse of the community that it represents. ICIAM's largest asset is its members and the fact that it covers many countries in all continents. Diversity is sometimes a source of heterogeneities and difficulties, but it can also be very fruitful. Let us celebrate this diversity and work together to make ICIAM stronger and more useful every year.

Maria J. Esteban, President of ICIAM

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.



# The ICIAM 2015 Congress

ICIAM's signature event, the Congress, took place in Beijing, China from August 10 to August 14, 2015. This was the eighth Congress, and the largest to date, and it was a great success. The coming issues of DIANOIA will feature more articles on highlights of the meeting. Here I would just like to once again express our community's gratitude to the organizers for the work they put in, the resources they marshalled, and the attention they paid to every detail.

At the opening ceremony, a welcoming address was given by His Excellency Li Yuanchao, the Vice President of the People's Republic of China. His Excellency holds a degree in Mathematics from Fudan University, and perhaps that colored the warmth of his remarks; or perhaps they express a wider appreciation of what we hope mathematics can achieve. A number of people have asked to see the text, and we are pleased to reprint it here (a copy appears on the ICIAM 2015 web page also).

We also join in congratulating the ICIAM Prize winners once again, and we are happy to print the "official" picture. It also shows the ceremonial backdrop of the stage used for the opening ceremony.



Presenting the 2015 ICIAM Prize winners. —Image used with permission.

Presented here are the remarks by H.E. Li Yuanchao, Vice President of the People's Republic of China, made at the Opening Ceremony of the Eighth International Congress on Industrial and Applied Mathematics August 10, 2015.

#### Strengthen Exchange and Cooperation Reach New Milestones of Science

Respected ICIAM President Barbara Lee Keyfitz, Distinguished Guests and Gentlemen,

Today, the Eighth International Congress on Industrial and Applied Mathematics is held in Beijing. On be-

half of the Chinese government, I have the pleasure to warmly welcome scientists, industrial experts, and delegates from all over the world, and to congratulate the ICIAM Prize recipients.

Since the First International Congress on Industrial and Applied Mathematics held in 1987, it has become a grand gathering of the highest level, at the largest scale, and with the most extensive influence in the field of industrial and applied mathematics. It is the first time for China to host the Congress, which will be a great opportunity for all delegates, including Chinese delegates, to exchange recent developments and look into the future in the field of industrial and applied mathematics.

Mathematics is the most universal scientific language, the most widely used scientific tool, and one of the most basic principles applied in natural and social sciences, which is of fundamental significance to the development of science and technology (S&T). Mathematics has been applied in almost all fields of human knowledge and activity, so as to promote innovative development of S&T and economy fundamentally, and shape the way of human life profoundly. Specifically, the internet technology, big data processing, space exploration, modern medical diagnosis, and financial derivative products have been developed on the basis of new theories and methods of mathematics. The extensive application of mathematics has become a vital driving force behind the development of our world.

China has a long history of mathematics with a tradition of emphasizing applications. Since the founding of the People's Republic of China, the development of mathematical research in China has been accelerated towards the international frontiers, with recognized achievements in both theoretical research and industrial applications. Since the reform and opening-up in the late 1970s, China launched an unprecedented modernization course in the human history, and carried out the largest and the fastest industrialization in the world. China became the world's second largest economy in 2010, and the value-added of China's manufacturing industry accounted for 20.7% of the world total in 2011. It has since become the largest manufacturing country in the world.

The application of mathematics is an important driving force behind the modernization of China, and has played a significantly fundamental role in the economic development and S&T progress. China has developed a series of cutting edge technologies, such as the fastest supercomputer Tianhe-2, the stream and silt control of the Three Gorges Reservoir, the optimization of high-speed railway, and the high-precision space remote sensing. Network S&T and its applications, represented by the internet and cloud computing, have been developing into a new engine for China's economic growth. China's online retail turnover was 2.8 trillion RMB in 2014, the largest in the world.

It is a recognition and encouragement to the development of applied mathematics in China that the Congress on Industrial and Applied Mathematics is hosted in Beijing and an ICIAM prize named after the Chinese Mathematician Su Buqing was established in 2003. I would like to take the opportunity to express my appreciation to the International Council for Industrial and Applied Mathematics.

Now, the Chinese people are working hard to achieve the nation's "two century" development goals, and to realize the Chinese dream of great national rejuvenation. President Xi Jinping has pointed out that powerful strength originated from S&T innovation is much more demanded than ever before. Faced with the emerging world-wide S&T and industrial revolution, China will implement strategies on innovation-driven development, keep on promoting new-type industrialization, and build an innovative nation. This certainly provides exceptional opportunities for the development of S&T, including mathematics.

The Chinese government has established special funds to support mathematical research through the Ministry of Education, the Ministry of S&T, the Chinese Academy of Sciences, and the National Natural Science Foundation of China. Such national strategic development plans as "Made in China 2025" and "Internet+", will provide abundant chances for the application of S&T, including mathematics. National talents plans such as the "Thousand Talents Plan" for overseas high-level talents and the "Ten Thousand Talents Plan" for domestic high-level talents, provide a strong support to talents' growth in all disciplines of sciences, including mathematics. Respecting labor, knowledge, talents, and creation in our society will build a favorable environment for innovation and entrepreneurship. It is our hope that new historical progress on S&T will be achieved in China, along with the wave of S&T development in the world, and that China's mathematics and its applications could enter into the forefront

of global scientific development.

Science is without borders. To ensure the development of China's S&T, we need to learn from and establish close ties with international scientific colleagues. Under the banner of peace, development, cooperation, and winwin strategy, China will actively support and take part in the international communication and cooperation. This Congress provides a much-needed platform for domestic and overseas delegates to carry out exchange and cooperation. We expect that the Congress will have a significant and far-reaching influence on the development of industrial and applied mathematics, promote exchange and cooperation among international communities, push forward the close connection and interaction between mathematics and S&T, and that the Congress will become a landmark in the history of industrial and applied mathematics.

Jointly together with our international counterparts, China will push forward the development of industrial and applied mathematics, enhance crossover, fusion, and innovation between mathematics and numerous other disciplines and fields, and promote the sustainable development of the economy and society. We encourage Chinese scientists to engage in widespread academic exchange and cooperation with scientists from all over the world, to reach new milestones of science together, so as to make greater contributions to the development of science, technology, and human civilization.

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



# Announcement of MCA-2017

Following the very successful inaugural Mathematical Congress of the Americas, MCA-2013 in Guanajuato, the second such Congress, MCA-2017, will take place in Montréal, Canada on July 23–28, 2017. The confirmed plenary speakers at MCA-2017 are

- Shafrira Goldwasser (MIT, USA)
- Manuel del Pino (Universidad de Chile)
- Andrew Granville (Université de Montréal, Canada)
- Peter Ozsvath (Princeton University, USA)
- Yuval Peres (Microsoft Research, USA)

The Congress is organized under the auspices of the Mathematical Council of the Americas. For more information: www.mcofamericas.org.

We look forward to seeing mathematicians from throughout the world in Montréal in July, 2017.

# Applied and Industrial Mathematics in Spain: An Overview

by Tomás Chacón Rebollo

During the period of January 1, 2005 to June 30, 2015, Spain was listed as the 8th country by global impact for its publications in mathematics (ISI Web of Knowledge), with a total of 68,449 citations and an average of 4,32 citations per paper. A large part of those publications dealt with applied and industrial mathematics, although there exists no separate record of them. Spain has kept this 8th position overall, due to developments that took place in the 80s and 90s in parallel to the increase of the Spanish economy.

Research in applied and industrial mathematics in Spain is mainly carried on in university departments. There currently exists more than 40 university departments that either totally or partially focus their research in Applied Mathematics. Most of these departments are located in public universities, with over 900 researchers (www.rsme.es/matesp). The research deals with modelling, numerical approximation and mathematical analysis of a broad set of systems and processes. These include image recognition and recovery, optimal design and control, controllability, homogenization, dynamical systems, impact analysis of climatic change, engineering design, celestial mechanics, multi-scale modelling of materials and fluids, modelling and simulation of epidemics, electromagnetism, finances, acoustics, fractional PDEs, PDE's in Kinetic Theory, Quantum-Kinetics, electoral methods, combinatorial and computational geometry, geometrical structures in physics, coding and cryptography, fire modelling, among many others.

A part of this university research is structured by a network of 15 mathematical research institutes, that either totally or partially work in applied and industrial mathematics. These institutes have typically made links and networks within the local research communities within each university. These connections have formed the RedIUM (the Network of University Mathematics Institutes), whose purpose is to boost the collaboration and exchanges between the institutes of the network.

There also exists several specific research centres dealing totally or partially with the research in applied and industrial mathematics. Among these centres is the ICMAT (Instituto de Ciencias Matemàticas, Madrid, www.icmat. es), which focuses on general research in mathematics, with special emphasis on applied mathematics. Also, the BCAM (Basque Center for Applied Mathematics, www. bcamath.org) and the CIMNE (International Center for Numerical Methods in Engineering, www.cimne.com) that focus on applied mathematics, with strong emphasis on industrial mathematics and form the link between the regional industry in the Basque Country and Catalonia, respectively. All three of these are highly competitive centres with a high rate of success in international calls for funding, in particular the ERC (European Research Council) ones.

A large part of the mathematical technology transfer in Spain is carried out by the Network for Mathematics & Industry (Math-in), which is a compilation of almost 40 research groups located in university departments and research centres (www.math-in.net) within Spain. This network structure makes it easy for companies to access more than 450 highly skilled researchers, spread throughout the country. Research activities within the groups are aimed at specific issues of their own areas of knowledge, paying particular attention to their applicability to development and innovation in companies. Math-in is progressively helping to close the gap between mathematical research and industry in Spain, it is also becoming the reference resource for industry willing to improve their production processes by fine analysis.

The Math-in network has successfully developed more than 720 contracts for SMEs and large companies both nationally and internationally, in areas of interest to the industry, having successfully participated in different national and international calls. Thanks to its work of consultancy, training, software development, organization of meetings, computer services and collaboration on projects, the network has at the present moment a wide portfolio of more than 300 clients.

The most relevant center of mathematical technology transfer in Spain is the Technological Institute for Industrial Mathematics (ITMATI, Santiago de Compostela, www.itmati.com), which provides services and solutions using mathematical technology to businesses, industries and governments. It provides services on product and solutions development, technological consultancy, and R&D projects, among others.

The Spanish government supports several programmes to structure and fund the scientific research, in the framework of the H2020 (Horizon 2020) programme of the European Union, particularly oriented to boost the transfer of innovative research and technology to industry. These programmes apply, in particular, to the research in applied and industrial mathematics as mathematics is one of the priority areas.

The main focus of such programmes is the funding of high-quality research projects, that are linked to a program to fund pre-doctoral researchers, with yearly calls for applications. This programme provides the basic funding for Spanish scientific research groups. There also exists a program to boost the development of research centers and units of excellence ("Severo Ochoa" and "Marìa de Maeztu" funding calls), in which applied mathematics is having a large success. In particular, the BCAM, CIMNE and ICMAT centers, mentioned above, have qualified in the Severo Ochoa call for applications.

In sum, today Spain has a large number of highquality research groups in applied and industrial mathematics, with several excellent research centers, which are highly competitive in national and international calls for funding. Spain also has a well structured fully developed network of mathematical technology transfer, which is highly competitive in providing effective links with industry. Tomás Chacón Rebollo is the chairman for the ICIAM 2019 Congress. His scientific specialties are Computational Fluid Dynamics and Numerical Analysis encompassing a wide variety of interests from mathematical and numerical turbulence modeling to sustainable building design by reduced order methods.



# **ICIAM Announcements**

# • 2016 ICIAM BOARD MEETING AND WORKSHOP

Following the recently established tradition, the ICIAM Board meeting for 2016 will be preceded by a two-day workshop. Both will take place on the campus of Campinas University. Campinas is a large city in the state of São Paulo. Campinas can easily be reached by coach from the main international airport of São Paulo, (São Paulo-Guarulhos International Airport – GRU). There are also flights to Viracopas International Airport (VCP) which is smaller but located very near Campinas. The date of the Board meeting is May 7, 2016, as decided at the Board meeting in Beijing in August 2015. The dates of the workshop are May 5–6. The poster in this issue of DIANOIA includes a request for volunteers to speak at the workshop. Representatives are asked to contact Jose Cuminato (jacumina@icmc. usp.br or jacuminato@gmail.com) to give a talk at the workshop.

### • THE NEW WEBSITE

The new website is now online at iciam.org. Besides having an up-to-date interface and greater ease in navigation, the new site has some "selfservice" features. Individual societies are now able to edit their own information, including making changes when presidents and representatives change. Instructions are being sent to each representative and president on how to do this. Of course, our webmaster, Ross Moore, is still available if you need help.

### • ICIAM 2023 – CALL FOR PRE-BIDS

Although the summer of 2023 is seven and a half years away, the Council is now starting the process of planning for the Tenth International Congress on Industrial and Applied Mathematics. Member societies are warmly invited to submit "pre-bids" for the 2016 Board meeting. At that meeting, the Board will decide on a short list for full proposals and site visits. The full text of the call for pre-bids is being circulated to all member societies, and is reprinted in this issue for your information. Societies are welcome to contact the president or any officer with questions.

### • CIMPA ELECTION

ICIAM is a "Scientific Associate" of CIMPA, and, as such, we may propose candidates for the Administrative Council of CIMPA. A call for nominations has been circulated by CIMPA and is published here. Please see the CIMPA website for further information and instructions, and contact the officers if you are interested in serving or wish to propose someone for office.

# ICIAM Board meeting in Brazil, May 2016

The 2016 ICIAM Board meeting in Brazil will be on May 7th at Unicamp, Campinas.

Together with the Board meeting, SBMAC is organizing the workshop: International Workshop on Industrial Mathematics to be held on May 05 and 06.

# Register now!

Call for presententions

website: www.cemeai.icmc.usp.br/IWIMath16/index.html

All ICIAM representatives are invited to submit a talk to the workshop, please see the site. Hotel accommodation will be covered for those presenting a talk at the workshop.





UNICAME



**CENTRE INTERNATIONAL DE MATHÉMATIQUES PURES ET APPLIQUÉES** 

## INTERNATIONAL CENTRE FOR PURE AND APPLIED MATHEMATICS

Nice, December 3, 2015

Dear members of CIMPA,

The Administrative Council (CA) will be renewed in a little more than one year. It seems to us appropriate to hold the election for the individual members of the CA during the General Assembly (AG) of 2016, to be held on 10 June (to be confirmed), at the Institut Henri Poincare in Paris.

According to the Statutes and the By-laws of CIMPA, the CA consists of, in addition to the 7 ex-officio institutional members, 7 individual members who are elected by the AG. Among these 7 members are the members of the Bureau. The Bureau composes of the President, possibly one or two vice-Presidents, a General Secretary and a Treasurer.

In view of the dates of the meetings, we suggest the following calendar:

- The AG elects 7 individual members during its meeting which should be on 10 June 2016.
- The new CA (the ex-officio members whose number is fixed by the Statutes, plus the 7 individual members elected previously) shall meet in an extraordinary session in January 2017, to elect the Bureau.
- After this meeting, the new CA and the new Bureau shall assume their function.

By this letter we launch a call for candidates for these 7 individual members of the next CA. We shall reflect carefully together on this crucial election, and we shall be happy to receive your comments on possible candidates. The term of office for members of the Bureau being four years, renewable once, three of the four members of the present Bureau (the President, the vice-President, the Secretary) are not eligible for re-election.

It was decided by the AG of 2014 that all CIMPA actions must be preceded by an open call. This implies that, in order to be submitted to a vote, all declaration of candidacy must be made after the sending out of this message, whose aim is precisely this call for candidacy. Furthermore, any member of CIMPA can present his or her candidacy during the AG until the election itself.

We remind you equally that the Statutes of CIMPA require that an individual member of the CA must be a member of CIMPA. If you wish to propose as candidate a colleague who is not a member of CIMPA, then he or she must seek to become a member (according the usual procedure advertised on our web site), and he or she must be presented by the CA and approved by the AG. His or her candidacy can then be considered during the election.

The Bureau shall consult widely in order to enlist the best candidates. Before the meeting of the AG in June 2016, it shall communicate to you the names of the candidates for the new CA which it has so far received after this call for candidacy.

Sincerely,

TSOU Sheung Tsun, Presidente Alain DAMLAMIAN, Vice-President Jean-Marc BARDET, General Secretary Marc AUBRY, Treasurer.



# Mathematics-in-Industry New Zealand

by WINSTON L. SWEATMAN

The inaugural Mathematics-in-Industry New Zealand (MINZ) study group was held at Massey University, Auckland, in the middle of this year. This brought together a mixture of over a hundred mathematical scientists to work on six projects ("challenges") provided by New Zealand industry. There were a large number of students participating. The week was instructive and enjoyable.

Study groups first came to the region in 1984 with the meetings initiated by Australia's national science agency (CSIRO). These workshops (MISG) have been continued as annual events occurring in January/February. They now constitute a special interest group meeting of Australia and New Zealand Industrial and Applied Mathematics (ANZIAM). The workshops came to New Zealand in the years 2004, 2005, and 2006 when they were hosted by Massey University in Auckland. In the following years, New Zealand industry continued to be involved and brought projects to the subsequent MISGs in Wollongong, Melbourne and Brisbane.

During this period, enthusiasm grew for additional activity based in New Zealand itself, and this led to the MINZ study group, again as an ANZIAM activity, with particular involvement of the New Zealand Branch. MINZ has enjoyed the active involvement and administrative support of KiwiNet, a national network of public research organisations, working together to transform scientific discoveries into marketable products and services (www.kiwinet.org.nz). The project was initiated and led by my colleague Graeme Wake, who had also directed the earlier MISG workshops in New Zealand in 2004–2006.

The format of our meeting was similar to study groups the world over. We began with presentations from industry representatives, during which the projects were outlined. Thereafter, small teams of participants worked on each individual project, reporting mid-week and at the end of the week. The industry representatives were present all week, with some projects having more than one industry representative. Allocated to each project were two moderators and also a student moderator who were charged with coordinating the group working on the project and leading the presentations. In between activity on the projects there was an evening workshop for the students and invited speakers.

The projects were provided by Fisher and Paykel, Compac Sorting, Fonterra, Transpower, Eyedentify, and Livestock Improvement Corporation. The first four organisations had all been involved in study groups before: the first two in New Zealand, Fonterra in Australia and Transpower in both New Zealand and Australia. The other two organisations were new to study groups.

Livestock Improvement Corporation provides herd testing for nearly three quarters of New Zealand's dairy farmers. This involves estimates of the productive milk output each year of about 3.5 million cows. Their challenge involved multivariate outlier detection and in particular distinguishing between outliers generated by errors in measurement and recording and those generated by exceptionally good cows. The team worked on this project using the R statistical package on a subset of the data.

Compac Sorting designs equipment to sort fruit. Their systems involve several spectroscopes that currently need individual manual calibration for each different kind of fruit. The idea behind the project was to seek transforms that can relate the readings of different spectroscopes so that only one requires manual recalibration for the new fruit. The group had scanning data from a number of machines in a sorting house and made some progress using principal component analysis. A test of effectiveness could be made by running the company's quality testing algorithm on raw and reconstructed data. Other approaches were also identified.

Eyedentify works with retail and police organisations in New Zealand and Australia conveying information to prevent crime. They have collected a database of about two years of recorded retail crime incidents. This is to be updated in real time and they wish to use this intelligence to answer the question "Who is most likely to offend in my store now?." A number of statistical approaches were used by the group, such as looking for repeat offence patterns or networks of offenders. They concluded that it seemed like the best approach would involve a composite mixture of different approaches.

Fonterra Co-operative group is the world's largest exporter of dairy products. Their project involved the study of a problem that would be expected in any industrial food processing system: the detection/removal of tiny metallic particles that arise from wear of metallic components of the processing machinery. In particular, the group studied one of the control measures used which involves passing a moving stream of milk powder past an array of magnets. The team considered the effect of changing the various factors involved. The study included the mechanics of the flow and the complex magnetic field of a number of magnets. Particle capture was simulated with MATLAB.

Transpower is New Zealand's electricity system operator. Their project was "Controlling time creep while operating in frequency control mode." The North and South Island of New Zealand are joined by a high voltage direct link across Cook Strait that balances the load and generation across the country. The frequency of the electric signal has controllers on each island. A further frequency keeping controller (FKC), commissioned in 2014, operates between the islands. In the management of the electricity system, time errors occur and would be indicated by an electric clock connected to the mains. These sometimes have to be corrected by manual intervention. With the introduction of the FKC the time errors have tended to be more variable and to accumulate. The project concerned understanding the root causes of this variability within the complex control system. Statistical analysis and dynamical modelling were used in the study.

The Fisher and Paykel project involved the operation of a clothes dryer. The aim was to improve the identification of the end cycle and to better understand the drying process for various load weights and types. A clothes dryer brought onto campus and dismantled helped the team better understand the processes involved. The temperature of the exhaust is a key measure. The team investigated data supplied by the industry representatives as well as considering dynamical models.

A booklet of equation-free summaries of the projects

has been produced and full report papers will be produced in early next year for publication in the ANZIAM Journal E. A video of the meeting was produced by KiwiNet and can be seen here www.youtube.com/watch? v=mFkpHZdVris. The next MINZ study group is scheduled to take place at Victoria University of Wellington 4-8 July, 2016. These study groups are enjoyable and instructive so if you have a chance to attend one give it a go.

Winston Sweatman is President of the New Zealand Mathematical Society and Director of for Mathematics in Industry at Massey University. His first study group was in 2004 and to date has attended 4 study groups in New Zealand, 12 in Australia, 2 in Ireland, and 1 each in Canada and China.





cently appointed a new executive director, whose term begins next year. The following is a re-print of the announcement of our new Executive Director Dear members and friends of CIMPA,

His term of office is 4 years, renewable once. Sincerely

Tsou Sheung Tsun President.



# News from the International Council for Science

Excerpts from the September 2015 edition of the ICSU newsletter, with highlights from ICSU's current activities.

ICSU, the International Council for Science, publishes an online newsletter at www.icsu.org. We are pleased to feature the following two items from the most recent newsletter. ICIAM is an Associated Society to ICSU.

After a three-year consultation process, the world's governments agreed to the Sustainable Development Goals (SDGs). Throughout the process, ICSU and its partner organizations have continuously pushed for a sound scientific basis for these goals and a strong role for science in their implementation, for example through the first ever scientific review of the 169 targets that will operationalize the 17 goals, published in February. The 3rd ICSU/ISSC/DFG Young Scientists Networking Conference at Villa Vigoni had as its topic how science can

contribute to the implementation of the SDGs, and we have just released a new video featuring interviews with the participants and their vision for a sustainable future.

During the World Social Science Forum in Durban, South Africa, the International Council for Science (ICSU), the International Social Science Council (ISSC) and International Council for Philosophy and Human Sciences (CIPSH) jointly announced that 2016 would be the International Year of Global Understanding (IYGU). The aim of IYGU is to promote better understanding of how the local impacts the global in order to foster smart policies to tackle critical global challenges such as climate change, food security and migration.



# **Bid Process for ICIAM 2023**

### International Council for Industrial and Applied Mathematics (ICIAM) — December 2015

Member societies are invited to apply to hold the Tenth International Congress of Industrial and Applied Mathematics in 2023.

# Rules and resolutions concerning the process

The application process is governed by the "Rules," given below, and by the following resolution of the ICIAM Board at its meeting in Helsinki in May 2001.

- a) Prior to deciding about the location of each ICIAM Congress, the Council, at its Annual Board meeting, will decide on the amount of a financial compensation for the use of ICIAM's name.
- b) The amount has to be decided for each Congress.
- c) The payment must be transferred at the latest by the end of the Congress.
- d) Should there be other smaller conferences where ICIAM's name is to be used, a similar policy will be implemented.

The ICIAM Board, at its next meeting in São Paulo (Campinas), Brazil on Saturday, 7 May, 2016, will set the license fee for the Tenth Congress in 2023 (as a reminder, the license fee for ICIAM 2019 was set at USD 37,000). In addition the local expenses, including registration fee and travel expenses, of the five prize winners and the Olga Taussky-Todd lecturer, are to be covered by the Congress organizers.

### Timetable for applications

§1. The first of the rules below specifies that the preproposal should be submitted, in written form, to the ICIAM Board seven years in advance. In the present circumstances this is interpreted to mean that the pre-proposal should be submitted to the meeting of the Board in São Paulo (Campinas), Brazil on Saturday, 7 May, 2016. While applications submitted at the meeting itself will be admitted, the Officers request that if possible applications should be submitted to the ICIAM President, Maria J. Esteban, no later than 31 March, 2016. In this respect "written form" will be considered to allow submissions to be made via email.

At this stage the required amount of documentation is small, but do please note the requirement to specify both the location and a preliminary budget.

§2. The second of the rules below is expected to be interpreted by the meeting of the Board in São Paulo (Campinas), Brazil on Saturday, 7 May, 2016 in the following way:

> Some of those who submit an application as above will be invited to submit a more detailed application by 31 October, 2016. At this second stage it is important that a more detailed budget be presented, and that a Congress Director be nominated. This is a person who is willing and able to devote considerable time and effort to the project until the Congress in 2023. Past precedent suggests that the Board will also be expecting to see detailed consideration given to the question of how the expected high scientific level is to be achieved.

The early date for the detailed submission, namely the end of October, 2016, is to allow the Officers to arrange site visits to each of the remaining candidate sites, and for the reports of the site visits to be consolidated, before the Board meeting anticipated to be held in 2017. Of course no Officer who may be perceived to have a conflict of interest will take any part in the selection process.

The final decision on the site of the 2023 Congress will be made by the Board at its meeting in 2017.

Approved by ICIAM in Helsinki, May 2001 Distributed to member societies, December 2015. Maria J. Esteban President, ICIAM

# Rules concerning the application for an ICIAM congress

§1. An application for hosting and organizing an ICIAM congress should be submitted to the ICIAM Board seven years in advance. This application is to be submitted in written form and should propose a location and a budget outline.

- §2. Six years in advance a Congress Director should be nominated and a more detailed budget submitted. On the basis of this information the ICIAM Board will make its decision on the applicants.
- §3. Five years in advance the hosting society makes a proposal for the chair of the Scientific Program Committee (SPC) to the ICIAM Board which has the final say and appoints the SPC Chair at this time.
- §4. Four years in advance the SPC Chair submits to the ICIAM Board a proposal concerning the SPC members. Again, the final decision on the composition of the SPC is made by the ICIAM Board (four years in advance). Members of the SPC are individual members and cannot delegate this membership to other representatives. The SPC should be of reasonable size (15–20 members) and of exceptional scientific qualification. The member societies should be involved in the selection of SPC members.
- §5. Two and a quarter years in advance the ICIAM Board will approve/disapprove (not modify) the list of invited speakers submitted by the SPC. The invitations of the invited speakers should be signed by the Congress Director and the SPC Chair.
- §6. The organizers of ICIAM Congresses are urged to stick to the successful structure of previous ICIAM Congresses. At all these Congresses the scientific programme consisted of:
  - invited lectures;
  - minisymposia;
  - contributed presentations in lecture form; and
  - contributed presentations in poster form.

All types of presentations have to be included, all being weighted equally. Contributed papers have to be accepted to the extent practically possible (a factor to be considered in the choice of a conference venue).

In the composition of the minisymposia program the member societies, invited by the ICIAM President, are asked to take an active role. The SPC should make sure that all fields, especially those not covered by invited speakers, are represented at the ICIAM Congress and are of highest possible quality.

Approved by CICIAM in Sydney, 29 July 1997. Revised December 2003 to change 'CICIAM' to 'the ICIAM Board', and 'CICIAM Chair' to 'ICIAM President'. Reinhard Mennicken ICIAM Board





# **INTERNATIONAL CONFERENCE**

# On

# The Occasion of Silver Jubilee of the Indian Society of Industrial and

# **Applied Mathematics (ISIAM)**

Sharda University

Knowledge Park- 3, Greater Noida, UP (Delhi NCR), India 29-31 January, 2016

### FOCUS AREAS

- 1. Image processing with special focus on Medical Imaging, Biometrics and Tomography.
- 2. Wavelet Methods for Problems of Engineering and Science including Medical Science and Social Science.
- 3. Mathematical Methods, Models and Algorithms for Atmospheric Science, Industry, Finance and Nano-Technology.
- 4. Inverse Problems, Time Series Analysis, Data Mining.

### PATRONS

Prof. K.R. Sreenivasan Ex. Director ICTP, Trieste, Italy & currently senior functionary, New York University

Hon'ble Mr. P. K. Gupta Chancellor, Sharda University

Hon'ble Mr. Y. K. Gupta Pro Chancellor, Sharda University

**Prof. Vijay Gupta** Vice Chancellor, Sharda University



## **STEERING COMMITTEE**

#### **Prof. U. P. Singh** (Chairman Silver Jubilee Programme Committee of ISIAM)

Prof. H. P. Dikshit (Ex. President ISIAM)

Prof. N. K. Gupta (President ISIAM)

Prof. G. D. V. Gowda (Dean TIFR CAM Bengaluru)

**Prof. B. Bhattacharya** (Dean SBSR, Sharda University) **Prof. P. Manchanda** (Joint Coordinator Jubilee Programme Committee)

**Prof. A. H. Siddiqi** (Coordinator Jubilee Programme Committee)

# BROAD MATHEMATICAL AREAS

Approximation Theory, Analytic & Numerical Solution of Partial Differential Equations (PDE), Functional analysis and Harmonic Analysis.

For details see www.siam-india.in www.sharda.ac.in

## TENTATIVE LIST OF INVITED SPEAKERS INCLUDE

Prof. Barbara Keyfitz President ICIAM

**Prof. Maria J. Esteban** President elect ICIAM, France

Prof. A. Fitt Secretary ICIAM, UK

Prof. E. Candes Stanford Univ. USA

Prof. P. Kutchment Texas A & M, Univ. USA

Prof. L.Chua UC Berkeley, USA

# **CONTACT PERSONS:**

Prof. A. H. Siddiqi Mobile No. +91-9871069944 Email: siddiqiconference@gmail.com Prof. P. Manchanda Mobile No. +91-9815010067 Email: pmanch2k1@yahoo.co.in

Expected Support from NBHM, DST, CSIR, DRDO, INSA, ICTP and ICIAM

# Global change impact on diseases and alien species expansion A capacity building workshop supported by



AIMS, Cape Town, May 2-6 2016

#### **INTRODUCTION**

This international, interdisciplinary, educational and capacity building workshop will bring together the two subjects of infectious diseases and invasive species and the context of climate change, thus allowing sharing the methods and building partnerships. The workshop will address the whole range of topics, from field-work and collecting of data to the building and validating of models, to the adjustment of models to take into account the changing environment and the social characteristics, and to the design and implementation of strategies to fight infectious diseases and invasive species. This will be done through lectures, practical training and round table discussions. Special emphasis will be put on African diseases and invasive species, as well as the characteristics of changing environment in Africa.

The workshop is mostly aimed to young researchers and postgraduate students, with a majority coming from Africa. International experts from around the world will give the mini-courses and lectures and will lead the working groups. There will be a limited number of contributed talks and a poster session.

#### **GOALS OF THE CONFERENCE**

The main objectives of the workshop are to network communities coming from different backgrounds (biology, mathematical sciences, medicine, social sciences and global environment change) and different parts of the world, and having an interest in the study and control of epidemic diseases and invasive species, and to contribute to the training of young researchers.

An important feature of the workshop is its location in Africa, which unfortunately, is the centre of several pandemic diseases threatening not only the economy and social cohesion of the continent but also seriously affecting other parts of the world. Thus, central to the workshop is the participation of this new generation of young African scientists from different backgrounds, including doctoral students and female scientists, to expose them to modern cutting edge scientific techniques and methods in the field, to put them in contact with world leading experts in different relevant fields, and have them taking part in the interdisciplinary discussions.

This workshop, the first activity bringing together IMU, IUBS, IUIS, IUMS, ICIAM, ISSC, ecoHEALTH Alliance (Future Earth), ICSU ROA, ISB and UNESCO has the important objective of building a lasting collaboration and enriching expertise in the different organizations.

#### MAIN THEMES

- Epidemic diseases in the context of changing environment
- Invasive species in the context of changing environment
- Socio-economic adaptation to new epidemic diseases and invasive species

#### **APPLICATION**

 $\label{eq:website:http://www.aims.ac.za/en/research-centre/workshops-conferences/currentfuture/global-change-impact-on-diseases-and-alien-species-expansion} \\$ 

Applications: the website will be open for applications in October 2015. The workshop is planned for 50 participants. The participants from Africa will receive full funding.

#### **Scientific Committee**

Pablo Fernandez de ArroyabeHernaez (Spain, ISB), JacekBanasiak (South Africa, AIMS), YuryDgebuadze (Russia, IUBS), Charles Ebikeme (ISSC), Jorge Kalil (Brazil, IUMS), Mark Lewis (Canada), Jean Lubuma (South Africa), Alberto Martinelli (Italy, ISSC), Mariagrazia Pizza (Italy, IUMS), Mario Primicerio (Italy, ICIAM), Daya Reddy (South Africa, ICSU), Christiane Rousseau (Canada, IMU)

#### Organizers

JacekBanasiak (South Africa) <u>banasiak@ukn.ac.za</u> Christiane Rousseau (Canada) <u>rousseac@dms.umontreal.ca</u>

# Confirmed speakers and leaders of working groups

- <u>Peter Daszak</u> (medicine and disease ecology), University of Columbia, USA
- <u>Kristie Ebi</u> (environmental health), University of Washington, USA
- <u>Abba Gumel</u> (mathematics),Arizona State University, USA
- <u>John Hargrove</u> (biomathematics, epidemiology, insect physiology), Center of Excellence in Epidemiological Modelling and Analysis (SACEMA), South Africa
- <u>Mark Lewis</u> (mathematics), University of Alberta, Canada
- <u>Andrea Pugliese</u> (mathematical and theoretical population biology), University of Trento, Italy
- <u>Judith Omumbo</u> (epidemiology), African Academy of Science
- David Richardson (botany and zoology), University of Stellenbosch and Director of Centre for Invasion Biology, South Africa





# 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.

The Full Members and their representatives

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

**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): Shin'ichi Oishi and Hiroshi Kokubu

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

**MOS** (Mathematical Optimization Society): William (Bill) Cook

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

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

**SEMA** (Sociedad Española de Matematica Aplicada): Tomás Chacón Rebollo

**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

**SMAI** (Société de Mathématiques Appliquées et Industrielles): Fatiha Alabau-Boussouira and Alain Damlamian **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): Don McClure

**AWM** (Association for Women in Mathematics): Jill Pipher **ChinaMS** (Chinese Mathematical Society): Xiaoshan Gao **CMS-SMC** (Canadian Mathematical Society, Société Canadienne de Mathématiques): Elena Braverman

**CzechMS** (Czech Mathematical Society): Zdeněk Strakoš **DMV** (Deutsche Mathematiker-Vereinigung): Günther Leugering

EMS (European Mathematical Society): Franco Brezzi

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

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

**IMS** (Institute of Mathematical Statistics): Hans Rudolf Künsch

IMU (Israel Mathematical Union): Amy Novick-Cohen

**KMS** (Korean Mathematical Society): Yong Hoon Lee **LMS** (London Mathematical Society): Stephen Huggett

MSJ (Mathematical Society of Japan): Yoichi Miyaoka

**NMF** (Norwegian Mathematical Society): Elena Celledoni

ÖMG (Österreichische Mathematische Gesellschaft): Alexander Ostermann

**PTM** (Polskie Towarzystwo Matematyczne (Polish Mathematical Society)): Łukasz Stettner

**RSME** (Real Sociedad Matemática Española): María Elena Vázquez-Cendón

SingMS (Singapore Mathematical Society): Weizhu Bao

SMF (Société Mathématique de France): Bernard Helffer SMG-SMS (Schweizerische Mathematische Gesellschaft -

Société Mathématique Suisse - Swiss Mathematical Society): Jean-Paul Berrut SMM (Sociedad Matemática Mexicana): Maura Nuñez-

**SMM** (Sociedad Matemática Mexicana): Mayra Nuñez-Lopez

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

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

UMI (Unione Matematica Italiana): Pierangelo Marcati

The current officers of ICIAM

President: Maria J. Esteban, France

Past President: Barbara Lee Keyfitz, USA

Secretary: Sven Leyffer, USA

Treasurer: Jose Alberto Cuminato, Brazil

Members-at-Large: Taketomo (Tom) Mitsui, Japan and Volker Mehrmann, Germany

ICIAM Newsletter October 2015