ICIAM Dianoia. Volume 7, Issue 1-2 August 2019

The ICIAM Dianoia is now an online newsletter! This issue, which combines Issue 1 and Issue 2 of Volume 7, contains material from our backlog. Although some of the news is now out-of-date, it is included to provide and archive of ICIAM’s activities. In October, we plan to publish the remainder of Volume 7, including reports from ICIAM 2019. As this is the first publication in our new format, we are particularly interested in comments and suggestions. Please send them to Barbara Keyfitz (keyfitz.2@osu.edu).

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2019: an intense year for the ICIAM community

As I wrote some days ago in a letter sent to the presidents and representatives of all ICIAM member societies, 2019 will be very intense for the ICIAM community, as the ICIAM 2019 congress is approaching quickly. It will take place on July 15-19, in the beautiful city of Valencia, situated in the East coast of Spain. According to the congress organizers, the number of submissions for mini-symposia has reached a record, above the previous Vancouver and Beijing congresses. That shows the interest of the community to attend the congress and participate in its scientific program. Apart from the mini-symposia, we will have a beautiful series of invited talks, selected by a high-level international scientific committee, lead by A. Quarteroni. There will also be the Olga Taussky-Todd Lecture lecture delivered this time by F. Tisseur and the public lecture, by V. M. Pérez-Garcína, specialist of mathematical oncology. There will also be all the conferences organized within the SEMA and SIAM annual meetings, that will be embedded into the congress. The ICIAM prizes lectures will complete the scientific program, and I assume that there will also be prize lectures organized by SEMA and SIAM, corresponding to their prizes. All that certainly means a large number of very interesting talks. The complete program, that contains also an industry day and some round tables, can be consulted in the congress website.
The ICIAM congresses are the main activity of ICIAM, but other activities are taking place in a more continuous way, like, for instance, the sponsoring of conferences, the annual Board meetings and the workshops organized ahead of them. This year the ICIAM Board meeting will take place on July 20th, right after the end of the congress, and several important decisions will be made in it: first, the election of four Officers (the Secretary, the Treasurer and two officers at large) and after that, the choice of the Scientific Program committee (SPC) for the next congress (Tokyo, 2023), whose chair will be Professor Y. Nishiura. We will also be presented with a first report about the congress. As done in previous congress years, the day before the beginning of the congress, there will be a meeting of the presidents of member societies present in Valencia. This meeting is naturally less formal than the Board meeting, has no particular rules for its agenda, and the main goal is to discuss ICIAM matters of interest to every society, as well as to find possible new activities that could enrich the current list. That meeting will take place on July 14th. We are all excited about the coming congress and the possibility of meeting in Valencia so many of you.

Maria J. Esteban

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

Speaker Profiles: Invited Speakers at ICIAM 2019

The invited speakers at any ICIAM Congress are one of the highlights of the Congress. For the 2019 ICIAM Congress in Valencia, Spain, the 27 invited speakers were selected by the Scientific Program Committee, chaired by Professor Alfio Quarteroni. Brief biographies of all the speakers were published on the Congress website and in the Congress program. We publish this information in Dianoia for the information of the ICIAM Community. Speakers are listed here in the alphabetical order of their names.

Prof. Marsha Berger

Marsha Berger is a professor in the Computer Science Department of the Courant Institute of Mathematical Sciences, at New York University. Her research has focused on adaptive and Cartesian mesh methods for computational fluid dynamics. She is a SIAM (Society for Industrial and Applied Mathematics) Fellow and a member of both the US National Academy of Sciences and the US National Academy of Engineering. She is also a member of the Cart3D team that won NASA’s Software of the Year award in 2002 and IEEE’s Fernbach award in 2004. Marsha Berger is a winner
(along with Arkadi Nemirovski) of the 2019 Norbert Wiener Prize in Applied Mathematics (given by the American Mathematical Society and SIAM). Her prize citation reads, "for her fundamental contributions to adaptive mesh refinement (AMR) and to Cartesian mesh techniques for automating the simulation of compressible flows in complex geometry." Marsha earned her M.S and Ph.D. at Stanford University.

Prof. Alfredo Bermúdez de Castro Alfredo Bermúdez de Castro (A Coruña, Spain, 1950) is a Professor of Applied Mathematics at the University of Santiago de Compostela (USC) and coordinator of the Research Group in Mathematical Engineering (mat+i) since 1986. He has been a key figure in the development of Applied Mathematics in Spain for the past 40 years, with internationally recognized achievements related to computational methods and their application to industrial problems. His activity spans fluid and solid mechanics, combustion, electromagnetism, acoustics, metallurgy, environment, chemical kinetics, finance, noise control theory and optimization. He was the founding member and former Vice President of the Spanish Society of Applied Mathematics (SEMA), and one of the founding members of the Technological Institute for Industrial Mathematics (ITMATI). He is a member of the Spanish Royal Academy of Sciences, co-chairman of the Scientific Committee at the Basque Center of Applied Mathematics (BCAM) and Honorary member of the European Consortium for Mathematics in Industry (ECMI).

Prof. Peter Bühlmann Bühlmann is Professor of Mathematics and Statistics at ETH Zurich, where he was Chair of the Department of Mathematics from 2013-2017. He studied mathematics at ETH Zurich where he received his doctoral degree in 1993. He was a Postdoctoral Research Fellow in 1994-1995 and a Neyman Assistant Professor from 1995-1997 at UC Berkeley. His main research interests are in high-dimensional and computational statistics, machine learning, causal inference and applications in the bio-medical field. He is a founding member of the Max Planck ETH Center for Learning Systems and a member of the Competence Center for Personalized Medicine (University of Zürich and ETH Zürich). He is a Fellow of the Institute of Mathematical Statistics and of the American Statistical Association, a winner of the Guy Medal in Silver of the Royal Statistical Society, and was an invited speaker at the 2018 ICM in Rio de Janeiro. In 2012, he won the Golden Tricycle Award for the most family-friendly supervisor, at ETH Zürich.

Prof. Carlos Conca Carlos Conca is Professor at the University of Chile and Researcher at the CMM (Center for Mathematical Modeling) in Chile. He holds a Docteur d'Etat degree in Mathematical Sciences from the University Pierre et Marie Curie, where he worked with Jacques Louis Lions. His research area is mathematical mechanics and inverse problems. He pioneered the development of applied mathematics in Chile, for which he was awarded a Presidential Chair in Sciences by the President of the Chilean Republic in 1996, and the National Award of Exact Sciences by the Ministry of Education in 2003. Beyond mathematical theory, his research encompasses phenomena in processes of industrial origin. Mathematical models he proposed at the beginning of the 1980's gave useful answers to questions from the company "Electricité de France" on tubular nuclear reactors. In Chile, he has fostered a fruitful relationship with the mining company CODELCO Chile (National Copper Corporation of Chile) for more than 30 years. Carlos Concas's ideas have led both to developments in pure and applied mathematics and to technological innovations.
Prof. Wolfgang Dahmen

Wolfgang Dahmen is the SmartState and Williams-Hedberg-Hedberg Chair in Mathematics at the University of South Carolina, USA. His research interests are in Approximation Theory, Numerical, Applied and Harmonic Analysis as well as interdisciplinary applications. Together with his collaborators he has developed adaptive and nonlinear solution concepts in a variety of contexts such as image and data analysis, machine learning, the numerical solution of singular integral and partial differential equations, and model reduction. Professor Dahmen received his PhD from RWTH Aachen in 1976 and his Habilitation from the University of Bonn. After an IBM Postdoctoral Fellowship, he held positions at the University of Bielefeld, the Free University of Berlin and RWTH Aachen, where he held a Distinguished RWTH Professorship before joining the University of South Carolina in 2017. He has received the Gottfried-Wilhelm-Leibniz Award of the German Research Foundation, and was elected to the German National Academy of Sciences, Leopoldina. Among many other distinctions, he has been Chair of the Board of Directors of the Society Foundations of Computational Mathematics.

Prof. Hans De Sterck

Hans De Sterck has returned to the University of Waterloo, Canada, where he is Professor of Applied Mathematics, after being head of the Applied Mathematics Section at the School of Mathematical Sciences of Monash University in Melbourne, Australia since 2015. He studied at the University of Leuven, Belgium, and held postdoctoral positions at the von Karman Institute in Belgium, and the University of Colorado, USA. His main area of research is high-performance numerical methods for computational science and data science. His research includes multilevel methods for linear systems and Markov chains, high-order accurate methods for nonlinear systems of hyperbolic PDEs, and nonlinearly preconditioned optimization methods for tensor decompositions, with applications ranging from parallel computational fluid dynamics to big data processing and computational social science. Professor De Sterck's professional activities include Chair of the SIAM activity group on Computational Science and Engineering (2017-2018) and Vice-Chair of the SIAM activity group on Data Mining and Analytics (2018-2019).

Prof. Leah Edelstein-Keshet

Leah Keshet obtained her BS and MS from Dalhousie University, Canada, and her PhD from the Weizmann Institute of Science, Israel, in 1982 under the supervision of L. A. Segel. She held postdoctoral appointments at Brown and Duke Universities in the USA before moving to her current position at the University of British Columbia, Canada. Her research focuses on mathematical models in biology, at macroscopic, cellular and sub-cellular levels. Leah was the first woman president of the Society for Mathematical Biology (SMB). She has won the Krieger-Nelson Prize of the Canadian Mathematical Society (CMS) for outstanding research by a female mathematician, and the Research Prize of the Canadian Applied and Industrial Mathematics Society, CAIMS. She has been selected as a Fellow of SIAM and of SMB. Besides ICIAM, Leah has been an invited plenary speaker at many conferences, including SIAM Life Sciences, CMS, Royal Society, ANZIAM, CAIMS, and ESTMB. In 2016, the SMB initiated the Leah Edelstein-Keshet Prize to recognize women, both junior and senior, who have made outstanding research contributions to mathematical biology.

Prof. Isabelle Gallagher

Isabelle Gallagher is Professor of Mathematics at Paris-Diderot University and at the Ecole Normale Supérieure of Paris. She earned her PhD from Pierre and Marie Curie University, and worked at the Centre Nationale de la Recherche Scientifique (CNRS) before assuming her current position. Her principal research concerns the mathematical analysis of Partial Differential Equations related to Fluid Mechanics, through two different points of view. First, she examines reconciling the derivation of macroscopic PDE with Newton’s laws for classical particles constituting the microscopic description of fluids. In addition, she
studies long-standing open questions concerning the behavior of smooth solutions to the Navier-Stokes equations associated with smooth initial data in three space dimensions, and solving these equations globally for general initial data. She was an invited speaker at ICM 2014 and ECM 2012, and the recipient Paul Doistau–Émile Blutet Prize of the French Academy of Sciences in 2008, and of the CNRS Silver Medal in 2016.

Prof. Omar Ghattas

Omar Ghattas is the John A. and Katherine G. Jackson Chair in Computational Geosciences, Professor of Geological Sciences and Mechanical Engineering, and Director of the Center for Computational Geosciences in the Institute for Computational Engineering and Sciences (ICES) at The University of Texas at Austin. He is also a member of the faculty in the Computational Science, Engineering, and Mathematics (CSEM) interdisciplinary PhD program in ICES, and holds courtesy appointments in Computer Science and Biomedical Engineering. Prior to coming to UT-Austin in 2005, he was a professor at Carnegie Mellon University. He earned BS, MS, and PhD degrees from Duke University. Ghattas's research interests include simulation and modeling of complex geophysical, mechanical, and biological systems on supercomputers, with specific interest in inverse problems and associated uncertainty quantification for large-scale systems. Among his honors are the ACM Gordon Bell Prize in 2003 (for Special Achievement) and again in 2015 (for Scalability); and the 1998 Allen Newell Medal for Research Excellence. He is a Fellow of the Society for Industrial and Applied Mathematics (SIAM).

Prof. Donald Goldfarb

Donald Goldfarb is the Avanessians Professor of Industrial Engineering and Operations Research at Columbia University. He is internationally recognized for the development and analysis of efficient and practical algorithms for solving various classes of optimization problems, including the BFGS (Broyden-Fletcher-Goldfarb-Shanno) quasi-Newton method for unconstrained optimization, steepest-edge simplex algorithms for linear programming, and the Goldfarb-Idnani algorithm for convex quadratic programming. After obtaining a PhD degree from Princeton, Goldfarb spent two years as a postdoctoral fellow at the Courant Institute. He co-founded the Computer Science Department at the City College of New York before joining Columbia University. Goldfarb is a Fellow of SIAM. He was awarded the INFORMS John Von Neumann Theory Prize in 2017, the Khachiyan Prize in 2013, the INFORMS Prize for Research Excellence in the Interface between OR and CS in 1995, and was listed in The World's Most Influential Scientific Minds, 2014, as being among the 99 most cited mathematicians between 2002 and 2012.

Dr. Thomas A. Grandine

Thomas Grandine is a Senior Technical Fellow of The Boeing Company, one of the world's premier aerospace companies, where he has worked for the past 32 years. He received a B.S. degree from Yale University in 1981, and attended graduate school at The University of Wisconsin, studying mathematics and computer science and earning masters degrees in each on his way to a Ph.D. in numerical analysis as a student of Carl de Boor. His areas of expertise include advanced geometric design, curve and surface modeling, numerical approximation, splines, and multidisciplinary design optimization. He has extensive experience in computational methods for both design and manufacturing applications. In addition to a long publication record, he holds a number of patents. He is a Fellow of the Society for Industrial and Applied Mathematics, where his involvement includes six years as Vice President for Industry. He is currently a member of the Board of Trustees of SIAM.
Prof. Nicholas Higham
Nicholas Higham is Royal Society Research Professor and Richardson Professor of Applied Mathematics at the University of Manchester. His degrees are from the University of Manchester, and he has held visiting positions at Cornell University and the Institute for Mathematics and its Applications, University of Minnesota. His research is in numerical linear algebra and ranges from theory to the development of algorithms and software, with a focus on accuracy and stability. His book “Functions of Matrices: Theory and Computation” (SIAM, 2008) was the first research monograph on matrix functions and he is editor of the “Princeton Companion to Applied Mathematics” (2015). Professor Higham's honors include the Alston S. Householder Award, the Leslie Fox Prize in Numerical Analysis, a Junior Whitehead Prize from the London Mathematical Society, and the Fröhlich Prize of the London Mathematical Society. He is a Fellow of the Royal Society, a SIAM Fellow, and a Member of Academia Europaea, and has just completed a term as President of SIAM, 2017-2018.

Prof. Yunqing Huang
Yunqing Huang is a professor of mathematics at Xiangtan University. He obtained his PhD degree from the Chinese Academy of Sciences, and started his career with high accuracy analysis of finite element methods, investigating such properties as superconvergence, extrapolation, postprocessing, and a posteriori estimates. Another of Professor Huang's research directions is the finite element analysis of electromagnetic fields in metamaterials. He and coauthors obtained optimal error estimates and superconvergence for various models. They have also worked on modeling and simulations on backward wave propagation and electromagnetic cloaking. Professor Huang's awards include the Feng Kang Scientific Computing Award, the First Class Natural Science Award of the Ministry of Education, the First Class Natural Science Award of Hunan Province, and the Second Class National Award in Teaching Achievements. He is also the Chief Editor of AAMM (Advances in Applied Mathematics and Mechanics), and recipient of the National Science Fund for Distinguished Young Scholars.

Dr. Kristin Lauter
Kristin Estella Lauter a Principal Researcher and Research Manager of the Cryptography Group at Microsoft Research in Redmond, Washington. Lauter received her BA, MS, and Ph.D degrees in mathematics from the University of Chicago. Prior to joining Microsoft, she held positions as a visiting scholar at Max Planck Institut fur Mathematik in Bonn, Germany, T.H. Hildebrandt Research Assistant Professor at the University of Michigan, and a visiting researcher at Institut de Mathematiques Luminy in France (1999). Lauter's research areas are number theory, algebraic geometry, and applications to cryptography. She is particularly known for her work on homomorphic encryption, elliptic curve cryptography, and for introducing supersingular isogeny graphs as a hard problem into cryptography. Lauter is a recipient of the Selfridge Prize and is a Fellow of the American Mathematical Society and of the Association for Women in Mathematics. Lauter is the 2018-2020 Polya Lecturer for the Mathematical Association of America. She served as President of the Association for Women in Mathematics from 2015 –2017.

Prof. Claude Le Bris
Claude Le Bris is Civil Engineer-General and Research Scientist at the École des Ponts, Paris, as well as scientific leader of the MATHERIALS research team at Inria. After graduating from Ecole Polytechnique, he earned his PhD under the supervision of Pierre-Louis Lions. His research has focused on mathematical analysis and numerical methods for partial differential equations, with contributions in several areas including the mathematics of computational chemistry and physics, multiscale problems and homogenization theory. Le Bris' list of honors includes the Blaise Pascal Prize from the French Academy of Sciences and the Giovanni Sacchi-Landriani Prize from the Lombard Academy of Arts and Sciences. He gave an invited lecture at the ICM, Madrid 2006. He has
been a Distinguished Ordway Visitor at the University of Minnesota, an Aisenstadt Chair at the Université de Montréal, Charles J. Amick Memorial Lecturer at the University of Chicago, Göran Gustafsson lecturer in Mathematics at KTH Stockholm, and Coxeter lecturer at the Fields Institute, Toronto.

Prof. Ruo Li
Ruo Li was educated at Peking University, where he received a PhD in computational mathematics under P.-W. Zhang. After graduation and a postdoctoral fellowship at the University of Kent, UK, he moved back to Peking University as a faculty member. He has been a visitor at Caltech, Hong Kong Baptist University and Hong Kong University of Science and Technology. He now serves as the associate dean of the School of Mathematical Sciences at Peking University. His research focus is numerical methods for partial differential equation, particularly numerical methods for fluid dynamics, including discontinuous Galerkin methods for eigenvalue problems, and patch reconstruction tools. Some of Li's other research topics include stochastic Galerkin methods for uncertainty quantification, compressible two-phase flows and kinetic theory. He is also known for work on level-set methods and nearly-singular solutions of Euler and Navier-Stokes equations. He is the faculty advisor for the Peking University student chapter of SIAM.

Prof. Kazue Sako
Kazue Sako is a Distinguished Researcher in the Security Research Labs of the NEC Corporation, where she has worked since 1986. She earned a BS in Mathematics and a PhD in Engineering from Kyoto University, and also lectures at the Tokyo Institute of Technology. In her career path at NEC, she rose through positions as Researcher, Principal Researcher, Research Fellow, Innovation Producer and Senior Engineer before assuming her present position. Her research area is cryptography, and she works on protocols for creating "a safe, secure, and fair society", currently focusing on the application of blockchain technology, used in Bitcoin cryptocurrency, to other fields, with the objective of making a safer society. Her research includes cryptographic protocols for such applications as electronic voting, auction, lottery, and anonymous authentication. Dr. Sako is a member of the Science Council of Japan, and is the current President of JSIAM, as well as Vice President of the Institute of Electronics, Information and Communication Engineers. Her research publications have won several awards from IPSJ, the Information Processing Society of Japan.

Prof. Sylvia Serfaty
Sylvia Serfaty is Silver Professor at the Courant Institute of Mathematical Sciences of New York University. She earned her BS and MS in Mathematics from the École Normale Supérieure in Paris, and her PhD from Université Paris Sud. Her previous positions include appointments at Université Pierre et Marie Curie, and the Ecole Normale Superiore de Cachan. She works in calculus of variations, nonlinear partial differential equations, and mathematical physics. A large part of her work has focused on the Ginzburg-Landau model of superconductivity and on understanding why and when vortices form triangular lattices. She has more recently turned her attention to questions of statistical mechanics of systems with Coulomb-type repulsion, also arising in approximation theory and random matrices, and which turn out to be generalizations of the questions addressed for the behavior vortices in superconductors. She was a plenary speaker at the ICM Rio in 2018, and is the recipient of the EMS and Henri Poincaré prizes, and of the Grand prix Mergier Bourdeix of the French Academy of Sciences.
Prof. James Sethian

James Sethian is Professor of Mathematics at the University of California at Berkeley and is the Director of the Center for Advanced Mathematics for Energy Research Applications (CAMERA) at the Lawrence Berkeley National Laboratory, which develops new mathematical and computational techniques for analyzing data that come from synchrotron light sources. Sethian's research has been focused on computational methods for moving interfaces in fluids and materials, and has applied these techniques to a host of scientific and engineering problems, including applications to fluid mixing, semiconductor modeling, wave propagation in materials, industrial jetting and printing devices, image processing, combustion modeling, and industrial foams. He is a fellow of SIAM and of the AMS, is a member of both the US National Academy of Sciences and the US National Academy of Engineering, has received the ICIAM Pioneer Prize and the joint SIAM-AMS Wiener Prize, and was a plenary speaker at ICIAM in 1999. He received his PhD from the University of California at Berkeley, and B.A. from Princeton University.

Prof. Panagiotis Souganides

Panagiotis Souganides is the Charles H Swift Distinguished Service Professor of Mathematics at the University of Chicago, USA. Following his PhD at the University of Wisconsin and a postdoctoral position at the University of Minnesota, he served on the faculty of Brown University, the University of Wisconsin and the University of Texas before joining the University of Chicago in 2008. His research area is Partial Differential Equations, where he has been one of the developers of the theory of homogenization and stochastic methods. He has made contributions to phase transitions and evolution of interfaces, microscopic limits of particle systems, turbulent combustion, stochastic homogenization, stochastic partial differential equations, and equations on graphs. In 1994, he gave an invited lecture at the ICM in Zurich, and in 2009 he received the Medal of the College de France. He has served on the Board of Governors of the (Minnesota) Institute for Mathematics and its Applications, and on the Council of the American Mathematical Society. In 2017 he was elected a member of the European Academy of Sciences.

Prof. Hiroshi Suito

Hiroshi Suito is a professor and principal investigator at the Mathematical Science Group of Advanced Institute for Materials Research, Tohoku University, Japan. His main research fields are applied mathematics and numerical simulations, which he has used to address widely diverse problems. After working as an engineer at COMCO and a research scientist at Institute of Computational Fluid Dynamics, Co. Ltd, Hiroshi Suito obtained his PhD degree from Chiba University. He has served on the faculty of Chiba University and also Okayama University. Through the Japan Science and Technology Agency (JST) Mathematics Program "Alliance for Breakthrough between Mathematics and Sciences", he worked closely with medical doctors on such problems as biological flows, and medical image diagnosis. Professor Suito has also applied mathematical modeling and numerical simulation to resolving environmental issues of air and water flows. He was awarded the Grand Prize of the Second H. Fujiwara Mathematical Science Award in 2013.

Prof. Eitan Tadmor

Eitan Tadmor is a Distinguished University Professor at the University of Maryland, College Park (UMd). He earned his PhD from Tel Aviv University, held a postdoctoral fellowship at CalTech, and then served on the faculty and Tel Aviv University and UCLA before being recruited to lead the University of Maryland Center for Scientific Computation and Math Modeling. Tadmor's research centers on the interplay between analytical theories and computational algorithms with diverse applications to shock waves, kinetic transport, incompressible flows, image processing, and self-organized dynamics. His contributions to the development of high-resolution methods include introducing the class of central schemes, of entropy conservative schemes and the spectral viscosity
method for nonlinear conservation laws. He is also known for multi-scale hierarchical decompositions for solving ill-posed inverse problems in image processing. Tadmor delivered an invited lecture at the ICM 2002 Beijing; he is a Fellow of the AMS, and a recipient of the SIAM-ETH Henrici prize.

Prof. Anna-Karin Tornberg
Anna-Karin Tornberg is a professor of Numerical Analysis at KTH, Sweden. Her research concerns the development of numerical methods for the solution of partial differential equations. One specific focus is on boundary integral methods for fluid flows involving particles and drops. Professor Tornberg earned her PhD in Numerical Analysis at KTH, and held postdoctoral positions there and at the Courant Institute, NYU, USA. She also served on the faculty at NYU before returning to KTH. Among her honors are the Leslie Fox First Prize in Numerical Analysis, the Carl-Axel Froberg Prize, and the Göran Gustafsson prize in Mathematics, where she was the first woman to receive the prize in mathematics. She is an elected member both of the Swedish Royal Academy of Sciences of the Swedish Royal Academy of Engineering Sciences. Earlier awards include the selection as an Alfred P. Sloan research fellow (2006) while Prof. Tornberg was part of the faculty at the Courant Institute of Mathematical Sciences (New York University). She was an invited speaker at a SIAM annual meeting, at SciCADE and at the ICM Rio de Janeiro 2018.

Prof. Marcelo Viana
Marcelo Viana is a professor of mathematics and is currently the director of the Instituto de Matemática Pura e Aplicada (IMPA), in Rio de Janeiro. His undergraduate degree is from the University of Porto, Portugal, and his doctoral degree from IMPA. His research interests cover several areas of dynamical systems, ergodic theory and bifurcation theory, including regularity of Lyapunov exponents, intermittency and strange attractors. Viana's academic distinctions include the Ramanujan Prize and the Grand Prix Scientifique Louis D. awarded by the Institut de France, and the National Order of Scientific Merit (Brazil). He is a member of the Brazilian Academy of Sciences, and a Corresponding Member of the Portuguese and of the Chilean Academies of Sciences. He has been a plenary speaker at the International Congress of Mathematical Physics, the International Congress of Mathematicians and the Latin American Congress of Mathematicians. Viana served as vice-president of the International Mathematical Union, and chaired the organization of the International Congress of Mathematicians in Rio de Janeiro in 2018.

Prof. Xiao-Ping Wang
Xiaoping Wang received his BSc degree in mathematics from Peking University and his PhD degree in mathematics from Courant Institute, NYU, USA. He was a postdoctoral fellow at MSRI, Berkeley and at the University of Colorado, Boulder, as well as a visitor at the Program in Applied and Computational Mathematics, Princeton University before he came to the Hong Kong University of Science and Technology (HKUST). Prof. Wang is currently Chair Professor of mathematics and the department head at HKUST, and is the Director of the Croucher Laboratory on Multi-scale Modelling and Computation. Professor Wang's contributions include adaptive methods for singular problems; his current research interests span modeling and simulation of interface problems and multiphase flow; numerical methods for micromagnetic simulation; and thresholding in image segmentation. He has received the Feng Kang Prize of Scientific Computing of the Chinese Academy of Sciences, and was a plenary speaker at the SIAM Conference on Mathematical Aspects of Materials Science in 2015.
Prof. J.A.C. Weideman  
JAC (André) 
Weideman is Professor of Applied Mathematics at Stellenbosch University in South Africa. He was born in Bloemfontein, South Africa, and educated at the University of the Orange Free State (UOFS) in the same city. Before moving to Stellenbosch and taking up his current position, he occupied academic positions at the UOFS, at MIT, and at Oregon State University, USA. Professor Weideman’s research focuses on computational results for classical (and less classical) equations of applied mathematics. Among Weideman’s most cited research is an early paper on the numerical solution of the nonlinear Schrödinger equation, and mid-career papers on software for spectral methods for differential equations as well as an algorithm for the computation of the complex error function. His recent interests include the numerical inversion of the Laplace transform, contour integral methods for partial differential equations, and the computation of the Painlevé transcendent in the complex plane. Weideman is associate editor of Numerical Algorithms and Electronic Transactions of Numerical Analysis, and is Fellow of SIAM.

Prof. Karen E. Willcox  
Karen E. Willcox is Director of the Institute for Computational Engineering and Sciences (ICES) and a Professor of Aerospace Engineering and Engineering Mechanics, at the University of Texas at Austin. She holds the W. A. “Tex” Moncrief, Jr. Chair in Simulation-Based Engineering and Sciences and the Peter O'Donnell, Jr. Centennial Chair in Computing Systems. Willcox holds a Bachelor of Engineering Degree from the University of Auckland, New Zealand, and masters and PhD degrees from MIT. Before joining ICES, she was Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology and Co-Director of the MIT Center for Computational Engineering. Prior to joining the MIT faculty, she worked at Boeing Phantom Works. Her research has produced scalable computational methods for design of next-generation engineered systems, with a particular focus on model reduction as a way to learn principled approximations from data and on multi-fidelity formulations to leverage multiple sources of uncertain information. Willcox is Fellow of SIAM, an Associate Fellow of AIAA, and a Member of the New Zealand Order of Merit.

How to Propose to Host an ICIAM Board Meeting

ICIAM (the Council) holds a Board Meeting every year, generally in May, except for Congress years (year 3 mod 4) when the meeting takes place immediately following the Congress, at a location near the Congress venue. In the other three years of the four-year cycle, the Council seeks a member society to host the meeting. The invitation
below was formulated for the 2020 meeting to encourage potential hosts to apply by clarifying what is involved in such an effort. It has been reworded for a generic (non-Congress-year) Board meeting.

Thank you for considering hosting the <year N> ICIAM Board Meeting. This form provides some background information on what is typically involved. Please provide short answers to each question below and submit this information to secretary@iciam.org (mailto:secretary@iciam.org) at least two days before the <year N-1> ICIAM Board Meeting. We will use this information to decide the location of the next Board Meeting.

**Background.** The ICIAM Board Meeting is a full-day meeting that is preceded by a two-day workshop on industrial and applied mathematics (apart from its scientific content and networking opportunities, the workshop allows member delegates to get travel expenses reimbursed from their grants). The hosting society is responsible for the following costs: (1) the creation of a website for registration of delegates and (if necessary) letters of invitation for visa purposes; (2) meeting rooms and AV equipment for the workshop; (3) the meeting room for the Board meeting for 40-50 delegates; (4) a working (buffet?) lunch for the Board meeting. Not required, but recommended, is a dinner following the Board meeting to allow delegates to continue discussions and socialize. Financial support for workshop speakers who request assistance would also be appreciated, but is not required (the level or existence of support is left to the discretion of the local organizers).

In order to allow the Board to evaluate your proposal, please complete the information below. Please note that the Board will also consider other aspects in its decision such as geographical diversification and ease of access to Board Meetings.

**Location:**

**Proposed Date:**

**Briefly list your previous organizational experience:**

**Describe theme, and layout (session format, local participation) of the Workshop:**

**Briefly describe the layout of the facilities and support provided for the Meeting:**

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**Interview by Roberto Natalini with Giulia Di Nunno, 2019 Su Buchin Prize Winner**
Natalini: How did you decide to become a mathematician? What has been the influence of your parents?

Di Nunno: Still during the last year of high-school I did not have clear ideas of what my path could be. I have always been eclectic with interests and I was attracted by very different fields and directions. Of course, I was discussing with my parents, but they have always given the same happy advice: whatever you choose, choose because you like it and you think you will be happy! So, this was it. I remember I was traveling from Milan to Paris for pleasure and, while on the train, I was studying the various university brochures. Well, when I came to the one in mathematics, I got trapped. Not because it was fancy, actually the least marketing orientated of all the pamphlets, not because it was revealing well what all it was about, actually the format was quite dry, but it was hinting towards mathematics as the common element of all I was attracted to. So, there it was. Decision made.

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

Di Nunno: Surely my parents have played a very important role. One is a linguist who taught me to be open to all diversities of minds and languages. She did recognise mathematics as a language in itself, thus worth studying. The other is an economist with a passion for history and archaeology, used at logical deductions, beauty, and search for truth. Together with my sister they have been always very supportive. Some of my teachers in mathematics were presenting the subject in a nice way, without hiding the important critical points, but tackling them directly in a true yet sometimes entertaining way. I’m still in contact with some of them. Last but not least, the headteacher at my high-school, though specialised in literature and classical languages, she was a tough lady who introduced the study of advanced mathematics and physics at an earlier stage in an experimental program. She was an example of someone visionary enough to be able to anticipate her times and persistent to build projects and programmes from scratch. It is probably the program she designed that bought me closer to sciences.

Natalini: Why did you decide to leave your country to live in Norway?

Di Nunno: Well, that was not really planned as such. I first visited Norway after an invitation to give a seminar there. That was during my PhD studies. Then a research collaboration started and I visited Oslo for a longer period. It has always been very pleasant to stay there. So, when the time came to make applications for jobs, I did apply to several posts in Italy and in Europe, which I had visited and not. Finally, the position in Oslo turned out to be very appealing. So, I got started without any plans for how long I would stay. But I liked it, and I still do.

Natalini: Being a woman has been a problem for choosing mathematics as a profession? And in your career?

Di Nunno: I have never thought that any profession was not possible for women. That's the way I was brought up and the environment I’ve been growing in. It was only much later, during PhD studies, that I actually realised that not many women were around and that it would have been better to have more. In general, I have always found myself well in the working environment I visited. Though I must admit that there are some exceptions, where there is still much of a disbelief when a woman is introduced as a full professor. It seems that this is due to a prevailing social belief with substantially more rigid gender roles and expectations, that leads to thinking that women are not as capable as men in mathematics and science. It takes strong efforts at many levels to change this.

Natalini: What have been your main directions in research? Why did you choose these directions?

Di Nunno: I’m working in stochastic analysis, which is using both techniques of analysis and of probability. After the fundamental contribution of Kiyosi Itô in the 40s, the area has grown impressively, becoming an independent field of mathematics, with a frantic development during the last fifty years, in view of the many applications to economics,
biology, and natural sciences. Indeed, stochastic analysis is all about the mathematics for the time development of phenomena driven by chaos. Within the field I have worked mostly in stochastic calculus, studying the role of information in the different integrals and stochastic differentiation. I have applied my work in optimisation problems generated by finance and economics. The choice of the field came out gradually already at university, where I had chosen at first the direction of analysis. However, I included a course in stochastic processes, which really fascinated me, so I decided to shift direction and entered the world of probability. I came to appreciate the power of probability and analysis joined together already with the work on my master thesis, then I continued further.

Natalini: What is your best achievement in research? Could you explain in layman's terms its meaning?

Di Nunno: One of my early results that I really do appreciate still and that is easy to explain is the introduction of the non-anticipating stochastic derivative. Indeed, stochastic differentiation is such a recent invention compared to the concept of differentiation in analysis. To explain, one has to think that a stochastic process has in general not differentiable paths. Thus there is no chance to translate the classical concept of differentiation to stochastic processes. In fact, even the stochastic integral (Itô integral) is defined as a class of functions. Then the non-anticipating derivative is introduced as a formula that gives the integrand under the integral sign. As an operator, it turns out to be the dual of the Itô integral. Differently from other types of derivatives, the non-anticipating derivative is well-defined for the very large class of integrators called martingales. As for its use in applications, let me give an example coming from the hedging of financial risks. If one has taken up a risk at some future time, for example the uncertain outcome of a financial position, then one would like to find a hedging strategy allowing to come as close as possible to this risk value, so to be able to minimise the exposure to risk. Well, the non-anticipating derivative helps to describe such optimal hedging strategy, when the minimisation or risk is set in terms of variance.

Natalini: Recently, you have been awarded with the ICIAM Su Buchin Prize, which is intended to provide international recognition of an outstanding contribution by an individual in the application of Mathematics to emerging economies and human development, in particular at the economic and cultural level in developing countries. Could you explain what kind of activities have you pursued to deserve this Prize?

Di Nunno: My activities in the developing countries have been substantially concentrated in Africa. I have been involved in different projects mostly related to capacity building in the academic institutions and dealing with the quality of the education and research programs at university. I have been visiting several countries of this beautiful continent both within the framework of some project and also on direct invitation by some colleagues there. So, I have been holding courses and supervising students at different African Universities. In 2011 I was appointed as member first and then chair of the Committee for Developing Countries of the European Mathematical Society. During these eight years, the committee has put up a series of activities to promote the quality and the visibility of those centres in developing areas that are doing outstanding work in research and in the education of students within their country and also at international level. We have started the so-called ERCE Emerging Regional Centres of Excellence label, which is a recognition given by the EMS to these centres. Still with this committee we have worked for a program, with Simons Foundation funding, supporting the development of the individual academic path of African researchers, with particular attention to younger researchers and female scientists. These are still running programs. At present, I am involved in different ways in the international organisation CIMPA – Centre International des Mathematiques Pures et Appliqueés and in the Swedish, ISP – International Science Programme.

Natalini: Why have you started to be concerned with the education of young African mathematicians?
Di Nunno: When I moved to Norway, the Department of Mathematics was already heavily engaged in a Norwegian funded program in capacity building directed by my colleague Bernt Øksendal. I liked the program and I started taking an active part by supervising some master students from Zimbabwe. This program brought me to meet many mathematicians working in the Southern African region, opening up for further new joint collaborations. Some of the students that took part to that first Norwegian program are now having fixed academic positions. We have then started other programs, the last of which was based in Dar-es-Salam, Tanzania. One nice common aspect of all these programs is that they were involving a network of African countries, thus promoting collaboration within African institutions, while at the same time, they were based and substantially run by the hosting institution.

Natalini: What are the main necessities, according to your experience, to improve the economical and cultural situations in Africa?

Di Nunno: The question is broad and difficult. First of all, we have to pay attention to the fact that Africa is not one country, but many and very different economically and culturally from each other. So, necessities are different and with different urgency. At a general level and from an academic perspective, I can say that there is often a problem of capacity in terms of variety of fields represented at each institution and also of level of mathematical research carried out. There are countries where brain drain is systematic, countries that are largely populated and the efforts of few individuals seem never enough, there are countries so vast that the universities have campuses thousands of kilometres away from each other with logistic challenges. I’m talking about academics, because from a development perspective one should not underestimate the importance of its development. Indeed, I see the possibility that each country has to educate one’s own leaders at the highest level as the guarantee of the long-lasting self-standing success of any other development program. To explain with an example, all the efforts put in urgent health programs in the more remote areas, in clean water say, may have little impact in few years if the country leaders and local investors do not have the ability of analysing, evaluating, quantifying, designing, building, maintaining, the clean water pipe grid of extraction, filtering, and distribution. As we know mathematics is crucial in many theoretical and applied areas. Human resources in terms of expertise is an investment for all countries. So much valid for African countries as well.

Natalini: How do you balance your commitment in Africa with your academic life?

Di Nunno: It takes some good planning indeed, particularly when it comes to travelling. However, the good thing about mathematics is that one can do it everywhere.

Natalini: Finally, a last general question. What do you wish for Mathematics, and in particular for African Mathematics in 2019?

Di Nunno: To be rich, deep, varied, and visible.

Roberto Natalini

Roberto Natalini received his PhD in Mathematics from the University of Bordeaux (France) in 1986. He has been director of the Istituto per le Applicazioni del Calcolo “Mauro Picone” of the National Research Council of Italy since 2014.
The Florilege of the Popularization of Mathematics

Some months ago a new website was born in France related to the popularization of mathematics; it is called the Florilège de la popularisation des mathématiques; its address is https://www.florilege-maths.fr/ and its main aim is to inform about all actions and activities concerning the popularization of mathematics having taken place in France, or in French-speaking countries, in the past, present, and, as time goes on, in the future.

The idea behind the creation of the Florilège was that it would be a shame to lose the rich memory of everything that has been done in the past, about the authors and the places and about so many interesting activities, texts, films, etc., which could become a source of inspiration for others in the future. And unexpected treasures were actually found! The team that prepared the database feeding the Florilège website discovered that apart from the actions and publications that were well known to them, there were, and sometimes far away in time, countless actions and very interesting initiatives to promote mathematics in the direction of the general public, students, young people, etc. For instance, who knew that George Sand's first lover was a great popularizer of science: the handsome Stéphane Ajasson de Gransagne (1802-1846)? Did you notice the names of the mathematicians affixed in gold letters on the Eiffel Tower?

There are two layers in the Florilège website: the underlying database which contains a large number of files concerning actions or products of the popularization of mathematics in French, books, videos, films, comics, exhibitions, blogs, games, etc. but also the actors/authors behind them, the associations organizing them, or the places where they took place. At the time of the launch of the website there were more than 1300 records in this database, and by now there must be at least one hundred more. But the richness of the database is not everything, far from it. In such a website you need an easy-to-use interface that invites and facilitates its consultation. Therefore, after the important step of the collection of information, there was a long time of reflection about how to structure all the collected data, and how to present it in a pleasant, informative and inviting way.

The data and files have been classified into four categories: READ (Lire), SEE (Voir), CHALLENGES (Défis) and SURF (Surfer). In READ one naturally finds all kinds of publications, magazines and books, but also comics, etc. In SEE we find videos, documentaries and films that talk about mathematics intending to popularise them, but also exhibitions and conferences, and all that is related to "Mathematics and Art" as well. The CHALLENGE section lists games, rallies, puzzles and contests, as well as summer schools that have to do with popularization. Finally, in SURF we find activities related to the internet, such as blogs, websites and web-TVs.

Naturally, publications (books, magazines, etc.) are the oldest way to popularize mathematics, and science in general. At the beginning of the Florilège project, it was decided to exclude the pedagogical works intended for the teaching of mathematics and to keep only the books and publications aiming to popularize mathematics in the
direction of a wider cultivated audience. Thanks to the immense knowledge of two historians of mathematics, Bernard Bru and Pierre Crépel, whose invaluable indications were decisive for the history of mathematical popularization, it appeared that the first publications of interest were related to entertainment as for instance the "Problèmes plaisants et délectables" (1612) of the mathematician and humanist Bachet de Méziriac (1581 - 1638). It was therefore necessary to go back more than a century before the publication of the Encyclopedia of Diderot and d'Alembert (1751 - 1772)!

The READ sections correspond to the "classical" activities related to the popularization of sciences in general, and mathematics in particular. But it is clear that the current evolution of communication and media favors a lot the SEE section, and that the activities appearing in the SURF section will become in the future one of the most important popularizing media. But all this would not be so interesting without three elements that complete the website of the Florilège: (1) a very good search engine; (2) a "Participation" tab that allows anyone to propose information that is missing in the website. Indeed, no one can pretend to know everything, and the Florilège team is fully aware that much must be missing. By opening the site to external proposals and contributions, we want to overcome these possible gaps or omissions. Finally, (3) another feature that adds interest to the website is a series of texts reflecting about the meaning of popularization and also of introduction to the activities related to the different sections of the website. These texts were all written by Michèle Chouchan, former producer and coordinator at France Culture radio station and author of essays on science.

Announcing new activities is not a priori one of the goals of this website, but the Florilège team decided to create two sections, "Breaking news" and "Zoom", to highlight new files that recently enriched the database and that could be of large interest. Also, every four months there will be a newsletter featuring interesting coming activities and facts of the past that could be good to know.

All colleagues interested in the popularization of mathematics, and reading French, are invited to consult and use this website. And those who will like it are also encouraged to make it known among people outside our community, teachers, students and the general public. This website is dedicated to the memory, yes, but willingly, to a living memory, so that the database continues to enrich itself continuously, and so that what is done now and in the near future remains also in the memory, in order to inspire and motivate other people in the more distant future.

Maria J. Esteban, on behalf of the Florilège team composed of Mireille Chaleyat-Maurel, Stéphane Cordier, Michel Darche and Maria J. Esteban

Maria J. Esteban

Maria J. Esteban is a senior researcher at CNRS and works at the University Paris-Dauphine. Her research area includes nonlinear partial differential equations, especially variational methods. Her term as President of ICIAM ended October 1, 2019.
Press Release. Karen Uhlenbeck: first woman to win the Abel Prize

PRESS RELEASE

The Norwegian Academy of Science and Letters has decided to award the Abel Prize in Mathematics for 2019 to Karen Keskulla Uhlenbeck of the University of Texas at Austin, USA

"for her pioneering achievements in geometric partial differential equations, gauge theory and integrable systems, and for the fundamental impact of her work on analysis, geometry and mathematical physics."

The woman behind the numbers

When Karen Keskulla Uhlenbeck held a Plenary Lecture in Kyoto, Japan in 1990, at the world's most important gathering of mathematicians - The ICM, or the International Congress of Mathematicians - she was only the second woman in history to have done so, the first being Emmy Noether in 1932.

“The recognition of Uhlenbeck’s achievements should have been far greater, for her work has led to some of the most important advances in mathematics in the last 40 years.” – Jim Al Khalili, Royal Society Fellow.

Uhlenbeck is a mathematician, but she is also a role model and a strong advocate for gender equality in science and mathematics. As a child, she loved reading and dreamed of becoming a scientist. Today, Uhlenbeck is Visiting Senior Research Scholar at Princeton University as well as Visiting Associate at the Institute for Advanced Study (IAS). She is one of the founders of the Park City Mathematics Institute (PCMI) at IAS, which aims to train young researchers and promote mutual understanding of the interests and challenges in mathematics.

Filling the analyst's toolbox

“Karen Uhlenbeck receives the Abel Prize 2019 for her fundamental work in geometric analysis and gauge theory, which has dramatically changed the mathematical landscape. Her theories have revolutionized our understanding of minimal surfaces, such as those formed by soap bubbles, and more general minimization problems in higher dimensions.” – Hans Munthe-Kaas, Chair of the Abel Committee.

Uhlenbeck developed tools and methods in global analysis, which are now in the toolbox of every geometer and analyst. Her work also lays the foundation for contemporary geometric models in mathematics and physics.
Inspired by a fellow Abel Prize laureate, the late Sir Michael Atiyah, Uhlenbeck became interested in gauge theory. Gauge theory is the mathematical language of theoretical physics, and Uhlenbeck’s fundamental work in this area is essential for the modern mathematical understanding of models in particle physics, string theory and general relativity.

About the Abel Prize

• The Abel Prize recognizes contributions to the field of mathematics that are of extraordinary depth and influence. It is presented annually in Oslo by His Majesty King Harald V, and is administered by the Norwegian Academy of Science and Letters on behalf of the Norwegian Ministry of Education and Research.

• The prize amount is NOK 6 million. The choice of laureate is based on the recommendations of the Abel Committee, which is composed of five internationally recognized mathematicians. The Abel Prize was established in 2002 on the 200th anniversary of Niels Henrik Abel’s birth, and it has been awarded to 19 laureates.

• Niels Henrik Abel (1802 – 1829) was a Norwegian mathematician. In spite of his short life, he made significant contributions to a variety of mathematical fields.

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• For more information about the laureate, her achievements and the Abel Prize, please visit www.abelprisen.no. (http://www.abelprisen.no.)