Newsletter 27

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2016

Foreword

Dear Reader,

As the new coordinator of the Editorial Team, let me present Newsletter no. 27 with a few words. This issue marks a change: from the next issue, we will be changing the newsletter's format and are planning a new webpage for it. The change of format will be a good occasion to add new sections to the newsletter, for which we have already collected a few very interesting suggestions and we hope to receive many more.

Starting with this issue the Editorial Team acquired another new member, **Mihaela Pricop-Jeckstadt** from TU Dresden; together with Mihaela we welcome to EWM **Kaie Kubjas**, from Aalto Science Institute, our new Deputy Treasurer.

The highlights of the issue are three interviews: with **Claire Voisin** who won the 2016 CNRS gold medal; with **Alessandra Celletti**, member of the EWM Scientific Committee and the new Editor-in-Chief of *Celestial Mechanics and Dynamical Astronomy,* and with **Carola-Bibiane Schönlieb**, our new Convenor, elected at the EWM General Assembly in Berlin in July (together with **Elena Resmerita** as Co-Convenor). Moreover, we publish here the report of the General Assembly, together with reports on the Women of Mathematics Exhibition and the meeting of the IMU Committee for Women in Mathematics.

Let me finish by expressing our deepest gratitude to **Susanna Terracini** and **Angela Pistoia,** for the great job they did as past Convenor and Co-Convenor and special thanks to **Anne Taormina** for creating a database of UK women mathematicians and for inviting them to join our network: the importance of the creation of national databases of women scientists has been stressed again during the General Assembly, chapeau to Anne for having made the UK one.

Anna Maria Cherubini

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INTERVIEW: Carola-Bibiane Schönlieb

Carola-Bibiane Schönlieb is a Reader in Applied and Computational Analysis at the Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge, a position she has held since 2015. She is head of the Cambridge Image Analysis group, Director of the Cantab Capital Institute for Mathematics of Information, Co-Director of the EPSRC Centre for Mathematical and Statistical Analysis of Multimodal Clinical Imaging, since 2011 a fellow of Jesus College Cambridge, and since 2016 a fellow of the Alan Turing Institute. Her current research interests focus on variational methods and partial differential equations for image analysis, image processing and inverse imaging problems. Her research has been acknowledged by scientific prizes, among them the LMS Whitehead Prize 2016, and by invitations to give plenary lectures at several renowned applied mathematics conference, among them the SIAM conference on Imaging Science in 2014, the SIAM conference on Partial Differential Equations in 2015, the IMA Conference on Challenges of Big Data in 2016 and the SIAM annual meeting in 2017.

Carola graduated from the Institute for Mathematics, University of Salzburg (Austria) in 2004. From 2004 to 2005 she held a teaching position in Salzburg. She received her PhD degree from the University of Cambridge in 2009. After one year of postdoctoral activity at the University of Göttingen (Germany), she became a Lecturer in at DAMTP in 2010, and was promoted to Reader in 2015.

EWM: You are the newly-elected convener of EWM. What made you accept this demanding position on top of all the other obligations you surely have?

The encouragement of women is a topic that has been close to my heart since I started doing research back at the University of Salzburg, Austria. Back then, Peter Hellekalek, the then head of department of mathematics in Salzburg, proposed to me to create a mentoring programme for women undergraduate students in mathematics, supporting them in their endeavours and advising them on their career plans. We called this mentoring programme m^2, emphasising that the linkage between mentor and mentee do not just add up to 2m, but that this indeed exponentiates the effect. From that time onwards I strongly believe in the strength of women's networks and the importance of role models. This is why I have accepted the election to EWM convenor, alongside my colleague Elena Resmerita.

EWM: Can you give us an idea of what you hope to achieve with EWM in the next years?

Elena and I have the luxury to be starting our work in an already very strong association that has been built by the professional work and enthusiasm of previous convenors and women mathematicians in the EWM standing committee. We have a couple of ideas though of things that we would like to achieve within the next years. Among them is a more visible showcasing of the life of women mathematicians by featuring their personal and professional success stories. This is very much motivated by our belief in the importance of visibility of positive role models for encouraging the younger generation. Taking the current work of the London Mathematical Society in creating a database of UK mathematicians as an example, we would like to build a database of women mathematicians in Europe as a resource for more targeted networking, speaker selection for conferences and workshops, hiring and prize committees. Elena and I are also very keen to establish a process by which the EWM network can be used as a mentoring framework between early career and advanced career mathematicians. Moreover, we would like to set up a formal funding call for EWM members to be able to apply for support when travelling to conferences and workshops as EWM

ambassadors. And, like all of our predecessors, we will continue the battle for acquiring funding, raising membership numbers and keeping up with organising EWM summer schools and general meetings. In all of this, we are fortunate to be supported by a very active and engaged standing committee.

EWM: Can you tell us a little about how and when you decided to pursue mathematics as a career, and what led you to your present research area?

In my life things seem to have just happened. During my undergraduate studies I was awarded a prize for outstanding achievements as a student. I have never thought of myself in this way, but there you go. This prize attracted the attention of a professor in Salzburg (you see how important prizes are!) who offered me a position in his research project on mathematical methods for the analysis of paintings. I wrote my diploma thesis with him, and I loved it. So my first experience with mathematical research was really good and I owe my thesis supervisor huge thanks for that, because this is what made me think about the possibility of doing a PhD! For my PhD project I wanted to change direction a bit. My diploma thesis was on a very applied topic and I thought I would like to pursue a purer path for my PhD. I started out with a PhD in polynomial interpolation in Salzburg which turned out not to be the right thing for me. If it wouldn't have been for the then head of the mathematics department, Peter Hellekalek, I would have probably stopped my mathematical career there. Peter encouraged me to apply for PhD places somewhere else, and this is how I met my second mentor and PhD supervisor Peter Markowich. Thanks to him I started working in the field of applied analysis, which is somehow bridging applied and pure mathematics by doing rigorous mathematical analysis on models that originate in applications. Partly due to my background in mathematics and arts, partly because Peter M had a project on the restoration of medieval frescoes at that time, I wrote my PhD thesis on partial differential equations for image restoration, a work that later turned into a book which has been published by Cambridge University Press this year. Anyway, my PhD time was extremely rich, interesting and inspiring. I worked on many different interesting problems, collaborated with excellent and creative mathematicians, did research in Austria, Argentina, California, the UK, and met so many precious and interesting people along the way. After finishing my PhD I went to the University of Göttingen to do a PostDoc. This is when I started working on inverse problems in imaging, in particular variational methods for image reconstruction in Magnetic Resonance Tomography. Coming to Cambridge one year later, I started building a mathematical group on inverse imaging problems, with whom I am now working in a broad realm of problems in image analysis, image processing and image reconstruction with various interdisciplinary links to biologists, medical physicists, forest ecologists, art historians, material scientists and chemical engineers. My research interests range from nonlinear partial differential equations to variational models, with applications in digital image analysis and processing. I study fourth-order nonlinear diffusion equations and non-smooth optimization problems, like the total variation functional, for image reconstruction and restoration, especially for what is called image inpainting, segmentation and object tracking and motion analysis in videos. Moreover, I work on computational methods for large-scale problems appearing in 3- and 4-D imaging. Within this context I am interested in both the theoretical and computational analysis of the problems considered as well as their practical implementation and their use for real-world applications like arts restoration, biomedical imaging and remote sensing.

Currently, my research focuses on customising variational image analysis models to applications by learning their setup from examples, as well as interdisciplinary work on tree segmentation in airborne imaging data in collaboration with forest ecology, cell tracking in microscopy images for cancer research, auto-contouring for image guided radiotherapy and restoration of illuminated manuscripts in collaboration with the Fitzwilliam Museum.

EWM: Sticking with your research, what are the results you like the most?

I really like the intra- and interdisciplinary aspect of my work. My research takes me through several mathematical disciplines, functional analysis, variational calculus, nonlinear PDE analysis, convex analysis and optimisation, inverse problems, and numerical analysis, and through my close collaborations with other disciplines I get to know aspects from cancer research, biology and plant sciences, as well as art conservation. This broadness in topics, the collaboration with many different kinds of people, as well as the fact that working with images is very visual - you see the effect behind your mathematical models immediately - makes my research for me extremely rich and exciting.

EWM: Apart from mathematics, what interests and hobbies do you have?

My second love in life apart from mathematics are dogs. Dogs are such wonderful creatures, genuine and true. My husband Bertram Düring (who is a mathematician too) and I have a four year old Flat Coated Retriever girl - amazing dogs really. We enjoy going running and hiking with her, she is an excellent companion and forces us to switch off from time to time.

INTERVIEW: Alessandra Celletti

Alessandra Celletti is currently head of the Departement of Mathematics at the University of Rome Tor Vergata, vice-president of the IAU Commission on Celestial Mechanics and Dynamical Astronomy, past-President of the Italian Society of Celestial Mechanics and Astrodynamics, member of the scientific committees of the Italian Mathematical Union and the National Group of Mathematical Physics.

She is internationally recognized for her works on Dynamical Systems, especially on KAM theory, and Celestial Mechanics. She was invited speaker at the 6th European Congress of Mathematics. Besides an extensive list of research publications, she is also the author of several popular books on Celestial Mechanics.

The asteroid n. 117539 (2005 DJ1) bears the name "Alessandra Celletti".

EWM: Have you always been interested in mathematics? When and how did you decide on an area in which to specialise?

One of the first memories of my life is from when I was about 5 years old and somebody asked me what I wanted to do when grown-up. My answer was that I wanted to study the sky through Mathematics. Of course I did not know that the name of what I wanted to do was "Celestial Mechanics"! Over the years I never changed my mind (I am very persistent!) and my studies were

always focused on Dynamical Systems theory and Celestial Mechanics. The only short hesitation was when - as a teenager - I was tempted to become a director of scientific short films (see below).

EWM: Can you tell us a little about your career path so far, and any particular obstacles you had to overcome?

The main obstacle has been when I was a child and teenager, since my father did not appreciate my attitude for Mathematics and would have liked me to do something else. This was the first obstacle. Luckily, my mother and my grandmother, with whom I lived and grew up, supported me under all aspects. I took a Master in Mathematics at Roma La Sapienza and I moved to ETH-Zurich where I

obtained my PhD. I was extremely honoured to have fantastic advisors, J. Moser and J. Waldvogel, who enhanced my curiosity for Celestial Mechanics. There were not many female PhD students at that time in Zurich and I was mostly alone. Soon after my PhD I got a position as Researcher in L'Aquila, the town that was almost destroyed by an earthquake in 2009. I spent wonderful years in L'Aquila from 1990 to 1999, when I moved to Roma Tor Vergata as associate professor.

During the following years, I made a lot, really a lot, of applications for full professorship positions: I collected excellent reports most of the time, but no position. More than once I have been told: "You deserve a position, but as a woman you can wait". But, you know, I am persistent and I continued until I became full professor.

EWM: You have recently been appointed Editor-in-Chief of the journal "Celestial Mechanics and Dynamical Astronomy". What do you expect from this experience?

I like to read papers, working for this journal gives me the opportunity to have a lot of information on the most recent results in the field. I just started in the new job and therefore I still need to master the mechanism: I think I will learn a lot from my colleagues. As a personal wish, I hope that more women will contribute to the journal and will join the editorial board. I already raised this issue.

EWM: You are a member of the EWM scientific committee. Can you tell us why you think it important to do this job?

In many occasions people justify the fact that they do not invite women to a conference, a committee, or an editorial board, because there are no good candidates. In the years I spent in the EWM scientific committee, I learned that there are a lot of excellent women candidates for

conferences, committees, etc. So the argument used for not including them is false. In this respect, as I proposed to the Italian Mathematical Union and as it was also mentioned within EWM, I think it would be very useful to have a regularly updated list of women mathematicians with names, seniority and expertise.

EWM: Your publication list is extensive, also including several technical and popular science books. Do you find time for hobbies outside of mathematics?

Good question. I used to have many hobbies, beside my job of course, which is the "primary" hobby. In the past I played tennis, went sailing, played classical guitar, then piano, etc. I have never been very constant in my "secondary" hobbies. At a certain point I spent a lot of time making popular science short movies: I made three videos co-produced by the Italian Space Agency, titled "The numbers of the Universe: from zero to infinity, and back". I even dubbed two of them! It was a lot of fun. Please, don't ask me if I have hobbies now... I should practice some sport, but I am very focused on my work (I am also Head of Department...).

EWM: Can you explain something of your particular favourite research problems?

I always need to work on more topics in parallel, at least one theoretical and one applied. Among the theoretical subjects, my favourite one is KAM theory, on which I have worked since my master thesis. The aspect that I like the most is that it needs to mix in a proper way analysis, dynamical systems, number theory, and even methods for computer-aided proofs. The theory concerns the persistence under small perturbations of surfaces run by quasiperiodic motions.

My favourite applied problem is why the Moon always shows the same side to the Earth. This is a problem of rotational dynamics in Celestial Mechanics: it is due to the fact that the period of revolution of the Moon around the Earth is the same as the period of rotation around itself. Such behaviour is very common in the Solar system and it is called a spin-orbit resonance. Combining KAM theory with spin-orbit resonances is definitely my favourite problem!

INTERVIEW: Claire Voisin

Claire Voisin is Professor at Collège de France (Algebraic geometry chair), and member of the Académie des sciences (Paris). In September 2016 she was awarded the CNRS Gold medal, the highest scientific award in France. She has been plenary speaker at the International Congress of Mathematicians. She has been distinguished visiting professor at IAS (Princeton, 2014-2015) and invited Senior fellow of ETH (Zurich 2017). She is foreign associate of the Accademia Nazionale dei Lincei and the National Academy of Sciences.

Voisin is recognized for her work on Hodge theory and algebraic cycles. She is known particularly for her construction of compact Kähler manifolds not homeomorphic to complex projective manifolds, for her proof of the generic Green conjecture on syzygies of canonical curves, and for her contribution to the stable Lüroth problem.

EWM: How would you explain your research to a non-specialist?

I am working on algebraic geometry. In algebraic geometry, we are given varieties in a very algebraic way, via their spaces of algebraic functions: if a variety is defined by a number of polynomial equations in affine ambient space, its space of algebraic functions is the quotient of the space of polynomial functions on the ambient space by the ideal generated by these equations. So an important part of algebraic geometry is in fact commutative algebra. On the other hand, if one works over the complex numbers, the varieties one gets can also be considered as topological spaces.One of my main interests is the topology of these spaces: the question is not only computing it, but relating it to intrinsic properties of our varieties as algebraic varieties. Consider topological invariants like cohomology: they depend only on the underlying topological space, not on the precise equations defining our variety in ambient space. There are now enhanced structures like Hodge structures on cohomology which depend usually on the complex structure and sometimes determine it. One can say that they reflect the properties of the variety as a complex variety or manifold. But in algebraic geometry there are still more intrinsic and algebraic invariants constructed via algebraic K-theory or the theory of algebraic cycles. Relating the three sets of data is what I call studying the topology of algebraic varieties. Note that I also worked very much on a sort of natural extension of algebraic geometry, namely compact Kaehler geometry, and proved that there are more topological types of compact Kähler manifolds than complex projective manifolds.

EWM: What made you choose maths as a career?

I would not say that I chose math as a career; I got interested, so I started, then I continued and it was a sort of addiction. I never really 'thought' of doing this, it's like this was simply obvious and also the easiest way.

EWM: So it just happened?

How can I say; once I started seriously doing maths, there was no alternative. I got used to it, I had to do this. Since I started, I never wanted to do something different. I would even say I find it more and more interesting over time.

EWM: Did your family encourage you?

The fact is that my family did not care so much, because I come from a very large family: I have eight sisters and three brothers. My parents were very happy if we were independent and earned money. I left my family's home when I was 17, I got a scholarship and, starting from this point, I never had to ask money from my parents. I should say that when I was a child I had some contacts with maths, especially geometry, but my parents did not care so much about our future careers; if I had been a teacher in high school they would have been happy.

EWM: The standard question now: how does it feel to receive such a prestigious prize, the CNRS medal?

It was a very big surprise. You can see the list of the previous medals, it is hard to believe that I am in the same league. But of course, it is very nice that my work gets this recognition.

EWM: Is the prize for a particular result or for your career?

I think for my whole career, but of course, I have some results which are more important than the rest of my research and more deserving of recognition, for example on the Hodge theory of projective and Kaehler manifolds, and also, in a different direction, on the syzygies of projective curves.

EWM: Do you recall any particular difficulty you faced in your work, in your career?

What is hard are the moments when you lack inspiration to formulate new ideas, new problems. Also some times it happened that I did some research which was unsuccessful. It is important to be able to stop something which does not work, not to spend too much time and energy on an idea that you drive by force. You need to change. I always found travelling very useful for this, because if you are alone you tend to stay stuck on a subject, while if you travel you get some distance and you can try something new, a new subject, your mind has a new drive, a new energy.

EWM: So far you referred to difficulties in maths. Did you have any other type of difficulties? Did you have good conditions to work all the time?

I had excellent working conditions, because I had no teaching, I could teach only when I wanted to, and in high level courses. I had a CNRS position, so I was able to work at home, no time and energy wasted in public transportation. Life was made very easy by my CNRS position; and you know the French system of child care, so I had no excuse for not working full-time.

I should mention that what made my life so very easy is that my husband is also a mathematician, so not only the every day schedule is much softer, but we understood both that we needed time for us. At the weekends, I used to work in the morning and he in the afternoon. That was nice, we both agreed that we should do things this way.

EWM: What do you love most in your job? What do you dislike most?

I like very much the moment I start a new research, I like very much the moment I have something in my mind: sometimes it is barely an idea, sometimes it's just the beginning of something. But there is this quality of the dream, and the fact that your mind works alone, you do not need to force it.

I also like to give talks; this is a bit different, but I like it very much. I have to challenge myself to discuss, because I am what in French we call 'introvertie'. There is a lot of introversion in our work, because we are contemplating something. But there is also a part of our work that is different, discussing, giving talks, attending conferences, which is also nice. Still, for me, the very nice part of my job is when I work on something new by myself.

EWM: And the bad part?

The bad part....there is some bad part, some suffering, when you are trying to do something which is difficult. There are some moments when you spend much energy, and moments in which the dynamics of research is a little lost. You don't feel you are inside of mathematics. But I am afraid this is especially bad for my family....

EWM: What kind of advice would you give to a student wanting to work in mathematics?

I don't like much giving advice; I think doing mathematics is a very personal choice and I am not sure I would like to encourage anyone doing mathematics because it is not the best way of earning money, not the best way of having an easy life. I don't think it's an easy job. I don't want to interfere, but if a person has this idea of doing maths I would suggest not being too specialised. It is not a good idea, learning only those things that you believe are interesting for your own research. Especially when you are young, you can learn a lot of things, you have memory and capacity. When you get older, you know more, but you lose part of the ability to learn new things. Young people should really try to learn a lot, not only on their thesis topics. It's very important. A career in mathematics is long, it's for forty years, if you start with a too small quantity of knowledge, it will be hard to make it substantial over a long time.

EWM: Why do you think there are so few women in certain areas of mathematics, in particular at high levels?

I don't know. In my domain, algebraic geometry, they are fewer then men, still less than in other fields. I find that my male colleagues are very pleasant, not sexist, I never had a problem with that, so it cannot be because of that. I don't see when the problem arise.

EWM: Well, for example there is a common belief that many girls leave after their PhD or even before because they get married, have children and they don't have time for research. For example in many European countries most of the women work part time, or don't work at all.

In France many women work, the child care system is excellent. It may be different in other countries but it does not concern France. But still there are a few women in

maths. It is true that there are more women in biology, for example, but maybe for maths you need more free time, a lot of room to let your mind free, a lot of freedom is necessary in research. I have been very lucky with my CNRS position.

EWM: Do you have a suggestion to change things or since you don't see the reasons, you don't think there are solutions?

In France of course, as in many countries, we hear a lot about the parity issue, the government is making laws about parity. Personally, I think that these things are dangerous. The problem is that, actually, this will not improve this specific problem of having few women wanting to work in mathematics. I think the parity action is going the wrong way. I don't think there are more women in pure maths than during the Seventies in France, after all that has been done to try improve the situation.

EWM: How do you succeed in balancing family and career and do you have time for hobbies, do you have other passions apart from maths?

I actually used to think the other way: I had five children, I was very passionate about educating them, about spending time with them and I think that family life helped me a lot. This job can be hard psychologically, with a lot of uncertainties related to research, the work sometimes goes very slowly. For me having to spend a lot of time with my children, having family duties, made me better balanced and that was in some sense very helpful.

You know, it's hard to convince yourself that you are doing something very useful, if you do pure maths. I don't ask myself a lot of these questions anymore but sometimes it is not clear if you are doing something very important. With a family, you don't have to ask yourself this question. I think I would have had much more psychological difficulty in my research if I had not had my family.

For the rest, I don't really have free time between my family, my research, some travels. Of course, I like to read literature, in my 'free time' at night but I don't have time to do something more substantial.

EWM: Can I ask you what you are reading now?

I have just read "Purity" by Jonathan Franzen, and then I am reading a very recently published book by Laurent Mauvigner, a French author, which I appreciate very much.

EWM: What do your children think of your work, are they happy you are so busy or resent you not having much for them?

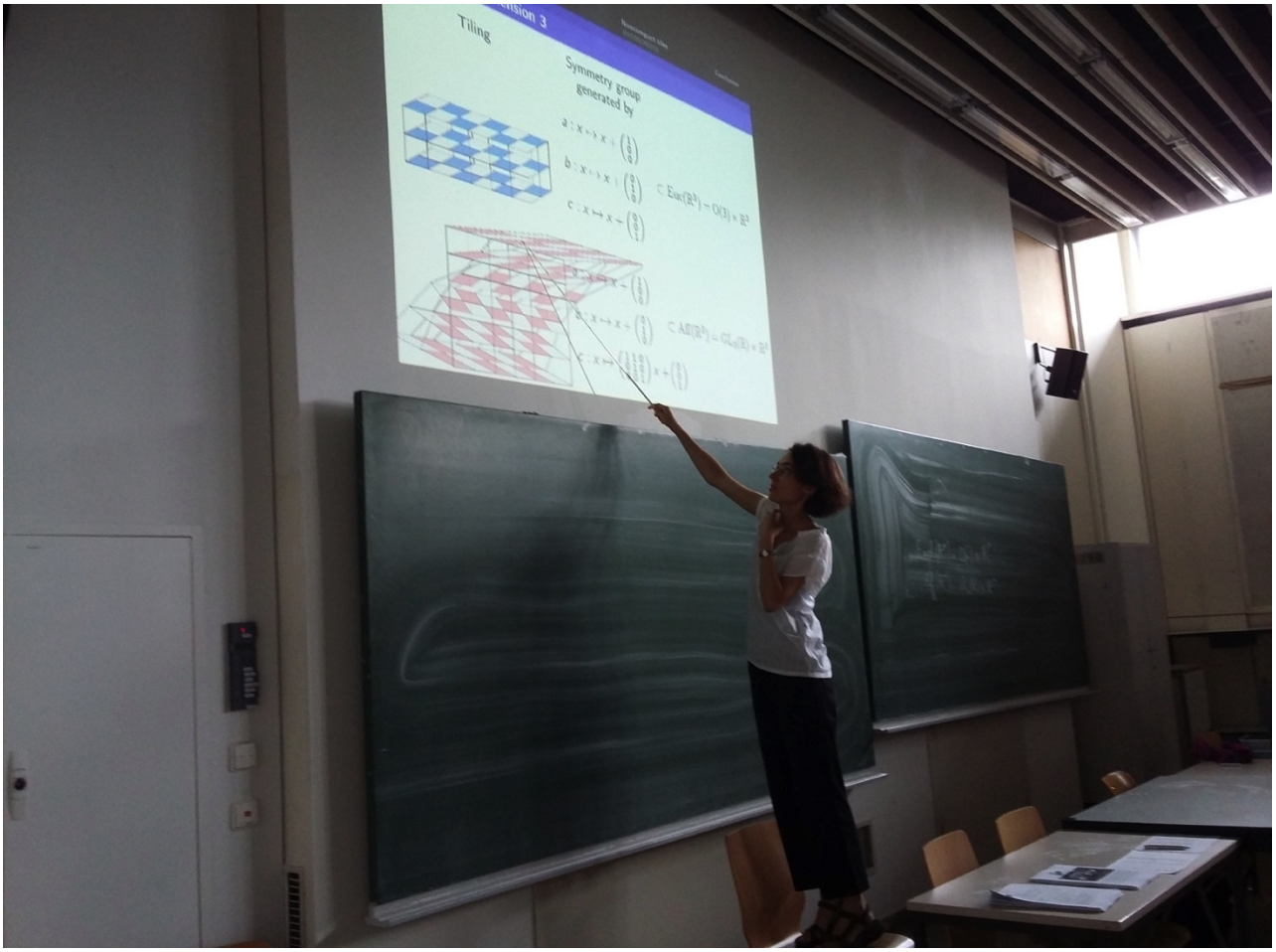
My children are grown up now, so no reason to complain anymore, but in any case I never felt my work was a problem for my children. I have always spent much time with them as children, especially on vacation. I also did research during vacations, but I have five children, they played, they had time on their own and we spent a lot of time doing things together. I never felt they were unhappy with me doing research.

Report from 18th EWM General Meeting

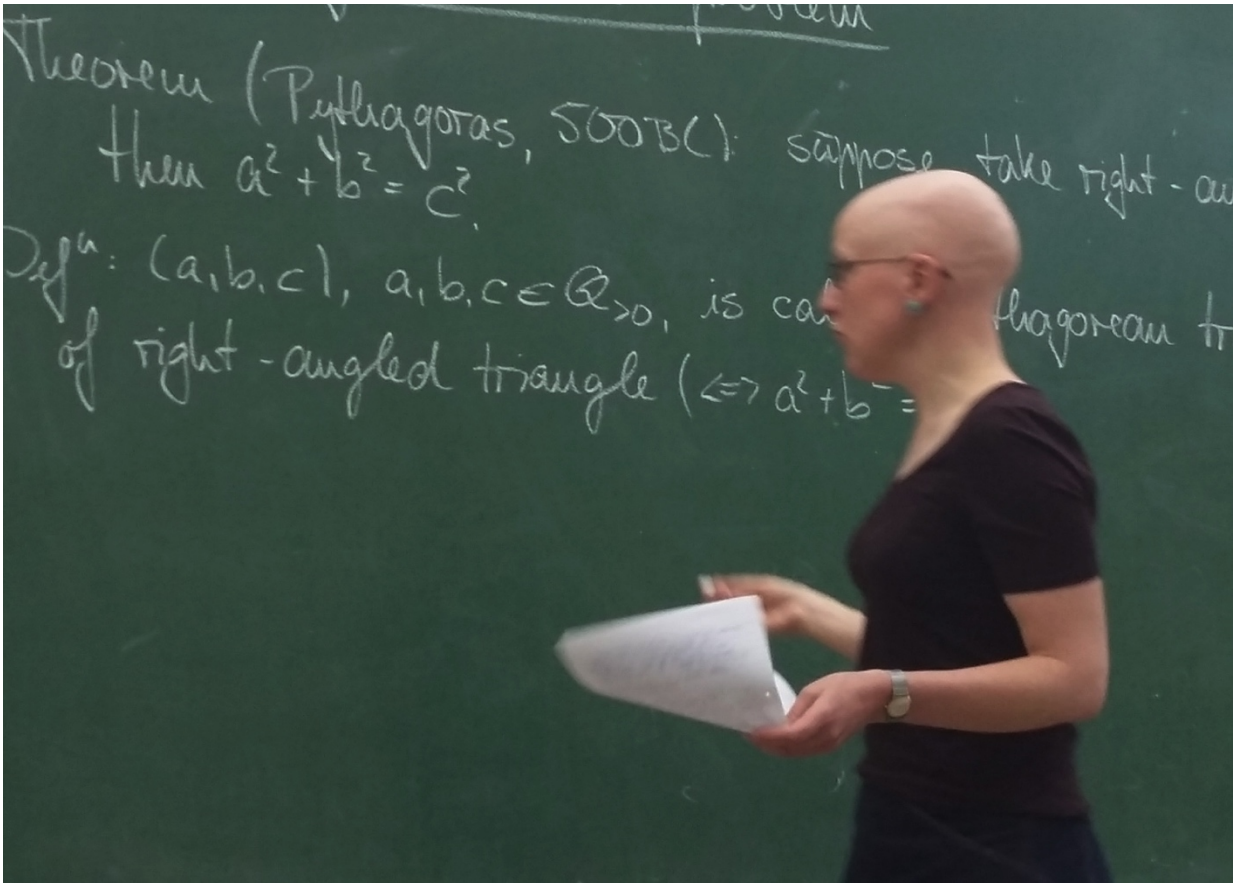
In the course of the 7th European Congress of Mathematics (ECM), which took place from the 18th to the 22nd of July 2016, the European Women in Mathematics Association (EWM) organised several events.
On Sunday, the 17th July, the programme started with survey lectures, lasting 50 min each, given by distinguished women mathematicians in a colourful mix of mathematical areas. This event aimed at celebrating and giving prominence to excellent women mathematicians in Europe. As is tradition by now, this was co-organised by EWM and the EMS as a satellite event of the ECM. The day saw wonderful lectures given by Fanny Kassel (CNRS and Université de Lille) on tessellations of the plane, Hannah Markwig (Universität des Saarlandes) on tropical geometry, Carola-Bibiane Schönlieb (University of Cambridge) on PDEs for image analysis, Britta Späth (Technische Universität Kaiserslautern) on the theory of finite groups, and Sarah Zerbes (University College London) on elliptic curves and the conjecture of Birch and Swinnerton-Dyer. Susanna Terracini, former EWM convenor, opened and chaired the whole the day, which as always she did beautifully, making everyone in the audience feel welcome and creating an atmosphere of genuine academic scholarship.
Following the survey lectures, Helena Mihaljevic-Brandt gave a very interesting presentation on the results of a project which investigated the gender differences in mathematics publications. The day ended with the EWM General Assembly, whose minutes can be found here:
http://www.europeanwomeninmaths.org/sites/default/files/documents/history_ga/ewmgajuly2016.pdf
During this meeting Susanna Terracini and Angela Pistoia stepped down as convenors of the EWM and were replaced by Carola-Bibiane Schönlieb and Elena Resmerita. The EWM would like to express their sincere and deep thanks to Susanna and Angela for leading the EWM for the the last few years, and doing it so professionally. Both will keep serving on the EWM standing committee.
The EWM/ECM programme continued with an afternoon programme of events on Wednesday, the 20th of July. As a distinguished woman mathematician herself, Alessandra Celletti (University of Roma Tor Vergata) gave a fascinating lecture on “Chaotic routes that shaped the universe: a history of some outstanding women scientists”. Her presentation was preceded by a speech by the EMS President, Pavel Exner, and was introduced by the Chair of the 7ECM Local Organizing Committee, Volker Mehrmann. Both interventions acknowledged the persisting gender gap in mathematical sciences, emphasising the need for continuing actions for improving the conditions for women in mathematical careers.
A prominent end to the EWM activities in Berlin was the opening of the exhibition ”Women of Mathematics - a gallery of portraits of women mathematicians”, displayed in the Mathematics Library of the TU Berlin. The opening included welcome addresses by Prof. Etienne Emmrich, Director of the Mathematics Institute, T.U., Prof. Christine Ahrend, Vice-president of the Berlin Technical University for Research, and Prof. Jean-Pierre Bourguignon, President of the ERC, as well as an introduction of the theme of the Exhibition by Prof. Sylvie Paycha

Beatrice Pelloni (EMS) and Carola-Bibiane Schönlieb (EWM)

Figure 1 Hannah Markwig (Universität des Saarlandes). Photo courtesy of Susanna Terracini.



Fanny Kassel (CNRS and Université de Lille). Photo courtesy of Susanna Terracini.



Sarah Zerbes (University College London). Photo courtesy of Susanna Terracini.

Britta Späth (Technische Universität Kaiserslautern). Photo courtesy of Susanna Terracini.

Carola-Bibiane Schönlieb (University of Cambrigde). Photo courtesy of Susanna Terracini.

Minutes from the 2nd IMU Committee for Women in Mathematics (CWM)

IMU Office, Berlin, Germany, Tuesday July 19th, 2016

***Present*:** Bill Barton (BB), Karen Vogtmann (KV substituting for Kristin Lauter), Shreemayee Bora (SB substituting for Sujatha Ramdorai), Sunsook Noh (SN), Marie Françoise Ouedraogo (MFO), Marie-Françoise Roy (MFR, Chair), Caroline Series (CS,Vice-Chair), John Toland (EC liaison).

***Absence with Apologies*:** Ari Laptev, Kristen Lauter, Sujatha Ramdorai, Betül Tanbay, Carolina Araujo.

a) Words of introduction

MFR welcomed the Committee and explained the absences and substitutions. Betül in particular was unable to come because of the political situation in Turkey after the coup. The participants introduced themselves.

b) A new project of Association for Women in Mathematics (AWM)

CS and KV introduced the Research Collaboration Conferences for Women (RCCW), a series of conferences in a variety of countries on different topics, sponsored by a very large grant from the NSF. This is a 5 year grant (2015-2020 called the *AWM ADVANCE GRANT: Career Advancement for Women through Research-Focused Networks.* The conferences are aimed at graduate student level upwards. The aim is not only to organize meetings but also to create networks of female mathematicians in specific subject areas. No-one at the CWM meeting had had direct experience with the program, but some had discussed with colleagues who were very enthusiastic about their experience. They seem to appreciate this new concept of subject-specific networking, and felt that this model of conference was particularly effective. Sujatha Ramdorai has expressed similar views to MFR and CS. The events are advertised as open to all but with special funding available for women. As an example the "AWM ADVANCE Workshop in Algebraic Combinatorics" was held at the JMM 2016 in Seattle, USA, see https://awmadvance.org/research-networks/

Also mentioned were the "Young Women in Mathematics" conferences organized by the Hausdorff Center for Mathematics at University of Bonn, see https://www.hcm.uni-bonn.de/events/scientific-events/ For example the "Young Women in Probability and Analysis" workshop will be held in October, 2016 in Bonn.

Other similar workshops run by MSRI in Berkeley, BIRS in Banff, IAS in New Jersey were mentioned.

These programs should be advertised on the CWM website http://www.mathunion.org/cwm/. Some enrichment of the section Organisations/By subject should be made. Initiatives could also be showcased on the home page.

c) Summary on the CWM-funded activities in 2016

CS summarized the categories of application that were received in response to our 2016 CFP call (regional networks, individual country activities, subject based activities, individual funding applications). We only funded regional and multinational network development. Networks were supported in Central Asia, Latin America, East Asia, India, North Africa, and West Africa.

We are requesting reports from the organizers of each funded program and in addition an independent evaluation by a committee member. We need also a summary of the reports for our website (possibly including links to full reports).

Here are the CWM-funded events in 2016 (more details on the CWM website):

i. Latin America (report from Carolina Araujo)

One meeting in Sao Paulo was held in March 2016, another is taking place now in Colombia (funded by our 2015 budget), and one is coming up in Mexico. All activities are aimed at launching a Latin American Women in Mathematics network at ICM 2018 in Rio. In Sao Paulo participants from Mexico and Chile were funded to attend. A further series of meetings in Brazil are being planned for 2017.

ii. North Africa:

MFO reported on the Tunisia meeting. It was held at Dauphine University of Tunis on 12th May 2016. Participants were from 6 countries: Algeria, Burkina Faso, Egypt, France, Tunisia, and Quebec. It was the first meeting of the Tunisian Women Mathematician's Association (TWMA). A Summer School is planned for the future.

iii. West Africa:

MFO reported on the Senegal meeting held in M'Bour on 7-8 July 2016 at AIMS Senegal. Participants were from 9 countries: Burkina Faso, Côte d'Ivoire, Gambia, France/Senegal, Mali, Niger, Nigeria, Senegal and South Africa. The Senegalese Women in Mathematics Association (SWMA) took part in the organization. Both scientific and organizational talks were given. Unfortunately, very few PhD students from Senegal attended the meeting.

We should encourage more graduate students to participate in these meetings.

iv. India:

SB reported on the activities of Indian Women and Mathematics (IWM): a regional mini-workshop held at IIT-Guwahati February 19-20, 2016 (note this was not funded by CWM); the annual conference held at University of Hyderabad June 29 - July 1, 2016, and the Overseas Visitor programme. Invited visitors were Isabelle Chalendar from University of Lyon in France (March 2016), Nalini Joshi from University of Sydney in Australia (June-July, 2016).

IWM website: https://sites.google.com/site/iwmmath/

v. Central Asia:

MFR reported that the regional meeting in Khazakstan will be held in September this year. The Central Asia Women in Mathematics Association (CAWMA) has been created.

vi. East Asia:

AWMF 2016 (Asian Women Mathematicians Forum 2016) will be held on 28th July 2016 in Bali, Indonesia during the AMC 2016 (Asian Mathematical Conference). The organizing chair is Kiki A. Sugeng of University of Indonesia. About 60 women mathematicians are expected to attend. A summary of the activities will be reported to the committee after the conference by SN and the Local Organizing Committee of AWMF 2016.

AWMF 2016 website: http://www.amc2016.org/home/asian-women-mathematicians-forum-2016program/

d) Report on (WM)^2 and CWM at ICM Rio 2018

(WM)^2 has been accepted as a satellite event to ICM 2018. (The ICM will take place August 1-9, 2018 in Rio de Janeiro in Brazil, http://www.icm2018.org/portal/en/)

(WM)^2 will be held on Sunday July 31st, 2018. Carolina Araujo is the main organizer as well as a local organizing member for ICM 2018.

A scientific committee for (WM)^2 has been formed by CWM with Georgia Benkart of University of Wisconsin-Madison as chair.

Various issues based on Carolina's progress report to MF and CS were discussed, mainly:

(i) parallel sessions; (ii) poster sessions; and (iii) venue (in the same place as ICM or otherwise). It was agreed to contact Carolina with our suggestions.

The local organizing committee will contact SN for the experience of ICWM 2014 that was held in Seoul.

In addition to (WM)^2, CWM will propose organizing a session inside ICM Rio, including a panel discussion and a party. Formally, this session is totally independent of (WM)^2 but of course activities will be coordinated.

e) Work on gender gap in mathematics and cooperation with other scientists

The International Union of Pure and Applied Physics has asked whether we would like to collaborate with them on a joint proposal to International Council for Science (ICSU) in response to their recent call for large scale collaborative projects between several scientific unions. The proposal would be to redo and broaden the IUPAP's previous Global Survey of Physicists in a Joint Global Survey of Mathematical and Natural Sciences with participating bodies IMU, International Union of Pure and Applied Chemistry and IUPAP.

To understand the nature of the survey proposed, we considered a presentation by Rachel Ivie in American Institute of Physics on the previous Global Survey which was based on answers to a questionnaire.

We also discussed a presentation by Helena Mihaljević-Brandt, Lucía Santamaría, and Marco Tullney of research on publication patterns: *A data-backed study on gender differences in mathematics publication patterns*. This appeared to be an example of the kind of statistical, objective research that is useful and it may also be useful to show to young women mathematicians.

A suggestion was made that a statistical investigation similar to the publication pattern research be added to the proposal, to be done in conjunction with other scientists. To further align with the ICSU call, we could suggest that the proposal includes public engagement program such as science education outreach to girls, by constituting a list of good practices.

This seems to be a good initiative worth trying. We need to investigate the level of commitment involved, following the guidelines and priorities mentioned in the ICSU call. MFR and BB will pursue this proposal.

f) CWM Website http://www.mathunion.org/cwm/ and email contacts list

CS is doing her best to keep the website up to date. At present owing to the IMU's system (Typo 3) it is very difficult to edit; however the whole IMU website is in the process of being completely redesigned and hopefully this will make easier and more interactive use possible.

Committee members should please send any relevant information for the website to CS she cannot be expected to find all the relevant events, organization, resources etc on her own.

SN will help CS with updating information on the CWM news blog and the IMU Facebook page.

Email network list:

A list of about 120 CWM Ambassadors round the world has been compiled. Their role will be to further disseminate information in their region, and to keep CWM informed of activities etc. Further names in missing countries are welcomed, but we are not aiming to compile a huge list of all possible female mathematicians in the world. See the list posted on CWM website.

g) Activities to be funded by CWM in 2017

After a discussion about future projects, it was decided to make a CWM 2017 call with two items:

One first item will be for networks of women in mathematics as before. This could be either launching new networks or reinforcing the networks that we already support in new countries (or parts of subcontinents). It may involve some of the same people as before, but we should try to attract significant number of new people. Grants up to €3000 will be available.

The second item will for partners to organize a Summer/Winter school with all women speakers and advertised mainly for women participants (although participants of both genders are welcome to attend). We will contribute up to €3000, towards speakers' costs or women participants.

A total of 8 networks or schools could be supported.

We also propose CWM supplementary grants, to support women already funded to go to a conference or meeting, but who need extra funds to make it possible (for example, for child care, separate accommodation, or more appropriate travel). Maximum grant €500, total of €5000 available. It was agreed that we should set up a subcommittee to make decisions about who to fund. This call could be on an ongoing basis and advertised on the CWM website.

Since IMU is willing to provide us with more funds we can implement all these calls. See the calls posted on CWM website.

We can also spend some money on advertising by designing a poster, a flyer, also offering some support for people who would like to print them for dissemination.

h) Other

Contact with IOWME (International Organization of Women and Mathematics Education)

SN and BB will try to contact IOWME at ICME-13 and report back on discussions on gender next week. IOWME is one of the ICMI affiliate organizations. (So far they did not answer emails.)

Contact with OWSD:

Organization for Women in Science in the Developing World (http://www.owsd.net) This organization is based in ICTP, Trieste. MFR and CS are in contact with the executive director Tonya Blowers and we are exploring possible future collaborations. CWM members are encouraged to look at their website.

ICTP Summer Project: (International Center for Theoretical Physics) The possibility of a summer school on dynamical systems in 2018 was discussed. Given all we have to do in 2018 already, it was decided not to pursue this as a joint CWM-ICTP project, but in case ICTP approves a summer school let by women it will be a good thing.

ERCOM

European Research Centres of Mathematics, http://www.ercom.org/. Ari Laptev is Chair of ERCOM, a committee of the EMS. MFR attended their annual meeting in St Petersburg, and raised women and mathematics issues. The topic received a favourable reception. As a result, each Centre will report on women's issues at the next meeting. We will remind them of this commitment in January.

i) Composition of CWM after ICM Rio

The issue was raised. The idea would be to keep about one half of the current members for a new four years period and to replace the others.

Marie-Françoise Roy & Caroline Series

Opening of the exhibition "Women of mathematics throughout Europe"

Exhibition: Women of Mathematics Throughout Europe. A Gallery of Portraits.

Opened at the Technical University of Berlin, 20 July 2016

Exhibition opening, Mathematics Library, Technical University of Berlin, 20th of July 2016. Copyright: Nikolaus Buettner.

“Entering the field of mathematics can be tough, and women often encounter specific obstacles. The exhibition offers a glimpse into the world of mathematics through photographs by Noel Tovia Matoff and excerpts of interviews by Sylvie Paycha and Sara Azzali of thirteen women mathematicians throughout Europe.” [http://womeninmath.net]

The exhibition was opened on the 20th of July 2016, in the Mathematics Library of the Technical University of Berlin, in the course of the 7th ECM congress, and since then has been travelling throughout Europe. It features portraits of thirteen women mathematicians, in photographs and interviews, originating and working in different European countries. The mathematicians interviewed are:

NALINI ANANTHARAMAN

KARIN BAUR

STEFKA BOUYUKLIEVA

ALICE FIALOWSKI

FRANCES KIRWAN

IRINA KMIT

KAISA MATOMÄKI

MARGARIDA MENDES LOPES

BARBARA NELLI

DUŠANKA PERIŠIĆ

KASIA REJZNER

KATRIN WENDLAND

OKSANA YAKIMOVA

Excerpts from their interviews have been published in the EWM portraits section.

For more details about the exhibition and the complete interviews please order the catalogue “Women of Mathematics throughout Europe. A gallery of portraits” from the publishing house VERLAG AM FLUSS, info@verlag-am-fluss.de

If you are interested in hosting this exhibition at your institution please contact info@womeninmath.net

Prizes, awards and appointments

Congratulations to our Convenor **Carola-Bibiane Schönlieb**, Reader at the University of Cambridge, who has been awarded one of the London Mathematical Society's 2016 Whitehead prizes for " her spectacular contributions to the mathematics of image analysis''. For a short video interview with Carola see: http://wild.maths.org/five-minutes-withcarola-bibiane-schönlieb

Colette Guillopé, Professor at Université Paris-Est, was nominated Officer of the French Legion of Honour (she was already a Knight). Colette is the EWM coordinator for France and the gender officer (chargée de mission Parité) of University Paris-Est Créteil. She has been president of the French associations Femmes & Sciences (2004-2008) and femmes et mathématiques (1996-1998).

Alessandra Celletti, Professor at Roma Tor Vergata, is the new Editor-in-Chief of the Springer journal "Celestial Mechanics and Dynamical Astronomy". This is a great achievement and a recognition of Alessandra's internationally renowned work on dynamical systems and celestial mechanics. Further, she has been appointed chair of the EMS Committee "Women in Mathematics" (WIM), from January 2017 to December 2020.

Claire Voisin, Professor at Collège de France, has been awarded the 2016 CNRS Gold Medal, France's highest scientific distinction. https://news.cnrs.fr/articles/claire-voisin-2016-cnrs-gold-medal
Out of 54 CNRS Gold Medals since the first one in 1954 (there were two men ex aequo in 1982), 50 were given to men. The 3 other women are Margaret Buckingham (Developmental Biology, 2013), Nicole le Douarin (Embryology, 1986) and Christiane Desroches-Noblecourt (Egyptology, 1975). The mathematicians are Emile Borel (1954), Jacques Hadamard (1956), Jean-Pierre Serre (1986 - Fields medalist in 1956), Alain Connes (2004, Fields medalist in1982).

Isabelle Gallagher, Université Paris-Diderot , won the silver medal from CNRS (for research): see here and read an interview here

Francesca Leinardi, Université Grenoble Alpes, won the cristal medal from CNRS (for mathematical engineering research) : see here

Christl Donnelly, Professor at Imperial College London, **Jane Hutton**, Professor at the University of Warwick, **Frances Kirwan,** Professor at the University of Oxford, **Sylvia Richardson**, Professor at the Medical Research Council, Biostatistics Unit, and **Gwyneth Stallard**, Professor at the Open University, were awarded by the CSC to celebrate their scientific achievements and ability to inspire others. http://csc.mrc.ac.uk/celebrating-women-science-ada-lovelace-day-2016/

The Prize Federigo Enriques has been awarded to **Giulia Saccà**, (Degree in Math at the University of Rome "Sapienza", Ph.D. at Princeton, advisor Gang Tian, currently post-doc at Stoney Brook in US), on September 7, 2015 at the Congress of the Italian Mathematical Society in Siena, for her Ph.D. Thesis " Fibrations in abelian varieties associated to Enriques surfaces".
Carla Cederbaum received the 2016 the Manfred Fuchs Award for junior researchers in all fields awarded by the Heidelberg Academy of Sciences and Humanities "for her research in differential geometry and mathematical relativity".

The Prize Mario Baldassarri has been awarded to **Margherita Lelli Chiesa**, Ph.D. at Humboldt Universitat Zu Berlin, advisor Gavril Farkas, for the article "Generalized Lazarsfeld-Mukai bundles and a conjecture of Donagi and Morrison" published in the Advances in Mathematics in 2015, at the Congress of the Italian Mathematical Society in Siena on September 2015.
The Prize Michele Cuozzo has been awarded to **Maria Colombo**, Ph.D. at la Scuola Normale Superiore of Pisa, advisor Luigi Ambrosio, on December 18, 2015, at the Department of Mathematics of the University of Rome "Tor Vergata", as best italian Ph.D. student of 2015. Her Ph.D. Thesis was " Flows of non-smooth vector fields and degenerate elliptic equations".

Sara Zahedi, Assistant Professor at the Royal Institute of Technology (KTH), Sweden, won a EMS Prize 2016 "For her outstanding research regarding the development and analysis of numerical algorithms for partial differential equations with a focus on applications to problems with dynamically changing geometry."

María Gaspar Alonso-Vega (Universidad Complutense de Madrid) y María Teresa Lozano Imízcoz (Universidad de Zaragoza) have received a medal from the Real Sociedad Matemática Española in recognition of their career (www.rsme.es/content/view/2032/139/) in the 2016 edition. Marta Macho Stadler received this medal in the 2015 edition.

Peregrina Quintela, Universidad de Santiago de Compostela, has received the "María Josefa Wonenburger Planells" prize, which is given to a woman in recognition of an outstanding career in science and technology.

Irene Arias, Universitat Politècnica de Catalunya, was awarded an ERC starting grant in 2015.

Gitta Kutyniok, Einstein-Professorin at Technische Universität Berlin, was elected as a member of the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW).

Idun Reiten, Professor Emerita at the Norwegian University of Science and Technology (NTNU) in Trondheim, has been nominated honorary member of the London Mathematical Society.

Upcoming events

Workshop "Young Women in Geometry" in Bonn, Max Planck Institut für Mathematik, 3rd to 5th April 2017

This meeting is part of the series of workshops Young Women in... The main lectures will be given by Anna Wienhard, Esther Cabezas-Rivas and Julie Rowlett

The workshop provides a platform for female graduate students and postdocs in Geometry to present their research. The main lectures will be complemented by participants' talks and a poster exhibition.Everybody is welcome to attend the workshop. We encourage all participants -male and female - to contribute a poster to our poster sessions and to apply for a contributed talk.

Organizers: Asma Hassannezhad, Anna Siffert

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Workshop "Women at the Intersection of Mathematics and High Energy Physics", to be held at the Mainz Institute for Theoretical Physics,March 6-10 2017, see

Women at the Intersection of Mathematics and High Energy Physics (06-10 March 2017)

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There will be a workshop for women in Data Science at ICERM: https://icerm.brown.edu/topical_workshops/tw17-3-wisdm/

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There will be a round table on "Women in Mathematics" on Thursday 2nd, February 2017, at the Congress of the the Real Sociedad Matemática Española, organized by the Committee "Mujeres y Matemáticas" in Spain.

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IMACS2016 - 20th IMACS WORLD CONGRESS

Conference Hall of Xiamen International Seaside Hotel
December 10, 2016 – December 14, 2016
IMACS 2016 World Congress is the 20th event in the Series of Interdisciplinary international Conferences organized by the International Association for Mathematics and Computer in Simulation.
Please refer to the Congress website: http://imacs2016.xmu.edu.cn
and the Society's website: http://www.imacs-online.eu
for general informations.

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Round table on "Women in Mathematics" on Thursday 2nd, February 2017, at the Congress of the the Real Sociedad Matemática Española, organized by the Committee "Mujeres y Matemáticas" in Spain.

News

The IMU's Committee for Women in Mathematics (http://www.mathunion.org/cwm/) invites proposals for funding of up to €3000 for activities or initiatives taking place in 2017, aimed at either:

a) Establishing or supporting networks for women in mathematics, preferably at the continental or regional level, and with priority given to networks in developing or emerging countries. Help could include, for example, funding meetings, travel for individuals for consultation purposes, or advice and support in creating websites. Please note that CWM will not normally fund activities taking place in the same or nearby location as one it has already funded in 2015 or 2016.

b) Organizing a mathematical school open to all with all women speakers and mainly women organisers.This type of mathematical school, which should include a significant proportion of time devoted to background and introductory material, can be a very effective way of showcasing the contributions of women mathematicians and creating an opportunity for female students to be in touch with women leaders, without excluding male students. Expenses covered by CWM could include, for example, costs for speakers, women organisers, or for women participants.

c) Other ideas for researching and/or addressing issues encountered by women in mathematics may also be considered.

Proposers should write a short account (no more than two pages) explaining the nature of their activity and how it fulfills one of the above aims, as well as indications on how the CWM money would be spent and other funding which may be available. There will be only one call for applications regarding activities in 2017 with deadline 15 December, 2016.

Applications should be sent to info-for-cwm@mathunion.org

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The Committee "Mujeres y Matemáticas" of the Real Sociedad Matemática Española launched a facebook group in March 8th, which has had great success: it has now more than 260 members:

https://www.facebook.com/groups/1000537593374592/

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The newsletter of the Real Sociedad Matemática Española has lauched a new weekly section on Women and Mathematics. The "Comisión Mujeres y Matemáticas" is responsible for its contents.

USEFUL LINKS AND CONTACTS

EWM website:	http://www.europeanwomeninmaths.org/	
EWM convenor:	Carola-Bibiane Schönlieb	cbs31(at)cam.ac.uk
EWM deputy convenor:	Elena Resmerita	elena.resmerita(at)aau.at
EWM email list:	Katrin Leschke	k.leschke(at)le.ac.uk

Other organisations with similar aims to the EWM:

The European Mathematical Society (EMS): http://www.euro-math-soc.eu/

EMS Women in Mathematics Committee: http://www.euro-math-soc.eu/comm-women.html

France: Femmes et mathématiques: http://www.femmes-et-maths.fr/

UK: LMS Women in Mathematics Committee: http://www.lms.ac.uk/activities/women_maths_com/

Job announcements:

http://www.math-jobs.com

http://www.jobs.ac.uk/

http://www.euro-math-soc.eu/jobs.html

Membership: The membership fee can be paid by credit card or Paypal via the EWM website, or by direct transfer to the EWM bank account. For more details, see

http://europeanwomeninmaths.org/about-us/membership